

Executive Council

Sixty-sixth session

Geneva

18–27 June 2014

Abridged final report with resolutions



**World
Meteorological
Organization**

Weather · Climate · Water

WMO-No. 1136



**World
Meteorological
Organization**

Weather • Climate • Water

WMO-No. 1136

Executive Council

Sixty-sixth session

Geneva

18–27 June 2014

Abridged final report with resolutions

WMO-No. 1136

© World Meteorological Organization, 2014

The right of publication in print, electronic and any other form and in any language is reserved by WMO. Short extracts from WMO publications may be reproduced without authorization, provided that the complete source is clearly indicated. Editorial correspondence and requests to publish, reproduce or translate this publication in part or in whole should be addressed to:

Chairperson, Publications Board
World Meteorological Organization (WMO)
7 bis, avenue de la Paix
P.O. Box 2300
CH-1211 Geneva 2, Switzerland

Tel.: +41 (0) 22 730 84 03
Fax: +41 (0) 22 730 80 40
E-mail: publications@wmo.int

ISBN 978-92-63-11136-4

NOTE

The designations employed in WMO publications and the presentation of material in this publication do not imply the expression of any opinion whatsoever on the part of WMO concerning the legal status of any country, territory, city or area, or of its authorities, or concerning the delimitation of its frontiers or boundaries.

The mention of specific companies or products does not imply that they are endorsed or recommended by WMO in preference to others of a similar nature which are not mentioned or advertised.

This report contains the text as adopted by Plenary and has been issued without formal editing. Acronyms used in this report may be found in METEOTERM, the WMO terminology database, at http://www.wmo.int/pages/prog/lsp/meteoterm_wmo_en.html. Acronyms may also be found at http://www.wmo.int/pages/themes/acronyms/index_en.html.

CONTENTS

Page

GENERAL SUMMARY OF THE WORK OF THE SESSION

1. ORGANIZATION OF THE SESSION (EC-66/Doc. 1)	1
1.1 Opening of the session	1
1.2 Approval of the agenda (EC-66/Doc. 1.2, REV. 1).....	1
1.3 Establishment of committees	2
1.4 Programme of work of the session	3
1.5 Approval of the minutes	3
2. REPORTS	3
2.1 Report by the President of the Organization (EC-66/Doc. 2.1).....	3
2.2 Report by the Secretary-General (EC-66/Doc. 2.2).....	7
2.3 Report of the Financial Advisory Committee (EC-66/Doc. 2.3, REV. 1; EC-66/Doc. 2.3(2))	11
2.4 Report of the 2014 Meeting of Presidents of Regional Associations and reports by the presidents of regional associations (EC-66/Doc. 2.4)	11
2.5 Report on the 2014 Meeting of Presidents of Technical Commissions and reports of presidents of technical commissions (EC-66/Doc. 2.5)	20
2.6 Report of the Executive Council Panel of Experts on Polar Observations, Research and Services (EC-66/Doc. 2.6).....	23
3. GLOBAL FRAMEWORK FOR CLIMATE SERVICES	26
3.1 Outcomes of the first session of the Intergovernmental Board on Climate Services (EC-66/Doc. 3.1)	26
3.2 WMO contribution to the Global Framework on Climate Services (EC-66/Doc. 3.2(1); EC-66/Doc. 3.2(2))	28
4. IMPLEMENTATION OF THE WMO STRATEGIC PLAN 2012–2015	30
4.1 Service Delivery (EC-66/Doc. 4.1(1); EC-66/Doc. 4.1(2); EC-66/Doc. 4.1(3); EC-66/Doc. 4.1(4), REV. 1; EC-66/Doc. 4.1(5); EC-66/Doc. 4.1(6), REV. 1; EC-66/Doc. 4.1(7))	30
4.2 Disaster risk reduction (EC-66/Doc. 4.2)	47
4.3 Data-processing and forecasting: weather, climate and water (EC-66/Doc. 4.3(1); EC-66/Doc. 4.3(2); EC-66/Doc. 4.3(3))	49
4.4 WMO Integrated Global Observing System and WMO Information System (EC-66/Doc. 4.4(1); EC-66/Doc. 4.4(2); EC-66/Doc. 4.4(3); EC-66/Doc. 4.4(4); EC-66/Doc. 4.4(5); EC-66/Doc. 4.4(6))	61
4.5 Research (EC-66/Doc. 4.5(1); EC-66/Doc. 4.5(2); EC-66/Doc. 4.5(3); EC-66/Doc. 4.5(4)).....	77
4.6 Capacity development (EC-66/Doc. 4.6(1); EC-66/Doc. 4.6(2); EC-66/Doc. 4.6(3))	86
4.7 Partnerships (EC-66/Doc. 4.7(1); EC-66/Doc. 4.7(2); EC-66/Doc. 4.7(2), ADD. 1)	94
4.8 An effective and efficient Organization (EC-66/Doc. 4.8.1(1); EC-66/Doc. 4.8.1(4); EC-66/Doc. 4.8.2, REV. 1; EC-66/Doc. 4.8.3; EC-66/Doc. 4.8.5(1); EC-66/Doc. 4.8.5(2); EC-66/Doc. 4.8.6; EC-66/Doc. 4.8.7)	101

5.	RESOURCE MANAGEMENT	105
5.1	Financial matters (EC-66/Doc. 5.1(1); EC-66/Doc. 5.1(2); EC-66/Doc. 5.1(3); EC-66/Doc. 5.1(4))	105
5.2	Internal Secretariat matters (EC-66/Doc. 5.2(1); EC-66/Doc. 5.2(2); EC-66/Doc. 5.2(3); EC-66/Doc. 5.2(4); EC-66/Doc. 5.2(5))	107
6.	COMMUNICATIONS AND PUBLIC AFFAIRS (EC-66/Doc. 6).....	109
7.	GENERAL AND LEGAL MATTERS	109
7.1	Fifty-ninth International Meteorological Organization Prize (EC-66/Doc. 7.1)	109
7.2	Other awards (EC-66/Doc. 7.2)	109
7.3	Constitutional and regulatory matters (EC-66/Doc. 7.3(1); EC-66/Doc. 7.3(2); EC-66/Doc. 7.3(4); EC-66/Doc. 7.3(5), REV. 1)	110
7.4	Designation of acting member(s) of the Executive Council (EC-66/Doc. 7.4)	112
7.5	Preparations for Seventeenth Congress (EC-66/Doc. 7.5, REV. 1).....	112
7.6	Review of panels and other bodies of the Executive Council (EC-66/Doc. 7.6(1); EC-66/Doc. 7.6(2))	113
7.7	WMO Technical Regulations – culture of compliance (EC-66/Doc. 7.7)	114
8.	EMERGING ISSUES	115
8.1	Global Air Navigation Plan (EC-66/Doc. 8.1)	115
8.2	WMO and its position on geoengineering (EC-66/Doc. 8.2).....	117
9.	SCIENTIFIC LECTURES AND DISCUSSIONS (EC-66/Doc. 9).....	118
10.	REVIEW OF PREVIOUS RESOLUTIONS OF THE EXECUTIVE COUNCIL (EC-66/Doc. 10).....	118
11.	DATE AND PLACE OF THE SIXTY-SEVENTH AND SIXTY-EIGHTH SESSIONS OF THE EXECUTIVE COUNCIL (EC-66/Doc. 11)	118
12.	CLOSURE OF THE SESSION (EC-66/Doc. 12)	118

RESOLUTIONS ADOPTED BY THE SESSION

<i>Final No.</i>	<i>Session No.</i>		<i>Page</i>
1	2.3/1	Message to the International Civil Service Commission and the General Assembly of the United Nations	119
2	2.4/1	Regular Meetings of Presidents of Regional Associations.....	119
3	2.4/2	Coordination between regional associations and technical commissions	121
4	3.1/1	Outcomes of the first session of the Intergovernmental Board on Climate Services	122
5	4.1(1)/1	Implementation of the WMO Strategy for Service Delivery.....	123
6	4.1/3	Amendment to the <i>Technical Regulations</i> (WMO-No. 49), Volume II – Meteorological Service for International Air Navigation, and related guidance material.....	125
7	4.1/1	Report of the sixteenth session of the Commission for Agricultural Meteorology	125
8	4.2/1	WMO disaster risk reduction roadmap.....	127
9	4.4(4)	Review of the Global Climate Observing System Programme.....	128
10	4.4/5	Schedule of Consultative Meetings on High-level Policy on Satellite Matters	129
11	4.5(2)/1	Post-THORPEX activities.....	130
12	4.5(2)/2	High-impact Weather Project	131
13	4.5(4)/1	Sand and Dust Storm Warning Advisory and Assessment System.....	131
14	4.6(1)/1	Guidance for the Education and Training Programme for 2016–2019...	132
15	4.6(1)/2	Executive Council criteria for the recognition and reconfirmation of WMO Regional Training Centres	133
16	4.6(1)/3	Feasibility study for establishing a WMO Global Campus	138
17	4.6(1)/4	Terms of reference of the Executive Council Panel of Experts on Education and Training	140
18	4.6(1)/5	Status of Bet-Dagan, Israel as a WMO Regional Training Centre	142
19	4.6(1)/6	Status of the Institute of Biometeorology, National Research Council, Florence, Italy as a WMO Regional Training Centre.....	143
20	4.6(1)/7	Executive Council criteria for the award of WMO Fellowships.....	143
21	4.6(3)/1	Country profile database initial operating capability.....	145
22	4.8.3/1	Implementation of risk management.....	146
23	5.1/1	Financial statements of the World Meteorological Organization for the year 2013.....	149
24	5.1/2	Proposed revision to Resolution 31 (Cg-XIII) – Short-term borrowing authority.....	150
25	10/1	Review of previous resolutions of the Executive Council.....	150

ANNEXES

I	Proposed resolutions for consideration by the Seventeenth World Meteorological Congress (paragraph 2.6.16 of the general summary).....	153
II	Value proposition for the international exchange of climate data and products to support the implementation of the Global Framework for Climate Services (paragraph 3.2.4 of the general summary).....	169
III	Proposed resolution for consideration by the Seventeenth World Meteorological Congress (paragraph 3.2.5 of the general summary).....	171
IV	Proposal on the draft terms of reference for a possible future Executive Council Working Group on Climate and Related Matters (paragraph 3.2.8 of the general summary).....	176
V	WMO Integrated Global Observing System Framework Implementation Plan (paragraph 4.4.6 of the general summary).....	176
VI	Space weather services (paragraph 4.4.91 of the general summary)	204
VII	List of WMO Regional Training Centres and their status (paragraph 4.6.22 of the general summary).....	207
VIII	WMO compendium mapping (paragraph 4.6.29 of the general summary).....	209
IX	Voluntary Cooperation Programme Trust Fund 2014 (paragraph 4.6.38 of the general summary).....	211
X	Staff appointments, promotions, nominations and transfers in the professional category and above since the sixty-fifth session of the Executive Council (paragraphs 5.2.5.1, 5.2.5.2 and 5.2.5.3 of the general summary).....	212
XI	Amendments to the WMO General Regulations of the World Meteorological Organization (paragraphs 7.3.12 and 7.3.14 of the general summary)	216
XII	Provisional annotate agenda for the Seventeenth World Meteorological Congress (paragraph 7.5.2 of the general summary)	217
XIII	List of international organizations to be invited to the Seventeenth World Meteorological Congress (paragraph 7.5.3 of the general summary).....	221
XIV	Process and timeliness for the selection and appointment of the Audit Committee (paragraph 7.6.3 of the general summary).....	225
XV	Executive Council position taken at its sixty-sixth session on issues related to the Conjoint ICAO/WMO Meteorology Divisional Meeting (paragraph 8.1.16 of the general summary).....	225
	APPENDIX. List of participants	228

GENERAL SUMMARY OF THE WORK OF THE SESSION

1. ORGANIZATION OF THE SESSION (agenda item 1)

1.1 Opening of the session (agenda item 1.1)

1.1.1 The President opened the sixty-sixth session of the WMO Executive Council at 9:30 a.m. on Wednesday, 18 June 2014. He welcomed members of the Executive Council and in particular the newly elected members, Mr Teshome (Ethiopia) who replaces Mr Mukabana (Kenya), Mr Konate (Côte d'Ivoire) to replace Mr Traore (Niger), Mr Nishide (Japan) to replace Mr Hatori (Japan), Mr Ko (Republic of Korea) to replace Mr Lee (Republic of Korea), Mr Lopez Gonzalez (Spain) to replace Mr Cano (Spain) and Mr Lacave (France) to replace Mr Jacq (France), as well as Mr Andi Sakya, Permanent Representative of Indonesia, replacing Mrs Sri W.B. Harijono as president of Regional Association V. A list of participants is given in the [appendix to the present report](#).

1.1.2 The President highlighted a number of global developmental issues and extreme weather- and climate-related events that should frame the deliberations of the session and put into context the role of the Organization to address a number of relevant scientific, technical and socio-economic challenges. He further provided an overview of the advances made by the Organization in 2013–2014, highlighting in particular the significant progress made towards the preparation of the Strategic Plan 2016–2019 and the accompanying integrated Operating Plan that reflect regional needs and the contributions of the constituent bodies of the Organization. He reviewed progress in programme areas such as the WMO Integrated Global Observation System (WIGOS)/WMO Information System (WIS), polar activities, the implementation of the Capacity Development Strategy, disaster risk reduction and service delivery, and aviation meteorological services. He underlined the important progress made with the implementation of the Global Framework for Climate Services (GFCS), the need to ensure close alignment of WMO's climate-related activities with the various components of the GFCS, the role of the Partnership Advisory Committee (PAC) of the Intergovernmental Board for Climate Services (IBCS) and referred to its Management Committee meeting (Geneva, 15 and 17 June 2014). Finally, he underscored a number of considerations to be made by the Council in preparation for Congress in relation to governance refinements, regulations and structures towards the continued effectiveness and efficiency of the Organization.

1.1.3 The Secretary-General welcomed the Council to Geneva and in particular the newly elected members, emphasizing the special character of the Council, where members act in their personal capacity. He recalled the numerous extreme weather and climate events that have affected many regions of the world since the last session and remarked that human influence on the climate system is undisputed and makes reduction of greenhouse gas emissions compelling. He noted the increasing recognition of the leading scientific and technical role of WMO by the United Nations system and other organizations and the expectations on the contribution of the Organization to major international processes such as the formulation of the post-2015 Development Agenda and Sustainable Development Goals, the new climate agreement that is expected to substitute the Kyoto Protocol, the post-Hyogo Framework on Disaster Risk Reduction and the reinvigoration of a global partnership for Small Island Developing States. In this regard he underlined the importance to be guided by the Council in the preparation of the budget proposal for the next financial period to be submitted to Congress, highlighting its link with the Strategic Plan 2016–2019 and the need to provide the Organization with sufficient means to discharge its mandate, including the implementation of the Global Framework for Climate Services (GFCS) and other the priorities indicated by Members.

1.2 Approval of the agenda (agenda item 1.2)

The Council approved the provisional annotated agenda, as contained in EC-66/Doc 1.2, REV. 1, on the understanding that amendments may be introduced in the course of the session in accordance with the provisions of Regulation 160 of the General Regulations.

1.3 Establishment of committees (agenda item 1.3)

Plenary meetings

1.3.1 The Council agreed to conduct the entire session in plenary meetings. Confidential issues would be discussed in camera. Therefore Council members, or their alternates, were required to attend every plenary and camera meeting so that decisions could therefore to be adopted at any time during the session.

1.3.2 The President decided to chair a number of general items. For other items, the President delegated chairpersonship to the Vice-Presidents according to the issues they are leading in the Council's work:

- (a) The First Vice-President would chair items related to WIS/WIGOS and capacity development;
- (b) The Second Vice-President would chair items on service delivery, DRR, partnerships and communications;
- (c) The Third Vice-President would chair items related to climate and water, research, and resource management.

1.3.3 The Assistant Secretary-General and several Directors were designated to serve as secretaries to plenary.

In-session Committees

1.3.4 The Council established a Coordination Committee in accordance with Regulation 29 of the General Regulations. It was composed of the President (Chairperson), the three Vice-Presidents, the Secretary-General or his representative, secretaries of plenary meetings and other key staff, invited by the President as necessary.

1.3.5 The Council established a number of in-session committees to assist with the work of the session:

Committee on Planning and Budget (open)

Mr Vertessy (Chairperson)

This Committee was open to all EC members.

Committee on Membership of the Joint Scientific Committee for WCRP

Mr Moksitt (Chairperson)

Mr Frolov, Mr Rathore and Mr Baez

Committee on the Theme for World Meteorological Day 2016 (open)

Mr Ostojski (Chairperson)

Core Members: Ms Furgione, Mr Sutherland, Ms Makuleni and Mr Waqaicelua

The Committee was open to all EC members.

Selection Committee for the IMO Prize

Mr Moura (Chairperson)

Mr Adrian, Mr Fallas, and Ms Kijazi

Selection Committee for the WMO Research Award for Young Scientists

Mr Taalas (Chairperson)

Mr Mohalfi, Mr Zheng and Mr Nkomoki

Selection Committee for the Väisälä Award

Mr Sutherland (Chairperson)

Mr Loumouamou and Mr Calpini, president of CIMO

Committee on Climate Data Policy (open)

Mr Moura (Chairperson)

This Committee was open to all EC members.

Committee on Preparations for Cg-17 (open)

Mr Sutherland (Chairperson)

This Committee was open to all EC members.

IPCC Future committee (open)

Mr Moksitt (Chairperson)

This Committee was open to all EC members.

Rapporteur on Previous Resolutions

Ms Che Gayah Ismail

1.4 Programme of work of the session (agenda item 1.4)

1.4.1 Working hours of the meetings were established as 9:30 to 12:30 and 14:30 to 17:30. The necessary arrangements concerning the allocation of agenda items to the plenary were made.

1.4.2 The Council held plenaries from 21:00 to 24:00 on Wednesday 25 June and from 20:30 to 22:30 on Thursday 26 June.

1.5 Approval of the minutes (agenda item 1.5)

The Council noted that in accordance with General Regulation 112 no minutes should be prepared unless otherwise decided for special items. Audio recordings of plenary meetings shall be made and retained for record purposes.

2. REPORTS (agenda item 2)**2.1 Report by the President of the Organization (agenda item 2.1)**

2.1.1 The Council noted the decisions made by the President on its behalf since its last session under General Regulation 9(7) (b) and Staff Regulation 9.5.

2.1.2 The President highlighted activities related to our priorities to illustrate how collective efforts have guided research advances, improved observations and enhanced the provision of quality services to help citizens of the world make informed decisions.

Strategic and Operational Planning

2.1.3 The third session of the EC Working Group on WMO Strategic and Operational Planning (WG/SOP, 11 to 14 February 2014, in Geneva), considered the draft WMO Strategic and Operating Plans 2016–2019; progress in the implementation of WMO Monitoring and Evaluation System; role and operation of NMHSs; continuous improvement of WMO processes and practices; maximum terms for the Secretary-General; and number and distributions of seats in the Executive Council, among other issues. The WG/SOP made recommendations under each item, some of which will be presented in separate documents for the Council's consideration.

2.1.4 Progress has been made toward the preparation of the WMO Strategic Plan for 2016–2019 and beyond. The current draft articulates the future directions of the WMO; its priorities, deliverables and performance indicators to support the preparation of the WMO Operating Plan (OP). This will facilitate the decisions of Congress in deciding WMO's next Results-based Budget (RBB) for 2016 through 2019. In its final form it will guide Members' investments to bring improved socio-economic benefits and enhance the performance of the NMHSs.

2.1.5 A total of 97 Members (51%) responded to the survey on the "Impacts of Achieved Results on Members" as of 30 November 2013. While the low level of response from some Regions and fluctuations from previous surveys in the number of responses made it difficult to assess progress against the baselines and the set targets for each KPI, significant achievements were generally noted against the Organization's 8 Expected Results. In particular, the most beneficial WMO Programme activities cited were: WIS and WIGOS as related to the development and modernization of observing networks as well as data collection, exchange and rescue; capacity development; Aeronautical Meteorology Programme (AMP) as related to the implementation of Quality Management Systems (QMS); Disaster Risk Reduction (DRR) Programme; Severe Weather Forecasting Demonstration Project (SWFDP), Tropical Cyclone Programme (TCP); Marine Meteorology and Oceanography Programme (MMOP) and GFCS as related to the provision of climate services. The Council was invited to provide guidance for further improvement of the WMO Monitoring and Evaluation System to objectively measure the achievement Expected Results in the Strategic Plan through the implementation of activities in the Operating Plan funded with resources in the Results-based Budget.

2.1.6 In addition to providing directions to guide preparations for the Programme and Budget for the next financial period, the Council is also invited to consider how the processes and practices in the Organization could be further improved. In particular, the Council should consider changes to the WMO General Regulations to incorporate the roles and responsibilities of the RAs that formalize the engagement and commitment of their Members and the contribution of their technical experts on technical commissions.

2.1.7 Great strides have been made in reviewing the working practices of the various constituent bodies of WMO and other informal structures; however more work is to be done. The EC Working Group on Strategic and Operational Planning is currently reviewing the remit, operation, organization and structure of the technical commissions for the consideration of EC. Another consideration is the scheduling and location of various constituent bodies. Much progress in reducing the duration of these meetings has been achieved since the Fifteenth Congress, however the scheduling of constituent body sessions should be carefully considered.

2.1.8 The Fifteenth Congress decided that, with the exception of Congress and the Executive Council, no more than two sessions of constituent bodies should be held in any period of three consecutive months to avoid cumulative costs on both Members and the Secretariat over a short period. There are three upcoming and overlapping technical commission sessions in 2014 and while we recognize the value in Members hosting various sessions, we should not lose sight of the wisdom of the Fifteenth Congress' decision.

Global Framework for Climate Services

2.1.9 WMO makes a very substantive contribution to the GFCS beyond its leadership accorded in the Fifteenth Congress. However, the GFCS success also depends on the effective long-term engagement of partner UN and international agencies, Members and stakeholders at national, regional and global levels across disciplines and institutions. NMHSs and WMO's constituent bodies are actively participating, with a user-focus, in early actions to strengthen the production, availability, delivery and application of science-based climate predictions and services. Consultations are taking place on how the GFCS can inform adaptation strategies in the United Republic of Tanzania, Malawi, Belize and for Small Island Developing States in the Pacific, just to name a few.

2.1.10 The Intergovernmental Board on Climate Services (IBCS) is a mechanism accountable to the Congress. The Executive Council will consider recommendations to Congress, as may be indicated by the IBCS Chairperson informing EC, to advise the Board on any matters relating to WMO Programmes and constituent bodies on the GFCS, with particular attention to future directions for and impacts on WMO's World Climate Programme and the Commission for Climatology, given recognition by Congress of their key roles in GFCS implementation. The Council must also consider all aspects of WMO's specific contributions to the GFCS.

2.1.11 The EC Task Team on International Exchange of Climate Data and Products to support GFCS implementation needs continued guidance from Members. The Council was invited to assess the recommendations of the Task Team and to consider how to achieve the appropriate balance between the importance of free and open data exchange with the known sensitivities on this matter. In this regard, the President invited the Council to consider the relevance of a clear definition of "climate data" and to reflect on the cost-benefits, in particular with respect to issues of cost-recovery and long-term investments in infrastructure.

WMO Information Systems (WIS) and WMO Integrated Global Observing System (WIGOS)

2.1.12 The President invited the Council to consider the significant efforts by the Management Teams of the technical commissions and regional associations in advancing the WIS/WIGOS priority. Regulatory material has been drafted under the mandate of the Inter-Commission Coordination Group on WIGOS (ICG-WIGOS) with input from many Members, ICG-WIGOS representatives and their technical experts. Regional associations have been active in developing their WIGOS implementation plans, and in some cases, jointly. Region I, taking into account regional differences, decided to also develop subregional Plans. The WIGOS Framework Implementation Plan (WIP) and Regional Plans are significant achievements. They define the necessary activities to establish an operational WIGOS by the end of 2015 leading naturally into a subsequent Pre-Operational Phase for WIGOS. Standards and recommended practices and procedures will be included in the WIGOS regulatory material that are under development and will be submitted to the Congress in 2015 for consideration. Links to operational Global Information System Centres (GISCs) for searching WIS can be found at www.wmo.int/giscs. WIGOS and WIS initiatives are foundational to the weather, climate and water enterprise.

2.1.13 The President invited the Council to consider the progress being made on priorities related to WMO Polar Activities, including the Third Pole and other High Mountain regions, as EC already recognized the importance of these activities by the fact that changes in the cryosphere have significant impact on people and alter the Earth's weather and climate at all latitudes. The Executive Council Panel of Experts on Polar Observations, Research, and Services (EC-PORS) has recommended the endorsement of the Implementation Plan of the Global Cryosphere Watch (GCW) including the GCW governance and working structure, the establishment of a core GCW network called CryoNet and the need to mainstream GCW as a core WMO activity to the EC. The Panel also took steps to strengthen the Antarctic Observing network (AntON); historically under-sampled area of the world.

Capacity Development

2.1.14 Capacity development activities hinge on robust and current information on, for example, the state of observing networks, institutional challenges and other factors that influence investment decisions. Our success in attracting resources to WMO Programmes has been greatly assisted by presenting a compelling case to potential investors. For the last several years, the WMO has been very successful in mobilizing resources and the President on behalf of the Council extended his appreciation to the Resource Mobilization and Development Office for their tireless efforts in attracting the interest of external partners such as the World Bank, European Commission and other investors in the weather, climate and water enterprise. The President also thanked donors through, for example, the Voluntary Cooperation Programme and the foundational role played in developing our human resources through education and training activities including the support offered by many Members that host Regional Training Centres.

2.1.15 Last year, the Council adopted the WMO Capacity Development Strategy Implementation Plan for 2012–2015. The EC Working Group on Capacity Development set up a Task Team to work with the Secretariat to move Country Profile Database (CPDB) to an operational state. The President noted the value of CPDB, which was first introduced in 2006, and urged the Council to provide its guidance to support the full implementation of the CPDB.

Disaster Risk Reduction

2.1.16 Disaster risk reduction is core to WMO and its Members mandates through their early warning and service delivery infrastructures, but is also essential to building resilience in our communities. Last year the Council strongly endorsed the WMO Strategy for Service Delivery and its Implementation Plan (IP). The Strategy is adaptable to the unique needs of all Members, both developed and developing, regardless of who the users are and whether providers deliver public or commercial products and services. The Implementation Plan guides the service delivery activities of WMO constituent bodies and Members that would lead to greater user satisfaction, better value for the investment of public funds, and increased awareness of the role of NMHSs in the protection of life and property.

2.1.17 The decade for the Hyogo Framework for Action 2005–2015 is coming to an end. Further strengthening of partnerships in the context of supporting risk-based decision-making across socio-economic sectors will likely be featured prominently in the development of the successor to the HFA as well as in the sustainability goals to succeed the Millennium Development Goals. The resulting initiatives from these new mechanisms will engage highly varied user communities spanning governments, commercial users, NGOs, media and the public.

2.1.18 The social and economic benefits that result from the delivery of "fit for purpose" services to various user groups are very closely linked to the improved capability of Members to produce and deliver those services. The President invited the Council to give consideration to the production of an authoritative joint publication by WMO and the World Bank on the assessment of socio-economic benefit of services to be published later this year. The Council is also invited to consider more fully a follow-up to the Madrid Conference held in March 2007 on "Secure and Sustainable Living; Social and Economic Benefits of Weather, Climate and Water Services and how to realize leveraging opportunities in areas of service delivery, DRR among others, and within the international community. A review of achievements since 2007 in valuation of meteorological and related services should be undertaken helping to highlight the contribution of NMHSs toward risk reduction.

Aviation Meteorological Services

2.1.19 The President reported that despite the good progress in some regions, many Members have not yet implemented their Quality Management System in compliance with ICAO Annex 3/WMO Technical Regulations Vol. II, or the WMO competence requirements for aeronautical meteorological personnel in their supporting role for Air Navigation Safety Management Systems. Therefore, relevant WMO bodies continued their efforts to assist Members resolve deficiencies and achieve the required level of compliance with international regulations. The President invited the Council to reflect on issues related to civil aviation noting the three important aeronautical meteorology events to be held in Montreal, between 7 and 18 July 2014: the Conjoint ICAO/WMO Meteorology Divisional Meeting, the fifteenth session of the WMO Commission for Aeronautical Meteorology (CAeM-15), and a WMO Technical Conference entitled "Aviation Meteorology – Building Blocks for the Future". Central to these discussions will be the meteorological support to the "One Sky" concept as it relates to the ICAO Global Air Navigation Plan. The Aviation System Block Upgrades (ASBU) approach, with a horizon of 2028 and beyond, has been designed to bring improvements in the global air traffic management system to cope with the challenges related to the ever growing demand of the aviation industry for capacity and efficiency, with due regard to safety and environment. The meteorological component of ASBU includes essential paradigm shift from "product-centric" to "data-centric" service delivery and the deployment of a System-Wide Data Management (SWIM) concept. These changes will have many implications to Members' business models for aviation services. The Conjoint ICAO/WMO meeting

will discuss the evolution of the World Area Forecast System (WAFS), the International Airways Volcano Watch (IAVW), and Space Weather service. In these discussions, the Council was invited to put forward convincing arguments to ensure that NMHS cost recovery models support the infrastructure and science requirements for future aeronautical meteorological service provision.

2.1.20 The Council took note of the report of the President. It dealt with related issues under the relevant agenda items.

2.2 Report by the Secretary-General (agenda item 2.2)

2.2.1 The Council took note of the report of the Secretary-General including highlights on the implementation of the Strategic Plan and Operating Plan 2012–2015 for the period 2012–2013.

Service Delivery

Enhanced capabilities of Members to deliver and improve access to high-quality weather, climate, water and related environmental predictions, information, warnings and services in response to users' needs, and to enable their use in decision-making by relevant societal sectors (ER 1)

2.2.2 The work carried out in 2012–2013 focused on the initial implementation of the WMO Strategy for Service Delivery and its Implementation Plan as a framework for all programmes involved in the delivery of weather, climate, water and environment-related services with the aim of further developing their ability and mechanisms for interaction with users and identification of user requirements. This is proving particularly important for those programmes, projects and activities that relate to the application of meteorology such as the Public Weather Services, including the Common Alerting Protocol (CAP) for disseminating warnings, Aeronautical Meteorology, Marine Meteorology and Oceanography, and Agricultural Meteorology Programmes. The Implementation Plan will assist Members in developing their services and improving their delivery in a coherent manner optimizing the use of limited resources. Cooperation continued with the International Civil Aviation Organization (ICAO) for the implementation of the Quality Management System for aeronautical services and the new WMO competency requirements for aeronautical meteorology personnel. The cooperation continued with the International Maritime Organization (IMO) for the implementation of the Worldwide Met-Ocean Information and Warning Service. The Strategy and Implementation Plan provide for linkages with the Global Framework for Climate Services (GFCS) and in particular the User Interface Platform. For example, the preparation and dissemination of guidance materials on the prevention and mitigation of impacts of extreme events on agriculture and on the analysis and evaluation of agrometeorological data, products and services are contributing to improved food security. A number of roving seminars for farmers were supported and had practical on-the-ground impacts on the use of climate information by farmers in improving agricultural production.

Disaster Risk Reduction

Enhanced capabilities of Members to reduce risks and potential impacts of hazards caused by weather, climate, water and related environmental elements (ER 2)

2.2.3 Significant progress has been made with the implementation of the DRR Work Plan 2012–2015 with the engagement and leverage of technical expertise from all WMO Technical Commissions and Programmes. This includes the documentation of good practices and development of guidelines on user requirements for weather, hydrological and climate products and services in the DRR priority areas. This has been achieved through the implementation of integrated holistic DRR demonstration projects with national capacity development and regional cooperation in South-east Europe and Central America where capacities are developed for Multi-Hazard Early Warning Systems. Cooperation of the Commission for Basic Systems (CBS) with the DRR Humanitarian Task Team has led to the development and provision of meteorological services to the international humanitarian agencies with the first pilot involving WMO Information System (WIS) and Global Data-processing and Forecasting Systems (GDPS). WMO has been

working extensively with Members, regional associations, and the UN Office for International Strategy on Disaster Risk Reduction (UNISDR) to engage in the regional and global consultations and drafting of the Post-2015 DRR Framework.

Data-processing and forecasting: weather, climate and water

Enhanced capabilities of Members to produce better weather, climate, water and related environmental information, predictions and warnings to support in particular disaster risk reduction and climate impact and adaptation strategies (ER 3)

2.2.4 With respect to flood forecasting and warning, wider application of the integrated flood management approach was promoted and better collaboration between hydrological and meteorological services in support of improved flood forecasting and warnings achieved through initiatives such as the Flash Flood Guidance System with global coverage. Some proposed pilot projects were not commenced in this period due to delays in identification of focus areas by some countries. Components of the World Hydrological Cycle Observing System (WHYCOS) continued to attract donor support and an increased level of activity. A wide range of capacity development initiatives were implemented including hydrological training through modules and regional training courses in climate and health under the Cooperative Programme for Operational Meteorology Education and Training (COMET). Despite increasing pressures on the Climate Prediction and Applications Programme through involvement in the GFCS, considerable progress has been achieved through cross-programme, cross-commission activities in establishing and maintaining the production infrastructure for seasonal forecasting services, in relation to the Global Producing Centres for Long-Range Forecasts and their associated Lead Centres. Delays have been observed in holding of some sectoral forums as regional coordination has been slow to develop. WMO contributions to the process of the United Nations Framework Convention on Climate Change (UNFCCC) have received high acclaim and given WMO strong visibility. A decadal climate report was published as a showcase on the importance of sharing climate data and knowledge to inform policy makers with an authoritative assessment and analysis. The Integrated Drought Management Programme, established in association with the Global Water Partnership, following the High Level Meeting on National Drought Policies is now operational. Linkages with other UN agencies were improved through greater involvement in UN-Water and the GFCS. The implementation of the Severe Weather Forecasting Demonstration Project (SWFDP) in Southern Africa, Eastern Africa and South-Western Pacific has led to the development of two other projects in South-Eastern Asia and the Bay of Bengal. The SWFDP will continue to benefit from active collaboration across several WMO Programmes to enhance capabilities of Members, especially least developed countries, in the production of forecasts and warnings and in service delivery in relation to meteorological hazards.

WMO Integrated Global Observing System (WIGOS) and WMO Information System (WIS)

Enhanced capabilities of Members to access, develop, implement and use integrated and interoperable Earth- and space-based observation systems for weather, climate and hydrological observations, as well as related environmental and space weather observations, based on world standards set by WMO (ER 4)

2.2.5 Substantial progress has been made on the implementation of the WMO Integrated Global Observing System (WIGOS), with constituent observing systems reporting tangible benefits from the integration to the Inter-Commission Coordination Group on WIGOS (ICG-WIGOS) and from the new enabling capabilities of WIGOS. The WIGOS Project Office is now fully staffed, which has enabled rapid progress in a number of areas: Regulatory Material drafted with input from many technical experts from the Members and currently reviewed by WMO Technical Commissions; Regional Implementation Plans approved by four RAs with the remaining two expected to follow shortly; and Guidance Material being developed. Work toward improved Quality Management of WMO observing systems — including a modernized approach to monitoring of observational data quality — and the development of a comprehensive Metadata Standard is showing good progress. With these developments, it is expected that the basic building blocks of the WIGOS framework would be in place and ready for approval by Cg-17. Substantial progress in the implementation of

WMO Information System (WIS) has been achieved since the beginning of the current financial period. As of March 2014, there were 15 Global Information System Centres (GISCs), 125 Data Collection or Production Centres (DCPCs) and 233 National Centres recorded in the WIS database of centres. Most of the GISCs are operational, and more than half of the DCPCs identified had completed their technical evaluation process. The progress of WIS centre certification and demonstration activity, along with many supporting data such as National WIS Focal Points, is available in the WMO Country Profile Database. Three Regional Associations (II, V and VI) have developed and approved their WIS Regional Implementation Plans. Regional Associations I and III are actively developing their plans, to be submitted to their forthcoming sessions for approval. The Secretary-General received the report of the independent review of the Global Climate Observing Programme (GCOS) programme, requested by its four sponsoring organizations: WMO, Intergovernmental Oceanographic Commission (IOC) of UNESCO, United Nations Environment Programme (UNEP) and International Council for Science (ICSU).

Research

Enhanced capabilities of Members to contribute to and draw benefits from the global research capacity for weather, climate, water and the related environmental science and technology development (ER 5)

2.2.6 In 2012–2013 the World Climate Research Programme (WCRP) focused on the preparation of its new Strategic Framework beyond 2015 with the implementation of the six Grand Challenges for climate science now underway, and focusing on regional climate, sea-level rise, extremes, water availability, climate sensitivity, and cryosphere. Outcomes include results from meetings and major conferences devoted to climate science and services, establishment of openly available archives of climate models, seasonal predictions archives and data. On this basis, 364 science articles were published that comprised contributions from 26 modelling centres and were used as the main source of climate predictions and projections for the IPCC AR5 Report “Climate Change 2013: The Physical Science Basis”. The Commission for Atmospheric Sciences (CAS), through the World Weather Research Programme (WWRP) and in cooperation with WCRP, established the Sub-seasonal to Seasonal Prediction Project (S2S) and the Polar Prediction Project (PPP) in 2013. WWRP has made good progress to establish another project, called HIWeather, focusing on the improvement of the predictions of high impact weather with the aim of providing enhanced decision-level information to users. These three projects will be a major focus of WWRP after the conclusion of THORPEX at the end of 2014. The Global Atmosphere Watch (GAW) Programme has continued to coordinate the observation of atmospheric composition and related parameters and in providing policy relevant information and has been actively involved in the development and implementation of WIGOS and WIS. The annual Greenhouse Gas Bulletin continued to provide fundamental data on the evolution of atmospheric greenhouse gases (GHGs), used as reference material to climate negotiations and policy decisions. GAW produced a global assessment of precipitation chemistry, guidelines for continuous measurements of ozone in the troposphere and recommendations on interpretation of Black Carbon measurements.

Capacity Development

Enhanced capabilities of NMHSs, in particular in developing and least developed countries, to fulfil their mandates (ER 6)

2.2.7 An increase in requests for fellowships was observed through 2012–2013, with a rate of meeting requests of 56%. Training workshops were held in public weather services, severe weather forecasting and nowcasting, hydrological forecasts, weather observations and telecommunications, climate services, tropical cyclone forecasting, GAW, aeronautical forecasts, use of numerical weather prediction, agrometeorology, tropical meteorology, cryospheric processes and others, as well as seminars for trainers. Training courses were all supported with regular and voluntary budgets, including for the provision of financial support to over 218 participants. In terms of outcomes, in the context of the WMO Capacity Development Strategy Implementation Plan for 2012–2015, Members observed significant improvements in their visibility and relevance in the national development agenda in 2013, associated with user accessibility to

timely and accurate forecasts and warnings, while less improvement was noted in terms of the visibility and relevance of the regional services provided by NMHSs in the regional development agenda. The infrastructure and operational facilities improved by Members included surface observing network, the data-processing/forecasting facilities, and equipment for meteorological, environmental and satellite data.

Partnerships

New and strengthened partnerships and cooperation activities to improve NMHSs' performance in delivering services and to increase the value of the contributions of WMO within the United Nations system, relevant international conventions and national strategic issues (ER 7)

2.2.8 Through 2012–2013, WMO has strengthened its cooperation with the UN system through an active participation in, and contribution to, relevant mechanisms, processes, conventions and initiatives. In particular, the leadership role of WMO in climate and water has been further recognized by the renewed chairpersonship of mechanisms such as UN-Water and the HLCP Working Group on Climate Change, by the involvement in the Task Team and Open Working Group on Sustainable Development Goals and the co-leadership with UNISDR of the Issue Brief on Climate and Natural Disasters, and by the direct contribution of the GFCS and GCOS to the work of UNFCCC SBSTA and COP. Partnerships were strengthened or established with both the UN system and other international organizations. The establishment of the GFCS has given particular impetus to this process, leading to renewed or expanded cooperation with numerous UN organizations (FAO, UNDP, UNESCO, UNISDR, WFP, WHO, World Bank), as well as other international organizations (EU, GWP, IFRC, IUCN). At the same time, as recalled, WMO has continued to strengthen its collaboration with organizations with particular mandates and expertise to assist NMHSs in improving the performance of services delivery, including through strengthening technical skills (EUMETNET, TWAS, UNESCO-IHE, UNITAR). Close cooperation continued with ICAO, IOC/UNESCO and ESCAP in implementing activities of the Tropical Cyclone Programme. In 2012–2013 WMO, with a view to better support Members, has also strengthened partnerships with international development organizations, including multilateral development banks such as the World Bank, the Asian Development Bank and the African Development Bank, and other institutions such as the European Commission, Regional Economic Communities, UN system partners, and bilateral development agencies, among others. WMO continued to collaborate with the International Atomic Energy Agency (IAEA) and the Comprehensive Nuclear-Test-Ban Treaty Organization (CTBTO) in the comprehensive study of the Fukushima Daiichi Nuclear Power Plant Accident, which led to the review of procedural arrangements and safety guidelines for emergency preparedness and response, as well as to improving the response system through new scientific and technical developments. The United Nations Scientific Committee on the Effects of Atomic Radiation (UNSCEAR) has completed its report to the UNGA on the levels and effects of the radiological releases from the accident, which included WMO study (2013) on the meteorological analyses covering the accident period.

An Effective and Efficient Organization

2.2.9 In 2012–2013 the improvement of the efficiency and effectiveness of the Organization has continued through the streamlining of processes and enhanced support services. Among the achievements, the following can be mentioned: increased cost-effectiveness of the meetings of constituent bodies through improved planning and organizational arrangements; expanded application of Information and Communication Technology to internal processes and services to Members (piloting of e-voting, PUB5, Country Profile Database, iRecruitment); transparency of administrative and financial processes, maintenance of the environmental characteristics of the WMO building and use of the videoconference facilities; amendment of Staff Regulations according to the UN Common System; activation of an Ethics Office function; introduction of an electronic induction programme accessible to all staff; and offering of training sessions to staff to upgrade their skills in order to further enhance their competencies. Among the challenges can be mentioned the reduction of recruitment time and increased cost-efficiency of travel and procurement processes.

2.2.10 The Council noted with appreciation the Secretary-General's continued actions to ensure the implementation of the Strategic Plan and Operating Plan for the first part of the 2012–2016 period and to increase the profile and contribution of WMO and NMHSs to international initiatives to respond to the global challenges directly related or exacerbated by climate variability and change, including through the enhancement of partnerships with a variety of international actors.

2.2.11 The Council dealt with related issues under the relevant agenda items.

2.3 Report of the Financial Advisory Committee (agenda item 2.3)

2.3.1 The Council considered the report of the Financial Advisory Committee. The Council took account of the recommendations of the Financial Advisory Committee in making its decisions under the various related agenda items.

Message to the International Civil Service Commission and UN General Assembly

2.3.2 The Council requested the Secretary-General to convey a strong message to the International Civil Service Commission (ICSC) and the UN General Assembly regarding concerns about the impact of rising staff compensation costs, and adopted [Resolution 1 \(EC-66\) – Message to the International Civil Service Commission and the General Assembly of the United Nations](#).

2.4 Report of the 2014 Meeting of the Presidents of Regional Associations (2014-PRA) and reports by presidents of regional associations (agenda item 2.4)

Report of the 2014-PRA

2.4.1 The Council noted that the 2014 Meeting of the Presidents of Regional Associations (2014-PRA) was held in Geneva on 20–21 January 2014 to discuss and exchange information on the preparation of the new WMO SOP 2016–2019; improvement of conduct of the work of regional associations; partnership and collaboration in Regions; and support for regional activities. The full report is available at <https://sites.google.com/a/wmo.int/2014-pra-1/>.

2.4.2 The Council noted that the presidents of regional associations (PRAs) provided the progress in the preparation of their respective operating plans in relation to the preparation of the new WMO Strategic and Operating Plan 2016–2019. PRAs made the following observations, which were also considered by the EC Working Group on Strategic and Operational Planning (WG-SOP):

- (a) The need to reflect achievements of WMO;
- (b) The strategic priorities represent the shared needs of Members;
- (c) The need to recognize the different capabilities of NMHSs and their unique needs;
- (d) The need to implement inter-regional projects;
- (e) The challenges associated with the rapidly evolving ICAO requirements;
- (f) The need for more guidance on the structure of regional operating plans;
- (g) The need to use processes during the intersessional period to approve the regional plans to ensure that the implementation periods are synchronized with WMO financial periods;
- (h) The need to align regional priorities with the WMO priorities;
- (i) The need to have a reasonable number of achievable deliverables.

2.4.3 The Council noted that PRAs discussed an RA VI proposed approach for the organization of RA sessions which would maintain the current frequency of every four years, but would introduce a number of changes including: shorter RA sessions to fit into one calendar week together with a regional conference and introducing a high-level segment in the session, then conducting a regional conference of directors of NMHSs in the middle of the intersessional period for 2–3 days using funds foreseen for a regional seminar.

2.4.4 The Council noted that PRAs reviewed the proposed text drafted by the Secretariat on the amendment to the General Regulations concerning the role and responsibilities of RAs and made some modifications which were discussed at the EC WG-SOP.

2.4.5 The Council noted that PRAs reviewed the request by the president of RA II to increase the number of seats in EC and other PRAs expressed their positions. It was agreed that after consideration by WG-SOP a document be presented to EC-66 to be prepared for a decision by Cg-17.

2.4.6 The Council noted that PRAs were informed of the status of UNISDR regional and global consultations towards drafting of the Post-2015 Framework for DRR and the meeting discussed the possibility to inviting UNISDR to the upcoming RA sessions and stressed the importance of keeping Members informed and engaged in the process.

2.4.7 The Council noted that PRAs were pleased to note the recent support for regional activities including the establishment of a post for Regional Coordination, the creation of the Project Coordination Unit, progress in the implementation of the Capacity Development Strategy, progress on the Country Profile Database (CPDB) and progress in Education and Training matters. They were also informed of the ongoing review of the location of the Office for Africa and Least Developed Countries and the Regional Office for Asia and the South-West Pacific.

2.4.8 The Council considered changes to the terms of reference of the meetings of PRAs as proposed by the 2014-PRA meeting to align with those of the WMO Bureau. The Council agreed this alignment offered a cost-effective and valuable opportunity for consultation and was in line with the practice of the presidents of technical commissions (PTCs) and recent meetings of the PRAs. Considering the need for interactions of PRAs to contribute to integrated planning and implementation, the Council adopted [Resolution 2 \(EC-66\) – Regular Meetings of Presidents of Regional Associations](#).

Report of the 2014-PRA-PTC

2.4.9 The Council noted that the joint 2014 Meeting of Presidents of Regional Associations and Presidents of Technical Commissions (2014-PRA-PTC) was held in Geneva on 22 January 2014 to discuss common issues of regional association (RAs) and technical commissions (TCs) and to strengthen the linkage and collaboration of between RAs and TCs. The full report is available at <https://sites.google.com/a/wmo.int/pr-ptc-1/>.

2.4.10 The Council noted that in relation to the preparation of the Integrated WMO Strategic and Operating Plan aligned to the WMO financial period (FP), PRAs and PTCs agreed to work towards having their priorities identified in the first year of the FP. The meeting agreed that it would be important to develop a clear coordination mechanism for providing information on the activities of the respective Regions and in Commissions and recognized the need for the engagement of Management Groups in the period preceding TC sessions to collate the perspectives of RAs.

2.4.11 The Council noted that the meeting made the following suggestions and conclusions on the collaboration between RAs and TCs:

- (a) The president of CAeM would consult with PRAs to develop a position to be presented at the CAeM-15 session; the Secretariat would compile a position paper on this issue; and the president of CAeM would organize a side-meeting to discuss this issue during EC-66;

- (b) PRAs and PTCs strongly supported the proposal of CIMO to develop a new edition of the International Cloud Atlas (ICA) recognizing that this document is fundamental to the operation of NMHSs and agreed that WMO needed to identify financial resources to enable funding this activity and recommended that all possible mechanisms, regular budget and/or trust funds, but also possibly considering private/public partnerships needed to be considered;
- (c) PRAs and PTCs expressed their commitment to play their respective roles in ensuring the implementation of the WMO Strategy for Service Delivery;
- (d) It was agreed that it would be important to show, in the WMO Strategic Plan, how new research could evolve to be operational;
- (e) PTCs and PRAs agreed to recommend to EC that it sets up an ad hoc task team, drawn from representatives of all TCs and RAs with Terms of Reference to review the International Meteorological Vocabulary and other related tasks and to recommend to EC that it sets up an ad hoc task team, drawn from representatives of all TCs and RAs, with terms of reference to review the provision of unique identifiers (Digital Object Identifiers (DOI)); and
- (f) PRAs and PTCs supported the proposal that routine procedures for evaluation of Member's compliance with the standards should be developed, and that RAs would assist in ensuring that WMO Technical Regulations penetrate national (or regional) legislation and regulations, and agreed that this issue should be brought up to EC.

2.4.12 The Council considered changes to procedural arrangements and terms of reference of the Meetings of Presidents of Regional Associations and Presidents of Technical Commissions (PRA-PTC) proposed by the 2014-PRA-PTC meeting in order to align with the meetings of PRA-PTC organized in recent years which had been held in conjunction with the WMO Bureau and adopted [Resolution 3 \(EC-66\) – Coordination between regional associations and technical commissions](#).

Reports of the presidents of regional associations

RA I – Africa

2.4.13 The Council noted the report of the president of RA I, Dr Mamadou L. Bah.

2.4.14 The Council noted with satisfaction the progress made by the African Ministerial Conference on Meteorology (AMCOMET) Secretariat and stressed the need to maintain the involvement of the WMO in the AMCOMET process, taking into account that AMCOMET is a WMO initiative with the main goal of improving visibility of NMHSs through the active engagement of African Ministers in charge of meteorology.

2.4.15 The Council noted that the AMCOMET Bureau, elected during the second session in Victoria Falls, Zimbabwe, October 2012, and the AMCOMET Secretariat are working on the major outcomes of the second session. In this regard, the Council requested the WMO Secretariat, in collaboration with the African Union Commission (AUC) and other partners, to support and facilitate the implementation of AMCOMET activities as appropriate and to formally establish the AMCOMET Secretariat within the WMO Secretariat. Activities thus far are as follows:

- (a) The Meeting of Experts and Stakeholders on the Implementation and Resource Mobilization Plan for the Integrated African Strategy on Meteorology (Weather and Climate Services) which took place on 10–12 February 2014;
- (b) The Task Force and Bureau Meetings of AMCOMET which took place on 26–30 May 2014 where the Bureau made a number of recommendations to AMCOMET on the Constitution and Rules of Procedure, Draft Implementation and Resource

Mobilization Plan, the way forward for the African Regional Space Programme and on the establishment of a Regional Climate Centre (RCC) in Central Africa.

2.4.16 The Council noted that a draft Regional WIGOS Implementation Plan for RA I (R-WIP-I) was developed. Subsequently, the RA I Management Group decided to hold subregional workshops to refine the developed draft R-WIP-I and requested the RA I Task Team on WIGOS to take into account subregional priorities and existing subregional projects. The Observing and Information Systems Services (OBS) Department and the Development and Regional Activities (DRA) Department made joint efforts to organize a WIGOS/WIS workshop in each of the five RA I subregions: Southern Africa Development Community (SADC), Harare, Zimbabwe, 5–7 June 2013; Economic Community of West African States (ECOWAS), Abidjan, Côte d'Ivoire, 12–15 November 2013; North Africa, Casablanca, Morocco, 18–21 November 2013; Economic Community of Central Africa States (ECCAS/CEMAC), Brazzaville, Congo, 29 April–2 May 2014; East African Community (EAC), Arusha, United Republic of Tanzania from 2–6 June 2014. A consolidated Regional WIGOS Implementation Plan for RA I will be developed and presented at the next RA I session for adoption.

2.4.17 The Council noted the importance of the 5th Africa Regional Platform on Disaster Risk Reduction, Abuja, Nigeria in from 13 to 16 May 2014 and encouraged the Secretariat to continue to strengthen collaboration with AUC, EAC, UNISDR and UNECA in an effort to enhance development in Africa.

2.4.18 The Council noted specific challenges and needs especially for the NMHSs in the Region related to the continuous development of human resources and building institutional capacity including capability of timely warnings for severe weather and climate extremes. In this regard, the Council noted with appreciation that the Secretariat carried out capacity development activities especially for the African LDCs including education and training, technical assistance and advice on national and regional development strategies, policies, projects and legislation related to weather and climate. The Council recognized the progress made in the implementation of the GFCS in the Region and encouraged the Secretariat to support Members to establish the National Framework for Climate Services.

2.4.19 The Council noted that WMO continued to enhance collaboration with the Southern African Development Community (SADC) by following up on challenges of the Region through the SADC Climate Services Centre (SADC-CSC) as well as the Meteorological Association of Southern Africa (MASA) and with the Intergovernmental Authority on Development (IGAD) subregions through the IGAD Climate Prediction and Applications Centre (ICPAC) by undertaking collaboration efforts that advance meteorology and capacity building in the Region.

2.4.20 The Council noted that following the recommendations from the 10th Meeting of the Committee of Directors of NMHSs of ECOWAS Member States held in Abidjan, Côte d'Ivoire, in July 2012, the ECOWAS Meteorology Programme was reviewed by a committee consisting of ECOWAS, WMO-NCWA, Nigeria Meteorological Agency, ACMAD and the Gambia and approved at the 11th Meeting held in the Gambia from 13 to 15 May 2014.

2.4.21 The Council recognized the assistance of WMO in the organization of the Southern Africa Climate Outlook Forum (SARCOF), the Greater Horn of Africa Climate Outlook Forum (GHACOF), the Western Africa Climate Outlook Forum (PRESAO), the Central Africa Climate Outlook Forum (PRESAC) and the Northern Africa Climate Outlook Forum (PRESANORD) whose products were extensively utilized by the spectrum of user groups in the region.

2.4.22 The Council noted that the preparations are being made to hold the RA I-16 session which will be followed by the third session of AMCOMET.

RA II – Asia

2.4.23 The Council noted the report of the president of RA II, Mr Ahmed Abdulla Mohammed, highlighting the major achievements including:

- (a) Implementation of the RA II Strategic Operating Plan (SOP) 2012–2015;
- (b) Development of the RA II Operating Plan (OP) 2016–2019;
- (c) Implementation of RA II Regional WIGOS and WIS Implementation Plans.

2.4.24 The Council recognized the proposal for an increase in the number of EC seats for RA II was made in light of regional aspects of WIS, WIGOS, GFCS, the operational Meteorological Satellite information services responsibilities provided by a number of Members in the Region, and the great diversity in geography, climate, ecosystems, religions, history, culture, experiences of economic development, political and economic systems. The RA II president noted that in addition to having the largest portion of population amongst the six WMO Regions, RA II has a large number of Members that are able to provide significant contributions to the work of the EC.

2.4.25 The Council recognized that India experienced casualties and damage to property in the eastern coastal region of India caused by Cyclone *Phailin* in October 2013, and appreciated the delivery of high-quality forecast information and warnings to the government authorities and the public, which was a good example of close cooperation of the NMHS with the relevant ministries, Government, disaster risk management officials and communities at risk. The Council also noted that countries in South-East Asia actively participated in the realization of an RA II WIGOS project regarding the capacity building in radar techniques with a possibility of integration of other surface-based remote sensing data to enhance the observational data and product utilization for better early monitoring and warning of extreme events.

2.4.26 The Council noted that a WMO Post-Typhoon *Haiyan* Expert Mission to Viet Nam was carried out on 14–16 April 2014 by representatives and experts of the Hong Kong Observatory, the RSMC Tokyo – Typhoon Centre/the Japan meteorological Agency, Met Office (United Kingdom of Great Britain and Northern Ireland) and the WMO Secretariat. The mission assessed the current capacity and capability of the National Hydrometeorological Service (NMHS) and requirements of the relevant authorities in Viet Nam and made recommendations to address specific aspects identified during the mission.

2.4.27 The Council recognized the existing level of partnership and collaboration with relevant United Nations agencies and inter-regional organizations, including the Association of Southeast Asian Nations (ASEAN), the United Nations Economic and Social Commissions for Asia and the Pacific (UNESCAP) and for West Asia (UNESCWA), the United Nations Environment Programme/Regional Office for West Asia (UNEP/ROW), the Permanent Committees of Meteorology of the League of Arab States (PCM/LAS) and of the Gulf Cooperation Council (PCM/GCC). The Council noted the importance of inter-regional cooperation, for example, through the project “Blue-Peace-Water Security in the Middle East”.

RA III – South America

2.4.28 The Council noted the report of the acting president of RA III, Mr Julian Baez Benitez.

2.4.29 The Council noted the most important activities undertaken in the Region, which included:

- (a) Preparation of the next RA III Strategic Plan within the WMO Strategic Thrusts and Expected Results, with the views and suggestions from Members, highlighting probable tendencies and evolving needs to be considered during the RA III-16 session, to be held in Asuncion, Paraguay in September 2014;
- (b) Demonstration phase of two Regional Climate Centres (RCCs) in the Region: the RCC for the West of South America (established in the International Research Centre on El Niño Phenomenon (CIIFEN), based in Guayaquil, Ecuador) and the RCC for Southern South America (established in the NMHSs of Argentina and Brazil), while the

third RCC for Northern South America (established in the NMHSs of Brazil and French Guyana) is concluding its implementation phase;

- (c) Regional Climate Outlook Forums (RCOFs) providing seasonal climate forecasting with two groups of countries in RA III participating simultaneously in the process and publishing monthly bulletins of seasonal forecasting, especially on El Niño and La Niña influences on rain and air temperature in the Region;
- (d) Pilot Project on the Networking of Regional Information from Automatic Weather Stations and Radar and AMDAR Data, through the new telecommunications system, that shall be discussed in the framework of the WIGOS Plan, during the RA III-16 session in Asuncion, Paraguay;
- (e) Establishment and operation of a new Regional Training Centre in the University La Molina (Lima, Peru) increasing the options for capacity development of the personnel in the Region;
- (f) Participation of professionals from the Region in Integrated Flood Management in national workshops and other activities. The NMHSs of the Region expressed their interest in maintaining as a regional priority the Pilot Project for Early Warning System on Hydrometeorological threats, particularly sudden floods, whose location will be decided by the RA III Working Group on Hydrology;
- (g) Virtual Centre for Severe Weather Monitoring and Forecasting developed with the financial support of the Iberoamerican Programme Trust Fund (AEMET), and efforts from NMHSs of Argentina, Brazil, Paraguay and Uruguay, oriented to cover the needs of the south-east area of South America. This initiative is considered a model to be replicated in the near future for the region of Central America in WMO RA IV;
- (h) The working groups of Regional Association III for the period 2012–2015 (Hydrology and Water Resources, Climate Services, Infrastructure and Technological Development) successfully conducted their meetings, in Montevideo, Uruguay (25–27 March 2014), Quito, Ecuador (4–7 May 2014) and Asunción, Paraguay (12–16 May 2014), respectively;
- (i) The presidents of RA III, Mr Julian Baez and RA IV, Mr Juan Carlos Fallas, with Mr Tyrone W. Sutherland, member of the Executive Council, participated in the Regional Platform for Disaster Risk Reduction in the Americas, held in Guayaquil, Ecuador (27–29 May 2014). On that occasion, the president of RA III participated as lecturer in the Panel on “The contribution of research for the management of resilient communities and its importance at decision maker’s level”.

2.4.30 The Council also noted specific challenges in RA III, including the cost of updating regional satellite stations in South America in light of the replacement of NOAA GOES-10 satellite by GOES-12, the traceability of meteorological instrument calibration and measurement, the implementation of the Quality Management System in compliance with ICAO requirements, the incorporation of WIGOS implementation activities into the strategic plan/work programme of RA III, the need for research to improve understanding of climate variability and change and their linkages to changing cycles and characteristics of El Niño/Southern Oscillation (ENSO) and its impacts on hydrometeorological hazards, the need for a coordinated framework of the GFCS and RCCs which include the development of tools and climate products and services to address disaster risk reduction at different timescales and coordinated Severe Weather Monitoring and Forecasting in the Region.

RA IV – North America, Central America and the Caribbean

2.4.31 The Council noted the report of the president of RA IV, Mr Juan Carlos Fallas Sojo.

- 2.4.32 The Council noted the most important activities in the Region, which included among others:
- (a) The Meeting of the Conference of Directors of Iberoamerican NMSs was held in Quito, Ecuador in November 2013 with the attendance of the Spanish-speaking Members of RA III and RA IV. The action plan for the period 2014–2017 was approved. The main lines of action of the three-year plan include, institutional strengthening of NMHSs and resource mobilization; development of climate services through pilot projects; education and training; and development of subregional virtual centres for the prevention and monitoring of extreme events. Among the decisions taken during this meeting, it is worth highlighting the establishment of the Associate Member category for non-Spanish-speaking countries in RA III and RA IV;
 - (b) WMO, through the trust fund from Spain, supported several activities during 2013 including courses on automatic weather stations maintenance, data processing, climate change, administration of meteorological and hydrological services, flood management, seasonal forecast, hydrology, statistic forecast tools, use of forecast products and satellites, and other topics. Additionally, a series of seminars and workshops were also supported, especially in hydrological forecasting, seasonal forecasting, coastal flooding, and telecommunications interaction. Several countries in RA IV have already benefited from the open source MCH database provided by the Conference;
 - (c) The Canadian Department of the Environment and WMO signed a USD 6.5 million Financing Agreement to support the programme “Haiti Weather Systems Programme – Climate Services to Reduce Vulnerability in Haiti”. The five-year project aims to develop the capacity of the NMHS of Haiti to deliver Early Warnings and also general weather, climate and hydrology services to the people of Haiti. Activities of the project up to March 2014 include setting up of project management, establishment of a WMO Project Office in Haiti, conclusion of a Memorandum of Understanding (MoU) between WMO and UNDP-Haiti; conclusion of the Letter of Agreement (LoA) with the Government of Haiti, establishment of an International Technical Advisory Committee (H-ITAC), acquisition of land for new offices for National Meteorological Centre – National Water Resources Service (CNM-SNRE), initiation of process for the CNM-SNRE 5-year Business Plan, plans to install available Automatic Weather Stations, facilitating Haitian access to Météo-France’s tools, improvements to current working conditions of CNM;
 - (d) Continuation of the Project Office in Mexico during 2013 to support the National Water Commission in achieving integrated, sustainable management of water and the PREMIA project aimed at, as outlined in the agreement between the WMO and the Government of Mexico, the efficient management of water, technical support in the fields of hydrology, meteorology, climate variability and change and their effects on water availability, in particular ground water reserves, and prevention of floods will be also be another area to be covered;
 - (e) The RA IV Workshop on Hurricane Forecasting and Public Weather Services continues to be organized on an annual basis at the National Hurricane Centre in Miami, United States of America, with strong support of WMO and USA. In 2014, the Latin America and Caribbean Hurricane Awareness Tour restarted its flights to strategic sites of the Region;
 - (f) Specific challenges in RA IV are:
 - Aviation: To meet ICAO and WMO requirements for QMS and forecasters competency training/certification;
 - GFCS: RCCs to serve the needs of the Region;
 - WIS/WIGOS: to coordinate planning with CBS for a harmonized implementation;

- DRR: to implement Central America EWS pilot projects and to improve hurricane warnings;
 - Working Group on Hydrology: to activate the working group and creation of a Discussion Forum;
- (g) The president of RA V participated in the Regional Platform for Disaster Risk Reduction in the Americas, held in Guayaquil, Ecuador, 27–29 May 2014 representing WMO as a scientific lecturer on the Early Warning System in the Costa Rica Sarapiquí River Basin, as an example of international collaboration and interaction with national institutions, oriented to mitigate the risks in rural communities.

RA V – South-West Pacific

2.4.33 The Council noted with pleasure the report of the newly elected president of RA V, Dr Andi Eka Sakya with a focus on the major outcomes from RA V-16, which was held in Jakarta, Indonesia, from 2 to 7 May 2014. The most important achievements of RA V included, among others:

- (a) Identification of challenges and high priority areas in the Region;
- (b) Refinement and implementation of the RA V Strategic Operating Plan 2012–2015 and the development of the RA V Operating Plan (OP) 2016–2019 for the enhancement of National Meteorological and Hydrological Services in the South-West Pacific;
- (c) Adoption of a Regional WIGOS Implementation Plan (R-WIP-V) and a Regional WIS Implementation Plan;
- (d) Adoption of a new working mechanism for effective implementation of the Regional Strategic Operating Plan by establishing a Management Group, four Working Groups with thematic task teams, and a Tropical Cyclone Committee;
- (e) Engagement and contribution to the Third International Conference on Small Island Developing States (SIDS) to be held in Apia, Samoa from 1 to 4 September 2014 through GFCS-SIDS Partnership.

2.4.34 The Council noted that the challenges and future priorities of RA V related to:

- (a) Maintenance and improvement of observations and telecommunication networks at the regional and national level through completion of the implementation of WIS and WIGOS;
- (b) Delivery of improved climate services through the establishment of the optimum network of RCCs to sustainably implement the GFCS;
- (c) Implement effective education and training programmes that build the capability of NMHSs in resource management, advocacy and outreach, and NWP utilization;
- (d) Achievement by all Members of the standards required for quality management and staff competencies, with a focus on aviation and marine meteorology.

2.4.35 The Council also recognized the importance of strengthening existing and setting up of multi-hazard early warning systems in light of disastrous tropical cyclones/typhoons, floods, drought, earthquakes and tsunamis such as Typhoon *Haiyan* (Yolanda) in the Philippines in November 2013, and Tropical Cyclone *Ian* in Tonga in January 2014.

2.4.36 The Council was pleased to note that a WMO/UNESCAP/Typhoon Committee Post-Typhoon *Haiyan* (Yolanda) Expert Mission to the Philippines was carried out from 7 to

12 April 2014 by the representatives and experts from the Asia-Pacific Broadcasting Union (ABU); the RSMC Tokyo –Typhoon Centre/the Japan Meteorological Agency; the National Disaster Management Institute and the National Emergency Management Agency of Republic of Korea; Typhoon Committee; UK Met Office; the United Nations Economic and Social Commission for Asia and the Pacific (UNESCAP); and the WMO Secretariat. The mission assessed the current capacity and capability of the Philippines and the Philippine Atmospheric, Geophysical and Astronomical Services Agency (PAGASA) and requirements of the relevant authorities in the Philippines and made recommendations to address specific aspects identified during the mission.

2.4.37 The Council commended the activities of the RA V Working Group on Weather Services aimed at having NMHSs in the Region to meet ICAO and WMO requirements respectively for quality management and competency of meteorological personnel providing service for international air navigation with the support from the Australian Agency for International Development (AusAID) and the Australian Bureau of Meteorology (BOM).

RA VI – Europe

2.4.38 The Council noted the report of the president of RA VI, Mr Ivan Čačić including the main achievements as follows:

- (a) The Regional Conference on Challenges and Priorities for European NMHSs was held on 10–11 September 2013 in Helsinki, Finland. The outcomes of the Conference have been endorsed by Regional Association VI at its sixteenth session (RA VI-16), which was successfully organized in Helsinki, Finland from 11 to 17 September 2013;
- (b) The re-established RA VI Management Group slightly enlarged its membership for a better geographical balance thus enhancing the effectiveness and efficiency of the regional subsidiary bodies;
- (c) The establishment of the RA VI Hydrology Forum as a platform for hydrologists within the Region to discuss matters of common concern, which was recognized as instrumental for promoting the recognition of WMO in the field of water;
- (d) The progress in implementation of the regional elements of the GFCS, including the successful organization of Regional and Inter-Regional Climate Outlook Forums, such as the South-East European COF, the North-Eurasian COF and the Mediterranean COF. The expansion of the RCOF mechanism to other geographical areas, such as the Polar and the Arab areas is in progress. The Polar RCOF is in the pipeline for 2015 in collaboration with Fast start project, supported by Canada, while the scoping meeting for the Arab COF is planned for October 2014 in Amman, Jordan;
- (e) The progress in developing methodologies, sharing experience and engaging Members in conducting analysis of the socio-economic benefits stemming from the meteorological, climatological and hydrological services;
- (f) The continuous efforts in developing the capacity of NMHSs to provide better services in support of DRR: the successful implementation of the second phase of the DRR project for the Western Balkans and Turkey in cooperation with UNISDR and with financial support of the European Commission DG for Enlargement and for the RA VI Members in the Middle East (Jordan and Lebanon) with financial support from the Swiss Agency for Development and Cooperation aimed at enhancing capacity for provision of services in support of water management, DRR and adaptation to climate change.

2.4.39 The Council noted the request of the Association to the Commission for Climatology (CCI) to work out recommendations, guidance and criteria for securing climate data homogeneity in the transition process from conventional to automatic meteorological station performance.

2.4.40 The Council noted further that the Association proposes stronger coordination at regional levels by the Members involved in the activities of the RSMC in Sand and Dust Storm Warning Advisory and Assessment System and suggests establishing a trust fund to support the global coordination of Sand and Dust Storm Warning Advisory and Assessment System activities.

2.4.41 With regard to the distribution of the seats on the Executive Council among the six WMO Regions, the Council noted that the Association would reserve the right to request one additional seat, should other Regions propose an increase.

Regional offices

2.4.42 The Council was pleased to note that, at the request of Cg-XVI, the Secretariat initiated a comprehensive review of resources and location of the Offices for Africa and Least Developed Countries (AFLDC) and the Regional Office for Asia and the South-West Pacific (RAP). The Council further noted that some of Members indicated their Governments' interest in hosting the RAP Office, including India, Republic of Korea and Qatar in RA II, as well as Indonesia, Philippines, Singapore in RA V, and AFLDC Offices including Egypt, Ethiopia, Kenya, Nigeria, Tunisia and Zimbabwe. The evaluation procedures and methodology were agreed by the Management Groups of RAs I, II and V, and an objective assessment is under way through the evaluation of more detailed information on the offers provided by the candidate Members. The assessment of candidate locations is expected before Cg-17 (May 2015) based on the regionally agreed criteria and evaluation procedures.

2.4.43 The Council was informed of the progress on the establishment of a new office for the Commonwealth of Independent States (CIS) region covering 10 countries in RA II (Asia) and RA VI (Europe), which was initiated by the Interstate Council on Hydrometeorology of the countries of CIS (ICH/CIS). The Council was pleased to note that the Government of the Republic of Belarus has indicated its willingness to host the office in Minsk. The Council agreed that a closer liaison among the ICHCIS, the Government of Republic of Belarus and WMO would be mutually beneficial and supported the on-going consultations that should find an appropriate format and related funding mechanism for a sustainable solution.

2.4.44 Information about regional events organized during the period June 2013–May 2014 is available at: http://www.wmo.int/pages/prog/dra/documents/List_of_Regional_Events_for_EC-66.pdf.

2.5 Report of the 2014 Meeting of Presidents of Technical Commissions and reports of presidents of technical commissions (agenda item 2.5)

2.5.1 The Council noted that the Meeting of the Presidents of Technical Commissions (PTCs) was held in the WMO headquarters (Geneva, 20–21 January 2014) and had discussed a wide range of subjects including: inter-commission issues and activities; follow-up actions taken by PTCs for the implementation of the WMO Strategy for Service Delivery; Disaster Risk Reduction; impact-based forecasting and risk-based warnings; WMO emergency response to Typhoon *Haiyan* that had ravaged some portions of SE Asia; The International Cloud Atlas; challenges of aviation meteorology; and the role of technical commissions (TCs) in the implementation of the Global Framework for Climate Services (GFCS), among other topics. The report of the meeting is provided at: https://docs.google.com/a/wmo.int/file/d/0B1MKEzYs7u_-SjltOEZZcC05UVk/edit. The discussions yielded decisions and recommendations for consideration by the Council. The Council took into account the views of the meeting of PTCs under specific agenda items as appropriate.

Inter-commission mechanisms

2.5.2 Regarding inter-commission mechanisms, the Council was pleased that PTCs had carried out a survey to investigate the level of efficiency of the mechanisms and how they could be made more effective. The Council supported the recommendation by PTCs that in the interest of efficiency, it was necessary to maintain an optimum number of inter-commission mechanisms and to, as much as possible, enhance the Terms of Reference (ToRs) of the existing groups instead of

creating new ones and to define the life span of such mechanisms. The Council recognized the value of the survey and agreed that it should be strengthened by including all cross-TCs mechanisms and by a fresh look at the teams.

Quorum in voting by correspondence for the election of vice-presidents of technical commissions

2.5.3 The Council supported the outcome of PTCs' meeting regarding the repeated situations of lack of quorum in voting by correspondence for the election of vice-presidents of TCs and quorum being reached at sessions by recourse to both Technical Conferences (TECOs) and proxies. It noted that the PTCs had requested the Secretariat to consult with the presidents of TCs, their management groups, Permanent Representatives and the EC Working Group on Strategic Operating Plan (ECWG-SOP) to develop a proposal for consideration by Congress. The Council noted that it would discuss this issue exhaustively under agenda item 7.3 and that among the points that would be considered would be to recommend changes to regulations on membership and to propose other processes that would facilitate the decision-making process.

CAGM regional focal points

2.5.4 The Council welcomed the decision of the Commission for Agricultural Meteorology (CAGM) to nominate a focal point to each regional association (RA) among Management Group members and to invite the chairpersons and co-chairpersons of the regional Task Teams on Agricultural Meteorology to actively participate in CAGM activities. The Council agreed with the recommendation of PTCs to encourage regional associations (RAs) to invite Agricultural Meteorology (AgMet) experts in their Management Group meetings or nominate an AgMet Advisor to the president of regional associations (PRAs).

Implementation of the WMO Strategy for Service Delivery

2.5.5 The Council welcomed the decision of PTCs to actively participate in the implementation of the WMO Strategy for Service Delivery by providing technical advice and guidance for mainstreaming service delivery into their respective areas of technical expertise and activities. It agreed that the role of TCs in the implementation of the Strategy was of great importance and that through the Strategy, TCs would contribute significantly to aligning WMO in tackling the major challenges facing the world including reducing the impact of severe weather hazards as well as increased social resilience. The Council discussed this issue under agenda item 4.1.

Disaster Risk Reduction as one of the WMO priorities

2.5.6 The Council noted the progress made by the DRR Focal Points of Technical Commissions and Technical Programmes (DRR FP TC-TP) since EC-65 which included reviewing and documenting existing activities, projects, initiatives, guidelines and manuals of the respective TCs and TPs. It supported the recommendation of PTCs that the DRR FP TC-TP analyse the activities of TCs and TPs and decide on the gaps and needs for the development of guidelines, recommended practices and standards for the implementation of DRR workplan, 2012–2015.

2.5.7 The Council noted that the PTCs had considered and supported the proposal by the DRR FP TC-TP for the development and implementation of an integrated operational demonstration project in Risk Analysis and Multi-Hazard, Multi-Sectoral Early Warning Systems engaging relevant TCs and Technical Programmes (TPs) and Regional Association II in South-East Asia. It noted that PTCs had further provided their recommendations regarding the proposed project. The Council discussed the proposed project in detail under item 4.2.

Impact-based forecasting and risk-based warnings

2.5.8 The Council recognized the importance of TCs in developing guidelines and standards to assist NMHSs provide high quality impact-based forecasts and risk-based warnings. It

appreciated the fact that risk-based warnings carried information that was easier to understand and to be applied by disaster responders, the public and governments. The Council appreciated that developing capacities to produce impact-based warnings was challenging and required more coordination between NMHSs and other organizations at multiple levels, as well as increased capacity to exchange and analyse disaster-related data than is currently the case. The Council therefore observed that all TCs whose roles include service delivery have a lot to contribute in ensuring that evolution by NMHSs into providing impact-based forecasts and risk-based warnings was implemented successfully. The Council discussed this issue under agenda item 2.

Proposed structure to strengthen operational centres, built upon the lessons learnt through the SWFDP

2.5.9 The Council noted that PTCs had discussed the proposal for a mechanism, built upon the lessons learnt through the Severe Weather Forecasting Demonstration Project (SWFDP). The proposal suggests development of a programme or mechanism to support operational centres through the Cascading Forecasting Process, supported through a fully funded office within the WMO Secretariat. The Council noted that this item would be discussed fully under agenda item 4.3.

The WMO International Cloud Atlas (ICA)

2.5.10 The Council strongly supported the proposal by the Commission for Instruments and Methods of Observation (CIMO) to develop a new edition of the International Cloud Atlas (ICA) as a WIGOS-related document that is fundamental to the operation of NMHSs. It noted the urgency to quickly update the ICA in view of the large media interest for the topic and the possible impact it could have on WMO's responsiveness image, were WMO to delay the update. The Council encouraged CIMO to try engaging interested partners in this activity to reduce the load on its experts and to consider the format options (web, CD and printed version) for ease of disseminating the ICA to Members having limited Internet connectivity and all others who were interested. The Council discussed this matter under agenda item 4.4.

WIGOS related WMO Technical Regulations (WMO-No. 49)

2.5.11 The Council supported the position taken by PTCs that a formal endorsement of the draft WIGOS Regulatory Material by a regular session of each technical commission was not mandatory. However, it was important to ensure support and input from all technical commissions involved. In this regard, the Council endorsed the timelines agreed upon by PTCs for the review process of WIGOS Regulatory Material leading up to submission of the draft WIGOS Regulatory Material to Cg-17 (reference paragraph 4.2.8.1, [Report of 2014 Meeting of PTCs](#)). It noted that the process ensured sufficient consultation with TCs and ICG-WIGOS.

