



Profiles of Reservoir Properties of Oil-Bearing Plays for Selected Petroleum Provinces in the United States

By Philip A. Freeman and Emil D. Attanasi

Open-File Report 2015–1195
Version 1.1, February 2016

U.S. Department of the Interior
U.S. Geological Survey

U.S. Department of the Interior
SALLY JEWELL, Secretary

U.S. Geological Survey
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U.S. Geological Survey, Reston, Virginia
First release: November 2015
Revised: February 2016 (ver. 1.1)

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Suggested citation:

Freeman, P.A., and Attanasi, E.D., 2016, Profiles of reservoir properties of oil-bearing plays for selected petroleum provinces in the United States (ver. 1.1, February 2016): U.S. Geological Survey Open-File Report 2015–1195, 68 p., <http://dx.doi.org/10.3133/ofr20151195>.

ISSN 2331-1258 (online)

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Profiles of Reservoir Properties of Oil-Bearing Plays for Selected Petroleum Provinces in the United States

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Abstract

Profiles of reservoir properties of oil-bearing plays for selected petroleum provinces in the United States were developed to characterize the database to be used for a potential assessment by the U.S. Geological Survey (USGS) of oil that would be technically recoverable by the application of enhanced oil recovery methods using injection of carbon dioxide (CO₂-EOR). The USGS assessment methodology may require reservoir-level data for the purposes of screening conventional oil reservoirs and projecting CO₂-EOR performance in terms of the incremental recoverable oil. The information used in this report is based on reservoir properties from the “Significant Oil and Gas Fields of the United States Database” prepared by Nehring Associates, Inc. (2012). As described by Nehring Associates, Inc., the database “covers all producing provinces (basins) in the United States except the Appalachian Basin and the Cincinnati Arch.”

Under contract to the USGS, INTEK, Inc., developed and applied algorithms to estimate variables useful in projecting EOR performance at the reservoir level and to complete some partial reservoir records of the “Significant Oil and Gas Fields of the United States Database” (Nehring Associates, Inc., 2012). The augmented database is referred to here as the “Comprehensive Resource Database” (CRD).

The CRD play and province classification scheme corresponds to the definitions used in the 1995 USGS National Oil and Gas Assessment (NOGA). The profiles in this report consist of a resource table and a six-part figure showing the variation of reservoir parameters selected because of their importance in the choice of a miscible or immiscible method for CO₂-EOR and in the assessment of potential oil recovery using the EOR processes. A subset of these reservoirs may be available for either miscible- or immiscible-type flooding for CO₂-EOR. Plays with fewer than 10 oil reservoirs were not graphed and were omitted from the province profiles. For this report and for the purposes of screening reservoirs as candidates for the application of CO₂-EOR methods, oil reservoirs must have no more than 10,000 standard cubic feet of natural gas per barrel of oil at surface conditions. Oil-bearing plays presented in this report must contain at least one oil reservoir so defined.

The profile plots allow geologists to evaluate the range of empirical and default values of the oil reservoir characteristics within a play and across plays that belong to the same province in the CRD. For most plays, the default estimates can be identified by the stacking of points at a single value on strip charts in the profiles. Reasonable default values should be within the range of the reservoir parameter values assigned by Nehring Associates, Inc. (2012), to reservoirs of that particular play.

Each province profile figure consists of five strip charts and a boxplot. The five strip charts display for individual plays the following reservoir-fluid and reservoir properties: *A*, oil density (American Petroleum Institute [API] gravity in degrees); *B*, computed pseudo-Dykstra-Parsons coefficient; *C*, reservoir porosity (in percent); *D*, reservoir permeability (in millidarcies); and *E*, estimates of the original oil in place (OOIP) per unit volume of reservoir rock (in barrels per acre-foot). The OOIP per unit volume of reservoir rock is an indicator of the relative richness of the oil reservoir and is derived from estimates in the CRD of OOIP, reservoir acreage, and net pay. The net pay is the interval of productive reservoir rock. The same data for OOIP per unit volume are graphed as a strip chart (*E*) and a boxplot (*F*).

Introduction

Profiles of reservoir properties of oil-bearing plays for selected petroleum provinces in the United States were developed to characterize the database to be used for a potential assessment by the U.S. Geological Survey (USGS) of oil that would be technically recoverable by the application of enhanced oil recovery methods using injection of carbon dioxide (CO₂-EOR).

2 Profiles of Reservoir Properties of Oil-Bearing Plays for Selected Petroleum Provinces in the United States

The USGS assessment methodology may require reservoir-level data for the purposes of screening conventional oil reservoirs¹ and projecting CO₂-EOR performance in terms of the incremental recoverable oil. The information used in this report is based on reservoir properties from the “Significant Oil and Gas Fields of the United States Database” prepared by Nehring Associates, Inc. (2012). As described by Nehring Associates, Inc., the database “covers all producing provinces (basins) in the United States except the Appalachian Basin and the Cincinnati Arch.”

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The CRD play and province classification scheme corresponds to the definitions used in the 1995 USGS National Oil and Gas Assessment (NOGA) (U.S. Geological Survey National Oil and Gas Resource Assessment Team, 1995; Gautier and Dolton, 1996). The 1995 NOGA petroleum provinces and the eight oil and gas regions are shown in figure 1. The 1- or 2-digit province codes in figure 1 identify provinces with conventional oil-bearing plays included in the profiles. A play code consists of the province code followed by 2 additional digits that uniquely identify the play within the province. For example, play 4412 is identified as the Delaware Sandstones play in the Permian Basin Province, which has code 44.

The data described in this report apply only to conventional oil-bearing plays either onshore or under State waters. Plays from continuous accumulations or from Federal waters were not included.

For each province, table 1 shows the number of known conventional oil-bearing plays, the total number of oil reservoirs, the province total estimate of the original oil in place (OOIP), and the province total estimate of known recovery (KR) for all oil-bearing plays and for the subset of plays displayed in the profiles. As shown in table 1, the estimate of the OOIP for a reservoir is based on the CRD. The estimate of KR is the sum of estimated reserves as of the end of 2010 plus cumulative oil production through the end of 2010. The KR estimate is based on data from Nehring Associates, Inc. (2012).

The profiles in this report consist of a resource table and a six-part figure showing the variation of reservoir parameters selected because of their importance in the choice of a miscible or immiscible method for CO₂-EOR and in the assessment of potential oil recovery using the EOR processes. A subset of these reservoirs may be available for either miscible- or immiscible-type flooding for CO₂-EOR. Plays with fewer than 10 oil reservoirs were not graphed and were omitted from the province profiles. For this report and for the purposes of screening reservoirs as candidates for the application of CO₂-EOR methods, oil reservoirs must have no more than 10,000 standard cubic feet of natural gas per barrel of oil at surface conditions. Oil-bearing plays presented in this report must contain at least one oil reservoir so defined.

For each province profile, a table shows the conventional oil-bearing plays by play number and play name (Gautier and others, 1996), the number of reservoirs in each play, the sum for each play of the estimated OOIP in that play’s reservoirs, the sum for each play of the KR in that play’s reservoirs, and the default play values for oil density and reservoir porosity and permeability. Play averages or, if necessary, province averages became default values in the CRD when such values were missing from individual reservoir records of the Nehring Associates, Inc. (2012), database. If Nehring Associates, Inc., specified values for all reservoirs in a play, then no default value was modeled, and the province table cells say ND (no default value needed). The profile plots allow geologists to evaluate the range of empirical and default values of the oil reservoir characteristics within a play and across plays that belong to the same province in the CRD. For most plays, the default estimates can be identified by the stacking of points at a single value on strip charts in the profiles. Reasonable default values should be within the range of the reservoir parameter values assigned by Nehring Associates, Inc. (2012), to reservoirs of that particular play.

Each province profile figure consists of five strip charts and a boxplot. The five strip charts display for individual plays the following reservoir-fluid and reservoir properties: *A*, oil density (American Petroleum Institute [API] gravity in degrees); *B*, computed pseudo-Dykstra-Parsons coefficient²; *C*, reservoir porosity (in percent); *D*, reservoir permeability (in millidarcies); and *E*, estimates of the original oil in place (OOIP) per unit volume of reservoir rock (in barrels per acre-foot). The OOIP per

¹A conventional oil reservoir is defined as an underground formation containing an individual and separate pool (natural accumulation) of producible oil that is confined by impermeable rock or water barriers and is characterized by a single natural pressure system. A field may consist of a single reservoir or multiple reservoirs that are not in communication but that may be associated with or related to a single structural or stratigraphic feature (U.S. Energy Information Administration, 2000).

²The Dykstra-Parsons coefficient (Willhite, 1986) is a measure of the reservoir heterogeneity, which is important in modeling recovery efficiency of waterfloods and CO₂-EOR projects. It is calculated from core samples. However, a pseudo-Dykstra-Parsons coefficient may be calculated by using other reservoir characteristics. The pseudo-Dykstra-Parsons coefficient is computed from the calculated waterflood sweep efficiency and mobility ratio for each reservoir in the database. The procedure was used for the National Petroleum Council’s 1984 study on enhanced oil recovery (National Petroleum Council, 1984; Robl and others, 1986; Hirasaki and others, 1989). The basic data for the relationships among pseudo-Dykstra-Parsons values, sweep efficiency, and mobility ratios were presented in graphical form in Willhite (1986) and Hirasaki and others (1984). When a pseudo-Dykstra-Parsons coefficient could be calculated by using the formula of Hirasaki and others (1984), they recommended that if the calculated value were between 0.1 and 0.5, it should be set to 0.5. They also recommended that if the calculated value exceeded 0.98, it should be set to 0.72. Any values calculated between 0.5 and 0.98 inclusive are shown as is. For some reservoirs having insufficient data, a value is not shown. The effect of this adjustment is seen on the graphs in figures 2–33 of this report of the pseudo-Dykstra-Parsons coefficient, many of which show stacked numbers of reservoirs at 0.5 and 0.72.

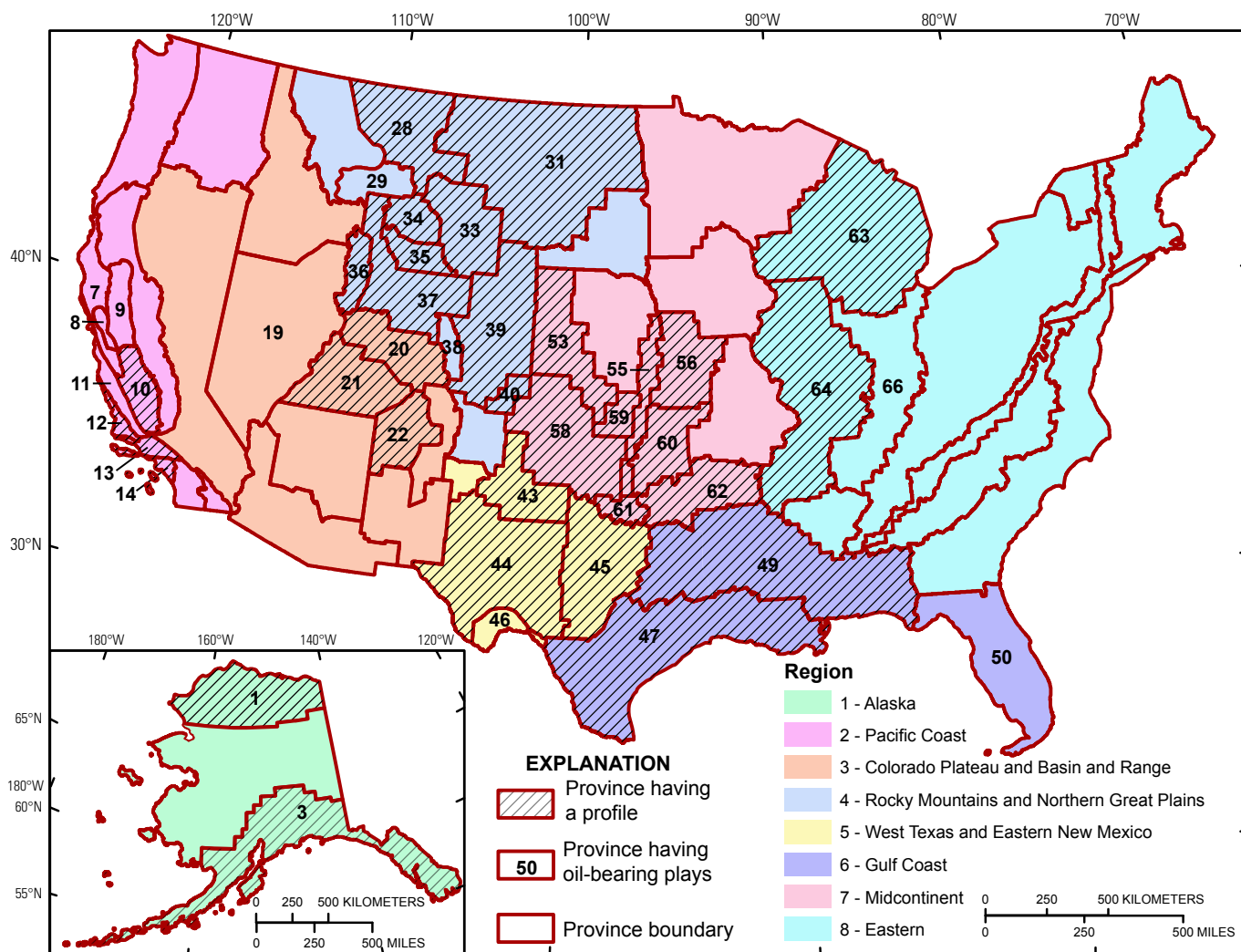


Figure 1. Maps of Alaska and the conterminous United States showing the province and region boundaries used in the U.S. Geological Survey's 1995 National Oil and Gas Assessment (NOGA); boundaries are from Beeman and others (1996). Provinces with oil-bearing plays are labeled by province code. Stripes designate provinces featured in this report's profiles of provinces containing conventional oil-bearing plays where at least 1 play has 10 or more oil reservoirs that have no more than 10,000 standard cubic feet of natural gas per barrel of oil at surface conditions. Oil reservoir properties in this report are based on data from the "Significant Oil and Gas Fields of the United States Database" prepared by Nehring Associates, Inc. (2012). As described by Nehring Associates, Inc., the database "covers all producing provinces (basins) in the United States except the Appalachian Basin and the Cincinnati Arch." See table 1 for province names corresponding to province codes; for example, code 31 identifies the Williston Basin Province.

unit volume of reservoir rock is an indicator of the relative richness of the oil reservoir and is derived from estimates in the CRD of OOIP, reservoir acreage, and net pay. The net pay is the interval of productive reservoir rock. The same data for OOIP per unit volume are graphed as a strip chart (*E*) and a boxplot (*F*). The strip chart of OOIP per unit volume shows the minimum and maximum value of the empirical data. The boxplot of the OOIP per unit volume shows the median (thick horizontal line) and the interquartile range between the 25th percentile (bottom of box) and the 75th percentile (top of box). It also shows the minimum and maximum values. The minimum value of the dashed vertical line is the smallest value of the data within 1.5 times the interquartile range below the 25th percentile, and the maximum value of the dashed vertical line is the largest value within 1.5 times the interquartile range above the 75th percentile. Some boxplots show only a horizontal line, indicating that the OOIP per unit volume is derived from common default values.

The profiles are presented in sequence according to region number and province code in tables 2–29 and figures 2–33. Where possible, the slate of graphs for provinces with only a single play were combined and displayed by region in tables 8 and 14 and figures 8 and 14. Three provinces include more plays than can fit into a single set of plots, so the plays in these provinces are divided into groups a and b or groups a, b, and c and are shown in sets of figures (figs. 18–20, 21–22, and 26–27).

Table 1. Summary of data for all oil-bearing provinces in Alaska and the conterminous United States.

[The table data include the number of conventional, oil-bearing plays, the number of reservoirs, estimates of the original oil in place (OOIP), and known recovery (KR). The four columns under the heading “All oil-bearing plays” include data from all oil-bearing plays within the identified province. The data summarized by the last four columns (under the heading “Oil-bearing plays shown in plots”) do not include plays of that province having fewer than 10 oil reservoirs. The reservoir characteristics for plays having at least 10 oil reservoirs are given in the province profiles in summary tables 2–29 and figures 2–33. The estimate of the OOIP for a province is the sum of the Comprehensive Resource Database estimates for oil reservoirs. The estimate of the KR is the sum of estimated reserves as of the end of 2010 plus cumulative oil production through the end of 2010. The KR estimate is based on data from Nehring Associates, Inc. (2012). MMBO, millions of barrels of oil; dash (–), no data shown because plays contain fewer than 10 oil reservoirs]

Region number (fig. 1)	Province number	Province name	All oil-bearing plays				Oil-bearing plays shown in plots			
			Number of plays	Number of oil reservoirs	OOIP (MMBO)	KR (MMBO)	Number of plays	Number of oil reservoirs	OOIP (MMBO)	KR (MMBO)
Region 1—Alaska										
1	1	Northern Alaska (fig. 2)	3	54	57,973	17,609	3	54	57,973	17,609
1	3	Southern Alaska (fig. 3)	1	15	3,985	1,375	1	15	3,985	1,375
Region 2—Pacific Coast										
2	7	Northern Coastal	1	1	14	1	–	–	–	–
2	8	Sonoma-Livermore Basin	1	1	20	2	–	–	–	–
2	9	Sacramento Basin	1	4	127	7	–	–	–	–
2	10	San Joaquin Basin (fig. 4)	9	200	59,141	16,398	5	185	58,573	16,268
2	11	Central Coastal	3	13	2,688	905	–	–	–	–
2	12	Santa Maria Basin (fig. 5)	2	23	3,718	917	2	23	3,718	917
2	13	Ventura Basin (fig. 6)	2	97	12,213	2,509	2	97	12,213	2,509
2	14	Los Angeles Basin (fig. 7)	7	85	29,493	9,044	4	74	28,071	8,810
Region 3—Colorado Plateau and Basin and Range										
3	19	Eastern Great Basin	1	8	207	54	–	–	–	–
3	20	Uinta-Piceance Basin (fig. 8)	2	24	7,797	1,778	1	22	6,153	826
3	21	Paradox Basin (fig. 8)	3	47	2,538	731	1	39	2,281	641
3	22	San Juan Basin (fig. 8)	3	29	7,244	178	1	20	7,116	153
Region 4—Rocky Mountains and Northern Great Plains										
4	28	North-Central Montana (fig. 9)	4	64	4,454	509	3	62	4,450	507
4	29	Southwest Montana	1	1	7	1	–	–	–	–
4	31	Williston Basin (fig. 10)	6	505	15,693	2,517	5	504	15,688	2,517
4	33	Powder River Basin (fig. 11)	9	401	16,838	3,248	7	389	16,473	3,209
4	34	Big Horn Basin (fig. 14)	3	121	14,120	2,853	1	113	13,458	2,751
4	35	Wind River Basin (fig. 14)	4	61	1,762	520	1	50	1,556	469
4	36	Wyoming Thrust Belt (fig. 14)	1	10	1,583	175	1	10	1,583	175

Table 1. Summary of data for all oil-bearing provinces in Alaska and the conterminous United States.—Continued

Region number (fig. 1)	Province number	Province name	All oil-bearing plays				Oil-bearing plays shown in plots			
			Number of plays	Number of oil reservoirs	OOIP (MMBO)	KR (MMBO)	Number of plays	Number of oil reservoirs	OOIP (MMBO)	KR (MMBO)
Region 4—Rocky Mountains and Northern Great Plains—Continued										
4	37	Southwestern Wyoming (fig. 12)	5	84	2,766	934	3	76	2,290	763
4	38	Park Basins	1	6	74	17	—	—	—	—
4	39	Denver Basin (fig. 14)	4	421	3,575	892	1	403	3,099	781
4	40	Las Animas Arch (fig. 13)	3	32	621	124	2	25	612	120
Region 5—West Texas and Eastern New Mexico										
5	43	Palo Duro Basin (fig. 15)	1	12	118	25	1	12	118	25
5	44	Permian Basin (fig. 16)	12	2,284	162,281	37,119	11	2,280	162,238	37,104
5	45	Bend Arch-Fort Worth Basin (fig. 17)	5	1,163	18,253	2,759	5	1,163	18,253	2,759
5	46	Marathon Thrust Belt	1	1	133	3	—	—	—	—
Region 6—Gulf Coast										
6	47	Western Gulf (figs. 18–20)	38	1,784	68,236	22,508	31	1,753	66,305	22,018
6	49	Louisiana-Mississippi Salt Basins (figs. 21, 22)	32	1,181	81,604	16,413	24	1,137	80,375	16,142
6	50	Florida Peninsula	2	11	325	125	—	—	—	—
Region 7—Midcontinent										
7	53	Cambridge Arch-Central Kansas Uplift (fig. 23)	4	698	10,398	3,149	4	698	10,398	3,149
7	55	Nemaha Uplift (fig. 24)	4	396	8,746	2,692	4	396	8,746	2,692
7	56	Forest City Basin (fig. 25)	3	41	1,007	132	2	40	955	126
7	58	Anadarko Basin (figs. 26, 27)	23	658	12,429	2,429	14	616	11,528	2,170
7	59	Sedgwick Basin (fig. 28)	3	201	3,211	780	3	201	3,211	780
7	60	Cherokee Platform (fig. 29)	4	851	35,108	7,248	4	851	35,108	7,248
7	61	Southern Oklahoma (fig. 30)	12	219	14,093	3,953	8	194	11,636	3,153
7	62	Arkoma Basin (fig. 31)	3	29	981	330	1	17	415	135
Region 8—Eastern										
8	63	Michigan Basin (fig. 32)	7	373	4,046	1,175	4	362	3,517	1,012
8	64	Illinois Basin (fig. 33)	4	522	30,700	4,037	4	522	30,700	4,037
8	66	Cincinnati Arch	1	2	447	107	—	—	—	—

Region 1 Profiles

Northern Alaska Province

Table 2. Number of oil reservoirs, amount of original oil in place, amount of known recovery, and other data for each conventional oil-bearing play containing at least 10 oil reservoirs in the Northern Alaska Province.

[The number of oil reservoirs and the known recovery are from the database by Nehring Associates, Inc. (2012). The known recovery (KR) is the sum of estimated reserves as of the end of 2010 plus cumulative oil production through the end of 2010. The original oil in place (OOIP) for each play is the sum of the Comprehensive Resource Database (CRD) estimates for that play's oil reservoirs. The CRD is based on the database by Nehring Associates, Inc. (2012), and contains updates made by the U.S. Geological Survey and INTEK, Inc. Values for API gravity, porosity, and permeability for each play are from the CRD; they are default values derived from INTEK's algorithms unless otherwise indicated. mD, millidarcies; MMBO, millions of barrels of oil]

Play number	Number of oil reservoirs	OOIP (MMBO)	KR (MMBO)	API gravity (degrees)	Porosity (percent)	Permeability (mD)	Play name
104	11	37,657	12,468	29.9	18.1	102	Barrow Arch Ellesmerian.
103	30	13,028	4,539	28.4	20.9	94	Barrow Arch Beaufortian.
101	13	7,289	601	23.7	24.6	213	Topset.

Figure 2 (page 7). Plots of reservoir-fluid and reservoir properties for oil reservoirs by play number ► for the Northern Alaska Province. *A*, Oil density (American Petroleum Institute [API] gravity in degrees). *B*, Computed pseudo-Dykstra-Parsons coefficient. *C*, Reservoir porosity (in percent). *D*, Reservoir permeability (in millidarcies). *E*, Estimates of the original oil in place (OOIP) per unit volume of reservoir rock (in barrels per acre-foot). *F*, Distribution of OOIP per unit volume of reservoir rock (in barrels per acre-foot). The boxplot in part *F* is explained in the text.

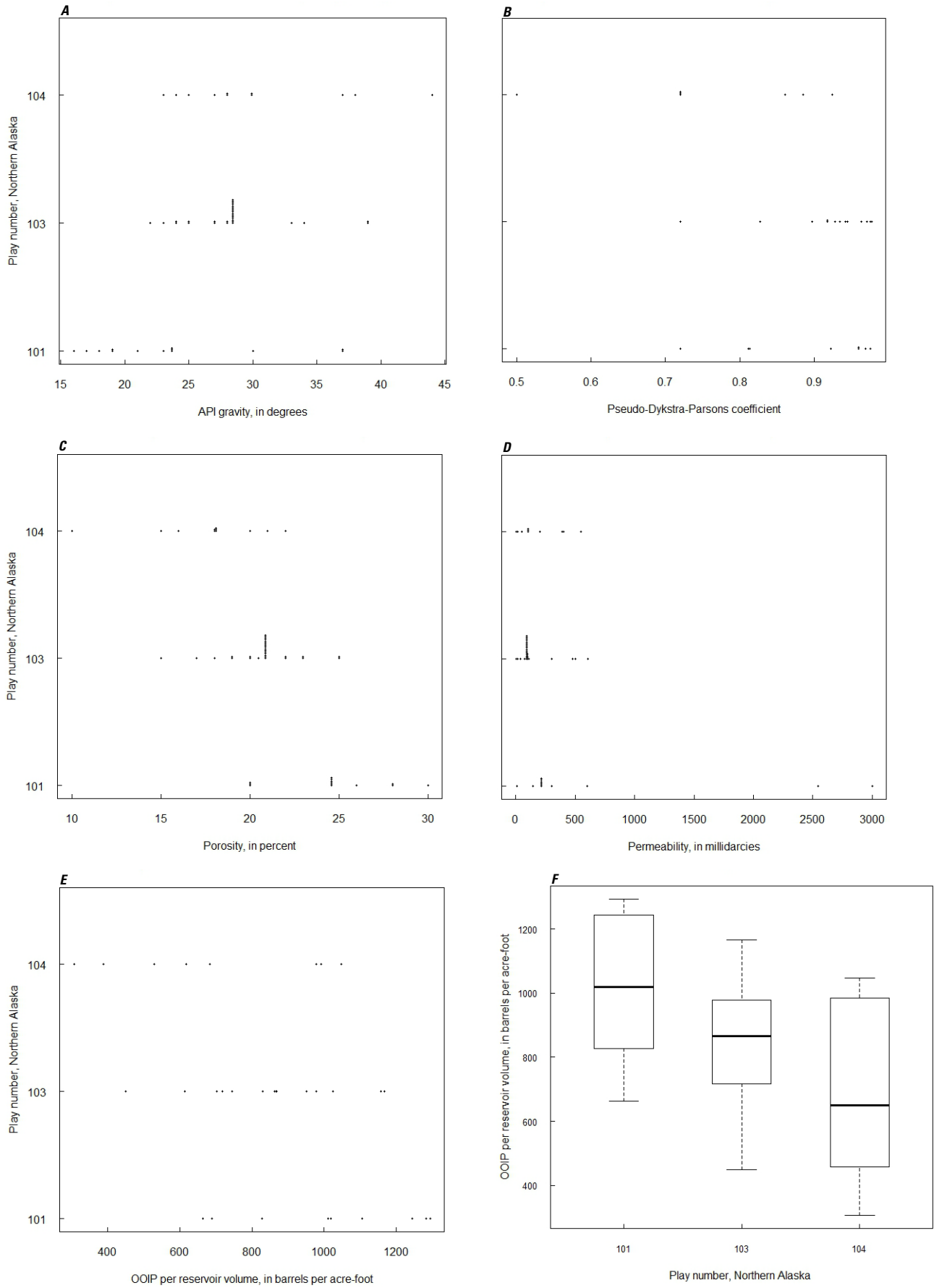


Figure 2. See caption on page 6.

Southern Alaska Province

Table 3. Number of oil reservoirs, amount of original oil in place, amount of known recovery, and other data for each conventional oil-bearing play containing at least 10 oil reservoirs in the Southern Alaska Province.

[The number of oil reservoirs and the known recovery are from the database by Nehring Associates, Inc. (2012). The known recovery (KR) is the sum of estimated reserves as of the end of 2010 plus cumulative oil production through the end of 2010. The original oil in place (OOIP) for each play is the sum of the Comprehensive Resource Database (CRD) estimates for that play’s oil reservoirs. The CRD is based on the database by Nehring Associates, Inc. (2012), and contains updates made by the U.S. Geological Survey and INTEK, Inc. Values for API gravity, porosity, and permeability for each play are from the CRD; they are default values derived from INTEK’s algorithms unless otherwise indicated. mD, millidarcies; MMBO, millions of barrels of oil]

Play number	Number of oil reservoirs	OOIP (MMBO)	KR (MMBO)	API gravity (degrees)	Porosity (percent)	Permeability (mD)	Play name
304	15	3,985	1,375	34.2	15.3	78	Cook Inlet Hemlock-Tyonek Oil.

Figure 3 (page 9). Plots of reservoir-fluid and reservoir properties for oil reservoirs by play number ► for the Southern Alaska Province. *A*, Oil density (American Petroleum Institute [API] gravity in degrees). *B*, Computed pseudo-Dykstra-Parsons coefficient. *C*, Reservoir porosity (in percent). *D*, Reservoir permeability (in millidarcies). *E*, Estimates of the original oil in place (OOIP) per unit volume of reservoir rock (in barrels per acre-foot). *F*, Distribution of OOIP per unit volume of reservoir rock (in barrels per acre-foot). The boxplot in part *F* is explained in the text.

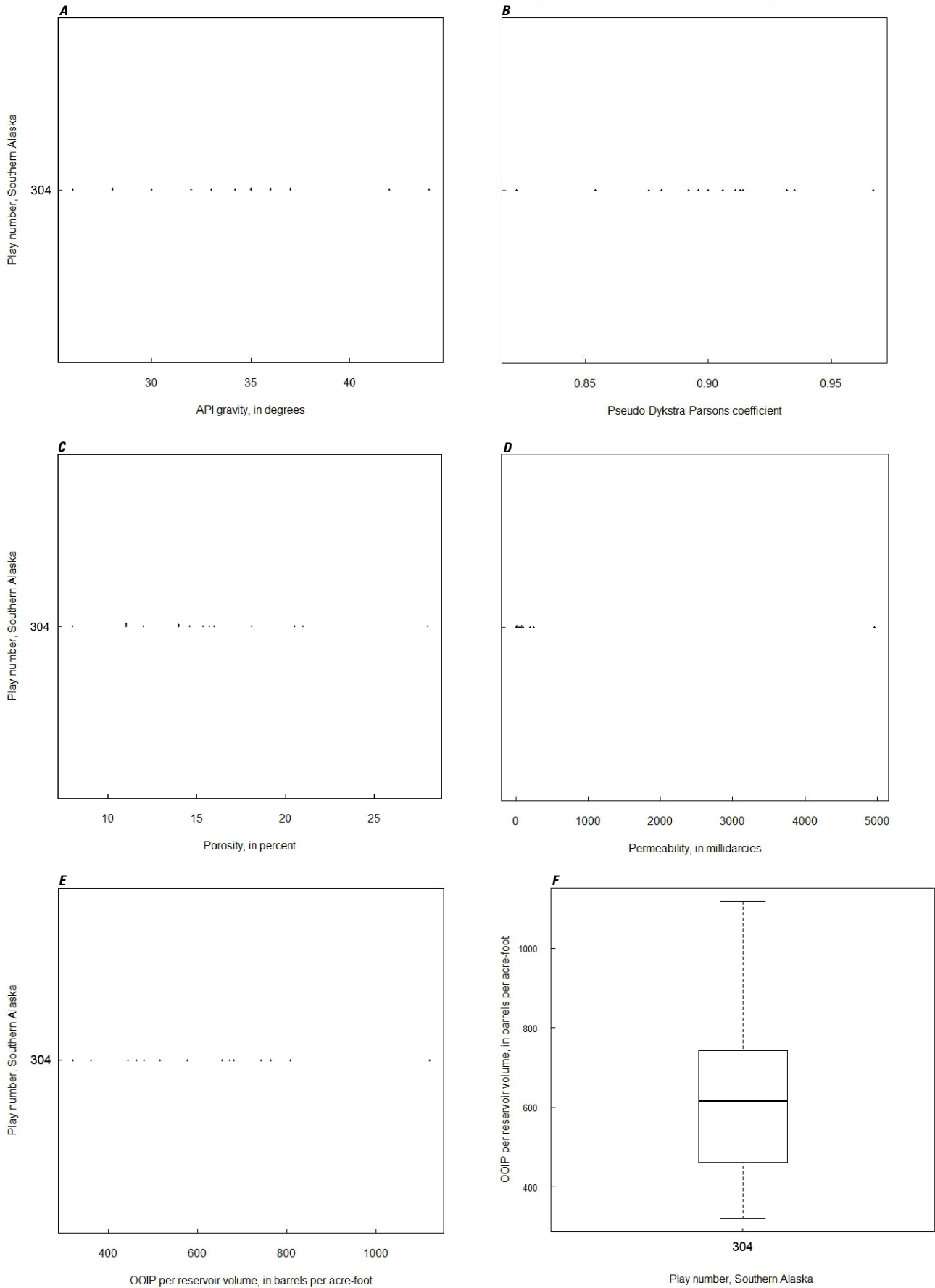


Figure 3. See caption on page 8.

Region 2 Profiles

San Joaquin Basin Province

Table 4. Number of oil reservoirs, amount of original oil in place, amount of known recovery, and other data for each conventional oil-bearing play containing at least 10 oil reservoirs in the San Joaquin Basin Province.

[The number of oil reservoirs and the known recovery are from the database by Nehring Associates, Inc. (2012). The known recovery (KR) is the sum of estimated reserves as of the end of 2010 plus cumulative oil production through the end of 2010. The original oil in place (OOIP) for each play is the sum of the Comprehensive Resource Database (CRD) estimates for that play's oil reservoirs. The CRD is based on the database by Nehring Associates, Inc. (2012), and contains updates made by the U.S. Geological Survey and INTEK, Inc. Values for API gravity, porosity, and permeability for each play are from the CRD; they are default values derived from INTEK's algorithms unless otherwise indicated. mD, millidarcies; MMBO, millions of barrels of oil; ND, no default value needed]

Play number	Number of oil reservoirs	OOIP (MMBO)	KR (MMBO)	API gravity (degrees)	Porosity (percent)	Permeability (mD)	Play name
1008	21	762	135	29.2	27.1	548	Tejon Platform.
1005	52	8,653	2,303	ND	22.7	224	West Side Fold Belt Sourced by Pre-Middle Miocene Rocks.
1004	49	36,188	9,489	ND	29.6	911	West Side Fold Belt Sourced by Post-Lower Miocene Rocks.
1003	27	2,375	674	ND	24.2	259	Lower Bakersfield Arch.
1002	36	10,595	3,667	ND	ND	1,361	Southeast Stable Shelf.

Figure 4 (page 11). Plots of reservoir-fluid and reservoir properties for oil reservoirs by play number ► for the San Joaquin Basin Province. *A*, Oil density (American Petroleum Institute [API] gravity in degrees). *B*, Computed pseudo-Dykstra-Parsons coefficient. *C*, Reservoir porosity (in percent). *D*, Reservoir permeability (in millidarcies). *E*, Estimates of the original oil in place (OOIP) per unit volume of reservoir rock (in barrels per acre-foot). *F*, Distribution of OOIP per unit volume of reservoir rock (in barrels per acre-foot). The boxplot in part *F* is explained in the text.

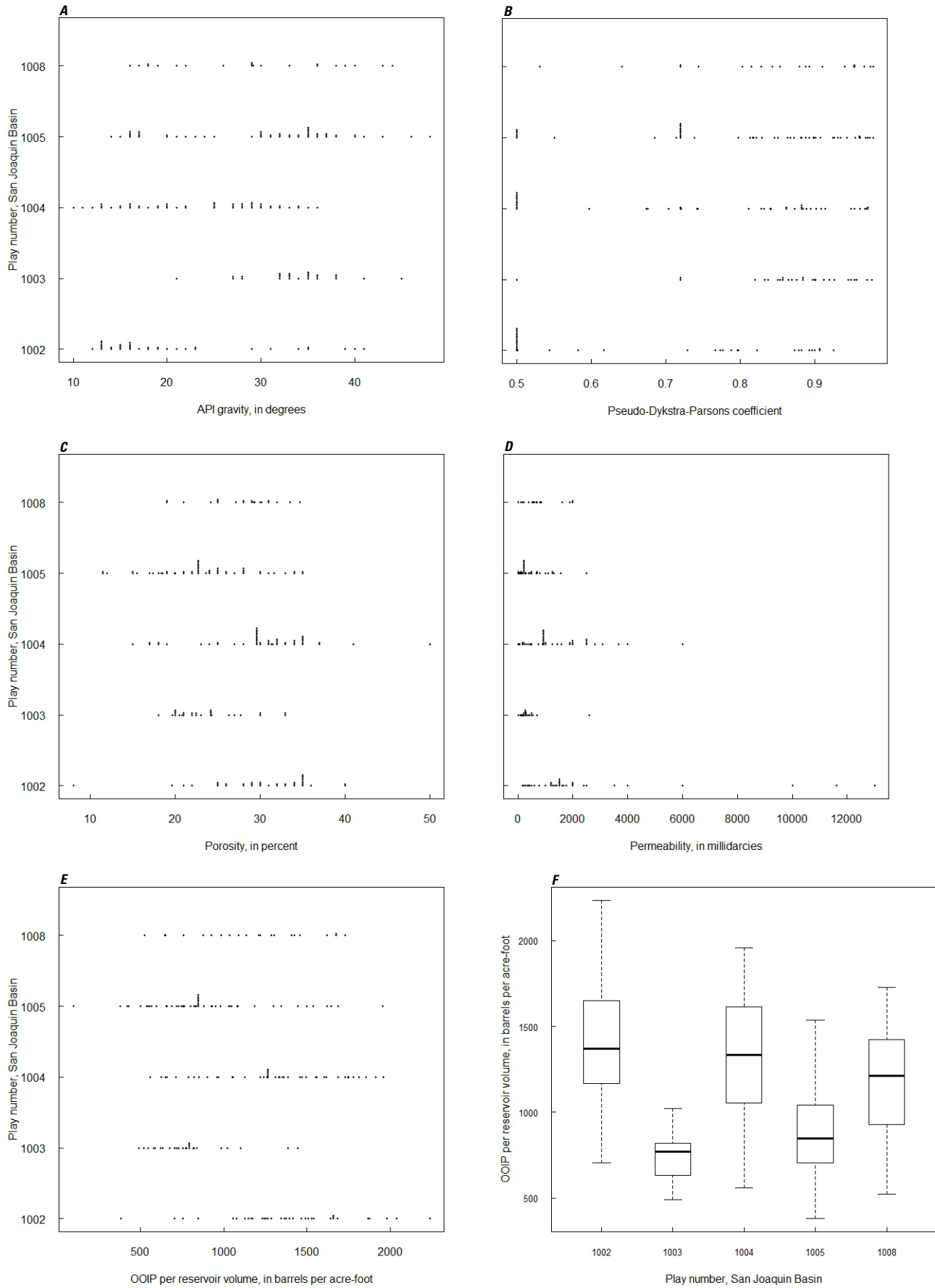


Figure 4. See caption on page 10.

Santa Maria Basin Province

Table 5. Number of oil reservoirs, amount of original oil in place, amount of known recovery, and other data for each conventional oil-bearing play containing at least 10 oil reservoirs in the Santa Maria Basin Province.

[The number of oil reservoirs and the known recovery are from the database by Nehring Associates, Inc. (2012). The known recovery (KR) is the sum of estimated reserves as of the end of 2010 plus cumulative oil production through the end of 2010. The original oil in place (OOIP) for each play is the sum of the Comprehensive Resource Database (CRD) estimates for that play’s oil reservoirs. The CRD is based on the database by Nehring Associates, Inc. (2012), and contains updates made by the U.S. Geological Survey and INTEK, Inc. Values for API gravity, porosity, and permeability for each play are from the CRD; they are default values derived from INTEK’s algorithms unless otherwise indicated. mD, millidarcies; MMBO, millions of barrels of oil; ND, no default value needed]

Play number	Number of oil reservoirs	OOIP (MMBO)	KR (MMBO)	API gravity (degrees)	Porosity (percent)	Permeability (mD)	Play name
1202	10	1,274	274	ND	28.2	1,213	Basin Margin.
1201	13	2,444	643	ND	18.8	861	Anticlinal Trends-Onshore.

Figure 5 (page 13). Plots of reservoir-fluid and reservoir properties for oil reservoirs by play number ► for the Santa Maria Basin Province. *A*, Oil density (American Petroleum Institute [API] gravity in degrees). *B*, Computed pseudo-Dykstra-Parsons coefficient. *C*, Reservoir porosity (in percent). *D*, Reservoir permeability (in millidarcies). *E*, Estimates of the original oil in place (OOIP) per unit volume of reservoir rock (in barrels per acre-foot). *F*, Distribution of OOIP per unit volume of reservoir rock (in barrels per acre-foot). The boxplot in part *F* is explained in the text.

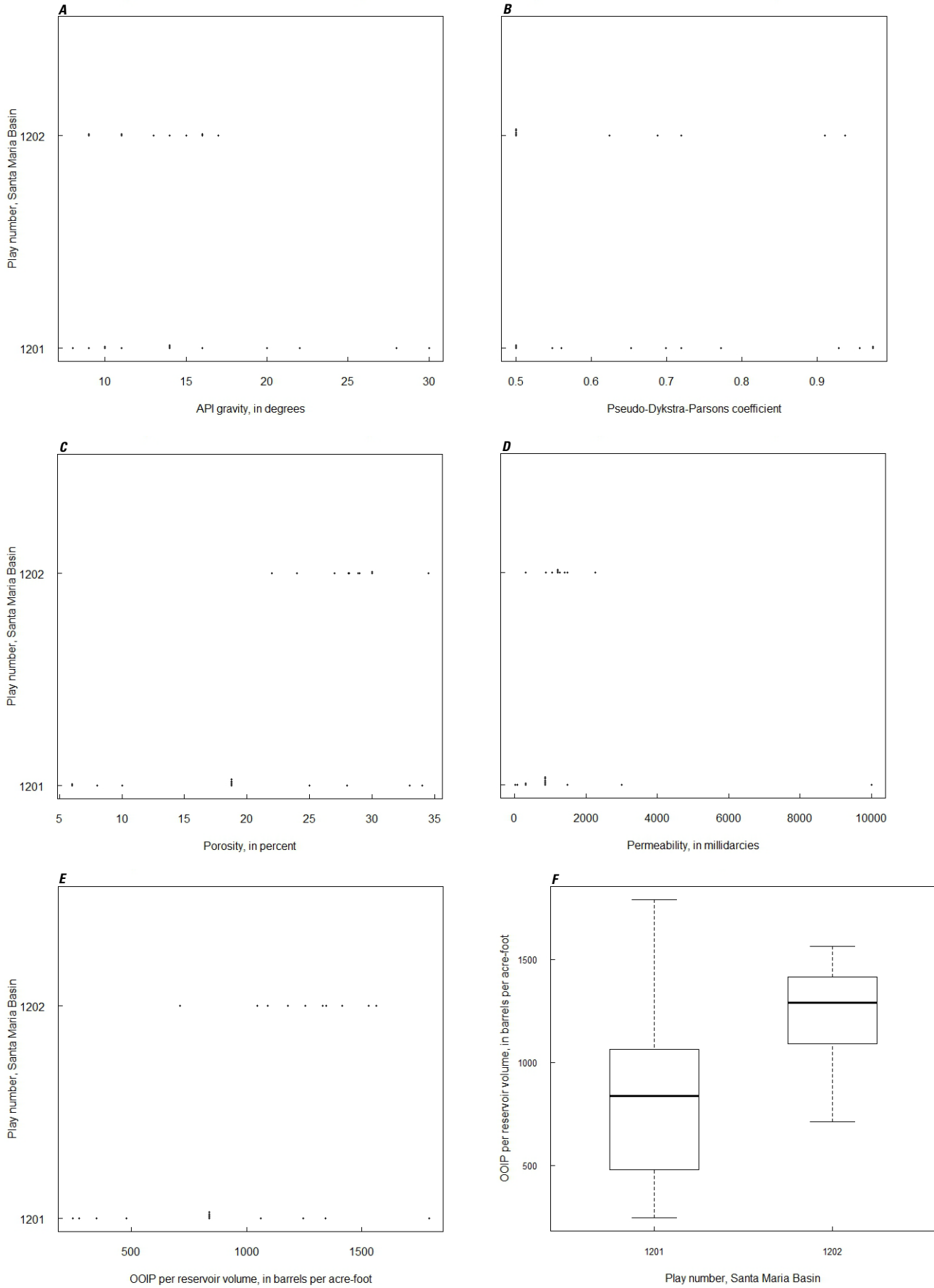


Figure 5. See caption on page 12.

Ventura Basin Province

Table 6. Number of oil reservoirs, amount of original oil in place, amount of known recovery, and other data for each conventional oil-bearing play containing at least 10 oil reservoirs in the Ventura Basin Province.

[The number of oil reservoirs and the known recovery are from the database by Nehring Associates, Inc. (2012). The known recovery (KR) is the sum of estimated reserves as of the end of 2010 plus cumulative oil production through the end of 2010. The original oil in place (OOIP) for each play is the sum of the Comprehensive Resource Database (CRD) estimates for that play’s oil reservoirs. The CRD is based on the database by Nehring Associates, Inc. (2012), and contains updates made by the U.S. Geological Survey and INTEK, Inc. Values for API gravity, porosity, and permeability for each play are from the CRD; they are default values derived from INTEK’s algorithms unless otherwise indicated. mD, millidarcies; MMBO, millions of barrels of oil; ND, no default value needed]

Play number	Number of oil reservoirs	OOIP (MMBO)	KR (MMBO)	API gravity (degrees)	Porosity (percent)	Permeability (mD)	Play name
1302	64	7,547	2,076	ND	20.9	171	Neogene-Onshore.
1301	33	4,666	433	ND	21.7	190	Paleogene-Onshore.

Figure 6 (page 15). Plots of reservoir-fluid and reservoir properties for oil reservoirs by play number ► for the Ventura Basin Province. *A*, Oil density (American Petroleum Institute [API] gravity in degrees). *B*, Computed pseudo-Dykstra-Parsons coefficient. *C*, Reservoir porosity (in percent). *D*, Reservoir permeability (in millidarcies). *E*, Estimates of the original oil in place (OOIP) per unit volume of reservoir rock (in barrels per acre-foot). *F*, Distribution of OOIP per unit volume of reservoir rock (in barrels per acre-foot). The boxplot in part *F* is explained in the text.

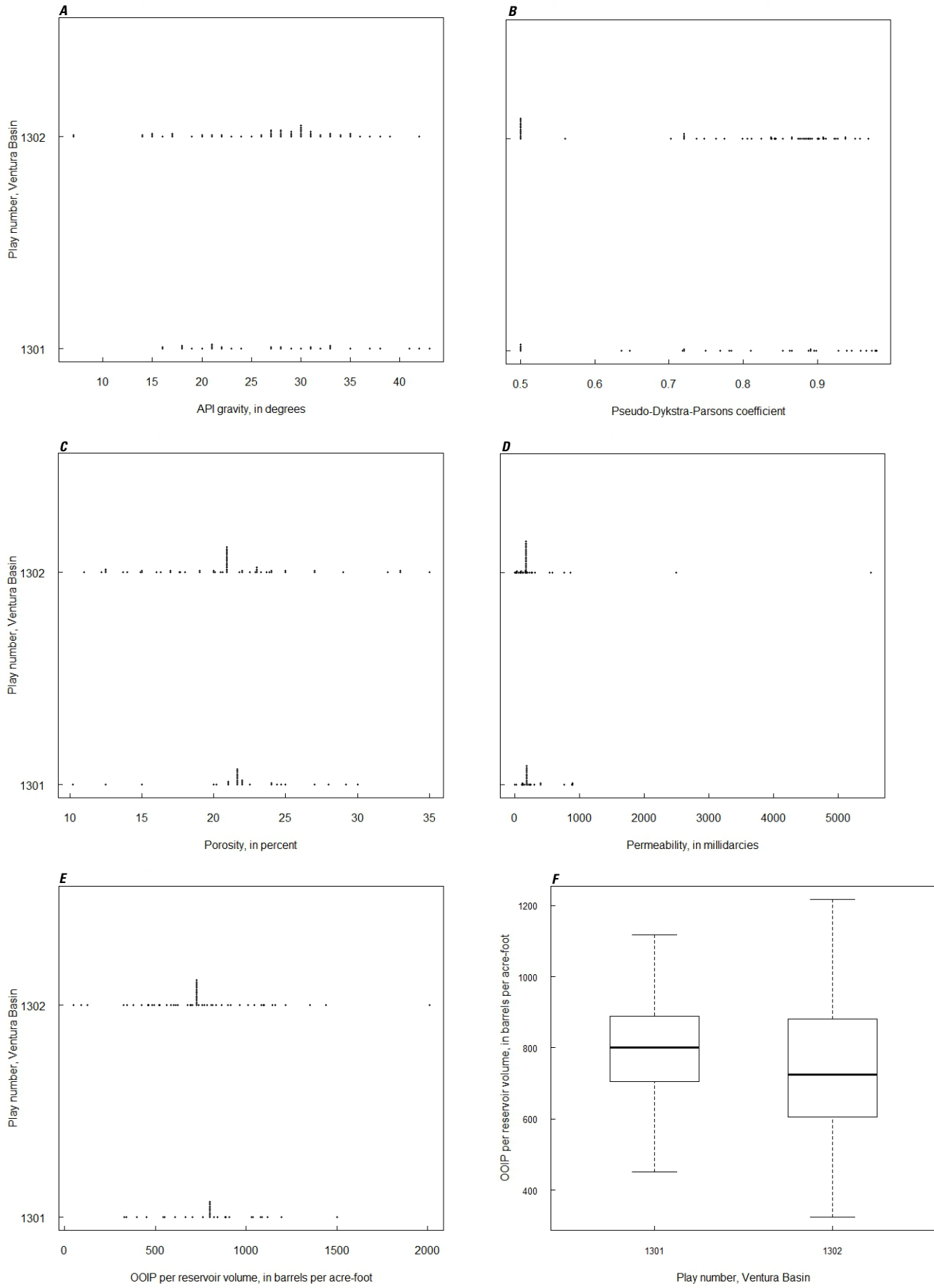


Figure 6. See caption on page 14.