IBCS structures and their implication for TCs

2.5.12 The Council recalled that Congress, at both its regular and extraordinary sessions in 2011 and 2012 respectively, had requested TCs to reflect on their contribution to the GFCS. In order to enable the process of the participation of TCs in the GFCS, the Council indicated that it would be desirable that the Intergovernmental Board on Climate Services (IBCS) establishes a Technical Advisory Committee (TAC) that would, among other things, account for a coordinated TCs' contribution to the implementation of the GFCS. PTCs would determine their representation in this TAC based on the forthcoming decision of the IBCS in order to facilitate effective implementation of the GFCS. It urged Members to look beyond the meteorological community when designating experts to TCs in order to ensure that TCs had at their disposal experts who had the capacity to add value to the implementation of the four pillars of the GFCS.

Collaboration with the International Organization for Standardization (ISO)

2.5.13 The Council observed that the development of standards was a very involved process, sometimes taking lengthy periods of time to get a standard finalized. The Council therefore agreed

with the proposal by PTCs that since WMO is itself a standard setting organization, the development of common WMO-ISO standards needed to be considered on a case-by-case basis, such that the additional process and workload required for the development of a common WMO-ISO is taken up only when it is expected to bring specific benefit to both organizations. It further encouraged the Secretariat to work closely with CIMO to determine whether there was a need to modify the Working Arrangements between WMO and ISO based on the experience gained to date and on the interest of the technical commissions for such collaboration.

Challenges of Aviation Meteorology: next decade and beyond

2.5.14 The Council noted that the new concepts for Air Traffic Management (ATM) proposed in the ICAO Aviation System Block Upgrades (ASBU) are expected to bring fundamental long-term changes in 5-year blocks, impacting the mode of aeronautical meteorology service delivery to a time horizon of 2028. Service delivery will change from “product-centric” to “data-centric” and “net-centric”, with increasing de-regulation, competition, regionalization, and fuzziness in boundaries between local, regional and global providers. The Council further noted that the new concepts for ATM threatened the financial and organizational viability of NMHSs in most parts of the world and thus would pose significant challenges to WMO Members. Noting that the proposals for the Meteorology related ASBUs would be tabled for international agreement at the upcoming Conjoint ICAO MET Divisional Meeting / WMO CAeM-15 session to be held at Montreal, Canada (7–18 July 2014), the Council requested the CAeM president to closely engage regional associations and Members to prepare a consolidated and strong position for the Conjoint Meeting. The Council discussed this matter under agenda item 8.1.

Consideration of effective response when receiving requests for assistance from Members

2.5.15 The Council was informed about the WMO’s response to typhoon *Haiyan* in Viet Nam. The Typhoon devastated portions of South-East Asia and caused loss of life of more than 6000 people, mostly in the Philippines, in November 2013. PTC agreed on the importance of further enhancement of GDPFS functions, particularly RSMCs for such cases. The Council also noted the usefulness of discussion made beforehand between disaster management authorities and the NHMS of Viet Nam, and recommended that relevant tropical cyclone committees/panels should discuss enhancement of such discussion to be made beforehand between the national/local disaster management authority and the NMHS. The Council was informed that the PTC had discussed the possibility of the Secretariat creating an internal standard mechanism for its internal use. The Council further discussed this matter under agenda item 4.1.

2.6 Report of the Executive Council Panel of Experts on Polar Observations, Research and Services (agenda item 2.6)

WMO Polar and High Mountain Activities

2.6.1 The Council acknowledged the efforts of the EC Panel of Experts on Polar Observations, Research and Services (EC-PORS) to strengthen working relationships on activities in the Polar Regions and High Mountain regions such as the Third Pole (Himalayan – Tibetan Plateau) among WMO constituent bodies and Programmes and with external organizations to ensure objectives are aligned and for mutual benefit and recognition. The Council emphasized that these relationships strengthen WMO’s observations, research and services in the Polar and High Mountain regions which will be beneficial for all WMO Members, and a significant contribution to the GFCS.

2.6.2 Although WMO was not successful in 2013 in achieving observer status with the Arctic Council as an International Organization, the Council agreed with EC-PORS that WMO should seek observer status at the next opportunity.

2.6.3 EC agreed that a continuing effort was needed to improve services in high latitude and high altitude regions by promoting observations and predictive capability on all timescales, while ensuring an integrated approach to understand the global impact of changes in these regions so

that required services may be provided. The Council agreed to ensure that WMO Polar and High Mountain Activities support the WMO Strategic Plan 2016–2019 and beyond and agreed that a draft resolution on WMO Polar and High Mountain Activities be submitted to Cg-17.

2.6.4 The Council was concerned about the decreasing tropical ice sheets. It noted that there are only three high tropical mountain areas that still have vast snow cover, but rapidly decreasing, that is in Kenya, Peru and Indonesia. The Council agreed that the Panel, through the Global Cryosphere Watch, should further engage with the World Glacier Monitoring Service (WGMS) to monitor these glaciers using appropriate in-site and space technologies. The Council was informed that Indonesia had been active in doing research on the remaining tropical glacier in Papua Indonesia and that this will contribute to the Global Cryosphere Watch and High Mountain Activities of WMO.

2.6.5 The Council was informed that the China Meteorological Administration (CMA) will implement the Third Tibetan Plateau Atmospheric Scientific Experiment (TIPEX-III) from 2014 to 2023. It recommended that TIPEX-III be a component supporting the WMO Polar and High Mountain Activities and had encouraged the collaboration of WMO's relevant programmes with the TIPEX-III and the involvement of scientists from Members.

Arctic and Antarctic Observing Systems

2.6.6 The Council acknowledged the oversight provided by EC-PORS and its Antarctic Task Team (ATT) for WMO Antarctic responsibilities and coordination within Polar Regions. The Council acknowledged the contribution of the British Antarctic Survey (BAS) as a dedicated monitoring centre for the WMO Antarctic Observing Network (AntON) as the CBS Lead Centre for GCOS. It recognized the effort of the ATT in maintaining the list of AntON stations working with other organizations (e.g. SCAR, IAATO) to increase data availability, encouraging Member States to deposit their metadata and contributing to WMO regulatory material within WIGOS. These efforts are essential in keeping the observing system operating in this harsh environment. The Council agreed that the draft resolution on the Antarctic Observing network (AntON), including the list of stations currently comprising AntON, be submitted to Cg-17.

2.6.7 The Council acknowledged the strengthened cooperation with other polar international organizations, including the Antarctic Treaty System (ATS), the Council of Managers of National Antarctic Programs (COMNAP) and the International Ice Charting Working Group (IICWG). This collaboration is seen as essential in strengthening WMO's technical and scientific capabilities in Polar Regions. Members are urged to support these collaborative efforts whenever and wherever possible.

2.6.8 The Council acknowledged the important coordination efforts of the WMO Polar Space Task Group (PSTG) among all space agencies. The Council agreed that it is important to make the case that satellites ensure the integration between satellites and in-situ observations at Polar Regions and supported EC-PORS efforts to provide advocacy to sustain surface-based ground-truthing for calibration and validation of satellite observations and products. The Council acknowledged that the Global Cryosphere Watch (GCW) CryoNet is being designed to include calibration/validation support for satellite missions.

Polar Regional Climate Centres and Outlook Forums

2.6.9 The Council noted that EC-PORS assigned its Services Task Team the responsibility of exploring the potential for Polar Regional Climate Centres (PRCC) and Climate Outlook Forums for the Arctic, Antarctic and Third Pole regions to be in close alignment with the implementation of the GFCS. It concurred that a regional rather than national approach would be appropriate. The Council noted that the Canadian FastStart contribution would help facilitate efforts in the Arctic and Third Pole regions. The Council urged GFCS and the World Climate Programme to continue to develop a vision for climate services provision in these regions aligned to the WMO RCC framework and to provide an update at Cg-17.

Global Integrated Polar Prediction System

2.6.10 The Council urged the WWRP and WCRP to continue their efforts to achieve a seamless prediction capability as is envisioned by the Global Integrated Polar Prediction System (GIPPS) which can support the services required in those regions. The Council also noted that the linkage between polar and lower-latitude regions will receive a concentrated effort. The Council noted the progress to date, especially by the Polar Prediction Project, and expressed its support for the planned Year of Polar Prediction centred on mid-2018. The Council agreed that a draft resolution on the GIPPS should be submitted to Cg-17 for consideration.

Global Cryosphere Watch (GCW)

2.6.11 The Council noted the recommendation of the fifth session of EC-PORS regarding the development and implementation of the GCW, in particular the proposal of its governance and the establishment of the GCW Steering Group (GSG) that would provide high level guidance and general direction on GCW implementation and its further development through an appropriate mechanism to be agreed upon by the Congress. The inclusion of partners on the GCW Teams, in specific tasks and on the GSG, is recognized as critical for the long-term success of GCW as a cross-cutting initiative.

2.6.12 The Council acknowledged the significant progress by GCW in developing and implementing the tasks identified in the GCW Implementation Plan (GCW-IP), including the development of the core GCW observing network called CryoNet, preparation of initial regulatory material for WIGOS, tangible progress on the observation and exchange of in-situ snow depth data, and the satellite snow products intercomparison and evaluation exercise being supported by the European Space Agency (ESA). The Council noted that the GCW website and GCW data portal and catalogue are now operational and provide a useful outreach mechanism.

2.6.13 The Council acknowledged that GCW is a cross-cutting activity with interests extending globally and for which partnerships are critical. The Council noted that the resources of the GCW Coordination Office, that is required to provide GCW with the support for ongoing development and implementation of its programme, would be reflected in the budget proposal for the seventeenth financial period. The Council urged Members to support the operation of CryoNet stations and support efforts to improve exchange of all cryosphere data for the benefit of weather, climate and water, and related environmental research and operations, including the GFCS.

2.6.14 The Council concurred with the decision of EC-PORS to approve the proposed GCW working structure, the Terms of Reference and membership of the GSG, the process for the establishment of CryoNet, including its initial sites and criteria for inclusion of the candidate sites into CryoNet, and the GCW partnership criteria. The Council noted that EC-PORS reviewed the GCW Implementation Plan (GCW-IP) and agreed that it be submitted to Cg-17 for consideration. The Council also agreed that GCW should be mainstreamed and implemented in WMO Programmes as a cross-cutting activity and requested EC-PORS to provide oversight and guidance to GCW for its development and implementation. The Council noted a strong EC-PORS request for an appropriate level of regular budget funding of the core GCW functions and urged Members to continue contributing to the GCW Trust Fund to allow activities to continue throughout 2014–2015 at an accelerated pace. The Council recommended that the draft GCW resolution, including the GCW-IP, be submitted to Cg-17.

International Polar Partnership Initiative (IPPI)

2.6.15 The Council noted the evolution of the International Polar Initiative (IPI) to the current International Polar Partnership Initiative (IPPI) and that the revised IPPI Concept document had been reviewed by EC-PORS. The Council stressed that the IPPI should enable WMO to fulfil its responsibilities more effectively and efficiently, within budgetary resources, and recommended that the Concept document need to be further elaborated to: (a) clearly articulate activities and tangible outcomes that are cost-effective; (b) address WMO objectives; and (c) articulate benefits to national programmes. The Council acknowledged that there are potential synergies with initiatives

of other organizations, and recognized that more work needs to be done by the IPPI Steering Group before bringing a document to all parties for consideration. The Council restated that GCW and GIPPS remain tangible contributions by WMO to an IPPI. The Council requested EC-PORS to ensure any concerns within WMO and external parties are addressed before submission of a draft IPPI resolution to Cg-17.

Draft Resolutions for consideration by Cg-17

2.6.16 The Council noted that the Panel, in responding to Cg-XVI decisions, had developed six proposals for resolutions for consideration by the Seventeenth WMO Congress, namely: (a) the Revision of the Manual on the GOS, Volume II, The Antarctic; (b) the continuation of the Antarctic Observing Network (AntON); (c) the Global Integrated Polar Prediction System (GIPPS); (d) the WMO Polar and High Mountain Activities; (e) the International Polar Partnership Initiative (IPPI); and (f) the Global Cryosphere Watch (GCW). The Council reviewed these draft resolutions as provided in [Annex I to the present report](#) and requested the Secretary-General to take this into account when preparing relevant Congress documents for Cg-17.

3. GLOBAL FRAMEWORK FOR CLIMATE SERVICES (agenda item 3)

3.1 Outcomes of the first session of the Intergovernmental Board on Climate Services (IBCS-1) (agenda item 3.1)

3.1.1 The Council recalled the decisions of the first session of the Intergovernmental Board on Climate Services (IBCS-1) held in Geneva, Switzerland in July 2013, which included: (a) adoption of the Implementation Plan of the GFCS (with its Annexes and Exemplars), and projects and activities contained in the Compendium of initial GFCS projects for immediate implementation; (b) establishment of a Partners Advisory Committee (PAC) as a stakeholder engagement mechanism; and (c) establishment of the Management Committee of the IBCS.

3.1.2 The Council noted the organization of a one day workshop entitled “*Operational Climate Services: a dialogue on practical action*” that provided an opportunity to demonstrate the need to implement the five components of the GFCS as an organized and coordinated system, which would maximize synergies in addressing the entire value chain for the production and application of climate services in the initial four priority areas.

3.1.3 The Council was pleased to note that the Secretary-General had invited partner agencies to join the PAC and that some partners had started submitting to the GFCS Office their applications to join the PAC. The Council further noted that efforts to mobilize the support of partners for the implementation of specific activities in support of Members are underway. Specific support is being provided to the World Bank (WB) and the United Nations Development Programme (UNDP) to inform the design of their support to National Meteorological and Hydrological Services of Member countries. Efforts are also underway to reflect GFCS priorities under eligible activities of entities such as the European Commission through Copernicus and Horizon 2020, the Green Climate Fund and others. The Council requested the Secretary-General to continue his efforts to enhance the engagement of partners and stakeholders and promote alignment and synergy of their activities with those planned or under development through the GFCS.

3.1.4 The session noted that some Members had established frameworks for climate services at national level. Belize, China, Germany, Nigeria, Senegal, South Africa, Spain, Switzerland and the United Kingdom have launched their initiatives. In some cases the process is initiated with national consultations supported by the GFCS Office that enable the identification of key gaps and needs and provide lessons which are being used for the development of guidelines to support countries in establishing their frameworks. In addition, the GFCS Office supported the participation of Directors of NMHSs (or their representatives) to a meeting in Barbados with the disaster management community on the GFCS. The Council noted that costs considerations may preclude the GFCS Office from directly supporting all national consultations and thus encouraged

representatives from Regional Climate Centres and Members to participate in regional and national consultations of neighbouring countries to familiarize themselves with the process of organizing and structuring such consultations. Furthermore, the Council urged Members to establish their frameworks for climate services and to communicate to the GFCS Office whenever these are established.

3.1.5 The Council further noted efforts to support climate services at regional level with the organization of regional consultations that facilitate the development of concrete action plans. Regional consultations were held for the Caribbean and Pacific Islands. Additional consultations are planned for Latin America (28–30 July 2014), South Eastern Europe (TBD) and the Middle East (TBD).

3.1.6 The Council noted efforts to implement activities contained in the GFCS Implementation Plan, through specific projects. Projects funded by Norway are underway in the United Republic of Tanzania and Malawi, while others are under formulation for the Small Island Developing States (SIDS) in the Indian Ocean, Caribbean and Pacific regions, as well as Central and South-East Asia and Polar Regions. In this regard, the Council acknowledged the contributions of Members that are allowing the implementation of these activities, including Norway, Canada and Australia. In addition, in order to optimize NMHSs participation in the implementation of GFCS-related projects and activities, the Council requested that where possible, this should be done in conjunction with WMO projects e.g. WIGOS implementation. Furthermore, the Council emphasized the importance of ensuring the visibility and the role of NMHSs in providing climate services under the GFCS. In this regard, it stressed the need to enhance the capacity of NMHSs so as to allow them to effectively contribute to the development and application of climate services.

3.1.7 The Council stressed the importance of ensuring the participation of the experts from the other partner agencies in the implementation of GFCS. The Council noted that the GFCS Office is planning a consultative meeting with WMO Technical Commissions and those of partner agencies and that the outcomes would be reported to IBCS-2 for discussion.

3.1.8 The Council welcomed the contributions provided and pledged by the following Members: Australia (CHF 484,000), Bangladesh (CHF 1,776), Canada (CHF 5,796,000), China (CHF 200,000), Finland (CHF 461,700), France (CHF 62,000), Hong Kong, China (CHF 9,520), India (CHF 118,000), Islamic Republic of Iran (CHF 9,920), Ireland (CHF 488,400), Norway (CHF 18,885,000), Republic of Korea (CHF 126,368), Switzerland (CHF 1,250,000), United Kingdom (CHF 350,000), South Africa (CHF 20,000) and Qatar (CHF 125,000). In this regard, the Council noted that most of the contributions to the GFCS Trust Fund were earmarked for the implementation of specific project activities used in accordance to the terms stipulating the eligible activities agreed between the donor and WMO. In addition, the Council appreciated the various in-kind contributions that have been made by various Members for improving climate services by seconding experts to the GFCS Office and facilitating the organization of various GFCS-related activities. The Council was pleased to note that candidates from China and the Republic of Korea have been selected to join the GFCS Office.

3.1.9 The session also noted the hosting of National Climate Outlook Forums (NCOF) by the WMO as an initial stage for the Implementation of the User Interface Platform (UIP) in countries where effective user interfaces do not exist. A first meeting was held in Maputo, Mozambique in March 2014 and plans are under way to conduct NCOF meetings in Belize and Myanmar.

3.1.10 The Council noted that, through bilateral and regional cooperation, some Members are already supporting the implementation of GFCS-related activities in various parts of the world outside the purview of the GFCS Office. In this regard, the Council noted that Members would be invited to report their activities that contribute to the implementation of the GFCS based on revised criteria for designation of projects as contributing to the GFCS approved by IBCS-1. The Council urged Members to report their activities at the earliest opportunity, when so requested.

3.1.11 The Council noted that sharing of information, lessons learnt and good practices among Members would contribute to enhanced implementation of the GFCS. In this regard, the Council

stressed that the GFCS Office should facilitate the collection of such experiences from Members with a view to sharing them broadly.

3.1.12 The Council noted the current efforts to ensure that the roles and contributions of the various stakeholders to the implementation of the GFCS for realizing the results defined for the 2-, 6-, and 10-year time frame are identified. In this regard the session noted the preparation of a meeting expected to develop a matrix where the specific contributions of the various actors, including WMO constituent bodies, partner agencies and key stakeholders will be depicted. This will enable alignment of activities and effective monitoring and evaluation of progress in implementing the GFCS.

3.1.13 The Council noted with concern the low level of contributions for the organization of the second session of the Intergovernmental Board on Climate Services scheduled for 10–14 November 2014 in Geneva, Switzerland. The Council further noted that only Switzerland had contributed CHF 150,000.00 to support the organization of the session. The Council noted that a minimum of CHF 662,000.00 is required for the organization of a session of the IBCS and urged Members to come forward with contributions to enable the organization of the second session of the IBCS. The Council stressed the need for the IBCS to come up with a well-considered plan for the funding of future sessions of the IBCS that could include funds from partner organizations that stand to benefit from the implementation of the GFCS.

3.1.14 The Council adopted [Resolution 4 \(EC-66\) – Outcomes of the first session of the Intergovernmental Board on Climate Services](#).

3.2 WMO contribution to the GFCS (agenda item 3.2)

Report of the Task Team on the WMO Policy for International Exchange of Climate Data and Products to Support the Implementation of the GFCS

3.2.1 The Council took note of the verbal report by the Chairperson of the Task Team on the WMO Policy for International Exchange of Climate Data and Products to Support the Implementation of the GFCS. The Council noted that the Task Team had met in Geneva from 12–14 November 2013 and prepared a draft resolution on the WMO Policy for International Exchange of Climate Data and Products to Support the Implementation of the GFCS for consideration by EC-66, prior to submission to Cg-17. The Council noted that the Task Team had identified a number of issues that required further discussion in the report of its meeting.

3.2.2 The Council further noted that there had been an opportunity for the draft resolution to be examined by the EC Working Group on Strategic and Operational Planning (EC WG SOP) in February 2014. The EC WG SOP was, in general, pleased with the directions taken and output from the EC Task Team. Based on their discussion of the documents (including the draft resolution and its Annex) the Group raised an additional number of topics that should be taken into consideration by EC during its deliberations.

3.2.3 The Council thanked the Task Team for the effort it had made in bringing a draft resolution forward for its consideration.

3.2.4 The Council noted that a value proposition on the benefits to be obtained from the International Exchange of Climate Data and Products to Support the Implementation of the GFCS had been prepared in support of the draft resolution (see [Annex II to the present report](#)). The Council examined the value proposition document and gave the following guidance:

- (a) The benefits realized from climate data and products are greatly enhanced when combined with socio-economic information. Linking physical and social science information enables a wide range of societal benefits and enhances decision support. Sources of this socio-economic information may be from other UN-sponsored or -related programmes. Furthermore, countries possess considerable visualization, forecast, and decision-support capabilities that could be shared to the benefit of all. The

value of these tools and capabilities is traceable directly to practices of free and open data and products exchange. The greater the availability and sharing of the data, then the greater the applicability and accuracy of these tools and capabilities, which for society supports ready, responsive, and resilient communities;

- (b) The issue of investments in long-term infrastructure and sustainability of observation systems remains of considerable concern to a number of Members and guidance on mechanisms by which NMHSs can address such issues while implementing the resolution will be required.

3.2.5 The Council also reviewed and revised the draft resolution (see [Annex III to the present report](#)).

3.2.6 The Council noted that the twelfth session of the Consultative Meeting on High-level Policy on Satellite Matters (CM-12) had discussed the WMO Policy for International Exchange of Climate Data and Products to support the implementation of the GFCS, from the perspective of the architecture for climate monitoring from space. While the session expressed strong support to the general approach proposed by the ECTT, it recommended that the draft resolution be reviewed by space agencies, taking into account the challenges of ensuring generation and long-term preservation of satellite-based climate data records. The consultative meeting also emphasized the potential for inclusion of other observations, in addition to those mentioned as “climate relevant essential data” in the annex to the draft resolution. The Council requested the Secretary-General to inform space agencies of this draft resolution so that their feedback could be provided at Cg-17 through Members connected with the Coordination Group for Meteorological Satellites (CGMS) and the Committee on Earth Observation Satellites (CEOS), among others.

Report of the EC Working Group on Climate and related Weather, Water and Environmental Matters (ECWG-CWE), 10–12 December 2013

3.2.7 The Council noted that the EC Working Group on Climate and related Weather, Water and Environmental Matters (ECWG-CWE) considered important overarching issues relevant to the GFCS.

3.2.8 The Council noted that at the last ECWG-CWE (Geneva, 10–12 December 2013), the Group reviewed its ongoing work and also deliberated on its future work and has recommended the possible continuation of the Group in the next financial period under a simplified name as “EC Working Group on Climate and Related Matters” (ECWG-CRM) and revised Terms of Reference (see [Annex IV to the present report](#)). The Council deferred the discussions to EC-67 for further consideration.

3.2.9 The Council noted that the ECWG-CWE had emphasized the importance in integrating and coordinating climate relevant activities across the Programmes in WMO. The Council noted with appreciation that the Secretary-General had strengthened such coordination to address relevant climate matters including WMO contributions to the implementation of GFCS.

3.2.10 The Council noted the progress report of the programme on Research on Climate Change Vulnerability, Impacts and Adaptation (PROVIA) and recommended that the GCOS Secretariat and GCOS Scientific Steering Committee as well as the WCRP Joint Planning Staff and GCOS Joint Scientific Committee should liaise with the PROVIA Secretariat hosted by the United Nations Environment Programme (UNEP) in Nairobi and PROVIA Scientific Steering Committee to extend collaboration on joint research interests and share lessons learnt in establishing a fully operational programme under the World Climate Programme (WCP). The Council recognized that close interaction among the four components of the WCP provides a strong basis for contribution to the implementation of the GFCS as well as other initiatives such as the Warsaw International Mechanism for Loss and Damage Associated with Climate Change Impacts, adopted by COP 19 of the UNFCCC.

3.2.11 The Council further noted that, in terms of agreement on a universal definition for “Climate Services”, there is some amount of ambiguity in the use of this term as pointed out by the ECWG-CWE. In the WMO framework, as proposed by the High Level Task Force for the GFCS, the “Climate Services” are considered to involve the provision of information on the state of the actual and expected future states of the climate system. In the GFCS Implementation Plan, “Climate Services” are characterized to enable society to manage better the risks and opportunities arising from climate variability and change. The Council recognized the need for further clarification on the definition of “Climate Services”, by a competent body such as the WMO Commission for Climatology (CCI), to enable a better understanding of the goals of the different activities of all GFCS stakeholders, taking into account the High Level Task Force report.

WMO Contribution to the Implementation of the GFCS

3.2.12 The Council noted and was appreciative of the considerable contributions being made by the WMO to the implementation of the GFCS. The Council noted that technical activities associated with WMO’s contribution to the implementation of the GFCS were addressed under agenda item 4 as part of the relevant Expected Results.

4. IMPLEMENTATION OF THE WMO STRATEGIC PLAN 2012–2015 (agenda item 4)

4.1 Service Delivery (agenda item 4.1)

Enhanced capabilities of Members to deliver and improve access to high-quality weather, climate, water and related environmental predictions, information, warnings and services in response to users’ needs, and to enable their use in decision-making by relevant societal sectors (ER 1)

Report of the Executive Council Working Group on Service Delivery

4.1.1 The Council noted with appreciation the report of the Chairperson of the Executive Council Working Group on Service Delivery (ECWG-SD) on the work of the Working Group which had convened in Geneva, Switzerland, March 2014. (The meeting report can be accessed online at the following web link: http://www.wmo.int/pages/governance/ec/tor_en.html#disaster.) The Council recalled that the Working Group had been established by the Executive Council, with the overall mandate of providing guidance on service delivery with particular attention to strengthening coordination among WMO Programmes and constituent bodies in the delivery of meteorological and hydrological services.

4.1.2 The Council agreed that service delivery lay at the heart of the WMO mission and daily work. The Council shared the conviction of the Working Group that raising the standards of service delivery was vital for the success of Members as service providers and their goal of enhancing the visibility of National Meteorological and Hydrological Services (NMHSs) and attracting new resources to strengthen their capacity. Attention to the importance of service delivery had started to grow with the adoption of The WMO Strategy for Service Delivery (herein referred to as “the Strategy”) by Cg-16 and the approval by the sixty-fifth session of the WMO Executive Council (EC-65, Geneva, May 2013) of the Implementation Plan (herein referred to as the IP) for The WMO Strategy for Service Delivery. The Council shared the satisfaction of the Working Group that the steady recognition of the importance of service delivery had culminated in the inclusion of service delivery as a priority in the WMO Strategic and Operating Plan (2016–2019), and agreed that this sent a strong signal at all levels of the Organization about the recognition of the importance of service delivery by WMO.

4.1.3 The Council endorsed that service delivery needed to be considered as the core business of WMO and that it should be integrated in a harmonized and holistic approach, based on the attributes and principles of effective service delivery as contained in The WMO Strategy for Service Delivery and its Implementation Plan, into all WMO Programmes, in particular Public Weather Services (PWS) and Disaster Risk Reduction (DRR) programmes. It agreed that

Members should be assisted to implement service delivery in a practical manner, recognizing sectoral requirements by users through training, developing guidance, and sharing best practices.

4.1.4 The Council was of the opinion that in view of the high priority status of service delivery in the WMO Strategic and Operating Plans (2016–2019), it was crucial that coordinated mechanisms be put in place to ensure continuation of the work of the Working Group as a mechanism for the implementation of the Strategy, especially as regards social and economic benefits, impact-based information, public/private partnerships, Common Alerting Protocol (CAP) and social media.

4.1.5 The Council endorsed the overarching recommendations on service delivery formulated by the Working Group, along with the mapping of these recommendations against the six Strategy Elements of the Service Delivery Implementation Plan. The recommendations are as follows:

- (a) Following the acknowledgement by Cg-16 of service delivery as one of the Strategic Thrusts of WMO, adoption by Congress of the Strategy, and the subsequent approval of the Strategy IP by EC-65, service delivery should be integrated in a harmonized and holistic approach, based on the attributes and principles of effective service delivery as contained in the Strategy and its IP, into all WMO Programmes and through design and implementation of demonstration projects;
- (b) Relevant technical commissions, with the support of the Secretariat, should take action to raise the level of the existing and future service delivery guidance materials within a regulatory framework for assisting Members in fulfilling their national service delivery mandates;
- (c) The Secretariat should take concrete steps to promote quality management in areas beyond aeronautical meteorology;
- (d) In order to sustain improved, efficient and effective service delivery, the Secretariat and relevant TCs are encouraged to put in place mechanisms to ensure the flow of science and technology into operations and service delivery;
- (e) Members, with assistance from regional associations, are encouraged to pay special attention to performance measurement and continuous improvement, as a critical element in building a service-driven culture.

4.1.6 The Council adopted [Resolution 5 \(EC-66\) – Implementation of the WMO Strategy for Service Delivery](#).

Aeronautical Meteorology

Institutional and management issues

Implementation of QMS

4.1.7 The Council noted the progress made by Members in implementing quality management system (QMS) for aeronautical meteorological services. It was recalled that the ICAO and WMO requirement for ISO 9000 certification was a recommended practice, thus not necessitating a formal notification of non-compliance as per Article 9 b) of the Convention. Nevertheless, it has been proven that the ISO certification was the best practice that ensures credibility and confidence with the aviation users. In this regard, the Council noted the recent information on the number of Members per Region who have completed the QMS implementation and achieved ISO 9000 certification, as follows: Region I – about 25%; Region II – about 35%; Region III – about 30%; Region IV – about 20%; Region V – about 50%; and Region VI – about 90%. Furthermore, the Council noted that the QMS implementation has been progressing well for most Members who have not achieved yet ISO certification, with the exception of 18 Members where no implementation activities have been reported. It was noted in particular that in Region I,

the effort was supported by several VCP projects and ASECNA actions with the expectation that the number of ISO certified service providers will grow by the end of this year.

4.1.8 The Council expressed concern of the presented monitoring data on the implementation of QMS with most of the Regions still far below 50% with regard to ISO certification. Such a situation affects the credibility of the NMHSs and other aviation meteorology service providers and has a negative impact on their attempts to establish cost-recovery mechanisms. The Council also noted reported difficulties to cost-recover the cost of establishment and maintenance of QMS, and for competency assessment. The Council noted the concerns in RA I with regard to the expressed commitment from the AMCOMET, which accorded high priority to QMS implementation by the African NMHSs, but which was not followed by sufficient support for practical realization. In seeking efficient methods to assist Members, the Council encouraged the developed Members to further support countries in need of assistance related to QMS and cost-recovery know-how. It noted that the developed NMHSs have a potential to help through coaching and mentoring less developed NMHSs to meet the requirements and enhance their services to aviation.

4.1.9 The Council appreciated the effective monitoring by the Secretariat with regard to the implementation of QMS through a well-developed system of national focal points (quality managers). The feedback from Members showed clearly that introduction of quality management in the provision of meteorological service to aviation was a highly useful process bringing new culture to the service providers. It was also noted that the ISO 9000 compliant QMS, once established, would require continuous effort to sustain and undergo regular checks and re-certification, thus, the NMHSs and other service providers should plan resources accordingly. The Council reaffirmed its strong encouragement to all Members to complete and sustain the QMS for aviation and requested the Secretary-General to continue supporting the QMS activities, in particular, identifying and addressing the problems in those countries where implementation has not been initiated.

Future of WMO Quality Management Framework

4.1.10 The Council welcomed the work of the strongly motivated Commission for Aeronautical Meteorology (CAeM) Task Team on QMS (TT-QMS) which had delivered a set of highly useful resources and tools to minimize the cost of establishing a QMS. It was appreciated that the Guide for Implementing QMS was deliberately kept simple and pragmatic, including a basic, but effective risk analysis of organizational risks for service providers and countries. The Council noted that many other WMO Programmes have approached the team for support, and have taken on board many of the resources developed for aviation. It was recalled that the WMO Strategy for Service Delivery referred to the QMS as a vital approach to all service areas and steps have been undertaken to promote QMS in the provision of services having important safety implications, such as marine, hydrology, DRR, etc. The Council agreed that quality management was becoming a requisite function and managerial practice to be promoted through different service delivery areas. This would require further guidance and capacity development by a suitable multi-disciplinary body, supported by adequate resources within the Secretariat; moreover, a new ISO 9001:2015 Standard was coming in 2015 with some fundamental changes, including a focus on leadership and risk management. The Council requested the president of CAeM to ensure that the current TT-QMS would continue working until the end of the current financial period and support the transition to a new QMF structure to be decided by Cg-17. The Council further recommended the inclusion of organizational risk analysis for service providers and Members in future updates of the guiding documents on QMS implementation, in order to assist Members in implementing such risk analysis.

Implementation of competency standards for aeronautical meteorological personnel

4.1.11 It was recalled that during the intersessional period the provisions concerning the required competencies for aeronautical meteorological personnel (AMP), including aeronautical meteorological forecasters (AMF) and aeronautical meteorological observers (AMO), included in the WMO *Technical Regulations* (WMO-No. 49, Volume I, Chapter 5), became standard practices as of 1 December 2013. Therefore, all Members were expected to undertake the necessary

measures to ensure compliance with those standards and inform the Secretariat thereof. Noting that the preparation for the implementation of the competency requirements have been initiated by the CAeM Expert Team on Education, Training and Competencies (ET-ETC) well before the target date, the Council appreciated the ample guidance developed and made available, including on-line resources (<http://www.caem.wmo.int/moodle/>), to assist Members in the competency assessment of their AMP. Training workshops on competency assessment have been carried out in almost all Regions with the remaining one for Region III scheduled for November 2014 in Buenos Aires, Argentina. The Council appreciated the assistance provided by a number of Members in conducting training events and developing on-line resources in support of achieving worldwide compliance with the competency standards.

4.1.12 The Council was informed that the Secretariat was monitoring the status of implementation of the competency standards through various means and communication channels. However, it expressed concern about the low rate of response from Members to the circular letters issued by the Secretary-General to collect official information on the implementation. This situation did not allow building a reliable authoritative statistics of the attained compliance at regional and global scale. With regards to the low rate of response, the Council requested the Secretariat to investigate the underlying reasons and to devise new mechanisms for improving the rate of response. The Council felt that the regional associations through their relevant subsidiary bodies should play a proactive role in monitoring the implementation of the competency standard and identify any needs for assistance to their Members. The Council also urged those Members who have not yet informed the Secretariat on the status of implementation to do so as soon as possible. The Council appreciated the Secretariat's reporting on the status of the QMS implementation and urged the Secretariat to adopt similar rigorous tracking and reporting practices as related to the equally important implementation of competency standards for aeronautical meteorological personnel.

Qualification standards

4.1.13 The Council further recalled that the qualification requirements for AMF in the WMO Technical Regulations will become a standard practice on 1 December 2016. The Council emphasized that the preparation for compliance with those requirements should be initiated in due time to avoid a big lag between the date of coming into force and the actual implementation by Members. The Council requested the CAeM and its ET-ETC, supported by Secretariat, to provide clear guidance on the necessary steps to be undertaken by Members and relevant training institutions in order to facilitate national implementation actions and resource planning.

Cost-recovery

4.1.14 Related to the implementation of QMS and competency requirements, a number of developing Members were still in need of assistance in establishing an adequate cost-recovery mechanism for the provision of meteorological service to aviation. It was noted that lack of, or inadequate, cost-recovery was affecting mostly NMHSs providing meteorological service for aviation but poorly connected with the national aviation stakeholders due to administrative reasons (i.e., NMHS not under the Ministry of Transport). The Council acknowledged that several VCP-funded projects were on-going in Region I and Region II in an attempt to promote the best practices in cost-recovery and establish the needed national agreement between the stakeholders that would enable the NMHSs to start recovering costs following the relevant ICAO and WMO guidance. It was expected that more requests for such projects would be coming from Members in the near future. Development of an appropriate cost-recovery mechanism for those Members with low traffic volumes (i.e., the small island States), with due consideration of the specifics of the flight operations, should also be considered. The Council encouraged Members to share existing different cost-recovery mechanisms that would be beneficial for those Members in need of developing their own cost-recovery arrangements and requested the CAeM and the Secretariat to continue their assistance to NMHSs in developing countries to implement cost recovery.

4.1.15 The Council was informed of the Northern Europe Aviation Meteorology Consortium, NAMCON, which have been formed with the aim of establishing multinational service provision to gain efficiency and decrease costs of services through subregional cooperation. The Council considered NAMCON as an example of possible cooperative arrangements that would allow Members to meet the future challenges.

4.1.16 The Council was aware that the cost-recovery issue was not unique for the developing countries. It was noted that some developed Members, whose NMHSs budget was highly dependent on revenue from the aviation sector, were also concerned with the ability to sustain those revenues in view of the expected changes in the business model for service provision including the trend for regionalization or even globalization of services. Therefore, the Council requested the CAeM, supported by the Secretariat, to accord high priority to the issue of cost-recovery in its future work programme and expand the existing guidance on the subject building on best practice of Members and risk analysis of changing service provision modalities.

4.1.17 The Council noted that in an increasing number of Members, the meteorological services for aviation are provided outside the NMHSs by non-governmental entities. In those Members, the transfer of such services which have been provided by NMHSs to private entities will impact on the role of their NMHSs. The Council requested the Secretary-General and the CAeM to support Members through appropriate guidance in this changing framework to secure the observation of WMO and ICAO regulations and policies with regard to the role of designated meteorological authority, the NMHSs and their infrastructure, and PRs as interface between private service providers and WMO Programmes and governance.

4.1.18 The Council further noted that the expansion of the private sector in the provision of aeronautical meteorological services may have a negative impact not only on the capabilities of NMHSs to provide services to aviation, but also to their basic infrastructure. Some Members were of the view that a possible response by NMHSs could be to reduce the exchange of the aeronautical meteorological information, which may necessitate a review of the WMO regulations and procedures related to aeronautical meteorological data exchange, in particular, Resolution 40 (Cg-XII) and WMO Publication No. 9, Volume C.

4.1.19 The Council agreed that the issue of cost-recovery should be approached from a risk management perspective. There is a need to assess risks stemming from expected changes in service provision in the future. Such risk assessments should be done at national level since risks are different for each country and should cover, inter alia, the implementation of QMS and *competency* standards with respective roadmaps and milestones. Assessments should also include different scenarios related to the cost-recovery from aviation, including its eventual cessation, and how this would affect the capacity of other programmes and services. The Council recommended that such risk analysis should be conducted before next Congress to allow better assessment of risks and impacts and requested the president of CAeM to coordinate such activities.

Enhancement of meteorological service for aviation

Large scale, high impact aviation hazards

4.1.20 The Council noted the extensive cooperation between WMO, ICAO, IATA and other international and national stakeholders associated with on-going and emerging aviation service delivery requirements for large scale, high impact aviation hazards, such as, volcanic ash, space weather and nuclear emergencies. The Council was informed that the eighth meeting of the ICAO International Airways Volcanic Watch Operations Group (IAVWOPSG/8), held at the Australian Bureau of Meteorology in Melbourne in February 2014, endorsed a Concept of Operations for space weather information in support of international air navigation to be considered by the Conjoint ICAO/WMO MET Divisional Meeting in Montréal in July 2014. It was noted that provisions for an operational space weather service will become effective through the forthcoming Amendment 77 to ICAO Annex 3 / WMO-No. 49, Volume II, as of November 2016. The Council

appreciated the instrumental role of the CAeM/CBS Inter-Programme Coordination Team on Space Weather (ICTSW) in developing the scientific background and requested ICTSW to continue providing relevant advice and recommendations on the establishment of adequate international structure for the operational provision of space weather service and requested the CAeM and CBS to consider the need for operational expertise within the membership of ICTSW to carry out this work.

4.1.21 The Council noted further that a Concept of Operations for the provision of information about the release of radioactive material into the atmosphere in support of international air navigation and a Volcanic Ash service delivery “Roadmap” have also been developed for consideration by the Conjoint ICAO/WMO MET Divisional Meeting. The Council agreed that WMO should continue playing a leading role in the exchange of knowledge and experience related to the underpinning science and technology for detection, analysis and forecasting of high impact aviation hazards. In this regard, the Council commended the highly successful workshop on Ash Dispersal Forecast and Civil Aviation (November 2013, Geneva) organized conjointly by WMO, IUGG, UK Met Office, British Geological Survey, University of Geneva, other international organizations, industry and academia partners.

4.1.22 The Council was further informed that IAVWOPSG/8 had delegated several tasks relating to the science of volcanic ash monitoring and modelling to the WMO-IUGG Volcanic Ash Scientific Advisory Group (VASAG). The Council, whilst fully supporting the ongoing fruitful cooperation between WMO and IUGG, encouraged the VASAG to review its terms of reference after the Conjoint ICAO/WMO MET Divisional Meeting in July 2014 with a view to proposing any necessary amendments for consideration by EC-67.

4.1.23 The Council appreciated the participation of the Members and their NMHSs in the exercises organized by ICAO to check the coordinated actions by the operational aeronautical meteorological offices and other air navigation service providers in the case of volcanic ash and encouraged further participation in those exercises.

MET Services to ATM and MET Information Exchange

4.1.24 The Council appreciated the intensive work being undertaken in developing an agreed set of functional requirements for meteorological information and services in support of Air Traffic Management (ATM) as part of the ICAO’s Aviation System Block Upgrades (ASBU) approach. For WMO, this work was coordinated by the CAeM Expert Team on MET Services to ATM and MET Information Exchange (ET-M&M). The team worked in close cooperation with various ICAO bodies and other stakeholders, such as Eurocontrol, in documenting the current and foreseen capabilities needed to enable the so-called “trajectory-based operations (TBO)”. The Council noted that these issues will be in the focus of the Conjoint ICAO/WMO MET Divisional Meeting and requested the CAeM to establish an appropriate subsidiary body at its fifteenth session (July 2014) to pursue further the ATM-related tasks which will be of primary importance for the future of aviation MET services.

4.1.25 The Council further noted the work completed by the CBS OPAG-ISS Task Team on Aviation XML (TT-AvXML) to enable the exchange of the meteorological messages METAR/SPECI, TAF and SIGMET in XML/GML format. Bilateral testing has been conducted and the Amendment 76 to ICAO Annex 3, which became applicable in November 2013, enabled such exchanges. Noting that the transition from the TAC formats to the new XML/GML would be a significant change for many NMHSs, the Council requested the CAeM and CBS to ensure that sufficient guidance is provided to enable effective resource planning and harmonized implementation at national and regional level.

Addressing critical deficiencies and future challenges

4.1.26 Concern was expressed about persisting deficiencies in the provision of meteorological service to international air navigation by some Members, which have been included in the ICAO regional lists of air navigation deficiencies, including: provision of MET observations and reports,

SIGMET and Meteorological Watch Office (MWO) services, information on volcanic activity, and availability and use of World Area Forecast System (WAFS) products. Although some improvements have been achieved recently, the Council considered that the resolution of the safety-related deficiencies in the provision of aeronautical meteorological services should be addressed through coordinated subregional and national plans. Therefore, the Council requested the Secretary-General to work closely with ICAO, IATA and other partners, including regional aviation safety organizations, towards developing a coordinated action plan for resolving the long-standing safety-related deficiencies in the provision of meteorological service to international air navigation in all regions. Such deficiency resolution plans should be established following a methodology allowing the Members concerned to develop and implement respective education and training activities aimed at solving the identified deficiencies in a sustainable manner.

4.1.27 The Council noted that the new concepts for Air Traffic Management (ATM) (discussed under agenda item 8.1 – Global Air Navigation Plan) could put the financial and organizational viability of NMHSs in many parts of the world at stake and thus could pose significant challenges to WMO Members. In this connection, the Council urged all Members to be well prepared for the upcoming WMO/ICAO Conjoint MET Divisional Meeting to be held from 7 to 18 July 2014 in Montréal, Canada, with a view to seek an appropriate balance of the views of aviation users, advanced Members and Members from developing countries, so that suitable models for future aviation weather service delivery could be determined taking into consideration the fundamental principles of international cooperation with equal opportunities. The Council also requested the CAeM to deliberate during its fifteenth session (15–16 July 2014, Montréal, Canada) on a new working structure and action plan for the Commission in response to the outcomes of the MET Divisional Meeting. Further, the Council encouraged WMO, ICAO and the private sector to discuss the new developments and the principles thereof to ensure sustainability and improvement of the services.

Coordination of research and development

4.1.28 The Council noted that while the new concepts for Air Traffic Management (ATM) were expected to pose significant challenges to WMO Members, deployment of NWP, nowcasting, probabilistic forecasts and other advanced technologies to provide near-term and immediate services (< 20 min) will also provide many opportunities for service enhancements by Members in close cooperation with the research community, CAS, CBS and CIMO. In this connection, the Council was pleased to note that CAeM and CAS were developing a joint Aviation Research Demonstration Project (AvRDP) with a view to demonstrate the capability of nowcasting and mesoscale modelling techniques in support of Trajectory Based Operations under the Aviation System Block Upgrade (ASBU). The objective was to make available enhanced MET information services integrating high-resolution, rapidly updated nowcast and forecast along the flight trajectory, as well as probabilistic information, to support ATM decision-making and risk assessment. The Council recommended further that every product resulting of such research should be made available in open source software and built upon common and homogeneous guidelines allowing for a maximum dissemination and replication among Members.

Amendment to the Technical Regulations (WMO-No. 49), Volume II

4.1.29 The Council noted that in February 2013, the International Civil Aviation Organization (ICAO) approved Amendment 76 to Annex 3 to the ICAO Convention, Meteorological Service for International Air Navigation. Consequently, the new eighteenth edition of Annex 3 became applicable on 14 November 2013. Following the established practice, the Council agreed that WMO *Technical Regulations* (WMO-No. 49), Volume II, need to be aligned with Amendment 76. In addition, small changes to the *Guide to the Quality Management System for the Provision of Meteorological Service for International Air Navigation* (WMO-No. 1001) have also been incorporated in order to fully align the guidance material on QMS with Amendment 76. The Council adopted [Resolution 6 \(EC-66\) – Amendment to the Technical Regulations \(WMO-No. 49\), Volume II – Meteorological Service for International Air Navigation, and related guidance material.](#)

Public Weather Services

Implementation of “The WMO Strategy for Service Delivery”

4.1.30 The Council recalled that the Public Weather Services (PWS) Division had provided support to the Executive Council Working Group on Service Delivery (ECWG-SD) in the development of “The WMO Strategy for Service Delivery” (herein referred to as “the Strategy”) and its “Implementation Plan (IP)”. The Council welcomed that the Strategy and its IP had been published in English and were in the process of being published in other official WMO languages. The Strategy and its Implementation Plan can be accessed at: http://www.wmo.int/pages/prog/amp/pwsp/documents/WMO-SSD-1129_en.pdf.

4.1.31 The Council recalled that in approving the Implementation Plan, the sixty-fifth session of the WMO Executive Council had requested the PWS Programme to make every effort to assist NMHSs in the application of the Strategy in a realistic, pragmatic and concrete manner in the provision of services to the public and other users, and, to organize regional seminars/conferences for the senior management of NMHSs in order to familiarize them with the IP. The PWS Programme responded by organizing three regional Seminars on Socio-Economic Benefits and Delivery of Meteorological and Hydrological Services held in Curaçao for the English-speaking Caribbean Members (December 2013); South Africa for the Southern African Development Community (SADC) region (November 2013); and Brunei Darussalam for the Association of South-East Asian Nations (ASEAN) Members (October 2013). The seminars in which senior management and technical staff of 38 Members’ NMHSs participated were well received by the participants. The Council requested that further detailed and country-specific training for NMHSs as well as pilot projects be organized to assist Members in the implementation of the Strategy.

Social and economic issues related to service delivery

4.1.32 The Council stressed the importance of the government investments in infrastructure and particularly in human resources of the NMHSs as the main pillar for an effective service delivery. The Council recalled that EC-65 had underlined the importance of a WMO-World Bank Project for the joint development of an authoritative publication on methodologies for the assessment of the socio-economic benefits of NMHSs activities, and had requested that a report on the progress of the project be presented to EC-66. In this regard, the Council expressed appreciation that the production of the publication was proceeding well and that the PWS Programme had, during the three regional seminars (see paragraph 4.1.31), introduced the participants to the basic concepts of assessing socio-economic benefits of hydrometeorological services as outlined in the publication. A recent meeting of the lead authors and editors, organized by the PWS Programme at the National Center for Atmospheric Research (NCAR) facilities (Boulder, Colorado, United States of America, April–May 2014), had reviewed and further progressed with the draft of the publication. The Council requested that further training on the application of the methodologies contained in the publication be provided to the senior staff of NMHSs, and that pilot projects be developed on testing the methodologies.

4.1.33 The Council recalled that EC-65 had discussed the issue of holding a follow-up conference to the Madrid Conference (Madrid plus X). The Council noted that its Executive Council Working Group on Strategic and Operational Planning (EC WG/SOP) had, in February 2014, discussed the possibility to hold a follow-up conference to the Madrid Conference held in 2007, and had recommended to EC to consider holding a conference in 2017, which would focus on:

- (a) Economic value of climate services;
- (b) Offering NMHSs an opportunity to demonstrate the benefits of their services;
- (c) Methodology for analyzing socio-economic benefits;
- (d) Access to services to support development;

- (e) Progress on studies on socio-economic benefits;
- (f) The benefits of government investment in the infrastructure and human resources of NMHSs.

The WG had also recommended that the Conference include a High-level Segment. The Council in addition recommended that Madrid+10 could also focus on guidance on communicating these benefits to the governments and other decision-makers.

4.1.34 The Council recommended that due to the importance of the issue, the work on analysis of the benefits of the conference be progressed through its appropriate working group and that a proposal be brought forward to Seventeenth Congress on holding the Madrid +10 conference. The Council noted with appreciation the kind offer of Spain to host the follow-up conference to the Madrid Conference, if, following further consideration, the holding of such a conference should be approved.

Improving Forecast and Warning Services

4.1.35 The Council noted a number of new initiatives related to the PWS Programme that required guidance and advice from the Council, the most important of which related to impact-based forecasts, risk-based warnings and service provision to megacities, and to surface transportation.

Impact-based forecasts and risk-based warnings

4.1.36 The Council noted that NMHSs have traditionally provided advice based on thresholds of environmental parameters such as temperature, wind speed, river levels, etc. Such advice leaves the recipient to judge the impact of the predicted conditions on their activities, and the consequent risk to life, property and infrastructure. The Council appreciated that impact-based forecasts and warnings combine prediction of the environmental conditions with an assessment of the vulnerability of the recipients to those conditions. For example, three inches of snow in Scotland on a quiet Sunday morning has little or no impact and would warrant no warning. The same amount of snow around London just before a busy rush hour can cause chaos and would warrant a level of warning. The impact-based warning in this simple comparison takes into account the meteorological phenomenon, the place, the time, the circumstances and consequences. The level of warning is agreed in advance in a combined analysis of impact with the specific user and, in a sense, is issued on their behalf. The Council supported this approach which would enable NMHSs to provide advice which is tailored to specific users' needs and circumstances and is therefore more relevant and actionable by them.

4.1.37 The Council recalled that EC-65 (ref.: Abridged final report, general summary, paragraphs 4.1.26–4.1.38), had discussed NMHSs' move towards impact-based forecasting and risk-based warnings in the provision of public forecasts and warning services in support of social resilience. It agreed that governments and the public need to know the impact of severe weather hazards on their lives, livelihoods, property and economy and are demanding more than just statements of expected weather conditions from their NMHSs. It expressed appreciation that the PWS Programme through the PWS Expert Team on Meeting User Needs in Reducing the Impacts of Hydrometeorological Hazards (CBS/OPAG-PWS ET/DPM), is actively pursuing this topic through preparation of a set of WMO guidelines for Members on developing multi-hazard impact-based information and warning services. These services will be coordinated with and issued by their responsible organizations following the "single official voice" principle (see paragraph 4.1.41). It agreed that parallel with the publication of the guidelines, the best way to demonstrate the steps needed to progress towards impact-based forecasting was through organizing pilot projects. In this regard, the Council requested the PWS Programme to include the topic of impact forecasting in its training events and to establish a small number of such projects in countries participating in the Severe Weather Forecasting Demonstration Project (SWFDP), as a particular application of the PWS component of the SWFDP, focusing on improvement in service delivery.

Service Provision in the Framework of PWS

4.1.38 The Meeting of the Executive Council Working Group on Service Delivery (ECWG-SD, Geneva, March 2014), supported the importance of the emerging issues related to PWS as contained in paragraphs 4.1.39–4.1.45, and made recommendations to the Council for taking these initiatives forward (see also paragraphs 4.1.1–4.1.5).

Provision of weather forecast and warning services to megacities

4.1.39 The Council agreed that megacities needed climate, weather and environmental services in order to be resilient in withstanding the impacts of environmental hazards on all timescales related to floods, heat wave and cold spells, Ultra Violet (UV) radiation, ozone concentrations, haze and air quality, among others. It is crucial for NMHSs to deliver user-relevant services with targeted improvements in communication and client relations through a robust multi-channel system of dissemination and communication of information to all partners and the public in a megacity. In this context, the Council welcomed the work of the PWS Programme to address these challenges, including contribution to a set of guidelines for establishing weather, climate, water and related environmental services for megacities and large urban complexes. It requested that service delivery for megacities be given focused consideration alongside research activities.

Provision of operational meteorological assistance to the work of humanitarian agencies

4.1.40 The Council noted the outcome of the Meeting of the Commission for Basic Systems (CBS/DPFS-PWS) Task Team on the Provision of Operational Meteorological Assistance to Humanitarian Agencies (Geneva, Switzerland, July 2013). The full report is available at: http://www.wmo.int/pages/prog/www/CBS-Reports/documents/Final-Report_TT-Humanitarian-July2013.pdf. The main recommendation of this Task Team was that the WMO Global Seasonal Climate Update (GSCU) <http://www.wmo.int/pages/prog/wcp/ccl/opace/opace3/documents/GSCU-Brief.pdf>, that is being developed would be a potential WMO contribution to the Early Warning Early Action (EWEA) report, which is widely used by humanitarian agencies for preparedness. While noting the main recommendation and possible translation of the GSCU in a user-friendly language, easily understandable by Humanitarian Agencies (HAs), the Council recalled that the GSCU development was under trial phase and that the aim of GSCU would be to assist the NMHSs as well as RCCs and RCOFs. It therefore requested that CBS and CCI consider most appropriate and effective contribution to humanitarian agencies and the EWEA report.

“Single official voice” for warnings

4.1.41 The Council emphasized the need for Members to strengthen their service delivery role to ensure that they continue to provide the “single official voice” for warning services in an environment of increasing competition from other service providers. To this end, it strongly encouraged Members to participate in various WMO initiatives which would assist NMHSs in addressing this issue. Such initiatives include: (i) the World Weather Information Service (WWIS) that enables Members to communicate their official city forecasts to media; (ii) the Severe Weather Information Service (SWIC) that displays warnings for tropical cyclones; heavy rain and snow, thunderstorms, gale and fog; (iii) the Common Alerting Protocol (CAP) standard for alerts through all media; and (iv) the International Register of Alerting Authorities.

The Common Alerting Protocol (CAP) standard

4.1.42 The Council recalled that EC-65 had strongly encouraged the engagement of Members in adopting the CAP standard for communicating all alerts through all media. It supported the initiative of the PWS Programme to offer training on CAP to NMHSs through the CAP Jump-Start Offer which provides on-location technical assistance to enable efficient and cost-effective delivery of warning services by NMHSs. For more information on the CAP Jump-Start Offer see: http://www.wmo.int/pages/prog/amp/pwsp/CAPJumpStart_en.html.

The World Weather Information Service (WWIS) and the Severe Weather Information Centre (SWIC)

4.1.43 The Council expressed appreciation for the launch of the new and improved version of the World Weather Information Service (WWIS) website (<http://worldweather.wmo.int/>). It commended the Hong Kong Observatory (HKO) and the ten language hosts for operating WWIS. It encouraged Members to increase their participation in WWIS by increasing the number of forecast days and the number of cities for which they provide forecasts and climate information.

Competencies in service delivery

4.1.44 The Council reviewed progress in developing competency requirements for PWS forecasters and advisors, as well as the additional competency framework for more specialized roles in delivery of public weather services to the media and emergency management. The framework will provide guidance for Members in establishing and demonstrating appropriate levels of competency in PWS delivery. The Council was informed that the competency framework would be presented to the 2014 Commission for Basic Systems extraordinary session (CBS-Ext.(14), Asuncion, Paraguay, September 2014) for approval. These competencies will be regarded as recommended practice and will be referenced in the WMO Technical Regulations. In this connection the Council expressed the desirability of development of a competency framework for the delivery of services across all WMO Programmes which are involved in service delivery.

New technologies in service delivery

4.1.45 The Council highlighted the continuing growth in the importance of Social Media channels such as Twitter, Facebook and YouTube in the delivery of services (see *Guidelines on Strategies for use of Social Media by National Meteorological and Hydrological Services* (WMO-No. 1086, PWS-24) at: http://library.wmo.int/pmb_ged/wmo_1086.pdf), as well as the use of smart phones in the dissemination of weather forecasts and warnings. It recognized the proliferation of smart phones on the global scale including in the developing and Least Developed Countries (LDCs) in recent years, provided a new and efficient channel of communicating information to the public. It encouraged the use of these new tools and requested that Members be assisted to develop Applications (Apps) for increasing the reach of weather forecast and warnings.

Tropical Cyclone Programme

Support to Operational Forecasters

4.1.46 The Council recalled that the primary objective of the Tropical Cyclone Programme (TCP) was to reduce, to a minimum, the loss of life and damage caused by tropical cyclones through establishment of national and regionally coordinated systems leading to timely delivery of forecasts and warnings services to users so that they can take protective measures within a multi-hazard approach.

4.1.47 The Council was informed about WMO's response during Typhoon *Haiyan*, and of the discussions related to recommendations on follow-up actions from the Meeting of the Presidents of Technical Commissions (PTC-2014, Geneva, January 2014). It was further informed that the Executive Council Working Group on Service Delivery (ECWG-SD, Geneva, March 2014), had endorsed the recommendations by PTC-2014 and had stressed the need for service delivery to be a priority in the TCP.

4.1.48 The Council noted with pleasure that the TC Forecaster Website (TCFW) (<http://severe.worldweather.wmo.int/TCFW>) continued to be updated, and easily accessible, and became an official WMO website open to the public. The Council also noted that the web version of the updated Global Guide to Tropical Cyclone Forecasting was uploaded to the web server hosted by the Bureau of Meteorology, Australia, and was in the final stage of thorough review before it is made accessible to users. The Council expressed sincere appreciation to the authors, for their valuable voluntary contributions, especially to Mr Chip Guard of Guam, USA who was the

Chief Editor. The Council also requested the Secretariat to circulate a letter to the Members prone to tropical cyclones to announce the availability of the Guide.

Coordination of Forecasting Services

4.1.49 The Council recalled that at its sixty-fifth session it welcomed the recommendation of the 7th Technical Coordinating Meeting (TCM) (Indonesia, November 2012) to explore the feasibility of developing a globally unified classification of tropical cyclones including a category system. Careful study and investigation by the ad hoc team established by TCM have been ongoing. A concept paper of the investigation would be presented to the next TCM planned in 2015.

4.1.50 The Council recalled the Amendment 75 to ICAO Annex 3/WMO Technical Regulations [C.3.1] concerning provision of the graphical format of tropical cyclone advisories to the aviation community. In this respect, the Council noted that discussion and communications between ICAO and TCACs were on-going for final migration to provision of products on request. In view of the improved usability of the advisories in international air navigation, the Council urged the TCACs to complete the migration of the advisory format as early as possible.

Regional Tropical Cyclone Committees

4.1.51 The Council recognized the important role of the five regional tropical cyclone (TC) committees in improving and enhancing regional coordination and collaboration of Members to deliver their improved tropical cyclone forecasting and warning services through the regularly updated operational plans/manual and technical plans. In this connection, the Council expressed its appreciation to the TC committees for the excellent work being done through their operational plan/manual and Coordinated Technical Plan, respectively, to promote the strengthening of the tropical cyclone, storm surge and flood warning services and related disaster risk reduction in their respective area of responsibility. Furthermore, the Council highly commended the TC RSMCs/TCWCs in their regions of responsibility for their round-the-clock surveillance and timely forecasting and warnings of tropical cyclones for the Members during tropical cyclone seasons.

4.1.52 Considering the efficiency and effectiveness in developing regional early warning systems, the Council reiterated the important functions of the TC committees as stated in the paragraph above to be discharged in their regions through a multi-hazard approach. It requested the Secretary-General to provide the necessary support to the regional TC committees to fulfil their evolving roles as established regional warning mechanisms.

Capacity Development

4.1.53 The Council noted that the training opportunities and courses regularly organized by the TCP in cooperation with its partner programmes have been of significant assistance to NMHSs for enhancement of their operational forecasting of tropical cyclones. It accordingly expressed appreciation to the Australian Bureau of Meteorology, China Meteorological Administration, Météo-France, Japan Meteorological Agency, and NOAA/National Hurricane Centre for hosting the group trainings, and to the Japan Meteorological Agency and the India Meteorological Department for the on-the-job training at RSMCs. Regarding the group training, the Council noted with satisfaction the special arrangements that have recently been made for the NMHSs in urgent need of capacity development, including the RA IV Workshop on Hurricane Forecasting and Warning and PWS for Haiti. The Council supported the TCP's approach taken to cover broader aspects of warning services in the trainings through developing synergies with its partner programmes such as in particular DPFs for SWFDP, DRR for EWS, and MMOP for CIFDP, in addition to PWS which has already proven its notable achievements in service delivery.

4.1.54 The Council reiterated the need to develop the tropical cyclone forecaster competencies to ensure the quality of tropical cyclone forecasting services and to meet the users' requirements. It noted with satisfaction the tangible progresses in developing TC forecasting competencies in RA IV and RA V. The Council stressed the need for, and urged the Secretariat to

support development of TC forecasting competencies in other tropical cyclone basins by regional tropical cyclone committees under the initiative of the RSMCs while ensuring that these are well coordinated with other relevant and developing competencies, such as Marine Weather Forecasting. The Council requested the Secretary-General to provide administrative support for the regional tropical cyclone committees to effectively implement the training opportunities and course, putting priority on identified regional training needs.

4.1.55 The Council recognized that, while tropical cyclone forecast has attained increasing accuracies in the track forecasting, there were still serious challenges in operational tropical cyclone forecasting, particularly in forecasting rapid changes of tropical cyclone intensity, tracks and related storm surges, and remote enhancement of precipitation, which implied an enormous threat to the public beyond expectation. The Council therefore reiterated that high priority be continuously given to the transition from R&D into operational applications, particularly those in forecasting of rapid changes of track and intensity of tropical cyclones and the impact of associated hazards during landfall due to its significance for reduction of disaster risks. Noting that the research workshops and projects organized by TCP and WWRP provide excellent opportunities in this regard, the Council urged the Secretary-General to take necessary actions to promote the involvement of operational forecasters in those events. In this connection, the Council noted the organization of the 8th WMO International Workshop on Tropical Cyclones (IWTC-VIII) and the 3rd International Workshop on Tropical Cyclone Landfall Process (IWTCLP-III) in Jeju, Republic of Korea, in December 2014, and encouraged Members to have as many of their operational tropical cyclone forecasters as possible to attend the two workshops.

4.1.56 The Council noted that a series of the joint MMOP/TCP Workshop on Storm Surges and Wave Forecasting had been successfully conducted for developing countries to establish and improve forecasting capabilities for waves and storm surges. In parallel with the implementation of the Storm Surge Watch Scheme (EC-LX, Geneva, June 2008), the Council requested the WMO Secretariat to continue organizing and facilitating these workshops, as collaboration between MMOP, TCP and DPFS for SWFDP-EA, in those Regions in need. Furthermore, the Council noted that ongoing SWFDDP in RA V has achieved valuable benefits for the related Members in the Region, and therefore, recommended the Tropical Cyclone Programme (TCP) to extend the activities of the project.

4.1.57 The Council was informed that the RA IV Hurricane Committee at its 36th session, held in Cancun, Mexico, agreed to convene a regional workshop on storm surge in early 2015 in collaboration with the Marine Meteorology and Oceanography Programme (MMOP), and that both Mexico and the US were considering if they could host such a workshop. The Council noted with appreciation the offer from Mexico to organize the workshop on storm surge in 2014 to implement the Sea, Lake and Overland Surges from Hurricanes (SLOSH) model provided by NOAA, and to provide partial fund to facilitate the participation of Members in the Region, which are interested in implementing the model.

4.1.58 The Council noted the request to seek a revision of the technical guide on the intensity of tropical cyclones, as this was based on wind speed, swell, minimum central pressure and storm surge along the coast, but did not take into account rain generated by a tropical cyclone, particularly in mountainous regions and low-lying coastal areas which were subject to sudden flooding. The Council noticed that categorization of tropical cyclones was arranged at regional level, and therefore recommended the Secretariat to bring it forward to the regional tropical cyclone bodies to examine and consider the feasibility of such a revision.

Marine Meteorology and Oceanography

Support to Enhance Marine Meteorological Service Capabilities

4.1.59 The Council recognized with satisfaction that continuous efforts had been made by JCOMM groups and teams to implement the JCOMM intersessional workplan (2012–2017), in particular, to respond to technical and regional requirements for improved marine meteorological and oceanographic services. In this context, the Council noted with satisfaction the results from the

training workshop on marine forecasting held in Dakar, Senegal from 3 to 7 March 2014, for forecasters in the Gulf of Guinea and North Atlantic Region (<http://www.jcomm.info/MF-Training-2014>), and encouraged the Secretariat to work with the West African Members to implement the workshop recommendations for future development of marine weather services in the Region. The Council noted that this training was organized in close partnership with the African Centre of Meteorological Applications for Development (ACMAD) and many other national and international partners implementing training and education activities for marine meteorology, and encouraged that such integrated planning should be extended to overall training activities to ensure synergies and effective use of resources.

4.1.60 The Council recalled that a World-Wide Met-Ocean Information and Warning Service (WWMIWS) had been implemented through the collaboration of WMO, the International Maritime Organization (IMO) and the International Hydrographic Organization (IHO), through technical advice from the JCOMM Expert Team on Maritime Safety Services (ETMSS). The Council encouraged Members to actively link with the METAREA Coordinators of the respective region/area to enhance coordination among met services in the same METAREA to ensure seamless service of the meteorological Maritime Safety Information (MSI). In this context, the Council encouraged the responsible Services for METAREA Coordination (including the designated Coordinators, Issuing Services and Preparation Services) to actively participate in the 2nd Maritime Safety Services Enhancement Workshop (<http://www.jcomm.info/MSS2>), to be held from 18 to 22 August 2014 in Wellington, New Zealand, in conjunction with the 6th meeting of the World-Wide Navigational Warning Service Sub-Committee (WWNWS-6) of IHO. The Council also urged the responsible Services for METAREA Coordination to provide the necessary input for WWMIWS implementation on a regular basis, including the confirmed contact information for METAREA Coordinators and the METAREA Self-Assessments.

4.1.61 The Council noted the importance of proper communication and collaboration with partner organizations, such as the European Commission, to avoid duplications and to ensure synergies for improved services (e.g. WMO marine meteorological services and Copernicus Marine Services), particularly in the ongoing development of the marine Data Collection or Production Centres (DCPCs).

Regulatory Framework and Guidance for Marine Meteorological Services

4.1.62 The Council recalled that the regulatory framework for WWMIWS – [Joint IMO/IHO/WMO Manual on Maritime Safety Information](#) (Joint MSI Manual) – is in reference to the *WMO Manual on Marine Meteorological Services (WMO-No. 558)*, and requested the JCOMM/ETMSS to work with other teams and groups of JCOMM to continuously review the Joint MSI Manual to ensure the consistency along with the ongoing process for the review of WMO-No. 558. The Council also noted that the future review and revision of the Joint MSI Manual should be a part of holistic and streamlined inter-agency collaboration among WMO, IMO and IHO, which should comprise: (1) support for the Global Maritime Distress and Safety System (GMDSS) through WWMIWS; (2) support for Search and Rescue (SAR) and for the International Convention for the Prevention of Pollution from Ships (MARPOL), mainly through the ongoing review of the global coordination mechanism for marine environmental emergency response, and; (3) WMO contribution to the development by IMO for the International Code of safety for ships operating in polar waters (Polar Code) through the ongoing coordination by JCOMM Expert Team on Sea Ice (ETSI) for regulatory framework for sea ice service. The Council therefore requested the Secretariat to prepare workplans for rigorous extension of collaboration with IMO, IHO and other relevant organizations through more holistic and streamlined approach.

4.1.63 Recalling the recommendation of Cg-XVI to all technical commissions to define competency requirements for their core job-tasks, the Council was pleased to note the ongoing development of the [WMO Marine Weather Forecaster \(WMF\) Competence Standards Framework](#). It noted that the ongoing process has taken into account considerable variation in the legitimate functions of Marine Weather Offices worldwide, therefore, the WMF competencies proposed for adoption for the respective regional/national functions and priorities reflected this variety of functions. The Council was informed that following the review of the draft by relevant groups and

experts such as the EC Panel of Experts on Education and Training, the Framework would be submitted to the Cg-17 for approval. It recommended that the process should continue to take into account the relevant national and regional frameworks, and that those competence frameworks under development, such as the one for the Public Weather Service (PWS), should be taking into account respective requirements to ensure harmonized development and application to the work of NMHSs.

Support for Transfer of Science to Operation

4.1.64 The Council noted that technical commissions should play a role as the mechanism to ensure the flow of science and technology into operations and service delivery. In this context, the Council urged the teams and groups of JCOMM to enhance their collaborative effort with the research programmes of WMO and partner organizations, and requested the Secretariat to provide the necessary support for the coordinated work of the relevant teams and groups of JCOMM, CAS and other technical commissions. Primary attention should be given to those activities directly addressing WMO priorities, including the following areas:

- (a) Ocean component of operational coupled sub-seasonal to seasonal predictions, taking into account applications of ocean observations and standardization of ocean data for use in ocean analyses and seasonal forecast systems;
- (b) Integration of sea ice component in the Global Integrated Polar Prediction System, particularly through its sub-components, the WWRP Polar Prediction Project and WCRP Polar Climate Predictability Initiative (PCPI), and ensuring due consideration on and update of the manuals and guidelines for sea ice services;
- (c) Intake of scientific and technical development into the operational coastal forecasting and warnings, through the Coastal Inundation Forecasting Demonstration Project (CIFDP), particularly for the socio-economic aspects as well as for advanced services for small islands and coastal megacities.

Coastal Inundation Forecasting Demonstration Project

4.1.65 The Council noted the progress in the implementation of the Coastal Inundation Forecasting Demonstration Project (CIFDP: <http://www.jcomm.info/CIFDP>), to demonstrate how integrated coastal inundation forecasting and warnings can be improved and effectively coordinated by the National Meteorological and Hydrological Services (NMHSs). It noted with satisfaction the progress in ongoing National Sub-Projects of CIFDP: in particular; for Bangladesh (CIFDP-B) for the successful implementation of Phase 2 in developing a ready-to-operate coastal inundation forecasting model and associated training for forecasters; for Fiji (CIFDP-F) completing its Phase 1 in October 2013 and preparing the launch of Phase 2, and for Indonesia (CIFDP-I) formally launching Phase 1 through the National Stakeholders Workshop (3–5 December 2013, Jakarta, Indonesia). The Council congratulated those countries for their proactive role in advancing the project at the national level, and expressed its appreciation to the countries contributing to/providing support for the implementation of CIFDP, both financially and through in-kind technical advice.

4.1.66 The Council further recognized the solid scientific and technical advice provided by the JCOMM Expert Team on Waves and Coastal Hazard Forecasting Systems (ETWCH) and working groups of CHy. It also noted linkages with related programmes and projects with CIFDP, including the regional Storm Surge Watch Scheme (SSWS), the Severe Weather Forecast Demonstration Project (SWFDP), the eSurge project of the European Space Agency (ESA), the WMO Working Group on Societal and Economic Research Applications (WG-SERA) and many others. The Council encouraged JCOMM and CHy to continue close coordination with these activities, for synergies in strengthening national capacities under the respective subprojects, and to continue contribution to the implementation of the Global Framework for Climate Services (GFCS) linked with the GFCS priority areas of Water and Disaster Risk Reduction.

4.1.67 The Council emphasized that the experience and expertise gained from the implementation of various CIFDP National Sub-Projects could contribute to the national efforts of other countries in addressing similar concerns to enhance capabilities for coastal inundation forecasting and warning, and requested the Secretariat to continue to explore and coordinate activities to maximize the benefit and synergies of CIFDP implementation, particularly for those Members in need of technical assistance at the face of severe coastal hazards. In view of the needs and requirements identified through the experience of TC *Haiyan* and associated storm surge events, the Council requested the Secretariat to take necessary measures to assist Members with such requirements, by coordinating activities for improved impact-based forecasting and risk-based warning services in coastal zones, through the established process and expert pools of CIFDP. The Council also encouraged JCOMM and CHy, through the CIFDP Steering Group, to actively provide technical guidance to the enhancement of the regional Storm Surge Watch Scheme (see also paragraphs 4.1.46–4.1.58).

Services for Ocean Fisheries

4.1.68 In addressing the global food security and associated climate issues, the Council noted with satisfaction the joint effort by JCOMM and the Commission for Agricultural Meteorology (CAgM), through the Joint JCOMM-CAgM Task Team on Weather, Climate and Fisheries (TT-WCF: <http://www.jcomm.info/TT-WCF>), to enhance understanding and capabilities in marine climatology/oceanography and their impact on ocean fisheries, particularly in the Pacific Island Countries (PICs). The Council noted that the workplan of the Task Team was approved at the sixteenth session of CAgM (April 2014), as well as at the tenth Management Committee of JCOMM (May 2013), leading to enhanced observations and data transmission by fisheries vessels in the Pacific region. Noting the direct benefit of the Team's work to SIDS particularly in the South Pacific, the Council endorsed the work of the Task Team and requested the Secretariat to take steps to promote activities of the Team (see also paragraphs 4.1.70–4.1.77). The Council, noting that this should be the direct contribution to the GFCS implementation addressing the priority area of Food Security and to all structural pillars of GFCS, also emphasized the need for enhanced effort to maintain and extend marine climatology, encompassing regions and subregions, and particularly for the extreme phenomena affecting the productivity of fisheries.

4.1.69 The Council further emphasized the importance to reach out to society, and noted the importance of roving seminars for outreach of marine meteorological services to fishermen and other stakeholders in order to improve the understanding of the technical language used in marine meteorological services. It further noted the benefit of roving seminars in optimizing the feedback mechanism of services to reach possible maximum impact into society (e.g. Farmers Field School for agricultural meteorology). In this context, the Council welcomed the initiative of CAgM and JCOMM of a series of roving seminars for fishermen in West Africa, and encouraged Members to extend this effort to other regions within available resources.

Agricultural Meteorology

Sixteenth session of the Commission for Agricultural Meteorology (CAgM-16)

4.1.70 The Council noted the outcomes of the sixteenth session of the Commission for Agricultural Meteorology (CAgM-16) held in Antalya, Turkey from 10 to 15 April 2014. In particular, the Council endorsed the four Focus Areas that CAgM-16 had adopted for the work plan of the Commission in its intersessional period 2014–2018: Operational Agricultural Meteorology; Science and Technology for Agricultural Meteorology; Natural Hazards and Climate Variability/Change in Agriculture; and Capacity Development in Agricultural Meteorology. The Council noted the report of CAgM-16 and endorsed its recommendations/resolutions by adopting [Resolution 7 \(EC-66\) – Report of the sixteenth session of the Commission for Agricultural Meteorology](#).

4.1.71 The Council noted the approach taken by the Commission of aligning its activities with the priorities as established in the WMO Strategic Plan and, in particular, the importance placed on the Commission's contributions to Service Delivery, the Global Framework for Climate Services, Disaster Risk Reduction and Capacity Development.

4.1.72 The Council noted that CAgM-16 decided to continue the work of the Joint JCOMM/CAgM Task Team on Weather, Climate and Fisheries. The Council encouraged this collaboration, approved the continuation of this inter-commission team and requested the two Commissions to further strengthen their cooperation in this area of critical importance to food security.

4.1.73 The Council supported the initiative proposed by CAgM-16 to create a Joint CAgM/CCI Expert Team on Phenology with the possible collaboration with the International Society of Biometeorology.

4.1.74 The Council encouraged Members to nominate more experts to participate in the Open Panels of CAgM Experts (OPCAMEs) and facilitate their active participation in the work of CAgM in the four Focus Areas. It also noted with appreciation the increasing use of electronic media and teleconferencing by the Commission in carrying out its activities and supported the continued use of such tools with a view on strengthening communication and feedback mechanisms of relevant CAgM projects and activities.

4.1.75 The Council noted the need to develop standards and guidelines for global soil moisture measurements in support of the International Soil Moisture Network (ISMN) which is coordinated by the Global Energy and Water Exchange Project (GEWEX), GEO, and the Committee on Earth Observation Satellites (CEOS). The Council supported the CAgM recommendation to establish and coordinate a Soil Moisture Demonstration Project (SMDP) to develop these standards and guidelines, which would also provide valuable support to the mission and objectives of the WIGOS and GFCS.

Global Framework for Climate Services

4.1.76 The Council noted that the Secretariat and the president of the Commission were involved in providing input, facilitating the progress and supporting consultation meetings of the GFCS Agriculture and Food Security Exemplar. The Council also noted that the aim of this Exemplar was to bring together and identify user needs with regards to climate issues from the various UN agencies and international organizations involved in agriculture and food security. The Council requested the Secretariat to continue to collaborate with the various UN agencies on the Exemplar of Agriculture and Food Security.

4.1.77 The Council noted the formulation and implementation of Global Initiatives in AgroMeteorology (GIAM) as proposed by the president of CAgM. The objective of GIAM is to meet requirements from the WMO Strategic Plan and for implementation of GFCS, WIS, WIGOS, and DRR as well as from other associated international entities such as the Group of Earth Observations, United Nations Convention on Biological Diversity, and United Nations Convention to Combat Desertification. GIAM will examine observation/forecasts, research, user interface platform, service delivery and capacity development related to agricultural meteorological activities consistent with CAgM priorities. The Council recommended that the GIAM initiative may also be reported to the IBCS and other relevant collaborating international bodies. The Council supported the establishment of a GIAM coordination office dedicated to the agriculture and food security sector with extrabudgetary funding. In the meantime, the Council accepted the offer from the Korea Meteorological Administration to support a temporary GIAM coordination office.

Water Management

4.1.78 The Council noted that service delivery in the context of water management encompasses the entire suite of WMO thematic responsibilities; weather services, climate services, and hydrological services. Effective water management is critically dependent upon extensive and widely available data and products from all three sectors, as well as on point forecast products having quantified uncertainty. There is also a growing need for such information as comprehensive water resource and related assessments, statistics of precipitation, flood and drought events, as well as meaningful assessments of spatial and/or temporal trends in surface water quantity and quality. Given the specific needs of water management, weather, climate and

hydrological services should ensure that the uncertainties intrinsic to their data and forecasts are understood and quantified.

4.1.79 The Council noted that water management can play a key role in mitigation strategies for addressing climate change, including reduction in flooding, water storage for droughts, and hydropower production. The Council further noted that water management requires the integration of weather services, climate services, and hydrological services. The Council recommended that proper consideration be given to water management through the Global Framework for Climate Services (GFCS) in addition to the current focus on flood management.

4.1.80 The Council noted that many rivers pass through the territory of multiple Members (transboundary rivers). The Council further noted that efficient water management operations will require rapid sharing of weather services, climate services, and hydrologic services between Members. The Council urged Members to develop agreements for coordinating service delivery on transboundary rivers, such as through water basin commissions or other appropriate mechanisms, and where appropriate, to adopt common technologies for facilitating data and information sharing.

4.2 Disaster risk reduction (agenda item 4.2)

Enhanced capabilities of Members to reduce risks and potential impacts of hazards caused by weather, climate, water and related environmental elements (ER 2)

Progress with the implementation of the WMO Disaster Risk Reduction activities and plans for post-2015

4.2.1 The Council noted the fundamental importance of multi-hazard information and services provided by NMHSs in support of risk-informed and impact-based DRR decision-making. The Council noted progress in documenting good practices and guidelines to assist the relevant activities of Members, including: (i) WMO hazard definition, classification and hazard data/metadata and modelling requirements to support loss and damage data collection and risk analysis in collaboration with the Disaster and Civil Protection Agencies (DCPAs); (ii) WMO Guidelines for National Meteorological and Hydrological Services on Institutional Partnerships in Multi-Hazard Early Warning Systems and Supporting Emergency Preparedness, Response, Rescue and Early Recovery Operations; and (iii) WMO Guidelines on Requirements for Meteorological and Climate Services for Disaster Risk Financing and Insurance (completed or forthcoming by 2015). The Council further noted the contribution of the DRR Focal Points of TCs and Technical Programmes (DRR FP TC-TP), WMO DRR User-Interface Expert Advisory Groups (DRR UI-EAGs) and other agencies. The Council encouraged Members to actively participate in the national process for risk analysis, building partnerships and working arrangements with national agencies responsible for collection of loss and damage data.

4.2.2 The Council noted the continued implementation of DRR national capacity development projects with the regional cooperation framework in South-east Europe and Central America. Recalling the recent flooding and other hydrometeorological extreme events in those regions, the Council encouraged the Secretariat and Members to continue efforts to conduct and deliver the outcome of the projects. The Council noted that, through a discussion at the meetings of the DRR FP TC-TP, a suggestion was made to initiate a DRR project in South-East Asia focusing on capacity development in risk analysis and Multi-Hazard Early Warning Systems (MHEWS). This had been discussed during the 2014 Meeting of the Presidents of Technical Commissions (PTC-2014; January 2014). The Council noted the relevant recommendations of the PTC-2014, and requested the Secretary-General, together with the PTC with support from the DRR FP TC-TP, RA II, Members and strategic partners, to facilitate the scoping of the proposal in line with the recommendations of the PTC to complement the existing relevant projects and activities in order to avoid duplication, in collaboration with relevant WMO projects and programmes.

4.2.3 The Council noted the work of the CBS/DPFS-PWS Task Team on the Provision of Operational Meteorological Assistance to Humanitarian Agencies as a direct contribution from CBS to the WMO DRR priority.

4.2.4 The Council stressed the importance of DRR training materials, including in relation to strengthening national institutional arrangements. The Council noted that a significant amount of training modules have been developed by Members, Regional Training Centres (RTCs) and the DRR Programme that could be extended and elaborated through the appropriate introduction of relevant materials from partners such as the World Bank, and other United Nations agencies (e.g. UNISDR, UNDP, UN-OCHA, WFP, CADRI and UNITAR). The Council requested the Secretary-General to:

- (a) Review available DRR training modules and programmes developed by Members, RTCs and partner agencies;
- (b) Facilitate coordinated access to DRR training and guidance materials.

4.2.5 The Council noted that implementation of the DRR activities has directly contributed to the implementation of the GFCS, with concrete deliverables in the 2014–2015 time frame, including guidelines on user requirements for climate services for hazard risk analysis and disaster risk financing and insurance.

4.2.6 The Council was pleased to hear of the planned first pilot of the CBS/DPFS-PWS Task Team on the Provision of Operational Meteorological Assistance to Humanitarian Agencies, in collaboration with the Global Disaster Alert Coordination System (GDACS). However, the Council expressed concern about GDACS' practice of also issuing its own multi-hazard warnings. It recognized that GDACS and other non-NMHS sourced alerts and warnings could challenge and undermine the authoritative meteorological, hydrological and other environmental hazard warnings issued by NMHSs. The Council therefore requested CBS to review the governance procedures relating to the provision and availability of meteorological, hydrological and other environmental hazards, with a view to developing appropriate guidance for consideration by Cg-17.

Post-2015 Framework for DRR

4.2.7 Taking into consideration that the term of the Hyogo Framework for Action (HFA) 2005–2015 is drawing to an end, the Council recalled that the third World Conference on Disaster Risk Reduction (WCDRR-III, 14–18 March 2015, Sendai, Japan) would consider for adoption the Post-2015 Framework for DRR. The Council also noted that regional and global consultations are under way in 2014, facilitated by the United Nations International Strategy for Disaster Risk Reduction (UNISDR) and the regional socio-economic groupings for drafting of the Post-2015 Framework for DRR.

4.2.8 The Council welcomed the proposal by Japan to work with the Secretariat and Members to develop and conduct a demonstration on the advantage and responsibilities of WMO and NMHSs, especially introducing development and strengthening Early Warning Systems against natural hazards.

4.2.9 The Council encouraged all Members to actively participate in and provide input to the national and regional consultations on the Post-2015 Framework for DRR, as well as to the WCDRR-III event, to showcase: (i) the importance of meteorological, hydrological and environmental services in support of DRR decision-making, through case studies and “success stories”; and (ii) technical and institutional capacities and challenges faced by Members in implementing early warning systems in support of risk-informed decision-making.

4.2.10 The Council noted the strategic importance for WMO to actively participate in the planning of the WCDRR-III, particularly in the drafting of the Post-2015 Framework for DRR, with clear direction from a WMO-wide DRR strategy. In this context, the Council emphasized that focused effort should be made to clearly identify the role of NMHSs and of other national bodies in the overall Post-2015 Framework for DRR, and to enhance their capabilities to deliver authoritative, and where possible, impact-based forecasts and warnings to inform decision support mechanisms at local, national, regional and global levels. The Council further emphasized that the DRR activities of Members are part of their service delivery mandates to ensure readiness,

response and resilience, and therefore, requested the Secretary-General to ensure alignment of the WMO DRR-related programmes and activities with the WMO Strategy for Service Delivery.

4.2.11 The Council adopted [Resolution 8 \(EC-66\) – WMO disaster risk reduction roadmap](#).

4.3 Data-processing and Forecasting: Weather, Climate and Water (agenda item 4.3)

Enhanced capabilities of Members to produce better weather, climate, water and related environmental information, predictions and warnings to support in particular disaster risk reduction and climate impact and adaptation strategies (ER 3)

Weather Issues

Evolution of the Global Data-processing and Forecasting System (GDPFS)

4.3.1 The Council recalled that Cg-XVI (2011) adopted the outline for a revised Manual on the GDPFS (WMO-No. 485) through Resolution 6 (Cg-XVI), wherein it decided that this Manual is the single source of technical regulations for all operational data-processing and forecasting systems of Members. The Council noted that the revision of the Manual was near completion and a status report will be provided to CBS-Ext.(14). It also noted that the revised Manual will, at its completion, conform to the principles and procedures contained in: *Guidelines on the Preparation and Promulgation of the WMO Technical Regulations* (WMO-No. 1127, 2014).

4.3.2 The Council noted the joint CBS-CCI Workshop on Operational Long-range Forecasting: GPCs and RCCs, in support of NMHSs and RCOFs was held (Brasilia, Brazil, 25–27 November 2013) and requested CBS and CCI to develop a coordinated action plan that incorporates the Workshop's recommendations for enhancing the exchange of data, methods and tools between Global Producing Centres for Long-range Forecasts (GPCs) and Regional Climate Centres (RCCs), and for improving operational practices used by NMHSs and RCOFs in long-range (seasonal) forecasting. The Council noted that examples of successful practice may be drawn from the Cascading Forecasting Process of the SWFDP in short- and medium-range weather forecasting. In this respect, the Council expressed appreciation of the training activities carried out in all regions by some Members.

4.3.3 The Council recalled the request by Cg-XVI (2011) to the Lead Centre for Long-range Forecasts Multi-Model Ensemble (LC-LRFMME) to extend its role to also include the operational exchange of extended-range (beyond 10 days up to 30 days) predictions, and further encouraged GPCs running dynamical sub-seasonal (less than 90 days) prediction systems, to supply data from their respective systems on a voluntary basis for generation and display of multi-model sub-seasonal products by the LC-LRFMME, as has been done for seasonal range products. Noting that standard procedures for verification of extended-range forecasts would be required to support the operations exchange of forecasts, the Council further encouraged CBS and CCI to collaborate with WWRP-THORPEX/WCRP research plans and activities on sub-seasonal to seasonal prediction.

4.3.4 The Council, having considered the implementation of the WMO Strategy for Service Delivery, noted that its success depended on high quality outputs of Members' data processing and forecasting systems (ER 3), and effective linkages between data processing and service delivery functions, including for example in the development of scientifically sound methods for impact-based forecasting and the production of risk-based warnings. The GDPFS and its operational centres should be strengthened and further developed towards a seamless data processing and forecasting to cover all forecasting time scales, and extended to include environmental-related predictions in support of service delivery (ER 1). Consequently, the Council also encouraged the Secretariat and relevant Commissions to develop related guidance materials for Members to take advantage of full GDPFS capabilities.

4.3.5 The Council noted possible needs of some Members that may arise in their anticipation of a major meteorological or meteorology-related hazard threatening the safety and security of

their populations. It therefore requested CBS to develop, in consultation with RSMCs, a concise guide on actions to be taken by NMHSs' in the run-up to extreme weather-related events. It should provide guidance on the actions and activities an NMHS could utilize to increase the preparedness to respond to an extreme event building on existing guidance and including RSMC contacts and other information regarding the role of other operational centres.

4.3.6 The Council requested the Secretariat, in coordination with the TCs, RAs and operational centres including RSMCs, to analyze the issue and develop a draft working arrangement that elaborates the roles and responsibilities for coordination of WMO's response to Member's requests for assistance noting that operational responsibility lies with the Members, and to report back to EC for consideration.

4.3.7 The Council further encouraged continuing cooperation between CBS, JCOMM and CAS to ensure research plans and outputs intended for operational implementation could readily benefit data-processing and forecasting systems of Members, including in Polar Predictions, Sub-seasonal to Seasonal Predictions, and further developments in the Sand and Dust Storm Warning and Advisory System.

Severe Weather Forecasting Demonstration Project (SWFDP)

4.3.8 The Council noted the outcomes of the Workshop to Assist in Sustaining National Meteorological Services – Strengthening WMO Regional and Global Centres (Washington DC, USA, 18–20 June 2013), jointly organized by the World Bank, WMO, and the National Weather Service USA, and requested CBS to consider the Workshop recommendations to guide the future development of the SWFDP, and ultimately the evolution of the GDPFS.

4.3.9 The Council welcomed the establishment of the Project Office for the Severe Weather Forecast Demonstration Project and expressed its appreciation to the Secretariat, especially for its active contribution in having organized the Training Workshop of the regional subproject for South-East Asia, held in the Philippines in June 2014. It also thanked the Philippines; Hong Kong, China; Japan, UK and Viet Nam who contributed to this successful event by hosting it and sending experts. The Council recognized the high expectations on the Cascading Forecasting Process approach to enhance capabilities of NMHSs for disaster risk reduction activities and encouraged Members to further contribute to the implementation of the demonstration phase of regional sub-projects, with the support of the Secretariat.

4.3.10 The Council recognized that outputs from advanced NWP/EPS centres of the GDPFS could be widely shared and more effectively used by Members if they were suitably tailored for practical use by NMHSs. The Council therefore stressed the importance of WMO operational centres' contributions to the Cascading Forecasting Process with particular consideration of outputs useful for centres with regional or subregional operational responsibilities (e.g. RSMCs, satellite product centres, technical training centres), to support and sustain the development of much needed capacities at NMHSs in severe weather forecasting, and warning services, in relation to identified meteorological hazards and associated societal risks and impacts in developing and least developed countries. The Council recommended that regional associations should assume greater coordination responsibility for their subregional centres engaged in regional or subregional operations.

4.3.11 The Council agreed and further stressed that a broader implementation of the Cascading Forecasting Process as part of the GDPFS programme would contribute to strengthening many service delivery functions of NMHSs that have requirements for data-processing and forecasting, and similarly also strengthen NMHSs links with other national organizations in hydrometeorologically relevant activities, especially those that address important societal or economic risks and impacts. It also recalled, in principle, that the SWFDP model could also be applied to prediction and delivery of services at longer time scales, i.e. beyond forecasting severe weather hazards a few days in advance in the forecasting range, to developing seamless regional early warning systems in the context of the planned Climate Services Information System (CSIS) of the GFCS.

4.3.12 The Council noted the ongoing work in the development of the Climate Watch Systems (CWS) for operational monitoring and anticipating extreme meteorological events, which could benefit from collaboration with the SWFDP to demonstrate its effectiveness. It requested CBS to assist CCI in developing guidance material, and if needed, operational criteria or technical regulations for inclusion in the Manual on the GDPFS.

4.3.13 The Council was informed of the success of the pilot demonstration project on the Southern African Regional Flash Flood Guidance System supported by the WMO Secretariat. This project was a follow-up to the highly successful SWFDP and has now been expanded to the entire Southern African region. The primary purpose of the SARFFG is to provide operational forecasters and disaster management agencies with real-time informational guidance products pertaining to the threat of small-scale flash flooding throughout the region. The SARFFG provides the necessary products to support the development of warnings for flash floods from rainfall events through the use of satellite-based rainfall estimates and hydrological models. The Council noted that the project was been implemented in other regions and encouraged closer collaboration between the SWFDP and FFGS projects.

Emergency Response Activities (ERA)

4.3.14 The Council, having recalled the ERA arrangements for specialized atmospheric transport and dispersion modelling, considered that in a broader context of developing risk-based high-impact forecasting services, that the experiences from the ERA programme may be relevant.

4.3.15 The Council agreed that collaboration with the International Atomic Energy Agency (IAEA) should continue in relation to the review and revision of safety-related guides in relation to meteorological and hydrological aspects. In addition, as an outcome of the lessons identified from the Fukushima Daiichi Nuclear Power Plant Accident triggered by the Great East-Japan Earthquake and Tsunami (2011), the IAEA's Action Plan on Nuclear Safety called for an expanded mandate of its Incident and Emergency Centre (IEC) to undertake "assessment and prognosis in response to an emergency at a nuclear power plant". The Council agreed that WMO should provide meteorological and hydrological support in relation to the IAEA/IEC's expanded role, in coordination with other relevant international organizations.

Climate System Monitoring and Assessment

Climate Statements and Publications

4.3.16 The Council noted with appreciation the contribution of Members to the WMO Statement on the Status of the Global Climate in 2013. The Council furthermore highlighted the value of the Statement supplement for Africa as a highly visible demonstration of the will of African countries to implement efficient climate monitoring mechanisms by benefitting from the opportunities provided by the GFCS. It encouraged continuation and further development of the African supplement in order to build sustained climate monitoring capacities.

4.3.17 The Council welcomed with appreciation the publication 'The Global Climate 2001–2010, A Decade of Extremes', which received excellent attention by Members and the media. It stressed the role of such authoritative reports and recommended the further development of the concept of multi-year statements by paying special attention to the consolidated inclusion of socio-economic impact data. The Council suggested that the next report, corresponding to the period 2011–2020, be planned well in advance, including a draft table of contents and identification of a list of contributors for each section.

Climate Indices and monitoring products

4.3.18 The Council noted with appreciation the work of the joint CCI/WCRP-CLIVAR/JCOMM Expert Team on Climate Change Detection and Indices (ET-CCDI), which has helped improve understanding and characterization of climate variability and change, which are essential for climate services development. The Council urged Members to support the work of the ET-CCDI by

establishing, regularly updating and sharing datasets of relevant climate indices. The Council highlighted the need to develop marine climate extremes indices, and urged CCI, WCRP and JCOMM to closely collaborate on this issue. The Council further emphasized the need for continued regional capacity building for the monitoring of changes in extremes and requested the ET-CCDI and the Secretariat, in collaboration with regional associations, to organize additional regional workshops and support to the Regional Climate Centres (RCCs) in this respect. The Council requested that the follow-through of the work of ET-CCDI be reinforced through the establishment of focal points at NMHSs. These focal points should ideally have participated in the ET-CCDI workshops and would be responsible for updating the indexes and communicating with ET-CCDI. The Council noted the benefit of updating the software used in the ET-CCDI workshops and requested that the development of a toolkit as an outcome of the workshops, including presentations and practical exercises used in these workshops, be considered.

4.3.19 The Council noted the joint workshop between BMKG (Indonesia) and KNMI (the Netherlands) on a South-East Asia Climate Assessment and Dataset (SACA&D) held in Bogor Indonesia in May 2014. The workshop aimed to establish a web-oriented climate data system presenting climate monitoring products such as climate indices, trend maps, statistics of extreme events and gridded datasets in a user friendly way. The Council also noted the recommendation of the workshop on the need to establish RCC-Networks in RA V in the South-East Asia and Pacific Island subregions.

4.3.20 The Council noted the ongoing efforts of the CCI Task Team on National Climate Monitoring Products (TT-NCMP) to develop a list of NCMPs to be routinely generated and exchanged by the Members. The initiative could facilitate regional and global climate system monitoring activities by standardizing national contributions to global climate monitoring in a systematic manner. The Council highlighted the need for the provision of guidelines and the identification of tools for Members to calculate NCMPs, and to implement appropriate mechanisms for exchanging and collecting NCMPs on a routine basis. The Council also noted that it was necessary to undertake a careful and thorough review by Members in view of a possible impact on their operational climate services by this initiative, and the Council encouraged CCI to consider developing formal procedures that would routinely generate a list of products by Members.

Operational Monitoring of Extreme Events

4.3.21 The Council highlighted the role of NMHSs in the provision of timely weather and climate advisories for warning against extreme weather and climate events, and urged Members to strengthen their cooperation on the climate watch systems, to ensure their harmonized implementation, interoperability and timely exchange of related data and products. The Council emphasized that these systems should be developed as an integral part of NMHSs efforts in support of climate risk management and disaster risk reduction, based on the concept of a seamless approach extending from weather to climate scales.

4.3.22 The Council noted with appreciation the ongoing work of the CCI Task Team on the Definition of Extreme Weather and Climate Events (TT-DEWCE) on providing guidance on the definition and tools for monitoring extreme weather and climate events including heat waves, cold waves, heavy precipitations and dry spells. Such guidance would enable a harmonized monitoring of these extremes to support operational climate services including early warning, climate watches, climate prediction, and support to research in climate change assessment.

4.3.23 The Council appreciated the progress made by the China Meteorological Administration (CMA) in developing an Objective Identification Technique for Regional Extreme Events (OITREE), which was published in 2012.

4.3.24 The Council further appreciated the initiative by CCI to set up a WMO portal which will be used by Members to provide national updates on observed extreme weather and climate events on quasi-real time basis. The web portal will support WMO Climate System Monitoring, in particular the input to the Annual Statement on the Status of Global Climate.

4.3.25 The Council looks forward to CCI recommendations on the above activities and noted the opportunity to link the activities listed above with other WMO Programmes and projects, such as the WMO Severe Weather Forecasting Demonstration Project (SWFDP) and the WMO Public Weather Services (PWS) programme.

4.3.26 The Council noted with appreciation the development of a Data Base on Extremes by the WMO RA VI RCC-Node on Climate Monitoring, hosted by DWD, which provides consistent and routinely managed information on the occurrence of extreme weather and climate events describing time of occurrence, duration, geographical extent and intensity and impacts of extreme weather and climate events affecting Europe.

Climate Services Information System

4.3.27 The Council noted that WMO had already put in place, or identified, several entities to specifically support NMHSs climate operations, including the highly specialized centres designated by WMO based on standards and criteria, namely Global Producing Centres of Long Range Forecasts (GPCs), the WMO Lead Centre for Long-Range Forecast Multi-Model Ensembles (LC-LRFMME), the WMO Lead Centre for Standard Verification System of Long Range Forecasts (LC-SVSLRF), Regional Climate Centres (RCCs) and WMO Information System (WIS) Centres (GISCs, DCPCs), as well as mechanisms such as the Regional Climate Outlook Forums (RCOFs) and Climate Watch Systems. The Council noted with satisfaction that these entities are appropriately highlighted in the GFCS Implementation Plan as part of its Climate Services Information System (CSIS) pillar, approved by the first session of the Intergovernmental Board on Climate Services (IBCS-1).

4.3.28 The Council agreed that formally designated structures for CSIS elements and mechanisms are essential for standardization, sustainability, reliability, adherence to policies etc. The Council noted that the existing WMO CSIS structural elements, especially on the aspects of climate data, climate monitoring or climate predictions other than at seasonal time scales represented by GPCs, could be more effectively coordinated with GFCS perspectives, noting that the structural elements currently well serve as the basis for CSIS implementation. The Council requested CCI and CBS to explore possible approaches to designating CSIS structural elements in a more formally coordinated manner and in line with Principle 7 for implementing the GFCS, i.e., to facilitate and strengthen existing infrastructure and avoid duplication. In this respect the Council took note of the ongoing initiative to improve data management in support of climate as referred to in paragraph 4.4.93. This initiative is expected to greatly facilitate climate data services across all geographical scales, thereby contributing to the relevant CSIS development.

4.3.29 The Council recognized that the implementation of CSIS at national scales will impose considerable demands on climate information providers, including NMHSs. The Council noted that a Climate Services Toolkit based on agreed standards and good practices to support CSIS activities would improve efficiency and raise capacity of service providers, and ensure that the information and products developed for and provided to users is reliable, consistent and of high quality. The Council also agreed that such a toolkit will also make training workshops more focused, tangible and efficient in imparting the operational skills. The Council therefore urged developers of tools and datasets suitable for inclusion in Climate Services Toolkit to support the efforts of CCI in its development and dissemination in close coordination with the GFCS implementation. The Council requested CCI to put in place appropriate measures to ensure the tools and datasets included in the Toolkit are based on robust science and methodologies. In this regard, the Council emphasized the need to have ongoing consultations with senior scientists of different specialties on the corresponding content, techniques and software included in the Toolkit. The Council noted the need to avoid the inclusion of outdated techniques and to respond to evolving learning needs. In addition, the Council requested CCI to explore ways of ensuring the long-term maintenance and sustainability of the toolkit contents.

4.3.30 The Council noted that a WMO Technical Conference on "Climate Services – Building on CLIPS Legacy" is being organized from 30 June to 2 July 2014 in Heidelberg, Germany, on the occasion of the sixteenth session of CCI (CCI-16) and the 35th annual meeting of the Joint

Scientific Committee of WCRP. The Council further noted that the CCI Management Group had proposed the theme focused on CLIPS legacy taking into account the longstanding leadership role that CCI played in the implementation of the CLIPS project ever since its establishment in 1995, and the decision of Cg-XVI to conclude CLIPS in 2015 and transition its ongoing activities into the implementation of the GFCS.

4.3.31 The Council noted that the CCI Expert Team on Climate Services Information System (ET-CSIS) is working on a wide range of issues relevant to CSIS operations, in close alignment with the relevant aspects of the Implementation Plan for the GFCS. The Council further noted with appreciation that the CCI Management Group, considering the overarching nature of CSIS cutting across all the Open Panels of CCI Experts (OPACEs), proposed to set up an Implementation Coordination Team (ICT) focused on the CSIS, with membership spanning all the OPACEs, within the working structure for the sixteenth intersessional period of CCI.

4.3.32 The Council noted with appreciation the progress in the establishment and operation of Regional Climate Centres (RCCs) in all the regional associations. The Council recognized the need for standardization of RCC products and services, and appreciated that the CCI/CBS Expert Team on RCCs is developing guidance on this and other operational aspects of the RCCs. The Council urged the presidents of regional associations, CCI and CBS to closely work together to ensure successful establishment and operation of RCCs in all Regions and facilitate the effective use of their products and services by the NMHSs.

4.3.33 Recognizing the growing benefits of RCOFs in fostering networking amongst climate experts, capacity building, user engagement and in development of consensus-based forecasts for the subregions, the Council noted with appreciation that a new Association of South East Asian Nations Climate Outlook Forum (ASEANCOF) had been established based on the initiative from Regional Association V with strong support from the ASEAN Sub-Committee on Meteorology and Geophysics. It appreciated the leading role played by the Centre for Climate Research Singapore (CCRS) in hosting the inaugural session (ASEANCOF-1) and its sustained commitment to the process. The Council thanked the United States Agency for International Development (USAID) for providing financial support to ASEANCOF-1.

4.3.34 The Council noted with satisfaction the launch of the Mediterranean Climate Outlook Forum (MedCOF), and the holding of its first two sessions, MedCOF-1 in Belgrade (Serbia), 13 to 19 November 2013 and MedCOF-2 as an on-line session from 18 April to 28 May 2014. The Council appreciated the initiative and coordination of the State Meteorological Agency of Spain to put in place the MedCOF following a planning meeting held in Madrid in June 2013 and to operate and maintain the website of MedCOF. The Commission further appreciated the financial support provided by Spain for the RCOFs in Central America, the Caribbean, and southern South America, as part of its programme of Latin American cooperation.

4.3.35 The Council noted with appreciation that the WMO CBS/CCI Workshop on Operational Long-range Forecasting: GPCs and RCCs, in support of NMHSs and RCOFs (Brasilia, Brazil, 25–27 November 2013) involved all the RCCs, RCOFs and selected NMHSs representing all six WMO Regional Associations. The Council noted that the workshop helped identify priorities for strengthening cooperation and enhanced exchange of data, methods and tools between GPCs and RCCs, and to develop recommendations aimed at improving operational practice in long-range forecasting, including in support of NMHSs and RCOFs.

4.3.36 The Council noted that the CCI Task Team on Global Seasonal Climate Update (GSCU) progressed with the trial phase of the GSCU and that a number of updates have been produced to evaluate the content as well as operational requirements. The Council appreciated that the CBS/CCI Expert Team on Operational Prediction on Sub-seasonal to Longer-time Scales (ET-OPSLS) and its GPC-representative members were actively supporting the improvement of the prototype. The Council noted that the trial phase of the GSCU development will continue into the next intersessional period of CCI.

4.3.37 The Council noted that National Climate Outlook Forums (NCOFs) are envisioned as key national platforms for promoting regular dialogue and inter-agency coordination in responding to climate variability and change. The Council further noted that such forums at national level help to provide climate information at relevant timescales through a regular and sustained multi-stakeholder dialogue process between information provider(s) and users at the national level, and serve as an effective and sustained user interface platforms for CSIS. The Council noted with appreciation that a pilot NCOF was hosted by the Instituto Nacional de Meteorologia (INAM) Mozambique (Maputo, 3–6 March 2014) with WMO support. The Council urged Members to take up NCOF implementation as a key component of GFCS implementation at the national level, and requested the Secretary-General to facilitate the development of guidance to help NMHSs to set up and coordinate NCOFs on a regular basis using global and regional operational products that meet WMO standards.

Climate Information for Adaptation and Risk Management

4.3.38 The Council noted with appreciation that the CCI Task Team on Climate Risk Management (TT-CRM) in collaboration with the Tropical Agricultural Research and Higher Education Centre (CATIE), the International Atmospheric Circulation Reconstruction over the Earth (ACRE) and the UK Met Office, and with the endorsement of the president of RA IV organized a joint WMO/ACRE/CATIE Central America Workshop on Managing Climate Risks to Agriculture and Water Resources (Turrialba, Costa Rica, 28 April to 2 May 2014). The Council noted that the workshop brought together sector experts, climate scientists and forecasters from NMHSs across Central America and international experts acting as resource persons in order to demonstrate the effective utilization of tailored and targeted climate data, reanalyses and seasonal forecasts that address specific user requirements for managing climate risks in the region. The Council supported similar initiatives in other regions following the generic template on conducting CRM workshops developed during the above event. In this context, the Council stressed that NMHSs are an essential part of the associated multi-disciplinary research processes, and should not be considered merely as data providers.

4.3.39 The Council appreciated collaborative and concerted efforts of the experts from WMO CCI and WHO in developing the Guidance on Implementation of Heat Health early Warning Systems (HHWS). The Council recognized the critical importance of the Guidance in view of increased frequency and intensity of heat waves during the last decades and considered the Guidance as a significant achievement of WMO and WHO that will support the implementation of integrated HHWS. The Council noted with satisfaction that the draft document had been endorsed by the WMO Commission for Climatology (CCI) Management Group and had been submitted for endorsement to WHO.

4.3.40 The Council noted with appreciation that the CCI Expert Team on Climate Risk and Sector-Specific Climate Indices (ET-CRSCI) developed a software called “ClimPACT” with the aim of producing an easy and consistent way of calculating the indices, emulating the successful approach established by the ETCCDI. The Council further noted that an inception workshop was organized to demonstrate and provide training on the use of the software package for the Western South American subregion (Guayaquil, Ecuador, 10–14 June 2013), in which country experts from climate, water, agriculture and health sectors were brought together to apply the software. The Council recognized the added value of application-oriented climate information, and encouraged ET-CRSCI to continue its efforts to improve the software and facilitate its application in other regions in close collaboration with user sector agencies.

4.3.41 Recognizing the importance of the above-mentioned inception workshop, the Council requested to CCI to facilitate updates to the ClimPACT software taking into account the recommendations made by the workshop participants. Furthermore, the Council highlighted the importance of evaluating the ClimPACT indexes with the participation of regional experts from different sectors (climate, water, agriculture and health), which is indispensable in light of the variable nature of climate-sector relationships. Further, the Council encouraged the establishment of a team or the designation of specialists in collaboration with other agencies to collect and provide relevant time series information specific to each sector (crop yields, phenology, mortality,

etc.). This will make possible comparison of observed climate impacts with those obtained from climate indices, facilitating validation as well as inference. The Council suggested that it would be appropriate to include in ClimPACT, or as a companion software package, capabilities to ingest and graphically display sectoral time series along with those of climate indices.

Guide to Climatological Practices

4.3.42 The Council noted with appreciation that the translation of the *Guide to Climatological Practices* (WMO-No. 100) into all WMO official languages was completed and that Spanish, Arabic and Chinese versions were posted on the web, while translations into other official languages were expected to be released in the second half of 2014. It further noted that CCI had initiated an update process of this publication to keep it current based on the latest technical developments in climate data management, data analysis, monitoring and prediction areas. It urged Members to actively support their contribution to the updating practice of this publication and proposed that the Secretariat broaden the access to the electronic version of the Guide across all the relevant expert networks and user communities to advise them on the necessary technical guidance.

Joint Expert Group on Climate, Food and Water (JEG-CFW)

4.3.43 The Council noted that a meeting of the Joint CCI/CAGM/CHy Expert Group on Climate, Food, and Water (JEG-CFW) was held in Jeju, Republic of Korea on 5 November 2013, with a particular focus on weather and climate, observations, phenology and drought. The Council noted that the recommendations of the JEG-CFW were reported to the Executive Council Working Group on Climate and Related Weather, Water and Environmental Matters (ECWG-CWE) in December 2013. The Council noted that the JEG-CFW proposed to establish a Joint CAGM-CCI Expert Team on Phenology, possibly in collaboration with the International Society of Biometeorology (ISB). The Council requested the two Commissions to consider this proposal.

4.3.44 The Council noted that the JEG-CFW discussed the use of simple rainfall observations made by volunteers and requested that the CAGM, CCI, CHy, and CIMO work together to further explore this issue and come up with proposals on the way forward.

4.3.45 The Council supported the JEG-CFW recommendation to update the previous WMO Brochure on Weather, Climate, and Food security by adding water aspects to the theme and requested the Secretariat to assist the JEG-CFW in this regard.

WMO Drought Initiatives

4.3.46 The Council noted that the Technical Support Unit (TSU) of the Integrated Drought Management Programme (IDMP) was established in August 2013 within the Climate and Water Department of WMO Secretariat. The Council was appreciative that the Global Water Partnership (GWP) seconded an expert to the TSU and that the Government of Canada has provided funds for the IDMP to start its work. The Council was encouraged that the governance bodies of the IDMP had already met and that the IDMP has published its first publication "Guidelines for National Drought Management Policies and Preparedness Plans", which is available on the IDMP website (<http://droughtmanagement.info>).

4.3.47 The Council noted that the IDMP is working with partners to develop regional projects such as the Central and Eastern Europe-GWP (CEE-GWP) project. The Council encouraged the development of IDMP regional projects on drought management and their extension to other regions in the world.

4.3.48 The Council recognized the interest shown by the Ibero-american cooperation programme funded by Spain, and the meeting of Directors of Ibero-american NMHSs for CIMHET-XI, in Quito (Ecuador), to explicitly support the work of IDMP and the establishment of national drought management policies. In this regard, the Council noted with appreciation the Workshop on National Drought Policies in Mexico, Central America and the Caribbean as part of the activities of CIMHET, held in Antigua, Guatemala, from 4 to 8 November 2013.

4.3.49 The Council noted that there are other WMO activities which relate to drought issues such as the WMO Disaster Risk Reduction Programme Focal Points of Technical Commissions and Programmes and international activities such as the development of the Post-2015 Framework for Disaster Risk Reduction (DRR). The Council encouraged the Secretariat to liaise and coordinate with these activities to ensure that drought issues are adequately represented.

4.3.50 The Council noted that the UN-Water Decade Programme on Capacity Development (UNW-DPC), WMO, UNCCD and FAO are collaborating on the National Drought Management Policies Initiative which had already organized three regional workshops (Central and Eastern Europe in Romania, July 2013; Latin America, December 2013; and Asia-Pacific in Viet Nam, May 2014). The Council was appreciative that WMO was the lead organizer for the Latin America workshop held in Fortaleza, Brazil. The Council noted that in most Asian countries these policies are needed since no drought risk and impact assessments have been carried out, noting also that legal frameworks for national drought policy are equally crucial. Another workshop is scheduled for Eastern and Southern Africa (August 2014), with additional workshops dependent on available funds. The Council requested the Secretary-General to continue to support this initiative and to harmonize this initiative with the IDMP.

Water Issues

Progress with the CHy Work Programme (2012–2016)

Meteorology, Climatology and Hydrology (MCH) database

4.3.51 The Council was pleased to note that, as requested by CHy-14, a community of practice on database management systems had been established, based on the open source MCH system. MCH, originally developed in Spanish by Mexico, adapted and installed in several Latin American countries by the Iberoamerican Programme funded by Spain and offered to WMO for use by Members, had been translated into English and French and installed in Ghana, Belize, Curaçao and Sint Marteen, Albania, Bosnia and Herzegovina, with several other countries to be added in the next few months. In all cases, NHS staff have been trained in the operation and management of the system. The Council encouraged other Members to take advantage of the availability of this open source software and noted that software had been developed to enable the transfer of data from CLICOM to MCH. The Council noted the interest expressed by the British Caribbean Territories to have the database introduced into the Caribbean and the offer by CIMH to assist WMO in this regard.

DEWETRA platform

4.3.52 The Council noted that at CHy-14, Italy had offered to make the DEWETRA platform freely available to members of CHy. The DEWETRA platform is a real-time integrated system for hydrometeorological and wildfire risk forecasting, monitoring and prevention. It has the capability to ingest data from different sources and produce several types of integrated maps, useful for risk-management decision-makers. The Council was pleased to see that as a follow-up to the offer above, WMO organized a Workshop in Rome in October 2013, where representatives of 15 countries, from all regional associations, were introduced to the system and the procedures to be followed in case they were interested in requesting it for their country were explained. A Cooperation Agreement between WMO and the Italian Department of Civil Protection (the “owner” of the software) has been signed and the first installation missions were undertaken in April and May 2014. The Council expressed its appreciation to the Government of Italy for making the DEWETRA platform available to its Members and encouraged Members to take advantage of this offer, as Croatia, Ecuador, Guyana and the Philippines have already done. The Council also noted that the DEWETRA platform had previously been installed by Italy in Albania, Lebanon, the Plurinational State of Bolivia and, for regional purposes, at the Caribbean Institute for Meteorology and Hydrology (CIMH).

Water ML2.0 and Data Exchange

4.3.53 The Council was pleased to note that considerable progress had been made with respect to the development and application of WaterML 2.0. The Council noted that WaterML2.0 is a significant multilateral effort that has resulted in its adoption by the Open Geospatial Consortium as an international standard for water data exchange. Documentation had been developed by Italy on one technical solution (based on CUAHSI) that supports exchange of hydrological data using WaterML 2.0. It is planned to host this software (open source) on the WMO website. The Council noted the opportunity for WMO to take a leadership role, particularly via the Global Framework for Climate Services, in promoting WaterML2.0 as a means of enhancing the sharing of water data. The Council encouraged CHy to further develop the material to support the introduction of WaterML 2.0 and agreed that the addition of case studies on the implementation of WaterML 2.0 would greatly assist Members.

4.3.54 The Council noted that within the framework of the EU funded project “Building Resilience to Disasters in Western Balkans and Turkey” WMO supported the International Sava River Basin Commission in developing a data exchange policy, based on the Resolution 25 (Cg-XIII), Exchange of Hydrological Data and Products. The Council encouraged the further promotion of Resolution 25 (Cg-XIII) in the water sector.

Capacity Development

4.3.55 The Council noted that distance learning courses in Basic Hydrological Sciences were held in 2013 for Asia and Africa, and a second course for Asia was held in March 2014. These courses are jointly organized by WMO, COMET and NOAA and a local WMO Regional Training Centre (RTC); the India National Water Academy (in the case of Asia) and the Institute for Meteorological Training and Research (IMTR) of Kenya (for Africa). In addition, CIMH organized a Basic Surface Water Modelling Distance Learning Course in September 2013, the Iberoamerican network Prohimet held a workshop on early warning of hydrometeorological phenomena in Aguascalientes, Mexico, in November 2013 and a training course for the Western Balkans on flood loss assessment was organized by the Associated Programme on Flood Management (APFM) in Sarajevo from 7 to 9 May 2014.

4.3.56 The Council was informed that the training material on the WMO Manual on Stream Gauging had been translated into Spanish and was being translated into French and that a training of trainers for Spanish-speaking instructors on stream gauging had been held in Mexico from 11 to 15 November 2013. The community of practice of instructors in stream gauging was being developed and was intended to be activated by May 2014. A workshop on stream gauging for French-speaking countries of RA I is scheduled for the last quarter of 2014. The French version of the *Manual on Flood Forecasting and Warning* (WMO-No. 1072) was currently being finalized.

Integrated Drought Management Programme (IDMP)

4.3.57 The Council noted that the IDMP was being implemented across the Agricultural Meteorology and Hydrology and Water Resources Programmes and that achievements had been reported on under agenda item 4.1. The IDMP was cooperating closely with the APFM to ensure integration of water and flood management issues in the area of drought management and agricultural meteorology.

World Hydrological Cycle Observing System (WHYCOS)*WHYCOS International Advisory Working Group (WIAG)*

4.3.58 The Council noted that the tenth session of the WIAG-10 was held in Geneva from 10 to 11 October 2013. The meeting discussed the follow-up to the 2011 WHYCOS Review and noted that the WMO Secretariat was taking action on the recommendations and was studying the best operational arrangements in the Secretariat to provide maximum support to the implementation of the programme and its components. Some of the recommendations are also

being addressed in the ongoing review of the WHYCOS Guidelines. The Council was pleased to note that the revised version of the Guidelines puts more emphasis on the goal of collecting quality data, publishing accurate products/information and promoting the application of standards in hydrological practices. It also puts more emphasis on the choice of most appropriate data collection equipment and practices (including observers), transmission modes and technologies. In addition to activities and outputs, it will also recommend putting more emphasis on project design and implementation and on outcomes and societal impacts. Recommended administrative procedures and institutional settings are also simplified to make them more adaptable to varying local constraints.

WHYCOS Component Projects

4.3.59 The Council also noted the progress that had been achieved in a number of WHYCOS component projects. The Council urged all WHYCOS component projects to adopt and apply the revised WHYCOS Guidelines in the implementation of their initiatives.

Monitoring Systems for SDGs

4.3.60 Integrated water resources management is a key for climate change adaptation strategies and the only way to appropriately address freshwater-related Sustainable Development Goals targets. WMO monitoring systems and CHy's guidance in terms of hydrological data analysis should play a central role in designing monitoring systems and decision support for SDGs. The Council therefore encouraged the Secretary-General and CHy to actively participate in the discussions related to SDG monitoring and to propose contributions that synthesize GFCS components with SDG-related monitoring and to coordinate this effort with UN-Water.

4.3.61 The Council was informed that Germany contributes to this endeavour with the new Global Water Data Centre, which supports water management planning through its unique combination of freely available data on water quantity from the WMO Global Runoff Data Centre and data on water quality from the UNEP Global Water Quality Centre, both centres hosted at the Federal Institute of Hydrology in Koblenz, thus making use of the inherent synergies. Germany will initiate the appropriate process through the WMO Technical Commissions in order to acquire the recognition of the Global Water Data Centre as a WMO Data Centre.

WMO Flood Forecasting Initiative

WMO Flood Forecasting Initiative Advisory Group (FFI-AG)

4.3.62 The Council noted that in response to Cg-XVI Resolution 15 which established the FFIAG, the first meeting of the FFI-AG had been held in Geneva from 7 to 9 October 2013. The Council noted that a strong focus of this group was to ensure alignment with a range of projects being undertaken across WMO, including the Severe Weather Forecasting Demonstration Project (SWFDP), the Flash Flood Guidance System (FFGS) with global coverage and the Coastal Inundation Forecasting Demonstration Project (CIFDP). The Council requested the president of CHy to report to Cg-17 on progresses achieved with the workplan.

4.3.63 The Council expressed its concern about the consequences of the recent catastrophic flood event on the Sava River and its tributaries in the Western Balkans (Bosnia and Herzegovina, Croatia and Serbia). The Council considered it crucial that actions be taken concerning the recovery of hydrological infrastructure in the affected areas and, in particular, the related capacity development on common monitoring and hydrological forecasting and warning systems. In this regard, the Council requested the Secretary-General to send an expert mission to assess the situation and develop a recovery plan and to instruct the Resource Mobilization Office to explore financing possibilities to support this activity.

Flash Flood Guidance System (FFGS)

4.3.64 The Council noted the work of CHy and CBS, as well as significant contributions by Members, leading to the extensive uptake of the FFGS. As called for in Resolution 21 (Cg-XV), and with financial support from USAID/OFDA, regional components of the global FFGS have been implemented or are under development in Central America, South-East Asia, Southern Africa, Black Sea and Middle East, Haiti, Pakistan, South-east Europe, South Asia and Central Asia. Nationally funded projects have also commenced, or are proposed, in South Africa, Romania, Mexico and Oman. Through funding from the Swiss Development Corporation, Jordan will be added to the Black Sea and Middle East regional FFGS programme. The Council also noted the proposal to convene a 10-year follow-on conference to the First International Conference on Flash Flood Forecasting, which USA is willing to support.

Associated Programme on Flood Management (APFM)

4.3.65 The Council noted that the APFM, in partnership with the Global Water Partnership (GWP), continued to compile and produce guidance documents and tools in support of Integrated Flood Management. The Council welcomed the fact that four new tools had been published in 2013, and noted with satisfaction that seven more were being developed. The Council noted that the HelpDesk on IFM had reached a peak in terms of requests received during the same period, either for rapid guidance or for the development and support of pilot projects. The Council was pleased to note that APFM was also supporting the EC-funded project PEARL (Preparing for extreme and rare events in coastal region) in the framework of the FP-7, as well as the IPA "Building resilience to disasters in Western Balkans and Turkey".

Global Flood Partnership (GFP)

4.3.66 The Council was informed of the proposed establishment of a Global Flood Partnership. The broad objective of the GFP is the development of flood observational and modelling infrastructure, leveraging on existing initiatives for better predicting and managing flood disaster impacts and flood risk globally. It aims to achieve this through bringing together the scientific community, service providers (satellite and weather), national flood and emergency management authorities, humanitarian organizations and donors to provide operational, globally-applicable flood forecasting and monitoring tools and services, complementary to national capabilities. The Partnership aims to strengthen the sharing of hydrometeorological data and information, foster in-country capacity-building and improve flood risk management models and products. Given what appears to be significant overlap between the objectives of GFP and WMO Member responsibilities, and that WMO does not appear to have been involved in the evolution of GFP, it is recommended that a discussion of the Partnership, including a resolution addressing appropriate engagement by the WMO, occur at Cg-17. It is also recommended that CHy provide guidance for WMO's involvement in the GFP, and that it work to ensure that the mandate, roles and responsibilities of the NMHSs in providing flood forecasting and warning services at the national level be recognized, acknowledged and taken into consideration by the GFP as it continues to develop.

Hydrology Forums

4.3.67 The Council noted that Hydrology Forums had been established in RA VI and RA IV. These forums are aimed at facilitating collaboration between hydrological experts in the Regions and are implemented, as much as possible, through virtual means. This sharing of knowledge, experiences, expertise and opportunities between experts is expected to advance the practice of hydrology in the Regions. The Council requested that the practice is reviewed for possible implementation in other Regions.

Progress in Implementation of the Strategic Plan and Operating Plan (2012–2016)

4.3.68 The Council noted the substantial progress in water issues achieved against the objectives of the Strategic Plan and Operating Plan (2012–2016) under Expected Result 3. The

Council was informed that the main areas in which progress had not been as expected were in support of flood forecasting initiatives in some regions where decisions were yet to be made on projects to be supported and in preparations for meetings in support of some CHy activities. Each of these areas would be a particular focus for the next eighteen months.

4.4 WMO Integrated Global Observing System and WMO Information System (agenda item 4.4)

Enhanced capabilities of Members to access, develop, implement and use integrated and interoperable Earth- and space-based observation systems for weather, climate and hydrological observations, as well as related environmental and space weather observations, based on world standards set by WMO (ER 4)

Implementation of the WMO Integrated Global Observing System (WIGOS)

4.4.1 The Council noted the progress achieved in the implementation of WIGOS in accordance with Resolution 10 (EC-64) – WIGOS Framework Implementation Plan (WIP). In this regard, the Council expressed its appreciation of the significant accomplishments since Cg-XVI in the most critical activities to be implemented by 2015 and thanked all experts involved for their work, effort and time.

4.4.2 The Council expressed appreciation to all technical commissions and regional associations that had adapted and designed their working structure/mandates/activities to support the WIGOS implementation. It agreed that for the implementation of WIGOS, dedicated groups of experts are needed within technical commissions' and regional associations' structures that will support the work of their representatives in the Inter-Commission Coordination Group on WIGOS (ICG-WIGOS).

4.4.3 Great appreciation was expressed to Members such as Australia, China, Germany, Norway and the United Kingdom who have contributed to the implementation of WIGOS during the current financial period. In particular, the support from Switzerland for developing and hosting the WIGOS Operational Information Resource (WIR) and the Observing System Capabilities Analysis and Review Tool (OSCAR) was noted with appreciation.

4.4.4 The Council appreciated the further progress achieved in the Regional WIGOS Implementation Plans (R-WIP). Four regional associations (RAs II, IV, V and VI) already endorsed their R-WIP, the other two (RAs I and III) are expected to do so at their forthcoming sessions this year.

4.4.5 The Council agreed that the overall issue of WIGOS Data Management needs focus and attention. This covers issues such as storage and archival methods and responsibilities, reprocessing, discoverability and data access. This should be considered in the broader WMO context and should, in due course, be adequately reflected in the WMO *Technical Regulations* (WMO-No. 49), Vol. I, with clearly defined areas of responsibilities of all concerned (WIGOS, WIS, DPFS, etc.). Close collaboration and cooperation of all relevant technical commissions is needed. The Executive Council requested further guidance to the Members on how to address this matter and referred it to CCI and CBS for further study.

4.4.6 The Council acknowledged that ICG-WIGOS had updated the WIP, adjusted target dates for tasks' completion. The Council noted the updated version of WIP as given in [Annex V to the present report](#).

4.4.7 The Council stressed the importance of an early development of a "Vision for WIGOS in 2040" and requested CBS to lead this development, with involvement of the other technical commissions. A draft Vision should be submitted to Cg-18 in 2019 for endorsement.

4.4.8 The Council agreed that the implementation of the WIGOS Framework is approaching a point of maturity where WIGOS is now enabling the development and deployment of its

components. With the key initial building blocks of the WIGOS Framework in place by Cg-17, the prerequisites are available for a Preoperational Phase of WIGOS from 2016 to 2019.

4.4.9 The Council agreed that WIGOS, supported by WIS, should continue as a WMO Strategic Priority Area for the next financial period. Noting the difficulties in implementing WIGOS in some of the developing and least developed countries, the Council requested that increased priority be given to supporting the capacity development for WIGOS in these areas.

WIGOS Regulatory Material and Guidance

4.4.10 The Council noted that the development of the WMO *Technical Regulations* (WMO-No. 49), Vol. I, Part I – WIGOS, as requested by EC-64, was proceeding ahead of the Parts II – VI of this Volume. The Council requested the technical commissions to accelerate the development of the other Parts of Vol. I to ensure a comprehensive approach leading to all parts being consistent with each other. The Council agreed that the Vol. I, Part I – WIGOS could be approved and promulgated effectively by Cg-17.

4.4.11 Recognizing the importance of the free and unrestricted exchange of data and products necessary for the effective implementation of WIGOS, and the need to integrate observations supporting a broad range of application areas from a large and heterogeneous variety of sources, both NMHS and non-NMHS owned, into the WIGOS framework, the Council requests ICG-WIGOS to investigate whether the existing data policies and protocols in place for the Global Observing System and other WIGOS components adequately covers the requirements for WIGOS, and that the Group provide a report to Cg-17 on this issue.

4.4.12 In this regard the Council expressed its concern regarding a standard terminology to be used in WMO regulatory material and requested the Secretary-General to make every effort to update and maintain unambiguous references with all definitions needed for the WMO Technical Regulations (currently the International Meteorological Vocabulary, WMO-No. 182, and the METEOTERM database).

4.4.13 The Council agreed that the current WIGOS Metadata semantic standard should be formalized. It was underlined that interoperability requires certain fixed vocabularies (e.g., variable names, Station Identifiers); however, various stakeholders exist, such as WMO, GEO, EU, CEOS.

4.4.14 The Council agreed that the WMO should drive the process of establishing governance and take responsibility for hosting and maintaining such vocabularies needed for metadata management.

WIGOS Partnerships

4.4.15 The Council highlighted the importance of third-party (non-NMHS) observations for Members to provide enhanced services and noted that the WIGOS integration of these data is a critical contribution to WMO, its Members and its application areas. The Council agreed that the WIGOS Framework already provides a mechanism for NMHSs and their national partners to share observations, while recognizing that policies regarding these data normally fall outside of the NMHSs. The Council further urged the Secretariat to actively reach out to and establish agreements with partner organizations with observing systems activities (e.g. the Copernicus marine monitoring service), with the particular goal of establishing common terminology regarding metadata standards and, whenever possible, common vocabularies. The Council recommended looking into the possibility of holding joint Conferences or Workshops as a way to facilitate the dialogue and achieve agreements on this important issue.

4.4.16 In this regard, the Council requested the Secretary-General to re-emphasize to Members the need to register all observing stations across all WIGOS component observing systems operating to WMO standards within their territories, providing the correct and complete coordinates of their observing stations, and to make their observations available in real-time. The

Council also encouraged Members to make station identifiers available to potential non-NMHS collaborators in observations.

4.4.17 The Council reminded Members of their obligation to check and correct the entries in WMO Publication No. 9, Volume A for all their observing stations, and to ensure that the locations reported in TDCF reports are correct and consistent with Volume A, using the procedures of the Operational Information System of the World Weather Watch.

4.4.18 The Council reiterated that collaboration and coordination with partners, including AfriGEOSS, the European Commission and many other non-WMO, non-NMHS communities, is a priority for WIGOS and will need additional attention in order to build synergy and avoid unnecessary duplication of effort. In this regard, the Council requested the Secretary-General to inform the European Commission of WIGOS initiatives underway within the WMO.

4.4.19 At this stage, WIGOS is ready to fully support and contribute to the implementation of the Global Framework for Climate Services (GFCS). However, it was noted that better understanding and more concrete specification of the WIGOS role to the Observation and Monitoring Pillar, and contribution from ICG-WIGOS is needed from the GFCS community.

The WIGOS Information Resource (WIR)

4.4.20 The Council stressed the importance of the WIR; it was noticed that the launch of the Observing Systems Capabilities and Requirements (OSCAR) tool would, for the first time, make all the information regarding observational requirements and observing systems capabilities available in the same place. However, the Council noted that the remaining parts of the WIR are yet to be developed and that substantial resources for their development and subsequent operation are required. It therefore urged Members to consider providing assistance for their development and/or future operations.

4.4.21 The Council considered that having the WIR available in all the WMO official languages could benefit Members. It requested the Secretary-General to explore the possibility and associated costs and take these into account in the further development of the WIR and report back to EC.

Communication and Outreach

4.4.22 Recognizing a huge increase in number and diversity of Automatic Weather Stations (AWS), particularly by non-NMHSs' agencies in many WMO Regions, the Council welcomed and fully supported an initiative to organize a series of WIGOS/WIS Conferences on Automatic Weather Stations. In this regard, the Council urged Members to submit their offer to host such a Conference and to contribute resources.

4.4.23 The Council noted that there is still a strong requirement for communications and outreach, particularly 'in the field', targeted at senior managers with responsibility for observations programmes. Therefore, the Council encouraged Members to communicate success stories and benefits achieved through their WIGOS implementation activities, lessons learned and experiences gained, so that such material could be shared with others.

Specific WIGOS Issues

4.4.24 The WMO AMDAR observing system is now fully integrated into the World Weather Watch Programme following the cessation of activities of the AMDAR Panel in 2012 and the establishment of two work teams on aircraft-based observations within CBS and CIMO, respectively. Recognizing that there continued to be large areas of the globe not yet benefiting from upper-air coverage of this inexpensive but high quality and high impact observing system, the Council agreed and offered full support for the approach recommended by the CBS Expert Team on Aircraft-based Observing Systems, that in line with the relevant actions of the Implementation Plan for the Evolution of the Global Observing Systems (EGOS-IP), each regional association

should consider the development of an implementation plan for aircraft-based observations as a component of their respective Regional WIGOS Implementation Plans. The Council also urged Members to cooperate with RAs and to endeavour themselves to work with their national airlines towards the development of new AMDAR programmes.

4.4.25 The Council recalled the importance of implementing the actions of the Implementation Plan for the Evolution of Global Observing Systems (EGOS-IP) in order to address the identified observational gaps with regard to the observational user requirements of WMO Application Areas. The Council urged Members, in collaboration with partner organizations, and identified agents in the EGOS-IP, to address the 115 actions listed in the EGOS-IP.

4.4.26 While also noting the importance of monitoring status of actions of the EGOS-IP, the Council recalled that not all Members have nominated National Focal Points (NFPs) for the purpose of monitoring the implementation of the EGOS-IP nationally, reporting on implementation issues, and providing feedback to the CBS through the Secretariat. The Council therefore requested Members who have not as yet nominated NFPs to do so.

4.4.27 The Council recognized the difficulties that JCOMM is facing with regard to the implementation of marine meteorological and oceanographic observing systems. In particular, noting the ongoing development of the Tropical Pacific Observing System (TPOS) and related observing system network design activities, the Council urged Members to enhance their contributions in support of the implementation and operations of the tropical moored buoy arrays, in particular in the Tropical Pacific Ocean, where data availability has dropped substantially in the last two years. Of particular interest is the provision of ship time to assist in the deployment and servicing of tropical moored buoys.

4.4.28 The Council also recalled the importance of sea level pressure observations from drifting buoys, and noted that such data have been shown to have a substantial positive impact in particular for global NWP, especially when measured on a per observation basis. While noting that most of the barometers installed in drifting buoys are currently funded by research, and that such funding is currently at risk of being substantially reduced, the Council urged Members and NMHSs to contribute to the funding of the barometers on drifters.

4.4.29 The Council noted the progress made in defining a WMO mechanism to recognize centennial observing stations. It acknowledged the outcome of a recent scoping meeting and recommended to consolidate the proposal during the upcoming CCI, CIMO and CBS sessions in order to table it at Cg-17 for approval.

4.4.30 The Council strongly encouraged the WMO Permanent Representatives to nominate their National WIGOS Focal Points. The process should be initiated, if not already done so, by a letter from the president of the respective regional association to all Members of the Region. The Council reiterated that commitment by Members to WIGOS is essential and urged Members to fully support implementation of WIGOS in their Region, including providing sufficient resources. In this regard, the Council agreed that it is essential to make Members aware that WIGOS is not optional but is a necessity, and that it is relevant to all Members.

4.4.31 The Council reiterated its concern on the sustainability of the observing systems/networks, especially in developing and less developed countries. In particular, there should be insistence on donors and recipients taking an end-to-end approach when projects are considered, so that initial investments in acquisition, installation etc. are supplemented with maintenance, training and operational funds to ensure the sustained operation of observing systems and supporting activities.

4.4.32 In order to maximize sustainability, the Council requested that the Resource Mobilization Office of the WMO Secretariat should pay appropriate attention to this critical issue when considering any donation from major development partners to investments in the observing systems of WMO Members. Sustainability of such observing systems should be guaranteed by the donors and recipients.

Radio-frequency coordination

4.4.33 The Council, recalling EC-65 Resolution 9, related to radio-frequency for meteorological and related environmental activities, noted that several Members are increasingly concerned by some of the issues to be considered under the ITU World Radiocommunications Conference 2015 agenda. It noted that the WMO Preliminary Position on the WRC-15 Agenda reviewed by EC-65 which continues to be maintained by the CBS Steering Group on Radio Frequency Coordination now includes the results of studies which are becoming available from the WRC-15 process.

4.4.34 The Council reiterated its concern about the potential impact of WRC-15 agenda item 1.1 considering the additional spectrum allocations to the mobile service on a primary basis and identification of additional frequency bands for International Mobile Telecommunications (IMT) and related regulatory provisions, to facilitate the development of terrestrial mobile broadband applications. In particular, it noted that studies support the notion that the introduction of future public mobile communication systems in the 2700–2900 MHz frequency band, widely used for ground-based meteorological radars, and Radio-Local Area Networks (RLANs) in the 5 350–5 470 MHz band, used by instruments such as altimeters, scatterometers and Synthetic Aperture Radars (SAR) would result in severe interference with SARs such as CSAR on Sentinel 1, with RadarSat, and with ground-based meteorological radars.

4.4.35 The Council noted that two bands that have been an essential component of the satellite-based advanced dissemination methods of the GTS are under threat from IMT. These include the 1 675–1 710 MHz band as used by all meteorological satellite systems with earth receiving stations operated by almost all NMHSs and many other users. This band is essential for providing operational and time-critical meteorological information to the users around the world. It also noted that the 3 400–4 200 MHz frequency band is used by the meteorological community to distribute meteorological data through commercial satellite systems, especially in RA I where VSAT is the main form of communication allowing the submission and sharing of data and products for meteorological services, in particular those supporting aviation services.

4.4.36 The Council highlighted the importance of WMO Members ensuring that the WMO Position Paper on WRC-15 Agenda be taken into consideration by national and regional preparation processes for WRC-15 and, noting the success in RA VI of the EUMETFREQ contribution to regional frequency management, it encouraged Members to ensure that national and regional WIGOS Implementation Plans clearly identify radio frequency coordination as a core priority.

4.4.37 The Council agreed to keep as a priority issue EC-65 Resolution 9 - Preserving the radio-frequency spectrum for meteorological and related environmental activities at the World Radiocommunication Conference 2015.

EC-PORS – Global Cryosphere Watch (GCW)

4.4.38 The development and implementation of GCW is addressed in EC-66/Doc. 2.6 - Report of the EC Panel of Experts on Polar Observations, Research and Services.

Instruments and Methods of Observation

4.4.39 The Council recalled that parts of the *International Cloud Atlas (ICA)* – Manual on the Observation of Cloud and Other Meteors (WMO-No. 407, Volume I and II) constitute an Annex to WMO *Technical Regulations* (WMO-No. 49), regulating practices that shall be followed by Members, but had not been updated since 1975 (Vol. I) and 1987 (Vol. II). The Council noted that PTC and PTC-PRA had expressed strong support for the proposals of CIMO related to the update of the ICA. It agreed that the ICA should remain the world's authoritative, primary source of cloud classification, be fully comprehensive and contain the most up-to-date information and that it was the responsibility of WMO to maintain this document up-to-date as a WIGOS-related document that is fundamental to the operation of NMHSs. The Council supported the proposal of CIMO to carry out an extensive revision and update of the ICA to make it the undisputable web-based

global reference standard for the classification and reporting of clouds and meteors, noting that appropriate formats (e.g. CD or printed version) would also be needed to disseminate it to Members having limited Internet connection. The Council noted that no funding had been planned in the WMO regular budget to fund this activity and recommended that the Secretariat investigate all possible options to finance this activity, including possibly private-public partnerships. The Council urged Members to consider providing financial contributions and seconding experts for this activity, and requested CIMO to proceed with the update, as soon as possible, taking into account the availability of funds. However considering the challenges associated with using visual cloud observations for climate studies, the Council asked the Technical Commissions to further consider alternative concepts for physically-based cloud measurements as recommended in the GCOS Implementation Plan, since these would be more suitable for use in NWP or climate-related applications.

4.4.40 The Council was pleased that a significant update of the WMO Guide to Meteorological Instruments and Methods of Observation (WMO-No. 8) had been prepared including contributions from CIMO, CAS, CBS and JCOMM and that the preliminary version had been provided to all WMO Members for review. The Council also appreciated the significant efforts made by France, Russian Federation and Spain in finalizing its translation. It noted that CIMO-16 would be invited to approve the provisional 2014 English edition of the CIMO Guide. In view of the importance of this material to all Members, it requested the Secretariat to publish the new edition of the Guide as soon as possible after CIMO's approval of its text.

4.4.41 The Council noted that the Minamata Convention on Mercury (<http://www.mercuryconvention.org/>) developed by UNEP is a global treaty to protect human health and the environment from the adverse effects of mercury, which it is planned to bring into force in 2020. The Council noted that CIMO was of the understanding that this convention would have significant impact on Members using mercury-based meteorological instruments in their observing networks, but was pleased that appropriate mercury-free alternatives are generally available and affordable. The Council recommended that CIMO, in collaboration with the Secretariat, clarifies the implications of this convention to Members through the development of relevant outreach material. That material must create awareness among all NMHSs of the provisions of the Minamata Convention on mercury so that they can prepare themselves to introduce alternative instruments in their networks as appropriate to ensure the continuity and quality of their observations. The Council recommended that the Secretary-General also consider informing Members of the implications of this Convention.

4.4.42 The Council was pleased with the progress made towards the further development of the Siting classification for meteorological observing stations on land as a common WMO-ISO standard, noting that the Final Draft International Standard (FDIS) would be submitted for approval within ISO as well as within WMO (CIMO-16) as slight modifications have been made to the text that had been originally approved by CIMO-XV, at the request of ISO. In view of the additional work and coordination that is needed to develop a common WMO-ISO standard, the Council recommended that this approach be followed only when it is expected to bring specific benefits to both organizations. It further requested the Secretariat to review the Working Arrangements between WMO and ISO to determine whether they should be modified, taking into account the experience gained in developing the first common WMO-ISO standard and the interest of the technical commissions for such collaborations.

4.4.43 The Council recommended that the Secretariat investigate the WMO use of the term 'standard' and consider formally introducing this term into the titles of appropriate technical and regulatory documents, in order to enable the creation and maintenance of a list of documents that contain the real standards of the Organization.

4.4.44 Global improvements in the quality and traceability of observational data from basic observational instrumentation have resulted from the implementation of standardized calibration, maintenance and operational procedures, thanks to the establishment of the WMO Regional Instrument Centres and Regional Radiation Centres. The Council noted that WMO Members are increasingly transitioning from manual to automated observations for more than these basic

measurements, yet similar success in ensuring global data quality has not yet been accomplished for the more complex associated observing equipment (such as ceilometers, weather radars, radar wind profilers, lidars, etc.). The Council recommended that CIMO explores further options for improving the global situation with regard to standardization of surface-based observing systems and techniques.

4.4.45 The WMO Solid Precipitation Intercomparison Experiment (SPICE) now includes 20 sites, in 15 countries, both in the Northern and Southern hemispheres. Over 30 different instrument models in multiple configurations are being tested, covering all major measurement principles for measuring solid precipitation and snow on the ground (current and emerging). The official measurement phase will last until 2015. The Council was pleased that a number of WMO programmes and initiatives had expressed interest in SPICE and appreciated the commitment of the project team to work towards publishing the final report of SPICE in 2016. It encouraged all Members hosting a site, and interested stakeholders, to consider taking advantage of these sites (in particular those with a Double Fence Automatic Reference) to support other initiatives, such as verification of models and radar calibration, ground validation of satellite data and ensure the continuation of the measurements at these locations.

WMO Information System (WIS)

Implementation of WIS

4.4.46 The Council noted that four Regional Associations (II, III, V and VI) had developed WMO Information System (WIS) Regional Implementation Plans and that Regional Associations I and IV were actively developing their plans. The Council, noting that the Sixteenth World Meteorological Congress (Cg-16 (paragraph 11.4.7)) aimed to complete WIS implementation across all WMO centres by 2015, encouraged Regional Associations I and IV to complete their plans to enable their Members to derive the full benefits of WIS.

4.4.47 The Council noted that as of March 2014 there were 15 Global Information System Centres (GISCs), 125 Data Collection or Production Centres (DCPCs) and 233 National Centres recorded in the WIS database of centres. The Council encouraged the 54 DCPC candidates that had not yet started the technical evaluation process to make the necessary technical and management preparations to ensure successful designation as soon as practicable. The Council noted that the progress of WIS centre certification and demonstration activity, along with many supporting data such as National WIS Focal Points, was available in the WMO Country Profile Database (<http://www.wmo.int/cpdb>). It encouraged Members to review their data in the Country Profile Database and advise the Secretariat of any updates required.

Quality Management

4.4.48 Recalling Resolution 13 (EC-65), the Council noted that good progress had been made in implementing the GISCs. It noted that GISCs Jeddah, New Delhi, Pretoria and Tehran were successfully audited by CBS. The only GISC not to have started the formal process of technical assessment, GISC Casablanca, was making progress on its technical implementation and had taken an active role in the planning and training for WIS in its Region. The Council agreed that its conditional designation will continue.

4.4.49 The Council appreciated the activities by CBS expert teams in developing specifications of the monitoring required by WIS centres. It agreed with the approach being taken that WIS monitoring concentrate on the effectiveness of the exchange of information, and that it is the responsibility of application programmes to monitor the completeness and quality of the information content. The Council encouraged CBS to review the proposed WIS monitoring at CBS-Ext.(14) and to recommend standard practices to the Seventeenth World Meteorological Congress (Cg-17).

4.4.50 The Council noted that quality improvement of information exchange requires feedback from information users to information providers, such as the identification by numerical weather

prediction centres of errors in locations of observing stations reported in the Table Driven Code Forms. The Council therefore encouraged Members operating centres that make use of information delivered through the WIS to cooperate in identifying systematic problems in the information and reporting the problems to the originators of the information to support the originators' quality management processes.

Cooperation in telecommunications systems

4.4.51 The Council noted that CBS had continued the work towards establishment of an international forum of users of satellite data telecommunications systems (SATCOM). It requested CBS to review the reports of the initial ad hoc SATCOM meetings, for consideration by Cg-17, including assessment of budget implications associated with the organizational and operating practices should a Forum be established.

4.4.52 The Council appreciated the leading role played by ECMWF in managing the introduction of the Next Generation RMDCN that, as well as providing the Region VI telecommunications network, will provide the WIS Core Network connecting all GISCs. The Council noted that the pilot implementations had proceeded well, and encouraged Members that had expressed their intention of participating in the new contract to make the appropriate technical and procedural changes to ensure that the transition to the new contract proceed smoothly. It requested CBS to continue to explore potential benefits of the technology provided by the NG RMDCN to the WIS core network with an aim to increasing the efficiency and effectiveness of WIS.

Approval of changes to Manuals

4.4.53 The Council noted that the "fast track" method of approving changes to the code tables in WMO-No. 306 The Manual on Codes had been used twice since EC-65, and that the "between sessions" method had been used once in support of changes to support international civil aviation. The Council further noted that the "fast track" procedure had also been used for the first time to implement changes to the code lists in WMO-No. 1060 The Manual on the WMO Information System to support the WMO Core Metadata Profile.

4.4.54 Volume II of WMO-No. 386 The Manual on the Global Telecommunications System contains information on the regional structure of the Global Telecommunications System (GTS). The Council noted that to manage operations, Members need to know the telecommunications links that are implemented in practice. Responding to a requirement expressed by EC-PORS for rapid updating of the information about telecommunications paths used by stations in Antarctica, the Council asked CBS to consider at CBS-Ext.(14) how such information could be published and to recommend a solution to Cg-17.

4.4.55 The Council noted that experts from CBS, CAeM and ICAO had created a representation of meteorological information required by international civil aviation in extensible markup language (XML) known as IWXXM. The Council recognized that IWXXM and WaterML2, which CHy had developed in cooperation with the Open Geospatial Consortium, represented a new type of data representation that differs from the traditional alphanumeric codes that are described in Volume I.1 of WMO-No. 306 The *Manual on Codes*, and the table driven code forms that are described in Volume I.2. The Council asked CBS to consider creating Volume I.3 of WMO-No. 306 to accommodate XML and related data representations in its review of IWXXM at CBS-Ext.(14) and to present recommendations on XML to Cg-17.

Availability of observations

4.4.56 The Council thanked Members for participating in the World Weather Watch quantitative monitoring exercises. It noted that although the percentage of global upper-air observations received from the Regional Basic Synoptic Networks remained stable, increases in Regions IV and V masked a continuing decrease in the availability of upper-air observations from Region I.

Migration to Table Driven Code Forms

4.4.57 The Council recalled the target of November 2014 for completing the migration to Table Driven Code Forms (TDCF). It noted that the use of TDCF is a prerequisite for increasing the range of World Weather Watch station identifiers, and that any Members who are unable to process reports that originate in TDCF would be unable to benefit from additional observations. The Council further noted that CBS-Ext.(14) is expected to review the migration and report to Cg-17.

Standardization of data management

4.4.58 The Council noted that ICG-WIGOS had identified a need to standardize data management practices across programmes and to advise Members on good practice. The Council recalled that the WMO Information System is limited to the description and exchange of information. The Council therefore suggested that CBS might wish to review the scope of WIS and make recommendations to Cg-17 on how such standards might be developed.

4.4.59 The Council noted that ICG-WIGOS and the Meeting of the Presidents of Technical Commissions had recognized the importance of using standard vocabularies and terminology when exchanging information, data and products between programmes, and that the Global Framework for Climate Services (GFCS) and the Group on Earth Observations (GEO) would have requirements for standardization beyond WMO Programmes. The Council recognized that WMO should lead in the definition of such vocabularies for the disciplines of weather, water and climate and asked CBS to consider how such vocabularies might be created and maintained, noting the potential roles of the International Meteorological Vocabulary and the International Hydrological Vocabulary with the aim of preparing a proposal for Cg-17.

4.4.60 The Council noted that ICG-WIGOS and the Meeting of the Presidents of Technical Commissions had each noted requirements for uniquely identifying objects such as stations or documents, and that such identifiers would be most useful if they could be used directly to access further information about the object or to obtain the object itself. The Council suggested that CBS might prepare a proposal for Cg-17 on how this might be achieved.

Capacity development

4.4.61 The Council noted with appreciation that CBS had addressed the need for capacity development activities to support Members in their implementation and operation of the WIS by developing draft WIS competences and an associated training and learning guide. These documents would help Members to identify whether they had access to the skills required to operate their WIS centres, and also provided guidance on how the skills of their staff could be developed to fill any gaps that were identified. The Council recommended this approach to other Commissions. The Council encouraged CBS to finalize these documents at CBS-Ext.(14) and to present them to Cg-17.

Engagement with industry

4.4.62 Noting that many manufacturers of equipment now have demonstrated experience with implementing systems that are compliant with WIS and TDCF, the Council encouraged CBS (Commission for Basic Systems) to work with HMEI to develop working arrangements whereby suppliers promote efficient implementation and operation of the WIS, such as by making WIS and TDCF compliance the default installation option for equipment.

Global Climate Observing System (GCOS)

4.4.63 The Council welcomed the report by Dr Stephen Briggs (European Space Agency), Chairperson of the GCOS Steering Committee with effect 1 March 2014. He stressed that a strengthened Global Climate Observing System will be a core contribution to the successful implementation of the Global Framework for Climate Services (GFCS), because observations and

monitoring constitute one of its essential pillars. The Council emphasized the role of GCOS in the development of Climate Services as the main basis of GFCS for information about the status of the climate system. The Council expressed particular appreciation to the past Chairperson, Professor Adrian Simmons (European Centre for Medium-Range Weather Forecasts), for his outstanding contributions during his four-year tenure. The Council reiterated its urgent call issued at EC-64 and EC-65 to Members to assist international and national organizations in the implementation of global observing systems for climate.

4.4.64 The Council was informed about the planning process for the assessment of the adequacy of the global observing systems for climate. A progress report will be prepared for submission to GCOS' sponsoring organizations; WMO, the Intergovernmental Oceanographic Commission (IOC) of the United Nations Educational, Scientific and Cultural Organization (UNESCO), United Nations Environment Programme (UNEP) and the International Council for Science (ICSU) and Parties to the United Nations Framework Convention on Climate Change (UNFCCC), in the course of 2014 and early 2015. It will document how actions in the GCOS Implementation Plan have been or are being addressed, in reviewing the overall status of each Essential Climate Variable (ECV) and identifying gaps. It will be followed by a new Implementation Plan that will draw on the progress report. The evolving GFCS requires that the new Implementation Plan will consider new developments, systems and frameworks, such as the Global Earth Observation System of Systems (GEOSS), the WMO Integrated Global Observing System (WIGOS), the findings of the Intergovernmental Panel on Climate Change (IPCC) Fifth Assessment Report, Future Earth, Blue Planet, and the Programme of Research on Climate Change Vulnerability, Impacts and Adaptation (PROVIA). A draft version of the plan will be made available for public review in October 2015, to be finalized in the summer of 2016 to meet the timescale that had been indicated to the UNFCCC Subsidiary Body for Scientific and Technological Advice (SBSTA).

GCOS Expert Panels for Land, Atmosphere and Oceans

4.4.65 The Council was informed that the GCOS expert panels are currently reviewing the ECVs specified for each physical domain and cross-cutting topics. The next panel sessions in 2015 will consider the draft of the Progress Report prior to its release for public review, and will also consider the outcomes of dedicated workshops, to be held in early in 2015 in preparation of the new Implementation Plan.

4.4.66 The Council recalled the positive role of the regional GCOS plans in improving the functionality of GCOS as well as in identifying the observational gaps.

4.4.67 The Council noted that the sixteenth session of the GCOS/GTOS/WCRP Terrestrial Observation Panel for Climate (TOPC) met from 10 to 11 March 2014, at the European Commission's Joint Research Centre (JRC) in Ispra, Italy. The Panel, chaired by Professor Konrad Steffen (Swiss Federal Institute for Forest, Snow and Landscape Research), reviewed the action status based on the last GCOS Implementation Plan and assessed the progress in the terrestrial domain, and how the terrestrial observing systems design has developed. Furthermore, cross-cutting issues involving the domains of ocean and land need to be more strongly addressed: coastal zone and river run-off data for example. The Council reiterated its view that the Secretary-General should initiate a GTOS-sponsor dialogue on the future of GTOS and its support for the TOPC.

4.4.68 The Council noted the outcomes of the GCOS/WCRP Atmospheric Observation Panel for Climate (AOPC), which met for its 19th session from 9 to 11 April 2014, at the JRC in Ispra, Italy. The panel reviewed the atmospheric ECVs and discussed progress made in implementing atmospheric climate observation networks. At the end of the session the Chairperson, Professor Adrian Simmons, handed over the position of chairperson to Dr Kenneth Holmlund (European Organisation for the Exploitation of Meteorological Satellites, EUMETSAT), who will bring expertise in space-based observations, as Head of the Remote Sensing and Products Division. Members commended this panel for creating an efficient platform for discussions on the climate components of existing research and operational atmospheric observing systems and the

related programmes, including cross-cutting links to WIGOS and the World Climate Research Programme (WCRP).