Los Angeles Basin Province

Table 7. Number of oil reservoirs, amount of original oil in place, amount of known recovery, and other data for each conventional oil-bearing play containing at least 10 oil reservoirs in the Los Angeles Basin Province.

[The number of oil reservoirs and the known recovery are from the database by Nehring Associates, Inc. (2012). The known recovery (KR) is the sum of estimated reserves as of the end of 2010 plus cumulative oil production through the end of 2010. The original oil in place (OOIP) for each play is the sum of the Comprehensive Resource Database (CRD) estimates for that play's oil reservoirs. The CRD is based on the database by Nehring Associates, Inc. (2012), and contains updates made by the U.S. Geological Survey and INTEK, Inc. Values for API gravity, porosity, and permeability for each play are from the CRD; they are default values derived from INTEK's algorithms unless otherwise indicated. mD, millidarcies; MMBO, millions of barrels of oil; ND, no default value needed]

Play number	Number of oil reservoirs	OOIP (MMBO)	KR (MMBO)	API gravity (degrees)	Porosity (percent)	Permeability (mD)	Play name
1404	18	6,082	1,887	ND	27.1	317	Whittier Fault Zone and Fullerton Embayment.
1403	25	11,247	3,298	ND	25.9	296	Newport-Inglewood Deformation Zone and Southwestern Flank of Central Syncline.
1402	16	9,378	3,212	ND	23.8	479	Southwestern Shelf and Adjacent Offshore State Lands.
1401	15	1,365	413	29.0	28.7	288	Santa Monica Fault System and Las Cienegas Fault and Block.

Figure 7 (page 17). Plots of reservoir-fluid and reservoir properties for oil reservoirs by play number ► for the Los Angeles Basin Province. *A*, Oil density (American Petroleum Institute [API] gravity in degrees). *B*, Computed pseudo-Dykstra-Parsons coefficient. *C*, Reservoir porosity (in percent). *D*, Reservoir permeability (in millidarcies). *E*, Estimates of the original oil in place (OOIP) per unit volume of reservoir rock (in barrels per acre-foot). *F*, Distribution of OOIP per unit volume of reservoir rock (in barrels per acre-foot). The boxplot in part *F* is explained in the text.

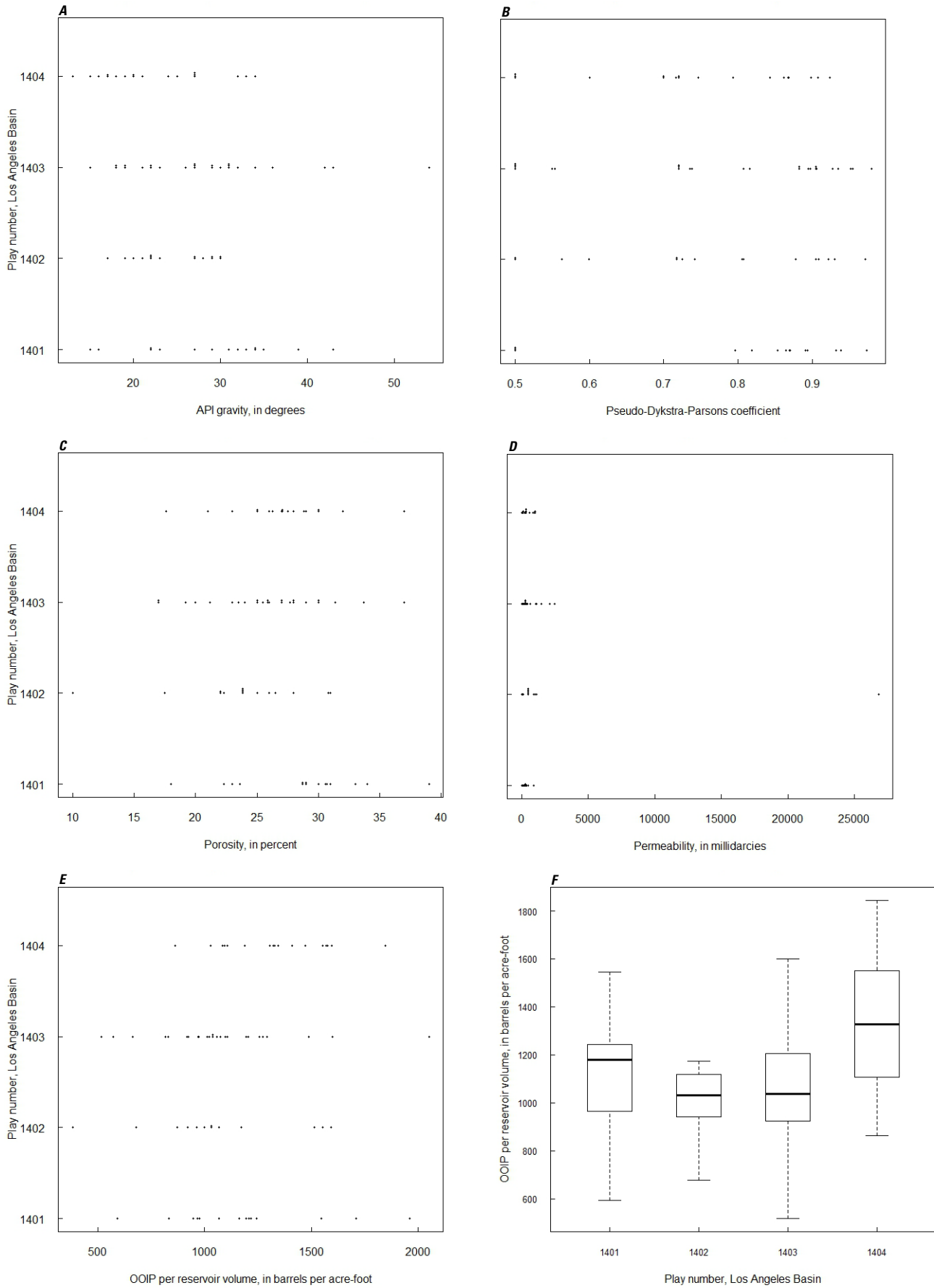


Figure 7. See caption on page 16.

Region 3 Profiles

Combined Profiles for Plays in Region 3: Uinta-Piceance Basin, Paradox Basin, and San Juan Basin Provinces

Table 8. Number of oil reservoirs, amount of original oil in place, amount of known recovery, and other data for each conventional oil-bearing play containing at least 10 oil reservoirs in the Uinta-Piceance Basin (Province 20), Paradox Basin (Province 21), and San Juan Basin (Province 22) Provinces in Region 3.

[The number of oil reservoirs and the known recovery are from the database by Nehring Associates, Inc. (2012). The known recovery (KR) is the sum of estimated reserves as of the end of 2010 plus cumulative oil production through the end of 2010. The original oil in place (OOIP) for each play is the sum of the Comprehensive Resource Database (CRD) estimates for that play's oil reservoirs. The CRD is based on the database by Nehring Associates, Inc. (2012), and contains updates made by the U.S. Geological Survey and INTEK, Inc. Values for API gravity, porosity, and permeability for each play are from the CRD; they are default values derived from INTEK's algorithms unless otherwise indicated. mD, millidarcies; MMBO, millions of barrels of oil; ND, no default value needed]

Play number	Number of oil reservoirs	OOIP (MMBO)	KR (MMBO)	API gravity (degrees)	Porosity (percent)	Permeability (mD)	Play name	Province
2002	22	6,153	826	32.4	12.1	6	Uinta Tertiary Oil and Gas	Uinta-Piceance Basin.
2102	39	2,281	641	ND	10.7	11	Porous Carbonate Buildup	Paradox Basin.
2207	20	7,116	153	ND	14.4	54	Tocito/Gallup Sandstone Oil	San Juan Basin.

Figure 8 (page 19). Plots of reservoir-fluid and reservoir properties for oil reservoirs by play number ► for the Uinta-Piceance Basin, Paradox Basin, and San Juan Basin Provinces in Region 3 (Region 3, other provinces). Play codes are identified by play name and province in table 8; data for plays are graphed in the reverse order from the listing in table 8. *A*, Oil density (American Petroleum Institute [API] gravity in degrees). *B*, Computed pseudo-Dykstra-Parsons coefficient. *C*, Reservoir porosity (in percent). *D*, Reservoir permeability (in millidarcies). *E*, Estimates of the original oil in place (OOIP) per unit volume of reservoir rock (in barrels per acre-foot). *F*, Distribution of OOIP per unit volume of reservoir rock (in barrels per acre-foot). The boxplot in part *F* is explained in the text.

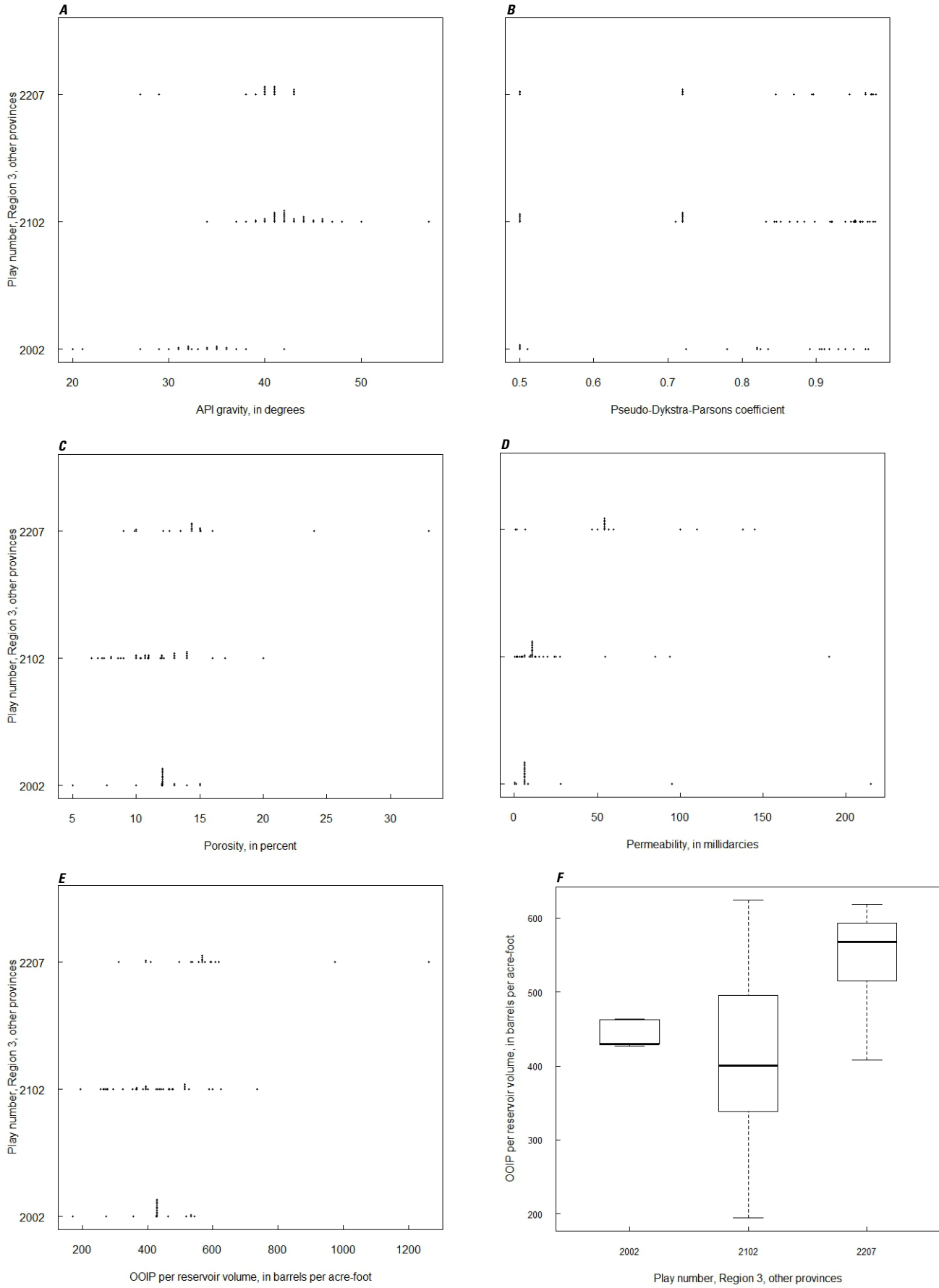


Figure 8. See caption on page 18.

Region 4 Profiles

North-Central Montana Province

Table 9. Number of oil reservoirs, amount of original oil in place, amount of known recovery, and other data for each conventional oil-bearing play containing at least 10 oil reservoirs in the North-Central Montana Province.

[The number of oil reservoirs and the known recovery are from the database by Nehring Associates, Inc. (2012). The known recovery (KR) is the sum of estimated reserves as of the end of 2010 plus cumulative oil production through the end of 2010. The original oil in place (OOIP) for each play is the sum of the Comprehensive Resource Database (CRD) estimates for that play's oil reservoirs. The CRD is based on the database by Nehring Associates, Inc. (2012), and contains updates made by the U.S. Geological Survey and INTEK, Inc. Values for API gravity, porosity, and permeability for each play are from the CRD; they are default values derived from INTEK's algorithms unless otherwise indicated. mD, millidarcies; MMBO, millions of barrels of oil; ND, no default value needed]

Play number	Number of oil reservoirs	OOIP (MMBO)	KR (MMBO)	API gravity (degrees)	Porosity (percent)	Permeability (mD)	Play name
2808	27	3,564	294	ND	18.5	174	Jurassic-Cretaceous Sandstones.
2806	22	355	111	ND	14.8	109	Tyler Sandstone.
2805	13	531	102	ND	12.6	41	Devonian-Mississippian Carbonates.

Figure 9 (page 21). Plots of reservoir-fluid and reservoir properties for oil reservoirs by play number ► for the North-Central Montana Province. *A*, Oil density (American Petroleum Institute [API] gravity in degrees). *B*, Computed pseudo-Dykstra-Parsons coefficient. *C*, Reservoir porosity (in percent). *D*, Reservoir permeability (in millidarcies). *E*, Estimates of the original oil in place (OOIP) per unit volume of reservoir rock (in barrels per acre-foot). *F*, Distribution of OOIP per unit volume of reservoir rock (in barrels per acre-foot). The boxplot in part *F* is explained in the text.

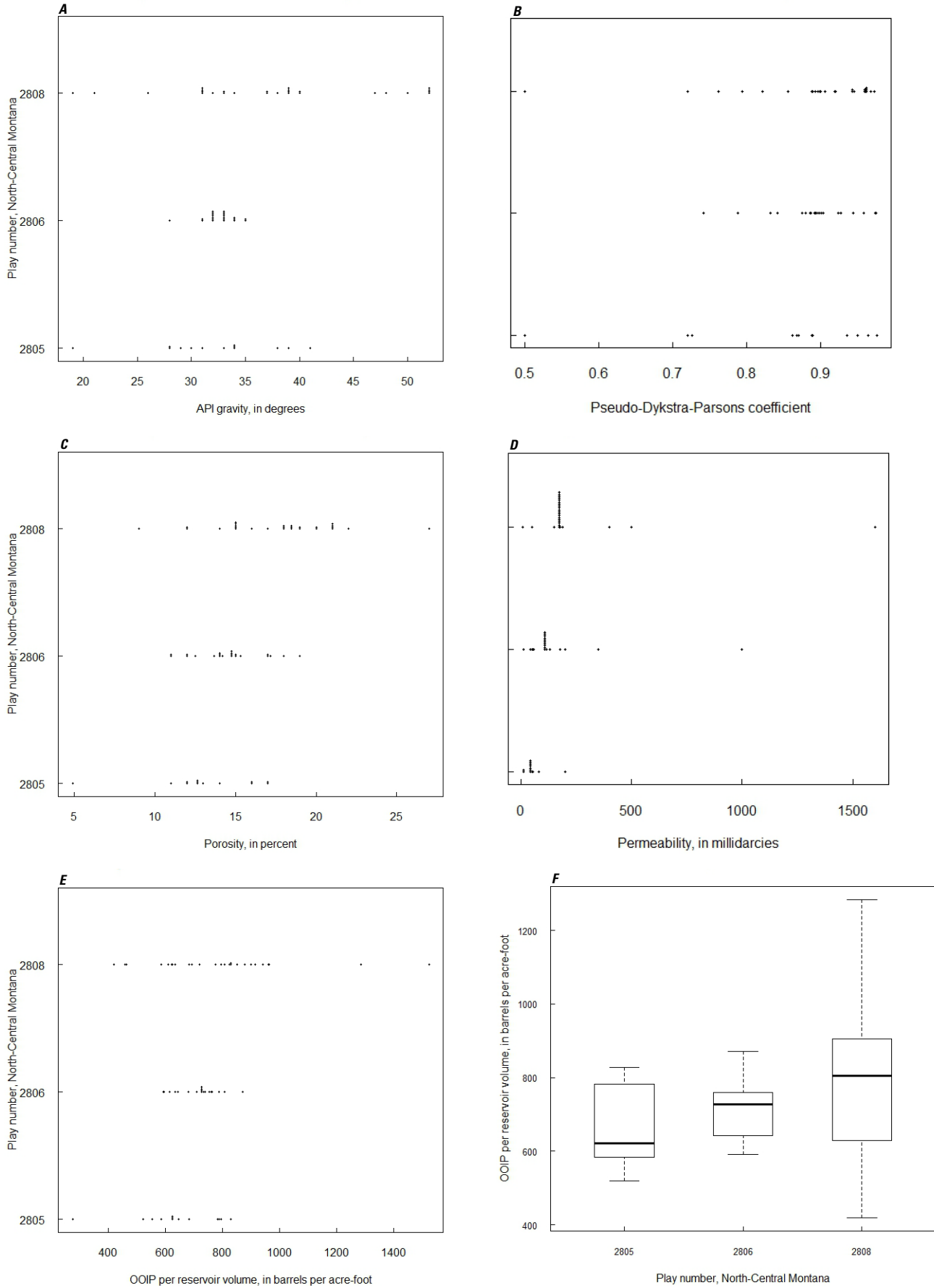


Figure 9. See caption on page 20.

Williston Basin Province

Table 10. Number of oil reservoirs, amount of original oil in place, amount of known recovery, and other data for each conventional oil-bearing play containing at least 10 oil reservoirs in the Williston Basin Province.

[The number of oil reservoirs and the known recovery are from the database by Nehring Associates, Inc. (2012). The known recovery (KR) is the sum of estimated reserves as of the end of 2010 plus cumulative oil production through the end of 2010. The original oil in place (OOIP) for each play is the sum of the Comprehensive Resource Database (CRD) estimates for that play's oil reservoirs. The CRD is based on the database by Nehring Associates, Inc. (2012), and contains updates made by the U.S. Geological Survey and INTEK, Inc. Values for API gravity, porosity, and permeability for each play are from the CRD; they are default values derived from INTEK's algorithms unless otherwise indicated. mD, millidarcies; MMBO, millions of barrels of oil; ND, no default value needed]

Play number	Number of oil reservoirs	OOIP (MMBO)	KR (MMBO)	API gravity (degrees)	Porosity (percent)	Permeability (mD)	Play name
3106	16	488	150	ND	14.9	61	Post-Madison through Triassic Clastics.
3105	31	1,338	213	42.6	10.2	4	Pre-Prairie Middle Devonian and Silurian.
3103	81	749	132	41.3	12.8	26	Middle and Upper Devonian (Pre-Bakken–Post-Prairie Salt).
3102	159	6,710	811	42.5	12.8	4	Red River (Ordovician).
3101	217	6,403	1,212	36.2	10.6	10	Madison (Mississippian).

Figure 10 (page 23). Plots of reservoir-fluid and reservoir properties for oil reservoirs by play number for the Williston Basin Province. *A*, Oil density (American Petroleum Institute [API] gravity in degrees). *B*, Computed pseudo-Dykstra-Parsons coefficient. *C*, Reservoir porosity (in percent). *D*, Reservoir permeability (in millidarcies). *E*, Estimates of the original oil in place (OOIP) per unit volume of reservoir rock (in barrels per acre-foot). *F*, Distribution of OOIP per unit volume of reservoir rock (in barrels per acre-foot). The boxplot in part *F* is explained in the text. ►

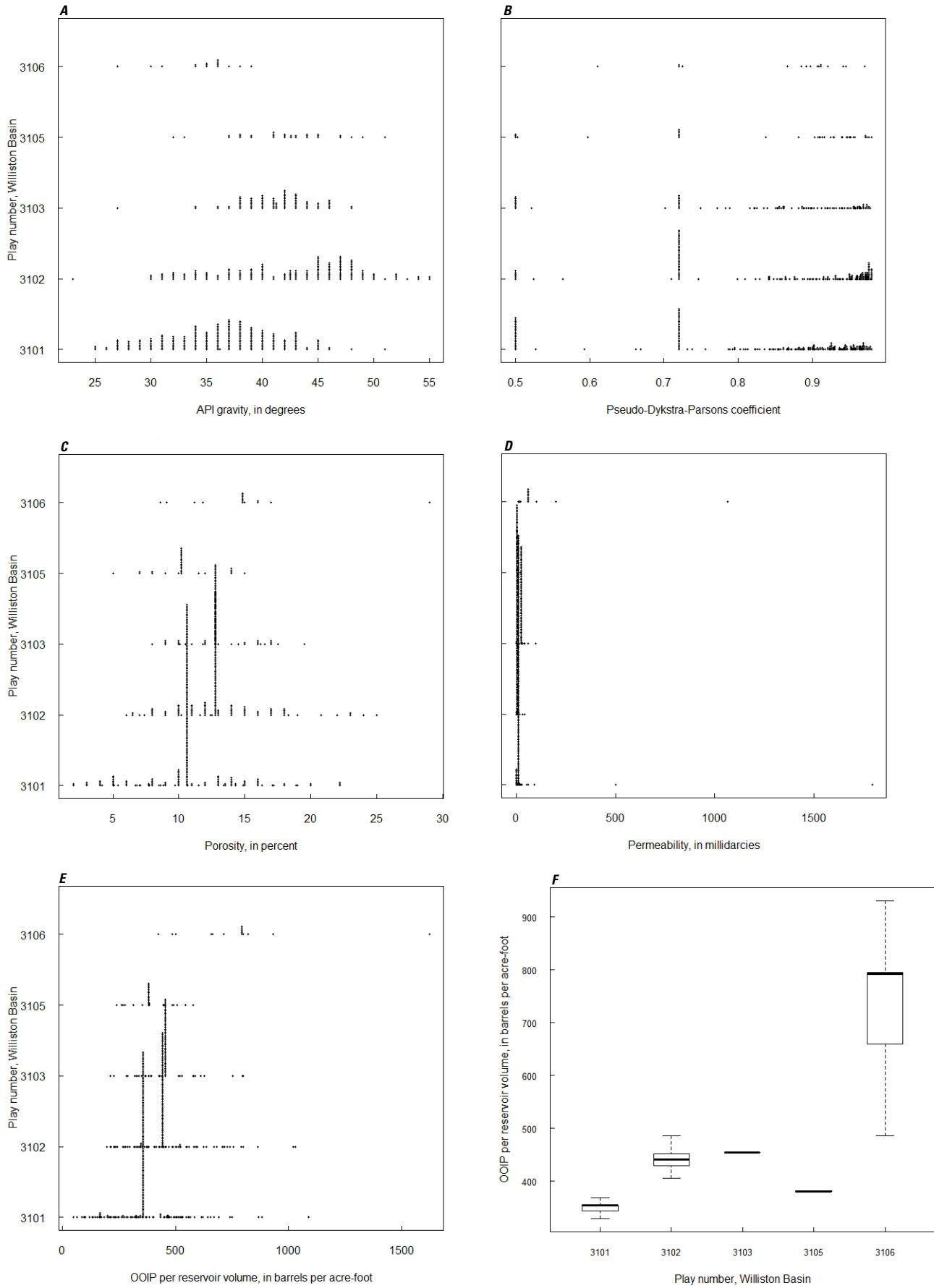


Figure 10. See caption on page 22.

Powder River Basin Province

Table 11. Number of oil reservoirs, amount of original oil in place, amount of known recovery, and other data for each conventional oil-bearing play containing at least 10 oil reservoirs in the Powder River Basin Province.

[The number of oil reservoirs and the known recovery are from the database by Nehring Associates, Inc. (2012). The known recovery (KR) is the sum of estimated reserves as of the end of 2010 plus cumulative oil production through the end of 2010. The original oil in place (OOIP) for each play is the sum of the Comprehensive Resource Database (CRD) estimates for that play's oil reservoirs. The CRD is based on the database by Nehring Associates, Inc. (2012), and contains updates made by the U.S. Geological Survey and INTEK, Inc. Values for API gravity, porosity, and permeability for each play are from the CRD; they are default values derived from INTEK's algorithms unless otherwise indicated. mD, millidarcies; MMBO, millions of barrels of oil; ND, no default value needed]

Play number	Number of oil reservoirs	OOIP (MMBO)	KR (MMBO)	API gravity (degrees)	Porosity (percent)	Permeability (mD)	Play name
3313	22	6,101	140	38.5	14.9	5	Mesaverde-Lewis.
3312	16	825	229	37.1	12.9	8	Sussex-Shannon Sandstone.
3309	21	671	48	ND	14.2	24	Deep Frontier Sandstone.
3307	66	2,050	585	ND	16.5	89	Muddy Sandstone.
3306	21	588	164	ND	14.3	146	Fall River Sandstone.
3304	178	1,799	642	26.0	17.0	116	Upper Minnelusa Sandstone.
3302	65	4,439	1,400	ND	17.2	79	Basin Margin Anticline.

Figure 11 (page 25). Plots of reservoir-fluid and reservoir properties for oil reservoirs by play number for the Powder River Basin Province. *A*, Oil density (American Petroleum Institute [API] gravity in degrees). *B*, Computed pseudo-Dykstra-Parsons coefficient. *C*, Reservoir porosity (in percent). *D*, Reservoir permeability (in millidarcies). *E*, Estimates of the original oil in place (OOIP) per unit volume of reservoir rock (in barrels per acre-foot). *F*, Distribution of OOIP per unit volume of reservoir rock (in barrels per acre-foot). The boxplot in part *F* is explained in the text. ►

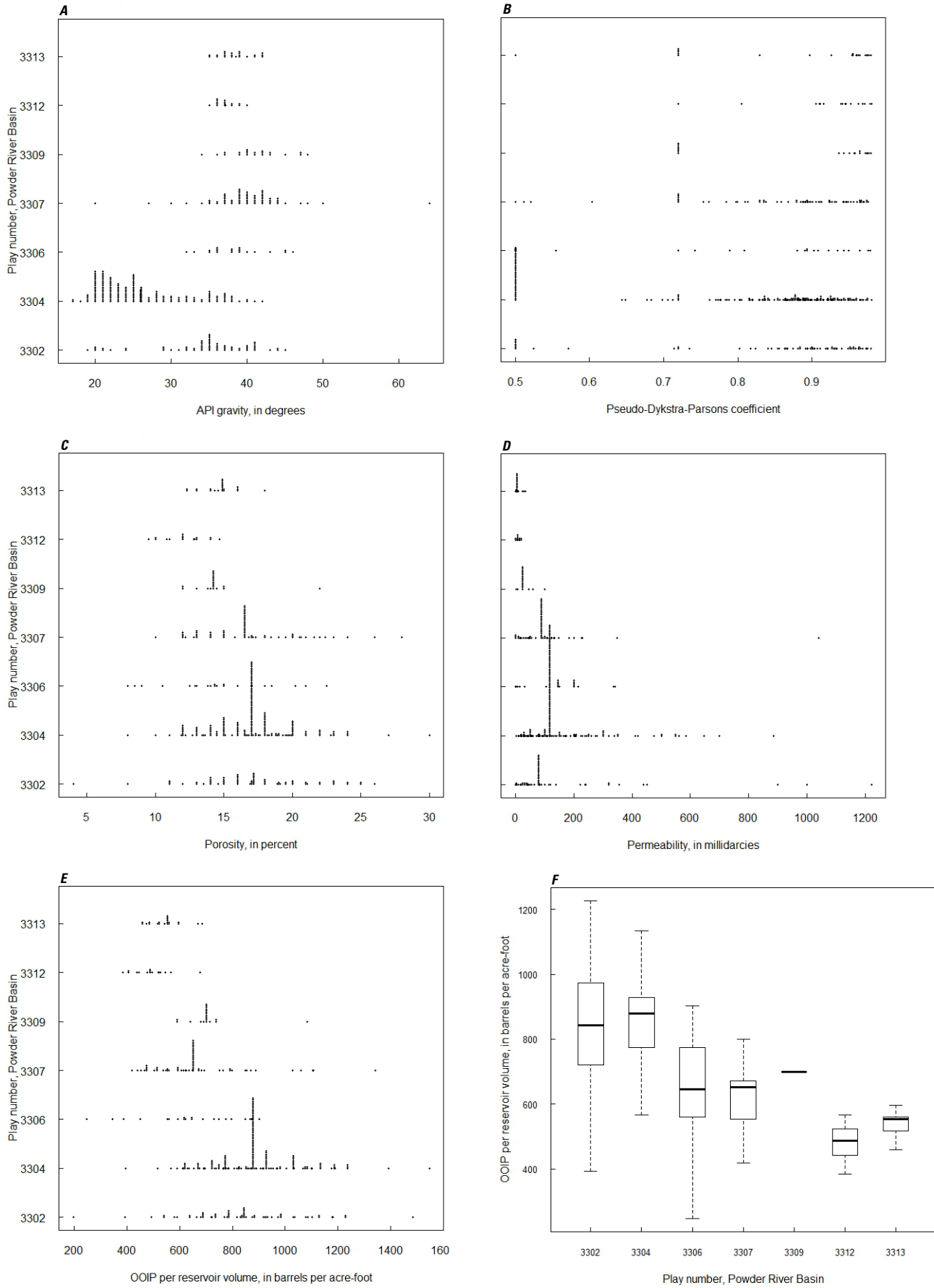


Figure 11. See caption on page 24.

Southwestern Wyoming Province

Table 12. Number of oil reservoirs, amount of original oil in place, amount of known recovery, and other data for each conventional oil-bearing play containing at least 10 oil reservoirs in the Southwestern Wyoming Province.

[The number of oil reservoirs and the known recovery are from the database by Nehring Associates, Inc. (2012). The known recovery (KR) is the sum of estimated reserves as of the end of 2010 plus cumulative oil production through the end of 2010. The original oil in place (OOIP) for each play is the sum of the Comprehensive Resource Database (CRD) estimates for that play's oil reservoirs. The CRD is based on the database by Nehring Associates, Inc. (2012), and contains updates made by the U.S. Geological Survey and INTEK, Inc. Values for API gravity, porosity, and permeability for each play are from the CRD; they are default values derived from INTEK's algorithms unless otherwise indicated. mD, millidarcies; MMBO, millions of barrels of oil; ND, no default value needed]

Play number	Number of oil reservoirs	OOIP (MMBO)	KR (MMBO)	API gravity (degrees)	Porosity (percent)	Permeability (mD)	Play name
3707	41	1,292	485	34.8	15.0	65	Platform.
3704	10	500	136	ND	14.8	13	Moxa Arch-LaBarge.
3703	25	498	142	ND	15.7	50	Axial Uplift.

Figure 12 (page 27). Plots of reservoir-fluid and reservoir properties for oil reservoirs by play number for the Southwestern Wyoming Province. *A*, Oil density (American Petroleum Institute [API] gravity in degrees). *B*, Computed pseudo-Dykstra-Parsons coefficient. *C*, Reservoir porosity (in percent). *D*, Reservoir permeability (in millidarcies). *E*, Estimates of the original oil in place (OOIP) per unit volume of reservoir rock (in barrels per acre-foot). *F*, Distribution of OOIP per unit volume of reservoir rock (in barrels per acre-foot). The boxplot in part *F* is explained in the text. ►

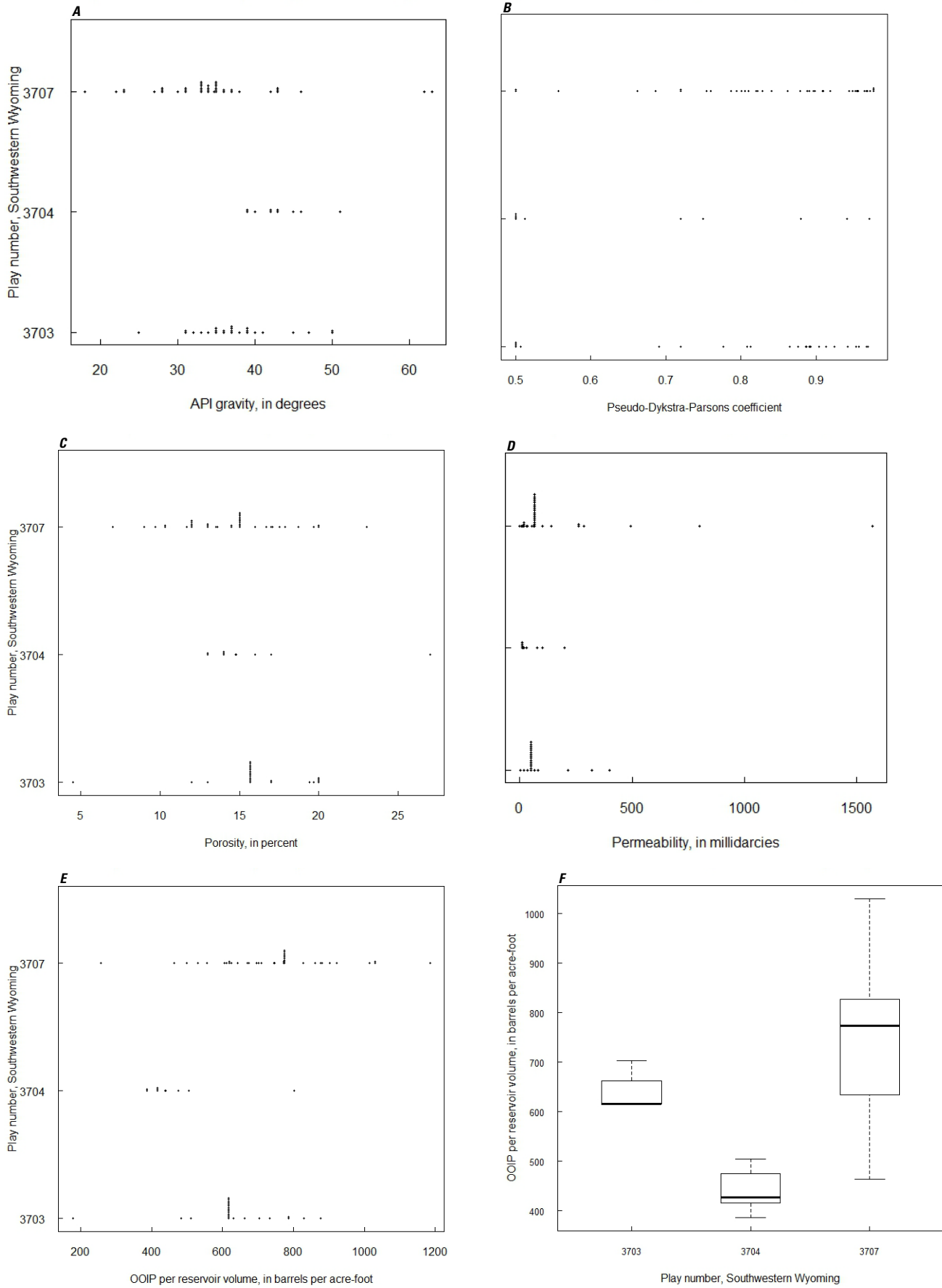


Figure 12. See caption on page 26.

Las Animas Arch Province

Table 13. Number of oil reservoirs, amount of original oil in place, amount of known recovery, and other data for each conventional oil-bearing play containing at least 10 oil reservoirs in the Las Animas Arch Province.

[The number of oil reservoirs and the known recovery are from the database by Nehring Associates, Inc. (2012). The known recovery (KR) is the sum of estimated reserves as of the end of 2010 plus cumulative oil production through the end of 2010. The original oil in place (OOIP) for each play is the sum of the Comprehensive Resource Database (CRD) estimates for that play's oil reservoirs. The CRD is based on the database by Nehring Associates, Inc. (2012), and contains updates made by the U.S. Geological Survey and INTEK, Inc. Values for API gravity, porosity, and permeability for each play are from the CRD; they are default values derived from INTEK's algorithms unless otherwise indicated. mD, millidarcies; MMBO, millions of barrels of oil; ND, no default value needed]

Play number	Number of oil reservoirs	OOIP (MMBO)	KR (MMBO)	API gravity (degrees)	Porosity (percent)	Permeability (mD)	Play name
4005	10	178	30	38.7	12.0	16	Mississippian Carbonate.
4004	15	434	90	ND	15.6	1	Lower Pennsylvanian (Morrowan) Sandstone Oil, Gas, and Natural Gas Liquids.

Figure 13 (page 29). Plots of reservoir-fluid and reservoir properties for oil reservoirs by play number for the Las Animas Arch Province. *A*, Oil density (American Petroleum Institute [API] gravity in degrees). *B*, Computed pseudo-Dykstra-Parsons coefficient. *C*, Reservoir porosity (in percent). *D*, Reservoir permeability (in millidarcies). *E*, Estimates of the original oil in place (OOIP) per unit volume of reservoir rock (in barrels per acre-foot). *F*, Distribution of OOIP per unit volume of reservoir rock (in barrels per acre-foot). The boxplot in part *F* is explained in the text. ►

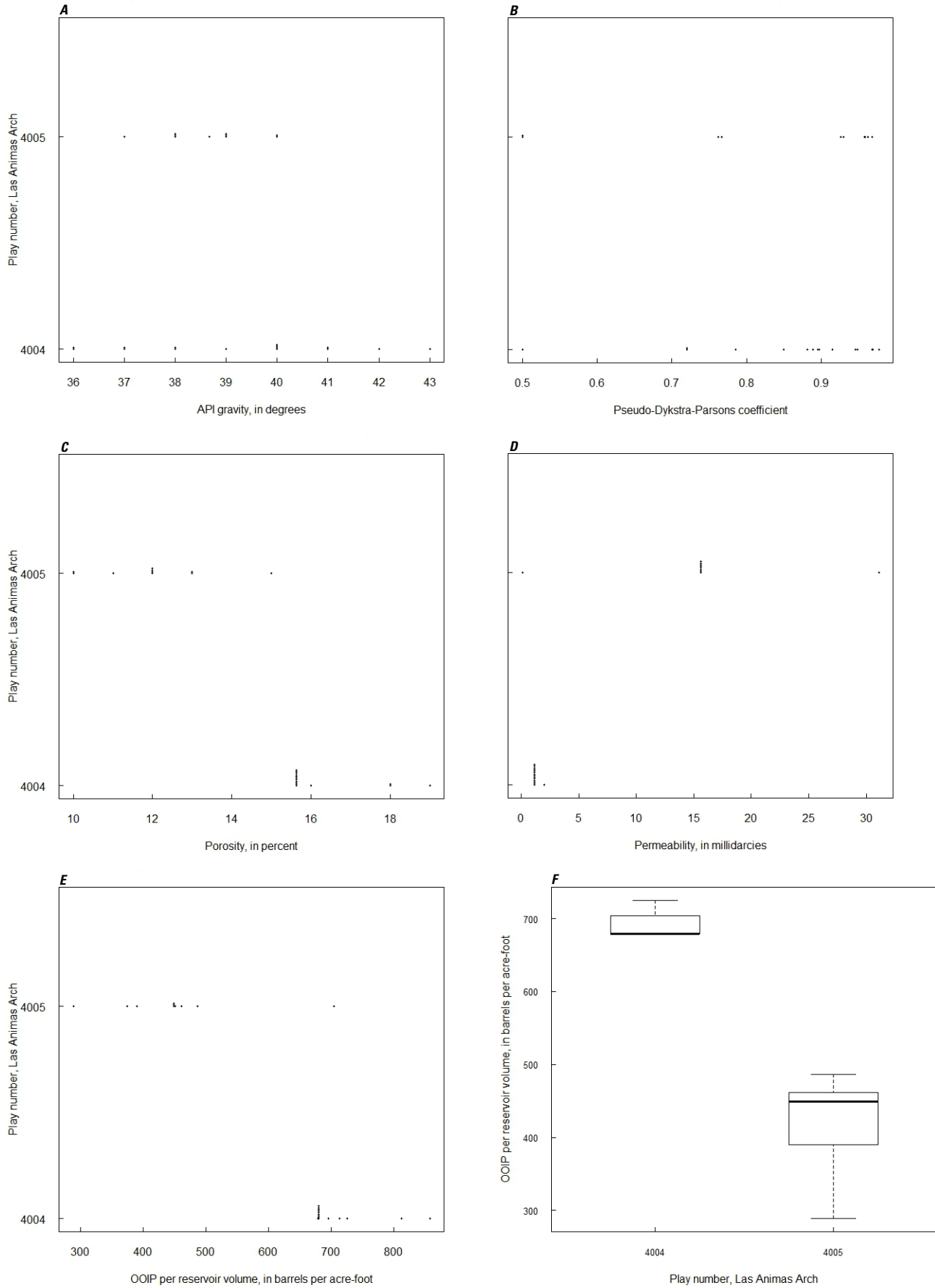


Figure 13. See caption on page 28.

Other Plays in Region 4: Big Horn Basin, Wind River Basin, Wyoming Thrust Belt, and Denver Basin Provinces

Table 14. Number of oil reservoirs, amount of original oil in place, amount of known recovery, and other data for each conventional oil-bearing play containing at least 10 oil reservoirs in the Big Horn Basin (Province 34), Wind River Basin (Province 35), Wyoming Thrust Belt (Province 36), and Denver Basin (Province 39) Provinces in Region 4.

[The number of oil reservoirs and the known recovery are from the database by Nehring Associates, Inc. (2012). The known recovery (KR) is the sum of estimated reserves as of the end of 2010 plus cumulative oil production through the end of 2010. The original oil in place (OOIP) for each play is the sum of the Comprehensive Resource Database (CRD) estimates for that play's oil reservoirs. The CRD is based on the database by Nehring Associates, Inc. (2012), and contains updates made by the U.S. Geological Survey and INTEK, Inc. Values for API gravity, porosity, and permeability for each play are from the CRD; they are default values derived from INTEK's algorithms unless otherwise indicated. mD, millidarcies; MMBO, millions of barrels of oil; ND, no default value needed]

Play number	Number of oil reservoirs	OOIP (MMBO)	KR (MMBO)	API gravity (degrees)	Porosity (percent)	Permeability (mD)	Play name	Province
3402	113	13,458	2,751	26.7	15.1	43	Basin Margin Anticline	Big Horn Basin.
3502	50	1,556	469	28.1	14.5	41	Basin Margin Anticline	Wind River Basin.
3604	10	1,583	175	ND	7.7	26	Absaroka Thrust	Wyoming Thrust Belt.
3905	403	3,099	781	37.9	18.3	192	Dakota Group (Combined J and D Sandstones)	Denver Basin.

Figure 14 (page 31). Plots of reservoir-fluid and reservoir properties for oil reservoirs by play number for the Big Horn Basin, Wind River Basin, Wyoming Thrust Belt, and Denver Basin Provinces in Region 4 (Region 4, other provinces). Play codes are identified by play name and province in table 14; data for plays are graphed in the reverse order from the listing in table 14. *A*, Oil density (American Petroleum Institute [API] gravity in degrees). *B*, Computed pseudo-Dykstra-Parsons coefficient. *C*, Reservoir porosity (in percent). *D*, Reservoir permeability (in millidarcies). *E*, Estimates of the original oil in place (OOIP) per unit volume of reservoir rock (in barrels per acre-foot). *F*, Distribution of OOIP per unit volume of reservoir rock (in barrels per acre-foot). The boxplot in part *F* is explained in the text. ►

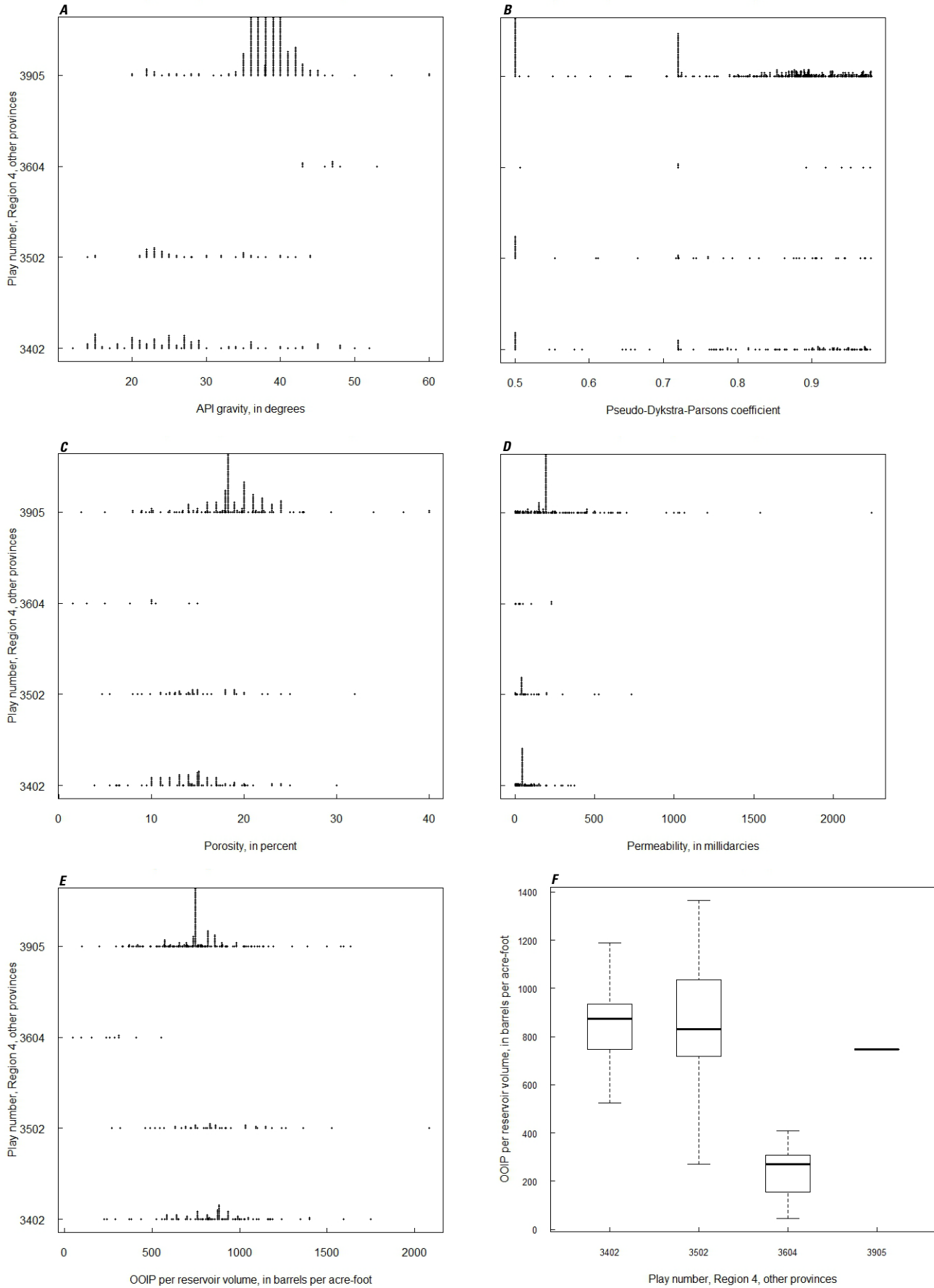


Figure 14. See caption on page 30.

Region 5 Profiles

Palo Duro Basin Province

Table 15. Number of oil reservoirs, amount of original oil in place, amount of known recovery, and other data for each conventional oil-bearing play containing at least 10 oil reservoirs in the Palo Duro Basin Province.

[The number of oil reservoirs and the known recovery are from the database by Nehring Associates, Inc. (2012). The known recovery (KR) is the sum of estimated reserves as of the end of 2010 plus cumulative oil production through the end of 2010. The original oil in place (OOIP) for each play is the sum of the Comprehensive Resource Database (CRD) estimates for that play's oil reservoirs. The CRD is based on the database by Nehring Associates, Inc. (2012), and contains updates made by the U.S. Geological Survey and INTEK, Inc. Values for API gravity, porosity, and permeability for each play are from the CRD; they are default values derived from INTEK's algorithms unless otherwise indicated. mD, millidarcies; MMBO, millions of barrels of oil]

Play number	Number of oil reservoirs	OOIP (MMBO)	KR (MMBO)	API gravity (degrees)	Porosity (percent)	Permeability (mD)	Play name
4301	12	118	25	42.0	13.8	359	Upper Paleozoic.