4.4.69 The Council appreciated in particular the AOPC's work on the GCOS Surface Network (GSN), the GCOS Upper-Air Network (GUAN) and the GCOS Reference Upper-Air Network (GRUAN). The Council was informed on the GCOS Network Meeting which also took place at the JRC, from 7 to 8 April 2014. The experts focused on the design, scientific principles, performance and use of data from the GSN and GUAN, and their roles in relation to the comprehensive surface and upper-air networks. The GSN and GUAN were initiated some 20 years ago, and GCOS is now reviewing the requirements for these networks in the light of changes in both technology and data needs. The meeting included experts for specific operational networks, monitoring and archive centres, and data users, and presented its conclusions to be reflected in the forthcoming Progress Report and Implementation Plan. The Council requested the Panel to continue to advise on climate observing elements of WIGOS, and to ensure GCOS cooperates fully with WIGOS and WIS.

4.4.70 The Council was informed that the Ocean Observations Panel for Climate (OOPC) met from 3 to 5 September 2013 in Silver Spring, USA, to discuss a five-year workplan, and to revise its terms of reference to reflect the reorganization of the Global Ocean Observing System (GOOS). The panel is co-chaired by Professors Mark Bourassa (Florida State University, USA) and Toshio Suga (Tohoku University, Japan). The Tropical Pacific Observing System (TPOS) was reviewed as a priority, and a workshop was held at Scripps Institution of Oceanography, La Jolla, USA in January 2014. Building on the successes of Tropical Pacific observations over the last 30 years, the meeting was motivated by the evolving requirements for tropical Pacific observations, and recent and emerging advances in observing system technology. The meeting was made more urgent by recent challenges in sustaining the tropical Pacific mooring array, TAO/TRITON. The expert's main recommendation was to establish a TPOS Project to achieve the transition from a loosely coordinated set of observing activities in the tropical Pacific to an integrated systematic and sustained TPOS by 2020. The project will be coordinated by a Steering Committee, providing scientific oversight, and a Resources Forum, to bring agencies together to discuss how to collectively support the observing system. The Council encouraged WMO Members to contribute technical expertise to TPOS design activities, and to discuss future support for this critical observing system and examine ways in which future systems can be engineered to better avoid intentional and unintentional damage.

4.4.71 The Council noted the importance of Indian Ocean observing arrays and emphasized that as these networks mature, building partnerships to ensure long-term maintenance is critical. The Council further noted with great appreciation the contribution of ship time by Indonesia via BMKG (Badan Meteorologi, Klimatologi, dan Geofisika) to assist with maintenance of the Research Moored Array for African-Asian-Australian Monsoon Analysis and Prediction (RAMA). BMKG's contribution complements a partnership of countries throughout Africa and Asia working to deploy and service the platform. The Council asked that the next GCOS Implementation Plan should also take into account observational needs in the South Indian Ocean to improve the understanding of global systems like monsoons.

4.4.72 The Council noted the importance of liaising closely with space agencies on dedicated space-based observations for climate, in particular through the Committee on Earth Observation Satellites (CEOS), the Coordination Group for Meteorological Satellites (CGMS) and their Joint CEOS/CGMS Working Group on Climate, the WMO Space Programme and the development of the architecture for climate monitoring from space. A first element of this developing end-to-end system is an ECV inventory, which provides information on the physical representation of the Architecture. The Council requested the GCOS Secretariat to remain engaged in the next stages of development and implementation of the architecture.

GCOS Reference Upper-Air Network (GRUAN)

4.4.73 The Council noted that the implementation of GRUAN has progressed over the past years. GRUAN currently consists of 15 initial reference sites, which are predominantly located in the Northern Hemisphere mid-latitudes. The Council encouraged its Members to support GRUAN

operations, in particular in tropical and southern hemispheric regions, and also to collaborate with scientific institutions to reach better global coverage over major climatic zones. It welcomed the exemplary collaboration between an operational service and a scientific institution at the new GRUAN site of Ny-Ålesund, and noted the general concern over continued funding for GRUAN sites. The Council encouraged those Members maintaining GRUAN sites to undergo the formal GRUAN certification and assessment process. The Council encouraged the nomination of representatives of the WMO Technical Commissions (CBS, CIMO, CAS and CCI) for the Working Group on GRUAN. The 6th Implementation and Coordination Meeting was held from 10 to 14 March 2014, Washington, D.C., USA and focused on bringing additional data streams online. Initial GRUAN-quality data can be accessed at NOAA's National Climatic Data Center. The AOPC intends to conduct a scientific review of GRUAN's performance during its 2015 session. The Council encouraged that work continues on cross-calibration requirements and supported future discussions on a reference network for surface observations.

GCOS Cooperation Mechanism

4.4.74 The Council recognized that the cooperation mechanism to improve climate observation networks is, in particular, important for developing countries. The 9th GCOS Cooperation Mechanism Donor Board Meeting was held on 3 June 2014, in Bonn, Germany, and discussed in particular Region I, as this is clearly the poorest performing network in all aspects of the requirements, which reinforces the need for GCOS to focus its support in this Region. The Council reiterated that strengthening GSN and GUAN is an important requirement for an effective GFCS. The Council urged Members, with support of the GCOS Secretariat, to coordinate nationally among the responsible agencies for climate observing to secure funding for the GCOS Cooperation Mechanism.

Report of the GCOS Review Process

4.4.75 The Council was informed that the Steering Committee of the Global Climate Observing Committee (GCOS), at its 19th session from 20 to 23 September 2011 in Reading, UK, welcomed an independent review of the GCOS programme, requested by its four sponsoring organizations: WMO, Intergovernmental Oceanographic Commission (IOC) of UNESCO (which stands for United Nations Educational, Scientific and Cultural Organization), United Nations Environment Programme (UNEP) and the International Council for Science (ICSU), and appreciated the willingness of WMO to take the lead. The report was prepared by the GCOS Programme Review Board under the chairmanship of Mr Wolfgang Kusch.

4.4.76 The Council was informed that the review focused on assessing the added value the GCOS programme is giving to the Members of its sponsors and to the closely affiliated Earth Observation Community with respect to climate science research and climate politics. The programme review provided the basis for eventually revising the GCOS Memorandum of Understanding and updating the GCOS strategic plan.

4.4.77 The Council noted that the major outcome of the review is the general recognition of the normative work of GCOS in defining guidelines and setting principles. The review showed that a clear vision of the GCOS programme will be key for its future activities and success.

4.4.78 The Council took note of the Synthesis Report of the GCOS Programme Review and encouraged the co-sponsors to take steps to implement the recommendations given in the report and to accordingly revise the GCOS Memorandum of Understanding.

4.4.79 The Council adopted [Resolution 9 \(EC-66\) – Review of the Global Climate Observing System Programme](#).

WMO Space Programme

WIGOS Space Component

4.4.80 The Council recognized that space-based observations cut across all component observing systems of the WIGOS, with satellite capabilities now contributing to observing and monitoring climate and climate change, including atmospheric composition, hydrological and cryosphere variables, etc., and space weather, in addition to meteorology and oceanography.

Continuity and optimization

4.4.81 The Council acknowledged the plans from China, EUMETSAT and the USA to maintain polar-orbiting operational satellites with full atmospheric sounding capabilities in morning and afternoon orbits respectively and noted the anticipated gap on the early morning orbit towards the end of the current decade. Noting with appreciation the successful launch and early operation of FY-3C, the Council was pleased to note that China Meteorological Administration (CMA) had nearly completed the feasibility study of deploying a FY-3 satellite on the early morning orbit and was undertaking the government approval procedure for revising the satellite development plan. The Council called Members, satellite operators and NWP centres, to further strengthen their cooperation with CMA in terms of sharing satellite data and related products and technologies.

4.4.82 The Council furthermore invited the USA to take appropriate measures to mitigate the risk of a gap in the transition from Suomi-NPP to JPSS-1 and JPSS-2 satellites. It also urged EUMETSAT and its Member States to initiate the EPS Second Generation programme in time to ensure continuity after the EPS programme.

4.4.83 The Council recalled the vital role of satellite observations from various orbits for permanent weather monitoring, nowcasting and very short-range forecasting. It welcomed the measures taken by the USA on GOES-East operations to mitigate the termination of the GOES-South America mission. The Council also recognized the USA contribution to space weather monitoring on current and future GOES missions, as well as the pending launch of the DSCOVR spacecraft. It welcomed the successful launch and operation of INSAT-3D by India, and GPM-core by the USA in cooperation with Japan. The Council looked forward to the confirmation of the launch of Jason-3 to pursue ocean surface topography observation, and of the deployment of the two COSMIC-2/Formosat-7 constellations.

4.4.84 EUMETSAT confirmed that by the end of 2016 the operations of Meteosat-7 over the Indian Ocean, provided by the organization on a best efforts basis, will stop and the satellite has to be de-orbited. These satellite observations are addressing essential WMO requirements, as the Indian Ocean modulates climate variability over Africa and is a source of severe weather systems on the Indian Ocean islands and large parts of Eastern and Southern Africa. The Council strongly encouraged potential contributors and in particular China, EUMETSAT, India and the Russian Federation to develop a coordinated plan to secure the continuation of Indian Ocean data coverage. In this regard the Council noted that CMA and EUMETSAT had agreed on an arrangement ensuring the continuity of the Indian Ocean coverage after the decommissioning of Meteosat-7 after 2016. It invited the CGMS to support these plans and to present a report through the WMO Space Programme prior to the WMO Congress in 2015.

4.4.85 The Council was pleased to note the increased level of coordination among satellite operators. It recalled however that satellite missions were only contributing to the WMO Integrated Global Observing System (WIGOS) to the extent that data were available in a timely manner to the users.

User preparation for new generation of satellite systems

4.4.86 The Council was pleased to note that the new generation Himawari-8 would be launched in Autumn 2014 by the Japan Meteorological Agency (JMA), to become operational towards mid-2015; it was underlined that the new system will have a totally new data dissemination

scheme. Noting the considerable enhancement of capabilities with the upcoming new generation of geostationary satellites of Japan, China, the USA, the Republic of Korea, the Russian Federation, and EUMETSAT in the 2014–2019 period, the Council welcomed the development of the Satellite User Readiness Navigator (SATURN) online portal, which provides users with a unique entry point to information on these new satellite systems. The Council asked the Secretariat to continue maintaining this information resource and urged all operators of satellites addressed by SATURN to provide regular and timely updates.

Architecture for Climate Monitoring from Space

4.4.87 The Council noted that the twelfth session of the Consultative Meetings on High-level Policy on Satellite Matters (CM-12) had discussed the progress made on the development of the Architecture for Climate Monitoring from Space, which is a contribution to the GFCS observation and monitoring component, as well as one of the key tasks of the WIGOS implementation plan. CM-12 had noted with appreciation the effective collaboration among space agencies through the Committee on Earth Observation Satellites (CEOS) and the Coordination Group for Meteorological Satellites (CGMS) and WMO. In this regard, it encouraged the initiatives taken within the WMO Space Programme to work with GCOS and the GFCS office on consolidating user requirements for space-based climate products and services in identifying user cases from GFCS priority areas.

Socio-economic benefits

4.4.88 The Council also noted that CM-12 had discussed the socio-economic benefits of satellite programmes. As WMO Members and their space agencies have to manage priorities in an increasingly resource-constrained environment, it is important to evaluate and document these socio-economic benefits in order to assist the decision process on new satellite programmes. In particular, socio-economic benefit assessments should provide an objective basis to inform the transition of mature Research and Development capabilities to an operational status, and to secure sufficient resources to support the development of applications. Recalling the highly successful series of WMO Impact Workshops (e.g. Sedona, 2012), the Council encouraged broadening the assessment of the impact of observing systems on user applications beyond numerical weather prediction.

Regional user mechanisms

4.4.89 The Council reiterated the importance of establishing standing mechanisms for maintaining user requirements for satellite data and products access and exchange in all WMO Regions as per Resolution 12 (EC-65). The Council stressed that such mechanisms should engage users from NMHSs and other operational institutions. These mechanisms ensure coordination of users and dialogue with satellite operators, and they should be part of the WIGOS-related component of each RA working structure.

4.4.90 The Council noted with satisfaction that the Asia-Oceania Meteorological Satellite Users' Conference (AOMSUC) provided an excellent forum for Members within the Asia Oceania community to meet and enhance their joint efforts in the utilization of satellite data and products for improved weather and climate services. It was informed that the Fifth AOMSUC will be held in Shanghai, China from 29 to 31 October 2014 and encouraged the participation of interested Members in this Conference.

Space weather

4.4.91 The Council appreciated the progress made by the Inter-Programme Coordination Team on Space Weather (ICTSW) in particular as concerns the definition of space weather services to aviation, in collaboration with the ICAO International Airways Volcano Watch Operations Group. It noted that the specification of these new services will be submitted to the conjoint ICAO Meteorology (MET) Divisional Meeting and CAeM-15 in July 2014 for entry into force in 2016. Bearing in mind that space weather services were supporting several application areas including, but not limited to the aeronautical sector, the Council highlighted the need of a

coordinated approach among WMO Members. It therefore requested the ICTSW to develop a detailed four-year plan of activities, taking into account the evolving service-oriented nature of space weather services, to inform the WMO planning processes, to address user needs, to articulate the activities of space weather providers with the applicable WMO programme areas, and to increase the awareness of Members in this area, along the lines of the proposal given in [Annex VI to the present report](#). The Council requested this work be carried out in consultation and coordination with CAeM and inform the EC WG on SOP so that plans, activities, and supporting expert groups are in consistency with wider WMO and ICAO efforts.

Consultative Meetings on High-level Policy on Satellite Matters

4.4.92 With regard to the implementation of Resolution 12 (EC-LXII), the Council noted with appreciation that critical satellite matters were now regularly addressed on the agenda of WMO constituent body sessions. However, holding the CM session during a weekend in the Executive Council time frame did not prove effective to facilitate participation of space agencies and was increasing the organizational challenges of the EC session. Furthermore, when CM is convened in conjunction with EC (or Congress) it is not possible to include the outcome of CM in the documentation submitted to the EC (or Congress) session. The Council therefore adopted [Resolution 10 \(EC-66\) – Schedule of Consultative Meetings on High-level Policy on Satellite Matters](#) replacing Resolution 12 (EC-LXII) and recommending to the Secretary-General to convene future CM sessions in advance of EC or Congress, for example in conjunction with WMO Bureau meetings as initially foreseen by Resolution 6 (Cg-XIV).

Climate Data Management and Applications

Improved data management in support of climate services

4.4.93 The Council stressed the importance of consistent management of climate-relevant data across national, regional and global scales, integrating in situ, remote sensing and model data from various sources. In this regard, it noted the opportunity for establishing a strategy for integrated data management in support of climate monitoring and analyses, and research and services. Elements of the strategy include: (i) standardizing functionality and calculation methods within the various CDMSs utilized by Members; (ii) standardizing practices for calculating Climate Normals; (iii) streamlining and coordinating national and international approaches for data rescue and preservation; and (iv) standardizing approaches for formatting, storing and preserving climate-relevant remote-sensing and model data. The Council welcomed the intention of CCI, in close collaboration with CBS and other technical commissions and programmes, to lead an initiative to improve existing data management systems, processes and mechanisms, and regulatory material to fully accommodate the special needs of climate data, such as homogeneity across time and space. The Council recalled its respective request at EC-65 to move from a concept to the definition of a High Quality Global Data Management Framework for Climate and, to this end, recommended to set up an appropriate working mechanism to facilitate and stimulate the collaborative nature of the effort. It furthermore requested CCI, through the above-mentioned working mechanism, to develop a strategy and elements of an implementation plan for improved data management in support of climate for consideration by Cg-17.

Data Rescue

4.4.94 The Council recalled Resolution 16 (Cg-XVI), and specifically its element "to accelerate rescue and digitization of climate records and to promote global and regional initiatives to collaborate on data rescue (DARE) and the exchange of related scientific knowledge and technological advances". The Council urged Members to do their utmost to prevent valuable climate data from deterioration and to make these data available to ensure consistency of, and consolidate, climate change analyses and relevant climate services.

4.4.95 The Council was informed of recent initiatives to develop an integrated 'International Data Rescue Portal (I-DARE)' to facilitate better coordination of data rescue activities worldwide and provide information on data inventories, best practices and technologies that will help

Members in carrying out Data Rescue more effectively and efficiently. The Council urged CCI to guide on the development of I-DARE and encouraged Members to collaborate in its implementation.

Climate Data Management Systems (CDMS)

4.4.96 The Council welcomed the success of the CCI Expert Team on Climate Database Management Systems in preparing a WMO CDMS Specification publication. The publication defines CDMSs in terms of functions and policies, thereby contributing to consistent and standardized climate data management procedures underpinning national climate services and facilitating international collaboration on climate data, product and service generation. Moreover, it provides guidance for countries wishing to acquire suitable CDMSs, and also CDMS developers, about essential CDMS functionality that complies with new and evolving technological requirements and standards. The Council noted with concern that an important part of the mandatory functionality is the ability to automate the production of standard WMO products and reports such as CLIMAT messages, World Weather Records, etc. that are currently problematic for many Members. To this end the Council recommended CCI and CBS to explore ways to better reflect this in the WMO Technical Regulations, e.g. to incorporate it into the Guide to WIS (WMO-No. 1061).

4.4.97 The Council requested CCI to liaise with CDMS developers to take into account WMO CDMS specifications for future evolution and development of these systems.

4.4.98 The Council encouraged regional associations to coordinate with their Members the creation of user groups, noting that in some cases these groups could be subregional or span across Regions. These groups should aim for providing a cost-effective means of CDMS modernization, maintenance, trouble-shooting exercises and information sharing. They will also need a robust sustainability strategy that enables ongoing, long-term support for CDMS, as well as other activities such as data rescue. Technical commissions, especially CCI and CBS, would coordinate with and support these groups in collaboration with the respective regional associations.

Climate Normals

4.4.99 Following its request at EC-65, the Council noted with satisfaction that CCI-16 will discuss a proposal for amending the WMO Technical Regulations with respect to the definition, computation and provision of WMO Climate Normals. It requested CCI to develop and publish accompanying guidance material on technical as well as user communication aspects.

World Weather Records

4.4.100 The Council reiterated the importance of the collection of global WMO datasets such as the World Weather Records. While noting its appreciation for the continuous support to the publication of World Weather Records over the past decades, the Council urged Members to collaborate with CBS lead centres for updating the World Weather Records pertaining to the previous ten year periods: 1991–2000 and 2001–2010. The Council also urged Members to submit annual World Weather Records pertaining to 2011, 2012 and 2013 and future years as requested by WMO in the new practice for annual submission of the World Weather Records as per request of Resolution 14 (EC-64).

International Climate Assessment and Dataset (ICA&D)

4.4.101 The Council noted the benefits of subregional and regional data portals and welcomed specifically the International Climate Assessment and Dataset (ICA&D) initiative, a climate services concept, which successfully combines the work of the Expert Team on Climate Change Detection and Indices (ET CCDI) and WMO's DARE activities. The concept builds on the software and mechanism developed for the European Climate Assessment and Dataset (ECA&D), a Web Portal for daily station data and derived indices, brought together in regional cooperation. ICA&D has

been introduced to three other regions, namely South-East Asia (SACA&D, comprising a distinct DARE element), Latin America (LACA&D) and West Africa (WACA&D, also comprising a distinct DARE element). The Council encouraged CCI and ETCCDI to foster further implementations of ICA&D worldwide in close collaboration with Members and WMO Regional Climate Centres.

4.5 Research (agenda item 4.5)

Enhanced capabilities of Members to contribute to and draw benefits from the global research capacity for weather, climate, water and the related environmental science and technology development (ER 5)

World Climate Research Programme (WCRP)

4.5.1 The Council noted with appreciation that WCRP led the development of the Research, Modelling, and Prediction Annex to the GFCS Implementation Plan, which was endorsed by the first session of the IBCS in July 2013. The research activities for the GFCS aim at establishing partnerships to conduct effective research in areas of initial priority for the GFCS and making the wealth of experimental climate information available to users. Also, they will create a scientific basis to account for climate information uncertainty in decision-making and will address a number of pressing science issues such as improved understanding of predictability and prediction skill of climate models. The Council urged Members to seek sources of funding and provide support to research activities endorsed in the Compendium of GFCS Projects and in the Research, Modelling, and Prediction Annex of the GFCS Implementation Plan. The Council reiterated the importance of WCRP cooperation with WMO constituencies involved in the development of the GFCS. In this regard, the Council welcomed enthusiastically the decision of the WCRP and CCI to hold a joint 1-day session of the CCI-16 Technical Conference and the 35th session of the WCRP Joint Scientific Committee (JSC), which will take place on 2 July 2014 in Heidelberg, Germany, and will focus on research and operational support to climate services.

4.5.2 The Council acknowledged with appreciation that the IOC of UNESCO remained a highly supportive sponsor of the WCRP and continued to provide effective guidance to WCRP on requirements for research, particularly on the role of ocean in climate. The Council also requested that IOC make every effort to restore its annual contribution to the JCRF to the previously agreed level.

4.5.3 The Council emphasized the importance of climate research in providing a strong contribution to, and motivation for, research on global sustainability. It noted that WCRP is in an excellent strategic position to contribute to the objectives of the Future Earth, a 10-year multidisciplinary research initiative in support of global sustainability. Optimal modalities of cooperation between WCRP and Future Earth will need to be developed, and the Council was pleased to note the ongoing communication on these issues between WCRP and Future Earth. The Council urged ICSU to maintain its strong support to WCRP and to continue to facilitate cooperation between WCRP and the relevant ICSU activities.

4.5.4 The Council was pleased to note the outcomes of the 34th session of the WMO/ICSU/IOC appointed Joint Scientific Committee (JSC) for WCRP held in May 2013 in Brasilia, Brazil. Following the JSC session, WCRP embarked on the preparation of implementation plans for the six Grand Science Challenges, as follows:

- (a) Provision of skilful future climate information on regional scales;
- (b) Regional sea-level rise;
- (c) Cryosphere in a changing climate;
- (d) Clouds and climate sensitivity;
- (e) Changes in water availability;
- (f) Prediction and attribution of extreme events.

These research topics had been identified by WCRP as scientific challenges of particularly high societal importance and as areas of research in which it is possible to expect significant progress within next five to ten years. They also serve as unifying themes across the four WCRP core projects and the various working groups.

4.5.5 The Council acknowledged with gratitude a number of highly successful large-scale community events organized by WCRP since EC-65. They include:

- (a) The WCRP/ACPC Conference on the African Climate System – Addressing Priority Research Gaps to Inform Adaptation Decision-Making in Africa, that took place from 15–18 October 2013 in Arusha, United Republic of Tanzania;
- (b) The joint WCRP-IPCC-EU “International Conference on Regional Climate – CORDEX 2013” held 4–7 November 2013 in Brussels, Belgium;
- (c) The sixth General Assembly of the WCRP Project “Stratosphere-troposphere Processes And their Role in Climate (SPARC) organized on 12–17 January 2014 in Queenstown, New Zealand;
- (d) The Conference on Climate and Society for Latin America and the Caribbean held on 17–21 March in Montevideo, Uruguay.

The Council also noted that the recent regional conferences of WCRP in Africa and Latin and Central America resulted in a number of useful recommendations. The Council urged WCRP to build on the outcomes of these conferences in furthering climate research in the regions.

4.5.6 The Council recognized significant progress on a number of research priorities pursued by WCRP, including, but not limited to, predictability of the North Atlantic Oscillation and Madden-Julian Oscillation on seasonal time scale, and of global surface temperatures on decadal time scale. It noted continuing improvements in coupled climate models and representation of atmospheric chemistry in them. Major achievements have been made in the research at the weather/climate interface (see also paragraphs 4.5.46–4.5.66) and in advancing understanding of regional climate, especially through the successful implementation of the Coordinated Regional Downscaling Experiment (CORDEX) in many regions of the world.

4.5.7 The Council took note with interest that the WCRP JSC at its 34th session endorsed the Earth System Grid Federation (ESGF) as a WCRP-recommended data and information dissemination mechanism. Through ESGF, WCRP is enabling access to the climate model outputs and observational products for all scientists in the world, with data being available on the same grid, uniformly formatted and documented through the WCRP-led Observations for Model Intercomparison Projects (obs4MIPs). The first WCRP initiatives that use this mechanism are the Coupled Model Intercomparison Project (CMIP), seasonal predictability experiments under the Climate system Historical Forecast Project (CHFP), and the Coordinated Regional Downscaling Experiment (CORDEX). The Council recommended to Members to study effective ways of accessing and evaluating the vast amount of research-based climate information that WCRP makes available through ESGF.

4.5.8 The Council acknowledged with appreciation the WCRP commitment to capacity development in the domain of climate research and its support to Early Career Scientists (ECS), as well as students and scientists from developing countries. It noted that WCRP is strengthening cooperation with the Asian-Pacific Network (APN) and the Inter-American Institute for Global Change Research, and is joining efforts with networks of early career professionals, such as the Young Earth System Scientists (YESS) and the Association of Polar ECS (APECS). The Council also noted with appreciation the increased number of training events offered by WCRP, such as the CORDEX training workshops in South Asia, South-East Asia, and South and Central America. It took note on the ongoing preparations for the 2014 summer school on attribution and prediction of Extreme Events (21 July–1 August 2014, Trieste, Italy), and encouraged Members to support suitably qualified candidates for participation in these events.

4.5.9 Once again, the Council noted a major contribution of WCRP and its affiliated scientists to the Fifth Assessment Report of the IPCC, especially to the WG I Report "Climate Change 2013: The Physical Science Basis". The WCRP intercomparison experiment CMIP Phase 5 (CMIP5) provided an unprecedented dataset of model projections, which were widely used around the world to study climate variability and change and the impacts of climate change. The CMIP5 output constituted the basis for more than 350 scientific publications. The Council was pleased to learn that WCRP is now working on the CMIP6 experimental design, which is expected to make climate predictions and projections even more robust and comprehensive.

4.5.10 The Council noted that during the last decade the WCRP activities were aligned to the strategic framework "Coordinated Observation and Prediction of the Earth System 2005–2015". The strategic framework facilitated development of practical applications of direct relevance to the needs of society and helped WCRP to focus a significant part of its activities on achieving the Expected Result 5 (Enhanced capabilities of Members to contribute to and draw benefits from the global research capacity for weather, climate, water and the related environmental science and technology development) of the WMO Strategic Plan 2012–2015. The Council appreciated this valuable contribution of the WCRP to the core objectives of WMO.

4.5.11 The Council also took note that WCRP requested WMO to increase the annual WMO contribution to the Joint Climate Research Fund in the next financial period, to ensure effective implementation of its research plans, in particular at a regional level. It took note of this request in its discussion on the Secretary-General's proposed budget to the Seventeenth WMO Congress.

World Weather Research Programme (WWRP)

4.5.12 The Council noted that the sixteenth session of the Commission for Atmospheric Sciences (CAS-16) was held in Antalya, Turkey from 20 to 26 November 2013. CAS-16 reviewed the progress of the WWRP including THE Observing system Research and Predictability EXperiment (THORPEX) and identified emerging research priorities and provided holistic guidance to the future activities of WWRP.

4.5.13 The Council recognized the importance of Forecast Demonstration Projects/Research and Development Projects (FDPs/RDPs) in responding to regional needs. The Council requested Members to identify and develop new FDPs/RDPs, such as for the Pyeong Chang 2018 Winter Olympic Games and high-resolution numerical prediction of landfalling typhoon rainfall (both under preparation) in consultation with WWRP, with a view to further improving operational weather and related environmental services and thereby meet the needs and requirements of NMHSs.

4.5.14 The Council requested WWRP to work closely with WCRP towards preparing scientific studies on climate change and extreme weather events, along similar lines to the research that led to the 2010 statement on the impact of climate change on tropical cyclone activity.

Nowcasting and Mesoscale Research

4.5.15 The Council noted the progress made with developing a Lake Victoria Research and Development Project (RDP) to better understand the dynamics of Lake Victoria thunderstorms and developing forecasting capabilities for the safety of people dependent on the lake for their livelihood. The Council also noted that this RDP has a strong linkage with the Severe Weather Forecasting Demonstration Project (SWFDP) in East Africa. Thus, the Council requested WWRP to coordinate with the SWFDP in East Africa and encouraged Members to participate in the implementation of the RDP and mobilize the required resources.

Societal and Economic Research Applications (SERA)

4.5.16 The Council noted with appreciation the collaboration of the CAS Working Group SERA with the Marine Meteorology and Oceanography Programme on its JCOMM/CHy Coastal Inundation FDP. The Council also noted the progress made on the draft concept paper for the SERA Warning Demonstration Project.

Weather Modification

4.5.17 The Council noted the lack of contributions to the Weather Modification Research Trust Fund and urged Members with an interest in this activity to contribute to the Trust Fund to sustain and continue the activities in advancing the practice of sound science in weather modification.

Tropical Meteorology Research

4.5.18 The Council noted with appreciation that there are three ongoing FDPs/RDPs in Tropical Meteorology Research which includes the Southern China Monsoon Rainfall Experiment (SCMREX) RDP, Northwest Pacific Tropical Cyclone Ensemble Forecast Project (NWP-TCEFP) and Typhoon Landfall FDP (TLFDP). The SCMREX RDP aims to improve the skill in forecasting heavy rain events which remains a serious threat to people's lives and properties in South-East Asia while both the NWP-TCEFP and TLFDP are looking into improving our understanding of tropical cyclone formation, a major concern especially for cyclones that develop very near heavily populated coastal areas.

Eighth International Workshop on Tropical Cyclones (IWTC-VIII) / Third International Workshop on Tropical Cyclone Landfall Processes (IWTCLP-III)

4.5.19 Research workshops and projects organized jointly by WWRP and the Tropical Cyclone Programme (TCP) provide excellent opportunities for active interaction between operational forecasters and researchers focused on facilitating the transfer of research and technology developments to operations. Noting this, the Council urged the Secretary-General to take necessary actions to promote the involvement of operational forecasters in those events, in particular, the IWTC-VIII and the IWTCLP-III, both of which will be held in Jeju, Republic of Korea from 2 to 10 December 2014.

THORPEX

4.5.20 The Council expressed its satisfaction with the recent progress of three THORPEX legacy projects aligned to meet the requirements of Members and the GFCS namely, the Sub-seasonal to Seasonal Prediction Project (S2S), the Polar Prediction Project (PPP) and the soon to be established High-Impact Weather (HIWeather) Project. The Council encouraged Members to participate in the implementation of these projects and provide the resources required.

4.5.21 The Council acknowledged the activities and continuing efforts of the five THORPEX Regional Committees (RCs) which facilitate provision of funding, logistical and other support, planning, coordination and implementation of THORPEX regional activities.

4.5.22 The Council was pleased to note that TIGGE ensemble forecasts for four SWFDP areas on the probability of occurrence of extreme weather events are now available at http://tparc.mri-jma.go.jp/TIGGE/tigge_swfdp.html. The Council encouraged Members to move forward to make the best use of achievements of TIGGE. The Council requested CAS and the Commission for Basic Systems (CBS) to develop mechanisms to make ensemble model products available on a real-time basis. This could be used for technology development in operational forecasting activities.

4.5.23 The Council adopted [Resolution 11 \(EC-66\) – Post-THORPEX activities](#).

High Impact Weather Project

4.5.24 The Council noted with appreciation that the WWRP is placing special emphasis on advancing better predictions of high impact weather events on wider time ranges, from nowcasting to seasonal time scale, as the socio-economic effects of these events remain of central importance to Members. The Council requested WWRP to coordinate its activities related to high impact weather with relevant technical commissions, regional associations, NMHSs, WCRP, GFCS, Disaster Risk Reduction (DRR) Programme and other appropriate WMO Programmes, including

the SWFDP and its subregional components to ensure operational testing and application in developing countries.

4.5.25 The Council, in acknowledging that predictions/forecasts have value only when they support decisions, supported the emphasis of the HIWeather Project on communication and interaction with stakeholders and requested that work be aligned with the WMO Service Delivery strategy as well as the active involvement of operational forecasters and relevant WMO projects and programmes in HIWeather project.

4.5.26 The Council requested WWRP to further refine the HIWeather project plan and to consult widely with Members and relevant areas of the Secretariat in the process. The Council emphasized that the goal of the HIWeather project was to enhance the capability of NMHSs in disaster risk reduction. The project would support high-priority research activities and the results could be used in operational activities eventually.

4.5.27 The Council adopted [Resolution 12 \(EC-66\) – High-impact Weather Project](#).

WWRP Open Science Conference

4.5.28 The Council was pleased to note that preparation for the World Weather Open Science Conference (OSC), scheduled during August 2014 in Montreal, Canada is proceeding well. The overarching theme of the conference is Seamless Prediction of the Earth System: from nowcasting through medium-range to seasonal forecasts. A strong focus will be placed on applications in key sectors and the active involvement of early career scientists, especially those from developing countries.

Global Atmosphere Watch (GAW) Programme

4.5.29 The Council noted that the priorities of GAW development were provided by the sixteenth session of the Commission for Atmospheric Sciences (CAS-16). These include the development of an Integrated Greenhouse Gas Information System (IGIS) to deliver services to society and support policy; aerosol observations and research, including assessment of impacts on air quality; weather, climate, and environmental research and services for megacities and large urban complexes; and utilization of evolving technologies.

4.5.30 The Council agreed that observations constitute the basis for the delivery of GAW products and services relevant to Members and that the observations are also essential in support of environmental conventions, the Global Framework for Climate Services (GFCS), the WMO Integrated Global Observing System (WIGOS), the Global Climate Observing System (GCOS) and many other initiatives. Regarding these observations, the Council noted that substantial gaps continue to exist and urged Members to fill them, noting that enhancing, sustaining and optimizing the GAW observing system is an important permanent requirement. The Council appreciated the efforts of several Members in this regard. New regional stations joined the GAW Programme in the UK, the Republic of Korea and the Russian Federation.

4.5.31 The Council acknowledged, in view of the IPCC AR5 report, the importance of aerosols and reactive gases (NO_x, VOCs, tropospheric ozone) as short-lived climate forcers/pollutants (SLCFs/SLCPs). It urged Members to establish reactive gas observation stations, to join the GAW Programme and to share their data for use in global assessments. The Council further acknowledged that acid precipitation is an increasing problem in developing countries. It urged Members in these countries to establish precipitation chemistry observation stations and encouraged the existing atmospheric deposition networks to join the GAW Programme and to report their data to the World Data Centre for Precipitation Chemistry (WDCPC).

4.5.32 Taking note of the decline in data submission of several GAW parameters, the Council reminded Members that recent data is needed in order for GAW to deliver required services and

up-to-date information and urged Members to submit GAW observational data to the respective data centres as recommended, normally within one year after the measurement.

4.5.33 The Council emphasized the importance of quality assurance and control (QA/QC) in GAW and requested Members to implement the WMO Quality Management Framework (WMO-No. 1100) for atmospheric composition measurements. The Council welcomed the formal establishment of the World Calibration Centre for nitrogen oxides (NO and NO₂) at FZ-Jülich in Germany.

4.5.34 The Council recognized the importance of the Rolling Requirements Review (RRR) process and welcomed the establishment of the GAW Task Team on Observational Requirements and Satellite Needs that will include addressing RRR in its activities. The Council recommended that in order to get the RRR process moving in GAW, it is best to start with the most obvious and simple cases.

4.5.35 The Council noted the importance of capacity development and acknowledged the usefulness of the GAW Training and Education Centre (GAWTEC) in Germany as well as co-sponsored summer schools and other training events. The Council recommended Members who operate WMO Regional Training Centres to consider extending their training programme to include atmospheric composition measurements, especially in countries that have experience with running GAW stations.

4.5.36 The Council noted that WMO has agreed to participate in the Climate and Clean Air Coalition (CCAC) as an actor, being able to participate in specific initiatives relevant to WMO's mandate and to nominate a person for the roster of the Scientific Advisory Panel. Recognizing that GAW can provide atmospheric composition information relevant for observing the mitigation of SLCFs, that the observations for these are not currently satisfactory and that there could be benefits for GAW if fuller collaboration existed, the Council recommended for WMO to seek to become a Partner in CCAC and to endorse the Framework Document of the Coalition, further noting that, e.g., UNDP, UNIDO, WHO, the World Bank and European Commission, are Partners.

4.5.37 The Council appreciated the on-going developments to establish an Integrated Greenhouse Gas Information System (IGIS), building on current activities. In order to move this activity forward, the Council requested for the CAS Environmental Pollution and Atmospheric Chemistry (EPAC) Scientific Steering Committee (SSC) to consider the development of a project plan for IGIS.

4.5.38 The Council welcomed the plan for an Integrated Global Aerosol Observation System, based on GAW Report No. 207 "Recommendations for a Composite Surface-based Aerosol Network". The Council recommended that this should address, in particular, observational gaps and filling these, standardization of measurement methods and data archiving protocols, improvement of data quality and the data delivery/data management system to serve multiple users, including researchers. The Council further recommended that this activity should foster aerosol-related process studies, satellite validation, model development and validation, assimilation of observational data into operational models, and the creation of a comprehensive aerosol climatology on a global scale. The Council reiterated that observations need to be fit for purpose and offer a proper link to downstream activities.

4.5.39 The Council appreciated the efforts of the expert group that prepared the recommendation document on interpretation of black carbon observations (<http://www.atmos-chem-phys.net/13/8365/2013/acp-13-8365-2013.html>). The Council further agreed that GAW should look into the measurements and reporting of PM_{2.5} and PM₁₀ that are made by many different institutes and authorities, that are very relevant in urban areas, and that are used extensively in health studies.

4.5.40 Regarding near real-time data delivery and usage, Members should utilize existing collaborations such as with Copernicus (former GMES) in Europe and similar initiatives in other

Regions, especially for integrated urban and non-urban data and forecasting services (e.g., chemical weather forecasting, or forest fires forecast and impact).

4.5.41 The Council was pleased to note the steps being taken in RA VI to implement lidar and ceilometer based aerosol monitoring networks and requested GAW to continue working with CBS, CIMO, CAeM, RA VI and other relevant bodies, e.g., EUMETNET and EARLINET, on the development of the RA VI WIGOS volcanic ash demonstration project.

4.5.42 The Council was pleased to note that GAW will celebrate its 25th anniversary in conjunction with the 13th Quadrennial ICACGP Symposium and 13th IGAC Conference in Natal, Brazil from 22 to 26 September 2014, with several highlights planned for GAW.

GURME

4.5.43 The Council recognized that the rapid urbanization that is currently taking place will require new types of services making best use of science and technology. Cities face unique sets of hazards and the services need to be tailored to these needs. This will require strong and wide-reaching institutional cooperation. The Council noted that these new services will provide opportunities through weather, climate and environmental predictions for optimizing, e.g., the functioning of the urban environment in terms of energy and transport. The Council recognized that city services will rely heavily on high-resolution coupled environmental prediction models that will include realistic city specific processes, boundary conditions and fluxes of energy and physical properties. New observational systems focused on the urban environment will also be required, as will be data sharing between institutions, and skill and capacity to make best use of latest technologies, to produce services in the challenging and rapidly evolving city environment. The Council acknowledged that these services will assist cities in facing hazards such as storm surge, flooding, heat waves, and air pollution episodes.

4.5.44 The Council noted that the concept paper for the above new urban cross-cutting activity, Integrated Urban Weather, Environment and Climate Service, has been developed (http://www.gfcs-climate.org/fact_Sheets#) and recommended that the climate service needs for megacities and large urban complexes be considered as a priority in GFCS.

4.5.45 Concerning GAW Urban Research Meteorology and Environment (GURME) activities directly, the Council noted that according to new data 7 million people are dying prematurely annually due to poor air quality. Noting that GURME is actively involved with WHO, the Council recommended that GURME enhance this cooperation by co-locating city projects with WHO to provide further information to address this issue. In addition, given that air quality is a focus area of research within the WWRP High Impact Weather (HIWeather) project, the Council recommended that GURME partner with the HIWeather project efforts.

WCRP, WWRP and GAW Joint Research Initiatives

4.5.46 The Council recognized the importance of the close cooperation between the World Climate Research Programme (WCRP), the World Weather Research Programme (WWRP) and the Global Atmosphere Watch (GAW) Programme to address the complex feedbacks between atmospheric composition and weather and climate processes.

Working Group on Numerical Experimentation (WGNE)

4.5.47 The Council noted the importance of the WGNE project focussing on the treatment of surface drag in models, led by the Environment Canada, to compare parameterized and physics components of model surface stress. The WGNE aerosol project, led by Centro de Previsão de Tempo e Estudos Climáticos (CPTEC) in Brazil, to evaluate aerosols impacts on weather and climate predictions, and the grey zone project to evaluate model capabilities at the 1–10 km resolution range are two further WGNE research areas aimed at improving models and

predictions. The Council encouraged modelling centres to actively participate in these WGNE activities.

4.5.48 The Council noted with satisfaction the progress made by the WGNE Madden-Julian Oscillation (MJO) task force in the six sub-projects on: (1) process-oriented diagnostics and metrics; (2) boreal summer monsoon intraseasonal variability; (3) the analysis of CMIP5 model capabilities on intraseasonal variability; (4) the vertical structure of the MJO and diabatic processes; (5) air-sea interactions; and (6) the MJO over the Maritime Continent. The Council acknowledged the contribution of the MJO task force to the Sub-seasonal to Seasonal Prediction (S2S) project.

Forecast Verification Research

4.5.49 The Council noted the success of the 5th International Verification Methods Workshop held in Melbourne in 2011 and its 6th workshop in the series held in New Delhi, India, in March 2014, organized by the Joint Working Group (WWRP/WGNE) on Forecast Verification Research (JWGFVR).

4.5.50 The Council noted that JWGFVR is actively involved in various WMO projects including: the Commission for Instruments and Methods of Observations (CI MO)/Solid Precipitation Instrument Calibration Experiment (SPICE), Forecast and Research in the Olympic Sochi Testbed (FROST 2014) for the Sochi Olympics, South China Monsoon Rainfall Experiment RDP/(SCMREX), Typhoon Landfall FDP, Polar Prediction Project, Sub-seasonal to Seasonal Prediction Project, and WMO Severe Weather Forecast Demonstration Projects (SWFDPs).

Sub-seasonal to Seasonal Prediction Project (S2S)

4.5.51 The Council noted the close cooperation, established by S2S, between the weather and climate research communities. The Council recognized that improvements in the predictive skill and in the use of sub-seasonal to seasonal predictions would benefit shorter-range weather and longer-range climate predictions as well as improved climate services within the Global Framework for Climate Services (GFCS).

4.5.52 The Council appreciated the contributions of Australia, United Kingdom and United States of America to the S2S Trust Fund. The Council encouraged Members to contribute to the trust fund to support the implementation of the project.

4.5.53 The Council noted the establishment of the S2S Steering Group and supported the developing five sub-projects (extreme weather, monsoons, MJO, Africa, and verification). The Council appreciated the establishment of the International Coordination Office hosted by KMA at the National Institute of Meteorological Research in Jeju, Republic of Korea in November 2013.

4.5.54 The Council appreciated the commitment of the European Centre for Medium-Range Weather Forecasts (ECMWF) and CMA to undertake the S2S database archiving and to provide related data services to support research.

Links between the Polar Prediction Project and the WCRP Polar Climate Predictability Initiative

4.5.55 The Council noted the activities of the Polar Prediction Project (PPP), led by the PPP Steering Group. The Council requested WWRP and WCRP to ensure close collaboration between PPP and the WCRP Polar Climate Predictability Initiative as recommended by EC-PORS (see agenda item 2.6).

4.5.56 The Council noted the progress in the planning of the Year Of Polar Prediction (YOPP) planned for 2017–2019 and its strong links with other related activities. The Council encouraged Members to engage in the planning process and to use this as an opportunity to strengthen polar observational networks and science initiatives.

4.5.57 The Council extended its appreciation to the Alfred Wegener Institute for Polar and Marine Research (AWI), Germany, for hosting the International Coordination Office (ICO) for the project.

4.5.58 The Council appreciated the contributions of Canada, United Kingdom and United States of America to the PPP Trust Fund. The Council encouraged Members to contribute to the trust fund to support the implementation of the project.

Year Of Tropical Convection (YOTC)

4.5.59 The Council recognized that the WWRP-THORPEX/WCRP yotc project (yotc.ucar.edu) has resulted in significant advances in understanding and modelling of tropical convection and its organization into complex multiscale precipitation systems with particular emphasis on MJO.

4.5.60 The Council recalled that the YOTC project and THORPEX will conclude at the end of 2014, and that relevant research activities will continue as part of the WGNE MJO Task Force, in particular, focussing on MJO interactions with the Maritime Continent. The Council urged WGNE to ensure a continued focus on the understanding and modelling of organized convection at the intersection of weather and climate time scales (sub-seasonal to seasonal) to improve operational weather and climate predictions.

4.5.61 The Council noted the joint research plan for the Year of Maritime Continent (YMC) in 2017–2018 that will involve researchers from Japan, USA, Australia, Canada, UK, Singapore, Indonesia and Papua New Guinea. This research project aims to produce better seasonal and sub-seasonal prediction over the Maritime Continent and listed countries. The Council supported the YMC plan through the work of the Madden–Julian Oscillation Task Force (MJO-TF) and the S2S project.

Sand and Dust Storm Warning Advisory and Assessment System (SDS-WAS)

4.5.62 The Council noted that regional nodes for SDS-WAS have been established in Asia (hosted by China), the Northern Africa-Middle East-Europe (hosted by Spain) and the Americas (hosted by USA), with an additional potential regional node in West Asia in collaboration with UNEP. The Council also noted the designation by EC-65 of the SDS-WAS regional centre in Barcelona, Spain, as the RSMC-Atmospheric Sand Dust storm Forecasts (ASDF) for Northern Africa (north of Equator), the Middle East, and Europe and was pleased with the operational status since March 2014 of the Barcelona Dust Forecast Center, the result of the cooperative efforts of AEMET, the Barcelona Supercomputing Center and WMO.

4.5.63 The Council acknowledged the initiative to designate another SDS-WAS regional node in Beijing, China, as the RSMC-ASDF for the region consisting of Asia and the Central Pacific.

4.5.64 The Council noted that the Joint CBS-CAS Task Team on Atmospheric Sand and Dust Storm Forecasts is preparing a study on the evaluation of dust prediction models to address the questions raised at CBS-15 on the performance of dust models.

4.5.65 The Council adopted [Resolution 13 \(EC-66\) – Sand and Dust Storm Warning Advisory and Assessment System](#), to establish the SDS-WAS Steering Committee and its trust fund to support the global research coordination of regional activities.

JRA-55 Reanalysis Data by JMA

4.5.66 The Council acknowledged that the Japan Meteorological Agency (JMA) has completed the Japanese second global atmospheric reanalysis (JRA-55) covering 55 years starting from 1958. The Council took note that advanced reanalysis products are indispensable for better climate monitoring and applications, which also contribute to promoting GFCS.

4.6 Capacity Development (agenda item 4.6)

Enhanced capabilities of NMHSs, in particular in developing and least developed countries, to fulfil their mandates (ER 6)

Education and Training Programme

Introduction

4.6.1 The Council noted that the EC Panel of Experts on Education and Training (ETR-Panel) had recently held its 26th session at the Korea Meteorological Administration headquarters in Seoul, Republic of Korea, from 24 to 28 March 2014 (<http://www.wmo.int/pages/prog/dra/etrp/documents/final-report26thSession.pdf>). The Council appreciated that this session of the ETR Panel had taken a forward looking and end-to-end approach to identify possible future directions for the ETR Programme based upon the draft Strategic Plan for 2016–2019, information from sessions of regional associations, technical commissions and data regarding Members staffing profiles and capabilities collected by the ETR Office. The Council noted the ETR Panel recommendations regarding strategic issues such as the Future Roles and Operations of WMO Regional Training Centres and a proposal for a WMO Global Campus; tactical issues such as the Terms of Reference for the EC Panel of Experts on Education and Training and the Key Performance Indicators (KPIs) for the ETRP for the next financial period; and operational issues including recommendations regarding reconfirmation of two existing Regional Training Centres.

Current and future requirements for Education and Training

4.6.2 The Council welcomed the approach used by the ETR Panel to identify the broad training needs of WMO Members, particularly those Members with restricted or no national meteorological, hydrological or climatological education and training capabilities. The Council noted that the ETR Office had recently collected data on staffing numbers and capabilities showing that the total global NMHS workforce was at least 150,000 and could be as high as 250,000 when taking into account staff involved in operational hydrology which was significantly under represented in the survey returns to the ETR Office.

4.6.3 Assuming an annual staff turnover of around 5% the Council was informed that the ETR Panel estimated at least 7,500 new staff are annually hired into NMSs globally (across all staff categories and based on conservative numbers of 150,000). The Council noted that the data from the 2013 ETR Office survey indicated that more than 24 of the 80 Members who returned data for the survey, primarily those Members without sufficient national training capacity, reported that at least 30% of their Aeronautical Meteorological Forecasters would not be able to meet the 1 December 2016 qualification requirements. The Council noted that based upon the current survey returns the minimum number of unqualified aeronautical meteorological forecasters would be approximately 500 out of an indicated 7,000 strong global workforce. The Council requested it be updated on the situation at subsequent sessions.

4.6.4 The Council noted the growing demand for continuous professional development education and training associated with proposed competency standards in areas such as public weather services, marine forecasting, tropical cyclone / typhoon / hurricane forecasting, WIS and climate services. Further demand is also anticipated by Members in areas of professional and management training of NMS staff. The Council concurred with the ETR Panel's conclusion that due to the increased requirements for compliance with the current and emerging qualification and competency standards / recommended practises there would be a growing unmet demand for education and training in not only the traditional areas typical covered by the WMO Regional Training Centres (RTCs) but also new areas associated with increased user liaison related to multi-hazard early warning services and provision of climate services. The Council noted that part of education and training on climate services were included in the RCC mandatory function, and that the number of RCCs had recently been increased. The Council noted with anticipation that education-related activities between RTCs and RCCs would be implemented in a mutually complementing manner.

4.6.5 The Council welcomed the approach used by the ETR Panel to identify the staff numbers and capabilities in a range of service areas and encouraged the Secretary-General to continue to gather data from Members who had not yet responded. The Council considered that this information will contribute to decisions on where to invest resources to ensure that all Members are able to contribute to and benefit from activities proposed under the High Priority areas for the 2016–2019 financial period. The Council suggested that the EC Working Group on Strategic and Operational Planning take account of the analysis undertaken by the ETR Panel to assess whether the underlying questions and approach should be included into the survey on “Impacts of Achieved Results on Members” or collected via mechanisms such as the Country Profile Data Base.

4.6.6 The Council adopted [Resolution 14 \(EC-66\) – Guidance for the Education and Training Programme for 2016–2019](#).

Review of the Future Roles and Operations of WMO Regional Training Centres

4.6.7 The Council was informed about the outcome of the ETR Panel’s review of the Future Role and Operation of WMO Regional Training Centres and thanked the ETR Panel and its Task Team for their excellent work. The Council supported the proposal to increase the role of the regional associations in the monitoring, recognition and reconfirmation of RTCs, including the assessment of the performance targets proposed by each RTC for the coming four-year period. This increased role was consistent with the discussion of the roles and responsibilities of regional associations addressed under agenda item 7.3.

4.6.8 Whilst noting the range of issues associated with changing the status of an RTC from confirmed to provisional the Council agreed that it was important to address performance and communication issues in Regional Centres for the overall strength of the RTC network. The Council agreed with the ETR Panel’s recommendation that this should be done based upon the targets proposed by the RTCs themselves and agreed by the appropriate regional association. This approach eliminates the need for absolute targets but would require the regional associations to be clear about their priorities and only recommend reconfirmation or approval of an institute proposed as an RTC if it was actively helping to address the high priority needs identified by the regional association. The Council welcomed and supported the suggestion that the ETR Panel prepare a Guide for RTCs that would further elaborate and clarify what was expected of RTCs and their partners.

4.6.9 The Council noted the potential for confusion about the number of RTCs and supported the ETR Panel’s determination that where a country had multiple institutions contributing to meeting regional requirements these would be known as components of the RTC hosted by that country. Thus countries such as China, India, Kenya, Madagascar, Nigeria, the Philippines and the Russian Federation would have one RTC with multiple components, not multiple RTCs in the one host country. The Council further considered the situation of RTCs located in one Region who provided significant support to Members from outside of their Region. The Council noted that the existing and proposed criteria covered this situation. The Council noted that whilst the RTC may provide significant support to Members outside their home Region, it was the home Region that would be responsible for considering whether or not to recommend confirmation or reconfirmation of an RTC to the Executive Council. The Council anticipated that the home Region would positively take into account the level of support provided by the RTC for Members outside of the Region.

4.6.10 Recalling its support for the introduction of quality management processes, the WMO Service Delivery Strategy and continuous improvement processes, the Council agreed with the ETR Panel’s recommendations to change the EC Criteria for Recognition and Reconfirmation of Regional Training Centres to include outlining the roles and responsibilities of the key partners in the RTCs and most importantly ensure that reconfirmation of RTCs was based upon them having assisted Members with education and training opportunities or resources. The Council adopted [Resolution 15 \(EC-66\) – Executive Council criteria for the recognition and reconfirmation of WMO Regional Training Centres](#).

Feasibility Study of Establishing a WMO Global Campus

4.6.11 The Council noted that during the work of the ETR Panel's Task Team on the Future Roles and Operations of RTCs the WMO Global Campus was conceptualized and subsequently presented at the Twelfth WMO Education and Training Symposium in Toulouse, France in September 2013. The Council further noted that the ETR Panel's Task Team does not intend for the WMO Global Campus to replace RTCs. Rather, it is envisioned that the WMO Global Campus would act as a mechanism that would enhance the quality of services provided by the existing RTC network as well as the quality of training services provided by other stakeholders. The Council noted that the Task Team recommended to the ETR Panel that a feasibility study into the Global Campus, as an extension to and built solidly upon the RTC network, be undertaken.

4.6.12 The Council supported the vision of the WMO Global Campus as a systemic and coordinated approach to assist Members personnel, particularly those from developing and least developed NMSs, access a wide range of quality-assured training opportunities and resources designed to support them to produce and deliver the required meteorological, hydrological and climatological services at national level.

4.6.13 The Council recalled that whilst the RTC network had shown an improvement in performance in the last two years, and further improvements were anticipated inline with the recommendations of the ETR Panel's Task Team, the Council considered that the RTC network alone would not be able to meet the anticipated demands of a global NMS and NHS workforce estimated to be from 150,000 to 250,000 people. The Council noted the estimate included the initial education and training of several hundred new staff/year from countries with no national education and training facilities. Thus new approaches and partners would need to be developed to supplement the existing RTC network.

4.6.14 The Council recommended that the feasibility study would need to: (a) elaborate on the vision; (b) define how the Members would benefit from the WMO Global Campus; (c) define the mechanisms through which the RTCs would link with and derive benefits from the Global Campus; (d) provide further recommendations for dealing with issues such as governance, quality control mechanisms and resources required for successful implementation and ongoing sustainability; (e) provide a cost benefit for the Global Campus; (f) prepare a roadmap for the establishment and implementation of the WMO Global Campus concept; and (g) augment RTCs and other training activities. The Council adopted [Resolution 16 \(EC-66\) – Feasibility study for establishing a WMO Global Campus](#).

Terms of Reference of the EC Panel of Experts on Education and Training

4.6.15 The Council appreciated the work undertaken by the ETR Panel to review and refresh its Terms of Reference for the next financial period. The Council recognized that a core membership of the ETR Panel had been stable for many years and this experience and corporate memory had served the ETR Panel well. However, the Council also recognized the need to engage new members on the Panel and with limited funding, the number of ETR Panel members cannot grow. On balance the Council decided to limit the number of terms an individual could serve as an ETR Panel member to two terms of four years effective for new members from 1 January 2016. The Council agreed that the proposed nomination process should be used to select the next ETR Panel in June 2015. To ensure continuity from this ETR Panel to the next ETR Panel, the Council agreed that some of the current ETR Panel members could be invited to serve an additional four years as part of the transition arrangements, but that they would need to follow the proposed nomination process.

4.6.16 The Council adopted [Resolution 17 \(EC-66\) – Terms of reference of the Executive Council Panel of Experts on Education and Training](#).

Key Performance Indicators for the 2016 to 2019 Financial Period for the ETR Programme

4.6.17 The Council appreciated that the ETR Panel had reviewed the Key Performance Indicators for the ETRP for the 2012 to 2016 financial period using data from the monitoring and evaluation programme for the years 2012 and 2013. The Council recalled that the three KPIs had been recommended by the ETR Panel in 2010 reflecting two key components of the ETRP (RTCs and Fellowships) with the third indicator related to the ability of the ETRP to take on new opportunities related to the GFCS. The Council noted that the respondents to the monitoring survey had generally been very supportive of both RTCs and fellowships and that Members were able to access ETR activities related to the GFCS.

4.6.18 The Council appreciated the ETR Panel's recommendations to modify the KPIs for the next financial period to reflect the emerging stress points related to the provision and access of ETR opportunities addressing compliance requirements associated with qualification and competency standards. The Council requested that the EC Working Group on Strategic and Operational Planning be advised of the recommended KPI areas so that they could be incorporated into the monitoring programme for the next financial period.

Review of the Regional Training Centres in Israel and Italy

4.6.19 The Council noted that its ETR Panel had carried out reviews of two RTCs located in RA VI in 2013, Bet-Dagan in Israel and the Institute of Biometeorology (IBIMET) in Italy.

4.6.20 The Council acknowledged and thanked the Permanent Representative of Israel with WMO for the ongoing support offered to Members by the RTC over the eight years since the last review. Whilst the number of students was relatively small, the Council noted that the RTC had key strengths in areas around agriculture, climate services and climate change and water resource management which were of great interest to Members. The Council adopted [Resolution 18 \(EC-66\) – Status of Bet Dagan, Israel as a WMO Regional Training Centre](#), reconfirming Bet-Dagan as an RTC for four years.

4.6.21 The Council debated the recommendation of the ETR Panel to defer consideration of reconfirmation of IBIMET as an RTC until EC-68. The Council noted that the ETR Panel had taken into account the strong support from the Permanent Representative of Italy with WMO for IBIMET to be reconfirmed as an RTC, as well as the support of RA VI for its reconfirmation, support from the president of CAgM and the planned course offerings from IBIMET in areas related to GFCS. The Council supported the ETR Panel's statement that the reputation of the RTCs as trusted and respected training providers relied upon each institution not only providing education and training opportunities but in actively coordinating with the wider ETR Programme to ensure that the training offered addressed key organization priorities and minimized duplication. In adopting [Resolution 19 \(EC-66\) – Status of the Institute of Biometeorology, National Research Council, Florence, Italy as a WMO Regional Training Centre](#), deferring consideration of the reconfirmation of IBIMET as an RTC, the Council acknowledged the potential for IBIMET to play an important role as an RTC in the future and encouraged it to actively contribute to and further collaborate with the WMO Education and Training Programme in the next two years.

4.6.22 The Council noted that by the end of 2015 the ETR Panel should have completed the second round of reviews of all RTC. [Annex VII to the present report](#) lists the 25 RTCs comprising 35 institutions currently recognized as RTC components. The Council noted that the Korea Meteorological Administration will be requesting recognition of its courses and facilities as a WMO RTC at the seventeenth session of the World Meteorological Congress.

Fellowships

4.6.23 The Council noted the review by the ETR Panel of current status and approaches being utilized within the WMO Fellowship Programme. The Council welcomed the involvement of new partners in the programme, particularly those addressing areas not traditionally covered by RTCs, and encouraged the Secretary-General to continue engaging new partners and new funding

streams for this important programme. The Council appreciated the ETR Panel's review of the 2006 EC Criteria for WMO Fellowships. The Council noted that whilst there were no major changes to the criteria, the revisions would bring them inline with current practises. The Council adopted [Resolution 20 \(EC-66\)– Executive Council criteria for the award of WMO Fellowships](#), updating the criteria.

Competency Standards

4.6.24 The Council was informed that the ETR Panel discussed the work being undertaken in a number of the WMO Technical Commissions on the development of competency standards for personnel. The Council appreciated the work being undertaken by the various technical commissions on competency standards and recommended practises. The Council stated that in light of WMO Publication No. 1127 (Guidelines on the Preparation and Promulgation of the WMO Technical Regulations) the ETR Panel should have a role in the review of the draft competency standards to ensure consistency between the various competency standards. Noting that the competency standards would most likely be included in the WMO Technical Regulations as recommended practises, the Council requested that the ETR Panel take a lead role in developing a Guide to assist the technical commissions and Members in the development and assessment of competency standards in the various fields. The Council requested it be updated on the status of competency development and implementation on a regular basis.

Resource Mobilization

4.6.25 Recalling that Cg-XVI (Resolution 37) authorized the Council, during the sixteenth financial period, to incur expenditure from the budget funded from Voluntary Contributions (revised) estimated at 153 M CHF, made up of 120 M CHF requested by the WMO Budget Office and the WMO Technical Programmes for activities (Project Compendium 2012–2015) and an anticipated 33 M CHF for joint cooperation programmes (such as JCOMM, GCOS, WCRP), the Council noted with appreciation that 45 M CHF had been receipted by WMO in total voluntary contributions in 2013 equalling some 42% of the 2013 total annual budget.

4.6.26 The Council noted that some 25–30 MCHF in concrete pledges for 2014 are already in the system from new and also multi-annual projects for which agreements are already signed.

4.6.27 The Council welcomed the broad range of financing partners including Canada, China, the European Commission, Germany, Greece, Ireland, Republic of Korea, Kingdom of Saudi Arabia, Japan, Norway, Spain, Switzerland, UK and the USA. The Council further welcomed the scope of ongoing initiatives aimed at development and modernization of Weather, Water and Climate Services and that most of the WMO Regions were directly benefiting from the initiatives.

4.6.28 The Council welcomed, in particular, the progress made on the regional initiative in the League of Arab States (LAS) region which spans WMO Regions I, II and VI. The Council recalled that EC-65 had called for such an initiative considering that NMHSs and weather and climate services in the region have been impacted by recent insecurity events. The Council welcomed the support of the Presidency of Meteorology and Environment (PME) of the Kingdom of Saudi Arabia and the Swiss Development Cooperation in this respect. The Council noted that a Needs Assessment and Implementation Plan for 2014–16 have been developed covering the areas of climate data rescue, modernization of the observation and climate network and improvement of forecasting and early warning systems. This Plan will be considered by the Permanent Meteorological Council of the LAS following a verification workshop involving local and international experts.

4.6.29 The Council further noted that voluntary contributions were also supporting the core priorities of WMO Technical Programmes including CIFDP, PWS, FFG, WHYCOS, AG-MET, SWFDP and GFCS including the joint WMO-WHO and WMO-WFP Offices for GFCS (see [Annex VIII to the present report](#)).

Development Partnerships

4.6.30 The Council noted that in addition to direct mobilization of funds, WMO has a major role to play in assisting NMHSs directly access financing (without it necessarily passing through the WMO Secretariat), leverage support through the programmes of the UN system and other development partners such as development banks and various ODA. The Council recognized that these agencies are increasingly focusing on enhancement of Weather, Water and Climate Services in their development activities.

4.6.31 The Council took particular note of the significant global and regional programmes that provide considerable investment (more than 150M CHF) in NMHSs for Weather, Water and Climate Services. The Council recognized that WMO is engaged in these programmes from a technical support perspective to assist NMHSs optimize the benefits. These include the World Bank Pilot Programme for Climate Resilience (PPCR) covering some 18 countries across most WMO Regions; the GEF/LDCF – UNDP, providing support for EWS to the National Meteorological Services and other line ministries (including disaster management, agriculture and water) in ten countries in Africa; the proposed WB-GFDRR-Sahel Programme for which WMO will enter into a specific partnership arrangement with the GFDRR to support implementation.

4.6.32 The Council was informed of the establishment of “ACP GFCS Task Team” to plan for financing of GFCS activities in the Africa-Caribbean-Pacific Regions within the Intra-ACP window of the EU EDF 11 with the European Commission, ACP Secretariat, African Union Commission, EUMETSAT and relevant regional organizations from the ACP Regions. WMO is co-chairing the Task Team.

4.6.33 Considering these programmes of WMO partners, the Council recognized that as well as sourcing direct financing through WMO, the Secretariat has a major role to play in catalyzing investments directly to Regional Centres and NMHSs.

4.6.34 The Council recommended that in order to ensure sustainability of the investment in modern real-time ground-based observation systems these should be recognized as Information and Communication Technology (ICT) items and integrated with ICT systems to be able to provide reliable information that is of vital importance to preserve human lives and livelihoods with high efficiency.

4.6.35 The Council also stressed the importance to provide adequate financing in order to assure the sustainability of the observing systems/networks on at least a 10-year basis, especially in developing and least developed countries. In particular, the Council strongly recommended to donors and/or funding bodies taking an end-to-end approach to include in the projects, besides the initial investments in acquisition, installation, maintenance and training, operational funds to ensure the sustained operation of observing systems and supporting activities for the period of at least 10 years.

4.6.36 In order to maximize sustainability, the Council requested that the Resource Mobilization and Development Partnership Office of the WMO Secretariat should pay appropriate attention to this critical issue when considering any donation and/or funding from major development partners to investments in the observing systems of WMO Members. A strong recommendation should be extended to funding agencies (i.e. World Bank, ADB, International Cooperation Agencies, etc.) in order to assure that sustainability of such observing systems should be guaranteed by the donors and/or by funders.

Voluntary Cooperation Programme

4.6.37 The Council welcomed the information that in 2013, in addition to the major regional development projects mentioned above, more than USD 33,000,000 of support was provided through the WMO Voluntary Cooperation Programme (VCP). The support was provided through training, technology, expertise and financial support. VCP is the specific WMO Community

cooperation mechanism. The funding was comprised of USD 378,824 from the VCP (F), USD 1,100,000 VCP (ES) and USD 30,167,176 in bilateral support (reported figures).

4.6.38 In 2013, the VCP secretariat received a total of 23 new project requests of which 20 were supported through the VCP-F and VCP (ES) coordinated process. Countries that received support included: Azerbaijan, Belize, Bhutan, Bosnia and Herzegovina, Botswana, Djibouti, Egypt, Guinea, Guyana, Kiribati, Maldives, Micronesia (Federated States of), Myanmar, Niue, Papua New Guinea, Philippines, Rwanda, Solomon Islands and Uzbekistan. The Council considered the priority areas for VCP (F) for 2014 and supported the allocation shown in the [Annex IX to the present report](#).

4.6.39 Recalling Resolution 24 (Cg-XV) – The WMO Voluntary Cooperation Programme, and considering the report of the Ad Hoc Informal Planning Meeting on the VCP and related Technical Cooperation Programmes 2013, the Council expressed its appreciation to VCP donors for the valuable efforts in supporting the VCP Programme. Recognizing that the VCP mechanism clearly remains an important delivery mechanism, the Council encouraged Members to further contribute to and participate more actively in the Programme.

4.6.40 The Council welcomed the Statement from the Chairperson of the Informal Planning Meeting of the VCP informing of the valuable role the IPM plays in fostering cooperation between WMO Member NMHSs in their international development activities and promoting synergies and cooperation between their activities.

Fellowship Fund

4.6.41 The inclusion of a fellowship component in all major projects for fellows participating in project areas continues to add a valuable source of financing to the Fellowship Programme leading to a further increase in the number of development partners supporting the programme. The Fellowship Fund financed fellows will be managed through the usual FELCOM mechanism to ensure transparency in application of these funds and clearly identified back to the donor source of funds and specific projects.

Project Coordination

4.6.42 In respect of the volume of voluntary contributions channelled directly through the WMO Secretariat, as indicated above, and in light of the target aimed at in the Compendium 2012–2015, and noting that Cg-XVI recognized that implementing this level of externally funded activities poses a significant challenge for WMO in terms of meeting implementation deadlines, complying with Agreements and donor requirements for reporting and evaluation, the Council welcomed the progress in enhancing project management processes within the Secretariat for the implementation of complex projects. The Council recognized that the Project Management Board (PMB) and the Project Coordination Unit (PCU) within the Resource Management and Development Partnerships (RMDP) Office now contributes significantly to the successful implementation of major cross-sectoral projects.

4.6.43 Acknowledging the additional pressure on WMO staff for implementation of non-core budget activities, the move towards complimenting core staff with project funded staff in Technical Departments and Regional Offices was appreciated (5–6 new positions in 2014). The Council welcomed the plan for the establishment of a Project Staff Roster to ensure more rapid recruitment of project officers and managers.

4.6.44 The Council also noted, in terms of continuous improvement in project management, the new arrangements with respect to allocation of Project Support Cost (PSC). Under the new arrangements a component of the support cost levied by WMO (7% to 13%) as per WMO Support Cost Policy (Resolution 20 (EC-64)) is reserved to support project management across the WMO Technical Departments and Regional Offices.

4.6.45 The Council noted that the RMDP has a staff complement of 2 core positions (D1, and P.5), with an additional P.4, Chief of Project Coordination Unit, currently under recruitment. The Council recognized that RMDP, as with other WMO Offices, is challenged to strategically deliver its contribution to the WMO Strategic Plan and the financing requirements of the WMO and Members, with this level of staffing. The Council welcomed the continued support of Member Governments to the RMDP through the UN JPO programme (Finland, Germany, Norway) and also through secondments (UK Met Office, Korea Meteorological Agency) to partially address this human resource gap.

4.6.46 Noting also that WMO is increasing its project based activity across all regions, the Council recognized that the WMO infrastructure is less well suited to country by country project implementation than other UN Agencies such as UNDP and World Bank Units where country offices are in place. The Council requested the Secretary-General to strengthen the role of WMO as a Technical Support Facility to leverage on/support the investments of these other agencies in NMHS development projects.

Progress in the implementation of the Capacity Development Strategy

4.6.47 The Council recalled the discussions in Cg-XVI on the need for a cohesive and coordinated approach to capacity development to maximize the outcome of capacity development activities. In this regard, the Council recalled the WMO Capacity Development Strategy (CDS) and the CDS Implementation Plan (CDSIP 2012–2015) that had been approved at EC-64 and EC-65 respectively.

4.6.48 While the Council noted with satisfaction the early progress on CDSIP implementation, it also recognized the need to further strengthen and harmonize such activities to address existing gaps in human, institutional, infrastructural and procedural capacities for many Members. It further appreciated that over the last year the Secretariat and Members had focused resources to build capacity in WMO priority areas such as compliance with QMS requirements, regional WIGOS/WIS implementation and training/fellowships in climate services.

4.6.49 The Council requested the Secretariat to continue its efforts towards a 'culture of compliance' and to build the technical, strategic and managerial skills of NMHS staff as critical components of Capacity Development. In order to utilize limited resources effectively and efficiently the Council urged all WMO Members to consider the strategic approaches to capacity development corresponding to the six Strategic Objectives of the CDS.

4.6.50 The Council was informed of the efforts of the EC Working Group on Capacity Development (ECWG-CD), notably the March 2014 meeting of the Task Team on the Country Profile Database (CPDB). It appreciated that the CPDB was recognized by the ECWG-SOP as holding potential for use in monitoring and evaluation of the implementation of the WMO Strategic Plan in the next financial period. The Council recognized the cost of maintaining the CPDB should be considered in the preparation of the 2016–2019 budget. The Council was briefed on the Initial Operating Capability of the CPDB, which is to start in July/August 2014 with the call to Members to update their country information. In this connection, the Council adopted [Resolution 21 \(EC-66\) – Country profile database initial operating capability](#).

4.6.51 The Council was also informed of actions taken by RA II, RA VI, and RA V at their sessions to regionalize the CDS through their appropriate regional subsidiary bodies and of the plan to hold a Task Team Meeting on the Categorization of NMHSs by level of service provision later in 2014.

4.6.52 Noting that the activities of the Technical Cooperation Programme (TCOP) are included in the Capacity Development Strategy activities and are manifest in other programmes of the WMO, the Council agreed to recommend to the Seventeenth Congress that the TCOP be incorporated under a new programme called the Capacity Development Programme.

Least Developed Countries Programme

4.6.53 The Council recalled Resolution 33 (Cg-XVI) – WMO Programme for the Least Developed Countries, and the discussion in Cg-XVI on the importance of this Programme and the high priority to be continually attached to it. The Council reiterated the importance to continue and enhance the WMO Programme for LDCs to address the obstacles and constraints limiting NMHSs in LDCs to provide relevant weather, water and climate information and services and to strengthen their capabilities to meet the demands and requirements of the priority areas for action in the Istanbul Programme of Action for the LDCs for the decade 2011–2020 as appropriate.

4.6.54 The Council noted the regional consultation on climate services for SIDS in the Pacific (Cook Islands, April 2014) and the workshop on coordination and partnership building for enhancing the benefits of weather, climate and water services in the development of LDCs in Asia (Bhutan, September 2014). The Council encouraged the LDCs and SIDS Members to take advantage of these events to strengthen their capacity development.

4.6.55 The Council noted with appreciation that the Secretariat carried out capacity development activities, especially for LDCs, including the implementation of GFCS, education and training, technical assistance and advice on national and regional socio-economic benefits related to weather and climate. The Council noted also specific assistances to some LDCs in developing their national strategic plan. The Council recognized that the support to LDCs is actively mainstreamed to all WMO Programmes and activities and encouraged the Secretariat to continue the efforts to enhance development in LDCs.

SIDS Conference

4.6.56 The Council noted that the UN Conference on Small Island Developing States will be held from 1 to 4 September 2014 in Apia, Samoa, with a preparatory session from 28 to 31 August, and will focus the world's attention on this group of countries that face special sustainable development challenges in view of their unique and particular vulnerabilities. The Council appreciated that the Secretary-General had circulated to Members a Guidance Note to National Meteorological and Hydrological Services regarding the engagement with the Conference and preparatory processes to promote the benefits of Weather and Climate Services for sustainable development of SIDS.

4.6.57 The Council welcomed the Secretariat plan to promote the benefits of enhanced weather and climate services for sustainable development of SIDS to high level decision-makers through a communications campaign, including major side events that will help to bring political attention to this issue. The Council noted in this regard that in order to create maximum value from this opportunity a series of key messages and communications products are being developed to assist NMHSs in SIDS to show how climate services can be best utilized to achieve national priorities in areas such as disaster resilience, health, agriculture, etc. These WMO communications products could also be adapted to national context and broadcast on national press, radio and TV in all SIDs.

4.7 Partnerships (agenda item 4.7)

New and strengthened partnerships and cooperation activities to improve NMHSs' performance in delivering services and to increase the value of the contributions of WMO within the United Nations system, relevant international conventions and national strategic issues (ER 7)

Cooperation with UN system and other International Organizations***Cooperation with the United Nations System***

4.7.1 The Council noted the actions taken by the Secretary-General to strengthen cooperation with the United Nations System. This has been facilitated by the WMO Liaison Office

at the United Nations in New York and achieved through the active participation of WMO senior officials in sessions of the sixty-eighth session of the United Nations General Assembly and associated Committees. WMO officials have been deeply involved in the Task Team and Open Working Group for Sustainable Development Goals related to the post-2015 Development agenda and have also contributed to the discussions at the Environmental Management Group (EMG), the High Level Committee on Programmes (HLCP), and the United Nations Development Group (UNDG). Continued efforts to promote the GFCS have also been made through targeted WMO senior level briefings to New York-based Missions and the World Bank.

4.7.2 The Council also acknowledged the critical importance of WMO engagement in consultations on the development of the Post-2015 agenda within the Open Working Groups (OWGs) and noted that WMO had co-lead the thematic Issue Brief on Climate and Natural disasters with UNISDR and other UN partners. The Council also welcomed the role played by the WMO Secretariat in contributing to other Issue Briefs, including in the areas of Poverty Eradication; Desertification, Land Degradation and Drought; Sustainable Agriculture; Health and Sustainable Development; Population Dynamics; Social Protection; Energy; Means of Implementation; Science, Technology and Innovation, Knowledge-sharing and Capacity-building; Sustainable Cities and Human Settlements; Sustainable Transport; Biodiversity; Forests; Gender Equality and Women's Empowerment; and Oceans and Seas.

4.7.3 The Council took note of the resolutions of the sixty-eighth session of the UN General Assembly addressed to the UN specialized agencies and relevant to WMO, as referenced in the recent circular letter sent to the Permanent Representatives. Some 33 UN resolutions adopted during the 68th session have been identified to contain some relevance and linkages to existing WMO priorities and activities in areas including Climate, Water and Food Security, DRR as well as Partnership and Capacity Development Activities, among others.

4.7.4 The Council conveyed its support for the actions taken to further strengthen the role of WMO in the UN system coordinated response to climate change, its contribution to the UNFCCC process, and its proactive engagement in global climate activities through the UN inter-agency mechanism HLCP Working Group on Climate Change chaired by the WMO Assistant Secretary-General. The Council welcomed WMO's active involvement in the preparation of the UN SG's Climate Summit scheduled to take place on 23 September 2014.

UNCC: Learn

4.7.5 The Council noted that WMO had been contributing to the work of the One UN Training Service Platform on Climate Change (UNCC:Learn) of UNITAR, a partnership of 33 multilateral organizations which supports Member States, UN agencies and other development partners in designing and implementing results-oriented and sustainable learning to address climate change. It noted that WMO contributed to the science section of an Introductory Learning Module (ILM) on Climate Change, covering six modules including climate science, policy, adaptation, mitigation, finance and planning. The modules provided interactive e-learning facility and a mix of different approaches including visuals, explanatory text, videos, and quiz questions. The Council welcomed this initiative, which marked the partnership between WMO and UNCC:Learn and supported expansion of the cooperation on producing an Advanced Learning Module (ALM), planned by the UNCC:Learn.