Figure 15 (page 33). Plots of reservoir-fluid and reservoir properties for oil reservoirs by play number for the Palo Duro Basin Province. *A*, Oil density (American Petroleum Institute [API] gravity in degrees). *B*, Computed pseudo-Dykstra-Parsons coefficient. *C*, Reservoir porosity (in percent). *D*, Reservoir permeability (in millidarcies). *E*, Estimates of the original oil in place (OOIP) per unit volume of reservoir rock (in barrels per acre-foot). *F*, Distribution of OOIP per unit volume of reservoir rock (in barrels per acre-foot). The boxplot in part *F* is explained in the text. ►

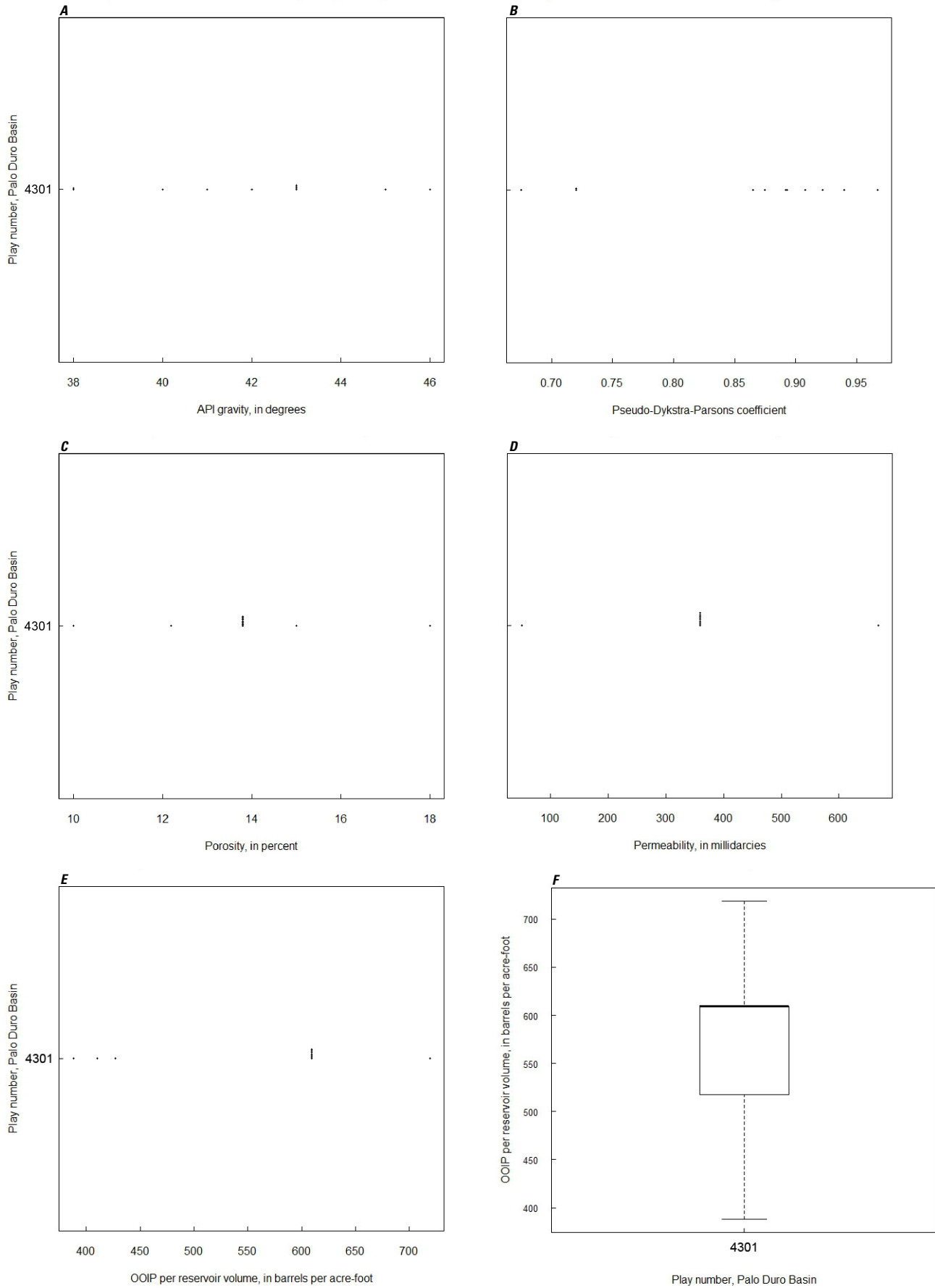


Figure 15. See caption on page 32.

Permian Basin Province

Table 16. Number of oil reservoirs, amount of original oil in place, amount of known recovery, and other data for each conventional oil-bearing play containing at least 10 oil reservoirs in the Permian Basin Province.

[The number of oil reservoirs and the known recovery are from the database by Nehring Associates, Inc. (2012). The known recovery (KR) is the sum of estimated reserves as of the end of 2010 plus cumulative oil production through the end of 2010. The original oil in place (OOIP) for each play is the sum of the Comprehensive Resource Database (CRD) estimates for that play's oil reservoirs. The CRD is based on the database by Nehring Associates, Inc. (2012), and contains updates made by the U.S. Geological Survey and INTEK, Inc. Values for API gravity, porosity, and permeability for each play are from the CRD; they are default values derived from INTEK's algorithms unless otherwise indicated. mD, millidarcies; MMBO, millions of barrels of oil; ND, no default value needed]

Play number	Number of oil reservoirs	OOIP (MMBO)	KR (MMBO)	API gravity (degrees)	Porosity (percent)	Permeability (mD)	Play name
4412	155	6,810	635	38.5	19.1	22	Delaware Sandstones.
4411	583	59,438	11,717	35.6	12.1	23	San Andres-Clearfork, Northwestern and Eastern Shelves.
4410	330	44,448	12,141	34.3	12.9	15	San Andres-Clearfork, Central Basin Platform and Ozona Arch.
4409	57	12,421	2,849	37.6	14.9	5	Spraberry-Dean.
4408	36	1,610	297	ND	10.5	33	Wolfcampian Carbonate, Eastern and Southern Margins of the Central Basin Platform.
4407	61	1,637	201	ND	11.4	15	Upper Pennsylvanian and Lower Permian Shelf, Slope and Basin Sandstones.
4406	420	9,982	1,663	41.7	10.4	39	Upper Pennsylvanian, Northwestern and Eastern Shelves, Northern Delaware and Midland Basins and Northern Central Basin Platform.
4405	84	9,068	3,063	ND	10.9	65	Horseshoe Atoll, Upper Pennsylvanian-Wolfcampian.
4404	13	168	39	41.5	10.5	27	Lower Pennsylvanian (Bend) Sandstone.
4403	247	4,191	1,034	43.6	8.4	77	Pre-Pennsylvanian, Northwestern and Eastern Shelves.
4402	294	12,464	3,467	42.2	8.3	41	Pre-Pennsylvanian, Central Basin Platform.

Figure 16 (page 35). Plots of reservoir-fluid and reservoir properties for oil reservoirs by play number for the Permian Basin Province. *A*, Oil density (American Petroleum Institute [API] gravity in degrees). *B*, Computed pseudo-Dykstra-Parsons coefficient. *C*, Reservoir porosity (in percent). *D*, Reservoir permeability (in millidarcies). *E*, Estimates of the original oil in place (OOIP) per unit volume of reservoir rock (in barrels per acre-foot). *F*, Distribution of OOIP per unit volume of reservoir rock (in barrels per acre-foot). The boxplot in part *F* is explained in the text. ►

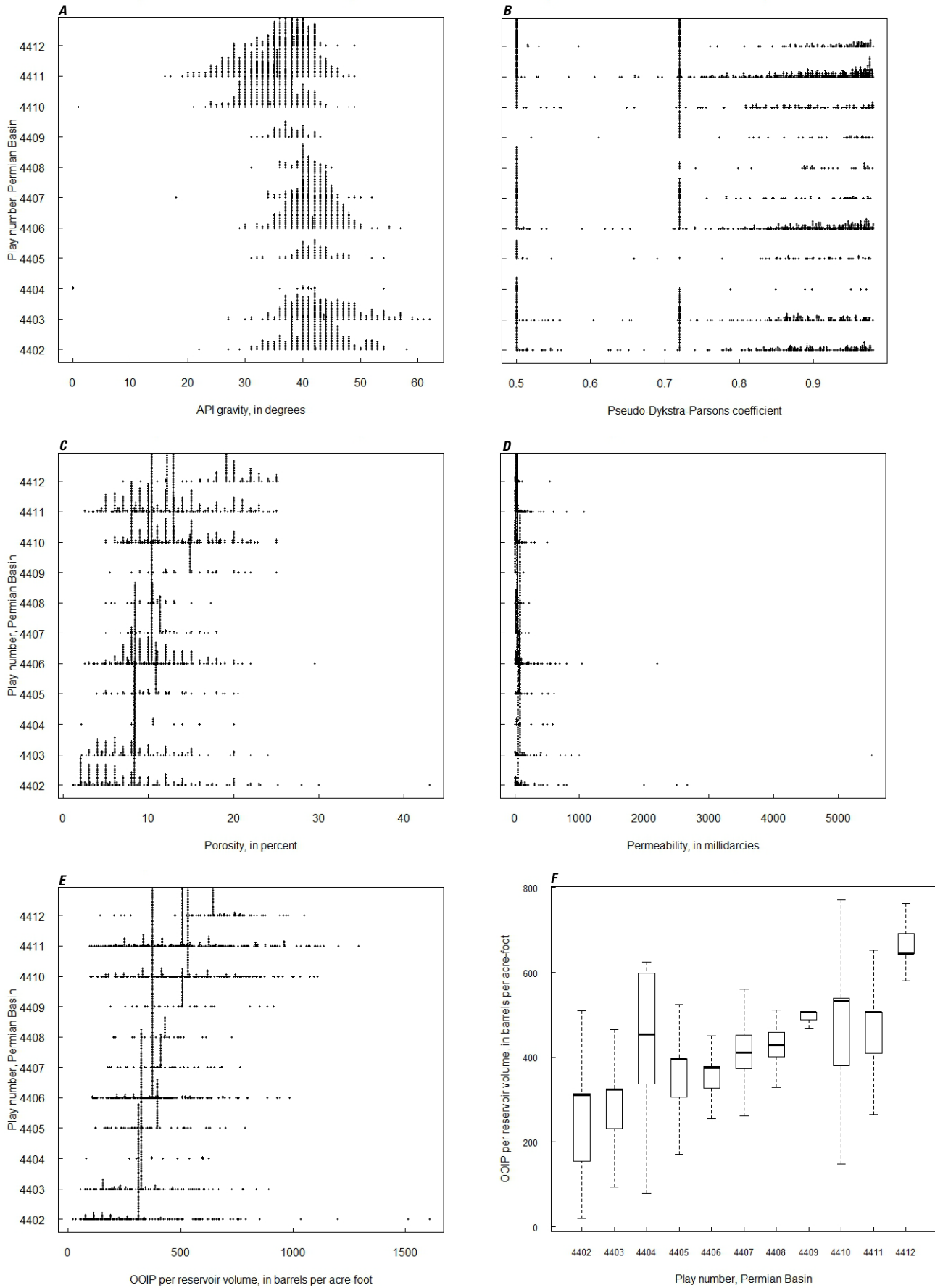


Figure 16. See caption on page 34.

Bend Arch-Fort Worth Basin Province

Table 17. Number of oil reservoirs, amount of original oil in place, amount of known recovery, and other data for each conventional oil-bearing play containing at least 10 oil reservoirs in the Bend Arch-Fort Worth Basin Province.

[The number of oil reservoirs and the known recovery are from the database by Nehring Associates, Inc. (2012). The known recovery (KR) is the sum of estimated reserves as of the end of 2010 plus cumulative oil production through the end of 2010. The original oil in place (OOIP) for each play is the sum of the Comprehensive Resource Database (CRD) estimates for that play's oil reservoirs. The CRD is based on the database by Nehring Associates, Inc. (2012), and contains updates made by the U.S. Geological Survey and INTEK, Inc. Values for API gravity, porosity, and permeability for each play are from the CRD; they are default values derived from INTEK's algorithms unless otherwise indicated. mD, millidarcies; MMBO, millions of barrels of oil; ND, no default value needed]

Play number	Number of oil reservoirs	OOIP (MMBO)	KR (MMBO)	API gravity (degrees)	Porosity (percent)	Permeability (mD)	Play name
4506	235	2,365	458	40.1	16.9	129	Post-Desmoinesian.
4505	563	11,344	1,777	40.6	15.3	63	Strawn (Desmoinesian).
4504	142	2,229	219	ND	14.0	35	Lower Pennsylvanian (Bend) Sandstone and Conglomerate.
4502	152	1,474	154	43.0	9.8	47	Mississippian Carbonate.
4501	71	841	150	40.6	11.9	109	Pre-Mississippian Carbonate.

Figure 17 (page 37). Plots of reservoir-fluid and reservoir properties for oil reservoirs by play number for the Bend Arch-Fort Worth Basin Province. *A*, Oil density (American Petroleum Institute [API] gravity in degrees). *B*, Computed pseudo-Dykstra-Parsons coefficient. *C*, Reservoir porosity (in percent). *D*, Reservoir permeability (in millidarcies). *E*, Estimates of the original oil in place (OOIP) per unit volume of reservoir rock (in barrels per acre-foot). *F*, Distribution of OOIP per unit volume of reservoir rock (in barrels per acre-foot). The boxplot in part *F* is explained in the text. ►

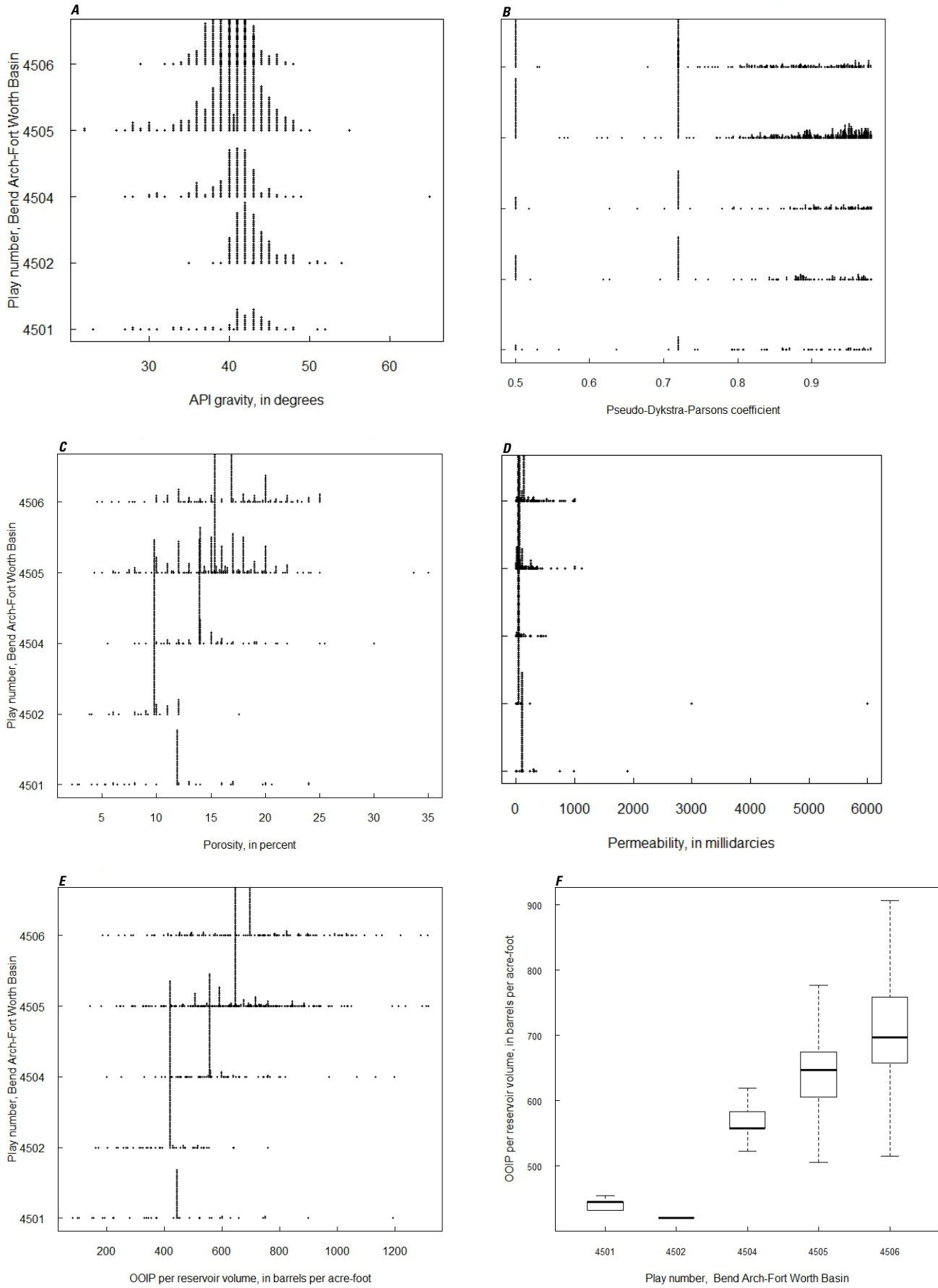


Figure 17. See caption on page 36.

Region 6 Profiles

Western Gulf Province

Table 18. Number of oil reservoirs, amount of original oil in place, amount of known recovery, and other data for each conventional oil-bearing play containing at least 10 oil reservoirs in the Western Gulf Province.

[The number of oil reservoirs and the known recovery are from the database by Nehring Associates, Inc. (2012). The known recovery (KR) is the sum of estimated reserves as of the end of 2010 plus cumulative oil production through the end of 2010. The original oil in place (OOIP) for each play is the sum of the Comprehensive Resource Database (CRD) estimates for that play's oil reservoirs. The CRD is based on the database by Nehring Associates, Inc. (2012), and contains updates made by the U.S. Geological Survey and INTEK, Inc. Values for API gravity, porosity, and permeability for each play are from the CRD; they are default values derived from INTEK's algorithms unless otherwise indicated. mD, millidarcies; MMBO, millions of barrels of oil; ND, no default value needed. Plays cannot fit in a single set of plots and so they are divided into groups a, b, and c to indicate how they are shown in figures 18–20]

Play number	Number of oil reservoirs	OOIP (MMBO)	KR (MMBO)	API gravity (degrees)	Porosity (percent)	Permeability (mD)	Play name
Group c (fig. 20)							
4746	25	3,676	1,286	28.3	30.6	1,241	Plio-Pleistocene Fluvial Sandstone Oil.
4745	60	8,631	2,706	34.5	29.1	818	Upper Miocene Deltaic Sandstone Gas and Oil.
4744	13	1,186	415	29.9	29.5	356	Upper Miocene Fluvial Sandstone Gas and Oil.
4743	104	6,259	2,183	36.0	28.1	672	Middle Miocene Deltaic Sandstone Gas and Oil.
4742	13	688	207	29.1	30.3	612	Middle Miocene Fluvial Sandstone Gas and Oil.
4741	15	749	233	41.1	28.7	1,250	Lower Miocene Slope and Fan Sandstone Gas.
4740	44	1,937	377	39.4	28.0	369	Lower Miocene Deltaic Sandstone Gas and Oil.
4739	51	918	317	ND	29.1	464	Lower Miocene Fluvial Sandstone Oil and Gas.
4738	63	2,934	1,027	36.6	29.4	430	Anahuac Sandstone Gas and Oil.
4737	24	270	74	41.4	31.2	830	Hackberry Sandstone Gas and Oil.
Group b (fig. 19)							
4736	42	888	275	40.4	25.7	404	Frio SE Texas/S. Louisiana Downdip Gas.
4735	156	3,415	1,280	37.8	28.4	474	Frio SE Texas/S. Louisiana Mid-Dip Gas and Oil.
4734	45	623	135	ND	26.9	303	Frio Updip Fluvial Gas and Oil.
4733	234	6,889	2,788	38.0	26.9	393	Frio South Texas Mid-Dip Oil and Gas.
4730	28	189	58	38.3	27.5	338	Vicksburg Updip Gas.
4728	162	2,676	789	31.4	30.6	574	Jackson Updip Gas and Oil.
4727	10	146	20	48.7	26.5	112	Yegua Downdip Gas.
4726	173	1,664	465	40.6	29.3	475	Yegua Updip Fluvial-Deltaic Oil and Gas.
4725	31	357	124	39.7	25.7	180	Middle Eocene Sandstones Updip Fluvial Oil and Gas.
4724	14	94	22	38.8	23.9	86	Middle Eocene Sandstones Downdip Gas.

Table 18. Number of oil reservoirs, amount of original oil in place, amount of known recovery, and other data for each conventional oil-bearing play containing at least 10 oil reservoirs in the Western Gulf Province.—Continued

Play number	Number of oil reservoirs	OOIP (MMBO)	KR (MMBO)	API gravity (degrees)	Porosity (percent)	Permeability (mD)	Play name
Group a (fig. 18)							
4722	104	1,807	431	40.2	21.0	123	Upper Wilcox Shelf-Edge Gas and Oil.
4721	22	358	53	ND	32.4	1,090	Upper Wilcox Updip Fluvial Gas.
4719	50	585	115	ND	23.6	135	Lower Wilcox Fluvial Oil and Gas.
4716	11	475	141	ND	20.5	9	Upper Cretaceous Sandstones Maverick Basin Oil.
4715	52	1,568	255	ND	23.4	39	Upper Cretaceous Sandstones Fault Zone Oil.
4714	11	170	11	ND	22.8	35	Upper Cretaceous Volcanic Mound Oil and Gas.
4713	15	2,251	88	ND	18.2	0.4	Austin Updip Oil.
4711	13	315	53	43.6	5.5	0.2	Austin Shelf Edge Gas and Oil.
4710	16	405	124	ND	15.8	65	Woodbine South Angelina Flexure Oil and Gas.
4705	18	424	86	ND	9.9	6	Lower Cretaceous Carbonate Shelf/ Shelf Edge Gas and Oil.
4701	134	13,760	5,878	31.6	29.7	691	Houston Salt Dome Flank Oil and Gas.

Figure 18 (page 40). Plots of reservoir-fluid and reservoir properties for oil reservoirs by play number for group a of the Western Gulf Province. Group a includes selected plays in the range from 4701 through 4722. *A*, Oil density (American Petroleum Institute [API] gravity in degrees). *B*, Computed pseudo-Dykstra-Parsons coefficient. *C*, Reservoir porosity (in percent). *D*, Reservoir permeability (in millidarcies). *E*, Estimates of the original oil in place (OOIP) per unit volume of reservoir rock (in barrels per acre-foot). *F*, Distribution of OOIP per unit volume of reservoir rock (in barrels per acre-foot). The boxplot in part *F* is explained in the text. ▶

Figure 19 (page 41). Plots of reservoir-fluid and reservoir properties for oil reservoirs by play number for group b of the Western Gulf Province. Group b includes selected plays in the range from 4724 through 4736. *A*, Oil density (American Petroleum Institute [API] gravity in degrees). *B*, Computed pseudo-Dykstra-Parsons coefficient. *C*, Reservoir porosity (in percent). *D*, Reservoir permeability (in millidarcies). *E*, Estimates of the original oil in place (OOIP) per unit volume of reservoir rock (in barrels per acre-foot). *F*, Distribution of OOIP per unit volume of reservoir rock (in barrels per acre-foot). The boxplot in part *F* is explained in the text. ▶

Figure 20 (page 42). Plots of reservoir-fluid and reservoir properties for oil reservoirs by play number for group c of the Western Gulf Province. Group c includes plays numbered 4737 through 4746. *A*, Oil density (American Petroleum Institute [API] gravity in degrees). *B*, Computed pseudo-Dykstra-Parsons coefficient. *C*, Reservoir porosity (in percent). *D*, Reservoir permeability (in millidarcies). *E*, Estimates of the original oil in place (OOIP) per unit volume of reservoir rock (in barrels per acre-foot). *F*, Distribution of OOIP per unit volume of reservoir rock (in barrels per acre-foot). The boxplot in part *F* is explained in the text. ▶

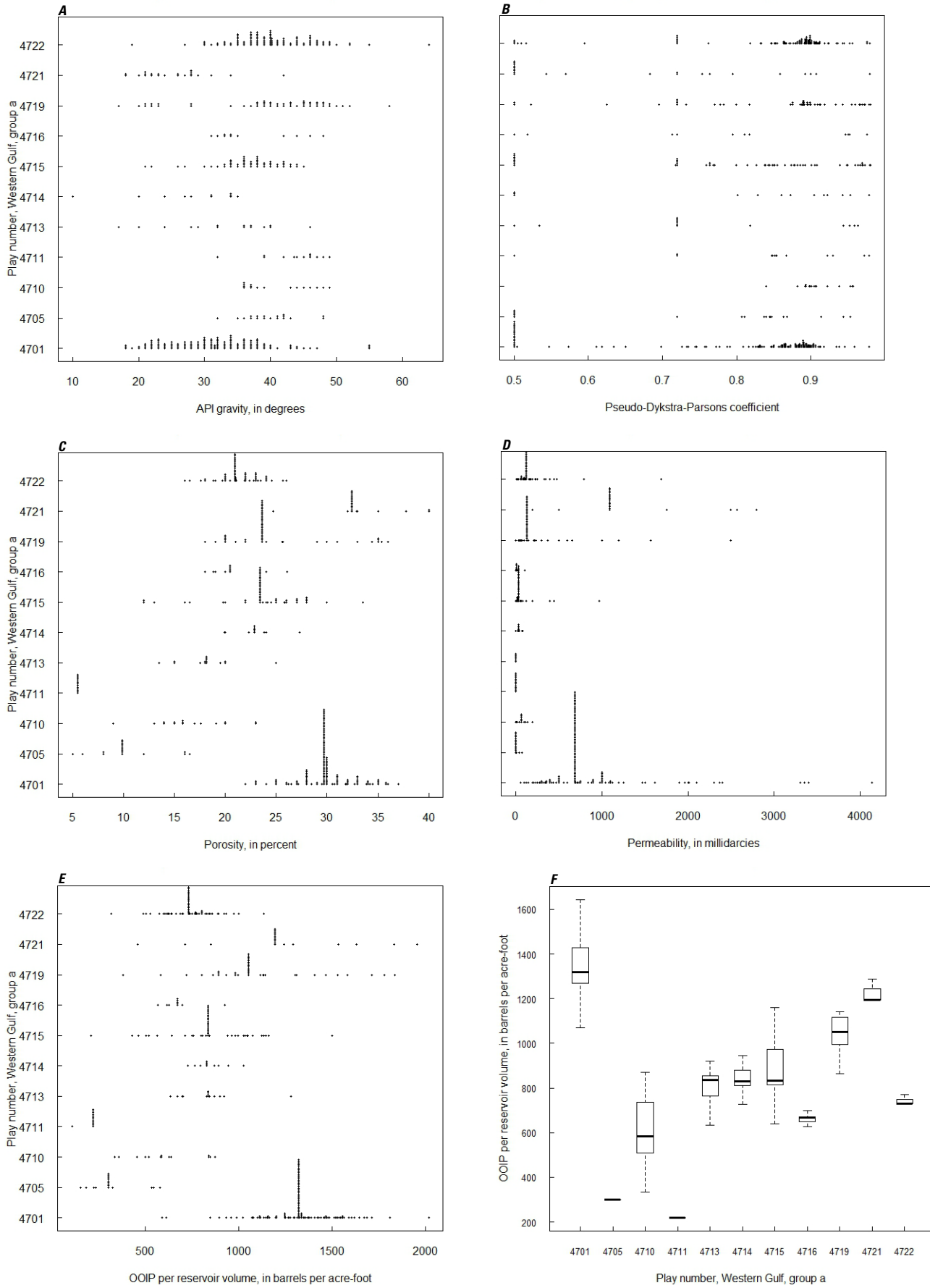


Figure 18. See caption on page 39.

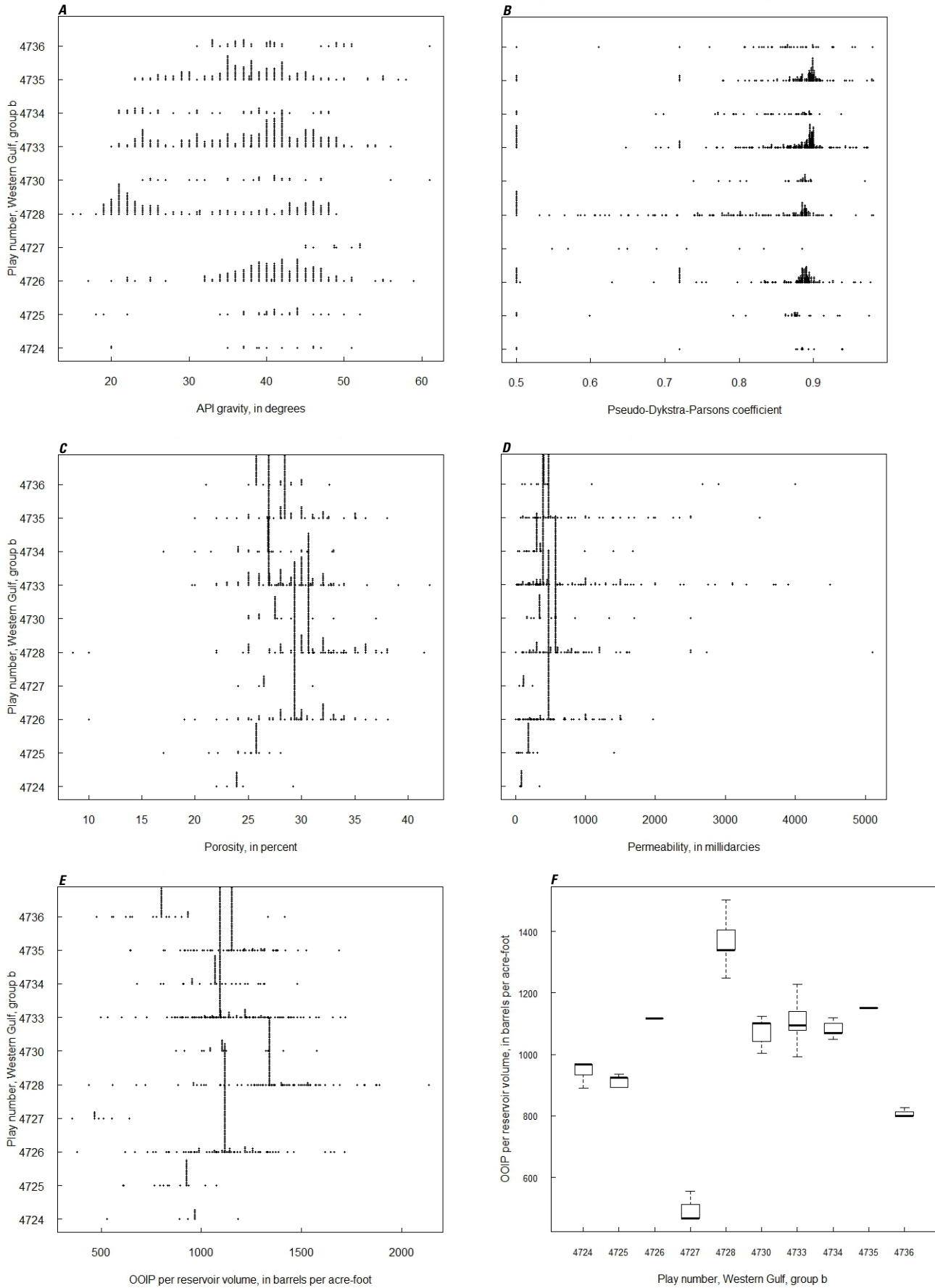


Figure 19. See caption on page 39.

42 Profiles of Reservoir Properties of Oil-Bearing Plays for Selected Petroleum Provinces in the United States

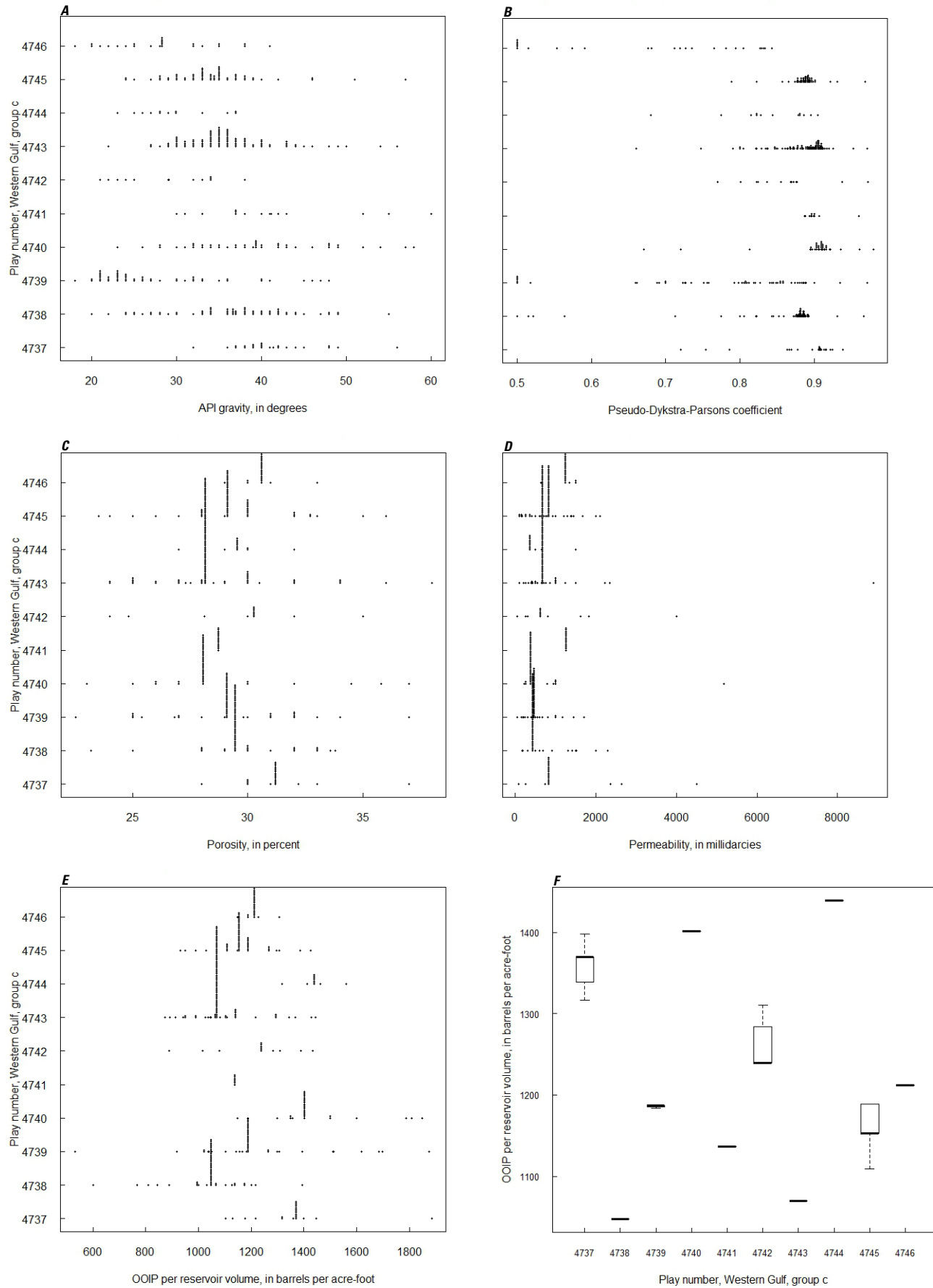


Figure 20. See caption on page 39.

Louisiana-Mississippi Salt Basins Province

This profile for the Louisiana-Mississippi Salt Basins Province includes plays containing reservoirs from both the East Texas Basin Province (code 48) and the Louisiana-Mississippi Salt Basins Province (49). These provinces were combined in 1995, as explained by Schenk and Viger (1996, p. 1): “For the 1995 National Assessment, provinces 48 and 49 were combined because many of the plays extended across the rather artificial province boundary between them, which is the State line between Texas and Louisiana. The plays in this section, although designated with 49, include the plays of East Texas.”

The combined provinces are shown in figure 1 of this report as Province 49, and the play numbers in this profile begin with 49.

Table 19. Number of oil reservoirs, amount of original oil in place, amount of known recovery, and other data for each conventional oil-bearing play containing at least 10 oil reservoirs in the Louisiana-Mississippi Salt Basins Province.

[The number of oil reservoirs and the known recovery are from the database by Nehring Associates, Inc. (2012). The known recovery (KR) is the sum of estimated reserves as of the end of 2010 plus cumulative oil production through the end of 2010. The original oil in place (OOIP) for each play is the sum of the Comprehensive Resource Database (CRD) estimates for that play’s oil reservoirs. The CRD is based on the database by Nehring Associates, Inc. (2012), and contains updates made by the U.S. Geological Survey and INTEK, Inc. Values for API gravity, porosity, and permeability for each play are from the CRD; they are default values derived from INTEK’s algorithms unless otherwise indicated. mD, millidarcies; MMBO, millions of barrels of oil; ND, no default value needed. Plays cannot fit in a single set of plots and so they are divided into groups a and b to indicate how they are shown in figures 21 and 22]

Play number	Number of oil reservoirs	OOIP (MMBO)	KR (MMBO)	API gravity (degrees)	Porosity (percent)	Permeability (mD)	Play name
Group b (fig. 22)							
4945	267	14,056	1,137	38.7	30.9	363	Wilcox Salt Basins Oil.
4944	33	5,864	1,041	26.1	26.9	1,293	Nacotoch/Navarro Oil and Gas.
4943	31	11,426	608	ND	26.4	889	Selma Salt Basins Oil.
4940	55	3,379	763	25.8	28.6	378	Eutaw/Tokio Updip Oil.
4939	13	7,179	5,413	ND	26.1	353	Woodbine/Tuscaloosa Sabine Flanks Oil.
4938	44	4,543	369	ND	25.1	213	Tuscaloosa Stratigraphic Oil and Gas.
4937	92	7,894	2,502	ND	24.0	406	Tuscaloosa/Woodbine Structural Oil and Gas.
4936	33	965	394	ND	26.1	906	Tuscaloosa Peripheral Fault Zone Oil.
4935	11	2,071	27	ND	17.5	155	Paluxy Downdip Gas.
4934	91	3,707	871	ND	21.5	367	Paluxy Updip Oil.
4932	100	5,286	748	ND	18.4	151	Glen Rose/Rodessa Updip Oil.

Table 19. Number of oil reservoirs, amount of original oil in place, amount of known recovery, and other data for each conventional oil-bearing play containing at least 10 oil reservoirs in the Louisiana-Mississippi Salt Basins Province.—Continued

[The number of oil reservoirs and the known recovery are from the database by Nehring Associates, Inc. (2012). The known recovery (KR) is the sum of estimated reserves as of the end of 2010 plus cumulative oil production through the end of 2010. The original oil in place (OOIP) for each play is the sum of the Comprehensive Resource Database (CRD) estimates for that play's oil reservoirs. The CRD is based on the database by Nehring Associates, Inc. (2012), and contains updates made by the U.S. Geological Survey and INTEK, Inc. Values for API gravity, porosity, and permeability for each play are from the CRD; they are default values derived from INTEK's algorithms unless otherwise indicated. mD, millidarcies; MMBO, millions of barrels of oil; ND, no default value needed. Plays cannot fit in a single set of plots and so they are divided into groups a and b to indicate how they are shown in figures 21 and 22]

Play number	Number of oil reservoirs	OOIP (MMBO)	KR (MMBO)	API gravity (degrees)	Porosity (percent)	Permeability (mD)	Play name
Group a (fig. 21)							
4930	30	1,027	68	ND	14.9	36	Pettet Southern Sabine Uplift Gas and Oil.
4929	14	286	36	ND	13.6	27	Sligo/Pettet Salt Basins Gas.
4928	37	587	116	ND	19.1	63	Sligo/Pettet Updip Oil.
4925	44	1,086	171	ND	21.8	244	Hosston Updip Oil.
4921	44	2,421	183	40.8	17.4	76	Cotton Valley Updip Oil.
4919	12	131	33	ND	21.0	45	Haynesville Updip Alabama-Florida Oil.
4918	18	2,092	173	ND	15.0	202	Haynesville Salt Basins Gas and Oil.
4916	21	524	157	ND	20.2	41	Smackover East Texas-Southern Arkansas Fault Zone Oil and Gas.
4912	82	3,780	591	43.5	14.2	72	Smackover Salt Basins Gas and Oil.
4911	27	154	58	ND	14.5	50	Smackover Alabama/Florida Updip Oil.
4910	23	1,350	621	ND	16.9	99	Smackover Alabama/Florida Peripheral Fault Zone Oil and Gas.
4901	15	567	62	ND	15.1	121	Piercement Salt Dome Flanks Oil and Gas.

Figure 21 (page 45). Plots of reservoir-fluid and reservoir properties for oil reservoirs by play number for group a of the Louisiana-Mississippi (L-M) Salt Basins Province. Group a includes selected plays in the range from 4901 through 4930. *A*, Oil density (American Petroleum Institute [API] gravity in degrees). *B*, Computed pseudo-Dykstra-Parsons coefficient. *C*, Reservoir porosity (in percent). *D*, Reservoir permeability (in millidarcies). *E*, Estimates of the original oil in place (OOIP) per unit volume of reservoir rock (in barrels per acre-foot). *F*, Distribution of OOIP per unit volume of reservoir rock (in barrels per acre-foot). The boxplot in part *F* is explained in the text. ►

Figure 22 (page 46). Plots of reservoir-fluid and reservoir properties for oil reservoirs by play number for group b of the Louisiana-Mississippi (L-M) Salt Basins Province. Group b includes selected plays in the range from 4932 through 4945. *A*, Oil density (American Petroleum Institute [API] gravity in degrees). *B*, Computed pseudo-Dykstra-Parsons coefficient. *C*, Reservoir porosity (in percent). *D*, Reservoir permeability (in millidarcies). *E*, Estimates of the original oil in place (OOIP) per unit volume of reservoir rock (in barrels per acre-foot). *F*, Distribution of OOIP per unit volume of reservoir rock (in barrels per acre-foot). The boxplot in part *F* is explained in the text. ►

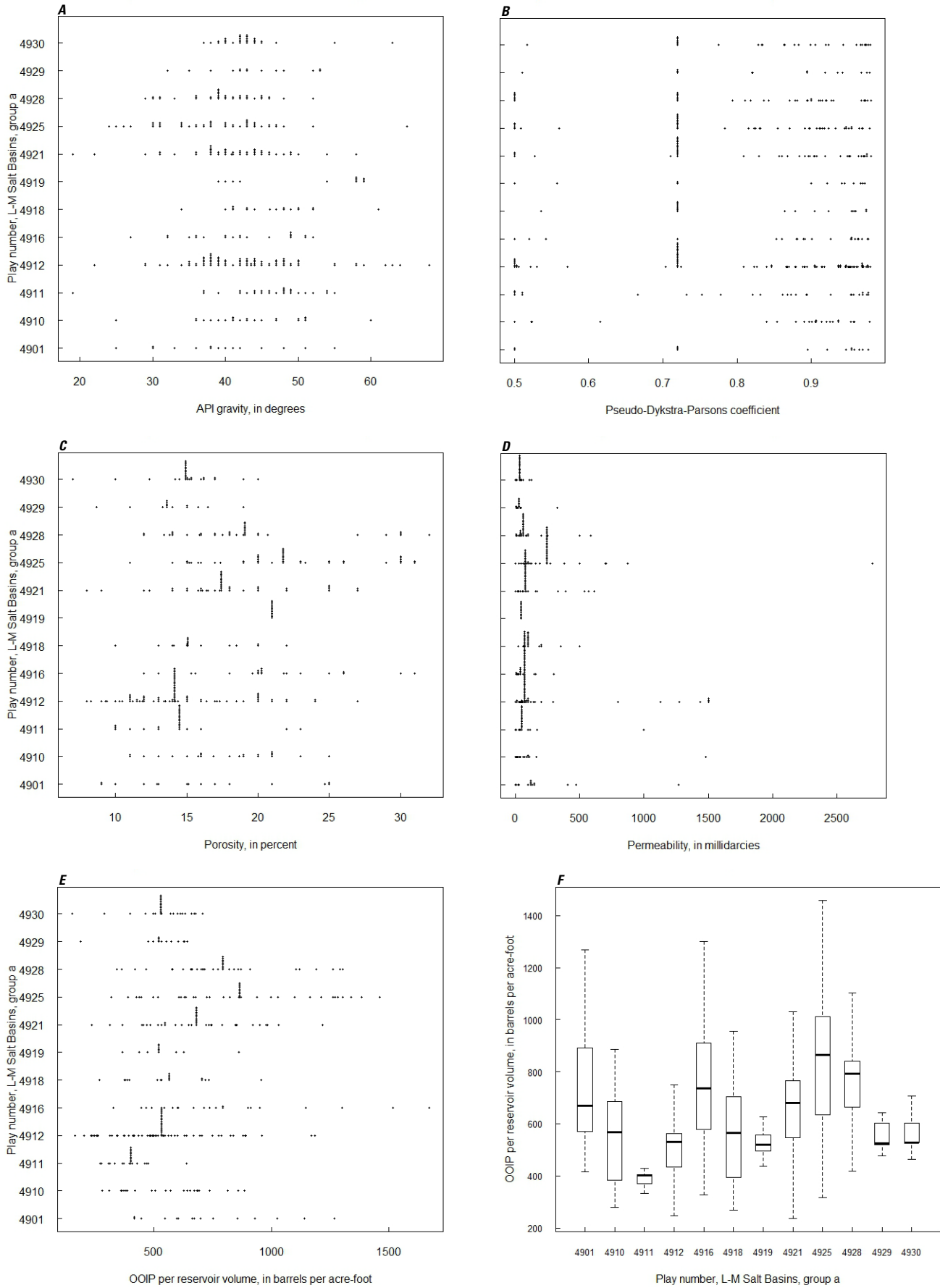


Figure 21. See caption on page 44.

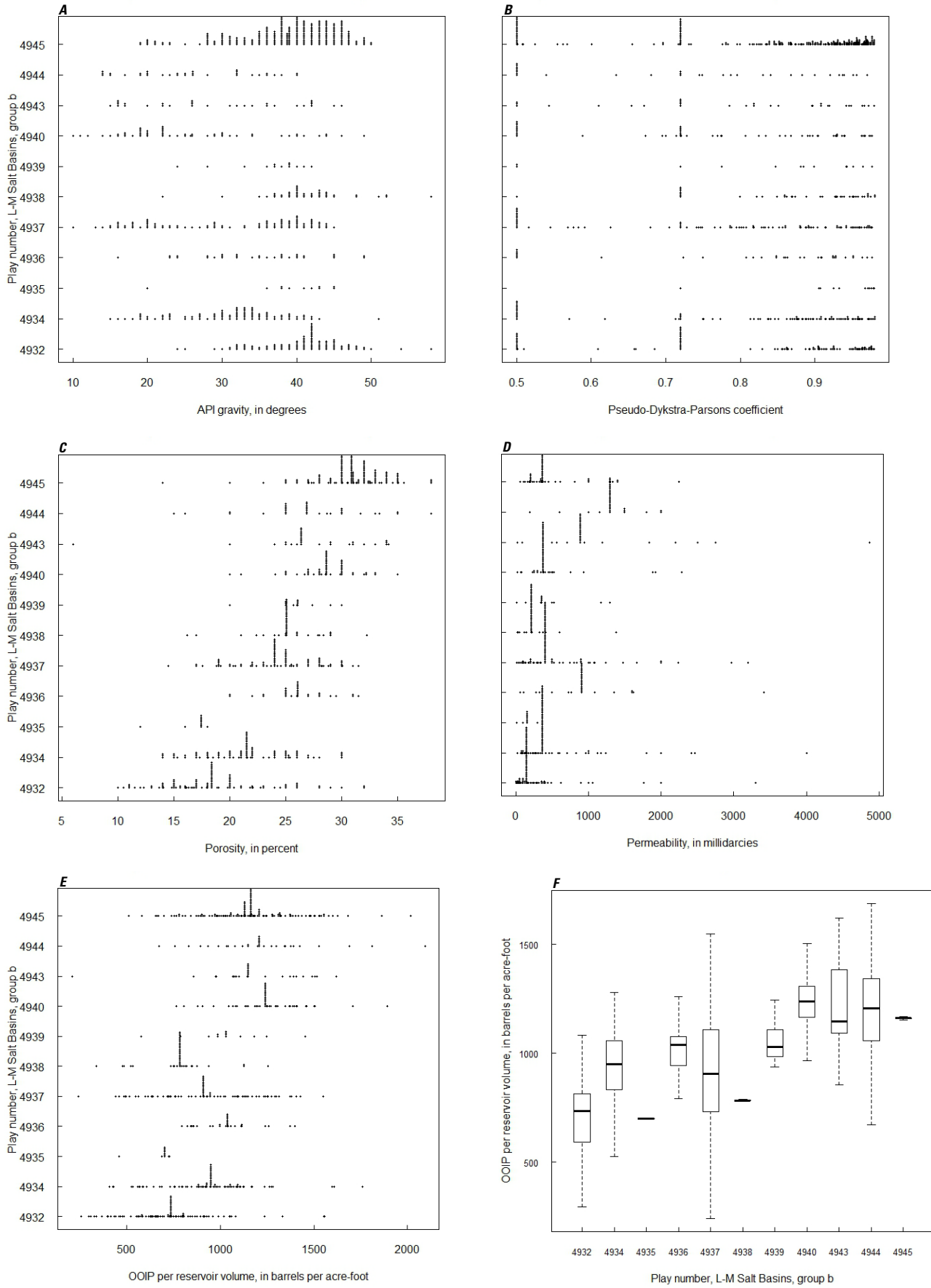


Figure 22. See caption on page 44.