4.7.6 WMO has been also closely involved in the discussions on the establishment of a High Level Political Forum (HLPF) and mechanisms to engage in science/policy dialogue and the future activities of this new body.

4.7.7 The Council requested Members and the Secretary-General to ensure appropriate follow-up to the UN General Assembly WMO-relevant resolutions. The Council invited Members to participate actively in relevant follow-up to the decisions of UN bodies in order to enhance the contribution of the WMO community, in particular through their NMHSs, to sustainable development objectives outlined in the Rio+20 outcome declaration and to the implementation of the internationally agreed development goals.

UN-Water

4.7.8 The Council was pleased to learn that the nomination of the WMO Secretary-General as Chairperson of UN-Water was confirmed for a second term of two years, starting in January 2014. The Council also noted the role WMO had continued playing, through this chairpersonship, in UN-Water's contribution to the definition of the post-2015 Development Agenda, in particular by providing technical advice on a proposed post-2015 Global Goal for Water. The Council also remarked that celebrations such as those of the International Year of Water Cooperation, celebrated in 2013, and the World Water Day on 22 March each year, contributed to enhance the visibility of WMO and gave an opportunity to highlight initiatives, such as the GFCS.

UN-Oceans

4.7.9 The Council agreed that the WMO, as a UN Specialized Agency, should continue to take an active role in the UN interagency mechanism UN-Oceans in the areas where WMO holds its mandates and technical expertise. The Council urged Members to identify priority areas, to ensure provision of appropriate technical input to the UN processes on ocean-related matters. The Council requested the Secretary-General to continue strengthening collaboration with UN partner organizations in order to pursue oceans-related common goals, and to support Members in the identification of priority areas.

GFCS partnerships

4.7.10 In this regard, following the decision taken by the extraordinary session of Congress (Cg-Ext.(2012)) to establish the Intergovernmental Board on Climate Services (IBCS), the Council noted the organization of the first session of the IBCS (IBCS-1) by the Secretary-General, which established a Stakeholder Engagement Mechanism in the form of a Partner Advisory Committee (PAC).

4.7.11 To advance implementation of the four initial priority areas of the GFCS, joint offices were established with the Global Water Partnership and the World Health Organization (WHO). These offices are located within the Climate and Water Department and the GFCS Office to support implementation of the Water and Health Exemplars.

4.7.12 Directors and senior staff members of NMHSs represented WMO at the WHO Regional Committees for: Africa (Brazzaville, Republic of Congo, September 2013); South-East Asia (New Delhi, India, September 2013); Europe (Izmir, Turkey, September 2013); the Western Pacific (Manila, Philippines, October 2013); and the Eastern Mediterranean (Muscat, Oman, October 2013), contributing to the discussion on Climate and Health.

4.7.13 WMO and the United Nations Economic Commission for Africa (UNECA) have recognized the benefits to be derived from increased collaboration, cooperation and interaction in the area of climate science research and applications, addressing user-driven priorities towards climate resilience and sustainable development. A Memorandum of Understanding (MoU) is expected to be signed in the coming months.

World Bank

4.7.14 The Council actively recalled the collaboration with the World Bank in the implementation of the GFCS. The Council noted the role of the World Bank in providing financial and other relevant support to the modernization of a number of NMHSs, particularly in RA II and RA III. The Council reiterated its support for continued collaboration between the two organizations towards the capacity development of NMHSs.

WMO participation in the work of United Nations Conventions***UN Framework Convention on Climate Change***

4.7.15 The Council noted that WMO actively participated in COP 19 of the UNFCCC in Warsaw, Poland, 11–22 November 2013. It further noted that WMO had contributed to the work of the UNFCCC Subsidiary Body for Technological and Scientific Advice (SBSTA) and Subsidiary Body for Implementation (SBI), mainly in the areas of adaptation, capacity-building, research and systematic observation, the national adaptation plans, as well as the Warsaw International Mechanism for Loss and Damage. The Council noted that COP 19 considered GFCS as an initiative to promote the science-based approach for adaptation, building climate resilience, reducing economic and social losses, and alleviating damages associated with climate change impacts. GFCS is also regularly included in the agenda of the SBSTA.

4.7.16 The Council was further pleased to note that Mr Emmanuel Dumisani Dlamini the Permanent Representative of Swaziland with WMO, was elected the chairperson of SBSTA for the next period leading to COP 20. Furthermore, it was informed that the election of two delegates from NMHSs of Tajikistan and Lesotho; as the Vice-Chairperson and Rapporteur of SBI, respectively, bring additional strength and value to the engagement of delegates from NMHSs in the UNFCCC process. The Council requested the Secretary-General to continue his efforts in enhancing the role and contribution of NMHSs through their participation in the implementation of the UNFCCC decisions, particularly in adaptation related areas.

WMO participation in UN System-wide coordination mechanism(s)***Cooperation with UNESCO International Hydrology Programme***

4.7.17 The Council noted that the new working arrangements between WMO and UNESCO regarding the long-term cooperation between UNESCO and WMO in the field of hydrology and water resources (Freshwater), which had been signed at the UN Headquarters in New York by the UNESCO Director-General, Irina Bokova, and the WMO Secretary-General on the sidelines of the UN Chief Executives Board meeting on 25 November 2013. While maintaining respective programmes in line with their fields of competence, the agreement recognizes the necessity of close cooperation on freshwater, water science and water resources.

Cooperation with Comprehensive Nuclear-Test-Ban Treaty Organization

4.7.18 The Council encouraged continuing scientific and technical collaboration with the Preparatory Commission of the CTBTO, in particular to make progress on establishing suitable arrangements for the relevant Regional Specialized Meteorological Centres (RSMCs) to have access to CTBTO radiological monitoring data and information, for improving and quality assuring the operational modelling outputs.

Partnership with the European Commission

4.7.19 The Council welcomed and encouraged initiatives by the Secretary-General to capitalize on and enhance the partnership with the European Commission. It agreed that, with the continuing involvement of the liaison office in Brussels, such efforts and high-level contacts should be pursued pro-actively in a sustained manner in order to strengthen collaboration on different EC policy areas and increase the attention devoted to the potential role and added value of the meteorological community, with the aim of aligning the European Commission initiatives in weather, climate and water with those of the WMO, in particular, those in RA VI (Europe), in order to avoid duplication and optimize synergies. These initiatives are related to many WMO Programmes and initiatives, including WMO's contribution to the GFCS, aeronautical meteorology, disaster risk reduction and marine services. The Council also recommended that the role of WMO and its Members, through their NMHSs, should be highlighted regarding European Commission international cooperation.

Cooperation with regional organizations

4.7.20 The Council noted that WMO, in collaboration with a number of national and regional development entities, had continued to provide support to the design and implementation of a number of projects and activities across the League of Arab States (LAS) which comprises 22 States in Regional Associations I, II and V. Such projects and activities include the Strategic Management of Hydrological and Meteorological Data and Information Product Generation and Regional Initiative for the Assessment of the Impact of Climate Change on Water Resources and Socio-Economic Vulnerability in the Arab Region.

Agreements with International Organizations

4.7.21 The Council welcomed the respective Agreements, Memoranda of Understanding and cooperation agreements signed between WMO and UNESCO on the International Hydrological Programme (IHP), the United Nations Institute for Training and Research (UNITAR), the International Federation of the Red Cross and Red Crescent (IFRC), the International Commission on Irrigation and Drainage (ICID), the International Union for the Conservation of Nature (IUCN) and EUMETNET.

Cooperation with GEO

4.7.22 The Council, noting that GEO-X Plenary (Geneva, January 2014) assessed the implementation of the GEO 2012–2015 Work Plan, recalled the multi-faceted relationship between WMO and GEO/GEOSS. WMO contributes programmatically to the Global Earth Observation System of Systems (GEOSS) 10-year Implementation Plan (2005–2015) through both the WMO Secretariat as a Participating Organization and through contributions from NMHSs as GEO Member States. Examples of these contributions include WMO's contributions in the agriculture, climate, water and weather Societal Benefit Areas (SBAs) through its Programmes and co-sponsored Programmes (such as WIGOS, GCOS, WWRP, GAW, GCW) and Radio Frequency Coordination (RFC). The Council appreciated that, in order to ensure interoperability with the GEOSS Common Infrastructure (GCI), the WMO Information System (WIS) had maintained close coordination with the GCI by providing access to observational data and information collected by NMHSs.

4.7.23 The Council welcomed the Geneva Declaration adopted by the GEO Ministerial Summit in January 2014, by which the mandate of GEO was renewed until 2025. It noted the strengthened relationships with GEOSS through the implementation of the Global Framework on Climate Services (GFCS) and also noted that the four priority areas of GFCS are similar to the SBAs for GEOSS (i.e. agriculture and food security, water, health and disaster risk reduction). The Council encouraged the GEO to continue its collaboration with WMO in the key WMO activities, especially in improved discovery of, and access to, climate data and information, promotion of data sharing principles, and capacity-building coordination. The Council stressed that the participation of WMO in GEO and its contribution to GEOSS had to be on a basis of mutual benefit that maximized synergies while minimizing duplication. WMO participation in GEO should provide an opportunity to improve global observing systems, especially in areas beyond national jurisdictions. That would also facilitate the exchange of data, metadata and products shared within GEOSS, while recognizing relevant international instruments and national policies and legislation.

4.7.24 The Council, recalling the progress of the AfriGEOSS initiative since GEO-IX Plenary in 2013, believed that the AfriGEOSS initiative will be successful if it builds on the complementary efforts by WMO marked by the two Conferences of Ministers Responsible for Meteorology in Africa (Nairobi, April 2010; Zimbabwe, October 2012) aimed at enhancing cooperation between African countries to effectively meet government and societal needs and requirements for weather and climate information and services, including the implementation of the WMO Integrated Global Observing System (WIGOS) in RA I (Africa). In this regard, the Council stressed the need for GEO to identify synergies between WMO and GEO efforts in Africa thus minimizing potential duplication and enhancing the benefit for the entire continent. It encouraged AfriGEOSS to proactively engage NMHSs in its work programme and activities at national level.

Future Earth

4.7.25 The Council noted the progress made in the development of the Future Earth initiative, led by the Science and Technology Alliance for Global Sustainability, with ICSU and ISSC acting as lead agencies. The Council appreciated the efforts of the WMO to contribute to the development of the Future Earth including in its governance structures, and welcomed the continued direct involvement of the JSC of the WCRP and of the WCRP as a strategic partner in the Future Earth development process.

4.7.26 Reaffirming the important and unique role that WCRP plays in the work of the WMO, including the ever increasing importance of its transdisciplinary work with the World Weather Research Programme and with the Commission for Climatology (CCI) among others, the Council encouraged the WCRP to strengthen its strategic contribution to the Future Earth initiative, working in concert with the WWRP and CCI in ensuring WMO's contribution to the advancing knowledge and understanding of the Dynamic Planet thematic area of the Future Earth. The Council noted the importance of connecting the knowledge of climate variability and change with the science supporting sustainable development especially in the face of the projected extremes in both weather and climate.

4.7.27 The Council invited ICSU and the UNESCO, as co-sponsors of WCRP, to help find and support efficient modalities of engagement to ensure that Future Earth is open to the participation of the full range activities of the WCRP, taking full advantage of the unique WCRP structure that involves core projects, working groups, advisory councils and sponsored activities. It also invited Future Earth to work closely with the WMO and the WMO-led Global Framework for Climate Services, to ensure that advancements in research on sustainable development are efficiently transitioned into reliable and timely services for society.

4.7.28 The Council noted the informal and interdisciplinary nature of the Science and Technology Alliance for Global Sustainability and its unique proposition of bringing together research funders, non-governmental institutions, academia and organizations of the United Nations in an informal mechanism to generate and help drive new initiatives for research on sustainability. The Council reaffirmed its support to the continued involvement of WMO in the Alliance as a member and encouraged the Secretary-General to keep these arrangements under review as the informal mechanism evolves and to keep close interaction with the Commission for Atmospheric Sciences (CAS) in this review.

4.7.29 The Council expressed its satisfaction on the visibility of the WMO in various international organizations and initiatives. The Council recommended that the concrete benefits to Members and their NMHSs should be a guiding principle in participation of WMO in such activities.

Cooperation with international organizations

Intergovernmental Panel on Climate Change

Report of the Chairperson of the Intergovernmental Panel on Climate Change

4.7.30 The Council thanked the Vice-Chairperson of the IPCC, Mr J.P. van Ypersele, for his report on the current status of the work of the Panel, and expressed its continued appreciation for the key role of the IPCC in preparing and disseminating high quality assessments in support of international policy formulation on the climate change issue.

4.7.31 The Council noted the thanks expressed by the IPCC for the continued support by WMO and reiterated WMO's commitment to assist IPCC in delivering its work programme, including through financial, administrative and operational support. This support is particularly crucial during the final stages of the approval and release of the Fifth Assessment Report (AR5). WMO will take a proactive role in the execution of the outreach programme of the AR5 to ensure the widest dissemination of its findings among policymakers at all levels.

4.7.32 The Council noted the progress made in the finalization of the Synthesis Report and welcomed the release of the three Working Group contributions to the AR5, the Working Group I contribution entitled *Climate Change 2013: the Physical Science Basis*, the Working Group II contribution entitled *Climate Change 2014: Impacts, Adaptation and Vulnerability* and the Working Group III contribution entitled *Climate Change 2014: Mitigation of Climate Change*.

4.7.33 The Council noted the work of the IPCC Task Force on National Greenhouse Gas Inventories and welcomed the release of the *2013 Supplement to the 2006 IPCC Guidelines for National Greenhouse Gas Inventories: Wetlands* and of the *2013 Revised Supplementary Methods and Good Practice Guidance Arising from the Kyoto Protocol*.

4.7.34 The Council noted that the United Nations Framework Convention on Climate Change (UNFCCC) reiterated the crucial role of IPCC assessment reports for its future work in decisions taken at the 18th and 19th sessions of the Conference of the Parties (COP 18 and 19), and encouraged the IPCC to continue to respond to requests from the UNFCCC.

4.7.35 The Council expressed appreciation and gratitude to: (i) the IPCC Secretariat, governments, institutions and organizations that continue to contribute to the functioning and work of the Panel including through hosting the Technical Support Units and contribute to the WMO/UNEP IPCC Trust Fund; (ii) the experts who continue to contribute to the writing and review of IPCC reports; and (iii) UNEP for its continued co-sponsorship of the Panel.

4.7.36 The Council invited the IPCC Secretariat to continue its active commitment towards greater participation of NMHSs in the activities of the Panel, e.g. by considering the regular inclusion of NMHS representatives in national delegations to IPCC meetings, and involvement in nomination of authors, reviewers, and experts for the IPCC assessment work and in the review of IPCC reports.

4.7.37 The Council noted the ongoing considerations within the IPCC on its future work and agreed that WMO would provide a contribution to these considerations.

Future of the IPCC

4.7.38 The Council noted that the IPCC had been responsive to reviews of its practices and procedures in the past and expected this responsive approach to continue into the future. Noting that the purpose of the IPCC Assessment Reports is to assess the state of knowledge, the Council supported the continuation of this concept and the move towards the presentation of information at regional and sectoral levels.

4.7.39 The Council noted that WMO accords high importance to contributions to the IPCC through, inter alia, programmatic contributions, involvement of both co-sponsors in the governance of its Secretariat and participation in the processes leading to the release of the IPCC Assessment Reports. The Council deemed that the IPCC should enhance the impetus for wider participation of scientists from developing countries and broaden the scope of linguistic and regional criteria in the selection of authors, contributors and reviewers.

4.7.40 The Council agreed that the IPCC Special Reports provide an excellent opportunity to present more action-oriented guidance to the user community at the regional and sectoral levels. The Council welcomed the WMO initiative to organize a series of regional workshops to address the gaps in observation and modelling for e.g. adaptation and to improve the interface mechanism with the IPCC.

4.7.41 The Council noted that with the pressure of climate change there are other issues related to sustainable development and both mitigation and adaptation to climate change and thus connections by IPCC with other groups such as ICSU and Academies of Science would be important in the identification and addressing of these scientific gaps.

4.8 An effective and efficient Organization (agenda item 4.8)

An effective and efficient Organization (ER 8)

4.8.1 WMO Strategic and Operating Plans 2016–2019 and budget for the seventeenth financial period 2016–2019 (agenda item 4.8.1)

4.8.1.1 The Executive Council recalled the decisions of Cg-XVI (paragraphs 8.5.1–8.5.5) and EC-65 (paragraphs 4.8.1.1–4.8.1.5) with respect to the preparation of the next WMO Strategic and Operating Plans for the period 2016–2019. The Council noted with appreciation the report and recommendations of its Working Group on WMO Strategic and Operational Planning (WG/SOP) on this issue.

WMO Strategic Plan

4.8.1.2 The Council considered the draft WMO Strategic Plan 2016–2019 and decided to recommend it to Congress with further improvements to:

- (a) Simplify the topology of the document, making the priorities the centrepiece of the document and ensuring that they are explicitly linked to budget requests set out in the revised budget proposal;
- (b) Have the following as priorities:
 1. Improve the ability of NMSs to meet ICAO requirements focusing on accelerating the implementation of competency standards and QMS to: (a) meet the emerging needs of the global air navigation plan; (b) meet the emerging issues in WMO Regions; and (c) strengthen cost recovery frameworks;
 2. Implement climate services under the GFCS Implementation Plan particularly for countries that lack them focusing on supporting the establishment of regional climate centres; identify user requirements for climate products; develop the Climate Services Information System (CSIS);
 3. Complete the implementation of the WIGOS/WIS focusing on the implementation of all the building blocks of the framework and supporting the uptake at regional and national levels;
 4. Implement operational polar weather, climate, and hydrological services focusing on operationalizing the Global Cryosphere Watch and advancing the Global Integrated Polar Prediction System (GIPPS);
 5. Enhance the capacity development of NMHSs to deliver on their mission by helping them to enhance their human resources, technical capacities and their infrastructure, particularly in developing, least developed and small island developing States;
 6. Improve expertise in providing high quality impact-based forecasts and, in particular, early warning of high impact weather, climate and water events, thereby contributing to international efforts on Disaster Risk Reduction and Prevention; and
 7. Conduct a strategic review of WMO structures, operating arrangements and budgeting practices focusing on the effectiveness of constituent body activities and the Secretariat arrangements;
- (c) Shorten and simplify the Strategic Plan, use action-oriented language and delete the appendices.

4.8.1.3 The Council requested the President to work with the Working Group on Strategic and Operational Planning to finalize the draft Strategic Plan by August 2014, in time for the preparation of the budget and further requested the Secretary-General to submit the Strategic Plan and budget to Cg-17 for consideration.

Budget

4.8.1.4 The Executive Council considered the Secretary-General's budget proposals for the seventeenth financial period (2016–2019) prepared in accordance with Resolution 20 (EC-65). The Council noted that many WMO Members are facing funding pressures and have therefore requested detailed budget proposals relating to the priorities as set out in the revised Strategic Plan to support any request for budget supplementation in the next financial period starting with a baseline budget of existing spending levels.

4.8.1.5 The Council recommended that:

- (a) The revised budget proposal should be accompanied by a series of proposed: (i) non-controllable cost increases (ii) savings measures; and (iii) investment measures;
- (b) For each measure, component activities, their costs, some justification and the risk of action or inaction should be briefly formulated;
- (c) The revised budget proposal should identify and quantify possible savings measures so that corresponding resources can be reallocated to priority activities, prior to consideration of bids for additional funding; and
- (d) Savings could be either efficiencies in internal processes, or could arise from proposed reductions in work programmes.

Improvement of WMO Processes and Practices

4.8.1.6 The Executive Council recalled the decisions of Cg-XVI (paragraphs 7.4.1–7.4.5) with respect to improvement of WMO Processes and Practices, including a request to the Council to continue to work on, and implement as appropriate, continuous improvement of WMO processes and practices, and bring back to the next Congress specific proposals, which may include changes to General Regulations or the WMO Convention as necessary. The Council noted with appreciation the report and recommendations of its Working Group on WMO Strategic and Operational Planning (WG/SOP) on this issue.

4.8.1.7 The Council considered the recommendations of the WG/SOP and:

- (a) Requested the WG/SOP to further review and prepare proposals relating to the work, interactions and content of the technical commissions, the working structures of the Executive Council and WMO Programmes delivering ER 1, ER 2, ER 4 and ER 5, for consideration by the Council; and
- (b) Encouraged the Secretary-General to engage, as appropriate, an independent external expert in organizational design and business process engineering, to aid a cost-effective review process, based on the terms of reference to be developed by the WG/SOP and noted with appreciation the willingness of the Permanent Representative of the United Kingdom of Great Britain and Northern Ireland with WMO to provide financial support for the review process.

4.8.2 Monitoring and Evaluation (agenda item 4.8.2)

4.8.2.1 The Executive Council recalled the decisions of the Sixteenth Congress (paragraphs 8.4.1–8.4.4) and EC-65 (paragraphs 4.8.2.1–4.8.2.2) with respect to further development and implementation of the WMO Monitoring and Evaluation (M&E) System. The

Council noted with appreciation the progress in the implementation of the WMO M&E System. The Council also noted with appreciation the Mid-Term Monitoring and Performance Evaluation Report prepared by the Secretariat for the first biennium of the financial period (January 2012–December 2013), which provided progress on achieved Expected Results and deliverables. It recognized the challenges to performance measurement, particularly with respect to the low and fluctuating levels of response to the Survey on Impacts of Achieved Results on Members, which made it difficult to compare the results of the surveys to establish progress.

4.8.2.2 The Council considered the report of its Working Group on WMO Strategic and Operational Planning (WG-SOP), welcomed the establishment of a WG-SOP task team to review the M&E system and agreed with the following recommendations of the WG-SOP:

- (a) Members should be able to see how the data is used in decision-making with regard to their areas of interest;
- (b) More LDCs and SIDS should be further encouraged or even assisted to complete their M&E Survey to make the results more representative;
- (c) Members should identify focal points for monitoring and evaluation, and International Advisors (INTAD) of PRs should be included in the communications requesting Members' to respond to the M&E survey;
- (d) The regional associations, with the support of their Regional Offices, should be more active in encouraging, including calling and following-up with all their Members to complete the M&E survey to improve responses from Members. The Management Group in each Region could be used as additional sources of information on progress against deliverables;
- (e) In preparing the performance analysis, the Secretariat should also draw upon other performance information from various WMO Programmes. Country Profile Database could be considered as a tool for online response and the staff at the WMO Secretariat could collect data while on missions; and
- (f) The WG/SOP should proceed with a detailed analysis of the KPIs to make them more relevant and useful.

4.8.3 Risk Management (agenda item 4.8.3)

Implementation of Risk Management

4.8.3.1 The Executive Council recalled its decisions at the sixty-third session (June 2011) to approve the WMO Risk Management Policy (paragraphs 5.7.1–5.7.4). The Council appreciated the progress made by the Secretariat in implementing risk management and the maturity of the system, as observed by the Audit Committee. It noted that risk management was an integral part of systems of internal control, and was getting organic and integrated in the planning, monitoring and evaluation processes. The *WMO Risk Management Framework* (WMO-No. 1111) was published in 2013.

4.8.3.2 The Council noted that the Audit Committee continued to monitor progress in the implementation of risk management in the Secretariat and requested the Committee to continue to consider the adequacy and development of risk management processes in the Organization and to keep it informed. It appreciated that most of the top-high risks for the Organization had been fully addressed or downgraded.

4.8.3.3 The Council agreed to revise the WMO Risk Management Policy to enable the Organization pursue opportunities if they outweigh the risks and the existing controls are adequate. The Council encouraged the technical commissions and regional associations to apply the policy in

considering risks and opportunities that may be associated with the implementation of the WMO Strategic Plan.

4.8.3.4 In that connection, the Council adopted [Resolution 22 \(EC-66\) – Implementation of risk management](#).

4.8.4 Oversight (agenda item 4.8.4)

Report of the Audit Committee

4.8.4.1 The Council noted with appreciation the report and recommendations of the Audit Committee (AC) on the annual Financial Statements, reports of the external and internal auditors including liabilities for the Organization, procurement, management of payroll, management of projects, and risk management. The Council welcomed the new member of the Committee, Ms Catherine Vendat, appointed by the President on behalf of the Executive Council in accordance with the terms of reference of the Audit Committee following the resignation of Ms H  l  ne Ploix. The Council thanked Ms Ploix for her contribution to the work of the Organization during her service on the AC.

4.8.4.2 The Council considered the recommendations of the Committee when dealing with respective issues on the agenda of the session.

Report of the Internal Oversight Office

4.8.4.3 The Council considered the annual accountability report of the Director of the Internal Oversight Office (D/IOO) for 2013. The Council also took into account the report of the Executive Council's Audit Committee in considering the report of IOO.

4.8.4.4 The Council considered the summary of oversight findings, recommendations and actions taken in response, and D/IOO's opinion on adequacy of governance, risk management and internal control processes. The Council noted the progress on implementation of audit recommendations, and the steps taken by the Secretariat to address the issues raised therein.

4.8.5 Status of Implementation of the Joint Inspection Unit (JIU) Recommendations (agenda item 4.8.5)

Recalling the WMO procedures of follow-up on JIU reports, the Council noted with appreciation the report on implementation of JIU recommendations addressed to the legislative bodies. The Council concurred with management comments and proposals regarding recommendations relevant to WMO legislative bodies. The Council also acknowledged with appreciation the work and reports of the JIU on matters concerning United Nations system-wide issues and WMO-specific matters.

4.8.6 Gender Mainstreaming (agenda item 4.8.6)

4.8.6.1 The Executive Council noted the report of the Secretary-General on progress achieved in the area of gender mainstreaming. It noted with appreciation the development of monitoring indicators to track implementation of the WMO Policy on Gender Mainstreaming and the collection of baseline data. It encouraged Members to continue providing responses to the 2013 Global Survey on Gender Mainstreaming at WMO and to collect sex-disaggregated data. The Council recognized the modest progress achieved in involving more female experts in the activities of WMO constituent bodies and key programmes but noted that their participation is still too low. It reiterated its urge for Members to nominate more female candidates to working structures of the WMO constituent bodies. The Council further tasked its Advisory Panel of Experts on Gender Mainstreaming and the Secretariat to work on the development of an implementation plan and consider any necessary updates to the WMO Policy on Gender Mainstreaming in preparation for Cg-17.

4.8.6.2 The Council was pleased with the progress in the organization of the Conference on The Gender Dimension of Weather and Climate Services (Geneva, 5–7 November 2014). It commended the dynamic International Steering Committee for the active work and effective guidance as well as Finland, South Africa, United Kingdom of Great Britain and Northern Ireland, United Republic of Tanzania and the United States of America for having provided funding. The Council encouraged other Members and partner organizations to provide voluntary contributions, and thus ensure the balanced and representative participation of relevant communities in the event.

5. RESOURCE MANAGEMENT (agenda item 5)

5.1 Financial matters (agenda item 5.1)

Consideration of the financial statements for 2013

5.1.1 Taking into account the reports of FINAC and the Audit Committee, the Executive Council considered the audited financial statements of the World Meteorological Organization for the year 2013 and the report of the External Auditor to the Executive Council. The Executive Council noted with satisfaction that the External Auditor had issued an unqualified audit opinion on the accounts for the year 2013.

5.1.2 The Council noted that for the year 2013, total revenue amounted to CHF 98.1 million (2012: 93.6 million) and total expenses to CHF 76.3 million (2012: 84.5 million), resulting in a surplus of CHF 21.8 million (2012: 9.1 million).

5.1.3 The Council noted that as at 31 December 2013, total assets amounted to CHF 241.0 million (2012: 219.8 million) and total liabilities to CHF 125.1 million (2012: 129.5 million), resulting in net assets/equity of CHF 115.9 million (2012: 90.4 million).

5.1.4 The Council noted that as at 31 December 2013, the total cash balance amounted to CHF 98.6 million (2012: 80.0 million) and that the increase was mainly because: (a) contributions received for future years increased by CHF 10.0 million from CHF 9.6 million at 31 December 2012 to CHF 19.6 million at 31 December 2013; and (b) voluntary contributions received in cash during 2013 also increased by CHF 7.3 million from CHF 10.9 million at 31 December 2012 to CHF 18.2 million at 31 December 2013.

5.1.5 The Council noted that for the year 2013, the total budget appropriation was CHF 69.0 million (2012: 69.0 million also) and that total expenditure amounted to CHF 64.8 million (2012: 64.4 million).

5.1.6 The Council noted with concern that as at 31 December 2013, unpaid contributions to the regular budget of the Organization had increased by CHF 4.4 million (38.6 %) from CHF 11.4 million at 31 December 2012 to CHF 15.8 million at 31 December 2013. The Council urged the Members to clear their dues at an early date.

5.1.7 The Council noted that for the year 2013, the revenue of the General Fund amounted to CHF 70.8 million (2012: 71.1 million) and expenses to CHF 61.6 million (2012: 71.0 million) resulting in a surplus of CHF 9.2 million (2012: surplus of 0.1 million). The Council noted that the increase in surplus of CHF 12.6 million mainly resulted from: (a) an increase of CHF 5.2 million in revenue from voluntary contributions; and (b) an unrealized gain of CHF 7.8 million from revaluation of the loan on the WMO headquarters building.

5.1.8 The Council noted that as at 31 December 2013, the General Fund cash balance amounted to CHF 24.1 million (2012: 25.1 million).

5.1.9 The Council noted that for the year 2013, the revenue from voluntary resources amounted to CHF 28.0 million (2012: 22.5 million) and expenses to CHF 15.4 million (2012: 13.4 million), resulting in a surplus of CHF 12.6 million (2012: 9.1 million).

5.1.10 The Council noted that as at 31 December 2013, the cash balance for voluntary resources amounted to CHF 56.4 million, reflecting an increase of CHF 19.9 million over the balance of CHF 36.5 million at 31 December 2012. The Council noted that the increase was mainly because: (a) voluntary contributions received for future years increased by CHF 9.9 million from zero at 31 December 2012; and (b) voluntary contributions received in cash for 2013 operations also increased by CHF 7.3 million from CHF 10.9 million at 31 December 2012 to CHF 18.2 million at 31 December 2013. The Council noted that the increase also reflects the policy to engage in expenditure only after the voluntary contributions have been received.

5.1.11 The Council considered that the financial position of the World Meteorological Organization remained sound at the end of 2013.

5.1.12 The Council adopted [Resolution 23 \(EC-66\) – Financial statements of the World Meteorological Organization for the year 2013](#).

Report of the External Auditor

5.1.13 The Council took note of the report of the External Auditor on the financial statements for 2013. It noted with appreciation that the External Auditor had issued an unqualified audit opinion, and dealt with the recommendations therein under relevant agenda items.

Proposed revision to Resolution 31 (Cg-XIII) – Short-term Borrowing Authority

5.1.14 The Executive Council considered the Secretary-General's proposed revision to Resolution 31 (Cg-XIII).

5.1.15 The Executive Council noted that Resolution 31 (Cg-XIII) authorizes the Secretary-General, if the cash balance of the Working Capital Fund proves to be temporarily inadequate for financing the approved budget, to borrow funds on a short-term basis:

- (a) From voluntary contributions to the extent that such borrowing does not affect the activities financed under the respective funds;
- (b) Only in extreme circumstances when no other alternative is available and after consultation with the Executive Council, or the President of WMO acting on its behalf, from Governments, banks or other external sources, as a last resort if the acquisition of funds under the authority given in (a) proves to be insufficient or not possible provided that the maximum amount of such borrowing shall not exceed two months expenditure from the approved biennial budget and the loan shall be limited in time to six months.

5.1.16 The Executive Council noted that the Publications Fund was closed at the end of the fourteenth financial period, in accordance with Resolution 42 (Cg-XV) and that this limited the Secretary-General's authority for internal borrowing to only one fund.

5.1.17 The Executive Council noted that WMO is managing a significant number of projects funded with voluntary contributions in addition to the Voluntary Cooperation Fund.

5.1.18 The Council decided to recommend for consideration by Seventeenth Congress that the Secretary-General's authority to borrow internally extend to all voluntary funding to the extent that such borrowing does not affect the activities financed under such funding, and adopted Resolution 24 (EC-66) – Proposed revision to [Resolution 31 \(Cg-XIII\) – Short-term borrowing authority](#).

Proposed Plan for funding long-term liability for After-Service Health Insurance Benefit

5.1.19 The Executive Council noted that WMO's liability for After-Service Health Insurance (ASHI) amounted to CHF 41.5 million at 31 December 2013, and that this reflected a decrease of CHF 29.2 million over the four-year period ending 31 December 2013. The Council noted that this decrease was primarily a result of higher rates used in the more recent years in discounting projected future costs of health care than those used in the earlier years. The Council also noted that, during the same (four-year) period, the number of retirees increased at four times the rate of active staff.

5.1.20 The Executive Council recalled that the Organization is funding these liabilities on a pay-as-you-go plan which was established under Resolution 7 (EC-LII) based on a load of 3% on payroll costs.

5.1.21 The Executive Council noted that the plan covers the short- to medium-term liabilities related to employee benefits, but it does not cover the same liabilities over the long-term.

5.1.22 The Council noted that WMO is one of the few Organizations in the United Nations system that does not have a plan for funding long-term liabilities for funding ASHI.

5.1.23 The Executive Council considered three options for funding the long-term liabilities, presented by the Secretary-General:

Option 1: Once-off assessment to Members;

Option 2: Assessment to Members over three financial periods, beginning with the seventeenth financial period; and

Option 3: Use of budgetary surpluses, if any.

5.1.24 The Executive Council requested the Secretary-General to resubmit the proposal to Cg-17 which should take into account: (a) the recommendations that may arise from the ongoing UN system exercise on reviewing the ASHI liability; (b) reflect on possible measures to contain and reduce ASHI liability; (c) the possibility of applying future potential surpluses at the end of a financial period – in total or in part – to this liability, beginning in the seventeenth financial period (17th FP); and (d) a reflection on the possibility of adopting measures to increase the cost-effectiveness of the health insurance scheme.

5.2 Internal Secretariat matters (agenda item 5.2)**5.2.1 Amendments to Staff Rules (agenda item 5.2.1)**

The Council noted the amendments to the Staff Rules applicable to the Secretariat staff made by the Secretary-General since the sixty-fifth session of the Executive Council.

5.2.2 Salaries of ungraded officials (agenda item 5.2.2)

5.2.2.1 The Council noted that in December 2013, the General Assembly of the United Nations had adopted a new base salary scale for staff in the Professional and higher categories which came into effect on 1 January 2014. It further noted that this scale reflected an increase of 0.19 per cent through the standard consolidation procedure of reducing post adjustment multiplier points and increasing base salary, i.e. on a no loss/no gain basis.

5.2.2.2 The Council noted that in accordance with Staff Regulation 3.1, the revised salary scale showing the new net amounts had been implemented in the Secretariat in respect of staff members in grades from P.1 to D.2.

5.2.2.3 The Council recalled that Sixteenth Congress had decided to authorize the Executive Council to carry out any adjustment of salary in respect of the Secretary-General, the Deputy Secretary-General and the Assistant Secretary-General, which might become necessary if an

increase in the salaries of comparable United Nations staff occurred during the sixteenth financial period.

5.2.2.4 The Council noted that comparable United Nations agencies (ITU and UPU) were adjusting, or had adjusted, the salaries of their ungraded officials in accordance with the rates shown below. Based on the decisions of the United Nations General Assembly, the Council decided to set the annual rates of net basic salary of WMO ungraded officials with retroactive effect from 1 January 2014 as follows:

	Existing provision	New Provision
	Net with Dependants	
Secretary-General	USD 164,864	USD 165,178
Deputy Secretary-General	USD 151,331	USD 151,618
Assistant Secretary-General	USD 139,027	USD 139,292

5.2.2.5 The Council requested the Secretary-General to take appropriate action as required by the decision thus taken, noting that this scale reflected an increase of 0.19 per cent through the standard consolidation procedure of reducing post adjustment multiplier points and increasing base salary, i.e. on a no loss/no gain basis.

5.2.3 Human resources management (staff matters) (agenda item 5.2.3)

Progress on actions from Sixteenth Congress

5.2.3.1 The Council referred to the Staff Survey that was conducted during 2012 and the outcome of which was discussed at EC-65. The Council noted the follow-up actions taken by WMO Management and the Staff Association in response to the Staff Survey and at the request of EC-65. The Council emphasized that a motivated and dedicated Secretariat is important for the Organization. The Council noted that WMO management had introduced training courses for WMO managers as well as a series of “soft skills” training courses for staff members at large, and that the Organization is improving “induction training” for newly recruited staff. The Council encouraged the Secretary-General and the Staff Association to continue to make management and staff aware of available management and supervisory tools, to strengthen the “induction training”, and to encourage staff to participate in relevant courses to maintain and improve their management skills, as appropriate.

5.2.3.2 The Council noted that the Secretary-General had established a Secretariat Working Group on Staff Survey Follow-up and received its recommendations in August 2013. These recommendations included the following: to ensure that necessary funds are made available to support staff development for staff of all levels within the Organization; and to ensure that position descriptions specify the relevant supervisory and management skills. The Council requested that the Secretary-General inform it of the follow-up to the 2012 staff survey.

5.2.4 Review of the WMO Travel Policy (agenda item 5.2.4)

The Council took note of the actions taken relating to the update of the WMO travel policy and requested the Secretary-General to submit a status update and a revised policy, as appropriate, at EC-67.

5.2.5 The Report on the appointments, promotions, nominations and transfers of staff in the Professional category and above (agenda item 5.2.5)

5.2.5.1 In accordance with Article 21 (b) of the Convention, the Council examined and approved the appointments made by the Secretary-General since its sixty-fifth session and listed in Table 1 of [Annex X to the present report](#).

5.2.5.2 In accordance with Article 9.5 of the Staff Regulations the Council noted the approval by the President of WMO, acting on behalf of the Council, of the extension of appointment of

1 staff member beyond the statutory age of retirement initiated by the Secretary-General since its sixty-fifth session and listed in Table 2 of [Annex X to the present report](#).

5.2.5.3 The Council noted the transfers, nominations and promotions made by the Secretary-General since its sixty-fifth session listed in Table 3 of [Annex X to the present report](#).

5.2.5.4 The Council noted the list of consultants hired since the EC-65).

5.2.5.5 The Council requested the Secretary-General to keep the EC members informed, at his discretion, of the departures of WMO Secretariat staff members in the professional and above category, as well as the WMO Secretariat Organigram.

6. COMMUNICATIONS AND PUBLIC AFFAIRS (agenda item 6)

6.1. The Council decided that the theme for the World Meteorological Day in 2016 would be: "Hotter, drier, wetter. Face the Future".

6.2 The Council noted with appreciation WMO's efforts to communicate clearly to decision-makers and the general public about the scientific and operational advances being made in the areas of weather forecasting, climate services, disaster risk reduction, climate variability and change, and the hydrological cycle.

6.3 The Council recognized that, to be truly effective, the Organization must align its messages and communications activities with those of the United Nations system and demonstrate how WMO and its Members contribute to sustainable development, to a diverse array of societal benefits, and to the international response to climate change. It encouraged the Secretariat to communicate to the public about the role of NMHSs in issuing warnings for extreme events and about marine issues, such as sea-level rise, storm surges and the need to strengthen marine observation networks.

6.4 The Council requested the Secretary-General to further strengthen support to WMO communications activities as directed by Congress and urged Member to enhance resources for communications activities, including extrabudgetary resources.

6.5 The Council welcomed the Secretariat's commitment to enhancing the WMO website, promoting the WMO brand, and strengthening the Information and Public Affairs Focal Point network.

6.6 The Council recognized the growing reach and impact of the press and media activities within the Information and Public Affairs programme, WMO's growing presence on social media, and its continuing work on the WMO Bulletin, other print products, exhibits, and audiovisual products.

7. GENERAL AND LEGAL MATTERS (agenda item 7)

7.1 Fifty-ninth International Meteorological Organization Prize (agenda item 7.1)

The Executive Council awarded the fifty-ninth IMO Prize to Dr Alexander Bedritskiy (Russian Federation).

7.2 Other awards (agenda item 7.2)

Norbert Gerbier-MUMM International Award

7.2.1 The Council noted that the Norbert Gerbier-MUMM International Award has been awarded for the past 27 years with the generous support of the MUMM Foundation and the Council thanked the MUMM Foundation for its support. Unfortunately, the MUMM Foundation can

no longer support the award. The Council agreed to suspend the Norbert Gerbier-MUMM International Award in order to consider other donors or reconstitute the Award.

WMO Research Award for Young Scientists

7.2.2 Based on the recommendation of its Selection Committee, the Council conferred the 2014 WMO Research Award for Young Scientists upon Mr Feng Chen for the paper entitled 'A 426-year drought history for Western Tian Shan, Central Asia, inferred from tree rings and linkages to the North Atlantic and Indo-West Pacific Oceans' by Chen et al. (*The Holocene* 23(8) 1095–1104).

Professor Dr Vilho Väisälä Awards

7.2.3 Approving the recommendations of their Selection Committee, the Council awarded the twenty-fourth Professor Dr Vilho Väisälä Award for an Outstanding Research Paper on Instruments and Methods of Observation to A. Overeem, H. Leijnse, and R. Uijlenhoet (all Netherlands) for the paper entitled 'Country-wide rainfall maps from cellular communication networks' published in *Proceedings of the National Academy of Sciences of the United States of America*, Vol. 110, No. 8, pp. 2741–2745, 2013 and decided not to award the fifth Professor Dr Vilho Väisälä Award for the Development and Implementation of Instruments and Methods of Observation to any of the proposed publications.

7.2.4 The Selection Committee recommended that the Guidelines for granting the Professor Dr Vilho Väisälä Awards be revised, in consultation with Väisälä, among other to:

- (a) Consider other channels of submission, which could increase the number of submissions for the award;
- (b) Further encourage the submissions from developing countries, clarifying the linkage of the Award for the Development and Implementation of the Instruments and Methods of Observation to the developments carried out in developing countries; and
- (c) Refine the criteria for granting the awards, to avoid possible misinterpretations of the criteria.

7.2.5 The Council noted that one paper was submitted for both the WMO Research Award for Young Scientists and the Professor Dr Vilho Väisälä Awards; the Council recommended Members to only submit a paper for one award and requested the Secretariat to facilitate coordination among the committees for the various awards.

7.3 Constitutional and Regulatory Matters (agenda item 7.3)

Terms for the Secretary-General

7.3.1 The Council considered the report and specifically the two proposals brought forward by its Working Group on WMO Strategic and Operational Planning (EC WG-SOP) regarding the terms for the Secretary-General, namely the choice between two four-year terms or three four-year terms for the number of terms of the Secretary-General.

7.3.2 In this regard, the Council endorsed the advice of the WG-SOP that a modification of the duration of the terms of a Secretary-General into two five-year terms would not be feasible.

7.3.3 The Council acknowledged the key elements put forward by the WG-SOP, including the technical scientific character of the Organization and the significant time it takes to translate research into operational services as key considerations which may influence the decision.

7.3.4 The Council recommended that the options presented to Congress regarding the regulation defining the number of terms of the Secretary-General be limited to two options, namely:

- (a) Keeping the current Regulation 198 on the number of terms of the Secretary-General unchanged, that is three four-year terms; or
- (b) Reducing the number of terms for the Secretary-General as currently provided for in Regulation 198 that is to two four-year terms.

7.3.5 The Council requested the Secretary-General to ensure a timely communication on this matter to the Members at least three months before the Seventeenth Congress as per Regulation 2 (g).

Number and distribution of seats in the Executive Council

7.3.6 The Council considered the report and specifically the proposals brought forward by its Working Group on WMO Strategic and Operational Planning (EC WG-SOP) regarding the number and distribution of seats in the Executive Council.

7.3.7 The Council noted the proposal of Regional Association II (Asia) for one additional seat for the Region in the Executive Council.

7.3.8 The Council also noted the positions of the Regional Association I (Africa), III (South America), IV (North America, Central America and the Caribbean), V (South-West Pacific) and VI (Europe) in reaction to this proposal, and recommended that Congress be provided with a comprehensive overview of the decisions taken by Congress in the past in relation to the increase in the number and distribution of seats in the Executive Council.

7.3.9 To ensure the best possible added-value and cost-effectiveness to the Organization as a whole, the Council also recommended that the matter of the number and distribution of seats per Region in the Executive Council be placed in the context of the various challenges faced by the Organization. The comprehensive overview provided to Congress should include current problems with EC and RAs representation, the steps taken to overcome these issues so far, as well as clarify the benefits and the additional costs of additional seats.

7.3.10 The Council requested the Secretary-General to ensure a timely communication on this matter to the Members at least six months before the Seventeenth Congress as per Article 28 of the WMO Convention.

Role and responsibilities of regional associations and any corresponding amendment to the General Regulations

7.3.11 The Council recalled that at its sixty-fifth session, it agreed, in general, to the proposed structure of the draft text for amendment to the General Regulations in relation to the role and responsibilities of regional associations (RAs) and requested the Secretariat to assist its Working Group on Strategic and Operational Planning (WG-SOP) in developing a broad and flexible definition of the role and responsibilities of RAs with a view to taking a decision at its sixty-sixth session on the benefit of recommending to Cg-17 amendments of the General Regulations in this respect.

7.3.12 The Council noted that after the endorsement on the need for better definition of the role and responsibilities of RAs and on a possible structure of the amendment to the general regulations by RA VI-16 (September 2013), a draft text was discussed by the 2014 Meeting of the Presidents of Regional Associations (2014-PRA) in January 2014, which suggested a few modifications to an initial text proposal drafted by the Secretariat and the addition of a revised text for Regulation 162 of the General Regulations as provided in [Annex XI to the present report](#).

7.3.13 The Council was informed that WG-SOP at its third session (February 2014) considered this above-mentioned version of the role and responsibilities of RAs and the necessary amendment to the General Regulations. Welcoming the contributions of the 2014-PRA meeting and of the Secretariat to this version, the WG-SOP recommended it to EC for consideration.

7.3.14 The Council decided to recommend amendments to Regulation 162 of the General Regulations and Annex II thereof as proposed in [Annex XI to the present report](#) and requested the Secretary-General to submit this proposal to Seventeenth Congress.

7.3.15 The Council further requested the Secretary-General to ensure a timely communication on this matter to the Members at least three months before the Seventeenth Congress as per Regulation 2 (g).

Functioning of technical commissions

7.3.16 The Council considered the report, and specifically the proposals brought forward by its Working Group on WMO Strategic and Operational Planning (EC WG-SOP), regarding possible amendments of the General Regulations with respect to the functioning of the technical commissions.

7.3.17 The Council noted that any amendment to the General Regulations should be aimed at optimizing the engagement of the Members in the light of the crucial role of the technical commissions in building capacities.

7.3.18 The Council acknowledged that further consideration of the matter was required and that it would not submit a proposal to Congress to amend the General Regulations at this point in time and would request one of its working groups, as appropriate, for further development of the proposal.

7.3.19 The Council requested the Secretary-General to write to Members to affirm their membership in each technical commission.

7.4 Designation of acting member(s) of the Executive Council (agenda item 7.4)

The Council designated as acting members of the Executive Council Mr Fetene TESHOME (Ethiopia) to replace Mr Mukabana (Kenya), Mr Daouda KONATE (Côte d'Ivoire) to replace Mr Traore (Niger), Mr Noritake NISHIDE (Japan) to replace Mr Hatori (Japan), Mr KO Yunhwa (Republic of Korea) to replace Mr Lee (Republic of Korea), Mr Miguel Angel LOPEZ GONZALEZ (Spain) to replace Mr Cano (Spain) and Mr Jean-Marc LACAVE (France) to replace Mr Jacq (France).

7.5 Preparations for Seventeenth Congress (agenda item 7.5)

7.5.1 The Council, recalling the decisions made and guidance offered by Sixteenth Congress concerning Seventeenth Congress, decided that Cg-17 should be held from Monday, 25 May to Friday, 12 June 2015. The Council decided that this duration is adequate to give due consideration of the items in the agenda. The efficiency gains made in the current financial period, in particular through the use of electronic documentation and electronic voting for elections will apply to the session of Congress. The session of FINAC will therefore be held from Saturday 23 May to Sunday 24 May 2015.

7.5.2 The Council approved the provisional agenda for Seventeenth Congress as shown in [Annex XII to the present report](#), and entrusted the President and Secretary-General with finalizing the items under "Future challenges and opportunities" in consultation with the Bureau.

7.5.3 The Council agreed that invitations should be extended to the international organizations listed in [Annex XIII to the present report](#).

7.5.4 The Council agreed that, in addition to the IMO lecture which will be delivered by the winner of the 59th IMO Prize, the scientific discussions during Seventeenth Congress could cover the following subjects:

- (a) Future direction of weather science;

- (b) Socio-economic impacts of weather and climate services;
- (c) Post-2015 UN Sustainable Development Agenda.

The Secretary-General was authorized to make arrangements for scientific lectures to be presented by outstanding experts on these subjects.

7.5.5 The Council agreed, after drawing lots, that delegations to Seventeenth Congress should be seated in alphabetical order of their countries as spelt in French, starting from the front of the hall and beginning with H.

7.5.6 The Council discussed the organization of a high-level segment on the first day of Congress and recommended to invite key Ministers from the regions, such as the Chairperson of AMCOMET, to address the Congress.

7.5.7 The Council discussed proposals for a major conference, which could be held during the seventeenth financial period.

7.6 Review of panels and other bodies of the Executive Council (agenda item 7.6)

7.6.1 Following changes in the membership of the Executive Council, the Council decided on the following replacements and changes in the composition of its working groups, panels and committees:

WG on WMO Strategic and Operational Planning

Mr Teshome to replace Mr Mukabana

Mr Nishide to replace Mr Hatori

Mr Lopez to replace Mr Cano

Mr Lacave to replace Mr Jacq

WG on Service Delivery

Mr Konate to replace Mr Traore

Mr Ko to replace Mr Cho

Mr Lacave to replace Mr Jacq

WG on Capacity Development

Mr Sakya to replace Ms Harijono

Mr Lopez to replace Mr Cano

Panel of Experts on Polar Observations, Research and Services

Mr J. Ikävalko (Finland) to replace Mr J. Damski (Finland)

Mr S.J. Park (Republic of Korea), Mr S. Carpentier (Australia) and Mr Ch. Fierz (International Association of Cryospheric Sciences) to join the Panel.

Process for the Appointment of Audit Committee members

7.6.2 The Council recalled that through its Resolution 8 (EC-LXIII) it approved the current terms of reference for the Audit Committee (AC). Among the changes introduced was the requirement that the Executive Council appoints members of the AC through a transparent process that involves a vacancy announcement for AC seats to call for applications from qualified individuals for consideration. The Council further recalled that the first appointment of members of the AC according to the new requirement had been implemented in the intersessional period through the ad-hoc arrangement, resulted in the appointment of seven members of the AC in

March 2012 for a period of three years. Three members of the AC have been since replaced and the terms of four AC members will come to an end in March 2015 before EC-67.

7.6.3 In order to regularize the process of selection and appointment of members of the Audit Committee in conformity with Resolution 8 (EC-LXIII) the Council agreed on the steps and timelines as given in [Annex XIV to the present report](#). The Council established a Selection Committee for the WMO Audit Committee to review the list of applicants that will be provided by the Secretariat and to make a recommendation to the Council, as required.

7.6.4 Furthermore, in order to synchronize regular appointment of AC members with EC sessions, the Council agreed to exceptionally extend the terms of four AC members: Mr M.L. Bah, Mr J. Hirst, Ms L. Makuleni, and Mr M. Ryan by three months to 30 June 2015 to enable them participate in the regular meeting of the AC in the period March–May 2015.

7.7 WMO Technical Regulations – culture of compliance (agenda item 7.7)

Guidelines on the Preparation and Promulgation of the WMO Technical Regulations

7.7.1 The Council noted with appreciation the publication of the Guidelines on the Preparation and Promulgation of the WMO Technical Regulations (WMO-No.1127). It was considered that these Guidelines would provide the basis for enhancing the overall quality of the technical regulations in terms of consistency and homogeneity of the regulatory documents, compatibility for implementation of the provisions, style and layout. The Council urged all bodies engaged in the preparation and maintenance of technical regulations to make use of the Guidelines in preparing and maintaining regulatory material.

7.7.2 The Council noted further that the Guidelines also provided a new logical framework of the regulation-making process, encompassing: (1) identification of requirement; (2) preparation of a technical proposal; (3) consultation with relevant communities and stakeholders; (4) adoption; and (5) promulgation and implementation. Owing to the complexity of the interaction and responsibilities of different stakeholders in the regulation-making process, it was considered that the logical framework would mainstream the processes thus ensuring consistent output.

7.7.3 The Council considered that the new Guidelines provide the necessary guidance for a thorough review of all existing technical regulations in order to enhance the regulatory framework of WMO and bridge the long-standing regulations with those being developed with regard to new systems and programmes. Acknowledging the primary role of the technical commissions in the preparation of the technical regulations, the Council reiterated its request by Resolution 26 (EC-64) to technical commissions to pursue the revision of the parts of the regulations for which they are responsible, for consideration by Cg-17 and subsequent publication of the next edition of WMO-No. 49 in 2016.

Measures to enhance compliance by Members with the technical regulations

7.7.4 The Council recalled that at its sixty-fifth session the notion of enhanced culture of compliance with the international regulatory framework created by WMO was raised. The new Guidelines (part 5) provide a set of concrete measures and recommended actions that would help in fulfilling this task. Those measures include:

- (a) Systematic notification of compliance by Members. Compliance status could also be derived through routine systems and networks performance monitoring (e.g. existing WWW/GOS, WIS, QMS);
- (b) Establishment of a central compliance database (e.g. as part of the CPDB);
- (c) Establishment of a mechanism for identification and resolution of critical deviations (deficiencies);

- (d) Streamlining the WMO technical assistance to address and eliminate the deficiencies identified.

7.7.5 Noting that these measures were in full compliance with relevant provisions of the Convention and General Regulations as well as with the WMO Strategic Plan and accompanying programmatic strategies, the Council requested the Secretary-General to establish appropriate mechanisms that would allow the Secretariat to monitor the compliance with the technical regulations in a systematic and coordinated manner throughout all technical programmes.

7.7.6 Furthermore, Members should be guided to develop their systematic compliance evaluation procedures and should be urged to report on compliance with a view to identify the root causes for non-compliance. Noting the clarification of roles and responsibilities of the regional associations considered under agenda item 7.3, the Council considered that the regional associations should have a major role in the monitoring of compliance and identification of critical deviations (deficiencies) in their Regions.

8. EMERGING ISSUES (agenda item 8)

8.1 Global Air Navigation Plan (agenda item 8.1)

ICAO Global Air Navigation Plan

8.1.1 The Council was aware of the development by ICAO of a new (fourth) edition of the Global Air Navigation Plan (GANP) approved by the ICAO Council and endorsed by the thirty-eighth Session of the ICAO Assembly (2013) with the objective to increase capacity and improve efficiency of the global civil aviation system whilst improving or at least maintaining safety. The GANP addresses also the other ICAO Strategic Objectives including the reduction of aviation's environmental impact.

8.1.2 The GANP has been developed as a response to the core challenges for aviation transport and air navigation system. Global air traffic has doubled in size once every 15 years since 1977 and will continue to do so. This growth occurs despite broader recessionary cycles and helps illustrate how aviation investment can be a key factor supporting economic recovery. Air transport today plays a major role in driving sustainable economic and social development. It directly and indirectly supports the employment of 56.6 million people, contributes over \$2.2 trillion to global Gross Domestic Product (GDP), and carries over 2.9 billion passengers and \$5.3 trillion worth of cargo annually.

8.1.3 Acknowledging that air transport's speed and efficiency significantly facilitate economic progress, it is also recognized that unmanaged air traffic growth can lead to increased safety risks in those circumstances when it outpaces the regulatory and infrastructure developments needed to support it. To ensure that continuous safety improvement and air navigation modernization continue to advance hand-in-hand, ICAO has developed a strategic approach linking progress in both areas. This will allow Members and stakeholders to realize the safe, sustained growth, increased efficiency and responsible environmental stewardship that societies and economies globally now require.

8.1.4 The Council noted further that the GANP represents a rolling fifteen-year strategy to guide complementary and sector-wide air transport improvements over the period 2013 to 2028. The GANP leverages existing technologies and anticipates future developments based on Member- and industry-agreed operational objectives, offering a long-term vision that will assist ICAO, Members and industry to ensure continuity and harmonization among their modernization programmes. The GANP is complemented by a companion ICAO Global Aviation Safety Plan (GASP) which sets out a continuous improvement strategy for core and then more advanced aviation safety systems. As with the GANP, the GASP was approved by the ICAO Council and endorsed by the 38th Session of the ICAO Assembly (2013).

Aviation System Block Upgrades (ASBU) methodology

8.1.5 The GANP explores the need for more integrated aviation planning at both the regional and national level, and addresses required solutions by introducing a consensus-driven Aviation System Block Upgrades (ASBU) methodology. In essence, the ASBUs (or “block upgrades” as they are commonly referred) provide a systems engineering modernization strategy for international air navigation, comprising a series of modules across four performance improvement areas and four time blocks.

8.1.6 The ASBU methodology will allow all Members to advance their air navigation capacities based on their specific operational requirements. The Block Upgrades will enable civil aviation to realize the global harmonization, increased capacity, and improved environmental efficiency that modern air traffic growth now demands in every region around the world.

8.1.7 The Council noted further that ongoing air navigation/air transportation improvement programmes being undertaken by a number of regions and Members (SESAR in Europe; NextGen in the United States of America; CARATS in Japan; SIRIUS in Brazil; and others in Canada, China, India and the Russian Federation) are consistent with the ASBU methodology. These Members are now mapping their planning to respective Block Upgrade Modules in order to ensure the near- and longer-term global interoperability of their air navigation solutions.

The meteorological component of the ASBU methodology

8.1.8 The Council noted that the aeronautical meteorology (AMET) is a thread running through the performance improvement area titled “globally interoperable systems and data”. Through System-Wide Information Management (SWIM), meteorological information will be a key enabler to the realization of the global Air Traffic Management (ATM) operational concept. In view of this stated importance of the aeronautical meteorological information, the Council emphasized the need of ensuring sustainable funding of the basic infrastructure necessary for its provision to aviation. The Council noted further that Block 0 (current capabilities), the MET Module describes meteorological information supporting enhanced operational efficiency and safety; in Block 1 (by 2018) the MET Module adds new capabilities to support enhanced operational decisions through integrated meteorological information (planning and near-term service); and in Block 3 (by 2028), the MET Module adds further capabilities to enhance ATM decision-making in the face of hazardous meteorological conditions in the context of decisions that should have an immediate effect (near-term and immediate service).

8.1.9 The Council noted further that the expected performance improvements will be based on substantial scientific and technological advancement in monitoring and predicting meteorological conditions, including those that pose a hazard to flight safety. These developments, which will be a focus of the WMO/ICAO Conjoint MET Divisional Meeting (Montréal, July 2014), are described in roadmaps and concepts of operations developed in close collaboration between Members, international organizations and stakeholders. They address crucial user requirements for increased horizontal and spatial resolution of meteorological data and products, improved forecasts of hazards by utilizing better algorithms and better observation systems and infrastructures, as well as the overarching requirement for global data sharing and digital data management, presented in the SWIM concept.

Expected impacts on Members and future actions by WMO bodies

8.1.10 Along with technological developments, the GANP envisages processes to ensure that all required supporting procedures, regulatory framework and capacity development are set in place. The increasing importance of regional and subregional approaches, and stronger collaboration with partners and stakeholders as aviation recognizes and addresses its multidisciplinary challenges ahead, are also stressed.

8.1.11 The Council appreciated the efforts undertaken by the CAeM and its Expert Teams to ensure participation in the development of concepts and roadmaps reflecting the MET contribution to the objectives of the GANP and ASBU in cooperation with relevant ICAO expert groups and

other stakeholders. The Council strongly encouraged CAeM to continue its engagement in the process and make sure that the views and needs of Members are adequately presented and accounted for in the planning of the MET components of ASBU implementation.

8.1.12 Recognizing the detailed nature of the GANP and the ASBU methodology, the regional, subregional and national diversity of approached and capacity development needs, the multidisciplinary nature of the coming changes to air traffic management and related meteorological services, the Council encouraged the CAeM to conduct a range of activities to increase the awareness of Members of the forthcoming changes in the aeronautical meteorological service provision. This should include assessment of changing institutional arrangements and potential impacts on NMHSs and other national aeronautical meteorological service providers. In particular, attention should be paid to the planned push towards regional or multinational service delivery models for services such as SIGMET, with the aim to develop adequate regulatory and cost-recovery mechanisms.

8.1.13 Recognizing further the lead role of WMO in the development of underpinning science and technology that would enable the enhanced aeronautical meteorological service expressed by the ICAO GANP, the Council urged CAeM to establish close cooperation with CAS, CBS and other relevant bodies to address cross-cutting issues and effective contribution by WMO in the global air navigation system development.

8.1.14 The Council was aware of the concerns by some Members regarding the need for better understanding of the far-reaching changes in the regulatory framework, business models and technology of air traffic management at global, regional and national level. In particular, the discussions in Europe on the new Single European Sky regulations (the so-called SES 2+) presented some new challenges and potential risks to the NMHSs with regard to the sustainability of the current business models for provision of meteorological service to the aviation sector with potential impacts on NMHSs ability to maintain and assure the continued exchange of quality meteorological data necessary to support the provision of aeronautical meteorological services. In this regard, the recent sixteenth RA VI session (September 2013) called for a European Conference on Aviation Meteorology to explore coordinated regional approaches for aviation meteorological service provision in response to the evolving ATM system and information- or data-centric requirements, based on the outcomes of the referred WMO/ICAO Conjoint MET Divisional Meeting. The Council recommended that, based on the experience in RA VI, similar regional or global awareness and coordination events should be organized to facilitate Members' development of adequate national and regional strategies and implementation plans.

8.1.15 Noting the overwhelming new requirements which will apply in different extents to all Members, including LDCs and SIDS, the Council urged a coordinated action by the regional associations and their Members, in consultation with ICAO and the aviation users, to develop regional and national action plans and roadmaps on the implementation of the foreseen changes in the meteorological service provision aligned with the GANP and ASBU. Such action plans and roadmaps should provide guidance both on technology, but also on the changing institutional arrangements, and related human resource considerations.

8.1.16 Considering the importance of the decisions and recommendation of the forthcoming ICAO/WMO Conjoint Meeting (2014), the Council agreed on a common position on a number of critical issues included in the programme of the Conjoint Meeting and the fifteenth session of CAeM, as presented in the [Annex XV to the present report](#). The Council urged all Members to use this material as guidance to help inform on their positions at the Conjoint Meeting. The Council requested the president of CAeM to ensure that the position expressed in Annex XV is duly reflected in the deliberations of the CAeM-15 and in preparing the future work programme of the Commission.

8.2 WMO and climate engineering (agenda item 8.2)

8.2.1 The Council noted the growing interest in climate engineering, also referred to as geoengineering, and its proposed application as a potential strategy for limiting climate change.

The Council acknowledged that climate engineering covers a wide spectrum of technologies, each with a different level of complexity, uncertainty and associated risk. The Council noted the interest of some Members in developing a science-based assessment on climate engineering, specify the gaps in scientific understanding and promote specific research activities to fill such gaps.

8.2.2 The Council noted that the Commission for Atmospheric Sciences at its sixteenth session (CAS-16) held in Antalya, Turkey in November 2013 stated that further research is needed to adequately understand the potential feasibility, the effectiveness and risks associated with various climate engineering techniques. The Council further noted that CAS agreed to contribute to a comprehensive assessment of the state of knowledge, science capacity and understanding of information gaps and to identify appropriate research to address these gaps.

8.2.3 The Council noted that several scientific bodies and academic institutions have developed statements and other documents on climate engineering/geoengineering – including the American Meteorological Society (AMS) and the University of Oxford, UK, and that a growing number of scientific papers on climate engineering have appeared in the peer-reviewed literature.

8.2.4 The Council requested the Commission for Atmospheric Sciences (CAS) to keep the Council and Congress updated on any significant developments in climate engineering of relevance to WMO, in order to enable decisions on the appropriate level and the nature of involvement of WMO in climate engineering.

9. SCIENTIFIC LECTURES AND DISCUSSIONS (agenda item 9)

9.1 At its sixty-fifth session, the Council conferred the 58th IMO Prize on Dr Tillmann Mohr (Germany). Dr Mohr was invited to present a lecture at EC-66.

9.2 The Council thanked Dr Mohr for his lecture entitled “The Global Meteorological Satellite System – one of WMO’s outstanding success stories”, and requested the Secretary-General to arrange for the appropriate publication of the lecture.

10. REVIEW OF PREVIOUS RESOLUTIONS OF THE EXECUTIVE COUNCIL (agenda item 10)

The Executive Council reviewed those of its previous resolutions which were still in force at the time of the sixty-sixth session and adopted [Resolution 25 \(EC-66\) – Review of previous resolutions of the Executive Council](#).

11. DATE AND PLACE OF THE SIXTY-SEVENTH AND SIXTY-EIGHTH SESSIONS OF THE EXECUTIVE COUNCIL (agenda item 11)

11.1 The Council agreed that the sixty-seventh session would be held at the WMO headquarters from 15 to 17 June 2015, immediately following the Seventeenth Congress in 2015.

11.2 The Council further tentatively scheduled the sixty-eighth session to be held at the WMO headquarters from Wednesday 25 May to Friday 3 June 2016.

12. CLOSURE OF THE SESSION (agenda item 12)

The sixty-sixth session of the Executive Council closed at 16:45 on 27 June 2014.

RESOLUTIONS ADOPTED BY THE SESSION

Resolution 1 (EC-66)

MESSAGE TO THE INTERNATIONAL CIVIL SERVICE COMMISSION AND THE GENERAL ASSEMBLY OF THE UNITED NATIONS

THE EXECUTIVE COUNCIL,

Noting that staff compensation in the United Nations common system organizations, including the World Meteorological Organization, are established by the General Assembly of the United Nations through the adoption of recommendations by the International Civil Service Commission (ICSC), and that staff compensation costs represent a significant portion of the budget for these organizations, including the World Meteorological Organization,

Noting further that the governing bodies of several United Nations common system organizations, including the Food and Agriculture Organization of the United Nations, the International Maritime Organization, the World Intellectual Property Organization, the Universal Postal Union, the World Health Organization and the International Civil Aviation Organization, have recently adopted resolution language instructing their organization heads to reach out to the General Assembly and ICSC to seek immediate relief from rising staff compensation costs,

Conscious of the skilful financial management of the Secretary-General given the particularly difficult economic climate and the ongoing efforts to identify all available cost-savings,

Requests the Secretary-General to convey to the General Assembly of the United Nations and the International Civil Service Commission the serious concerns of the Members of the World Meteorological Organization about the impact of rising staff compensation costs on the financial sustainability of the Organization. The Secretary-General should request that ICSC provide recommendations, as requested by the General Assembly at its last session, to bring staff remuneration to the level mandated by the General Assembly as expeditiously as possible in order to provide immediate relief to United Nations common system organizations experiencing unsustainable budget pressure caused by growing staff compensation costs and as a first step to ensure the long-term sustainability of the United Nations common system as a whole.

Resolution 2 (EC-66)

REGULAR MEETINGS OF PRESIDENTS OF REGIONAL ASSOCIATIONS

THE EXECUTIVE COUNCIL,

Noting Resolution 1 (EC-LX) – Regular Meetings of Presidents of Regional Associations,

Noting further:

- (1) That there is a need for a stronger coordination of the work of the regional associations and a closer interregional cooperation,

- (2) That the short meetings of presidents of the regional associations which were organized on an informal basis in conjunction with World Meteorological Congress and Executive Council sessions proved to be useful,
- (3) That informal meetings of presidents of regional associations were organized in the past two years in conjunction with other meetings where the participation of several of the regional presidents offered a valuable opportunity for consultation,

Considering:

- (1) That the presidents of regional associations, as ex-officio Executive Council members, shall present the view of their respective associations to the Executive Council at its sessions and to Congress at its regular sessions, and should be briefed and deliberate on critical issues as appropriate between sessions, consistent with provisions of the Convention of the World Meteorological Organization,
- (2) The need for more frequent and substantive interactions of the presidents of regional associations to contribute to integrated planning and implementation,

Decides:

- (1) That formal Meetings of Presidents of Regional Associations should be organized:
 - (a) To provide advice to Congress, the Executive Council and other WMO constituent bodies, particularly on common regional issues of concern and as necessary;
 - (b) To exchange information on the activities of the individual associations and share best practices;
 - (c) To coordinate, as necessary, the implementation of development and regional activities of the associations, in order to eliminate unnecessary overlap of actions, to arrange for mutual assistance and to rationalize the use of resources;
 - (d) To assess the usefulness and benefits to the Organization of all types of regional events and provide advice to the Secretary-General on the role and operation of WMO Offices in the Regions;
 - (e) To perform any other functions that might be referred to these meetings by Congress, the Executive Council and other WMO constituent bodies, as appropriate;
- (2) That these meetings should be chaired in rotation by the presidents of regional associations;
- (3) That these meetings should be held on at least an annual basis before sessions of Congress and the Executive Council, as well as in conjunction with the meetings of the WMO Bureau when feasible and appropriate;

Requests the Secretary-General to provide the necessary Secretariat support for these meetings, under pre-allocated resources availability.

Note: This resolution replaces Resolution 1 (EC-LX), which is no longer in force.

Resolution 3 (EC-66)**COORDINATION BETWEEN REGIONAL ASSOCIATIONS AND
TECHNICAL COMMISSIONS**

THE EXECUTIVE COUNCIL,

Noting Resolution 2 (EC-LX) – Coordination between regional associations and technical commissions,

Noting further:

- (1) That there is a need to enhance a closer cooperation and a stronger coordination mechanism between regional associations and technical commissions for a more responsive and proactive implementation of WMO Programmes, in particular at the regional level,
- (2) That the short joint Meetings of Presidents of Regional Associations and Presidents of Technical Commissions, which were organized on an informal basis in conjunction with World Meteorological Congress and Executive Council sessions and chaired by the President of WMO, proved to be useful in improving overall coordination between regional associations and technical commissions particularly in relation to cross-cutting programmes and activities such as strategic planning and volunteerism,
- (3) That informal one-day Meetings of Presidents of Regional Associations and Presidents of Technical Commissions that were organized in recent years in conjunction with other meetings involving the presidents offered a cost-effective and valuable opportunity for consultation on critical issues between sessions of the Executive Council and Congress,
- (4) The need for more frequent and substantive interactions of regional association and technical commission presidents to contribute to integrated planning and implementation,

Recognizing that the Secretariat should play a key role in this collaboration between regional associations and technical commissions as a link for the consistent implementation of relevant coordination mechanisms,

Decides:

- (1) That regular joint Meetings of Presidents of Regional Associations and Presidents of Technical Commissions should be organized:
 - (a) To establish various coordination mechanisms for strengthening the linkages and collaboration between regional associations and technical commissions in order to improve the implementation of WMO Programmes in the framework of the results-based management of the Organization;
 - (b) To exchange information and experience on best coordination practices between regional associations and technical commissions;
 - (c) To address issues of common concern in order to ensure continuity and success in the implementation of WMO Programmes at the global and regional levels, particularly in relation to specific areas and emerging issues (strategic planning, climate change adaptation, disaster risk reduction, resource mobilization) and provide advice to Congress, the Executive Council and other WMO constituent bodies, as appropriate;
 - (d) To perform any other functions that might be referred to these meetings by Congress, the Executive Council and other WMO constituent bodies;

- (2) That these meetings should be chaired by the President of WMO;
- (3) That these meetings should be held at least on an annual basis during or before sessions of Congress and the Executive Council, as well as in conjunction with meetings involving presidents of regional associations and presidents of technical commissions, if and when appropriate;

Requests the Secretary-General to provide the necessary Secretariat support for these meetings, under pre-allocated resources availability.

Note: This resolution replaces Resolution 2 (EC-LX), which is no longer in force.

Resolution 4 (EC-66)

OUTCOMES OF THE FIRST SESSION OF THE INTERGOVERNMENTAL BOARD ON CLIMATE SERVICES

THE EXECUTIVE COUNCIL,

Noting:

- (1) The decision of the World Climate Conference-3 to establish a Global Framework for Climate Services (GFCS),
- (2) The report of the Intergovernmental Meeting for the High-level Taskforce on the Global Framework for Climate Services, Geneva, 11–12 January 2010 (WMO-No. 1052),
- (3) The report of the High-level Taskforce on the Global Framework for Climate Services, *Climate Knowledge for Action: A Global Framework for Climate Services – Empowering the Most Vulnerable* (WMO-No. 1065), presented to the Sixteenth World Meteorological Congress,
- (4) Resolution 47 (Cg-XVI) – Response to the report of the High-level Taskforce on the Global Framework for Climate Services,
- (5) Resolution 48 (Cg-XVI) – Implementation of the Global Framework for Climate Services,
- (6) Resolution 1 (Cg-Ext.(2012) – Implementation Plan of the Global Framework for Climate Services,
- (7) Resolution 2 (Cg-Ext.(2012) – Establishment of the Intergovernmental Board on Climate Services,
- (8) Resolution 2 (IBCS-1) – Implementation Plan of the Global Framework for Climate Services,
- (9) Resolution 8 (IBCS-1) – Resource mobilization,

Considering:

- (1) The preparations for the second session of the Intergovernmental Board on Climate Services to be held from 10 to 14 November 2014,

- (2) That implementation of the Global Framework for Climate Services is under way and that additional resources are required to ensure effective implementation of the activities contained in the Implementation Plan and Compendium of initial GFCS projects and activities,
- (3) That involvement of Members and partner agencies is critical for the success of the Framework,
- (4) That the related efforts of the Intergovernmental Board and other relevant parts of WMO can be strengthened through better working relationships to further gain synergies in their respective plans,

Urges Members:

- (1) To provide resources to the GFCS Trust Fund to support the preparation of the second session of the Intergovernmental Board and the implementation of GFCS activities;
- (2) To support the GFCS Office through secondment of experts to that Office in order to enable effective support to the implementation of the Framework;
- (3) To report to the GFCS Office on activities that are contributing to advance the Framework when requested;

Requests the Secretary-General:

- (1) To continue efforts in supporting the Global Framework for Climate Services, while also exploring and advancing working relationships between the Intergovernmental Board on Climate Services and relevant constituent bodies of WMO;
- (2) To encourage Members to provide resources for GFCS activities and its governance;
- (3) To encourage GFCS partners of the Partner Advisory Committee to provide resources for GFCS activities;

Invites the Secretary-General to bring the present resolution to the attention of Members and all relevant organizations concerned.

Resolution 5 (EC-66)

IMPLEMENTATION OF THE WMO STRATEGY FOR SERVICE DELIVERY

THE EXECUTIVE COUNCIL,

Noting:

- (1) *The WMO Strategy for Service Delivery and its Implementation Plan* (WMO-No. 1129),
- (2) The recommendations of the Meeting of the Executive Council Working Group on Service Delivery (Geneva, March 2014) on the actions needed to expedite the implementation of the WMO Strategy for Service Delivery,
- (3) Resolution 4 (EC-65) – Implementation Plan of the WMO Strategy for Service Delivery,

Considering:

- (1) That service delivery should be integrated in a harmonized and holistic approach, based on the attributes and principles of effective service delivery as contained in the WMO Strategy for Service Delivery and its Implementation Plan,
- (2) That the implementation of the Strategy should engage all WMO Programmes with a service delivery role through a harmonized approach and participation of all relevant stakeholders,
- (3) That the benefits of the implementation of the Strategy should be demonstrated through appropriate demonstration projects,
- (4) The need to develop appropriate guidance and regulatory material related to the implementation of the Strategy to assist Members in fulfilling their national service delivery mandates,
- (5) That existing service delivery best practices, for example, the well-established service delivery practices in serving international air navigation and maritime safety, should penetrate into other service delivery areas, including those practices related to quality management and competency requirements for personnel engaged in service delivery,
- (6) That the quality and value of service delivery is highly dependent on the rapid uptake of the scientific and technological achievements,
- (7) The growing participation of private sector service providers that makes service delivery a highly competitive field,
- (8) That service delivery requirements of different economic sectors, in particular the transport sector, including air, marine and land transport subsectors and their intermodal dependency, have the potential to become emerging areas that could benefit from an innovative holistic service delivery approach,

Requests:

- (1) Relevant technical commissions, with the support of the Secretariat, to take action to raise the level of the existing and future guidance material on service delivery to form part of the overall WMO regulatory framework;
- (2) Regional associations to study the needs of their Members for enhancing their service delivery capacity and develop regional action plans based on the Implementation Plan of the Strategy;
- (3) Regional associations, in collaboration with relevant technical commissions, to identify potential demonstration projects on service delivery in their Regions, especially on issues related to social and economic benefits, impact-based information, public/private partnerships, Common Alerting Protocol and social media, and to work with the Secretariat for proper formulation and resourcing of such projects;
- (4) Relevant technical commissions, with the support of the Secretariat, to promote the expansion of best practices in quality management and competency standards to other areas of service delivery as requisite requirements to service providers;
- (5) Relevant technical commissions to put in place mechanisms to ensure the flow of science and technology into operations and service delivery;
- (6) The relevant technical commissions and the appropriate service delivery oriented working groups, for example, the Executive Council Working Group on Service Delivery, to investigate the potential benefits from an innovative and holistic service delivery approach that will meet the current and emerging needs of the transport sector and report to the Executive Council for further consideration;

- (7) The Secretary-General to support the implementation of the WMO Strategy for Service Delivery and its Implementation Plan in WMO Programmes, in particular the Public Weather Services Programme and Disaster Risk Reduction Programme, and to facilitate the collection of examples to be disseminated as best practices to Members.
-

Resolution 6 (EC-66)

**AMENDMENT TO THE *TECHNICAL REGULATIONS* (WMO-No. 49),
VOLUME II – METEOROLOGICAL SERVICE FOR INTERNATIONAL
AIR NAVIGATION, AND RELATED GUIDANCE MATERIAL**

THE EXECUTIVE COUNCIL,

Noting that the International Civil Aviation Organization (ICAO) approved on 27 February 2013 Amendment 76 to Annex 3 to the Convention on International Civil Aviation, *Meteorological Service for International Air Navigation*,

Considering that ICAO Annex 3 and the WMO *Technical Regulations* (WMO-No. 49), Volume II, Parts I and II, shall be aligned,

Considering further the need to align the related publication *Guide to the Quality Management System for the Provision of Meteorological Service for International Air Navigation* (WMO-No. 1001) with Amendment 76,

Approves the amendment to the WMO *Technical Regulations*, Volume II, which ensures the necessary alignment with Amendment 76 to ICAO Annex 3;

Further approves the alignment of the *Guide to the Quality Management System for the Provision of Meteorological Service for International Air Navigation* with Amendment 76;

Requests the Secretary-General to arrange for the publication of the amended *Technical Regulations*, Volume II and the *Guide to the Quality Management System for the Provision of Meteorological Service for International Air Navigation*.