Region 7 Profiles

Cambridge Arch-Central Kansas Uplift Province

Table 20. Number of oil reservoirs, amount of original oil in place, amount of known recovery, and other data for each conventional oil-bearing play containing at least 10 oil reservoirs in the Cambridge Arch-Central Kansas Uplift Province.

[The number of oil reservoirs and the known recovery are from the database by Nehring Associates, Inc. (2012). The known recovery (KR) is the sum of estimated reserves as of the end of 2010 plus cumulative oil production through the end of 2010. The original oil in place (OOIP) for each play is the sum of the Comprehensive Resource Database (CRD) estimates for that play's oil reservoirs. The CRD is based on the database by Nehring Associates, Inc. (2012), and contains updates made by the U.S. Geological Survey and INTEK, Inc. Values for API gravity, porosity, and permeability for each play are from the CRD; they are default values derived from INTEK's algorithms unless otherwise indicated. mD, millidarcies; MMBO, millions of barrels of oil]

Play number	Number of oil reservoirs	OOIP (MMBO)	KR (MMBO)	API gravity (degrees)	Porosity (percent)	Permeability (mD)	Play name
5309	233	4,089	1,341	35.1	16.3	365	Early Ordovician/Cambrian Arbuckle.
5308	43	378	124	36.6	14.7	365	Ordovician.
5305	404	5,710	1,628	35.4	14.7	133	Pennsylvanian Cyclical Carbonates and Sandstones.
5304	18	221	56	37.0	12.5	50	Mississippian and Devonian.

Figure 23 (page 48). Plots of reservoir-fluid and reservoir properties for oil reservoirs by play number for the Cambridge Arch-Central Kansas Uplift (Cambridge Arch-C. Kansas Uplift) Province. *A*, Oil density (American Petroleum Institute [API] gravity in degrees). *B*, Computed pseudo-Dykstra-Parsons coefficient. *C*, Reservoir porosity (in percent). *D*, Reservoir permeability (in millidarcies). *E*, Estimates of the original oil in place (OOIP) per unit volume of reservoir rock (in barrels per acre-foot). *F*, Distribution of OOIP per unit volume of reservoir rock (in barrels per acre-foot). The boxplot in part *F* is explained in the text. ►

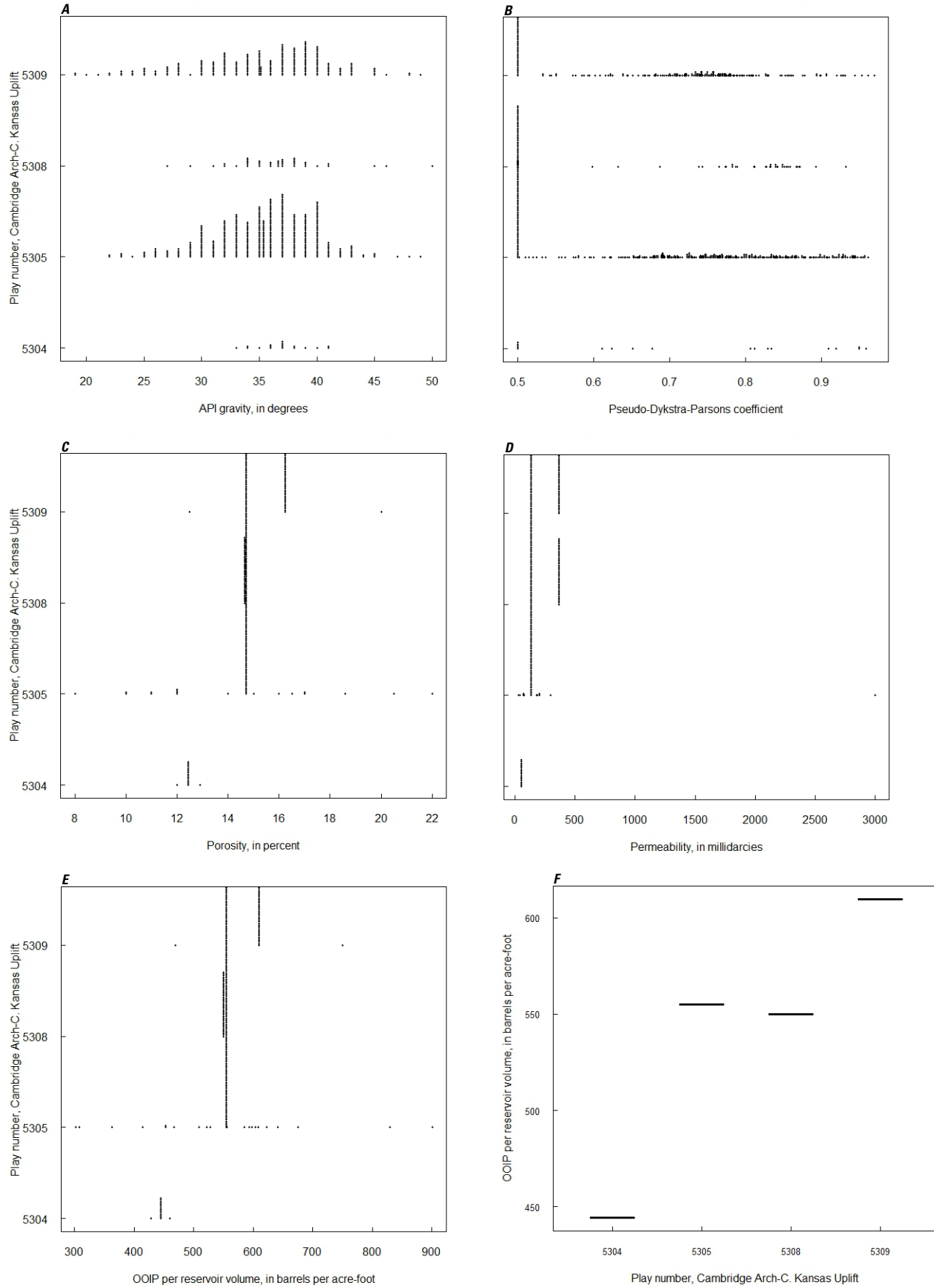


Figure 23. See caption on page 47.

Nemaha Uplift Province

Table 21. Number of oil reservoirs, amount of original oil in place, amount of known recovery, and other data for each conventional oil-bearing play containing at least 10 oil reservoirs in the Nemaha Uplift Province.

[The number of oil reservoirs and the known recovery are from the database by Nehring Associates, Inc. (2012). The known recovery (KR) is the sum of estimated reserves as of the end of 2010 plus cumulative oil production through the end of 2010. The original oil in place (OOIP) for each play is the sum of the Comprehensive Resource Database (CRD) estimates for that play's oil reservoirs. The CRD is based on the database by Nehring Associates, Inc. (2012), and contains updates made by the U.S. Geological Survey and INTEK, Inc. Values for API gravity, porosity, and permeability for each play are from the CRD; they are default values derived from INTEK's algorithms unless otherwise indicated. mD, millidarcies; MMBO, millions of barrels of oil]

Play number	Number of oil reservoirs	OOIP (MMBO)	KR (MMBO)	API gravity (degrees)	Porosity (percent)	Permeability (mD)	Play name
5505	90	1,613	472	40.3	13.5	20	Pennsylvanian Stratigraphic.
5504	90	2,555	851	39.5	15.3	4	Pennsylvanian-Permian Structural.
5503	79	932	238	39.1	13.0	197	Mississippian.
5501	137	3,645	1,131	38.8	12.4	211	Pre-Woodford Paleozoic.

Figure 24 (page 50). Plots of reservoir-fluid and reservoir properties for oil reservoirs by play number for the Nemaha Uplift Province. *A*, Oil density (American Petroleum Institute [API] gravity in degrees). *B*, Computed pseudo-Dykstra-Parsons coefficient. *C*, Reservoir porosity (in percent). *D*, Reservoir permeability (in millidarcies). *E*, Estimates of the original oil in place (OOIP) per unit volume of reservoir rock (in barrels per acre-foot). *F*, Distribution of OOIP per unit volume of reservoir rock (in barrels per acre-foot). The boxplot in part *F* is explained in the text. ►

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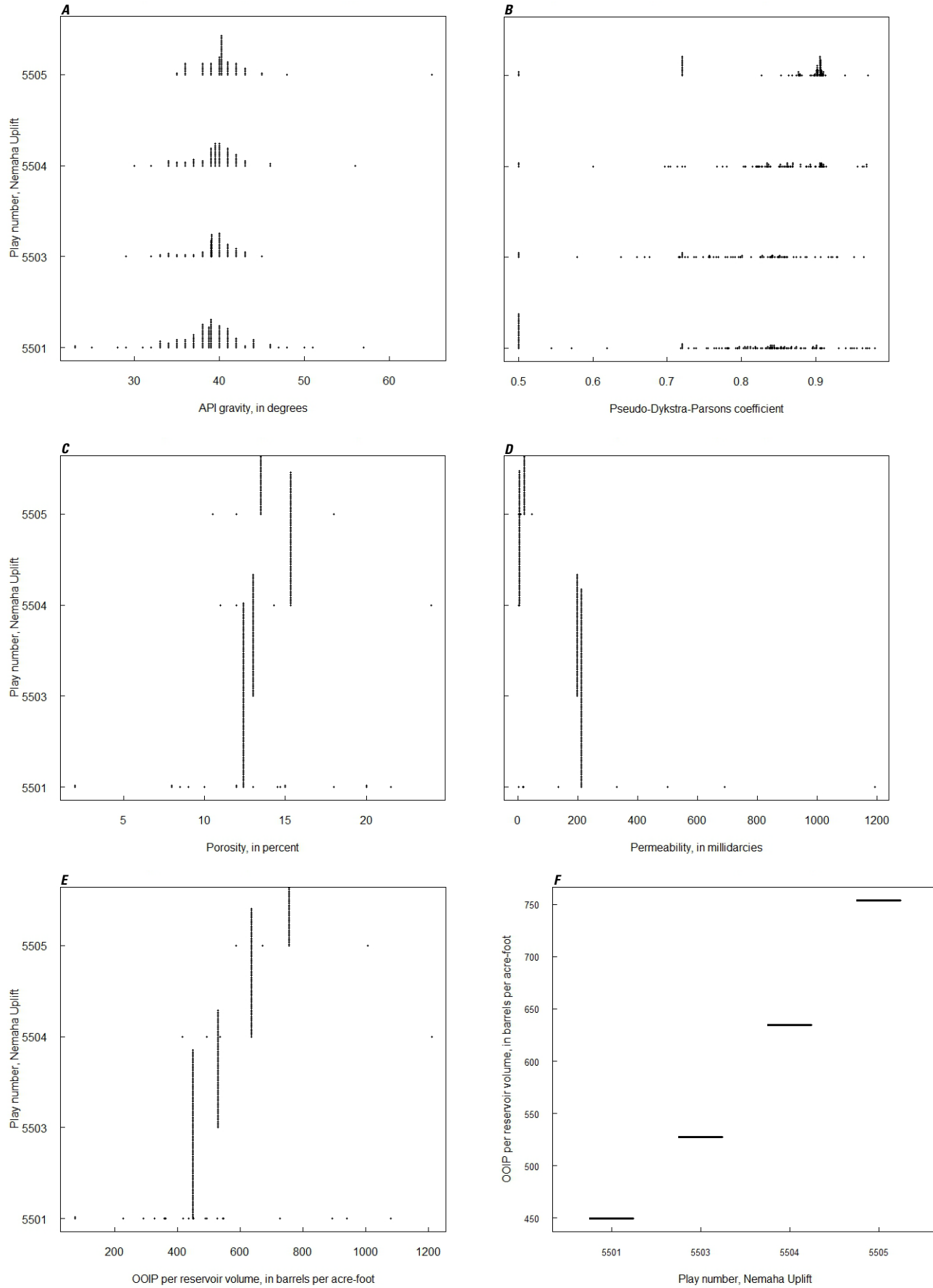


Figure 24. See caption on page 49.

Forest City Basin Province

Table 22. Number of oil reservoirs, amount of original oil in place, amount of known recovery, and other data for each conventional oil-bearing play containing at least 10 oil reservoirs in the Forest City Basin Province.

[The number of oil reservoirs and the known recovery are from the database by Nehring Associates, Inc. (2012). The known recovery (KR) is the sum of estimated reserves as of the end of 2010 plus cumulative oil production through the end of 2010. The original oil in place (OOIP) for each play is the sum of the Comprehensive Resource Database (CRD) estimates for that play's oil reservoirs. The CRD is based on the database by Nehring Associates, Inc. (2012), and contains updates made by the U.S. Geological Survey and INTEK, Inc. Values for API gravity, porosity, and permeability for each play are from the CRD; they are default values derived from INTEK's algorithms unless otherwise indicated. mD, millidarcies; MMBO, millions of barrels of oil]

Play number	Number of oil reservoirs	OOIP (MMBO)	KR (MMBO)	API gravity (degrees)	Porosity (percent)	Permeability (mD)	Play name
5603	28	850	108	28.2	17.4	141	Pennsylvanian.
5601	12	105	17	27.4	21.6	141	Pre-Woodford Paleozoic.

Figure 25 (page 52). Plots of reservoir-fluid and reservoir properties for oil reservoirs by play number for the Forest City Basin Province. *A*, Oil density (American Petroleum Institute [API] gravity in degrees). *B*, Computed pseudo-Dykstra-Parsons coefficient. *C*, Reservoir porosity (in percent). *D*, Reservoir permeability (in millidarcies). *E*, Estimates of the original oil in place (OOIP) per unit volume of reservoir rock (in barrels per acre-foot). *F*, Distribution of OOIP per unit volume of reservoir rock (in barrels per acre-foot). The boxplot in part *F* is explained in the text. ►

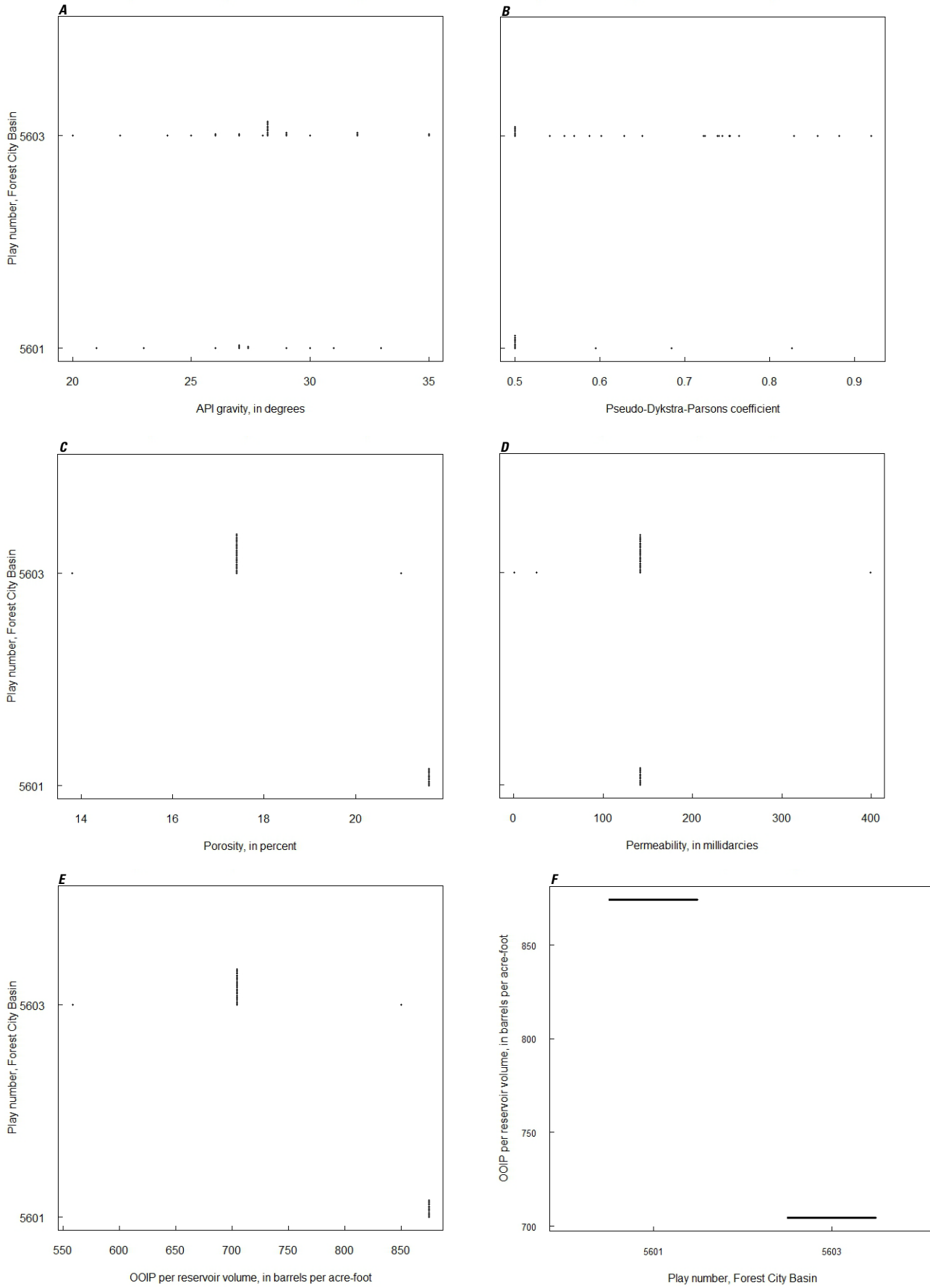


Figure 25. See caption on page 51.

Anadarko Basin Province

Table 23. Number of oil reservoirs, amount of original oil in place, amount of known recovery, and other data for each conventional oil-bearing play containing at least 10 oil reservoirs in the Anadarko Basin Province.

[The number of oil reservoirs and the known recovery are from the database by Nehring Associates, Inc. (2012). The known recovery (KR) is the sum of estimated reserves as of the end of 2010 plus cumulative oil production through the end of 2010. The original oil in place (OOIP) for each play is the sum of the Comprehensive Resource Database (CRD) estimates for that play's oil reservoirs. The CRD is based on the database by Nehring Associates, Inc. (2012), and contains updates made by the U.S. Geological Survey and INTEK, Inc. Values for API gravity, porosity, and permeability for each play are from the CRD; they are default values derived from INTEK's algorithms unless otherwise indicated. mD, millidarcies; MMBO, millions of barrels of oil; ND, no default value needed. Plays cannot fit in a single set of plots and so they are divided into groups a and b to indicate how they are shown in figures 26 and 27]

Play number	Number of oil reservoirs	OOIP (MMBO)	KR (MMBO)	API gravity (degrees)	Porosity (percent)	Permeability (mD)	Play name
Group b (fig. 27)							
5827	10	412	22	ND	12.8	49	Washes.
5824	10	195	26	37.6	14.1	16	Upper Virgilian Stratigraphic Oil and Gas.
5823	26	749	48	42.7	14.0	21	Lower Virgilian Sandstone Gas and Oil.
5822	69	555	91	37.4	13.9	42	Upper Missourian Oil and Gas.
5821	23	996	233	42.5	12.5	11	Lower Missourian Stratigraphic Oil and Gas.
5820	64	1,716	191	38.7	9.6	20	Upper Desmoinesian Oil and Gas.
Group a (fig. 26)							
5819	49	831	262	38.3	13.5	30	Lower Desmoinesian Stratigraphic Gas and Oil.
5816	128	2,843	512	39.3	12.8	39	Morrow Sandstone Gas and Oil Stratigraphic.
5814	72	467	142	38.2	10.4	19	Upper Mississippian Stratigraphic Gas and Oil.
5813	119	1,484	299	37.9	16.4	26	Lower Mississippian Stratigraphic Oil and Gas.
5810	10	199	70	43.7	11.3	120	Misener Oil.
5809	11	367	104	42.3	10.7	43	Hunton Stratigraphic-Unconformity Gas and Oil.
5805	15	259	81	44.5	9.3	46	Simpson Oil and Gas.
5804	10	456	91	39.6	13.7	100	Wichita Mountains Uplift.

Figure 26 (page 54). Plots of reservoir-fluid and reservoir properties for oil reservoirs by play number for group a of the Anadarko Basin Province. Group a includes selected plays in the range from 5804 through 5819. *A*, Oil density (American Petroleum Institute [API] gravity in degrees). *B*, Computed pseudo-Dykstra-Parsons coefficient. *C*, Reservoir porosity (in percent). *D*, Reservoir permeability (in millidarcies). *E*, Estimates of the original oil in place (OOIP) per unit volume of reservoir rock (in barrels per acre-foot). *F*, Distribution of OOIP per unit volume of reservoir rock (in barrels per acre-foot). The boxplot in part *F* is explained in the text. ▶

Figure 27 (page 55). Plots of reservoir-fluid and reservoir properties for oil reservoirs by play number for group b of the Anadarko Basin Province. Group b includes selected plays in the range from 5820 through 5827. *A*, Oil density (American Petroleum Institute [API] gravity in degrees). *B*, Computed pseudo-Dykstra-Parsons coefficient. *C*, Reservoir porosity (in percent). *D*, Reservoir permeability (in millidarcies). *E*, Estimates of the original oil in place (OOIP) per unit volume of reservoir rock (in barrels per acre-foot). *F*, Distribution of OOIP per unit volume of reservoir rock (in barrels per acre-foot). The boxplot in part *F* is explained in the text. ▶

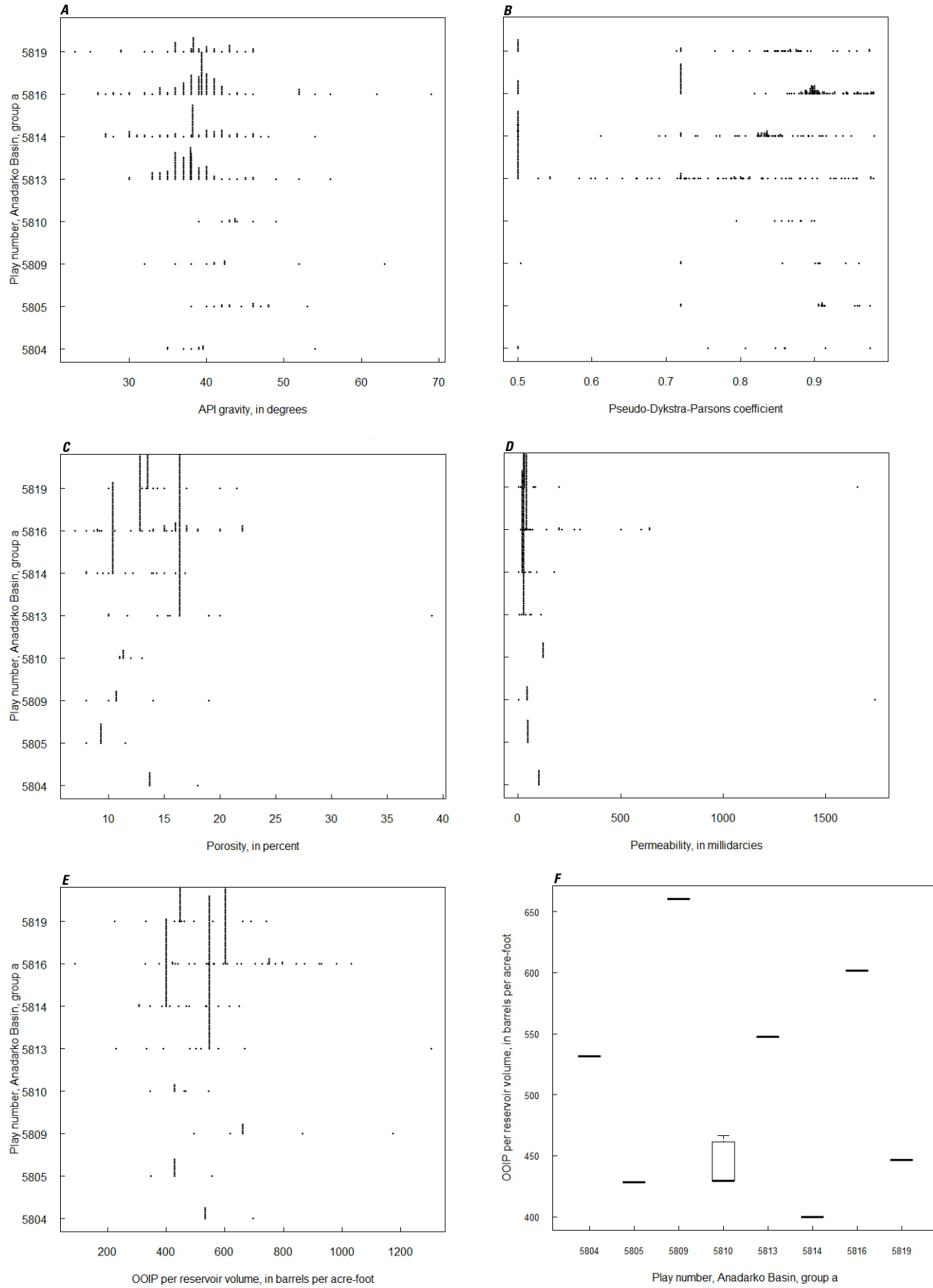


Figure 26. See caption on page 53.