Resolution 7 (EC-66)

**REPORT OF THE SIXTEENTH SESSION OF THE COMMISSION FOR
AGRICULTURAL METEOROLOGY**

THE EXECUTIVE COUNCIL,

Having considered the *Abridged Final Report with Resolutions and Recommendations of the Sixteenth Session of the Commission for Agricultural Meteorology* (WMO-No. 1134),

Decides:

- (1) To note the report;
- (2) To endorse Resolutions 1 to 4 (CAgM-16);

- (3) To encourage action on the recommendations of the Commission for Agricultural Meteorology from its sixteenth session, as follows:

Recommendation 1 (CAgM-16) – Drought and desertification

- (a) Approves the recommendation;
- (b) Requests the Secretary-General:
- (i) To cooperate, as appropriate, within available budgetary resources, with other relevant international and regional organizations in the implementation of the United Nations Convention to Combat Desertification (UNCCD) with regards to drought and desertification;
 - (ii) To continue collaboration with UNCCD in the implementation of the Drought Management Centre for South-eastern Europe and to explore the establishment of similar centres in other regions;
 - (iii) To continue collaboration with UNCCD, the Food and Agriculture Organization of the United Nations, the UN-Water Decade Programme on Capacity Development, and the United Nations Convention on Biological Diversity in supporting regional workshops for national drought management policies;
 - (iv) To continue collaboration with UNCCD on the implementation of the Integrated Drought Management Programme;

Recommendation 2 (CAgM-16) – National progress reports in agricultural meteorology

Approves the recommendation;

Recommendation 3 (CAgM-16) – Training and education in agricultural meteorology

- (a) Approves the recommendation;
- (b) Requests the Secretary-General:
- (i) To closely liaise with Regional Training Centres and specialized centres on the provision and content of education and training courses and tools in agricultural meteorology in order to strengthen and expand training programmes in that discipline. This is to ensure adequate response to identified training requirements for agricultural meteorologists and understanding of the potential role of the Global Centres of Excellence in Agricultural Meteorology (GCREAMs);
 - (ii) To facilitate, as appropriate and within available resources, the revitalization of inactive institutions in order to increase their capacities and to strengthen strategic institutions which may serve as additional centres to the GCREAMs, such as the Southern African Development Community Climate Services Centre;

Recommendation 4 (CAgM-16) – Review of resolutions of the Executive Council based on previous recommendations of the Commission for Agricultural Meteorology

Approves the recommendation;

Requests the Secretary-General to bring the above decisions to the attention of all concerned.

Resolution 8 (EC-66)**WMO DISASTER RISK REDUCTION ROADMAP**

THE EXECUTIVE COUNCIL,

Recalling Resolution 27 (Cg-XV) – WMO Strategic Plan, in which disaster risk reduction (DRR) is a strategic priority area,

Noting:

- (1) The significant importance of disaster risk reduction to WMO Members,
- (2) WMO DRR activities are fundamentally based upon, and are in support of, the core work of National Meteorological and Hydrological Services,

Noting further:

- (1) The Hyogo Framework for Action 2005–2015: Building the Resilience of Nations and Communities to Disasters,
- (2) The third World Conference on Disaster Risk Reduction, planned to be held in Sendai, Japan, from 14 to 18 March 2015, which would consider for adoption the Post-2015 Framework for Disaster Risk Reduction,

Considering that focused effort should be made by WMO Members to provide expertise in support of authoritative risk-informed decision-making:

- (1) To further develop and implement Multi-hazard Early Warning Systems that support readiness, response and resilience of nations and communities,
- (2) To advance understanding of high-impact meteorological, hydrological and environmental events, and rapid transfer of scientific and technological knowledge to DRR decision-making,
- (3) To support effective communication of warning information to stakeholders,

Emphasizing that the WMO Disaster Risk Reduction Programme should facilitate efforts that promote delivery of authoritative forecast and warning information to decision-support mechanisms at the local, national, regional and global levels, through:

- (1) Coherent and consistent implementation of WMO DRR priorities within all relevant programmes and projects of WMO, in the light of the recommendations of the regional associations and, where appropriate, the advice of the technical commissions,
- (2) Primary consideration to enhance the capabilities of National Meteorological and Hydrological Services to conduct their core activities,
- (3) Clear identification of the role of National Meteorological and Hydrological Services to deliver authoritative, and where possible, impact-based forecasts and warnings among WMO partners, United Nations bodies, and external planning processes, such as the Post-2015 Framework for DRR,

Requests the Secretary-General:

- (1) In consultation with Members, to urgently develop a WMO Disaster Risk Reduction roadmap of prioritized and realistically achievable activities and deliverables that are consistent with the WMO Strategic and Operating Plans, as well as the workplans for relevant WMO Programmes and projects;

- (2) To present a draft WMO DRR roadmap to the Seventeenth World Meteorological Congress for consideration and to be reflected in the WMO Strategic Plan and Operating Plan for 2016–2019;
- (3) To coordinate WMO-wide participation in the preparation and drafting of the Post-2015 Framework for DRR, in line with the development of the WMO DRR roadmap;
- (4) To provide regular updates to Members on the progress of the WMO DRR Programme, including the WMO-wide engagement in the Post-2015 Framework for DRR and the planning of relevant events at the third World Conference on Disaster Risk Reduction.

Resolution 9 (EC-66)

REVIEW OF THE GLOBAL CLIMATE OBSERVING SYSTEM PROGRAMME

THE EXECUTIVE COUNCIL,

Recalling Resolutions 29 (Cg-XVI) – Global Climate Observing System, 48 (Cg-XVI) – Implementation of the Global Framework for Climate Services, 15 (EC-64) – Global Climate Observing System and 6 (EC-65) – Restructuring of the World Climate Programme: inclusion of the Programme of Research on Climate Change Vulnerability, Impacts and Adaptation as an additional component,

Noting the *GCOS Programme Review, Synthesis Report, March 2014* (GCOS-181),

Recognizing:

- (1) The core contribution of the Global Climate Observing System (GCOS) programme to the Global Framework for Climate Services with respect to the Observations and Monitoring Pillar,
- (2) The new developments, systems and frameworks, such as the Global Earth Observation System of Systems, the WMO Integrated Global Observing System, the findings of the Intergovernmental Panel on Climate Change Fifth Assessment Report and activities of special interest to GCOS sponsors, such as Future Earth, Blue Planet, and the Programme of Research on Climate Change Vulnerability, Impacts and Adaptation,
- (3) The need to implement the recommendations given in the Synthesis Report in coordination with all sponsoring organizations of the GCOS programme,

Considering the GCOS Memorandums of Understanding signed with the International Council for Science (ICSU) and the Intergovernmental Oceanographic Commission of the United Nations Educational, Scientific and Cultural Organization (IOC/UNESCO) on 26 October 1991 and with ICSU, IOC/UNESCO and the United Nations Environment Programme on 9 April 1992 and the summer of 1998,

Decides to endorse the Synthesis Report as a good basis for updating the GCOS Memorandum of Understanding and the GCOS Strategic Plan;

Requests the Secretary-General:

- (1) To collaborate with the co-sponsors to implement the recommendations as appropriate;
 - (2) To inform the Seventeenth World Meteorological Congress about the outcome of the implementation of the recommendations.
-
-

Resolution 10 (EC-66)**SCHEDULE OF CONSULTATIVE MEETINGS ON
HIGH-LEVEL POLICY ON SATELLITE MATTERS**

THE EXECUTIVE COUNCIL,

Noting:

- (1) The *Abridged Final Report with Resolutions of the Fifty-second Session of the Executive Council* (WMO-No. 915),
- (2) Resolution 6 (Cg-XIV) – WMO Consultative Meetings on High-level Policy on Satellite Matters,
- (3) Resolution 12 (EC-LXII) – Schedule of Consultative Meetings on High-Level Policy on Satellite Matters,

Recalling the agreement of the Executive Council at its fifty-second session that a mechanism for discussions between the National Meteorological and Hydrological Services and the environmental satellite community should be provided in the form of Consultative Meetings on High-level Policy on Satellite Matters,

Considering:

- (1) That, as satellites have become the most important source of data assimilated in numerical weather prediction models, WMO must assure increasing emphasis and strategic discussions on how these data could be assimilated and used by National Meteorological and Hydrological Services all over the world,
- (2) That there is very close interaction between the WMO Space Programme, the Coordination Group for Meteorological Satellites, the Committee on Earth Observation Satellites, and entities such as the Global Space-based Inter-calibration System and the Sustained, Coordinated Processing of Environmental Satellite Data for Climate Monitoring, but Agency Director/senior-level participation of satellite agencies has decreased in the annual Consultative Meetings, mainly among the non-WMO-focused operational and research environmental agencies,
- (3) The increase in the number of related satellite-focused meetings which reduces the availability of senior satellite agency officials for annual Consultative Meetings,
- (4) The improvement to the effectiveness of the meetings to be expected from increased participation by senior satellite agency officials, particularly for addressing the requirements of monitoring the Earth's climate from space,

Decides to hold the Consultative Meetings on High-level Policy on Satellite Matters at least every two years and to schedule the meetings in advance of Executive Council or World Meteorological Congress sessions, preferably in conjunction with the WMO Bureau meetings, or otherwise as appropriate to facilitate participation of WMO officers and satellite agency principals;

Further decides that greater emphasis should be placed on discussion of critical satellite matters in the agenda of all WMO constituent body sessions, including reinstating a specific agenda item for the Executive Council and Congress;

Requests the Secretary-General to implement these changes.

Note: This resolution replaces Resolution 12 (EC-LXII), which is no longer in force.

Resolution 11 (EC-66)
POST-THORPEX ACTIVITIES

THE EXECUTIVE COUNCIL,

Noting:

- (1) Resolution 12 (Cg-XIV) – THORPEX: A Global Atmospheric Research Programme,
- (2) Recommendation 1 (CAS-16) – Post-THORPEX activities,
- (3) The *Strategic Plan for the Implementation of WMO's World Weather Research Programme (WWRP): 2009–2017* (WMO/TD-No. 1505),
- (4) The conclusion of THORPEX at the end of 2014, including the closure of its trust fund,

Recognizing the establishment of the THORPEX legacy projects (Polar Prediction Project (PPP), Sub-seasonal to Seasonal Prediction Project (S2S), and High-impact Weather Project (HIWeather)),

Considering the need for activities and research on data assimilation and observing systems, and on predictability, dynamics and ensemble forecasting under the World Weather Research Programme,

Recommends:

- (1) That the Working Group on Data Assimilation and Observing Systems and the Working Group on Predictability, Dynamics and Ensemble Forecasting be established at the beginning of 2015 under the Commission for Atmospheric Sciences (CAS), funded from the regular budget;
- (2) That the activities of the current THORPEX regional committees be continued under the WWRP after the end of THORPEX, if the participating regional members decide to continue on a self-organizing and self-funding basis, in collaboration with the regional associations, the WWRP working groups and projects, including three THORPEX legacy projects (PPP, S2S and HIWeather), research and development projects and forecast demonstration projects;
- (3) That the THORPEX legacy projects work together to (i) coordinate the respective roles of the projects in areas of common interest and (ii) establish collaborations to share results, techniques, and accomplishments among the projects;
- (4) That oversight for the THORPEX legacy project trust funds be provided by the CAS Management Group;

Requests the Secretary-General to support the conclusion of THORPEX activities and closure of its trust fund at the end of 2014.

Resolution 12 (EC-66)**HIGH-IMPACT WEATHER PROJECT**

THE EXECUTIVE COUNCIL,

Noting:

- (1) The recommendation made by the Commission for Atmospheric Sciences at its sixteenth session to establish a high-impact weather project,
- (2) The development of an implementation plan for high-impact weather research by the World Weather Research Programme Task Force,

Considering the need for improved predictions of high-impact weather events and the use of such predictions in the light of their continued negative impact on socio-economic development,

Endorses the establishment of the High-impact Weather Project;

Requests the Secretary-General to establish a trust fund for the High-impact Weather Project;

Urges Members:

- (1) To make voluntary contributions to the trust fund to implement the Project;
 - (2) To provide in-kind contributions, such as hosting a meeting/workshop/conference for the Project;
 - (3) To host an international coordination office for the Project.
-

Resolution 13 (EC-66)**SAND AND DUST STORM WARNING ADVISORY AND ASSESSMENT SYSTEM**

THE EXECUTIVE COUNCIL,

Noting:

- (1) The three Sand and Dust Storm Warning Advisory and Assessment System (SDS-WAS) Regional Nodes for Asia, Pan America and for Northern Africa, Middle East and Europe,
- (2) The additional potential Regional Node in West Asia in collaboration with the United Nations Environment Programme,
- (3) The development of the SDS-WAS Science and Implementation Plan,

Considering the need for a global coordination mechanism to facilitate information exchange among these SDS-WAS Regional Nodes,

Recommends:

- (1) That the SDS-WAS Steering Committee be established, with two nominations from each Regional Node;

- (2) That once established, the Steering Committee will select a chairperson, on a rotational basis from its members, for a two-year period;
- (3) That the Steering Committee will meet regularly to review research progress and priorities, and that the Chairperson of the Committee will report the SDS-WAS-related activities to annual meetings of the World Weather Research Programme Scientific Steering Committee;
- (4) That the Steering Committee be funded by the SDS-WAS Trust Fund from contributing Members;

Requests the Secretary-General to support the establishment of the Steering Committee and the Trust Fund for the Sand and Dust Storm Warning Advisory and Assessment System.

Resolution 14 (EC-66)

GUIDANCE FOR THE EDUCATION AND TRAINING PROGRAMME FOR 2016–2019

THE EXECUTIVE COUNCIL,

Noting Resolution 31 (Cg-XVI) – Education and Training Programme,

Noting also the high-priority areas outlined in the draft Strategic Plan and Operating Plan for 2016–2019,

Noting further that the Education and Training Programme is an important component of WMO capacity development activities,

Recognizing the future expectations and challenges for Members, and particularly their National Meteorological and Hydrological Services, identified in the draft Strategic Plan,

Decides that the Education and Training Programme needs to remain dynamic and nimble, and adopt approaches that will allow Members to address the continually evolving requirements:

- (1) For continuing professional development and reskilling to ensure the competencies of personnel as job requirements change and services evolve in areas such as:
 - (a) Management;
 - (b) User liaison;
 - (c) Resource mobilization;
 - (d) Programme development and evaluation;
 - (e) Negotiation;
- (2) For personnel to undertake in-situ education and training so as to minimize time away from the workplace;
- (3) For programmes to be accredited, and personnel certified against national and international regulations and standards;

Further decides that these approaches must:

- (1) Support the further development of education and training capabilities at a national level, particularly in developing and least developed countries, small island developing States and landlocked countries;
- (2) Maximize access to education and training opportunities and resources for all Members, independent of geographic location, development status and language;
- (3) Learn from and be guided by best practices within the wider education and training community;
- (4) Be forward-looking and flexible;

Requests the Executive Council Panel of Experts on Education and Training to use this guidance in updating the Education and Training Programme description for 2016–2019;

Requests the technical commissions to support the development of skilled trainers and education and training resources to ensure the successful introduction of the new services associated with activities identified in the high-priority areas for 2016–2019.

Resolution 15 (EC-66)

EXECUTIVE COUNCIL CRITERIA FOR THE RECOGNITION AND RECONFIRMATION OF WMO REGIONAL TRAINING CENTRES

THE EXECUTIVE COUNCIL,

Noting the *Abridged Final Report with Resolutions of the Sixty-second Session of the Executive Council* (WMO-No. 1059), general summary, paragraph 6.16(c) and its annexes regarding the Executive Council criteria for the recognition and reconfirmation of WMO Regional Training Centres (RTCs),

Noting further:

- (1) That the Executive Council criteria are included the *WMO Technical Regulations* (WMO-No. 49, Volume I, Annex E,
- (2) That RTCs play a key role in assisting Members with no, or limited, national capacity to address their need for quality education and training of personnel,
- (3) That the existing network of RTCs would make a greater contribution to meeting the training needs of WMO Members if all RTCs were fully effective,
- (4) That for institutions having no national accreditation as providers of vocational training, an appropriate standard is provided in ISO 29990:2010 – *Learning services for non-formal education and training – Basic requirements for service providers*,
- (5) That there is a need to clarify the roles and responsibilities of the various partners involved in the nomination, approval, monitoring and support of RTCs to ensure optimum performance,
- (6) That the Secretary-General supports the RTCs in a variety of ways including: (i) seeking to hold WMO supported training events using RTC facilities and capabilities; (ii) supporting the development of the professional and training expertise of RTC staff; (iii) promoting education and training opportunities in RTCs to Members; (iv) facilitating collaboration amongst RTCs and between RTCs and other training partners; and (v) promoting relationships between RTCs and regional associations,

- (7) That a WMO Member can host only one RTC, but an RTC might consist of several components, with each component being required in order to satisfy all the criteria to be recognized or reconfirmed as an RTC,
- (8) That the Executive Council decides on the recognition or reconfirmation of an RTC component, in the light of the recommendation of the regional association and, where appropriate, the advice of the relevant technical commission, and the Executive Council Panel of Experts on Education and Training, and the comments of the Secretary-General,

Decides:

- (1) That, at each of their normal sessions, regional associations should make recommendations to the following Executive Council session regarding the status of the RTCs located in their Region;
- (2) To incorporate the new material held as an annex to the present resolution as replacement of the existing Executive Council criteria in the *Technical Regulations*, (WMO-No 49), Volume I, effective 1 January 2015;
- (3) That these criteria will apply to all RTC components considered for recognition or reconfirmation at sessions of regional associations held after 1 January 2016;

Requests presidents of regional associations to inform Members hosting RTCs of the new criteria and the effective dates of implementation;

Requests Members hosting RTCs to inform the institution(s) comprising the RTC in their country of the revised criteria and effective dates of implementation;

Requests the Secretary-General:

- (1) To update the Technical Regulations and authorize the Secretary-General to make editorial changes to the criteria to ensure consistency with the Technical Regulations formatting and style;
- (2) To take account of the new criteria as well as the roles and responsibilities of the various parties involved in monitoring and supporting RTCs when drafting Memorandum of Understanding with the Members hosting RTCs;

Requests the Executive Council Panel of Experts on Education and Training to prepare the draft publication Guide for the recognition, reconfirmation and management of Regional Training Centres in time to be discussed at the Seventeenth World Meteorological Congress in May 2015.

Annex to Resolution 15 (EC-66)

**EXECUTIVE COUNCIL CRITERIA FOR THE RECOGNITION AND
RECONFIRMATION OF WMO REGIONAL TRAINING CENTRES**

Section 1

Addition to Abbreviations

Regional Training Centre (RTC)

A national education and training institution, or group of institutions in that country, recognized by the relevant WMO Regional Association as:

- (1) Providing education and training opportunities for WMO Members, particularly NMHS staff;
- (1) Providing advice and assistance on education and training matters to other WMO Members; and
- (3) Promoting education and training opportunities in weather, water and climate for WMO Members.

These activities are undertaken in accordance with WMO regulations and guidelines. An institute supported by multiple countries to provide such services could also be recognised by the relevant regional association as an RTC.

Section 2 – Replacement text for WMO-No. 49 Vol. I

4.5.1 Members should endeavour to provide national facilities, or participate in regional facilities, for the education and training of their personnel.

4.5.2 As not all national training facilities are recognized as regional training facilities, the criteria given in Appendix E to WMO-No. 49 Vol. 1 apply to each institution designated as being part of a WMO Regional Training Centre (RTC). Each such institution is referred to as an RTC component.

4.5.3 In recognizing, reconfirming and managing an RTC component, the regional association, the Permanent Representative of the host country, the Director of an RTC component and Coordinator of an RTC with multiple components take on the following roles and responsibilities. The performance and ongoing status of the institution(s) as an RTC is dependent upon each of the parties carrying out their roles and addressing their responsibilities. Failure of one party to carry out its role could jeopardise any subsequent reconfirmation of RTC status.

Regional Association

- Prioritize education and training needs of the regional association, and provide them to the RTCs at least every four years.
- Keep abreast of the activities and plans of each RTC and its components via the annual report they provide.
- Provide feedback to the RTCs, Members and Secretary-General on whether the RTCs are meeting the needs of the regional association.
- Contribute to quadrennial reviews of the RTCs arranged by the Executive Council for addressing the extent to which the RTCs are meeting the identified education and training needs of the regional association.
- At each session of the regional association recommend RTCs to the WMO Executive Council for consideration for confirmation based on performance against the criteria.
- Promote the activities and use of the RTCs by members of the regional association.
- Seek funding and resource opportunities to support and expand the work of the RTCs in addressing the education and training needs of the regional association.

Permanent Representative of the host country

- Inform the Secretary-General and the regional association of the contact details of, and any changes to, the Coordinator of an RTC and the Director of an RTC component.
- Where the RTC is composed of multiple components, ensure ongoing communication and coordination between the components to maximize education and training opportunities for Members.

- Facilitate coordination between the RTC and the regional association regarding regional education and training needs, funding and resource opportunities.
- Promote the resourcing of the RTC through support from government and other national and international funding bodies.
- Provide annual reports about the RTC's activities in the previous 12 months and its plans for the next 12 months with an outlook for future years to the regional association and the Secretary-General.
- Collaborate with other Permanent Representatives hosting RTCs to promote collaboration between the RTCs.
- Oversee and act as an advocate for the RTC to (a) comply with national and WMO standards and guidelines and (b) keep pace with evolving technological and educational developments.

Director of an RTC component

- Monitor and plan the RTC component's activities in accordance with the expressed education and training needs of the regional association.
- For vocational training activities, use processes within the RTC component that are consistent with ISO 29990:2010 (*Learning services for non-formal education and training – Basic requirements for service providers*).
- Monitor and inform the appropriate authorities of the requirements to develop and maintain the professional and training expertise of RTC staff, and the availability and maintenance of adequate training and Information Communications Technology infrastructure.
- Submit annual reports about the RTC component's activities in the previous 12 months and plans for the next 12 months with an outlook for future years to the Permanent Representative.
- Promote the RTC component's services to Members through regular communication and provide Members with easy access to the RTC's education and training programme and contact information.
- Work with other RTC components to (a) coordinate activities and (b) share resources and experiences in addressing regional education and training needs.
- Seek additional funding and resource opportunities to expand the ability of the RTC component to address the regional education and training needs.

Coordinator of an RTC with multiple components

- Coordinate the overall activities of the RTC components in accordance with the expressed education and training needs of the regional association.
- Coordinate preparation of annual reports about the RTC's activities in the previous 12 months and plans for the next 12 months with an outlook for future years for submission to the Permanent Representative.
- Coordinate arrangements for (a) promoting and providing information about the RTC's services to Members through regular communication, and (b) the sharing of resources and experience between the RTC components in addressing regional education and training needs.
- Ensure the RTC components collaborate and each is apprised of the other's education and training activities.

- Support the RTC components in seeking additional funding and resource opportunities to expand the ability of the RTC to address the regional education and training needs.

Section 3 – Replacement for Appendix E to WMO-No. 49 Vol. 1, WMO Technical Regulations

A Regional Training Centre (RTC) is a national education and training institution, or group of institutions in that country, recognized by the relevant WMO Regional Association(s) as:

- (1) Providing education and training opportunities for WMO Members, particularly NMHS staff;
- (2) Supplying advice and assistance on education and training matters to WMO Members; and
- (3) Promoting education and training opportunities in weather, water and climate for WMO Members.

These activities are undertaken in accordance with WMO regulations and guidelines. An institute supported by multiple countries to provide such services could also be recognised by the relevant regional association as an RTC.

Each institution forming part of an RTC is considered to be an RTC component. To be designated as an RTC component, an institution that undertakes education and training related to weather, water and climate shall satisfy the following criteria:

- (1) An RTC component is established only to meet the expressed requirements of more than half of the Members of the regional association that cannot be met by existing resources;
- (2) An RTC component is designed to meet the requirements of the Region, as expressed in a decision of the regional association as recorded in a resolution or statement in the general summary of the Abridged Report, though it is recognized that some RTC components might also take on a broader international remit;
- (3) The RTC component is located within the particular Region concerned and its location decided by the Executive Council, in the light of the recommendation of the regional association, the advice of the technical commission concerned and the EC Panel of Experts on Education and Training, and the comments of the Secretary-General.

The following criteria shall apply to each RTC component:

Identifying learning needs

- The RTC component has processes in place to gain information about the education and training needs of the Region.

Designing the learning service

- The RTC component selects methods of learning that respond to the aims and requirements of the curriculum and learning outcomes, and are appropriate for the learners.
- The RTC component ensures that its courses of instruction and other activities (e.g. delivering/developing e-learning, running off-site activities and providing advice/support) are carried out in a way that is consistent with the standards and guidance material issued by WMO.
- The RTC component provides courses and other resources and activities that address the expressed education and training needs of the Region.

Delivering the learning service

- The RTC component demonstrates that, during the previous four years, it has made a contribution to meeting the education and training needs identified by the regional association.
- The RTC component delivers training: (a) with competent instructors in terms of their scientific/technical ability and training expertise; and (b) in an environment which is conducive to learning with adequate learning resources, buildings, ICT systems and training facilities.

Assessing learning and evaluating the learning service

- The RTC component assesses the knowledge and competency of students, documents this information in a fashion suitable for a recognized quality management system, and provides students with a record of the education and training that has been successfully completed.
- The RTC component has processes for measuring the effectiveness and quality of the learning service, including obtaining feedback from learners.

Administering and managing the learning service

- The RTC component has adequate arrangements for administration, governance, planning, staffing, continuous professional development, reporting and self-assessment.
- If the RTC component has no national accreditation as a provider of vocational training, the RTC component can demonstrate that it carries out its training activities in accordance with the requirements of ISO 29990:2010.
- The RTC component produces an annual report on activities in the previous twelve months, and its plan for the next 12 months with an outlook for future years.
- The RTC component is: (a) open to students from all countries in the Region and, subject to availability of resources, to interested countries in other Regions; and (b) has appropriate services in place to support international/regional students.

Resolution 16 (EC-66)**FEASIBILITY STUDY FOR ESTABLISHING A WMO GLOBAL CAMPUS**

THE EXECUTIVE COUNCIL,

Noting Resolution 19 (EC-LXII) – Terms of Reference of the Executive Council Panel of Experts on Education and Training, particularly **Decides** (7) and (8),

Noting further:

- (1) The report of the twenty-sixth session of the Executive Council Panel of Experts on Education and Training concerning the review of the future roles and operations of WMO Regional Training Centres (RTCs),
- (2) The growing needs for education and training opportunities by personnel of National Meteorological and Hydrological Services in the areas of meteorology, hydrology and climatology,

- (3) That whilst RTCs play a key role in assisting Members with no or limited national capacity to address their need for quality education and training of personnel, it is very unlikely that the RTCs alone can address the expected demands in terms of breadth, level and number,

Decides:

- (1) That the Executive Council Panel of Experts on Education and Training should proceed with a feasibility study on the WMO Global Campus including the items listed in the annex to the present resolution;
- (2) That a detailed proposal for the establishment of and implementation plans for a WMO Global Campus should be prepared and presented to the Seventeenth World Meteorological Congress in May 2015;
- (3) That any proposal for a WMO Global Campus must not undermine the purpose and programmes of the network of RTCs, which are operated by Members for the benefit of the wider meteorological community;

Requests the Chairperson of the Executive Council Panel of Experts on Education and Training to create a small team to act as the steering committee for the feasibility study into the WMO Global Campus; the makeup of the team should ensure a balanced representation of the WMO Education and Training community including the Executive Council Panel of Experts on Education and Training, users, RTCs and non-RTC providers;

Requests the Secretary-General to provide support for the steering committee in completing the feasibility study on the WMO Global Campus;

Further requests the Secretary-General to provide an update on the WMO Global Campus proposal to the next joint Meeting of Presidents of Regional Associations and Technical Commissions nominally planned for January 2015.

Annex to Resolution 16 (EC-66)

ITEMS TO BE INCLUDED IN A FEASIBILITY STUDY OF A WMO GLOBAL CAMPUS

The feasibility study should include the following:

- Building clarity of the concept of the Global Campus and its potential benefits to WMO Members;
- Investigating options to develop a trial Global Campus registry of resources and activities, and exploring possible modes of distribution, while considering infrastructure and IT capabilities of Members;
- Establishing basic criteria for partners and providers to list resources and activities on the registry and developing ways to actively solicit and encourage organizations to offer their resources to WMO Members;
- Testing new arrangements/processes that have the potential to provide more resources in multiple languages at modest cost;
- Investigating ways to assure the quality of resources and activities available via the Global Campus;

- Examining issues surrounding the acceptance of courses and academic credits from a dispersed set of providers by surveying representative users;
 - Engaging with at least one new global partner as a way of increasing the capacity for WMO education and training activities;
 - Seeking new resources for supporting education and training opportunities, especially in climate services and hydrology, that can be made available to WMO Members;
 - Examining and testing ideas for providing training and support to RTCs so that they could:
(a) make an increasing contribution to providing resources, particularly for e-learning, to the Global Campus; and (b) benefit from the resources available via the Global Campus;
 - Identifying and recognizing potential constraints/challenges in the implementation of the Global Campus and where possible, propose ways of overcoming them;
 - Identifying the human and financial resources required, along with possible resourcing arrangements, for implementation of the Global Campus in terms of both initiation and maintenance.
-

Resolution 17 (EC-66)

TERMS OF REFERENCE OF THE EXECUTIVE COUNCIL PANEL OF EXPERTS ON EDUCATION AND TRAINING

THE EXECUTIVE COUNCIL,

Noting:

- (1) Resolution 19 (EC-LXII) – Terms of Reference of the Executive Council Panel of Experts on Education and Training,
- (2) Resolution 31 (Cg-XVI) – Education and Training Programme,
- (3) The *Abridged Final Report with Resolutions of the Sixty-third Session of the Executive Council* (WMO-No. 1078), general summary, paragraph 3.9 (a),

Considering that education and training in meteorology, hydrology and related disciplines is a major cross-cutting activity of WMO that has a large impact on enhancing the knowledge and expertise available to National Meteorological and Hydrological Services and improving the quality of products and services delivered to the users,

Considering further that the scope and demand for education and training is expanding with initiatives such as the Global Framework for Climate Services, disaster risk reduction and increasing compliance requirements,

Decides to adopt the terms of reference for the Executive Council Panel of Experts on Education and Training as follows:

- (1) To provide the Executive Council with input into the WMO strategic planning process by making recommendations on the future direction and activities of the WMO Education and Training Programme;

- (2) To establish and maintain information sharing arrangements with the regional associations, technical commissions and other relevant bodies in order to determine the prioritized education and training needs of Members;
- (3) To provide the Executive Council with advice on the standards for education and training of personnel of Members;
- (4) To provide the Executive Council with advice on the standards and recommended practices for the education and training of personnel of Members;
- (5) To provide the Executive Council with advice on actions for monitoring, strengthening and enhancing the Education and Training Programme, including the designation of suitable training institutions such as WMO Regional Training Centres;
- (6) To provide the Executive Council with advice on actions to improve the effectiveness of the Fellowship programme based on an ongoing review and evaluation of the programme;
- (7) To support other initiatives of the Education and Training Programme, including the development and review of activities and guidance material as required;
- (8) To select the Panel members and the number of terms to be undertaken in accordance with the annex to the present resolution.

Note: This resolution replaces Resolution 19 (EC-LXII), which is no longer in force.

Annex to Resolution 17 (EC-66)

TERMS OF REFERENCE OF THE EXECUTIVE COUNCIL PANEL OF EXPERTS ON EDUCATION AND TRAINING

Membership:

- (i) The Panel will be chaired either by the President of the Organization or a designated member of the Executive Council. If the Chair cannot attend a session of the Panel, she/he will appoint a Panel member to chair the session in her/his absence;
- (ii) In addition to the Chair, the Panel shall consist of a maximum of twelve members, each of whom will sit in a personal capacity;
- (iii) The members shall be appointed by the Executive Council on the basis of their extensive professional expertise in education and training matters, particularly in the fields of meteorology, climatology or hydrology and take into account the need for the Panel to have an appropriate technical, geographical and gender balance in considering the most highly qualified candidates;
- (iv) In addition to acting in a personal capacity Panel members will be expected to maintain regular contact with regional association ETR Focal Points and technical commissions to promote cross-cutting coordination and information exchange;
- (v) Members shall serve for a period of four years and may be re-appointed for one further period of four years. No individual may serve for more than eight years in total.

Appointment of Members:

The Panel members shall be appointed by the Executive Council through a transparent process as follows:

- (i) The Secretary-General will write to all Members, with copy to the presidents of regional associations and technical commissions, advising them of the opportunity to nominate one person with appropriate skills for consideration by EC for the EC Panel of Experts on Education and Training. The letter will be sent at least six months prior to the EC immediately following Congress. Written nominations endorsed by the PR of the country concerned, or president of the appropriate regional association or technical commission, to reach the Secretary-General no later than 3 months before Congress;
- (ii) The Secretary-General will review the qualifications, determine whether they meet the minimum requirements needed to serve, and submit a prioritized list of candidates to the Executive Council immediately following Congress;
- (iii) The Council will appoint members of the Panel from the list of candidates compiled by the Secretary-General. The Council may choose to create a selection committee to review the list prepared by the Secretary-General. The Council will authorize the President to fill any positions that fall vacant during the intersessional period using the list approved by EC;
- (iv) In accordance with General Regulation 35 (2012 Edition) the Chair of the Panel can invite experts to assist the Panel in its deliberations.

Administrative matters:

Financial support for participation by Panel members in meetings shall be provided by the Organization in accordance with General Regulation 37 (2012 Edition).

Resolution 18 (EC-66)**STATUS OF BET DAGAN, ISRAEL AS A WMO REGIONAL TRAINING CENTRE**

THE EXECUTIVE COUNCIL,

Noting the *Abridged Final Report with Resolutions of the Sixty-second Session of the Executive Council* (WMO-No. 1059), general summary, paragraph 6.16 (c) and its annexes,

Noting further:

- (1) That the reputation of WMO Regional Training Centres (RTCs) as a respected and trusted network of training providers is dependent upon the individual institutions addressing regional training needs,
- (2) That the RTC of Bet Dagan has continued to provide education and training opportunities for Members in partnership with the Education and Training Programme,
- (3) That the Executive Council Panel of Experts on Education and Training undertook a review of Bet-Dagan that identified several areas that could be improved so that Bet Dagan could better address the needs of Regional Association VI (Europe) and neighbouring Regions,
- (4) That Bet Dagan has requested to be reconfirmed as an RTC and that Regional Association VI supported this reconfirmation at its sixteenth session,

Recognizing that Bet Dagan has actions under way to provide several training workshops in the near future relevant to the Global Framework for Climate Services,

Decides to reconfirm Bet Dagan as a Regional Training Centre for four years.

Resolution 19 (EC-66)

STATUS OF THE INSTITUTE OF BIOMETEOROLOGY, NATIONAL RESEARCH COUNCIL, FLORENCE, ITALY AS A WMO REGIONAL TRAINING CENTRE

THE EXECUTIVE COUNCIL,

Noting the *Abridged Final Report with Resolutions of the Sixty-second Session of the Executive Council* (WMO-No. 1059), general summary, paragraph 6.16 (c) and its annexes,

Noting further:

- (1) That the reputation of WMO Regional Training Centres (RTCs) as a respected and trusted network of training providers is dependent upon the individual institutions addressing regional training needs,
- (2) That the Institute of Biometeorology (IBIMET), located in Florence, Italy had not provided reports or had contact with WMO regarding its activities as an RTC for more than six years,
- (3) That the Executive Council Panel of Experts on Education and Training undertook a review of IBIMET that identified a number of areas that need to be addressed for IBIMET to be fully functional as an RTC,
- (4) That IBIMET has requested to be reconfirmed as an RTC and that Regional Association VI (Europe) supported this reconfirmation at its sixteenth session based upon the proposed activities of IBIMET,

Recognizing that whilst IBIMET has actions underway to provide several training workshops in the near future relevant to the Global Framework for Climate Services,

Decides to defer confirmation of the status of IBIMET as a Regional Training Centre for two years, when the Executive Council will reassess the status at its sixty-eighth session, marking the progress of IBIMT in contributing to the WMO Education and Training Programme.

Resolution 20 (EC-66)

EXECUTIVE COUNCIL CRITERIA FOR THE AWARD OF WMO FELLOWSHIPS

THE EXECUTIVE COUNCIL,

Noting:

- (1) The discussion and decision of the Executive Council at its fifty-eighth session regarding the Executive Council criteria for the award of WMO fellowships (*Abridged Final Report*

with Resolutions of the Fifty-eighth session of the Executive Council (WMO-No. 1007), general summary, paragraph 3.6.20 and its annex),

- (2) The importance of the Fellowship Programme to WMO Members, particularly those from least developed and developing countries and from small island developing States,

Decides to update the Executive Council criteria for the award of WMO fellowships as contained in the annex to the present resolution, with implementation date effective immediately.

Annex to Resolution 20 (EC-66)

EXECUTIVE COUNCIL CRITERIA FOR WMO FELLOWSHIPS

Criteria for the award of WMO fellowships

1. The aim of the WMO Fellowship Programme is to support the education and training of qualified and suitable candidates, particularly from least developed and developing countries and Small Island Developing States. Applications from women are especially encouraged. Fellowships should benefit both the individual candidate and the candidate's institution, usually the National Meteorological and Hydrological Services (NMHSs).
2. WMO may award both short-term (less than six months) and long-term (6 months or longer) fellowships, based on recommendations of the Fellowships Committee aligned with the priorities of the ETRP.
3. Candidates applying for a WMO fellowship must complete a Fellowship Nomination Form, which must be certified by the Permanent Representative of the recipient WMO Member. The Permanent Representative will specify, amongst others, the expected benefit to the individual (for example to produce a qualified workforce), and the benefit to the nominating institution (for example to assist in the organizational development of the NMHSs in the light of the changing needs of the services required to meet the evolving needs of users).
4. To be considered by the Fellowships Committee for a fellowship, candidates must:
 - (a) Meet the entry requirements for the proposed course of study;
 - (b) Be proficient in, or capable of learning in, the language of study;
 - (c) Be of sound health as confirmed by their completed medical certificate;
 - (d) Only apply for courses of study directly applicable to WMO Programme areas.
5. Newly appointed directors of NMHSs are also eligible for very short-term training programmes in the management of NMHSs and for familiarization visits.
6. In awarding a fellowship, preference will be given to candidates who:
 - (a) Come from countries with least developed NMHSs as well as developing countries, countries with economies in transition and countries more vulnerable to natural disasters;
 - (b) Are supported by cost sharing;
 - (c) Apply for courses at RTCs or other training institutions in their Region;

- (d) Apply for short-term fellowships or long-term fellowships not exceeding 18 months in duration;
 - (e) Are expected to work and make a long-term contribution in the NMHS of their country in a suitable post on completion of the fellowship;
 - (f) Have not been awarded a long-term WMO fellowship within the previous four years.
 - (g) Comes from a country that has not recently benefited from a WMO fellowship;
7. In awarding a fellowship, account will be taken of:
- (a) The need for regional proportional balance;
 - (b) The need to practice equal opportunity policies (see Resolution 33 (Cg-XIV) – Equal opportunities for the participation of women in meteorology and hydrology);
 - (c) Whether the Permanent Representative from the candidates' country has provided WMO with the required report from any previous fellowship.
-

Resolution 21 (EC-66)

COUNTRY PROFILE DATABASE INITIAL OPERATING CAPABILITY

THE EXECUTIVE COUNCIL,

Noting:

- (1) That the development of a WMO Country Profile Database (CPDB) responds to the mandate given by the World Meteorological Congress (Resolution 49 (Cg-XVI) – WMO Strategy for Capacity Development) and the Executive Council (Resolution 18 (EC-64) – WMO Capacity Development Strategy and Resolution 16 (EC-65) – Implementation Plan of the WMO Strategy for Capacity Development) to establish a consolidated database containing weather-, water- and climate-related information about WMO Members from sources both within and outside the WMO Secretariat,
- (2) That the Database offers a mechanism for Members to share information about their national institutional arrangements, infrastructure, staffing, national focal points, projects, development status as well as, their participation in WMO activities,
- (3) That the Database can be expected to reduce the number and frequency of survey questions asked of Members and provides a means to ensure that timely information is collected and shared,
- (4) That the Executive Council Working Group on WMO Strategic and Operational Planning recognized that the Database also has the potential to enhance evaluation and monitoring related to WMO strategic planning and capacity development,

Noting further:

- (1) That the CPDB prototype and subsequent development has demonstrated the feasibility of this approach and related technology,

- (2) That a selection of survey information recently collected by the WMO is being included in the design of the CPDB Initial Operating Capability,
- (3) That the responsibility to maintain the data in the CPDB is shared by Members and the Secretariat,
- (4) That the usefulness of the Database will depend, in large part, on the completeness and accuracy of the data,

Decides that the Country Profile Database Initial Operating Capability should be implemented by the end of August 2014;

Requests Members:

- (1) To review the Database in order to ensure the accuracy and completeness of data relative to their State or territory, as well as projects they are involved in;
- (2) To nominate one or several national CPDB focal point who can access the Database to assist the Permanent Representatives in maintaining and updating country information;

Requests the Executive Council Working Group on WMO Strategic and Operational Planning and the Executive Council Working Group on Capacity Development, or their successors, to collaborate on the development of tools that can make use of the Country Profile Database for evaluation and monitoring of the implementation of WMO Strategic Plans;

Requests the Secretary-General to provide support to the Members in the implementation of the decision.

Resolution 22 (EC-66)

IMPLEMENTATION OF RISK MANAGEMENT

THE EXECUTIVE COUNCIL,

Noting the implementation of Results-based Management in the Organization based on a Strategic Plan and Results-based Budget for the sixteenth financial period,

Considering the continued improvements in systems of internal control at the Secretariat and the progress in the implementation of Results-based Management in the Organization,

Recognizing the significant role of risk management in the achievement of the Organization's objectives and implementation of the Strategic Plan,

Recognizing further the need for the Organization to pursue opportunities if they outweigh the risks and the existing controls are adequate,

Decides to approve the revised Risk Management Policy for the Organization as given in the annex to the present resolution;

Requests the Secretary-General to continue with the implementation of risk management using the most cost-effective approach;

Requests the Executive Council and its subsidiary bodies, the technical commissions and regional associations to apply the policy in considering risks and opportunities that may be associated with the implementation of the Strategic Plan;

Requests the Audit Committee, to keep under review high risks of the Organization and provide guidance on mitigation action as required, in addition to reviewing the adequacy, further development and implementation of the Risk Management Policy.

Note: This resolution replaces Resolution 12 (EC-LXIII), which is no longer in force.

Annex to Resolution 22 (EC-66)

WMO RISK MANAGEMENT POLICY

Introduction

The WMO Risk Management Policy builds on the Organization's Standing Instructions, codes, regulations and rules, together with relevant existing policies, in defining the processes to manage the risks facing the Organization. It is focused on the management of risks associated with the Organization's activities in order to minimize their negative impacts. Risk management is an integral part of the Organization's management processes, including internal control systems. The Secretariat will manage risks within its responsibility as defined in the WMO Convention. The technical commissions and regional associations will take into consideration any risks that may be associated with the decisions they make within their mandates.

Risk is defined as the effect of an uncertainty associated with an event on the achievement of the goals of the Organization. The broad categories of risks that shall have the attention of the Organization include:

- Strategic risks – associated with the inability to achieve goals that are set as part of the WMO mission and mandate;
- Operational risks – associated with failures in internal processes;
- Governance risks – associated with lack of involvement of all stakeholders at all levels;
- Financial risks – associated with inadequacies in financial resources and their management;
- Compliance risks – associated with inadequacies leading to an inability to operate within WMO Standing Instructions, codes, regulations and rules, and United Nations rules.

It is recognized that risks are often interrelated and not within the control of the Organization, which complicates the processes to manage them. WMO implements its programme activities and projects within an overall low risk. The Organization shall have the lowest risk appetite for risks related to operations and compliance, and reasonably higher risk appetite for strategic, governance and financial risks. Considerations shall be made to:

- (a) Accept the risk if the opportunities outweigh the risk and the existing controls are adequate. Evaluate the risk and opportunity prudently, and be accountable for it. The Secretariat shall, however, continue to monitor the risk;

- (b) Avoid the risk by not undertaking the programme activity(ies) associated with the risk or changing the scope, procurement process, supplier or sequence of activities, among others depending on the type of risk;
- (c) Treat the risk to reduce the impact, likelihood or both and/or improve the existing controls or develop new controls to reduce the risk to acceptable levels;
- (d) Transfer the risk so that a third party takes on the responsibility for an aspect of the threat; and
- (e) Share the risk. The approach is similar to transferring risks but in this case the risk is shared by transferring some portion of risk.

Objective

WMO is committed to achieving its goals within its mission and mandate by identifying, analyzing and managing the risks associated with its activities in order to minimize their negative impacts and pursue opportunities as appropriate.

The Organization will:

- Set a framework that takes into consideration the long-term interests of all Members and partners;
- Identify events and associated risks that may have a negative impact on the achievement of the goals and expected results;
- Identify opportunities that may be pursued within the risk appetite for the Organization;
- Identify, monitor and report on key risk indicators to help reduce exposure to risks;
- Establish and keep under review appropriate control measures to reduce exposure to risk;
- Reduce vulnerability and enhance resilience through human resource capacity-building in risk management; and
- Keep under regular review the risks facing the Organization.

The successful implementation of this policy shall be demonstrated by regular reports on the progress in risk management.

Principles

WMO risk management shall be guided by the following principles:

- **Integrated approach** – risk management shall be implemented as an integral part of the system of internal control and Results-based Management (RBM), and not as a stand-alone process;
- **Consistency** – the methods for identifying, assessing, monitoring, mitigating and communicating risks shall be consistent;
- **Ownership** – the owners of risks at all levels shall be conversant with the risks affecting their respective contribution to the achievement of the Organization's goals, and with appropriate processes to assess, monitor and mitigate them;
- **Accountability** – the owners of risks at all levels shall be accountable for their respective actions taken to manage the risks;

- Authority – the owners of risks shall have the authority to decide and implement appropriate actions to address risks in their respective areas of responsibility;
- Risk awareness – risk awareness shall be enhanced at all levels to enable staff to identify and analyse the risks associated with their actions and ways to mitigate them;
- Communication – the information systems shall be designed in a manner to facilitate efficient assessment, monitoring and reporting of risks.

Implementation

The Executive Council, Management Groups of technical commissions and regional associations, and the Secretariat will regularly identify, assess, record and mitigate their respective risks. Regular review of risks will focus on strategic, operational, financial, governance and compliance risks. The review will include, but is not limited to, the following activities:

- Regular review and update of risk registers;
- Planning of actions to mitigate high risks;
- Monitoring the risk indicators to identify emerging risks and initiate appropriate actions to mitigate them.

A Secretariat Risk Management Committee has been established by the Secretary-General to develop, review and monitor the risk management framework and policy; monitor the implementation and compliance with the WMO Risk Management Policy; and make recommendations to the Secretary-General, in particular on high risks.

The Executive Council, with advice from the Audit Committee, will keep under review high risks of the Organization and provide guidance on mitigation action as required.

This policy has been approved by the Executive Council.

Resolution 23 (EC-66)

FINANCIAL STATEMENTS OF THE WORLD METEOROLOGICAL ORGANIZATION FOR THE YEAR 2013

THE EXECUTIVE COUNCIL,

Recalling Resolution 21 (EC-LXII) – Consideration of the accounts of the World Meteorological Organization for the year 2009,

Noting Articles 14 and 15 of the Financial Regulations,

Considering the financial report of the Secretary-General on the financial statements of the Organization for the year ended 31 December 2013 and the report of the External Auditor to the Executive Council,

Gives formal approval to the audited financial statements of the World Meteorological Organization for the year 2013;

Requests the Secretary-General to transmit the financial statements together with his report and the report of the External Auditor thereon to all Members of the World Meteorological Organization;

Noting with concern the substantial amounts of outstanding assessed contributions of certain Members,

Urges the Members to clear their dues at an early date.

Resolution 24 (EC-66)

**PROPOSED REVISION TO RESOLUTION 31 (Cg-XIII) – SHORT-TERM
BORROWING AUTHORITY**

THE EXECUTIVE COUNCIL,

Noting Resolution 31 (Cg-XIII) – Short-term borrowing authority,

Decides to recommend that the Seventeenth World Meteorological Congress expand the Secretary-General's short-term borrowing authority to include voluntary contributions with immediate effect.

Resolution 25 (EC-66)

REVIEW OF PREVIOUS RESOLUTIONS OF THE EXECUTIVE COUNCIL

THE EXECUTIVE COUNCIL,

Noting:

- (1) Resolution 23 (EC-65) – Review of previous resolutions of the Executive Council,
- (2) Regulation 156 (9) of the General Regulations (2012 edition), concerning the review of the Executive Council resolutions,
- (3) Rule 27 of the Rules of Procedure of the Executive Council on the same subject,

Having examined its previous resolutions still in force,

Decides:

- (1) To keep in force the following resolutions:

EC-IV	2
EC-XII	6
EC-XXV	12
EC-XXXIV	13
EC-XXXV	21
EC-XXXVI	6
EC-XL	4
EC-XLII	19
EC-XLIV	15
EC-XLV	13

EC-XLVIII	3, 4, 12
EC-LI	5
EC-LVI	9, 18
EC-LVII	5, 17, 18
EC-LVIII	15
EC-LIX	6, 16, 17, 19, 26, 27
EC-LX	4, 6, 18
EC-LXI	4, 8, 14, 15
EC-LXII	6, 7, 10, 15
EC-LXIII	2, 3, 4, 5*, 6*, 7*, 8*, 11, 13
EC-64	1, 2, 3, 4, 5, 6, 8, 10, 11, 12, 13, 14, 15*, 16, 17, 18, 19, 20*, 22, 23, 24*, 26
EC-65	2, 3, 4, 5, 6, 7, 8, 9, 10, 11, 12, 16, 18, 19, 20, 22

(2) Not to keep in force the other resolutions adopted before its sixty-sixth session;

Requests the Secretary-General to publish the in-force resolutions, including those with corrigenda, in a new issue of *Resolutions of Congress and the Executive Council* (WMO-No. 508) and to bring this publication to the attention of all parties concerned.

Note: This Resolution replaces Resolution 23 (EC-65), which is no longer in force.

* Indicates that some resolution(s) mentioned in the given resolution are now not in force (see the annex to the present resolution).

Annex to Resolution 25 (EC-66)

FOOTNOTES TO THE FOLLOWING RESOLUTIONS

- Resolution 5 (EC-LXIII) – Executive Council Panel of Experts on Polar Observations, Research and Services**

Resolution 11 (EC-LXII) not in force
- Resolution 6 (EC-LXIII) – Executive Council Working Group on Service Delivery**

Resolution 5 (EC-LX) not in force
- Resolution 7 (EC-LXIII) – Executive Council Working Group on WMO Strategic and Operational Planning**

Resolution 2 (EC-LIX) not in force
- Resolution 8 (EC-LXIII) – Terms of reference and membership of the Audit Committee**

Resolution 10 (EC LVIII) not in force
- Resolution 15 (EC-64) – Global Climate Observing System**

Resolution 13 (EC-LXII) not in force

6. Resolution 20 (EC-64) – WMO Programme Support Cost Policy

Resolution 19 (EC-LVI) not in force

7. Resolution 24 (EC-64) – Guidelines on the planning and production of WMO publications

Resolution 13 (EC-LVI) not in force

Resolution 20 (EC-LXII) not in force

ANNEXES

ANNEX I

Annex to [paragraph 2.6.16](#) of the general summary

PROPOSED RESOLUTIONS FOR CONSIDERATION BY THE SEVENTEENTH WORLD METEOROLOGICAL CONGRESS

Draft Resolution x.1 (Cg-17)

AMENDMENTS TO THE *MANUAL ON THE GLOBAL OBSERVING SYSTEM* (WMO-No. 544), VOLUME II, REGIONAL ASPECTS – THE ANTARCTIC

THE CONGRESS,

Noting:

- (1) Resolution x.4 (Cg-17) – WMO Polar Activities,
- (2) Resolution 56 (Cg-XVI) – Amendments to the *Manual on the Global Observing System* (WMO-No. 544), Volume II, Regional Aspects – The Antarctic,
- (3) The WMO Strategic Plan (2016–2019) as it relates to the World Weather Watch and to the Antarctic,

Decides to amend the *Manual on the Global Observing System*, Volume II, Regional Aspects – The Antarctic, as given in the annex to this resolution;

Requests the Secretary-General:

- (1) To make the appropriate amendments as given in the annex to this resolution;
- (2) To bring this resolution to the attention of Members.

Annex: 1

Note: This resolution replaces Resolution 56 (Cg-XVI), which is no longer in force.

Annex to draft Resolution x.1 (Cg-17)

7. THE ANTARCTIC

7.1 ANTARCTIC OBSERVING NETWORK OF SURFACE AND UPPER-AIR OBSERVING STATIONS

7.1.1 Composition of the Antarctic Observing Network

7.1.1.1 The Antarctic Observing Network (AntON) is composed of surface and upper-air stations adequate to meet the requirements of Members, and constitutes one of the most important obligations of Members under Article 2 of the WMO Convention.

7.1.1.2 The AntON is reviewed by a dedicated subsidiary body of the Executive Council and adopted by the Council or the WMO Congress in a resolution. The list of stations constituting the

AntON is given in the annex to a resolution approved by Congress or the Executive Council. Changes are announced in the monthly Operational Newsletter issued by the Secretariat (see 7.1.6 below).

7.1.1.3 Manned surface land stations included in the AntON shall conform to the specifications laid down for land stations in Volume I of this Manual.

7.1.2 Composition Surface synoptic observations

All manned surface stations included in the AntON shall make surface observations at the four main standard times of observation, that is, 0000, 0600, 1200 and 1800 UTC. Whenever possible and desirable, observations should also be made at some or all of the four intermediate standard times of observation, that is, 0300, 0900, 1500 and 2100 UTC. Any surface station that cannot carry out the full observational programme should give priority to carrying out the observations at the main standard times.

New paragraph

Automatic Weather Stations (AWS) should measure pressure, temperature, wind speed and direction at least hourly. Additional measurements should be made as far as possible.

7.1.3 Upper-air synoptic observations

All upper-air stations included in the AntON should carry out radiosonde and/or radiowind observations at 0000 and 1200 UTC. Other considerations permitting, those stations that are unable to carry out the full observing programme should give priority to the observations that maintain the historic record. Stations that are separated by no more than about 600 km may wish to consider bilateral arrangements whereby each undertakes one of the ascents so as to complete between them the full observing programme required.

7.1.4 Climatological observations

7.1.4.1 As far as possible, all AntON surface stations shall report CLIMAT messages for better monitoring of climate.

7.1.4.2 CLIMAT reports from AntON stations shall be regarded as essential data in the sense of Resolution 40 (Cg-XII) – WMO policy and practice for the exchange of meteorological and related data and products including guidelines on relationships in commercial meteorological activities.

7.1.5 Operational procedures

Members are urged to comply fully with the global coding procedures and data-collection standards in accordance with procedures laid down in the WMO *Technical Regulations* (WMO-No. 49), *Manual on Codes* (WMO-No. 306), *Manual on the Global Telecommunication System* (WMO-No. 386), *Manual on the WMO Information System* (WMO-No. 1060), and in this Manual when operating the stations in the AntON.

7.1.6 Arrangements and procedures for updating and amending the Antarctic Observing Network

Certain minor changes in the AntON of surface and upper-air stations that do not affect the data requirements for the Antarctic as a whole are inevitable. To provide a simple and rapid means of effecting changes by Members, the following procedure shall be followed:

- (a) The President of WMO may approve, at the request of the Member concerned, on the advice of the Chairperson of a dedicated Executive Council subsidiary body and in consultation with the Secretary-General, minor amendments to the AntON. Any proposed

significant change in the composition of AntON would still require the formal agreement of Members operating components of the AntON;

- (b) The Secretary-General shall notify all Members of WMO through the Operational Newsletter or by circular letter of changes agreed with the President of WMO.

7.2 WEATHER REPORTING BY TRAVERSE PARTIES

Members operating stations in the Antarctic are encouraged to instruct all traverse parties to make surface observations wherever circumstances permit when they are more than 200 km away from their base. The observations, which should be carried out as close as possible to the standard times of observations, should be transmitted at least once a day.

7.3 AUTOMATIC WEATHER STATIONS IN THE ANTARCTIC

Members are encouraged to use automatic weather stations as a part of the AntON, taking advantage of the data-collection capabilities of polar-orbiting satellites and, in some cases, of the geostationary satellites.

7.4 SHIPS OPERATING IN ANTARCTIC WATERS

7.4.1 Members should ensure that all research vessels, supply vessels and tourist ships operating in the Antarctic make regular surface synoptic observations at main and intermediate synoptic hours, and transmit these data in real time. When these data cannot be transmitted in real time they should be submitted in delayed mode or as historic data.

Members should also ensure that vessels, whenever practicable, also make upper-air observations, and that any observations made are transmitted in real time.

7.5 SURFACE DRIFTING BUOYS

Members are encouraged to enhance their deployment and maintenance of surface drifting buoys, which shall be equipped with at least atmospheric pressure and sea surface temperature sensors, transmitting data in real time. Members are also encouraged to further develop buoy technology to enhance operations and real-time reporting both on and off the ice.

7.6 AIRCRAFT REPORTS

Members are encouraged to arrange for making, recording and distributing in real time observational reports from all flights to/from and within the Antarctic.

7.7 ADDITIONAL AND EXTENDED OBSERVATIONS

Members are encouraged to arrange for making, recording and distributing in real time additional and extended observations from ships and stations in the Antarctic. A list of observations made for the Global Atmosphere Watch (GAW) should be recorded in the GAW Station Information System (GAWSIS).

7.8 METADATA

Members/Operators of the observing stations/platforms shall provide observational and discovery metadata to WMO according to practices described in the Manual on WIGOS, WMO-No. xy [the number to be included at Cg-17].

Draft Resolution x.2 (Cg-17)

ANTARCTIC OBSERVING NETWORK (AntON)

THE CONGRESS,

Noting:

- (1) Resolution 55 (Cg-XVI) – Antarctic Observing Network (AntON),
- (2) The World Meteorological Organization (WMO) *Technical Regulations* (WMO-No. 49), Regulation (B.1) 3.1.1.2,
- (3) The WMO Strategic Plan as it relates to observations in the Antarctic,
- (4) The *Manual on the Global Observing System* (GOS) (WMO-No. 544), Volume I, Part II, paragraphs 2.1.3 and 2.1.4,
- (5) The *Manual on the Global Observing System* (WMO-No. 544), Volume II, The Antarctic,

Considering:

- (1) That the establishment and maintenance of an Antarctic Observing Network (AntON) of surface and upper-air stations to meet the requirements of Members, constitutes one of the most important obligations of Members under Article 2 of the WMO Convention,
- (2) That the density of the current Antarctic Observing Network (AntON) of surface and upper-air stations is much less than that desirable to properly characterize Antarctic weather and climate,
- (3) That in order to provide a good representation of climate for Antarctica, there is no need to distinguish between a synoptic and climate network,
- (4) That observing stations in Antarctica contribute significantly to the WMO Global Cryosphere Watch (GCW),
- (5) That manned stations in Antarctica also contribute vital ozone and other observations to the Global Atmosphere Watch (GAW),
- (6) The need for further integration of Antarctic observing systems according to the WMO Integrated Global Observing System (WIGOS) practices,
- (7) The needs of the research community as expressed by the Scientific Committee for Antarctic Research (SCAR),

Decides that the stations and the observational programmes listed in the Annex to this resolution constitute the Antarctic Observing Network (AntON);

Urges Members:

- (1) To spare no effort in their endeavours to secure full implementation of the network of stations and observational programmes set forth in the Annex to this resolution, particularly those contributing to Global Climate Observing System (GCOS);
- (2) To seek to maintain, and where possible restore, radiosonde stations in Antarctica;
- (3) To consider their observing stations for inclusion into the core GCW CryoNet based on its selection criteria;
- (4) To consider the possibility of cooperating with other Members in sharing the costs of re-opening and operating silent stations and opening new stations at key locations;

- (5) To comply fully with the standard times of observation, the coding procedures and the data-collection standards, as laid down in the WMO Technical Regulations and the Manuals on GOS, on Codes, on the Global Telecommunication System (GTS) and on the Global Data-processing and Forecasting Systems (GDPFS); providing the data in real time as far as is practicable;
- (6) To validate station positions and elevations using modern surveying techniques against those given in Weather Reporting (WMO-No. 9) Volume A at the required resolution and to communicate the results of these measurements to the WMO Secretariat;
- (7) To ensure that traceable calibration certificates are available for instrumentation, in line with the International Organization for Standardization (ISO) Quality Management certification;
- (8) To keep updated the observational metadata for all the stations; to make available appropriate discovery metadata and to provide them with all observational datasets through WIS;
- (9) To make available historic research and routine observational data to the appropriate Antarctic Data Collection and Production Centres (DCPCs) for archiving for climate purposes with the focus on the Global Framework for Climate Services (GFCS);
- (10) To incorporate existing research and new installations into the AntON;
- (11) To ensure that feedback is given to stations when Numerical Weather Prediction (NWP) detects problems with data or its transmission;

Requests the Secretary-General to bring any changes to the Antarctic Observing Network to the attention of the Members of WMO.

Note: This resolution replaces Resolution 55 (Cg-XVI), which is no longer in force.

(NOTE: Annex to this resolution will contain the list of AntON stations that will be updated 3 months before Cg-17 in consultation with the respective Members)

Draft Resolution x.3 (Cg-17)

GLOBAL INTEGRATED POLAR PREDICTION SYSTEM (GIPPS)

THE CONGRESS,

Noting:

- (1) Resolution 36 (Cg-15) – International Polar Year 2007–2008,
- (2) Resolution 57 (Cg-16) – Global Integrated Polar Prediction System (GIPPS),
- (3) Resolution 17 (EC-64) – Polar Prediction Project,

Considering:

- (1) The concerns about amplification of climate change at higher latitudes combined with an increasing interest of many governments in Polar Regions calls for a better understanding of weather, climate, water and related environmental variability and change to improve our ability to make reliable, quantitative predictions out to seasons, decades and centuries ahead,
- (2) The increased economic and transportation activities in Polar Regions, and the associated long-term requirement for sustained integrated observational and predictive weather, climate and water information to support decision-making,
- (3) That there remain key gaps in:
 - (a) Scientific understanding of processes and interactions in Polar Regions, including stable boundary layers, polar clouds and precipitation, sea ice/ocean dynamics, hydrology, permafrost and ice sheet dynamics,
 - (b) Scientific understanding of the linkages between weather, climate and ice changes in Polar Regions and lower latitudes,
 - (c) Sustaining and optimizing in-situ and satellite observations in Polar Regions, including reference observations,
 - (d) Available products and services for Polar Regions,
- (4) The global benefits of a Global Integrated Polar Prediction System (GIPPS), enabling not only service delivery and observing strategies in Polar Regions, but also addressing key uncertainties in weather, climate, water and related environmental variability and change, thereby improving global prediction, contributing to all World Meteorological Organization (WMO) high priorities, in particular Disaster Risk Reduction (DRR), and to the Global Framework for Climate Services (GFCS),
- (5) That this cannot be accomplished by WMO alone, and will require collaborative research and development involving World Weather Research Programme (WWRP) and World Climate Research Programme (WCRP), other WMO Programmes and external partners,

Acknowledging in particular the contributions of Members' national operational and research programmes to monitoring and real-time data provision, process studies, and current prediction systems tailored to the Polar Regions,

Decides:

- (1) To continue the decadal endeavour towards GIPPS, as an International Polar Year (IPY) Legacy to benefit the global community;
- (2) That the GIPPS should provide information to meet user needs for decision making on timescales from hours to centuries;
- (3) That the research underpinnings of GIPPS will be carried out through closely coordinated activities under the Polar Prediction Project (PPP) (time scales of hours to seasons) and the WCRP Polar Climate Predictability Initiative (IPPI) (time scales of seasons to decades);

Requests the Executive Council:

- (1) To provide broad oversight, guidance and monitoring of progress;
- (2) To ensure there is broad consultation and participation from other international organizations and agencies that wish to contribute to the development of GIPPS;

- (3) To submit a comprehensive report updating GIPPS progress to the Eighteenth Congress;

Requests technical commissions and regional associations to support the work of the Executive Council through the coordinated international research, development and implementation of GIPPS and to advise on possible future governance structures;

Invites relevant national bodies and international organizations, such as the International Council for Science (ICSU), research programmes conducted under the aegis of the Scientific Committee on Antarctic Research (SCAR), United Nations Educational, Scientific and Cultural Organization Intergovernmental Oceanographic Commission (UNESCO-IOC), and International Arctic Science Committee (IASC), the International Association of Cryospheric Sciences (IACS), and other relevant associations of the International Union of Geodesy and Geophysics (IUGG) and WMO co-sponsored and WMO-led Programmes such as WCRP and the Global Climate Observing System (GCOS), to join in the multi-year endeavour towards an operational GIPPS;

Requests Members:

- (1) To support efforts to address the key gaps in scientific understanding of the Earth system and environmental processes and interactions in Polar Regions;
- (2) To promote and/or establish national and international research programmes towards this endeavour;
- (3) To provide adequate voluntary resources to support development of GIPPS, including contributions to relevant Trust Funds;
- (4) To support, in particular, the Year of Polar Prediction (YOPP), planned from mid-2017 to mid-2019.

Requests the Secretary-General:

- (1) Within available budgetary resources, to support the development of GIPPS;
- (2) To strengthen coordination and collaborate closely with relevant international partner organizations and programmes in pursuing this endeavour;
- (3) To take any further actions necessary to implement these decisions;
- (4) To bring this resolution to the attention of all concerned.

Note: This resolution replaces Resolution 57 (Cg-XVI), which is no longer in force.

Draft Resolution x.4 (Cg-17)

WMO POLAR AND HIGH MOUNTAIN ACTIVITIES

THE CONGRESS,

Noting:

- (1) Resolution 55 (Cg-XVI) – Antarctic Observing Network (AntON),

- (2) Resolution 56 (Cg-XVI) – Amendments to the *Manual on the Global Observing System* (GOS) (WMO-No 544), Volume II, Regional Aspects – The Antarctic,
- (3) Resolution 57 (Cg-XVI) – Global Integrated Polar Prediction System (GIPPS),
- (4) Resolution 58 (Cg-XVI) – WMO Polar Activities,
- (5) Resolution 59 (Cg-XVI) – International Polar Decade Initiative (IPD),
- (6) Resolution 60 (Cg-XVI) – Global Cryosphere Watch (GCW),
- (7) Resolution 17 (EC-LXIV) – Polar Prediction Project (PPP),
- (8) The World Meteorological Organization (WMO) Strategic Plan (2016–2019),
- (9) Resolution 40 (Cg-XII) - WMO policy and practice for the exchange of meteorological and related data and products including guidelines on relationships in commercial meteorological activities,

Considering:

- (1) The growing demand for services based on sustained observations and research in Polar and high mountain regions which prompted the Sixteenth Congress to promote GIPPS and GCW,
- (2) That there remain key gaps in scientific understanding of processes and interactions in high latitude and altitude regions, including, inter alia, boundary layer behaviour, polar clouds and precipitation, sea ice/ocean dynamics, hydrology, permafrost and ice sheet dynamics, and their influence on the Earth system,
- (3) That there is consensus about the amplification of climate change and variability in Polar and high mountain regions yet these regions remain under-sampled domains of the Earth system,
- (4) That successful implementation of the International Polar Year (IPY) 2007–2008 has resulted in a legacy of enhanced polar observing systems and research on the polar environment,
- (5) That arrangements ensuring the legacy of the IPY-enhanced observational networks are cross-cutting and should be closely coordinated with the implementation of the WMO Integrated Global Observing System (WIGOS), and designed to improve in a most efficient way the capability of Members to provide the widening range of operational services and to better serve research programme requirements,
- (6) That continuity of long-term series of hydro-meteorological and related environmental observations is critical to detection of environmental change,
- (7) That there is a growing consensus that hydro-meteorological and related environmental data and products from publicly funded research should be made widely available and that there are mutual benefits in making appropriate research meteorological data available for forecasting and climate purposes,
- (8) That there is a continuing need to coordinate WMO activities with other international organizations active in Polar Regions,
- (9) That operational and research observing networks in Polar Regions (including AntON) and the cryosphere in general (observing component of GCW) should be integrated within the framework of WIGOS and the WMO Information System (WIS) and be enhanced to include cryosphere-related variables,

- (10) The achievements of the EC-PORS in ensuring coordination of the operational activities with other international organizations active in the Polar and high mountain regions and in engaging WMO technical commissions, regional associations and in the work of the Panel,

Decides:

- (1) That an integrated approach is needed to understand global impact of changes in polar and high mountain regions so that required services may be provided to users and that governments may be advised on aspects of adaptation and mitigation;
- (2) That operational and research observing networks including AntON, observing component of GCW and other activities in Polar and high mountain regions, should be integrated within the framework of WIGOS and the WMO Information System (WIS);
- (3) That concerted effort continue to be made to engage WMO Members, technical commissions and regional associations, as well as relevant research and international organizations and bodies, to improve services in high latitude and altitude regions by promoting observations and predictive capability on timescales from hours to centuries;

Invites Members, particularly those that have operational activities in Polar Regions:

- (1) To ensure continuity of their weather, climate, water and related environmental programmes in Polar Regions;
- (2) To ensure that appropriate hydro-meteorological and related environmental data from publicly funded research is made available to the operational community in real time;
- (3) To provide additional observations in Polar Regions by using manned and automatic hydrometeorological stations, atmospheric soundings, and other geophysical observatories on land, by recruiting additional voluntary observing ships, by equipping aircraft with appropriate means of recording and distributing observations, and by deploying automated observing platforms on and under the sea and ice, in order to meet the needs of Numerical Weather Prediction (NWP), hydrological services, climate studies and research programmes;
- (4) To enhance their satellite programmes in delivering appropriate satellite observing system infrastructure and products and services required for polar regions;
- (5) To consider the possibility of cooperating with other Members in sharing the costs of re-opening and operating previously functioning stations, in expanding existing stations or in deploying new observing and communication systems;
- (6) To support WMO Polar Activities by providing both human and financial resources in its endeavours to enhance observations, research and services in polar regions;

Encourages Members to liaise with all their national groups which may have operational activities in Polar Regions;

Requests the Executive Council to:

- (1) Promote the coordination of weather, climate, water and related environmental activities in Polar Regions;
- (2) Ensure close collaboration with other international organizations concerned such as the Antarctic Treaty Consultative Meeting (ATCM), the Scientific Committee for Antarctic Research (SCAR), the International Arctic Science Committee (IASC), the International Association of Cryospheric Sciences (IACS) and other relevant associations of IUGG, the Arctic Council, the Council of Managers of National Antarctic Programmes (COMNAP), the

Forum of Arctic Research Operators (FARO), International Centre for Integrated Mountain Development (ICIMOD) and the Intergovernmental Oceanographic Commission (IOC) of UNESCO;

- (3) Ensure that WMO Polar and High Mountain Activities support the WMO Strategic Plan 2016–2019 and beyond;

Requests regional associations and technical commissions to support WMO Polar and High Mountain Activities;

Requests the Secretary-General to bring this resolution to the attention of all concerned.

Note: This resolution replaces Resolution 58 (Cg-XVI), which is no longer in force.

Draft Resolution x.5 (Cg-17)

INTERNATIONAL POLAR PARTNERSHIP INITIATIVE (IPPI)

THE CONGRESS,

Noting:

- (1) The Concept Note “International Polar Partnership Initiative” (IPPI) prepared by the Steering Group on a long-term cooperative international polar initiative,
- (2) The proposal of the Steering Group to endorse the World Meteorological Organization (WMO) participation in IPPI,
- (3) Resolution 59 (Cg-XVI) – International Polar Decade Initiative,
- (4) The Report of the Fifth Session of the Executive Council Panel of Experts on Polar Observations, Research and Services (EC-PORS) (Wellington, New Zealand, 25–28 February 2014),

Considering:

- (1) The important role of the polar regions in global weather, climate and hydrology, including extreme events, the changing carbon cycle and regional inhomogeneity of sea-level rise, and the “polar amplification” of climate change,
- (2) Ongoing activities in the both polar regions and particular significance of the Arctic “opening” for the global economy,
- (3) The need for effective environmental stewardship in the polar regions encompassing environmental risk management, preparedness for prevention of and response to pollution and conducting search and rescue operations, and support to local population including indigenous communities,
- (4) The elevated costs of field research and observations in the polar environment that impede the development of comprehensive and sustained regional observing systems and result in the insufficient understanding of underlying processes and reduced accuracy of environmental information including predictions in the polar regions and their interactions with the rest of the Globe,

- (5) Arctic Science Committee (IASC), the Scientific Committee for Antarctic Research (SCAR), and several other international organizations, the planning of the Year of Polar Prediction (YOPP), activities of the World Weather Research Programme Polar Prediction Project (WWRCP-PPP), of the World Climate Research Programme Polar Climate Predictability Initiative (WCRP-PCPI), the continuing development of the Global Cryosphere Watch (GCW), and polar activities of other WMO Programmes,
- (6) Multiple synergies between Arctic and Antarctic activities, research, observations and services in the polar regions conducted by other international partners and similar synergies between the polar, Third pole and high mountain regions,
- (7) Substantial investments in polar scientific research and infrastructure made by many countries during the International Polar Year 2007–2008 (IPY) and after IPY and their positive outcomes in terms of new technologies for observations and analysis and improved models for Earth system prediction,
- (8) The conclusion, by the Steering Group on a long-term cooperative international polar initiative, that the main polar issues are not addressed at present as effectively as required and that a failure to effectively address polar issues has the potential to impact future generations in major ways,

Recognizing:

- (1) That a number of international organizations expressed their support for the IPPI Proposal and Concept,
- (2) That WMO initiatives such as the Global Integrated Polar Prediction System (GIPPS), GCW, the Antarctic Observing Network (AntON) and the polar activities of the Joint WMO-IOC Technical Commission for Oceanography and Marine Meteorology (JCOMM) would provide a substantial contribution to an IPPI and would strongly benefit from contributions by partner organizations and improved coordination of activities with them,
- (3) That strengthened cooperation and improved coordination and sharing of resources proposed by IPPI could be achieved through a common implementation plan for the development of observing systems, research, services, education and outreach, and practical applications of knowledge in the polar regions,

Agrees to participate in IPPI based on the Concept attached in the Annex to this Resolution;

Requests the Executive Council through its Panel of Experts on Polar Observations, Research and Services:

- (1) To define and secure WMO representation in the relevant IPPI governing structures;
- (2) To work with IPPI participants to ensure and agree that WMO participation results in substantial support to achieving WMO polar objectives and contribution to WMO polar initiatives;
- (3) To coordinate participation of WMO in relevant initiatives that would be conducted under the auspices of IPPI;

Requests the Secretary-General to bring this resolution to the attention of all concerned.

Annex: 1

Note: This resolution replaces Resolution 59 (Cg-XVI), which is no longer in force.

Annex to draft Resolution x.5 (Cg-17)

CONCEPT: INTERNATIONAL POLAR PARTNERSHIP (INITIATIVE)

Why an IPP(I)?

People have always been fascinated by the Polar Regions. They are often thought of as remote snow and ice covered deserts, where only a few hardy people, explorers and scientists venture. However this view is changing and it's the science at the poles that is leading this change. The polar environment affects the Earth system and its climate in many ways, influencing weather patterns and extreme events worldwide. Both Polar Regions are being economically exploited and the "opening" of the Arctic will further increase its already significant role as a major player in the global economy. Despite the marked progress in environmental research, scientists are still getting to grips with the multitude and complexity of physical and biogeochemical processes that take place in the both Polar Regions, and how these relate to the rest of the globe. Because of interrelated physical processes, human activity and teleconnections, it cannot be stated any more plainly: ***what happens in the poles does not stay in the poles.***

Although at present there is wide recognition of the importance of polar issues, much of the current understanding and in particular the relationship between human and natural influences is incomplete. Indeed, we need to look at the poles as a fully coupled human-natural system. ***Change is outpacing our understanding*** of the Arctic and the Antarctic and our ability to provide knowledge for decision-making in polar-related activities.

What will the IPP(I) address?

An IPP(I) will:

- Bring together and coordinate those working on polar issues to identify synergies and effectively use existing resources to address important issues of common interest,
- Facilitate research to address interaction of human and biophysical systems on many timescales, and
- Develop a nuanced understanding of the human and natural processes in the poles that directly relate to the future of people around the world.

With these goals in mind, promising directions for IPP(I) are those which advocate for further, nuanced knowledge of the poles, engage all stakeholders, are relevant to societal issues, and, most importantly, benefit from enhanced collaboration and coordination in polar activities, such as:

- Establishing and maintaining polar observing, assessment, prediction, and services systems,
- Promoting interdisciplinary/multiplatform data collection, exchange, and interoperability,
- Building capacity in communities of polar scientists and practitioners,
- Developing a common language and cooperative synergistic relations between local peoples, social and natural scientists, and practitioners.

Are we adequately addressing key problems? If not, what will be the consequences?

The poles remain the most extensive data voids on the planet. Almost all current observing systems depend on short-term research funding, while contributions to polar predictions systems are available in prototype versions only. In the Arctic, polar information services needed for sustainable development suffer from a lack of adequate observations. In the Antarctic, the

inadequacy of the observing system results in lack of or insufficient understanding of several key processes.

The **main polar issues are not addressed at present as effectively as required**. There needs to be a considerably greater sense of urgency among decision-makers and awareness by the general public regarding the global importance of environmental issues in the Polar Regions and of the need to address them in a coordinated, sustained, planned, timely, and resourceful manner and to speed up the transition of activities from research to operations. **A failure to effectively address polar issues will be felt much more strongly and in an increased number and variety of ways by future generations.**

Are we in position to address the existing challenges in the Polar Regions? If yes, how?

The International Polar Year 2007–2008 produced an unprecedented “snapshot” of the Polar Regions, expanding greatly our understanding of the poles, while often providing as many questions as answers. At present **there is the scientific and technological possibility to ensure reliable and comprehensive monitoring of the Polar Regions** and to further deepen the understanding of main processes and phenomena and their interactions in **order to support informed decision-making**. However, current financial considerations require increased efficiency of using existing funding, aiming at high return on investment and focusing on practical use of research outcomes and the ability to do more with less. **Cooperation, coordination, and sharing of resources should therefore be the main strategy** for developing polar activities. Because it is a long-sighted initiative, the IPP(I) will be able to continue to ensure the training of future generations of polar researchers. To achieve the increased efficiency of joint activities by several organizations **a common implementation plan is needed for the development of observing systems, research, services, education and outreach, and practical applications of knowledge in the Polar Regions**. The plan should help to conduct future polar activities in a socially conscious manner and in a true cooperation with local residents.

Some possible successes the IPP(I) is poised to address are:

- Observation and data assimilation systems in the Polar Regions that are able to support skillful environmental predictions at a range of time scales, effective environmental assessments, early warning systems, search and rescue, and pollution prevention and combat operations,
- Other examples.

Scope of the IPP(I)

The IPP(I) is born out of a conviction that the magnitude of the changes at the poles and the strength of their interactions with the rest of the Earth system call for **full breadth of polar and environmental sciences, observations, data, analysis, modelling, prediction and services**. A cross-disciplinary and systems approach is needed to addresses **both natural and human systems** as well as their interaction. IPP(I) will not attempt to identify important research questions, but will defer this task to its qualified participants. Potential IPP(I) participants are already doing this through the International Arctic Science Committee’s 3rd International Conference on Arctic Research Planning (ICARP-III), “crowdsourcing” techniques such as the Scientific Committee on Antarctic Research’s Horizon Scan, and the International Arctic Social Science Association’s Arctic Human Development Report II. These “bottom-up” processes rely on expertise and enthusiasm of broad research communities.

The IPP(I) recognizes significant similarities between polar and alpine regions. Observing systems in alpine regions are generally less developed than elsewhere, much like the poles. Overlapping extreme environments can play host to related physical, ecological, or human systems. **Linkages between high latitude and high altitude environments are important** for the IPP(I) and will be included in the planning documents in all aspects where considerable synergies are to be expected.

Outreach, education, mentoring, training of **early career scientists and specialists**, both the North and South, are necessary conditions for the initiative's success and an investment into building the work force for decades to come. In addition, meaningful and resourceful involvement of the **local residents**, including indigenous peoples, should be ensured.

Who will participate in the IPP(I)?

In order to address polar challenges, major national and international agencies and organizations will have to have a broad range of individual and cooperative activities. Taking into account the stakeholders' main goals, objectives, resources and available expertise and comparing them with the magnitude of the challenges facing us, lead to the unequivocal conclusion that **no stakeholder can effectively achieve its objectives in the Polar Regions without efficient coordination and sharing resources with partners.**

This IPP(I) Concept Document has been developed with input from representatives of organizations such as:

- Arctic Monitoring and Assessment Programme (an Arctic Council Working Group),
- Association of Polar Early Career Scientists,
- GRID-Arendal (for UNEP),
- Intergovernmental Oceanographic Commission of UNESCO,
- International Arctic Science Committee,
- International Arctic Social Sciences Association,
- International Council for Science,
- International Hydrographic Organization,
- Mountain Research Initiative,
- Scientific Committee on Antarctic Research,
- UNESCO,
- University of the Arctic,
- World Meteorological Organization.

The IPP(I) is envisioned as a platform to bring together organizations (national, international, intergovernmental, academic, industrial, etc.) with interests in the goals and topics stated in this concept document. Because the IPP(I) aims to bring other groups to the same table and values coordination rather than additional new programmes itself, it is envisioned that it can be run by only a micro-secretariat (part time person?) which facilitates frequent and close communications between participants.

While international organizations provide a forum for discussion of issues, finding joint approaches and solutions, it is the nations that are the final beneficiaries of the joint activities and the main actors of them. Small funding for programme coordination will initially come from international agencies and programmes but the main bulk of resources required for research and development activities, field work, construction, and exploitation will come from interested nations.

Draft Resolution x.6 (Cg-17)**GLOBAL CRYOSPHERE WATCH (GCW)**

THE CONGRESS,

Noting:

- (1) Resolution 60 (Cg-XVI) – Global Cryosphere Watch (GCW),
- (2) The Sixteenth Congress decision develop the Global Cryosphere Watch as an IPY legacy with the goal of achieving an operational GCW,
- (3) The GCW working structure has been initiated and significant progress has been made toward an operational GCW,
- (4) The GCW Implementation Plan developed under the auspices of the Executive Council,

Considering:

- (1) The cryosphere is global, existing in various forms spanning all latitudes and occurring in approximately one hundred countries in addition to the Antarctic continent,
- (2) The cryosphere is an integrative element within the climate system and provides one of the most useful indicators of climate change, yet it is arguably the most under-sampled domain in the climate system,
- (3) Cryosphere-related feedbacks in the amplification of climate change cause impacts on weather, climate and hydrology globally,
- (4) The cryosphere, its changes, and its impacts, not only have received increased scientific scrutiny in recent years, but also now receive continual attention by decision makers and coverage by the media, creating an unparalleled demand for authoritative information on past, present and future states of the world's snow and ice resources,
- (5) The GCW is a significant component of the World Meteorological Organization Integrated Global Observing System (WIGOS) and the WMO Information System (WIS), particularly in promoting interoperable and reference observations, and near-real time data and information exchange,
- (6) The GCW is recognized as a significant contribution to developing and implementing cryosphere observations and services within the Global Framework on Climate Services (GFCS),
- (7) The GCW can only succeed by working with WMO Members and with other organizations which have cryospheric interests,
- (8) That the development of GCW has progressed with the limited resources allocated by Cg-XVI and with support from extrabudgetary resources,

Appreciating:

- (1) The important contributions Members, international partner organizations and programmes make towards the development of GCW,
- (2) The relevant work undertaken by Members, the Executive Council, Regional Associations, technical commissions, the EC Panel of Experts on Polar Observations, Research and Services (EC-PORS) on the development and implementation of the GCW initiative launched by Sixteenth Congress,

- (3) The contributions of Members to the PORS Trust Fund in support of GCW development,

Decides to mainstream and implement GCW in WMO Programmes as a cross-cutting activity;

Decides further that implementation activities will be undertaken during the next financial period as one of the major efforts of the Organization with the goal that GCW should become operational from 2020 onwards;

Invites partner organizations to:

- (1) Collaborate with WMO on the implementation of the GCW;
- (2) Support the implementation of GCW by providing both human and financial resources;

Requests the Executive Council to:

- (1) Establish a mechanism to steer and monitor the activity and to achieve the broadest possible collaboration and cooperation;
- (2) Ensure the active participation and representation of the principal bodies concerned and also the participation, as appropriate, of technical experts and representatives of agencies undertaking observing and research initiatives relevant to the cryosphere;

Requests the regional associations and technical commissions to include this activity in their work programmes in order to fully accommodate the cross-programme nature of GCW;

Urges Members:

- (1) To develop their observing systems to support the observing component of GCW;
- (2) To coordinate their WIGOS and WIS implementation activities with GCW implementation;
- (3) To provide experts to participate in the GCW-related work of EC-PORS and technical commissions;
- (4) To provide both human and financial resources to help support the implementation of GCW;
- (5) To support regional and global GCW implementation activities;
- (6) To keep the Secretary-General informed about their GCW implementation activities;
- (7) To share relevant experience and cooperate with one another in implementing GCW, including assistance to Members with specific GCW implementation needs;

Requests the Secretary-General:

- (1) To ensure management of, and provide support to, the implementation of the GCW;
- (2) To establish a GCW Coordination Office;
- (3) To coordinate and collaborate GCW activities with the United Nations system organizations and other relevant international organizations and programmes;

Note: This resolution replaces Resolution 60 (Cg-XVI), which is no longer in force.

ANNEX II
Annex to [paragraph 3.2.4](#) of the general summary

VALUE PROPOSITION FOR THE INTERNATIONAL EXCHANGE OF CLIMATE DATA AND PRODUCTS TO SUPPORT THE IMPLEMENTATION OF THE GLOBAL FRAMEWORK FOR CLIMATE SERVICES

When WMO Cg-XII adopted Resolution 40 in 1995, there was widespread agreement that the exchange of meteorological data at the global level was absolutely essential for there to be improvements in weather forecasting through data assimilation and ingestion into Numerical Weather Prediction models and all WMO Members have benefited from this decision through enriched accuracy of forecasts and improved forecast lead times. This amply shows the value of global exchange of data.

Similarly, Resolution 25, adopted by Cg-XIII in 1999, assisted the exchange of hydrological data between countries, especially in shared (transboundary) river basins. Such data exchange greatly enhances the shared and sustainable management of water resources and in times of flood threat improves the capability of nations to provide much required flood forecasting and warning services. This shows the benefits of neighbour to neighbour exchange of data.

Now in the 21st century, climate change has been shown to be a reality and we are again faced with coming to agreement with respect to the international exchange of data of importance at both global and regional levels. Changes in climate variability are important to many sectors and in a range of spatial and temporal dimensions. This is accompanied by widespread recognition that data in themselves only become of value when they are used to produce services and products that can be used for decisions in support of socio-economic and environmental benefits. Indeed free and unrestricted access to data can and does facilitate innovation and the discovery of new ways to use, and purposes for, the data. Figure 1 reminds us this data value chain.

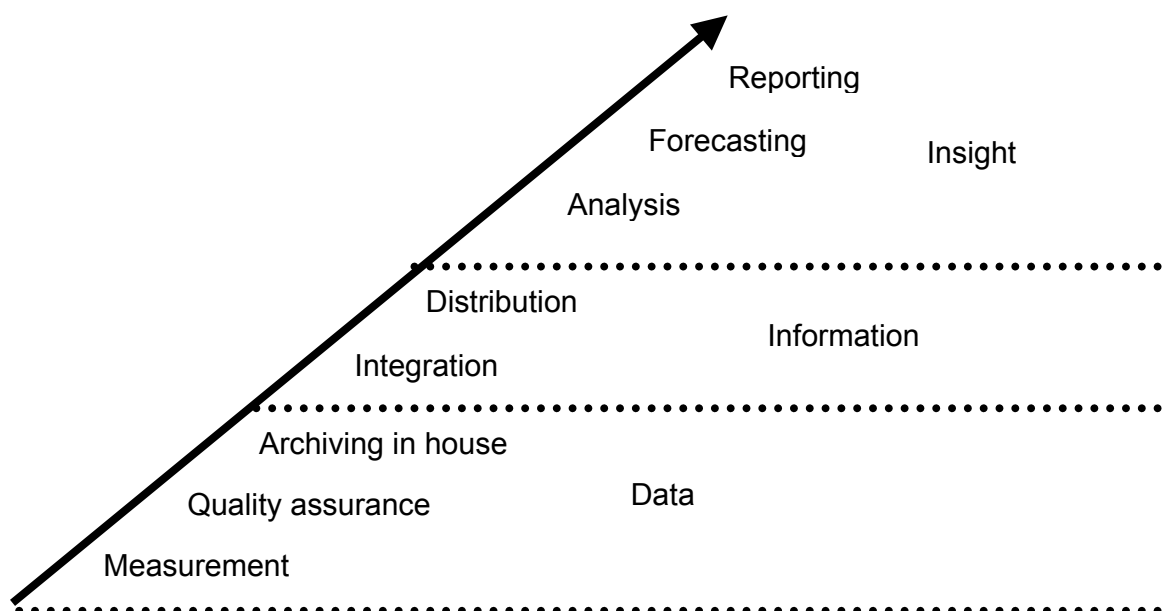


Figure 1: Increasing Value: Data >>> Information >>> Insight

Also, the 21st century has seen the rise of catch phrases such as: “*you cannot manage what you haven’t measured*” and “*data only reach their true value once they are used*”. For this to happen they must be available and accessible.

The benefits realized from climate data and products are greatly enhanced when combined with socio-economic information. Linking physical and social science information enables a wide range

of societal benefits and enhances decision support. The value of these tools and capabilities is traceable directly to practices of free and unrestricted data and products exchange. The greater the availability and sharing of the data, then the greater the applicability and accuracy of these tools and capabilities, which for society supports ready, responsive, and resilient communities.

However, the move from a practice of free and unrestricted access, such as that espoused in Resolutions 40 and 25 creates challenges for those countries that have initiated cost recovery policies with respect to data collection activities. These policies are primarily aimed at a return from investment of public monies and form part of the income of NMHSs used to operate and maintain observation networks. There is a need to address the issue of how to move the cost recovery component from the sale of data to cost recovery from the products and services derived from the data which contain the true value.

This requires NMHSs, or the countries themselves, to be in a position whereby they can receive a return from the investment in the data collection, either through charging for the products and services themselves, or gaining from cost recovery from those private sector agencies that provide the products and services. Capacity for product and services development and delivery is thus a key requirement in support of the implementation of a climate data exchange policy, particularly in least developed and developing countries and small island developing States. The GFCS provides the impetus to achieve this. A new approach to financing and funding of networks that sees cost recovery associated with value added products, returns on investment in societal benefits, public-private partnerships, etc. is needed and guidance on how this should be implemented is required.

This may also require Members to establish financial mechanisms, including new investments, for sustaining the network of stations and sensors needed for the global observing systems for climate, and also the maintenance and operation of the data preparation and management systems, necessary to support the implementation of the policy of free and unrestricted exchange of data and products.

The EC Task Team on the Climate Data Policy identified the following benefits from free and unrestricted access to climate data:

- (1) Better quality and greater variety of products and services, especially on a global and regional basis;
 - (2) Improvements to the numerous other services that are predicated on climate data and information;
 - (3) Enhanced national and international research into climate and an understanding of the climate system, leading to improved decision-making to benefit society;
 - (4) Better understanding/appreciation of the importance of these data and will likely lead to more support for the observing systems;
 - (5) Developing good regional products with the same quality and accuracy over the region;
 - (6) Encouraging local and regional studies related to the climate;
 - (7) Promoting education in the climate field, leading to a better understanding of climate, including its system and change;
 - (8) Promote and strengthen collaboration between providers and users of climate data and products.
-

ANNEX III
Annex to paragraph 3.2.5 of the general summary

**PROPOSED RESOLUTION FOR CONSIDERATION BY THE SEVENTEENTH
WORLD METEOROLOGICAL CONGRESS**

Draft Resolution xxx (Cg-17)

**EXCHANGE OF DATA AND PRODUCTS TO SUPPORT
THE IMPLEMENTATION OF THE GFCS**

THE CONGRESS,

Noting:

- (1) Resolution 40 (Cg-XII) – WMO policy and practice for the exchange of meteorological and related data and products including guidelines on the relationships in commercial meteorological activities,
- (2) Resolution 25 (Cg-XIII) – Exchange of hydrological data and products,
- (3) Resolution 16 (Cg-XVI) – Climate Data Requirements,
- (4) Resolution 48 (Cg-XVI) – Implementation of the GFCS,
- (5) Resolution 1 (Cg-Ext.(2012)) – Implementation of the GFCS,
- (6) Resolution 2 (Cg-Ext.(2012)) – Establishment of the Intergovernmental Board on Climate Services,
- (7) Resolution 6 (IOC-XXII) – IOC Oceanographic Data Exchange Policy,
- (8) Annex to paragraph 3.2.4 of the general summary of EC-65 – The role and operation of national meteorological and hydrological services – A Statement by the World Meteorological Organization,

Recalling that:

- (1) Cg-Ext.(2012) had adopted the Implementation Plan of the GFCS for further consideration by the Intergovernmental Board for Climate Services (IBCS)-1,
- (2) The vision of the GFCS is to enable society to manage better the risks and opportunities arising from climate variability and change, especially for those who are most vulnerable to climate-related hazards,
- (3) All eight principles for the implementation of the GFCS, in particular Principles 2, 5 and 6 which state that:
 - (a) A primary goal will be to ensure greater availability of, access to and use of enhanced climate services for all countries,
 - (b) Climate information is primarily an international public good provided by governments, which will have a central role in its management under the framework,
 - (c) Promote the free and open exchange of climate-relevant data, tools and scientifically based methods while respecting national and international policies,

- (4) The role of WMO (and its constituent bodies) in the establishment and maintenance of systems for the rapid exchange of meteorological and related information,

Considering:

- (1) That this Resolution will only apply to meteorological, hydrological, environmental and related data and products required to support the implementation of the GFCS, hereafter referred to as climate relevant data and products,
- (2) The fundamental importance of the free and unrestricted¹ exchange of climate relevant data and products to enable society to manage better the risks and opportunities arising from climate variability and change, especially for those who are most vulnerable to climate-related hazards,
- (3) The continuing importance, for the provision of climate services in support of the protection of life and property, of the free and unrestricted exchange of climate relevant data and products among WMO Members to facilitate the implementation of the GFCS,
- (4) The role of the World Data Centres (WDCs), the Global Producing Centres (GPCs) for Long Range Forecasts, the Regional Climate Centres (RCCs) and the Regional Climate Outlook Forums (RCOFs) in the provision of consolidated global and regional climate relevant data and products as identified in Climate Services Information System (CSIS) of the GFCS,
- (5) The WMO Statement on the role and operation of national meteorological and hydrological services in relation to the role of WMO Members' NMHSs in the provision of national climate relevant data and products in furthering applications of meteorology to all human activities,
- (6) The importance of the contribution of other GFCS partner organizations and the role these organizations can play in support of the goals and objectives of the GFCS,
- (7) The initial four priority areas for the implementation of the GFCS, health, disaster risk reduction, agriculture and food security and water and the climate relevant data related requirements of these priority areas as identified in the annexes to the Implementation Plan for the GFCS,

Recognizing:

- (1) The need for increased access to all types of climate relevant data and products,
- (2) The importance of access to reliable, relevant and timely data and products in supporting resilience to climate variability and change and underpinning sustainable development as espoused at various international forums, such as Rio +20, under the theme of the "Future We Want", and the meetings of the Conference of the Parties (COPs) of UNFCCC,
- (3) That increased availability of and access to climate relevant data, especially in data sparse regions, can lead to better quality and will create a greater variety of products and services,
- (4) That increased use of reliable climate products and stronger collaboration between providers and users can lead to improved climate-smart decision making, including those relevant to climate change issues,

¹ "Free and unrestricted" means non-discriminatory and without charge [Resolution 40 (Cg-XII) – WMO policy and practice for the exchange of meteorological and related data and products including guidelines on the relationships in commercial meteorological activities], in the context of this resolution, means at no more than the costs of reproduction and delivery, without charge for the data and products themselves.

- (5) That countries will benefit from the climate products that are derived through the use of their data at global, regional and national levels,
- (6) The rights of Members to choose the manner by, and the extent to, which they make their climate relevant data and products available domestically or for international exchange, taking into consideration relevant international instruments and national policies and legislation,
- (7) The importance of respecting the conditions of use set by the originators of the data and products, such as attribution, to facilitate access to the data and products,
- (8) The successful experience gained by Members in the development and implementation of Resolutions 40 (Cg-XII) and 25 (Cg-XIII),

Decides:

- (1) To adopt the policies and practices of Resolution 40 (Cg-XII) and Resolution 25 (Cg-XIII) for the exchange of climate relevant data and products to enable the achievement of the goals and objectives of the GFCS;
- (2) That Members shall provide, on a free and unrestricted basis, the climate relevant data and products described in Annex I to this resolution to enable society to manage better the risks and opportunities arising from climate variability and change for all nations, especially for those who are most vulnerable to climate-related hazards;
- (3) That Members should also provide the additional climate relevant data and products which are required to support and sustain the GFCS and WMO initiatives at the global, regional and national levels and, further, as mutually agreed, to assist other Members to enhance access to climate relevant data and in the provision of climate products in their countries. Such additional climate relevant data and products should be free of charge, but would have conditions associated with their use, such as, for example, restrictions on their use for commercial purposes, attribution of their source or licensing;

Urges Members to:

- (1) Strengthen their commitment to the free and unrestricted exchange of climate relevant data and products;
- (2) Increase the volume of climate relevant data and products accessible to meet the needs for implementation of the GFCS and the requirements of the GFCS partners;
- (3) Make use of the WMO Information System for the exchange of climate relevant data and products among Members;
- (4) Provide the related metadata as defined by the WMO Information System (WIS) and WMO Integrated Global Observing System (WIGOS);
- (5) Strengthen their commitments to the WMO WDCs and ICSU World Data System (WDS) in their collection and supply of climate relevant data and products on a free and unrestricted basis;
- (6) Implement the practice on the international exchange of climate relevant data and products, as described in Decides (1) to (3) above;
- (7) Inform all third parties of the terms and conditions associated with the additional climate relevant data and products (including their related metadata), such as ownership and attribution;

- (8) Make best efforts to ensure that users and subsequent users are aware of the conditions of use on the additional climate relevant data and products, particularly regarding their redistribution;

Encourages Members to establish financial mechanisms, including new investments, for sustaining the network of stations and sensors needed for the global observing systems for climate, and also the maintenance and operation of the data preparation and management systems, necessary to support the implementation of the policy of free and unrestricted exchange of climate relevant data and products;

Requests the Executive Council to:

- (1) Invite the president of the Commission for Climatology (CCI), in collaboration with the other technical commissions, in particular the president of the Commission for Basic Systems (CBS), to provide advice and assistance on the technical aspects of the resolution's implementation and ensure that appropriate standards are identified, implemented and maintained;
- (2) Task the technical commissions, as appropriate, to regularly review and update the climate relevant data and products to be provided by the global and regional climate centres with a view to increasing the access to and availability of climate relevant data and products;
- (3) Take into consideration the views of the IBCS with respect to the issues that may arise with the implementation of the resolution;
- (4) Foster initiatives that:
 - (a) Enhance the capabilities of Members, especially least developed countries (LDCs) and developing countries, to provide, deliver and improve access to climate relevant data and products to adequately respond to user needs and to enable their use in decision-making by all relevant societal sectors;
 - (b) Support Members in the implementation of this resolution, especially those who are most vulnerable to climate-related hazards;

Requests the Intergovernmental Board on Climate Services to:

- (1) Apply this resolution in the context of the implementation of the GFCS;
- (2) Maintain effective coordination with the GFCS partners, including FAO, WFP, WHO, UNISDR, UNESCO, UNDP, IOC, and other international organizations, and encourage them to adopt similar policies and practices to the free and unrestricted exchange of their related data and products in support of the GFCS;
- (3) Consider and recommend to Congress how third party data and products could be treated in the context of the implementation of this resolution;

Requests the Secretary-General to:

- (1) Assist NMHSs in making the case to their governments for establishing financial mechanisms, including new investments, for sustaining the network of stations and sensors needed for the global observing systems for climate, and also the maintenance and operation of the data preparation and management systems, necessary to support the implementation of the policy of free and unrestricted exchange of climate relevant data and products;
- (2) Bring this resolution to the attention of Members of WMO, ICSU WDS, WDCs, RCCs, GPCs GFCS partners and other involved international organizations;

- (3) Make known to all Members those climate relevant data and products which have conditions on their use;
- (4) Implement a process for monitoring the accessibility and exchange of climate relevant data and products under this resolution;

Further decides to review the implementation of this resolution at the Eighteenth Congress.

Annex to draft Resolution xxx (Cg-17)

CLIMATE RELEVANT DATA AND PRODUCTS TO BE EXCHANGED WITHOUT CHARGE AND WITH NO CONDITIONS ON USE

Purpose

The purpose of this listing of climate relevant data and products is to identify a minimum set of data and products which are essential to enable society to manage better the risks and opportunities arising from climate variability and change for all nations, especially for those who are most vulnerable to climate-related hazards, and which Members shall exchange on a free and unrestricted basis.

The climate relevant data and products which are essential include, in general, the data from the Regional Basic Climate Networks (RBCNs) and GCOS Surface Network and as many data as possible that will assist in defining the climate on at least a scale of the order of 200 km in the horizontal and daily in time.

Contents

In addition to the climate data and products provided under Annex I to Resolution 40 (Cg-XII), the following data and products, including those relating to the GCOS Essential Climate Variables (ECVs) (Atmospheric, Oceanic and Terrestrial):

- (1) All available¹ metadata for the data provided meeting the WIS/WIGOS metadata standards;
- (2) All available historical² climate³ time-series from the RBCN and the GCOS Surface Network at a time resolution necessary to resolve the statistics of climate, including trends and extremes;
- (3) All available climate relevant upper ocean data (0–700 m), in particular sea ice, temperature and salinity;
- (4) All available climate relevant coastal interface data, in particular sea level, waves and storm surges;
- (5) All available data on radiative forcing greenhouse gases and aerosols;
- (6) All available climate relevant satellite data and products;
- (7) All available streamflow and lake level data, including stage and discharge;

¹ "All available" means that the originators of the data can make them available under this resolution.

² "Historical data" are defined as observations that have been collected for as long a period as they are available.

³ "Climate data" are defined as meteorological observations that are older than 24 hours.

- (8) All available climate relevant cryospheric data, in particular snow cover, snow depth, glacial monitoring, permafrost and lake and river ice;
 - (9) All climate products distributed by ICSU WDS, WDCs, GPCs, RCCs, and RCOFs to meet their WMO obligations as defined by the CSIS of the GFCS;
 - (10) All available climate relevant data and products required for the current and future priority areas of the GFCS as defined in the Annexes to the Implementation Plan for the GFCS.
-

ANNEX IV

Annex to [paragraph 3.2.8](#) of the general summary

PROPOSAL ON THE DRAFT TERMS OF REFERENCE FOR A POSSIBLE FUTURE EXECUTIVE COUNCIL WORKING GROUP ON CLIMATE AND RELATED MATTERS

- (1) Regularly review and comment on the WMO Strategic Plan as it applies to climate and related weather, water and environmental matters and coordinate with EC and appropriate EC subordinate bodies in the formulation of the Plan;
 - (2) Provide guidance to the WCP, GAW, WWRP, HWRP & AMP on climate and related weather, water and environmental matters with the aim of strengthening collaboration and coordination with WMO constituent bodies and relevant bodies of other organizations;
 - (3) Provide strategic guidance on collaboration with co-sponsored programmes in the context of WCP, GFCS and other climate-related activities;
 - (4) Review decisions of other international organizations and UN conventions related to the functioning and activities of all climate-related programmes of WMO and assess the implications and recommend appropriate actions;
 - (5) Follow-up on the outcomes of major international conferences dealing with climate-related matters, taking into account the needs of developing and least developed countries and recommend appropriate actions;
 - (6) Collaborate with the Executive Council Working Group on Capacity Development and provide advice on mobilization of resources in support of climate services and related climate change adaptation needs of National Meteorological and Hydrological Services, particularly for developing and least developed countries;
 - (7) Collaborate with the Executive Council Working Group on Service Delivery with regard to climate services.
-

ANNEX V

Annex to [paragraph 4.4.6](#) of the general summary

WMO INTEGRATED GLOBAL OBSERVING SYSTEM FRAMEWORK IMPLEMENTATION PLAN

WORLD METEOROLOGICAL ORGANIZATION

WMO INTEGRATED GLOBAL OBSERVING SYSTEM (WIGOS)

WIGOS FRAMEWORK IMPLEMENTATION PLAN

(WIP)

Version 2.9

(19/03/2014)



VERSION CONTROL

Version	By	Date	Changes
1.0	EC-64	27/06/12	Approval by EC-64
1.0.1	WIGOS-PO	09/01/13	Consistency with WIR and R-WIP (RRR, WIR)
1.0.2	WIGOS-PO	20/02/13	Inputs into Table 2 (from OBS Task Action Plans)
1.0.3	WIGOS-PO	04/03/13	Inputs for Table 2 “Estimated costs (2012–2015)”
1.0.4	Chair, ICG-WIGOS	14/03/13	Minor corrections, adjustments
1.0.5	WIGOS PM	20/03/13	Suggestions by ICG-WIGOS-2
2.0	EC-65	17/05/13	Approval by EC-65
2.1	WIGOS-PO	20/05/13	Suggestions by JCOMM at EC-65 (paragraphs 2.3 and 2.8)
2.2	WIGOS-PO	30/09/13	Suggestions by IPET-WIFI-1 after considerations by Chair, ICG-WIGOS
2.3	WIGOS-PO	30/10/13	More details on resources (Table 2) on request of WIGOS POB-2
2.4	WIGOS-PO	31/01/14	Editorial by WIGOS-PO
2.5	Chair, ICG-WIGOS	02/02/14	Editorial and clarification (principally paragraphs 2.1, 2.2, 2.3 and 2.8)
2.6	WIGOS-PO	03/02/2014	Editorial by WIGOS-PO
2.7	WIGOS-PO	13/02/2014	Suggestions by ICG-WIGOS-3
2.8	WIGOS-PO	18/02/2014	Editorial by WIGOS-PO
2.9	WIGOS-PO	19/03/2014	Suggestions by Chair, ICG-WIGOS

CONTENTS

1. INTRODUCTION AND BACKGROUND
 - 1.1 Purpose of WIGOS and Scope of the WIGOS framework Implementation Plan (WIP)
 - 1.2 WIGOS Vision and Congress Guidance for WIGOS Implementation
 2. KEY ACTIVITY AREAS FOR WIGOS IMPLEMENTATION
 - 2.1 Management of WIGOS Implementation
 - 2.2 Collaboration with the WMO co-sponsored observing systems and international partner organizations and programmes
 - 2.3 Design, planning and optimized evolution of WIGOS component observing systems
 - 2.4 Observing System Operation and Maintenance
 - 2.5 Quality Management
 - 2.6 Standardization and Interoperability
 - 2.7 The WIGOS Information Resource
 - 2.8 Data Discovery and Availability (of Data and Metadata)
 - 2.9 Capacity Development
 - 2.10 Communications and Outreach
 3. PROJECT MANAGEMENT
 - 3.1 Project Framework
 - 3.2 Project monitoring, review and reporting mechanism
 - 3.3 Project evaluation
 4. IMPLEMENTATION
 - 4.1 Activities, Deliverables, Milestones, Costs and Risks
 5. RESOURCES
 6. RISK ASSESSMENT/MANAGEMENT
 7. OUTLOOK
- ANNEX I SUGGESTED WIGOS COMMUNICATIONS AND OUTREACH MATERIALS
- ANNEX II REFERENCED DOCUMENTS
- ANNEX III LIST OF ACRONYMS

WIGOS FRAMEWORK IMPLEMENTATION PLAN

1. INTRODUCTION AND BACKGROUND

1.1 Purpose of WIGOS and Scope of the WIGOS framework Implementation Plan (WIP)

The WMO Integrated Global Observing System (WIGOS) provides a new framework for WMO observing systems, including the contributions of WMO to co-sponsored observing systems. It is important to recognize that WIGOS is not replacing the existing observing systems, but is rather an over-arching framework for the evolution of these systems which will continue to be owned and operated by a diverse array of organizations and programmes. WIGOS will focus on the integration of governance and management functions, mechanisms and activities to be accomplished by contributing observing systems, according to the resources allocated on a global, regional and national level.

This plan for the implementation of the WIGOS Framework (WIP) addresses the necessary activities to establish an operational WIGOS Framework by the end of the period 2012–2015, as per the directive of the WMO Congress. Yet the WIGOS implementation will continue beyond 2015 through the governance and management mechanisms established by the execution of this plan.

The WIP also addresses a number of additional activities that would substantially improve the operational capabilities of WIGOS beyond the 2012–2015 Framework implementation; however these activities are dependent on resources in addition to the regular budget. If these activities are not completed, WIGOS can still be considered operational. The resulting system will, however, be less effective in achieving its goals and benefits to Members will be reduced or delayed.

This plan is laid out in several chapters that identify and describe the various activity areas to be addressed. Specific activities for each area are included in Table 2 (see Section 4), which identifies deliverables, timelines, responsibilities, costs and risks, and applicability to global, regional or national levels of implementation. Similar activities are grouped under the title corresponding to the respective sub-section of Section 2.

Following the Congress and Executive Council guidance WIGOS has produced and published a number of valuable documents detailing the concept, architecture, vision and brochure for WIGOS. These were used to great benefit by the WIGOS Pilot and Demonstration Projects and can be accessed from the following link: [WIGOS Basic and Communications Documents](#).

1.2 WIGOS Vision and Congress Guidance for WIGOS Implementation

The Sixteenth World Meteorological Congress decided that the enhanced integration of the WMO observing systems should be pursued as a strategic objective of WMO and identified this as a major expected result of the WMO Strategic Plan¹.

WIGOS vision calls for an integrated, coordinated and comprehensive observing system to satisfy, in a cost-effective and sustained manner, the evolving observing requirements of Members in delivering their weather, climate, water and related environmental services. WIGOS will enhance the coordination of WMO observing systems with those of partner organizations for the benefit of society. Furthermore, WIGOS will provide a framework for enabling the integration and optimized evolution of WMO observing systems, including WMO's contribution to co-sponsored systems. Together with the WMO Information System (WIS), this will allow continuous and reliable access to an expanded set of environmental data and products, and associated metadata, resulting in increased knowledge and enhanced services across all WMO Programmes.

¹ see http://www.wmo.int/pages/about/documents/1069_en.pdf

WIGOS implementation should be undertaken in an active and prudent manner in the sixteenth financial period and **will focus on a framework for improved governance, management, integration and optimization of the multiple observing systems coordinated by WMO**, so as to achieve a smooth transition, and no effort should be spared to make WIGOS operational by 2016.

The implementation of WIGOS should build upon and add value to the existing WMO observing systems with emphasis on integration of surface- and space-based observations in an evolutionary process to satisfy requirements of WMO and WMO co-sponsored Programmes. Since all WMO Programmes would benefit, each should actively participate and contribute its own expertise and resources in implementing WIGOS.

In implementing WIGOS, it is imperative that **the current management, governance and support activities be reviewed and aligned with WMO priorities**. This alignment would promote cooperation and coordination at the technical, operational and administrative levels.

Integrated satellite systems are an important and unique source of observational data for monitoring of weather, climate and the environment. It is important to further advance instrument intercalibration, data exchange, data management standardization, user information and training, in order to take full advantage of space-based capabilities in the context of WIGOS.

WIGOS will be essential for the Global Framework for Climate Services (GFCS), aviation meteorological services, disaster risk reduction, and capacity development as WMO priorities. It will also ensure a coordinated WMO contribution to the co-sponsored GCOS, GOOS, GTOS, and to the Global Earth Observation System of Systems (GEOSS).

2. KEY ACTIVITY AREAS FOR WIGOS IMPLEMENTATION

The component observing systems of WIGOS comprise the Global Observing System (GOS), the observing component of the Global Atmosphere Watch (GAW), the WMO Hydrological Observing Systems (including the World Hydrological Cycle Observing System (WHYCOS)) and the observing component of the Global Cryosphere Watch (GCW), including their surface-based and space-based components. The above component systems include all WMO contributions to the co-sponsored systems, i.e., GCOS, GOOS, GTOS, as well as the WMO contributions to GFCS and GEOSS.

To migrate the existing observing systems into a more integrated single system that is WIGOS, focused effort is required in the following key areas, detailed in the sub-chapters to follow:

- (a) Management of WIGOS implementation;
- (b) Collaboration with the WMO co-sponsored observing systems and international partner organizations and programmes;
- (c) Design, planning and optimized evolution;
- (d) Observing System operation and maintenance;
- (e) Quality Management;
- (f) Standardization and interoperability;
- (g) The WIGOS Information Resource;
- (h) Data Discovery and availability (of data and metadata);
- (i) Capacity development;
- (j) Communications and outreach.

2.1 Management of WIGOS Implementation

WIGOS implementation is an integrating activity for all WMO and co-sponsored observing systems: it supports all WMO Programmes and activities. The Executive Council and regional associations, through their respective working bodies, have a governing role in the implementation of WIGOS. The Sixteenth WMO Congress (Cg-XVI) decided that the technical aspects of WIGOS implementation will be guided by the technical commissions, with leadership provided through CBS and CIMO. Within the WMO Secretariat, WIGOS implementation will be supported by the WIGOS Project Office.

Members, individually and through their regional associations, will implement and manage WIGOS according to practices and procedures developed by technical commissions and described in WMO Regulatory Material on WIGOS. Therefore, the development of WMO Regulatory Material on WIGOS is a critically important step in WIGOS Framework Implementation.

Executive Council

The WMO Executive Council will continue to monitor, guide, evaluate and support the implementation of WIGOS. Following the guidance by Cg-XVI, EC-LXIII established the Inter-Commission Coordination Group on WIGOS (ICG-WIGOS) with a view to providing technical guidance and assistance for the planning, implementation and further development of the WIGOS component observing systems. Progress on implementation of WIGOS will be reported to subsequent sessions of EC. The Council designated the president of CBS as chairperson of ICG-WIGOS. The president of CBS subsequently delegated the role of chairperson of ICG-WIGOS to the vice-president of CBS.

Technical Commissions

Given the need for significant and active cooperation and enhanced coordination among the technical commissions, in particular those with responsibility for the WIGOS component observing systems, the ICG-WIGOS will ensure that technical aspects of WIGOS implementation are incorporated in the work programmes and implementation plans of all those WMO Technical Commissions concerned.

Regional Associations

Regional associations will play an essential role in WIGOS implementation. Regional associations, through their WIGOS regional working bodies (working groups, or task teams), will coordinate planning and implementation of WIGOS on the regional level taking into account all WMO future priorities, such as GFCS and DRR. The regional working bodies, under guidance from ICG-WIGOS, will be responsible for:

- (a) The development of regional WIGOS Implementation Plans;
- (b) The integration of WIGOS regional network components into a concept such as the Regional Basic Observing Network; and
- (c) The evolution of their regional networks according to the implementation plan for the evolution of global observing systems (EGOS-IP)².

Regional WIGOS implementation plans will also address regional aspects of requirements, standardization, observing system interoperability, data compatibility, data management, Quality Management procedures including performance monitoring and data quality monitoring, and proposed improvements in observing networks/systems. An important role of RAs will be to assess and continuously monitor regional requirements, identify regional gaps and identify capacity development projects to address those gaps.

² <http://www.wmo.int/pages/prog/www/OSY/gos-vision.html#egos-ip>.

WMO Members

Building on the WIGOS Framework Implementation Plan (WIP) and the Regional WIGOS Implementation Plan (R-WIP), Members are requested to develop their National WIGOS Implementation Plan (N-WIP) to help them to plan, implement, operate and maintain national networks and observing programmes based on the standards, recommendations and best practices stated in the WMO Technical Regulations and its WIGOS Manual. They will be encouraged to adopt a composite network approach to their networks and to include the acquisition, and onward transmission, of data from external sources, including NMHSs and other government agencies, the commercial sector and members of the public. A particular area of focus for WMO Members under WIGOS will be increased attention to site protection and radio frequency spectrum protection.

Plans should also be developed to strengthen cooperation through partnership with different owners overseeing the WIGOS component observing systems. Specifically, these activities aim to enhance cooperation amongst meteorological, hydrological, marine/oceanographic and academic/research institutions/services where they are separated at the national level.

Concerning Radio Frequency Spectrum Protection, Members should maintain close coordination with their national telecommunication authorities to register their frequencies for adequate protection, and to defend the availability of frequencies for Meteorology, Climatology and Earth observations, influencing positively the national delegations to the World Radiocommunication Conferences (WRC).

WMO Secretariat

The overall coordination and support to WIGOS implementation will be performed by the WIGOS Project Office³ under the guidance of the WMO constituent bodies and the WIGOS Project Oversight Board (POB/WIGOS) which is responsible for the coordination mechanism within the Secretariat. The WIGOS Project Office will also be in regular contact with the relevant partner organizations in relation to the implementation of WIGOS.

2.2 Collaboration with the WMO co-sponsored observing systems and international partner organizations and programmes

WIGOS will be an integrated, comprehensive, and coordinated system primarily comprising the surface-based and space-based observing components of the GOS, GAW, GCW, and WMO Hydrological Observing System (including WHYCOS), including all WMO contributions to GCOS, GOOS and GTOS. It should be noted that in contrast to the primarily NMHS owned observing systems upon which the WWW was built, the proposed WIGOS component observing systems are owned and operated by a diverse array of organizations, both research and operational. Therefore, the interaction between these various communities is important for the implementation of WIGOS. In particular, strengthening the interaction between research and operational observing communities is important for sustaining and evolving observing systems and practices, in line with new science and technology outcomes. WIGOS is a major observing component of GFCS and, in conjunction with the WMO Information System (WIS), will also provide indispensable contributions to GEOSS.

Partner Organizations and Programmes

Improved coordination and cooperation will need to be supported by a high-level reconciliation mechanism to be defined in the WMO-UNESCO/IOC-UNEP-FAO-ICSU MOU, in order to resolve possible problems in data policy, product delivery and other governance issues. These interagency and inter-observing system coordination mechanisms will need to be complemented and supported through similar cooperation and coordination arrangements among NMHSs and through national implementation mechanisms for GFCS, GCOS, GOOS, GTOS, and GEOSS.

³ Established following Resolution 50 (Cg-XVI)

The Architecture for Climate Monitoring from Space should be defined as an end-to-end system, involving the different stakeholders including operational satellite operators and R&D space agencies, the Coordination Group for Meteorological Satellites (CGMS), the Committee on Earth Observation Satellites (CEOS), the Global Climate Observing System (GCOS), the World Climate Research Programme (WCRP) and the Group on Earth Observations (GEO). Within the WMO context, the Architecture shall be part of the space-based component of WIGOS. Therefore, particular emphasis will be placed on their coordinated contribution to WIGOS, building on existing coordination mechanisms stated above.

2.3 Design, planning and optimized evolution of WIGOS component observing systems

The WMO has agreed on the Vision for the Global Observing Systems in 2025⁴ which provides high-level goals to guide the evolution of the global observing systems during the coming decades. To complement and respond to this Vision, an Implementation Plan for the Evolution of Global Observing Systems (EGOS-IP) was approved by CBS-15 (September 2012) for consideration by EC-65 (May 2013). This EGOS-IP focuses on the long-term evolution of WIGOS component observing systems, while the WIGOS-IP focuses on the integration of these component observing systems. Beyond 2015 these plans will provide Members with clear and focused guidelines, specifying actions that stimulate the cost-effective evolution of the observing systems to address in an integrated way the requirements of all WMO Programmes and relevant parts of co-sponsored programmes.

Concerning the surface-based sub-system of WIGOS, the current composition of mainly separate networks of observing stations comprises numerous different types of sites, for example:

- (a) Surface synoptic stations (Land and Sea stations);
- (b) Upper-air synoptic stations (Land and Sea stations);
- (c) Aircraft meteorological stations;
- (d) Aeronautical meteorological stations;
- (e) Research and special-purpose vessel stations;
- (f) Climatological stations;
- (g) GCOS Surface Network (GSN);
- (h) GCOS Upper-Air Network (GUAN);
- (i) GCOS Reference Upper-Air Network (GRUAN);
- (j) Agricultural meteorological stations;
- (k) Hydrological stations; and
- (l) Special stations, that include:
- (m) Weather radar stations;
- (n) Radiation stations;
- (o) Wind profiler stations;
- (p) Atmospheric detection stations (lightning detection network stations);
- (q) Micrometeorological flux stations;
- (r) Plant phenology observing stations;

⁴ Available from the WMO Website at: <http://www.wmo.int/pages/prog/www/OSY/gos-vision.html>

- (s) Meteorological rocket stations;
- (t) Global Atmosphere Watch (GAW) stations;
- (u) Global Cryosphere Watch stations, including CryoNet stations;
- (v) Planetary boundary-layer stations;
- (w) Data buoys (drifting and moored) and ocean surface gliders;
- (x) Ocean profiling floats and sub-surface gliders;
- (y) Ship-based observations (surface marine, oceanographic, and upper-air);
- (z) Tide-gauge stations; and
- (aa) Tsunami monitoring stations.

With the implementation of WIGOS, these separate networks will continue to evolve but will also be given a more prominent collective identity as the WIGOS surface-based sub-system and for some purposes may be considered as a single composite system of observing (fixed or mobile) sites/platforms. Regional associations will adopt a broader role in coordinating the implementation of relevant elements of the WIGOS surface-based sub-system, evolving from the previous concepts of the synoptic and climatological networks. Additional networks will be added as WIGOS evolves.

Similarly, the space-based sub-system of WIGOS is composed of many different platforms and types of satellites. There is already partial integration due to the existence of a globally coordinated plan, which is maintained by WMO and CGMS, and which takes into account the needs of a number of application areas. However, it should be further developed and expanded to better support certain application areas that, at present, are not benefiting from the full potential of space-based observations, for example, other components of GAW and the WMO Hydrological Observing System and new initiatives like GFCS and GCW. In addition, further integration shall be pursued in terms of inter-calibration, data and product harmonization, and composite product delivery. Regional associations will adopt an active role for compiling the views of Members and maintaining documented requirements and priorities for data and products to be available from the WIGOS space-based sub-system.

Rolling Review of Requirements (RRR)⁵

Coordinated strategic planning at all levels will be based on the RRR process, and will be supported by the WIGOS regulatory material.

The RRR process involves regularly reviewing the observational data requirements⁶ for each of the defined WMO Application Areas and all required variables (see Table 1). The RRR process also involves reviewing the capabilities of WMO observing systems and co-sponsored systems, and the details of the networks/platforms in existence⁷, for both space-based and surface-based systems, in delivering data on different variables. The comprehensive information collected for the globe on both requirements and capabilities is quantitatively recorded in a database accessible through the Observing Systems Capability Analysis and Review tool (OSCAR⁸) of the WIGOS Information

⁵ Currently specified in the *Manual on the Global Observing System* (WMO-No. 544), elaborated in the *Guide to the Global Observing System* (WMO-No. 488), and described further on the WMO website at <http://www.wmo.int/pages/prog/www/OSY/GOS-RRR.html>

⁶ The RRR describes data requirements, which are expressed in terms of space/time resolution, uncertainty, timeliness, etc., for each of the required observed variables, and are measures independent of observing technology.

⁷ Capabilities are derived from the individual platforms characteristics submitted by Members to WMO e.g. through WMO-No. 9, Volume A, or its evolution

⁸ The following components are currently available via the WMO website: User Requirements: <http://www.wmo.int/pages/prog/www/OSY/RRR-DB.html>; and Space-based capabilities: http://www.wmo.int/pages/prog/sat/gos-dossier_en.php. The surface-based capabilities part is currently under development.

Resource (WIR, see section 2.7 below). The information on surface-based networks and instrumentation details is currently recorded in WMO Publication No. 9, Volume A, but will ultimately be available, with additional metadata, through OSCAR. Space-based capabilities are also recorded and made available through OSCAR. OSCAR allows the performance of gap analyses to identify weaknesses in existing observing programmes.

The above steps represent the analysis phase of the RRR, which is as objective as possible. Next is the prioritization and planning phase of the RRR in which experts from the various application areas interpret the gaps identified, draw conclusions, identify key issues and priorities for action. This input is composed as Statements of Guidance (SoG) from each application area. The technical commissions respond to the SoG by formulating new global observing system requirements and the regulatory and guidance publications to assist Members in addressing the new requirements. Additionally, CBS and other technical commissions draw on the SoGs to develop a Vision and an Implementation Plan for further developments of WIGOS.

Table 1: The 12 recognized WMO Application Areas

No.	Application Area	No.	Application Area
1	Global NWP	7	Ocean Applications
2	High Resolution NWP	8	Agricultural Meteorology
3	Nowcasting & Very Short-range Forecasting	9	Hydrology ⁹
4	Seasonal to Inter-annual Forecasts	10	Climate Monitoring
5	Aeronautical Meteorology	11	Climate Applications
6	Atmospheric Chemistry	12	Space Weather

At the Regional Level

The primary coordination of the RRR will lie with CBS for overall WIGOS planning. Regional associations, through their respective WIGOS regional working bodies, will follow the technical guidance of the technical commissions as represented in the EGOS-IP and other observing system implementation plans in order to evolve and implement observing systems in the various Regions.

Regional associations will also be encouraged to examine, and report back to CBS, the global requirements for data, taking into account the particular requirements of the Region and international river basin authorities. This process will involve, in essence, the use of the global data to prepare regional data requirements, then use this for planning of WIGOS component observing systems at the regional scale and then encourage Members within the Region to implement these components, subject to further review at the national or subregional level, where appropriate.

The regional associations will also coordinate and identify issues regarding the data and product utilization needs of Members especially in regard to the application of actions and guidance from EGOS-IP and this Plan to inform and influence global level implementation and activities including the RRR.

At the National or Subregional Level

WMO Members will contribute to the collective regional effort to evolve and implement observing systems following the EGOS-IP and other observing system implementation plans.

WMO Members will also have available the global and regional data requirements information available to use as guidance for the preparation of national requirements information which can

⁹ Hydrological information only; water quality monitoring and information are currently excluded.

then be used to carry out the detailed planning for evolution of national WIGOS component observing systems.

In some cases, where countries are small and geographically close or already have established multilateral working relationships, there may be more merit in taking a subregional, as opposed to national, approach to WIGOS observing infrastructure planning. In this case, it will be necessary for the Members concerned to work in close cooperation to prepare subregional reviews of requirements to be used as a basis for detailed planning at that scale.

2.4 Observing System Operation and Maintenance

Observing system owners or custodians are responsible for operating and maintaining their systems and for complying with the regulations of the WMO and co-sponsored observing systems to which they contribute. System owners are generally NMHSs or other organizations within WMO Member countries but are sometimes other entities.

WIGOS involves, between observing systems, a process for sharing of operational experiences, of ideas and best practices, of expertise and for pooling resources for joint activities, such as done within EUMETNET¹⁰. The benefit is to realize synergies and greater efficiencies. These interactions may be between different teams within a single organization (such as an NMHS) or between organizations. These may benefit from technical guidance from relevant technical commissions and, while occurring primarily at a national level, may also occur at a regional or global level. For example:

- (a) Maintenance visits: meteorological, hydrological and other networks often require their technicians to visit similar geographical areas to maintain observing equipment. It may be possible, where appropriate, to manage maintenance visits as a joint activity thereby realizing efficiencies;
- (b) Spectrum management: greater influence nationally which feeds into ITU;
- (c) Calibration and Traceability: Potential for efficiencies and improvements to observational data quality through combining efforts at a national, regional and global level;
- (d) Procurement: considerable effort is often required to conduct procurement processes for observing systems. Where requirements allow, a joint procurement exercise can realize significant efficiencies;
- (e) Protection of weather radar from wind turbine interference: shared risk and greater influence with planning objections;
- (f) Many synergies are achieved by satellite operators through CGMS and the WMO Space Programme by harnessing the joint efforts of satellite operators, and these best practices will be expanded further to new WMO initiatives like GFCS.

It should also be noted that WMO Members need to increase their efforts to maintain metadata and provide it to WMO so that WIGOS support tools are effective.

2.5 Quality Management

Meeting the quality requirements and expectations of users will be critical to the success of WIGOS. This will require an in-depth examination of current practices used by WMO observing programmes, specific mission-related requirements that were already in place, and available technological opportunities. The WIGOS Quality Management will specify all processes for WIGOS component observing systems including guidance on its effective management.

¹⁰ A grouping of 29 European National Meteorological Services that provides a framework to organize co-operative programmes between its Members in the various fields of basic meteorological activities.

The WIGOS Quality Management approach is to apply the WMO Quality Management Framework (QMF) to the WIGOS component observing systems (see WMO *Technical Regulations* (WMO-No. 49), Vol. IV). WIGOS Quality Management will strive for compliance of all components of WIGOS with international standards, such as ISO 9001/9004 and the ISO 17025 standard where appropriate (i.e. with respect to instrument calibration and traceability of data). In addition to the WMO QMF document, further guidance to Members on WIGOS Quality Management will be provided via the standards and recommendations described in the Regulatory Materials, such as the Manual on WIGOS, and best practices in the Guide to WIGOS. Such guidance, for both mandatory and desirable practices and procedures, can be referenced for the application and implementation of quality management in national observing systems. In this context, WIGOS will give attention to:

- (a) The examination of current quality management practices being used by WMO observing programmes;
- (b) The documentation of the quality of observation at all stages of data processing; and
- (c) Ensuring, where possible, traceability to the International System of Units (SI).

One component of WIGOS worthy of particular mention in the context of quality management is the space-based component. CGMS, in coordination and collaboration with WMO, supports the development of quality assurance standards and formats for satellite observations, multi-satellite and multi-sensor algorithms for estimating retrieved data and products, and advanced atmospheric sounding derivation packages for use by WMO Members. This is a well-established and effective process and it is expected it will continue to address WMO's new requirements and to make significant contributions. To assist this effort, WIGOS will also ensure that surface-based sites that are needed for calibration/validation of satellite data are specified.

A key aspect of WIGOS Quality Management that requires particular attention under WIGOS is the systematic and rigorous performance monitoring and evaluation (PM&E) of WIGOS capabilities, in terms of both: (a) the flow of observational data/products to models; and (b) provision of products/information for decision-support tools and services in accordance with requirements specified by end users. Effective PM&E can improve the overall performance of WIGOS and its ability to effectively interact with its user community and to meet community needs and requirements.

In summary, responsibility for the development of WIGOS Quality Management, and for the provision of guidance to Members on how to achieve compliance with the relevant technical standards, lies with the WMO Technical Commissions and with CGMS, while the responsibility for ensuring compliance with the WIGOS quality principles (such as ISO 9001, 9004, 17025) will fall primarily to the WMO Members themselves.

2.6 Standardization and Interoperability¹¹

A key area for WIGOS standardization relates to instruments and methods of observation. Standardization of observations is required to achieve system interoperability (including data compatibility) across all WIGOS component observing systems and these are key to turning observations into effective data/products that meet real needs of all Members.

WIGOS standardization should build on existing WMO and other international standards and best practices, and take into account the ongoing rapid progress in technology that will continue to provide a basis for further improvements in the capability, reliability, quality and cost-effectiveness of observations.

System interoperability and data compatibility also rely on the use of standardized data representation and formats, standardized methods for information exchange, and standardization in data management. The first two lie in the WIS domain and the third is a natural extension of WIS

¹¹ Interoperability is a property referring to the ability of diverse systems to work together (inter-operate)

responsibilities. It is important that WIGOS and WIS implementation activities are closely coordinated in this respect, and that WMO agrees on an approach to standardizing data management across Programmes.

All standard and recommended practices and procedures will be documented in the WMO Technical Regulations, including the Manual on WIGOS and other relevant Manuals. Other guidance material will be documented in the Guides and other technical documentation under the responsibility of the respective technical commissions.

2.7 The WIGOS Information Resource

The WIGOS Information Resource (WIR), accessible via a centralized access point (web portal), will provide access to all WIGOS related operational information, including observational user requirements, a description of the contributing observing networks (instrument/site/platform metadata), and their capabilities, lists of standard and recommended practices and procedures used in the WIGOS framework, data policies applicable, and information on how to access data. It will also provide general information on WIGOS benefits, and impacts to Members. It will be a tool for conducting critical reviews as part of the Rolling Review of Requirements process, and it can be used to assist Members and regional associations in conducting observing network design studies as appropriate. It will contain guidance on how to develop capacities in developing countries according to WIGOS requirements, and will be providing them with a toolbox to be used nationally if and when required. The information collected is intended in particular to identify the gaps in the observing networks, identify areas where existing observing systems could be used, or their scope expanded at limited cost to address the requirements of more application areas. The information provided on standard and recommended practices and procedures will support the production of more homogeneous data-sets and make the observations traceable and of known quality.

The WIR will also include information on planned observing networks, and the planned evolution of existing observing systems, allowing having a vision of the future global, regional, and national contributions to WMO networks, and how they will address user requirements. It will rely on and give access to key WIGOS support tools as shown schematically in Figure 1. Based on feedback from Members and users of the information resource, the need for additional functionality and/or information sources to be accessible from within the resource will be considered by ICG-WIGOS once it has been implemented.

The key support tools of WIR are:

1. **The Portal:** A portal with access to general information and to the other components;
2. **The “Standardization of Observations” Reference Tool (SORT):** A tool linking to information on WIGOS standards and recommended practices and procedures;
3. **The Observing Systems Capabilities Analysis and Review tool (OSCAR):** A tool for Rolling Review of Requirements (RRR) process, network design and planning, providing information on observational user requirements and observing systems capabilities, including description of WIGOS component observing systems (i.e. observational metadata), and linkages to existing databases (e.g. WMO Country Profile database, when applicable).

For further details, reference is made to the Functional Requirements of the WIGOS Information Resource (WIR) available at www.wmo.int/wigos (Principal Documents).

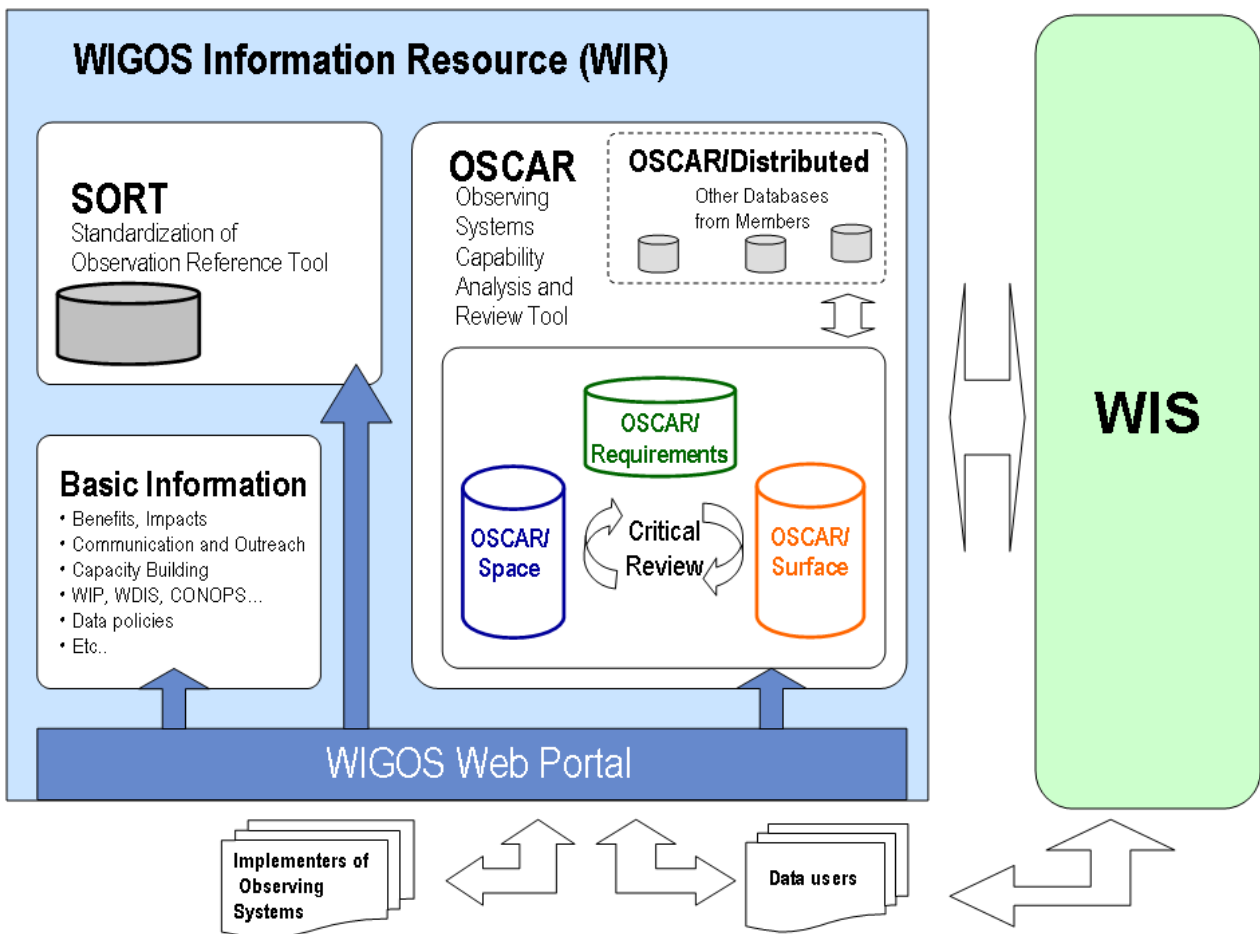


Figure 1: WIGOS Information Resource (WIR) and its Key Support Tools

2.8 Data Discovery and Availability (of Data and Metadata)

An important aspect of WIGOS implementation is to develop WIGOS (interpretation)¹² metadata and ensure all Members adopt WIGOS standard and recommended practices and procedures and make their data and metadata available. Relevant regulations and guidance will be developed and provided through the WIGOS relevant regulatory material.

Submission, management and archival of the data and metadata themselves is generally the responsibility of observing system owners/data custodians. However, several World Data Centres and a number of regional or specialized data centres exist that collect, manage and archive basic observational data that are relevant to WMO Applications.

Within the WIGOS framework, the WMO Information System (WIS)¹³ provides the means for exchange of data and (to a limited extent) interpretation metadata, and management of related discovery metadata¹⁴. These discovery metadata play an important role in the discovery, access and retrieval of WIGOS observations. In this regard, promotion and implementation of WIS will be supported and encouraged, through the operation of Global Information System Centres (GISCs), Data Collection and Production Centres (DCPCs) as well as National Centres.

¹² Interpretation metadata is the information required to interpret the data

¹³ <http://www.wmo.int/wis>

¹⁴ Discovery metadata is the information describing the data-sets, generally using ISO-19115 standard, and WMO core profile in case of WIS

Notably, data discovery, access and retrieval (DAR), itself falling in the WIS domain, is critically dependent on the archival of data. Data archival is not an aspect dealt with under either WIS or WIGOS, but is described in the WWW/Manual on the GDPFS.

WIGOS has been charged by EC with the task of including observations from high-quality stations operated by non-NMHS or third-party agencies (e.g. research laboratories, CTBTO), with the intent they be shared and discoverable via WMO information systems such as the GTS and WIS. For many of the WIGOS component observing systems, such as GAW, GCW and marine observing systems, access to such observations from partner organizations are critical to their mandate. Whereas many such organizations are very willing to share their data, some are facing substantial difficulties in: (a) obtaining WMO station IDs; and (b) in accessing the GTS/WIS to perform downstream quality monitoring as a normal duty of responsible data originators. These problems have existed for some time without adequate resolution and will continue to hamper the effective operation and outreach mission of WIGOS unless addressed.

2.9 Capacity Development

A coordinated capacity development effort at global, regional and national levels is of paramount importance to the developing countries. This is especially the case for NMHSs of Least Developed Countries (LDCs) and Small Island Developing States (SIDSs), to enable them to develop, improve and sustain national WIGOS component observing systems. This needs to be complemented by capacity development efforts outside of WIGOS but in closely related areas to improve access to, and effective utilization of, observations, data and products, and related technologies. The WIGOS capacity development activities at national and regional levels are focused on:

- (a) Providing assistance to Members to introduce or improve institutional mandates and policies that enable effective implementation, operation and management of observing systems;
- (b) Filling the existing gaps in the design, operation and maintenance of WIGOS observing systems, including both the infrastructure and human capacities development;
- (c) Technological innovation, technology transfer, technical assistance and decision-support tools.

Capacity development in satellite applications for developing countries, LDCs and SIDSs are also addressed in the Implementation Plan for the Evolution of the GOS (see WMO/TD-No. 1267). The virtual lab (VL) will continue to grow and help all WMO Members realize the benefits of satellite data.

2.10 Communications and Outreach

WIGOS will establish its communications and outreach strategy through the efforts of WMO Members, Programmes, Regional Associations (RAs) and Technical Commissions (TCs), and co-sponsors. The strategy will start by describing its purpose, the target audiences and the key messages to be conveyed to those audiences.

The strategy will provide details on WIGOS benefits, increased effectiveness, and efficiency, and impact on the WMO Members activities, as well as on the socio-economic benefits of WIGOS data. It will take advantage of outreach programmes developed and effectively deployed so far by WMO and its partner organizations. It will also provide material useful for growing WIGOS at the national level, including case studies highlighting success stories as well as growth opportunities. A suggested list of outreach materials identified to support WIGOS is shown in Annex I.

The WIGOS Portal will provide convenient access to relevant information on communications, outreach and capacity development, aimed at complementing, not duplicating, others' efforts. A variety of outreach materials will be developed to educate the Members, funding agencies, policy-makers and the general public, on the importance of WIGOS to society. Materials include posters

and other educational material for elementary and high school classes, a WIGOS brochure, a semi-annual or annual newsletter, an online photo and video library, and information on the current state of the observing systems.

3. PROJECT MANAGEMENT

3.1 Project Framework

The implementation of the WIGOS framework will proceed with the support of the WIGOS Project Office and with the following project oversight arrangements:

- (a) EC-LXIII established ICG-WIGOS to provide technical guidance and assistance for the planning, implementation and further development of the WIGOS framework and designated the president of CBS as chairperson of ICG-WIGOS; and
- (b) The administrative structure within the WMO Secretariat. The WMO Secretariat, through the WIGOS Project Oversight Board (POB/WIGOS), with WIGOS-relevant programmes and departments (OBS, RES, CLW, WDS and DRA) provides integrated support to ICG-WIGOS, its Task Teams and other relevant working bodies.

3.2 Project monitoring, review and reporting mechanism

- (a) The Executive Council will monitor, review, guide and support the overall implementation of WIGOS;
- (b) The ICG-WIGOS will report to subsequent sessions of the Executive Council on the progress in implementation of WIGOS;
- (c) The WIGOS Project Office, under the institutional guidance of the WMO constituent bodies and through the Secretariat internal coordination and oversight mechanism, will be responsible during the implementation phase for reporting to all WMO constituent bodies and Members on a regular basis, to present and document the progress in the WIGOS implementation as well as for the purpose of their close and active involvement.

3.3 Project Evaluation

The evaluation methodology will be designed against WIGOS implementation activity tables, i.e. with respect to the activities, deliverables, timeline, responsibility and budget allocations. This will include a schedule of monitoring and evaluation activities and related responsibilities. Mid-term evaluation, interim progress reports and post-implementation reviews are planned as a means of providing early feedback on progress towards success, and as a means of meeting accountability and transparency requirements for the whole implementation phase. RAs, TCs and NMHSs will provide progress reports at the request of the WIGOS Project Office.

4. IMPLEMENTATION

4.1 Activities, Deliverables, Milestones, Costs and Risks

Cg-XVI established a goal of WIGOS becoming operational by 2016. Table 2 presents the key implementation activities that are required for WIGOS implementation within the timeframe 2012–2015. The table is arranged to correspond to the activity areas presented in Section 2. In the table each implementation activity is presented along with its associated deliverables, timelines, responsibilities, costs and associated risk.

For each activity in Table 2, a detailed activity plan will be developed by the responsible entity or entities, with support of the WIGOS Project Office and guidance from ICG-WIGOS. The Project Office has responsibility for tracking execution of these activities and this plan itself.

Table 2. WIGOS Implementation Activities

Activities in **bold** are considered **the most critical** for WIGOS to be implemented by 2015.

Depending on the implementation scale, planned activities are specified as follows: **G** = Global activity, **R** = Regional activity and **N** = National activity.

Key to activity numbers: **a.b.c**, where **a** is number of respective sub-section of section 2, **b** is for a global (1), regional (2) or national (3) activity, and **c** is a sequential number to distinguish activities from one another. RQ: Required Resources. RB = Regular Budget.

(Evaluation of Progress: **Completed**; On-Track; **Overdue** indicated in the column for "Target Date for Completion")

No.	Activity	Deliverables	Target Date for Completion	Responsibility	Estimated Costs (2012–2015) K CHF			Potential Risks
					RQ	RB	Shortfall	Dependencies
1. Management of WIGOS Implementation								
1.1.1 G	1) Develop/Revise/Update WMO Regulatory Material to include WIGOS Regulations 2) Develop WIGOS Guide 3) Develop WIGOS Functional Architecture (FA)	1) Updated WMO Technical Regulations (WMO-No. 49) and the new WIGOS Manual for Cg-17 approval 2) Plan for WIGOS Guide ¹⁵ 3) WIGOS FA	1) Cg-17 2) 2015 3) 2016	ICG-WIGOS	400			High ¹⁶ 3.1.1; 4.1.1 5.1.1, 5.1.2 6.1.1; 7.1.1 8.1.1
1.1.2 G	Incorporate technical aspects of WIGOS implementation and continuing evolution into existing/new TCs and RAs working structures and procedures	1) RA & TC working structure adjusted to address WIGOS activities 2) Cross body coordination mechanisms in place	1) 2014 2) 2014	1) RAs; TCs 2) ICG-WIGOS	0			Low
1.1.3 G	Provide annual reports and recommendations to EC and Cg on progress in WIGOS implementation	Annual reports to EC, Cg on WIGOS implementation status	EC-65 EC-66 Cg-17	ICG-WIGOS	0			Low
1.2.1 R	Develop Regional WIGOS Implementation Plans (R-WIPs)	R-WIPs developed	2015	RAs	100			Low
1.3.1 N	Develop National WIGOS Implementation Plans (N-WIPs)	1. Guidance for N-WIPs developed 2. N-WIPs developed	1. 2015 2. 2019	Members	100			Medium ¹⁷
2. Collaboration with the WMO co-sponsored observing systems¹⁸ and international partner organizations and programmes								
2.1.1 G	Develop guidance, mechanisms and procedures for engagement, coordination and collaboration with partner organizations (to be used on all, global, regional and national levels)	1) Strategy for working with Partners is published & available on the Portal 2) MOU or relevant form of collaboration agreement concluded with interested Partners	1) 2015 2) 2015	ICG-WIGOS Partners	0			Med 7.1.1

¹⁵ WIGOS Guide be delivered by Cg-18

¹⁶ High-level coordination, and engagement from all WMO Programmes and expertise available

¹⁷ Postponed after Cg-XVII (specifically in the less-least developed countries) (ICG-WIGOS-2)

¹⁸ Congress emphasized that strong support and close collaboration among Members were needed to advance scientific knowledge and technical infrastructure to meet the WIGOS requirements. Within the Regions, it would be desirable to strengthen cooperation and partnership through Region-wide organizations or subregional groupings overseeing the WIGOS observing components. It specifically refers to enhanced cooperation among meteorological, hydrological and marine/oceanographic institutions/services where they are separated at the national level.

No.	Activity	Deliverables	Target Date for Completion	Responsibility	Estimated Costs (2012–2015) K CHF			Potential Risks
					RQ	RB	Shortfall	Dependencies
2.1.2 G	Develop Collaboration framework for the Architecture for Climate Monitoring from Space (ACMS) <i>(Note: for the development of ACMS itself, see new 3.1.2)</i>	1) ACMS strategy approved by Partners 2) Collaboration framework for 3.1.2 developed 3) ACMS governance scheme approved by Partners	1) 2013 2) 2014 3) 2015	CGMS, CEOS, SAT, CBS	35			Medium
2.2.1 R	Examine and recommend areas where closer regional cooperation and coordination would be beneficial	Recommendations to be included in regional WIPs	2015	RAs	0			Low
2.3.1 N	Establish closer collaboration at the national level, NMHS with other government agencies, and with potential external data providers	1) Guidance for establishing national collaboration frameworks; 2) National collaboration frameworks commenced	1) 2015 2) 2015	ICG-WIGOS, Members, RAs	0			Medium
3. Design, planning and optimized evolution of WIGOS and its regional, subregional and national component observing systems								
3.1.1 G	Complete RRR practices, procedures, responsibilities and mechanisms for all systems and agreed application areas	1) RRR included in the WIGOS regulatory material; consistency achieved with other WMO regulatory material; 2) Appropriate bodies have RRR responsibilities identified in their ToRs	1) 2014 2) 2015	CBS other TCs	50			High 3.1.3 3.2.1, 3.2.2 3.3.1, 3.3.2 7.1.1
3.1.2 G	Develop the Architecture for Climate Monitoring from Space (ACMS) focusing on GFCS four priorities	1) ACMS logical model 2) ACMS physical planning 3) ACMS implementation status	1) 2013 2) 2014 3) 2015	CGMS, CEOS, CBS, SAT	50			High 2.1.2
3.1.3 G	Using the RRR process & capitalizing on relevant experience of Members, develop guidance regarding observing network design principles	Guidance document on network design provided to Members	2015	IPET-OSDE, ICG-WIGOS, TCs	50			Low 3.1.1 3.2.1, 3.2.2 3.3.1, 3.3.2 7.1.1
3.1.4 G	To develop a concept of Regional Basic Observing Network (RBON) to be applied by RAs	Description of RBON concept applied by Regions	2015 onwards	ICG-WIGOS, RAs	0			Low 1.1.1
3.2.1 R	Evolve and implement observing systems in the Region following the technical guidance of the technical commissions as represented in the EGOS-IP and other observing system implementation plans	1) Report back to IPET-OSDE on the actions detailed in the EGOS-IP 2) EGOS-IP initiated within the Region	1) 2014 2) 2015	RAs	80			High 3.1.1, 3.1.3 3.2.2 3.3.1, 3.3.2 7.1.1
3.2.2 R	Update the global RRR database to take into account regional user requirements	Refined RRR database (OSCAR)	2015	RAs; IPET-OSDE	0			High

No.	Activity	Deliverables	Target Date for Completion	Responsibility	Estimated Costs (2012–2015) K CHF			Potential Risks
					RQ	RB	Shortfall	Dependencies
3.2.3 R	Migrate from the existing RBSN/RBCN into an integrated RBON	RBONs adopted by RAs	2015 onwards	RAs, Members	0			Low 1.1.1 3.1.4
3.3.1 N	Contribute to the collective regional effort to evolve and implement observing systems following the EGOS-IP and other observing system implementation plans	1) Report back to IPET-OSDE on the actions detailed in the EGOS-IP 2) EGOS-IP initiated at a National level	1) 2014 2) 2015	Members	0			High 3.1.1, 3.1.3 3.2.1, 3.2.2 3.3.2 7.1.1
3.3.2 N	Define subregional user requirements for observations	Plan for Updated RRR database (OSCAR)	2015	Members	15			High
4. Observing System Operation and Maintenance								
4.1.1 G	Develop guidance, mechanisms and procedures for improved integration of observational data and products	1) Guidance included in the plan for the WIGOS Guide 2) Work is underway for some specific product integration activities	1) 2015 2) From 2015	ICG-WIGOS	0			High 1.1.1; 3.1.1; 4.1.2; 6.1.1; 8.1.1
4.1.2 G	Develop guidance for the process of sharing, between component observing systems, operational experiences, sharing of expertise and a guidance for resourcing joint activities	Guidance included in the plan for the WIGOS Guide	2015	ICG-WIGOS	90			Medium 4.1.1
5. Quality Management (QM)								
5.1.1 G	Develop WIGOS Quality Management guidance, mechanism, practices and procedures	1) Initial WIGOS QM to be incorporated into WIGOS Regulatory material 2) Appropriate bodies have responsibilities identified in their ToRs	1) 2015 2) 2015	ICG-WIGOS Relevant TCs	280			High ¹⁹ (Resources) 5.1.2 8.1.1
5.1.2 G	Examination of current quality management practices and procedures being used by WMO observing programmes	Report on QM practices and procedures used with identification of areas for improvement	2014	ICG-WIGOS	200			High (Resources) 5.1.1
6. Standardization and Interoperability								
6.1.1 G	1) Develop guidance for WIGOS standards 2) Document the implemented standard and recommended practices and procedures on instruments, methods of observation, data products, etc.	1) Guidance to WIGOS standardization developed 2) Implemented standard and recommended practices and procedures are documented and available at the Portal as appropriate 3) Newly developed standard and recommended practices documented in the WIGOS regulatory material	1) 2015 2) From 2015 3) From 2015	Relevant TCs TT-WRM WIGOS PO	100			Low 1.1.1; 7.1.1; 7.1.3; 8.1.1;

¹⁹ High-level coordination; contributions from all WIGOS component observing systems & expertise available

No.	Activity	Deliverables	Target Date for Completion	Responsibility	Estimated Costs (2012–2015) K CHF			Potential Risks
					RQ	RB	Shortfall	Dependencies
7. The WIGOS Information Resource (WIR)								
7.1.1 G	Design and develop the WIGOS Information Resource (WIR)	1) Technical Specification 2) Decision made on developments of WIGOS Information Resource (internal vs. call for tender) 3) Operational Acceptance	1) 2014 2) 2014 3) 2015	Secretariat in cooperation with Members	330 & HR:2Y ²⁰			High 3.1.1, 3.1.3 3.2.1, 3.2.2 3.3.1, 3.3.2
7.1.2 G	Investigate the need for a database describing the Global Observational Products (Satellite Data, Weather Radar)	Documented requirements for the database	2013	SAT, CBS	0			Low
7.1.3 G	Survey WMO Members on what they could offer to support development and operations of WIGOS Information Resource	Published survey results and resulting decisions	2013	WIGOS-PO	50			Low 7.1.1
7.3.1 N	Provide information required by WIR	Required information available in WIR and maintained	From 2015	Members	0			Medium 7.1.1 7.1.3
8. Data discovery and Availability (of Data and Metadata)								
8.1.1 G	Develop WIGOS metadata standards, practices and procedures	1) WIGOS Metadata standards, practices and procedures approved and incorporated in WIGOS regulatory material 2) Initial access to WIGOS Metadata provided through the WIR 3) Practices and procedures established in WIGOS Manual 4) Mechanism for maintenance of MD standards established	1) 2015 2) 2014 3) 2015 4) 2015	TCs ICG-WIGOS	100			High 7.1.1 5.1.1
8.1.2 G	To develop a mechanism to assist Members in implementing and exploiting WIGOS metadata standards, practices and procedures	1) Mechanism developed	2014	ICG-WIGOS	0			Low 4.1.1, 8.1.1 10.1.1
9. Capacity development								
9.1.1 G	Develop a WIGOS Capacity Development (WCD) strategy including education and training	1) WCD Strategy developed & available on the WIR 2) WCD activities underway	1) 2013 2) 2015	ICG-WIGOS ETR, RAs	0			Medium 1.1.1, 1.2.1 2.3.1,3.1.3, 3.2.1, 4.1.1, 4.1.2, 5.1.1; 6.1.1, 7.1.1; 8.1.1, 9.1.3, 9.3.1, 9.3.2

²⁰ HR: Human resources in number of years

No.	Activity	Deliverables	Target Date for Completion	Responsibility	Estimated Costs (2012–2015) K CHF			Potential Risks
					RQ	RB	Shortfall	Dependencies
9.1.2 G	Assistance provided to Members regarding WIGOS implementation	Assistance provided to Members for the development of N-WIPs	2015	WIGOS PO WMO Members	200			Medium 3.1.1; 4.1.1 5.1.1, 5.1.2 6.1.1; 7.1.1 8.1.1
9.1.3 G	Develop WIGOS related guidelines and training materials and other relevant documentation	Training materials and guidelines developed	2015	WIGOS PO TCs	100			Medium 1.1.1; 7.1.1; 7.1.3; 6.1.1; 8.1.1;
9.3.1 N	Mobilize resources for WIGOS implementation	More resources made available to NMHSs for WIGOS implementation	2015	WMO Members with assistance from the WMO Secretariat	0			Medium
9.3.2 N	Assist Members in using WIR Tools for the design and management of national WIGOS networks	Initial steps taken to improve design on national networks	2015	WMO Members	120			Medium 7.1.1
9.3.3 N	Assist Members in implementing WIGOS metadata	Tools available to assist Members in providing the WIGOS metadata	2014	WMO Secretariat Members	250			Medium 8.1.1
10. Communications and outreach								
10.1.1 G	Develop an effective WIGOS communications and outreach strategy	WIGOS Communications and Outreach Strategy developed	2013	ICG-WIGOS	0			Low
10.1.2 G	Develop communications and outreach materials (see Annex I for suggestions)	Communications and outreach materials available on the WIGOS Portal	2015	WIGOS-PO	125			Low 7.1.1

5. RESOURCES

The timely completion of the WIGOS implementation in the sixteenth financial period directly depends on the available resources. Therefore, the Congress assigned a high priority to the proposed budget allocations for WIGOS activities. Congress also urged Members to continue to provide resources to support the implementation of WIGOS. Congress recognized that the key role to be played by the technical commissions in WIGOS implementation would require additional resources, and therefore further ***urged Members to also provide the resources to enable this role to be fully realized, as a part of their voluntary contributions.***

The full staffing requirement of the WIGOS Project Office will need to be met primarily through the secondment of experts from NMHSs. In this connection, Congress ***urged Members to provide secondment services to the Secretariat during the WIGOS Implementation to ensure its successful completion.***

The investment for fully implementing WIGOS should be given a high priority in Members' development and implementation plans. In addition, extra resources will need to be provided to the WMO Secretariat for both staff and non-staff costs for the implementation and coordination that are beyond the normal programmatic activities of the Secretariat. To ensure the funding needed for WIGOS implementation, provision of the following resources should be considered:

- (a) WMO Regular Budget for WIGOS implementation support activities;
- (b) WIGOS Trust Funds to supplement the WMO Regular Budget;

- (c) In kind contributions;
- (d) Staff secondments;
- (e) Voluntary Cooperation Programme funds for WIGOS related technical cooperation and capacity-development activities;
- (f) Regional fund-raising activities to support WIGOS; and
- (g) Operational hosts for information systems.

The strong need to assist the three regular staff must be met primarily through the secondment of experts, including Junior Professional Officer (JPO) from Members, for completion of the key Project Office tasks, as follows:

- (a) To assist the regular staff for the management and coordination of WIGOS projects and plans (JPO, extrabudgetary CHF 200 K is needed);
- (b) To design, develop and maintain the WIGOS Information Resource (WMO temporary staff, extrabudgetary CHF 400 K is needed);
- (c) To assist the development of WIGOS technical documentation (secondments, extrabudgetary CHF 150 K is needed);
- (d) To assist the WIGOS global and regional activities (secondment), and coordinate the management of the content of the WIGOS Information Resource.

Table 3 below provides a summary of the staff requirements for the WIGOS Framework implementation.

Table 3: WIGOS Project Office additional staff resources needed for a period 2013–2015

No.	Position	Additional resources needed	Note
4.	WIGOS Project Officer (P.3) (Responsible for the WIGOS Information Resource development and implementation)	Yes CHF 400 K	Initial consultations with donors
5.	Junior Professional Officer (Responsible for coordination of WIGOS regional and national plans and related projects, including the capacity development projects)	Yes CHF 150 K	Initial consultations with Members
6.	Seconded Experts (Responsible for the development of WIGOS Regulatory Material)	Yes CHF 150 K	Initial consultations with Members
	TOTAL:	CHF 700 K	

6. RISK ASSESSMENT/MANAGEMENT

The Risk Management Plan (RMP) will be developed for each implementation activity/projects, including risk mitigation. The following risk areas were identified:

- (a) Complexity of WIGOS;
- (b) Availability of basic infrastructure;

- (c) The firm commitment of all stakeholders to implement initial activities/projects within the agreed time frame, including a provision of required resources, both human and financial;
- (d) The requirement for appropriate leadership for the implementation of activities/projects;
- (e) Partial interests of stakeholders not converging into the stated objectives;
- (f) Coordination of interdependent projects;
- (g) Provision of an effective interface between users of services and entities operating observing systems;
- (h) Authority and responsibilities of entities and individuals for the implementation of projects;
- (i) Lack of transparency in the management of the implementation;
- (j) The potential for inadequate implementation if human resources are not available.

7. OUTLOOK

This document has described the key activities for the period 2012 to 2015. As determined by Cg-XVI, the goal is to have WIGOS operational by 2016. This is a challenging task. The experience gained during the WIGOS test of the concept phase clearly shows that it will be impossible to complete integration of all observing systems on global, regional and national levels in only four years. While WIGOS operations should start in 2016, there will still be a strong need to continue a significant number of implementation activities. It is essential to realize that additional resources will be needed to ensure the secretariat support for the continuation of the implementation process. However, it is too early to make a precise statement on how many resources in terms of staff and funding should be made available. The decision on these matters should be taken by the time of Cg-17.

SUGGESTED WIGOS COMMUNICATIONS AND OUTREACH MATERIALS

	<i>Targeted audience</i>	<i>Type and size of document</i>	<i>Activity</i>	<i>Time-frame</i>	<i>Status</i>
Web portal	WMO Members RAs, TCs Space Agencies Partner Organizations General Public	Web pages with links to other materials	WIGOS-PO to oversee development of the portal	2012–2013	To be done
WIGOS Imperative	WMO Members	10-page document (pdf)	WIGOS-PO to update doc.	2012	Done
WIGOS brochure	General Public	2-page brochure (pdf)	WIGOS-PO to produce draft brochure, circulate to ICG-WIGOS and relevant experts, updated and seek approval from ICG-WIGOS Chair	2012	Materials exist
WIGOS standard presentation (to be used at various events and adjusted as needed)	WMO Members	20-page presentation (ppt)	WIGOS-PO to produce draft standard presentation, circulate to ICG-WIGOS and relevant experts, updated and seek approval from ICG-WIGOS Chair	2012	Materials exist
WIGOS standard poster (to be used at various events and adjusted as needed)	<i>Ad hoc</i> Conferences	Poster (A2, pdf)	WIGOS-PO to produce draft poster, circulate to ICG-WIGOS and relevant experts, updated and seek approval from ICG-WIGOS Chair	2012	Materials exist
WIGOS rationale	WMO Members Space Agencies Partner Organizations	1-page document (pdf)	WIGOS-PO to consolidate information on WIGOS rationale from various existing materials	2012	Materials exist
WIGOS benefits in terms of, observing systems implementation effectiveness, and efficiency	WMO Members Space Agencies Partner Organizations	2-page document (pdf)	WIGOS-PO to draft first version, circulate to ICG-WIGOS and relevant experts, updated, and seek approval from ICG-WIGOS Chair		To be done as new document
Socio-economic benefits of WIGOS data	Governments WMO Members Funding Agencies Space Agencies Partner Organizations General Public	2-page document (pdf)	WIGOS-PO to draft first version, with other Departments (WDS, RES), update document, circulate to ICG-WIGOS and relevant experts, updated and seek approval from ICG-WIGOS Chair	2012	To be done as new document
Impact on WMO Members of WIGOS implementation	WMO Members	5 to 10 page document (pdf)	WIGOS-PO to draft first version, consult Members via survey, update document, circulate to ICG-WIGOS and relevant experts, update and seek approval from ICG-WIGOS Chair	2012–2013	To be done as new document

ANNEX II

REFERENCED DOCUMENTS

Reports of WMO constituent bodies

1. Fifteenth World Meteorological Congress, Abridged Final Report with Resolutions (WMO-No. 1026)
2. Sixteenth World Meteorological Congress, Abridged Final Report with Resolutions (WMO-No. 1077)
3. EC-LVIII, Abridged Final Report with Resolutions (WMO-No. 1007)
4. EC-LIX, Abridged Final Report with Resolutions (WMO-No. 1027)
5. EC-LX, Abridged Final Report with Resolutions (WMO-No. 1032)
6. EC-LXI, Abridged Final Report with Resolutions (WMO-No. 1042)
7. EC-LXII, Abridged Final Report with Resolutions (WMO-No. 1059)
8. EC-LXIII, Abridged Final Report with Resolutions (WMO-No. 1078)
9. CBS-XIV, Abridged Final Report with Resolutions and Recommendations (WMO-No. 1040)
10. CBS-Ext.(2010), Abridged Final Report with Resolutions and Recommendations (WMO-No. 1070)
11. Final report of the 1st session of the EC WG on WIGOS-WIS (December, 2007)
12. Final report of the 2nd session of the EC WG on WIGOS-WIS (May, 2009)
13. Final report of the 3rd session of the EC WG on WIGOS-WIS (March, 2010)
14. Final report of the 4th session of the EC WG on WIGOS-WIS (February, 2011)
15. Final report of the 1st session of the Subgroup on WIGOS of the EC WG on WIGOS-WIS (November, 2008)
16. Final report of the 2nd session of the Subgroup on WIGOS of the EC WG on WIGOS-WIS (October, 2009)
17. Final report of the 3rd session of the Subgroup on WIGOS of the EC WG on WIGOS-WIS (October, 2010)
18. Final report of the 1st session of ICG-WIGOS (September, 2011)

Other relevant documentation

19. Vision for the GOS in 2025 (CBS-XIV, 2009)
20. WIS Project and Implementation Plan (v. 1.2, February, 2010)
21. Implementation Plan for the Global Observing System for Climate in Support of the UNFCCC (GCOS-138, WMO/TD-No. 1523)
22. WMO Global Atmosphere Watch (GAW) Strategic Plan: 2008–2015 (WMO/TD-No. 1384)
23. Implementation Plan for Evolution of Space-and Surface-based Subsystems of the Global Observing system (WMO/TD-No. 1267)
24. WCRP Implementation Plan 2010–2015 (WMO/TD-No. 1503)
25. The first U.S. Integrated Ocean Observing System (IOOS) Development Plan, Washington, DC, January 2006
26. Global Earth Observation System of Systems GEOSS 10-Year Implementation Plan (GEO 1000, February 2005)
27. EUCOS programme management documentation
28. THORPEX International Research Implementation Plan (WMO/TD-No. 1258)
29. JCOMM Observing System Implementation Goals for Building a Sustained Global Ocean Observing System in Support of the Global Earth Observation System of Systems (2009)
30. Overarching Implementation Plan for the Ocean Data Portal and WIGOS Pilot Projects for IODE and JCOMM (6 November 2008)

LIST OF ACRONYMS

CEOS	Committee on Earth Observation Satellites
CGMS	Coordination Group for Meteorological Satellites
CONOPS	Concept of Operations
DAR	Discovery, Access and Retrieval
DB	Database
DCPC	Data Collection or Production Centre (of WIS)
DRR	Disaster Risk Reduction
ET	Expert Team (of WMO Technical Commission)
EUMETNET	Network of European Meteorological Services
FAO	Food and Agriculture Organization of the United Nations
GAW	Global Atmosphere Watch
GCOS	Global Climate Observing System
GCW	Global Cryosphere Watch
GEO	Group on Earth Observations
GEOSS	Global Earth Observation System of Systems
GISC	Global Information System Centre (of WIS)
GFCS	Global Framework for Climate Services
GOOS	Global Ocean Observing System
GTOS	Global Terrestrial Observing System
ICG-WIGOS	Inter-Commission Coordination Group on WIGOS
ICPC	Interagency Coordination and Planning Committee for Earth Observations
ICSU	International Council for Science
IOC	Intergovernmental Oceanographic Commission
ISO	International Organization of Standardization
ITU	International Telecommunication Union
LDCs	Least Developed Countries
MOU	Memorandum of Understanding

NMHS	National Meteorological and Hydrological Service
NOS	National Observing System
OSEs	Observing Systems Experiments
OSSEs	Observing System Simulation Experiments
QA	Quality Assurance
QC	Quality Control
QMF	Quality Management Framework
QMS	Quality Management System
RA	Regional Association
RCC	Regional Climate Centre
RIC	Regional Instrument Centre
RMIC	Regional Marine Instrument Centre
RRR	Rolling Review of Requirements
SIDS	Small Island Developing States
SoG	Statement of Guidance
SORT	“Standardization of Observations” Reference Tool (of WIGOS)
SLA	Service Level Agreement
TC	Technical Commission
TOR	Terms of Reference
UNEP	United Nations Environment Programme
UNESCO	United Nations Educational, Scientific and Cultural Organization
WCRP	World Climate Research Programme
WIGOS	WMO Integrated Global Observing System
WIP	WIGOS framework Implementation Plan
WIR	WIGOS Information Resource (WIR)
WIS	WMO Information System
WHYCOS	World Hydrological Cycle Observation System
WWW	World Weather Watch

ANNEX VI
Annex to paragraph 4.4.91 of the general summary

SPACE WEATHER SERVICES

1. Purpose of this Document

This document summarizes the needs for space weather services and recommends a set of activities to be undertaken within WMO to achieve a breakthrough in the capabilities to meet these needs.

2. Societal Demand for Space Weather Services

The demand for space weather services is increasing as the dependence on technologies impacted by space weather continues to grow. For example, a dramatic increase in the use of polar airline routes exposed to space weather events has generated requirements for global space weather information to air traffic navigation. The expanded uses of satellite-based navigation and timing and the optimization of electric power grid operations, also increase exposure to space weather events and hazards. Industries and governments are becoming more engaged in assessing the risks and developing mitigation strategies. Emergency management agencies are developing procedures to manage the risks of severe space weather events as part of their overall risk management approach. Space weather services are regularly used today in some countries by the commercial airlines, the satellite industry, drilling and surveying operations, and users of satellite-based navigation systems. It is anticipated that this demand will considerably expand with a broader awareness of the impact of space weather events.

On the international scene, the International Civil Aviation Organization (ICAO) is establishing requirements for space weather services. Within the Committee on Peaceful Uses of the Outer Space (COPUOS) of the United Nations General Assembly, the need was expressed to strengthen international coordination of efforts to monitor the space environment to support the long-term sustainability of space assets and activities. The Committee on Space Research (COSPAR) of the International Council for Science (ICSU) is developing a roadmap to identify the main scientific and observational challenges for the understanding of space weather processes. An operational coordination as foreseen by WMO is the missing link between these important initiatives.

Improving the provision of space weather services worldwide requires international coordination and cooperation, in order to create a shared satellite-based observing system, to secure the availability of critical global and regional observations, and to ensure the global consistency of the end products.

3. ICTSW activities

Since its establishment in May 2010, the WMO Inter-Programme Coordination Team on Space Weather (ICTSW) has demonstrated the relevance and benefits of its early activities responding to these demands. Focusing on operational services, WMO has established a framework whereby its Members are joining efforts to advance space weather observations, products and services, and leveraging their capabilities to produce benefits on a global scale. This is being done in close partnership with the International Space Environment Service (ISES), ICAO, the International Telecommunications Union (ITU), COPUOS, COSPAR and CGMS, taking account and advantage of the complementary capabilities and interests of these organizations.

4. Space Weather within WMO Programmes and Activities

Initial space weather activities are integrated into a number of WMO Programmes and projects.

In the WIGOS perspective, these accomplishments have included the establishment of a Space Weather Product Portal, of the identification of space weather observing requirements, and an

assessment of the current gaps in our observing systems as documented through the Statement of Guidance for Space Weather Observations. Space weather is fully integrated in the Rolling Review of Requirements and in the WMO Implementation Plan for the Evolution of the Global Observing Systems.

A pilot project is underway to use the WMO Information System for the exchange of space weather forecast products (geomagnetic activity, solar flares, and solar energetic particles).

Within the Aeronautical Meteorology Programme, WMO has worked with ICAO to define space weather services for global air traffic navigation. The ICTSW reviewed the ICAO Concept of Operations related to space weather and has provided guidance on the future organization of an effective operational space weather service delivery. WMO will have the responsibility to coordinate the response to these ICAO requirements. ICAO recognizes the ICTSW as the WMO technical body to provide advice on space weather matters. The active participation of WMO will be essential as it is anticipated that Annex 3 of the ICAO Convention will require such space weather services for civil aviation.

5. Proposed goals for space weather activities

WMO can provide a global framework for the emerging space weather services, helping Members through the following:

- (a) Evaluating space weather user requirements for observations, products and services;
- (b) Coordinating ground and space-based observations of key space weather phenomena and their precursors and ensuring their interoperability;
- (c) Promoting and facilitating data exchange and standardization;
- (d) Developing best practices for observing, recording, analyzing, forecasting, warning, and communicating the resulting information to the users;
- (e) Training and building capacity, promoting transition from research to operations, and subsequent user uptake;
- (f) Ensuring a science-based, authoritative voice on space weather situation.

Given the broad field of activity to be pursued, it is suggested that WMO focus in a first step on a limited number of pilot projects to be determined in accordance with the resources that the Members are ready to share to support, and benefit from, these activities.

6. Need for Expanded Space Weather Structure

Space weather activities have been initiated in many WMO core programme areas. However, a single team like ICTSW does not have the capacity or the focused expertise to develop fully the required capabilities in all areas. Therefore, it is envisaged to review the best mechanisms to address the evolving needs of Members by considering how to engage the appropriate expertise in the areas below.

WIGOS:

- Maintain observing requirements, the Statement of Guidance (gap analysis), and the OSCAR database content;
- Coordinate measurement specifications and support interoperability and integration of observations;
- Identify observing assets in each Region that can be included in global observing systems;

- Promote a high-level coordination of satellite-based and ground-based observing assets to ensure that high-priority gaps are addressed in a cost-effective manner through shared capabilities.

WIS:

- Standardize and enhance space weather product and information delivery through WIS;
- Maintain and expand the products available through the Space Weather Product Portal;
- Harmonize the definition of products and services in consultation with key user groups;
- Identify NMHSs within each Region that can participate in the collection of data and the production and dissemination of services.

Applications:

- Advise major application programmes and activities such as aeronautical meteorology, disaster risk reduction, services to the energy and telecommunication sectors, etc, on space weather service capabilities and the recommended approach to service delivery;
- Establish quality assurance guidelines and emergency warning procedures based on user requirements;
- Establish real-time communication mechanisms to share urgent information and maintain consistency of information during extreme events;
- Conduct post-event analyses to refine capabilities and document information reliability.

Capacity Development:

- Determine the current level of services available within each Region;
- Provide training and sharing of knowledge to allow the utilization of existing products and services by all Members and to encourage participation in regional service provision;
- Foster the development of operational, data-assimilative, predictive models, benefiting from advanced weather and climate prediction capabilities.

Global Framework for Climate Services:

- Coordinate the space weather observing requirements with the weather and climate monitoring architectures.

In order to be fully efficient, the activity of these expert teams will require increased support from the Secretariat and strong engagement of the Members. Space weather is an evolving effort and we must address how to meet Members' needs in a manner that is efficient and consistent with the WMO structure.

7. Summary

The early results obtained in the current financial period illustrate the broad field of activity that could benefit from WMO involvement in space weather, and demonstrate the capability of WMO to effectively facilitate a breakthrough in this area. Given the increasing demand for space weather services to aviation and other sectors, it is thus recommended that WMO engages at a larger scale, and on a sustainable basis, to improve global space weather capabilities.

ANNEX VII
Annex to paragraph 4.6.22 of the general summary

LIST OF WMO REGIONAL TRAINING CENTRES AND THEIR STATUS

<i>WMO Member</i>	<i>Parent Institution</i>	<i>Status and last year confirmed/ reconfirmed by EC or Cg</i>
Region I		
Algeria	Institut Hydrométéorologique de Formation et de Recherches (IHFR) Oran	Reconfirmed in 2006, to be reviewed in 2014
Angola	Instituto Nacional de Meteorologia e Geofísica (INAMET) Luanda	Reconfirmed 2009
Egypt	The Egyptian Meteorological Authority (EMA) Cairo	Reconfirmed 2010
Kenya	1. Institute for Meteorological Training and Research (IMTR) Nairobi	Reconfirmed 2010
	2. University of Nairobi (UONBI) Nairobi	Reconfirmed 2010
Madagascar	1. Ecole Nationale d'Enseignement de l'Aéronautique et de la Météorologie (ENEAM) Antananarivo – RTC Madagascar	Reconfirmed 2011
	2. Ecole Supérieure Polytechnique d'Antananarivo (ESPA) Antananarivo	Reconfirmed 2011
Niger	1. Ecole Africaine de la Météorologie et de l'Aviation Civile (EAMAC) Niamey	Reconfirmed 2002, to be reviewed in 2014
	2. Centre Régional Agrhymet (AGRHYMET) Niamey	Reconfirmed in 2002, to be reviewed in 2014
Nigeria	1. Federal University of Technology (FUT) Akure	Reconfirmed in 2006, to be reviewed in 2015
	2. Meteorological Research and Training Institute (MRTI) Lagos*	Reconfirmed in 2006, to be reviewed in 2015
South Africa	South Africa Weather Service (SAWS) NMTC Pretoria	Confirmed in 2011
Region II		
China	1. Nanjing University of Information, Science and Technology (NUIST) Nanjing	Reconfirmed 2012
	2. China Meteorological Administration Training Center (CMATC) Beijing	Reconfirmed 2012
India	1. India Meteorological Department Training Centre (IMD) New Delhi and Pune*	Reconfirmed 2012
	2. National Water Academy (NWA)	Confirmed 2012
Iran, Islamic Republic of	Islamic Republic of Iran Meteorological Organization (IRIMO) Tehran	Reconfirmed 2009, to be reviewed in 2015
Iraq	Iraqi Meteorological Organization (IMO) Baghdad	Confirmed in 1976, no review scheduled
Qatar	Qatar Aeronautical College (QAC) Doha	Confirmed 2010
Uzbekistan	Tashkent Hydrometeorological Professional College (THMPC) Tashkent	Reconfirmed 2012

<i>WMO Member</i>	<i>Parent Institution</i>	<i>Status and last year confirmed/ reconfirmed by EC or Cg</i>
Region III		
Argentina	1. Universidad de Buenos Aires (UBA) Buenos Aires	Reconfirmed 2010
	2. Servicio Meteorológico Nacional (SMN) Buenos Aires	Reconfirmed 2010
Brazil	Universidade Federal do Pará (UFPA) Bélem	PR advised EC-65 of withdrawal of designation of Belem as single RTC whilst working with a number of universities to create a virtual RTC
Peru	Universidad Nacional Agraria La Molina (UNALM) Lima	Confirmed 2011
Venezuela (Bolivarian Republic of)	Universidad Central de Venezuela (UCV) Caracas	Reconfirmed 2006, to be reviewed in 2014
Region IV		
Barbados	Caribbean Institute for Meteorology and Hydrology (CIMH) Bridgetown	Reconfirmed 2010
Costa Rica	Universidad de Costa Rica (UCR) San José	Reconfirmed 2010
Region V		
Indonesia	1. The Agency for Meteorology, Climatology and Geophysics (BMKG)	Confirmed 2012
	2. Research Centre for Water Resources (RCWR) Bandung	Confirmed 2012
Philippines	1. Philippine Atmospheric, Geophysical and Astronomical Services Administration (PAGASA) Quezon City	Reconfirmed 2011
	2. University of the Philippines (UP) Quezon City	Reconfirmed 2011
Region VI		
Israel	Postgraduate Training Centre for Applied Meteorology (PTCAM) Bet Dagan	Recommended for reconfirmation 2014
Italy	National Research Council Institute of Biometeorology (CNR-IBIMET) Florence	Recommendation for deferral of reconfirmation until June 2016
Russian Federation	1. Russian State Hydrometeorological University (RSHU) St. Petersburg	Reconfirmed 2012
	2. Advanced Training Institute of ROSHYDROMET (Moscow)	Reconfirmed 2012
	3. Moscow Hydrometeorological Technical School of Roshydromet (ATI)*	Reconfirmed 2012
Turkey	Turkish State Meteorological Service (TSMS)	Reconfirmed 2012

* This institution may operate more than one physical training facility

ANNEX VIII
Annex to paragraph 4.6.29 of the general summary

WMO COMPENDIUM MAPPING

Dept	Compendium Item	Total	Current Projects that Align with Compendium Activity (see index of projects in Annex 1) EC-66/INF. 4.6(3)	Total Project Budget (CHF)	Notional Allocation for this line (CHF)
CER	Creation of a climate museum	1,500,000	None	-	-
CER	Raising awareness of general public on climate issues and WMO services that are related, in particular, to GFCS	500,000	2	Approx 10000000	50,000
CER	Outreach activities on climate change science for children and youth	550,000	4	100,000	100,000
CER	Beyond the scientific community: Training courses for Permanent Representatives of WMO and Senior NMHSs staff in media communication skills	600,000	None	-	-
CER	Implementation of WMO Policy on Gender Mainstreaming	1,000,000	Gender Conference	TBD	-
CLW	Strengthening the Access and Delivery of Agrometeorological Products	2,750,000	1,2,6,13,18	Approx 5,000,000	3,000,000
CLW	Strengthening Drought Early Warning and Integrated Drought Management	5,500,000	7	Approx 200,000	200,000
CLW	Roving Seminars for Farmers	3,550,000	1,6,13,18	Approx 5,000,000	2,000,000
CLW	Development of user-targeted climate services for agriculture, water, and health sectors for Climate Risk Management and adaptation	4,100,000	2	Approx 10000000	8,000,000
CLW	Development of Climate Outlook Forums worldwide, on regional and national scales	3,250,000	4,8	Approx 2,000,000	1,000,000
CLW	Establishment of a worldwide system of Regional Climate Centres, with special focus on vulnerable developing regions	9,800,000	4,8	Approx 2,000,000	1,000,000
CLW	Enhanced capacity of NMHSs to more effectively use GPC and RCC products to develop and deliver climate services at national levels	10,600,000	1,2	Approx 10,000,000	1,500,000
CLW	Training aspects related to GPC and RCC infrastructure	1,600,000	8	4,000,000	2,000,000
CLW	Strengthening the capacities of Member countries to provide climate services	8,000,000	2,3,4,5,8,9	In excess of 30,000,000	5,000,000
DRA	Improving planning, management and operational framework of NMHSs in developing countries, LDCs and SIDS	500,000	4	Approx 5,000,000	2,000,000
DRA	Implementation of follow-up actions from the First Conference of Ministers responsible for Meteorology in Africa	1,050,000	1,2,18	Approx 500,000	500,000
DRA	Ministerial Conferences in the Americas and Asia Pacific	1,700,000	None	-	-
DRA	Ensuring sustainability and benefits of services provided by NMHSs in developing countries, LDCs and SIDS	500,000	1,2,3,4,7 (USAID Afghanistan) 18	Approx 5,000,000	2,500,000
DRA	Emergency assistance aimed at re-instatement of basic services	500,000	VCP, 3, USAID (Afghanistan)	Approx 5,000,000	500,000
DRA	Enhanced education and training regarding the function of WMO for Middle and Senior Managers	500,000	None	-	-
WCRP	Support young scientists from developing and least developed countries	2,000,000	4	200,000	250,000
DRA	Modernization of NMHSs at National and Regional Level (improved infrastructure, enhanced institutional frameworks and human capacity)	16,750,000	1,2,4,8,18	Approx 30,000,000	5,000,000
DRA	Development of Multi-hazard early warning system in South East Europe	11,000,000	11	2,500,000	250,000
DRA	Extension of Management by e-learning to French, Spanish, Russian and Arabic	500,000	None	-	-
DRA	Increased capabilities of Members to deliver and assess education and training activities	500,000	1,2,4 (Fellowship Programme)	Approx 500,000	300,000
DRA	Support to LDCs and developing countries for short-term training in aviation	2,000,000	None	-	-
DRA	Increased long-term fellowship opportunities	3,000,000	1,2,4 (Fellowship Programme)	Approx 500,000	300,000
DRA	Increased support to RTCs to develop and deliver programmes	1,000,000	1, in-kind support to World Bank CAHMP	Approx 700,000	350,000
DRA	Increased support for short- and very short-term fellowships	2,000,000	1,2,4 (Fellowship Programme)	Approx 500,000	300,000
DRA	Delivery of Country Profile Data Base and development of inter linkages between databases at programme level for planning, monitoring and reporting purposes	1,000,000	None	-	-

DRA	Increased Resource Mobilization	1,050,000	UKMO Secondment	Approx 500,000	500,000
DRA	Provision of expert services to developing countries, LDCs and SIDS	200,000	4	Approx 200,000	100,000
GFCS	Improving communications between the climate and agriculture and food security communities		1,2,18	Approx 5,000,000	5,000,000
GFCS	Developing National Climate and Health Working Groups		1,2,18	Approx 500,000	300,000
GFCS	Large-scale data recovery and digitisation		18	Approx 500,000	400,000
GFCS	Improving decision-making processes in climate related risks		14		150,000
GFCS	Strengthening regional systems for providing climate services		2, 4, 8, 9,10,20	Approx 15,000,000	10,000,000
GFCS	Establish frameworks for climate services at the national level in developing countries		1,2,18	In excess of 15,000,000	12,000,000
OBS	Support for the implementation of climate watch system in the Regions	400,000	4	Approx 500,000	2,000,000
OBS	Development of marine observations partnership	200,000	None	0	
OBS	Development of a simple PC-based software tool to assist countries and Regions in designing their national and regional synoptic and climatological networks according to WIGOS and GFCS requirements	1,150,000	None	0	
OBS	Development of WMO Space Weather Activities	1,200,000	None	0	
OBS	Implementation of Aircraft Observation Activities	250,000	None	0	
OBS	Development of the WMO Integrated Global Observing System (WIGOS) Operational Information Resource (WIR)	1,000,000	None	0	
OBS	Improvement of CIMO Guide	800,000	None	0	
OBS	Implementation of activities of the EC Panel on Polar Observations, Research and Services (EC-PORS)	2,400,000	4	Approx 1,000,000	1,000,000
OBS	Implementation of WIGOS	3,600,000	None	0	
OBS	Development of technical standards and guidance on methods of observation for modern remote-sensing technologies	1,300,000	None	0	
OBS	Improved quality, coverage, sustainability and interoperability of space-based observations	1,400,000	None	0	
OBS	Increased interoperability of the WMO Information System (WIS) with other information systems, including extended use of internationally recognized standards, leading to cost-effective systems for the implementation of the WIS	600,000	None	0	
OBS	Effective and affordable implementation and operation of the GTS (Part A of WIS), including its rehabilitation in case of deterioration during disasters, with a view to ensuring the exchange of WMO data products	650,000	World Bank CAHMP	In kind support from WMO	
OBS	Effective and affordable implementation and operation of the Data Access and Retrieval service (Part B of WIS), with a view to facilitating the discovery and exchange of WMO data products	1,200,000	None	0	
OBS	Implementation of WIGOS Pilot Project	1,000,000	None	0	
RES	Polar prediction of weather and climate (GFCS)	400,000	4		
RES	Seamless prediction of weather and climate (GFCS) focussing on subseasonal to seasonal prediction	400,000	None	0	
RES	An Integrated Global Greenhouse Gas Information System (IGIS)	350,000	None	0	4,000,000
RES	Healthy megacities and large urban complexes resulting from improved capabilities in environmental measurement, modelling, production and delivery of related services	700,000	None	0	
RES	Improved sand and dust storm forecast and observation products (DRR)	200,000	None	0	
RES	Improve 1-day to 2-week high impact weather forecast (DRR) and expand this to hourly toward seasonal timescale in the post THORPEX / post 2014 period	725,000	1		
WCRP	Regional and National Climate Information for Decision Makers	400,000	2		200,000
WDS	Development of Aeronautical Meteorological Forecaster Competencies	250,000	None	0	
WDS	Provision of Meteorological Services for Air Traffic Management, SIGMET advisories	150,000	None	0	
WDS	Implementation of QMS in support of Aeronautical Meteorology	300,000	In-kind support for World Bank PPCR (Nepal)	In kind support to PPCR from WMO	150,000
WDS	Expansion and Implementation of the SWFDP to all WMO Regional Associations	2,500,000	1,4, 15,17,24,in-kind support to World Bank CAHMP	0	
WDS	Improved Uptake of Weather and Climate Information for the Health Sector	1,000,000	2,18	0	300,000
WDS	Assessment of Socio-economic Value of Extreme Event-related Weather, Climate and Water Services	200,000	World Bank - PWS	0	
WDS	Coordination and Capacity Building for All-hazards, All-media Alerting	500,000	None	0	
WDS	Improved technical support for Marine Meteorology and Oceanography Sector	1,500,000	24	0	
WDS	Improved Storm Surge Watch and Coast Inundation Forecasting	1,000,000	24	0	
WDS	Development of and Meteorological and Climate Services to support Multi-hazard Early Warning Systems and Impact-based Decision-making for Disaster Risk Reduction in Southeast Asia	2,000,000	None	0	
WDS	Pilot Project for Provision of Operational Meteorological and Climate Services to Support Humanitarian Planning, Preparedness and Response	500,000	None	0	
		129,275,000			72,200,000

ANNEX IX
Annex to [paragraph 4.6.38](#) of the general summary

VOLUNTARY COOPERATION PROGRAMME TRUST FUND 2014

			Nominal Allocation USD
	Balance at 01/01/14	330,000	2014
	Anticipated Contributions 2014	200,000	
	Anticipated Available 2014	530,000	
	Priority Areas		
	Spares/shipping		20,000
	Expert services		50,000
	(Short-term) fellowships and training activities		120,000
	Project Development Activities for Regional Development Projects		
	Improvement of GTS		30,000
	Improvement of Observing Systems		30,000
	Improvement of GDPS		30,000
	Agricultural meteorology activities		30,000
	Support to CDMS and climatological activities		30,000
	Operational hydrology activities		30,000
	Improvement of satellite reception		30,000
	Communications / Media		30,000
	Sub Total		430,000
	Reserve		100,000

ANNEX X**Annex to paragraphs 5.2.5.1, 5.2.5.2 and 5.2.5.3 of the general summary****STAFF APPOINTMENTS, PROMOTIONS, NOMINATIONS AND TRANSFERS IN THE PROFESSIONAL CATEGORY AND ABOVE SINCE THE SIXTY-FIFTH SESSION OF THE EXECUTIVE COUNCIL****Table 1. Appointments****List of appointments of staff in the professional category and above made since EC-65 through competition after issuance of vacancy notices**

Name and Nationality	WMO Region	Functional title, grade and organizational unit	Effective date
GELLÉ, Ms F. (France)	VI	Translator / Editor (P.3), Language, Conference and Publishing Services Department	16 June 2013
ROLLI, Mr A. (Italy)	VI	Director (D.2), Resource Management Department	1 September 2013
TANG, Mr X. (China)	II	Director (D.2), Weather and Disaster Risk Reduction Services Department	1 September 2013
ESCOBAR JARITON, Mr C. (Paraguay)	III	National Officer (NOC), Regional Office for the Americas, Development and Regional Activities Department (post located in Asunción)	1 September 2013
GOMEZ DELGADO, Mr F. (Costa Rica)	IV	National Officer (NOC), Regional Office for the Americas, Development and Regional Activities Department (post located in San José)	1 September 2013
PEÑA FERNANDEZ, Mr J. (Spain)	VI	Project Manager (P.4), Regional Office for the Americas, Development and Regional Activities Department (post located in Haiti)	8 September 2013
CAPELLAS ESPUNY, Ms G. (Spain)	VI	Translator / Editor (P.4), Language, Conference and Publishing Services Department	10 September 2013
HILL, Ms K. (Australia)	V	Programme Officer – OOPC (P.3), Global Climate Observing System Secretariat, Observing and Information Systems Department	1 November 2013
ANTUNES DA CRUZ NUNES, Mr L. (Portugal)	VI	WIGOS Scientific Officer (P.4), WMO Integrated Global Observing System (WIGOS) Branch, Observing and Information Systems Department	3 November 2013
MUKABANA, Mr J. (Kenya)	I	Director (D.1), Offices for Africa and Least Developed Countries, Development and Regional Activities Department	5 January 2014
BAKLANOV, Mr A. (Russian Federation)	VI	Scientific Officer (P.4), Atmospheric Research and Environment Branch, Research Department	6 January 2014

Name and Nationality	WMO Region	Functional title, grade and organizational unit	Effective date
HOVSEPYAN, Ms A. (Armenia)	VI	Scientific Officer (P.4), Climate Prediction and Adaptation Branch, Climate and Water Department	6 January 2014
HUSSAIN, Mr A. (Pakistan)	II	Project Coordination Officer (P.3), Data-processing and Forecasting Division, Weather and Disaster Risk Reduction Services Department	12 January 2014
RIISHØJGAARD, Mr L. (Denmark)	VI	WIGOS Project Manager (P.5), WMO Integrated Global Observing System (WIGOS) Branch, Observing and Information Systems Department	14 January 2014
BUCH, Mr M. (Germany)	VI	Head, Entitlements and Contracts Management Unit (P.4), Human Resources Division, Resource Management Department	1 February 2014
RALIJEMISA, Ms H. (Madagascar)	I	Senior Internal Auditor (P.5), Internal Oversight Office	12 February 2014
FUHR, Mr M. (USA)	IV	Chief, Information Technology and Common Services Division (P.5), Resource Management Department	9 March 2014
PILON, Mr P. (Canada)	IV	Chief, Hydrological Forecasting and Water Resources Division (P.5), Hydrology and Water Resources Branch, Climate and Water Department	23 March 2014
HAROU, Mr Abdoulaye (Canada)	IV	Chief, Data-processing and Forecasting Division (P.5), Weather and Disaster Risk Reduction Services Department	1 April 2014
TANCREDI, Mr C. (France)	VI	Facility Management Engineer (P.3), Information Technology and Common Services Division, Resource Management Department	1 May 2014
DILLEY, Mr M. (USA)	IV	Director (D.1), Climate Prediction and Adaptation Branch, Climate and Water Department	1 May 2014
PRÖSCHOLDT, Mr T. (Germany)	VI	WIGOS Operational Information Resource (WIR) Development Officer (P.3), WMO Integrated Global Observing System (WIGOS) Branch, Observing and Information Systems Department	18 May 2014
GOMEZ, Mr B. (Gambia)	I	WMO Representative for North, Central and West Africa (P.4), Offices for Africa and Least Developed Countries, Development and Regional Activities Department (post located in Abuja)	1 June 2014
CARLSON, Mr D. (USA)	IV	Director (D.2), World Climate Research Programme, Research Department	16 June 2014

**List of appointments of staff in the professional category and above
made since EC-65 without competition**

Name and Nationality	WMO Region	Title, grade and organizational unit	Effective date
LEE, Mr Y. (Republic of Korea)	II	Seconded Expert (P.4), Regional Office for Asia and the South-West Pacific, Development and Regional Activities Department	7 April 2014

List of appointments made since EC-65 of Junior Professional Officers

Name and Nationality	WMO Region	Title, grade and organizational unit	Effective date
SJAAVIK, Ms L. (Norway)	VI	Junior Professional Officer (P.2), Office for Resource Mobilization and Development Partnerships, Development and Regional Activities Department	1 September 2013
SANDSTRÖM, Ms S. (Finland)	VI	Junior Professional Officer (P.2), Office for Resource Mobilization and Development Partnerships, Development and Regional Activities Department	15 September 2013
LUTHER, Mr J. (Germany)	VI	Junior Professional Officer (P.2), Disaster Risk Reduction Division, Weather and Disaster Risk Reduction Services Department	4 November 2013

Table 2. Extension of appointment beyond the statutory age of retirement since EC-65

Name and Nationality	WMO Region	Title, grade and organizational unit	Effective date
CHEN, Mr P. (Canada)	IV	Chief, Data-processing and Forecasting Division (P.5), Weather and Disaster Risk Reduction Services Department	6 months to 30 June 2014

Table 3. List of promotions, nominations and transfers since EC-65

Name and Nationality	WMO Region	Title, grade and organizational unit	Effective date
PARATIAN, Ms K. (Mauritius)	I	Finance Officer (Accounts) (P.2), Finance Division, Resource Management Department (Nomination with promotion following competition after issuance of Vacancy Notice)	1 June 2013

Name and Nationality	WMO Region	Title, grade and organizational unit	Effective date
SHIDA, Mr K. (Japan)	II	Senior Programme Manager for Regional Coordination (P.5), Development and Regional Activities Department (Nomination with promotion following competition after issuance of Vacancy Notice)	1 July 2013
KAHAMA, Ms G. (United Republic of Tanzania)	I	Personal Assistant to the Secretary-General (P.3), Office of the Secretary-General (Nomination to the grade of the post following underfilling of the post)	1 October 2013
AVELLAN, Ms C. (Germany)	VI	Junior Professional Officer (P.2), Climate and Water Department (Lateral reassignment from the Global Framework for Climate Services)	1 October 2013
PENG, Mr T. (China)	II	Chief, Tropical Cyclone Programme Division (P.5), Weather and Disaster Risk Reduction Services Department (Nomination with promotion following competition after issuance of Vacancy Notice)	1 January 2014
TAMRAKAR, Mr N. (Nepal)	II	Project Officer (P.2), Regional Office for Asia and the South-West Pacific, Development and Regional Activities Department (Lateral reassignment from the Climate and Water Department)	1 January 2014
LUCIO, Mr F. (Mozambique)	I	Director (D.1), Global Framework for Climate Services (Nomination with promotion following competition after issuance of Vacancy Notice)	15 January 2014
IVANOV, Mr D. (Bulgaria)	VI	Chief, Aeronautical Meteorology Division (P.5), Weather and Disaster Risk Reduction Services Department (Nomination following competition after issuance of Vacancy Notice)	1 February 2014
HOUNTON, Mr F. (Benin)	I	Senior Programme Manager (P.5), Offices for Africa and Least Developed Countries, Development and Regional Activities Department (Nomination with promotion following competition after issuance of Vacancy Notice)	1 March 2014

ANNEX XI**Annex to paragraphs 7.3.12 and 7.3.14 of the general summary****AMENDMENTS TO THE GENERAL REGULATIONS OF THE
WORLD METEOROLOGICAL ORGANIZATION****Amendment to Regulation 162 (addition of the underlined text)**

The associations of the Organization and their general terms of reference shall be those specified in Annex II to these Regulations. Each association shall be responsible for carrying out the functions specified in Article 18 (d) of the Convention within the area allotted to that association in Annex II.

Amendment to Annex II (inclusion of the following text before the geographical description)**General terms of reference**

In carrying out the functions specified in Article 18 (d) of the Convention within the allotted geographical areas defined in this Annex, under the general guidance of Congress and the Executive Council and with support from the Secretariat, each regional association, in close coordination and collaboration with other bodies concerned, shall:

- (a) Coordinate and organize activities of their Members at regional and subregional levels relating to the planning, implementation and evaluation of agreed programmes, strategies and activities;
 - (b) Study the needs of its Members and subregions with regard to their technical and institutional capacity and identify gaps impeding timely implementation of planned programmes and activities; collaborate with Members, technical commissions and other bodies, as necessary, in resolving critical deficiencies;
 - (c) Promote cooperation and efficiency through establishment of regional networks and facilities based upon identified regional needs in close coordination with the technical commissions concerned; monitor the performance of regional networks and facilities and require corrective measures as necessary;
 - (d) Establish regional operating plans and other implementation plans, as necessary, addressing agreed strategic priorities from a regional perspective and ensuring engagement of the Members in focused activities aimed at achieving the expected results of the WMO Strategic Plan;
 - (e) Structure its work to address regional priority areas and engage the available expertise of its Members to provide guidance and assistance in accordance with the needs of the Region;
 - (f) Build and promote cooperation and partnership with relevant regional organizations, including the UN Regional Economic Commissions, other UN bodies, subregional organizations, development partners, NGOs and professional associations;
 - (g) Ensure visibility and recognition of WMO in their respective Regions and engagement in regional initiatives and projects related to the strategic priorities of the Organization.
-

ANNEX XII
Annex to [paragraph 7.5.2](#) of the general summary

**PROVISIONAL ANNOTATED AGENDA FOR THE SEVENTEENTH
WORLD METEOROLOGICAL CONGRESS**

1. ORGANIZATION OF THE SESSION

- 1.1 Opening of the session
- 1.2 Establishment of the Credentials Committee
- 1.3 Approval of the agenda
- 1.4 Report of the Credentials Committee
- 1.5 Establishment of committees
- 1.6 Programme of work
- 1.7 Approval of the minutes

2. HIGH-LEVEL SEGMENT AND REPORTS

- 2.1 Report by the President of the Organization
- 2.2 Report by the Secretary-General
- 2.3 Report of the Chairperson of the Financial Advisory Committee
- 2.4 Reports by presidents of regional associations
- 2.5 Reports by presidents of technical commissions
- 2.6 Report by the Chairperson of the Intergovernmental Board on Climate Services

3. IMPROVING SERVICE QUALITY AND SERVICE DELIVERY

3.1 Service Delivery

Enhanced capabilities of Members to deliver and improve access to high-quality weather, climate, water and related environmental predictions, information, warnings and services in response to users' needs, and to enable their use in decision-making by relevant societal sectors (ER 1)

- Strategy on Service Delivery
- Aeronautical Meteorology – Priority
- Public Weather Services
- Tropical Cyclone Programme
- Marine Meteorology and Oceanography
- Agricultural Meteorology
- Water management

3.2 Disaster Risk Reduction (DRR) – Priority

Enhanced capabilities of Members to reduce risks and potential impacts of hazards caused by weather, climate, water and related environmental elements (ER 2)

4. ADVANCING SCIENTIFIC RESEARCH AND APPLICATION, AS WELL AS DEVELOPMENT AND IMPLEMENTATION OF TECHNOLOGY

4.1 Data-processing and forecasting: weather, climate and water

Enhanced capabilities of Members to produce better weather, climate, water and related environmental information, predictions and warnings to support in particular disaster risk reduction and climate impact and adaptation strategies (ER 3)

- Weather
- Climate, including the Climate Services Information System (CSIS) and User Interface Platform (UIP) of GFCS
- Water

4.2 WMO Integrated Global Observing System (WIGOS) and WMO Information System (WIS) – Priority

Enhanced capabilities of Members to access, develop, implement and use integrated and interoperable Earth- and space-based observation systems for weather, climate and hydrological observations, as well as related environmental and space weather observations, based on world standards set by WMO (ER 4)

- WIGOS
- WIGOS component systems: observing components of WWW, GAW, GCW and hydrological observations
- Satellite Programme
- GCOS
- WIS
- Climate Data Management and Applications

4.3 Research

Enhanced capabilities of Members to contribute to and draw benefits from the global research capacity for weather, climate, water and the related environmental science and technology development (ER 5)

- World Climate Research Programme
- World Weather Research Programme
- Global Atmospheric Research Programme
- Global Integrated Polar Prediction System (GIPPS), including Polar Prediction Project and the Polar Climate Predictability Initiative

5. STRENGTHENING CAPACITY DEVELOPMENT

Enhanced capabilities of NMHSs, in particular in developing and least developed countries, to fulfil their mandates (ER 6) – PRIORITY

- Capacity Development Strategy
- Education and Training Programme
- Technical Cooperation Programme
- Programme for the Least Developed Countries
- Regional Programme, including cooperation with regional bodies
- Resource mobilization and development partnerships

6. BUILDING AND ENHANCING PARTNERSHIPS AND COOPERATION

New and strengthened partnerships and cooperation activities to improve NMHSs' performance in delivering services and to increase the value of the contributions of WMO within the United Nations system, relevant international conventions and national strategic issues (ER 7)

- Cooperation with the UN and other international organizations
- Report of the Chairperson of the IPCC
- WMO and GEOSS – mutual contributions
- Future Earth
- International Polar Partnership Initiative (IPPI)
- GFCS partnerships
- Other partnerships

7. STRENGTHENING GOOD GOVERNANCE

An Effective and Efficient Organization (ER 8)

7.1 Oversight of the Organization

- Report of the Audit Committee
- Report of the External Auditor
- Annual Accountability Report of the Internal Oversight Office
- Joint Inspection Unit

7.2 Monitoring and evaluation

7.3 Risk management

7.4 Conference services

7.5 Languages

7.6 Publications

7.7 Information technology support

7.8 Continuous improvement of WMO processes and practices

7.9 Gender Mainstreaming

8. GLOBAL FRAMEWORK FOR CLIMATE SERVICES

9. FUTURE CHALLENGES AND OPPORTUNITIES

- Open data policies and their impact on WMO
- Third World Conference on Disaster Risk Reduction (Sendai Japan, March 2015) – outcomes and implications for WMO
- Global Air Navigation Plan
- Post 2015 UN Sustainable Development Agenda
- Holistic approach to service provision – concept
- Building new partnerships

- Future role of the private sector in meteorology
- Socio-economic impacts and their communication to governments and societies

10 WMO STRATEGIC PLAN AND BUDGET

10.1 WMO Strategic Plan 2016–2019

10.2 Budget for the Seventeenth Financial Period (2016–2019)

10.3 Major Conferences in 2016–2019

10.4 Preparation of the Strategic Plan 2020–2023

11. RESOURCE MANAGEMENT

11.1 Financial matters

11.2 Proportional contributions of Members

11.3 Staff matters

11.4 Secretary-General's contract

12. COMMUNICATIONS AND PUBLIC AFFAIRS

13. GENERAL AND LEGAL MATTERS

13.1 Questions concerning the Convention

13.2 Membership of the Organization

13.3 Revision of the General Regulations

13.4 Amendments to the Technical Regulations – Consolidated report

13.5 Financial Regulations

13.6 Review of previous resolutions of Congress

14. ELECTIONS AND APPOINTMENTS

14.1 Appointment of the Secretary-General

14.2 Election of the President and Vice-Presidents of the Organization

14.3 Election of members of the Executive Council

15. SCIENTIFIC LECTURES AND DISCUSSIONS

16. DATE AND PLACE OF EIGHTEENTH CONGRESS

17. CLOSURE OF THE SESSION

ANNEX XIII**Annex to paragraph 7.5.3 of the general summary****LIST OF INTERNATIONAL ORGANIZATIONS TO BE INVITED TO THE SEVENTEENTH WORLD METEOROLOGICAL CONGRESS****ORGANIZATIONS WITHIN THE UN SYSTEM**

Economic and Social Commission for Asia and the Pacific
 Economic and Social Commission for Western Asia
 Economic Commission for Africa
 Economic Commission for Europe
 Economic Commission for Latin America and the Caribbean
 Food and Agriculture Organization of the United Nations*
 Intergovernmental Oceanographic Commission of UNESCO
 International Atomic Energy Agency*
 International Civil Aviation Organization*
 International Fund for Agricultural Development*
 International Labour Organization
 International Maritime Organization*
 International Monetary Fund
 International Telecommunication Union*
 Joint Inspection Unit of the United Nations
 Office of the High Commissioner for Human Rights
 Office of the United Nations High Commissioner for Refugees
 United Nations Children's Fund
 United Nations Conference on Trade and Development
 United Nations Convention on Biodiversity
 United Nations Convention to Combat Desertification
 United Nations Development Programme
 United Nations Educational, Scientific and Cultural Organization*
 United Nations Environment Programme
 United Nations Framework Convention on Climate Change
 United Nations Human Settlements Programme (UN-Habitat)
 United Nations Industrial Development Organization
 United Nations Institute for Training and Research
 United Nations International Strategy for Disaster Reduction
 United Nations Office for the Coordination of Humanitarian Affairs
 United Nations Office on Drugs and Crime
 United Nations Population Fund
 United Nations University
 United Nations*
 UN Women
 Universal Postal Union
 World Bank
 World Food Programme
 World Health Organization*
 World Intellectual Property Organization
 World Tourism Organization*
 World Trade Organization

* Regulation 131 (a) (2012 edition) requires that an invitation be sent to the United Nations. The organizations within the UN system marked with an asterisk (*) have an agreement or a working arrangement with WMO, which provide for reciprocal representation. They should, therefore, normally be invited to Congress.

ORGANIZATIONS WITH AN AGREEMENT OR WORKING ARRANGEMENTS WITH WMO PROVIDING FOR REPRESENTATION

African Union

Agency for Air Navigation Safety in Africa and Madagascar (ASECNA)

Arab Centre for the Studies of Arid Zones and Dry Lands

Arab League Educational, Cultural and Scientific Organization (ALECSO)

Arab Organization for Agricultural Development (AOD)

Assembly of French Speaking International Civil Servants (AFFOI)

Association of Private Meteorological Services (PRIMET)

Baltic Marine Environment Protection Commission (Helsinki Commission)

Caribbean Meteorological Organization

Central African Economic and Monetary Community (CEMAC)

Comprehensive Nuclear Test Ban Treaty Organization (CTBTO) Preparatory Commission

Danube Commission

East African Community

Economic Community of West African States

European Centre for Medium-Range Weather Forecasts (ECMWF)

European National Meteorological Services (EUMETNET)

European Organization for Nuclear Research (CERN)

European Organization for the Exploitation of Meteorological Satellites (EUMETSAT)

European Space Agency

Intergovernmental Council for Hydrometeorology of the Commonwealth of Independent States (ICH CIS)

International Association for Urban Climate

International Committee for Weights and Measures (CIPM)

International Council for Research and Innovation in Building and Construction

International Council for Science

International Council for the Exploration of the Sea

International Federation of Red Cross and Red Crescent Societies (IFRC)

International Institute for Applied Systems Analysis

International Mobile Satellite Organization

International Ocean Institute

International Organization for Migration (IOM)

International Organization for Standardization (ISO)

International Renewable Energy Agency (IRENA)

International Seismological Centre

International Union for the Conservation of Nature (IUCN)

International Union of Geodesy and Geophysics

Islamic Educational, Scientific and Cultural Organization (ISESCO)

Lake Chad Basin Commission (LCBC)

League of Arab States

Niger Basin Authority

Open Geospatial Consortium (OGC)

Parliamentary Assembly of the Mediterranean (PAM)

Permanent Inter-State Committee on Drought Control in the Sahel

Permanent Joint Technical Commission for Nile Waters

Permanent South Pacific Commission

South Pacific Regional Environment Programme (SPREP)

World Farmers' Organization (WFO)

World Federation of Engineering Organizations (WFEO)

World Organization for Animal Health

ORGANIZATIONS WITH CONSULTATIVE STATUS*

Association of Hydro-Meteorological Equipment Industry
 International Association of Broadcast Meteorology
 International Association of Oil and Gas Producers
 International Astronautical Federation
 International Astronomical Union
 International Commission on Irrigation and Drainage
 International Federation for Documentation
 International Federation of Agricultural Producers
 International Federation of Airline Pilots' Associations
 International Maritime Radio Committee
 International Society of Biometeorology
 International Society of Soil Sciences
 International Union of Radio Science
 Organization to the ETC Group-Action on Erosion Technology and Concentration
 World Energy Council
 World Federation of United Nations Associations

OTHER ORGANIZATIONS

African Centre of Meteorological Applications for Development (ACMAD)
 African Development Bank
 Asian Development Bank
 Asian Disaster Reduction Centre (ADRC)
 Association of South-East Asian Nations
 The Executive Secretary of the Antarctic Treaty (ATCM)
 The Arctic Council Chairmanship Secretariat (AC)
 Committee on Earth Observations Satellites (CEOS)
 Centro internacional para la investigación del fenómeno El Niño (CIIFEN)
 Common Market for Eastern and Southern Africa (COMESA)
 Comité Regional de Recursos Hidraulicos del Istmo Centroamericano (CRRH)
 Communauté Economique des Etats de l'Afrique Centrale (CEEAC)
 Coordination Group for Meteorological Satellites (CGMS)
 Council for Europe
 CRIA Agency
 Economic Cooperation Organization (ECO)
 European and Mediterranean Plant Protection Organization
 European Bank for Reconstruction and Development (EBRD)
 European Commission
 European Co-operation in the Field of Scientific and Technical Research
 European Meteorological Society (EMS)
 Global Water Partnership
 Group on Earth Observations (GEO)
 Inter-American Development Bank
 Inter-American Institute for Cooperation on Agriculture (IICA)
 International Air Transport Association
 International Chamber of Shipping

* The consultative status (Resolution 2 (EC-IV)) accords to a non-governmental international organization entitlement to be represented by an observer without voting rights as sessions of constituent bodies in conformity with Article 26 (b) and Res. 2 (EC-IV).

International Commission for the Hydrology of the Rhine Basin
International Council of Aircraft Owner and Pilot Associations (IAOPA)
International Crop Research Institute for the Semi-Arid Tropics
International Research Institute for Climate and Society
Latin American Energy Organization
Organisation internationale de la Francophonie
Organization of American States
Regional Committee for Water Resources
South African Development Community (SADC)
The International Rice Research Institute
World Aerospace Education Organization
World Water Council

INVITATIONS GOVERNED BY RESOLUTION 39 (Cg-VII)

State of Palestine*

INVITATIONS TO NON-MEMBER COUNTRIES

In accordance with Regulation 19 of the General Regulations, invitations will be issued to the following non-Member countries because of their status as Members of, or observers to, the United Nations:

Andorra
Equatorial Guinea
Grenada
Holy See
Liechtenstein
Marshall Islands
Nauru
Palau
San Marino
Saint Kitts and Nevis
Saint Vincent and the Grenadines

There are no other names of independent countries, for which prior approval of the WMO Members is required, that were brought to the attention of the Secretary-General.

[In accordance with Regulation 20 (2012 edition), countries which are not Members of WMO but which are Members of the United Nations and countries which are neither Members of WMO nor Members of the United Nations but which have been accorded observer status by the United Nations shall be invited to attend Congress as observers, provided that such countries maintain Meteorological or Hydrometeorological Services.]

* The designation "State of Palestine" is used following the decision of EC-XLI (general summary, paragraph 13.3).

ANNEX XIV
Annex to [paragraph 7.6.3](#) of the general summary

**PROCESS AND TIMELINESS FOR THE SELECTION AND APPOINTMENT OF
MEMBERS OF AUDIT COMMITTEE**

	<i>Activity</i>	<i>Deadline 2015 cycle</i>	<i>General deadline 3-year cycle</i>
1	The SG consults AC members completing their first term to confirm their willingness to serve for a second term. Those AC members willing to serve for a second term will be included in the list of candidates and advised that they are not required to apply	April 2014	AC session April Y2
2	EC appoints a provisional AC Selection Committee	May–June 2014	EC session Y2
3	The advert is placed on the WMO website, journals and circular letters are sent to PRs (as per AC TOR)	July 2014	August Y2
4	Deadline for responses	August 2014	September Y2
5	The Secretariat reviews the applications as relates to qualifications and minimum requirements and compiles a list of candidates	January 2015	January Y3
6	The Secretariat submits a list of candidates to the AC Selection Committee after EC election and organizes its meeting (under confidential cover)	Few days before EC-67, June 2015	At the beginning of EC session Y3
7	The Secretariat submits a list of candidates to the Executive Council with recommendation of AC Selection Committee (under confidential cover)	At the beginning of EC-67	At the beginning of EC session Y3
8	The Chairperson of EC AC Selection Committee presents recommendations to EC for appointment and a reserve for any further replacements within the 3 years, if required	EC-67 in-session	EC in-session Y3
9	EC considers recommendation of the AC Selection Committee and appoints members of AC (and notes the reserve)	EC-67 in-session	EC in-session Y3
10	The AC members informed on their appointment (re-appointment)	After EC-67	After EC session Y3
11	In case of resignation of AC members at intersessional period the President acting on behalf of the EC may appoint a replacement, as per Resolution 8 (EC-LXIII), from the reserve list	As required	As required

ANNEX XV
Annex to [paragraph 8.1.16](#) of the general summary

**EXECUTIVE COUNCIL POSITION TAKEN AT ITS SIXTY-SIXTH SESSION ON ISSUES
RELATED TO THE CONJOINT ICAO/WMO METEOROLOGY DIVISIONAL MEETING**

1. The Council regarded the ICAO Global Air Navigation Plan (GANP) and related Aviation System Block Upgrades (ASBU) methodology as a key development for the coming decades imposing enormous challenges but also offering opportunities to Members to modernize and

rationalize services provided to aviation. It welcomed the recognition of the meteorological information as a key enabler, through its integration to the System-Wide Information Management (SWIM), for the realization of the Global Air Traffic Management concept. The Council agreed that the implementation of the meteorological components of the GANP and ASBU should be pursued by all WMO Members in a coherent way and emphasized the need to develop a relevant capacity development strategy. The Council agreed that the following concerns expressed by EC members at its sixty-sixth session (June 2014) should be addressed by WMO in cooperation with ICAO as a matter of priority.

Cost-recovery and Regionalization

2. As reflected in EC-66/Doc. 4.1(2), in spite of existing mechanisms and guidance developed over the years, a number of Members, in particular in developing countries, have not established cost-recovery mechanisms for the provision of aeronautical meteorological service. It should be noted in this regard that the establishment of such mechanisms is based on agreement at national level between the providers and authorities concerned. The Council requested WMO to continue and intensify the assistance to these Members through developing further guidance, promoting best practices and examples, to enable development of suitable national cost-recovery mechanisms. However, it was recognized that the success of such actions is highly dependent on the commitment of national Civil Aviation Authorities and Ministries of Transport (or appropriate authority) to adopt the proposed schemes and implement them in practice. In this regard, the Council acknowledged that commitment at regional level through such mechanisms as AMCOMET is of vital importance.

3. Implementation of the GANP and ASBU would imply more regional and global service provision. The Council emphasized that such multi-national service provision approaches should be implemented under agreed guiding principles and consideration of regional specificities and differences. The Council noted in this regard that regional and global services have already been widely implemented for some aeronautical meteorological services i.e. WAFS, VAACs and TCACs, forecasting services for SW Pacific States provided by Fiji, etc. The technological and, in some regions – institutional developments (e.g., the introduction of the Functional Airspace Blocks (FAB) in Europe), will stimulate future regionalization based on multi-national agreement between Members. The Council stressed the need to conduct risk analysis of these tendencies and their potential impacts on Members, their NMHSs and meteorological infrastructure. In particular, development of guiding principles and arrangements for sharing investments and responsibilities should be developed by WMO and ICAO.

4. The Council noted in this regard that the ICAO/WMO Conjoint Meeting (2014) will discuss two areas where a regional service model is envisaged: (1) The Space Weather service, likely to be realized through two global centres and several regional centres (under development by the WMO ICTSW and in agreement with ICAO); and (2) the proposal for new Regional Hazardous Weather Advisory Centres (RHWACs) similar to the existing VAACs, targeting the resolution of the long-standing deficiencies related to SIGMET in some regions. Both proposals are aimed at improving key safety services and will require strong partnership between Members within their respective Regions. It should be noted that the establishment of RHWAC will be based on regional agreement, i.e., in Phase I (2014–2017), it will not be mandatory for all regions, but only where the national capacities for SIGMET are insufficient. The respective working mechanisms, regulatory and cost-recovery frameworks are yet to be developed by ICAO and WMO. It will be essential in this regard to ensure establishment of a consolidated regional position by all regional associations who will also be encouraged to establish close cooperation with the respective ICAO Planning and Implementation Regional Groups (PIRGs).

5. Development of appropriate mechanisms for cost-recovery in case of multinational or regional service provision has been foreseen as an important task. The Council noted that the Conjoint Meeting (2014) would recommend to ICAO and WMO to undertake, as a matter of priority, a review and update as necessary the ICAO *Manual on Air Navigation Service Economics* (Doc 9161) and WMO *Guide to Aeronautical Meteorological Services Cost Recovery* (WMO-No. 904), so as to ensure that they appropriately reflect fair, agreed and equitable cost

recovery practices in those instances where aeronautical meteorological service provision is fulfilled on a multiregional, regional or subregional (multi-Member) basis. The Council requested the CAeM and the Secretariat to ensure broad consultation with Members and regional associations in the follow-up of the above recommendation. The Council further requested the CAeM to prepare a guidance document that would either detail the modalities of a regional cost recovery model or review the existing cost recovery model to ensure, as a minimum, adequate funding for National Meteorological and Hydrological Services to sustain the continued exchange of quality meteorological data necessary to support the underpinning provision of aeronautical meteorological services. The Council requested further that such a document should also include guidance and guiding principles for the establishment of overarching regional governance structures.

The role of NMHSs vis-à-vis the private sector and support to basic infrastructure

6. The Council noted serious concerns expressed by some Members relating to the assigning of the provision of meteorological service for international air navigation to entities outside the NMHS, in some cases, private/commercial entities. This issue was considered detrimental for many NMHSs due to loss of revenue from the aviation sector with implications on their viability and sustainability. The Council noted that the transfer of the aeronautical MET service provision to the private sector may pose a serious threat to the sustainability and maintenance of the basic infrastructure that underpins the provision of those services. It agreed on the need to develop a consolidated WMO statement on the role of NMHSs in the aeronautical service provision with emphasis on the basic infrastructure, research and development, which in part enables the provision of services to aviation and will play a vital role in the planned improvement of those services in GANP and ASBU. The Council requested Members participating in the ICAO/WMO Conjoint Meeting to express such position in relevant discussions. It also requested the CAeM through its Expert Team on Governance, in cooperation with the EC WG on Service Delivery, to work on a statement on the role of NMHSs in the future global air navigation system to be proposed for consideration by Cg-17. Such a statement should observe the spirit and provisions of both WMO and ICAO Conventions allowing Members to continue to exercise equal opportunities in providing aeronautical meteorological services, noting Members' prerogative in determining the provision of meteorological services for international air navigation commensurate with air traffic density and their capability.

7. In addition, the Council welcomed the plans for raising awareness of Members through regional conferences at the level of Directors of NMHSs in coordination with regional aviation stakeholders and recommended that those conferences should be organized as soon as possible after the ICAO/WMO Conjoint Meeting to enable regional and national downscaling of the GANP with due consideration of all institutional and governance issues.

Technology development and data policy

8. The Council noted further that the principles of accuracy, credibility and fit for purpose should be emphasized for the System-Wide Information Management (SWIM) data governance, noting Members' prerogative in determining the access of aeronautical MET information within the respective Member country. It encouraged Members to stand ready to respond in delivering technologies underpinning aeronautical meteorological services (e.g. high-resolution regional NWP, nowcasting, remote sensing) with the needed R&D support.

APPENDIX

LIST OF PARTICIPANTS

1. Officers of the session

David GRIMES	President
Antonio Divino MOURA	First Vice-President
Mieczyslaw OSTOJSKI	Second Vice-President
Abdalah MOKSSIT	Third Vice-President

2. Ex officio members of the Executive Council

Mamadou Lamine BAH	President of RA I
Ahmed ABDULLA MOHAMMED	President of RA II
Julián BÁEZ	Acting president of RA III
Juan Carlos FALLAS SOJO	President of RA IV
Andi Eka SAKYA	President of RA V
Ivan CACIC	President of RA VI

3. Elected members of the Executive Council

Gerhard ADRIAN
Anthony ANUFOROM
Juan Manuel CABALLERO GONZÁLEZ
Héctor Horacio CIAPPESONI
Luigi DE LEONIBUS
Alexander FROLOV
Laura FURGIONE (MS)
ZHENG Guoguang
John HIRST
Che Gayah ISMAIL (MS)
Agnes KIJAZI (MS)
Yunhwa KO
Daouda KONATE
Jean-Marc LACAVE
Miguel-Angel LOPEZ GONZALEZ
Camille LOUMOUAMOU
Linda MAKULENI (MS)
Saad Mohamad MOHALFI
Carlos NARANJO JÁCOME
Noritake NISHIDE
Jacob NKOMOKI
Laxman Singh RATHORE
Tyrone SUTHERLAND
Petteri TAALAS
Fetene TESHOME
Robert VERTESSY
Alipate WAQAICELUA

4. Alternates and Advisers to the Executive Council members

Ahmed ABDULLA MOHAMMED	
Abdulla AL MANNAI	Adviser
Monikumar RAMAKRISHNAN	Adviser
Gerhard ADRIAN	
Detlev FRÖMMING	Alternate
Jochen DIBBERN	Adviser
Thomas FITSCHEN	Adviser
Wolfgang GRABS	Adviser
Björn ORIWOHL	Adviser
Axel THOMALLA	Adviser

Anthony ANUFOROM Ernest A. AFIESIMAMA	Adviser
Mamadou Lamine BAH Amos MAKARAU	Adviser
Juan Manuel CABALLERO GONZÁLEZ Francisco VILLALPANDO José Antonio HERNÁNDEZ VEGA	Alternate Adviser
Héctor Horacio CIAPPESONI Mónica Beatriz MARINO Juan Manuel HÖRLER	Alternate Adviser
Luigi DE LEONIBUS Paolo ROSCI Leone M. MICHAUD	Alternate Adviser
Alexander FROLOV Alexander NURULLAEV Vladimir EREMIN Alexander GUSEV Dmitry KIKTEV Marina PETROVA (MS) E. SARUKHANIAN Yuryi TSATUROV R. VILFAND	Alternate (23–27 June 2014) Adviser Adviser Adviser Adviser Adviser Adviser Adviser
Laura FURGIONE Courtney DRAGGON (MS) Caroline CORVINGTON (MS) Justin FAIR David KENNY Marvin LEBLANC Mark PAESE James PERONTO David REIDMILLER Kelly SPONBERG Susan WEST (MS) Charles WOOLDRIDGE	Alternate Adviser Adviser Adviser Adviser Adviser Adviser Adviser Adviser Adviser Adviser
David GRIMES Michael CROWE Bruce ANGLE Al PIETRONIRO	Alternate Adviser Adviser
John HIRST Jane WARDLE (MS) Ian LISK Holly SEALEY (MS) Fiona TOVEY (MS) Bruce TRUSCOTT Rob VARLEY	Alternate Adviser Adviser Adviser Adviser Adviser
Che Gayah ISMAIL (Ms) Edvin ALDRIAN	Alternate (23 June (p.m.) to 27 June 2014)
Agnès KIJAZI (Ms) Hamza Athumani KABELWA Augustine Daniel KANEMB George LUGOMELA	Adviser Adviser Adviser
Yunhwa KO Sewon KIM Jengeun LEE (MS) Seungkyun PARK Jaegwang WON	Alternate (23–27 June 2014) Adviser Adviser Adviser

Daouda KONATE Joël BAMBA	Alternate
Jean-Marc LACAVE Bernard STRAUSS Patrick BÉNICHOU Quoc-Phi DUONG Philippe RAMET	Alternate Adviser Adviser Adviser
Miguel Angel LOPEZ GONZALEZ Carmen RUS JIMENEZ (MS) Francisco ESPEJO GIL Julio GONZALEZ BREÑA	Alternate Adviser Adviser
Camille LOUMOUAMOU Paul DINGA	Adviser
Saad MOHALFI Mohammed BABIDHAN	Alternate
Antonio Divino MOURA José Antonio ARAVEQUIA Emma Giada MATSCHINSKE (MS)	Adviser Adviser
Noritake NISHIDE Tatsuya KIMURA Jitsuko HASEGAWA (MS) Yoshiaki HIRANO Kohei MATSUDA Hiroyuki SUMINO	Alternate Adviser Adviser Adviser Adviser
Jacob NKOMOKI Joseph Katongo KANYANGA Loveness Nikisi SHABALENGU (MS)	Alternate Adviser
Mieczyslaw OSTOJSKI Janusz FILIPIAK Edyta WOZNIAK-DUDZINSKA (MS) Janusz ZALESKI	Alternate Adviser Adviser
Laxman Singh RATHORE S.D. ATTRI Shailesh NAYAK	Adviser Adviser
Andi Eka SAKYA Che Gayah ISMAIL (MS) Edvin ALDRIAN Jaumil Achyar DEWANTORO SITUMEANG Aries ERWANTO Anni Arumsari FITRIANY (MS) Asteria Satyaning HANDAYANI (MS) Helminah HERAWATI (MS) Dian NURATRI (MS) NURHAYATI (MS) Mulyono Rahadi PRABOWO Suko PRAYITINO Ardhasena SOPAHELUWAKAN	Adviser (23 June (p.m.) to 27 June 2014) Adviser (until 24 June 2014) Adviser Adviser Adviser Adviser Adviser Adviser Adviser Adviser Adviser
Tyrone SUTHERLAND David FARRELL Glendell DE SOUZA	Alternate Adviser
Petteri TAALAS Maria HURTOLA (MS) Joanna SAARINEN (MS)	Alternate Adviser
Robert VERTESSY Jon GILL Sue BARRELL (MS) Jeffie KAINE (MS)	Alternate Adviser Adviser

Alipate WAQAICELUA

Misaeli FUNAKI

Adviser

Guoguang ZHENG

XIAONONG SHEN

Alternate (23–27 June 2014)

XIANGHUA XU

Adviser

JUN YANG

Adviser

HENG ZHOU

Adviser

5. Presidents of technical commissions

Fred BRANSKI

Bertrand CALPINI

Oystein HOV

Byong-lyol LEE

Harry LINS

Thomas PETERSON

Nadia PINARDI (MS)

Chi-ming SHUN

Johan STANDER

6. Regional Hydrological Advisers

Dominique BÉROD

Dora GONIADZKI (MS)

Frigui HASSEN LOTFI

Edouardo PLANOS

7. Representatives of Members of WMO

Mikhail KHVOSTOV

Belarus

Vitali KORNEU

Belarus

Konstantin ANDREEV

Bulgaria

Georgi KORTCHEV

Bulgaria

Ali Abdulnabi ALMUTAWAA

Kuwait

Mohammed Karam GOHAR ALI

Kuwait

Peter LENNOX

New Zealand

Jenny ARANA VIZCAYA (MS)

Nicaragua

Salman BAL

Switzerland

Peter BINDER

Switzerland

Gabriela SEIZ

Switzerland

Stefan SIGRIST

Switzerland

Gerhard ULMANN

Switzerland

Bryson KOEHLER

United States of America

8. Representatives of international organizations**Association of Hydro-Meteorology Equipment Industry (HMEI)**

Brian DAY

Andy MCDONALD

Ashish RAVAL

Caribbean Meteorological Organization (CMO)

Tyrone W. SUTHERLAND

European Centre for Medium-Range Weather Forecasts (ECMWF)

Alan J. THORPE

European Organization for the Exploitation of Meteorological Satellites (EUMETSAT)

Paul COUNET

Group on Earth Observations (GEO)

Barbara J. RYAN (MS)

Intergovernmental Panel on Climate Change (IPCC)

Jean-Pascal VAN YPERSELE

International Civil Aviation Organization (ICAO)

G. BROCK

International Council for Science (ICSU)

Steven WILSON

International Ocean Institute (IOI)

Awni BEHNAM

International Union of Geodesy and Geophysics (IUGG)

Arthur ASKEW

The World Bank Group

Daniel KULL

David ROGERS

9. Invited experts

Stephen BRIGGS

Antonio J. BUSALACCHI

Eric Serge JEANNET

Wolfgang KUSCH

Tillmann MOHR

Gian-Kasper PLATNER

Neville SMITH

Chairperson, GCOS Steering Committee

Chairperson, WCRP Joint Scientific Committee

For more information, please contact:

World Meteorological Organization

7 bis, avenue de la Paix – P.O. Box 2300 – CH 1211 Geneva 2 – Switzerland

Communications and Public Affairs Office

Tel.: +41 (0) 22 730 83 14/15 – Fax: +41 (0) 22 730 80 27

E-mail: cpa@wmo.int

www.wmo.int