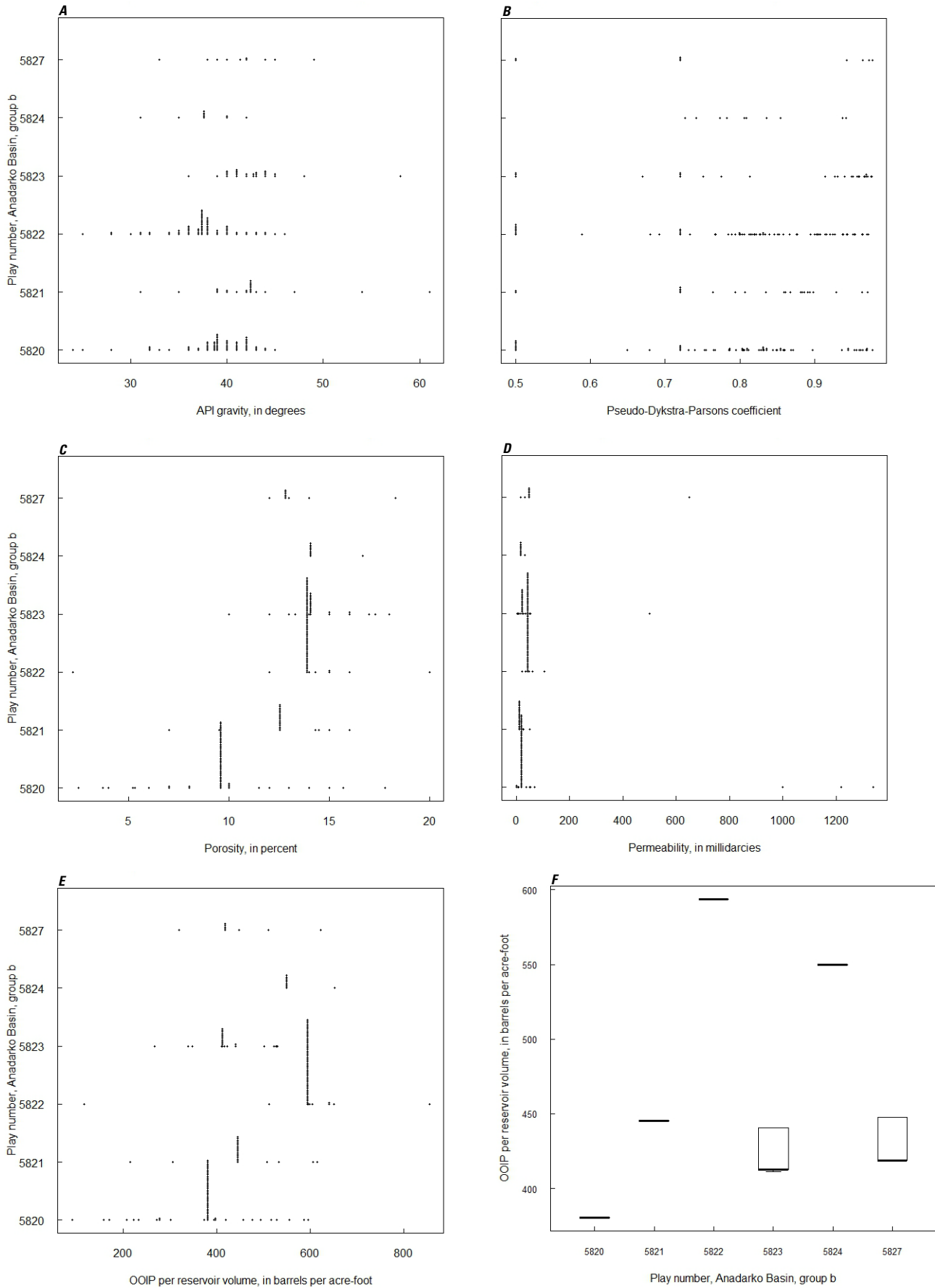


Figure 27. See caption on page 53.

Sedgwick Basin Province

Table 24. Number of oil reservoirs, amount of original oil in place, amount of known recovery, and other data for each conventional oil-bearing play containing at least 10 oil reservoirs in the Sedgwick Basin Province.

[The number of oil reservoirs and the known recovery are from the database by Nehring Associates, Inc. (2012). The known recovery (KR) is the sum of estimated reserves as of the end of 2010 plus cumulative oil production through the end of 2010. The original oil in place (OOIP) for each play is the sum of the Comprehensive Resource Database (CRD) estimates for that play's oil reservoirs. The CRD is based on the database by Nehring Associates, Inc. (2012), and contains updates made by the U.S. Geological Survey and INTEK, Inc. Values for API gravity, porosity, and permeability for each play are from the CRD; they are default values derived from INTEK's algorithms unless otherwise indicated. mD, millidarcies; MMBO, millions of barrels of oil]

Play number	Number of oil reservoirs	OOIP (MMBO)	KR (MMBO)	API gravity (degrees)	Porosity (percent)	Permeability (mD)	Play name
5903	46	341	118	38.3	19.8	42	Pennsylvanian Combination Traps.
5902	79	1,867	312	36.8	20.0	5	Mississippian Combination Traps.
5901	76	1,003	349	39.1	13.0	154	Lower Paleozoic Combination Traps.

Figure 28 (page 57). Plots of reservoir-fluid and reservoir properties for oil reservoirs by play number for the Sedgwick Basin Province. *A*, Oil density (American Petroleum Institute [API] gravity in degrees). *B*, Computed pseudo-Dykstra-Parsons coefficient. *C*, Reservoir porosity (in percent). *D*, Reservoir permeability (in millidarcies). *E*, Estimates of the original oil in place (OOIP) per unit volume of reservoir rock (in barrels per acre-foot). *F*, Distribution of OOIP per unit volume of reservoir rock (in barrels per acre-foot). The boxplot in part *F* is explained in the text. ►

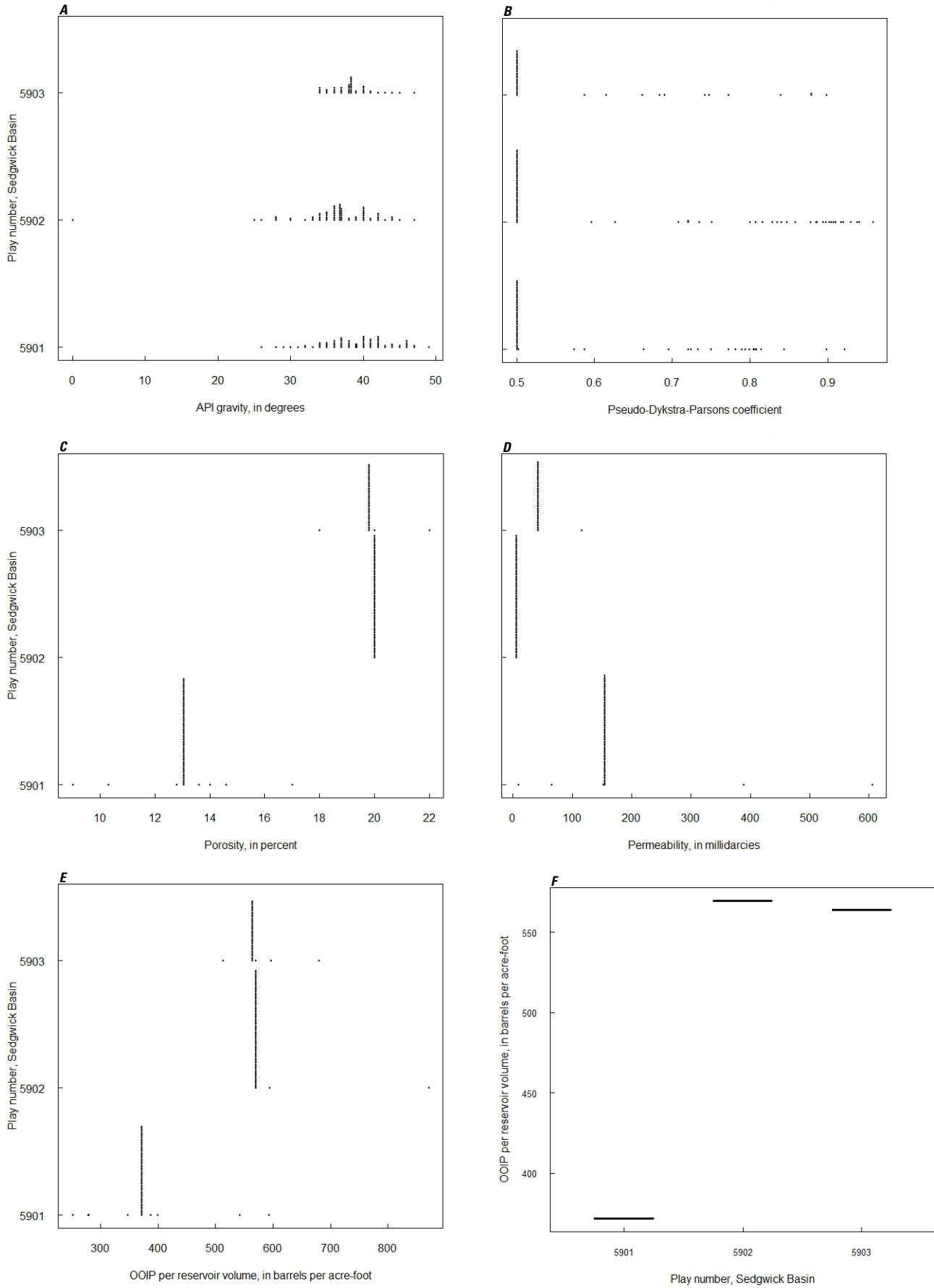


Figure 28. See caption on page 56.

Cherokee Platform Province

Table 25. Number of oil reservoirs, amount of original oil in place, amount of known recovery, and other data for each conventional oil-bearing play containing at least 10 oil reservoirs in the Cherokee Platform Province.

[The number of oil reservoirs and the known recovery are from the database by Nehring Associates, Inc. (2012). The known recovery (KR) is the sum of estimated reserves as of the end of 2010 plus cumulative oil production through the end of 2010. The original oil in place (OOIP) for each play is the sum of the Comprehensive Resource Database (CRD) estimates for that play's oil reservoirs. The CRD is based on the database by Nehring Associates, Inc. (2012), and contains updates made by the U.S. Geological Survey and INTEK, Inc. Values for API gravity, porosity, and permeability for each play are from the CRD; they are default values derived from INTEK's algorithms unless otherwise indicated. mD, millidarcies; MMBO, millions of barrels of oil]

Play number	Number of oil reservoirs	OOIP (MMBO)	KR (MMBO)	API gravity (degrees)	Porosity (percent)	Permeability (mD)	Play name
6005	210	4,856	963	36.7	13.7	35	Pennsylvanian Stratigraphic.
6004	324	21,565	3,399	36.5	15.7	49	Pennsylvanian Structural.
6003	71	1,615	516	37.2	14.7	77	Mississippian.
6001	246	7,072	2,370	38.5	14.1	88	Pre-Woodford Paleozoic.

Figure 29 (page 59). Plots of reservoir-fluid and reservoir properties for oil reservoirs by play number for the Cherokee Platform Province. *A*, Oil density (American Petroleum Institute [API] gravity in degrees). *B*, Computed pseudo-Dykstra-Parsons coefficient. *C*, Reservoir porosity (in percent). *D*, Reservoir permeability (in millidarcies). *E*, Estimates of the original oil in place (OOIP) per unit volume of reservoir rock (in barrels per acre-foot). *F*, Distribution of OOIP per unit volume of reservoir rock (in barrels per acre-foot). The boxplot in part *F* is explained in the text. ►

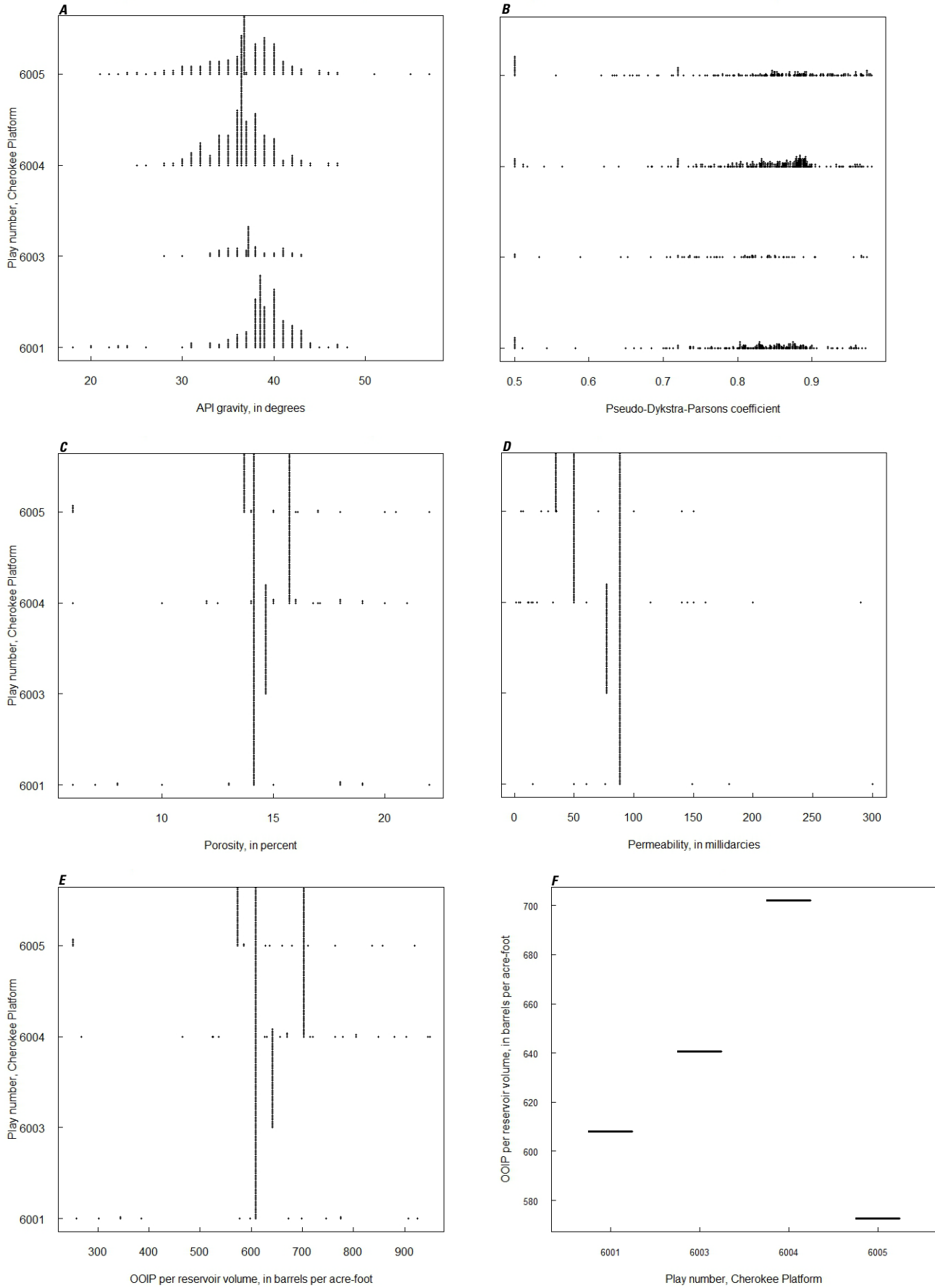


Figure 29. See caption on page 58.

Southern Oklahoma Province

Table 26. Number of oil reservoirs, amount of original oil in place, amount of known recovery, and other data for each conventional oil-bearing play containing at least 10 oil reservoirs in the Southern Oklahoma Province.

[The number of oil reservoirs and the known recovery are from the database by Nehring Associates, Inc. (2012). The known recovery (KR) is the sum of estimated reserves as of the end of 2010 plus cumulative oil production through the end of 2010. The original oil in place (OOIP) for each play is the sum of the Comprehensive Resource Database (CRD) estimates for that play's oil reservoirs. The CRD is based on the database by Nehring Associates, Inc. (2012), and contains updates made by the U.S. Geological Survey and INTEK, Inc. Values for API gravity, porosity, and permeability for each play are from the CRD; they are default values derived from INTEK's algorithms unless otherwise indicated. mD, millidarcies; MMBO, millions of barrels of oil]

Play number	Number of oil reservoirs	OOIP (MMBO)	KR (MMBO)	API gravity (degrees)	Porosity (percent)	Permeability (mD)	Play name
6112	14	402	109	35.9	20.4	1,236	Virgilian Sandstone Oil and Gas.
6111	28	1,484	468	32.6	19.1	294	Missourian Sandstone Oil and Gas.
6110	40	2,252	542	36.1	18.3	109	Desmoinesian Sandstone Oil.
6107	16	1,167	362	37.8	10.6	4	Misener-Woodford-Sycamore Gas and Oil.
6105	12	934	326	39.3	7.0	4	Hunton Oil.
6104	31	1,128	172	38.5	15.9	330	Viola Oil and Gas.
6103	39	2,716	644	37.8	16.3	297	Simpson Structural Oil.
6102	14	1,552	530	37.0	8.7	107	Arbuckle Oil.

Figure 30 (page 61). Plots of reservoir-fluid and reservoir properties for oil reservoirs by play number for the Southern Oklahoma Province. *A*, Oil density (American Petroleum Institute [API] gravity in degrees). *B*, Computed pseudo-Dykstra-Parsons coefficient. *C*, Reservoir porosity (in percent). *D*, Reservoir permeability (in millidarcies). *E*, Estimates of the original oil in place (OOIP) per unit volume of reservoir rock (in barrels per acre-foot). *F*, Distribution of OOIP per unit volume of reservoir rock (in barrels per acre-foot). The boxplot in part *F* is explained in the text. ►

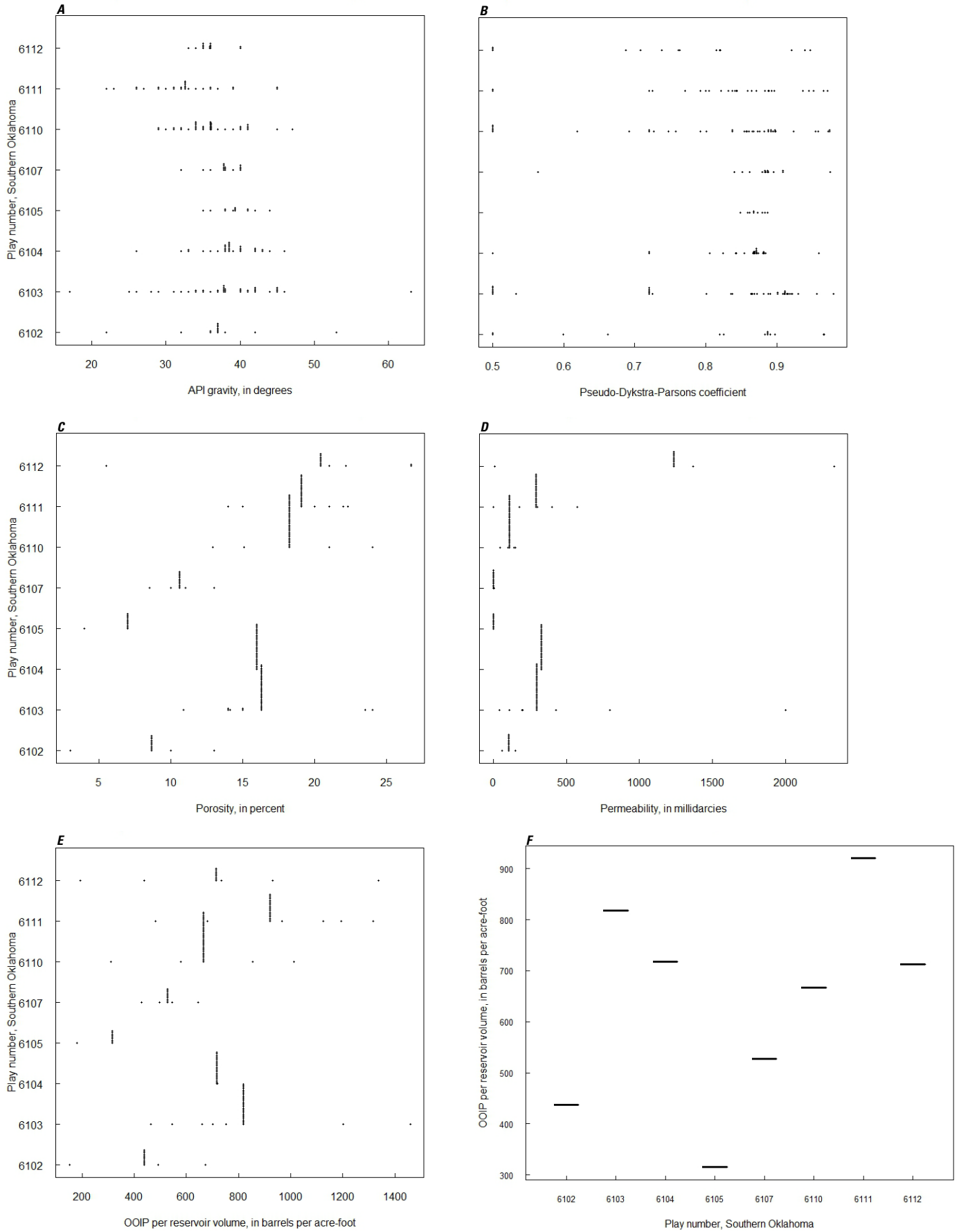


Figure 30. See caption on page 60.

Arkoma Basin Province

Table 27. Number of oil reservoirs, amount of original oil in place, amount of known recovery, and other data for each conventional oil-bearing play containing at least 10 oil reservoirs in the Arkoma Basin Province.

[The number of oil reservoirs and the known recovery are from the database by Nehring Associates, Inc. (2012). The known recovery (KR) is the sum of estimated reserves as of the end of 2010 plus cumulative oil production through the end of 2010. The original oil in place (OOIP) for each play is the sum of the Comprehensive Resource Database (CRD) estimates for that play's oil reservoirs. The CRD is based on the database by Nehring Associates, Inc. (2012), and contains updates made by the U.S. Geological Survey and INTEK, Inc. Values for API gravity, porosity, and permeability for each play are from the CRD; they are default values derived from INTEK's algorithms unless otherwise indicated. mD, millidarcies; MMBO, millions of barrels of oil]

Play number	Number of oil reservoirs	OOIP (MMBO)	KR (MMBO)	API gravity (degrees)	Porosity (percent)	Permeability (mD)	Play name
6204	17	415	135	37.8	13.0	31	Morrowan Shallow Marine Sandstone and Limestone Gas.

Figure 31 (page 63). Plots of reservoir-fluid and reservoir properties for oil reservoirs by play number for the Arkoma Basin Province. *A*, Oil density (American Petroleum Institute [API] gravity in degrees). *B*, Computed pseudo-Dykstra-Parsons coefficient. *C*, Reservoir porosity (in percent). *D*, Reservoir permeability (in millidarcies). *E*, Estimates of the original oil in place (OOIP) per unit volume of reservoir rock (in barrels per acre-foot). *F*, Distribution of OOIP per unit volume of reservoir rock (in barrels per acre-foot). The boxplot in part *F* is explained in the text. ►

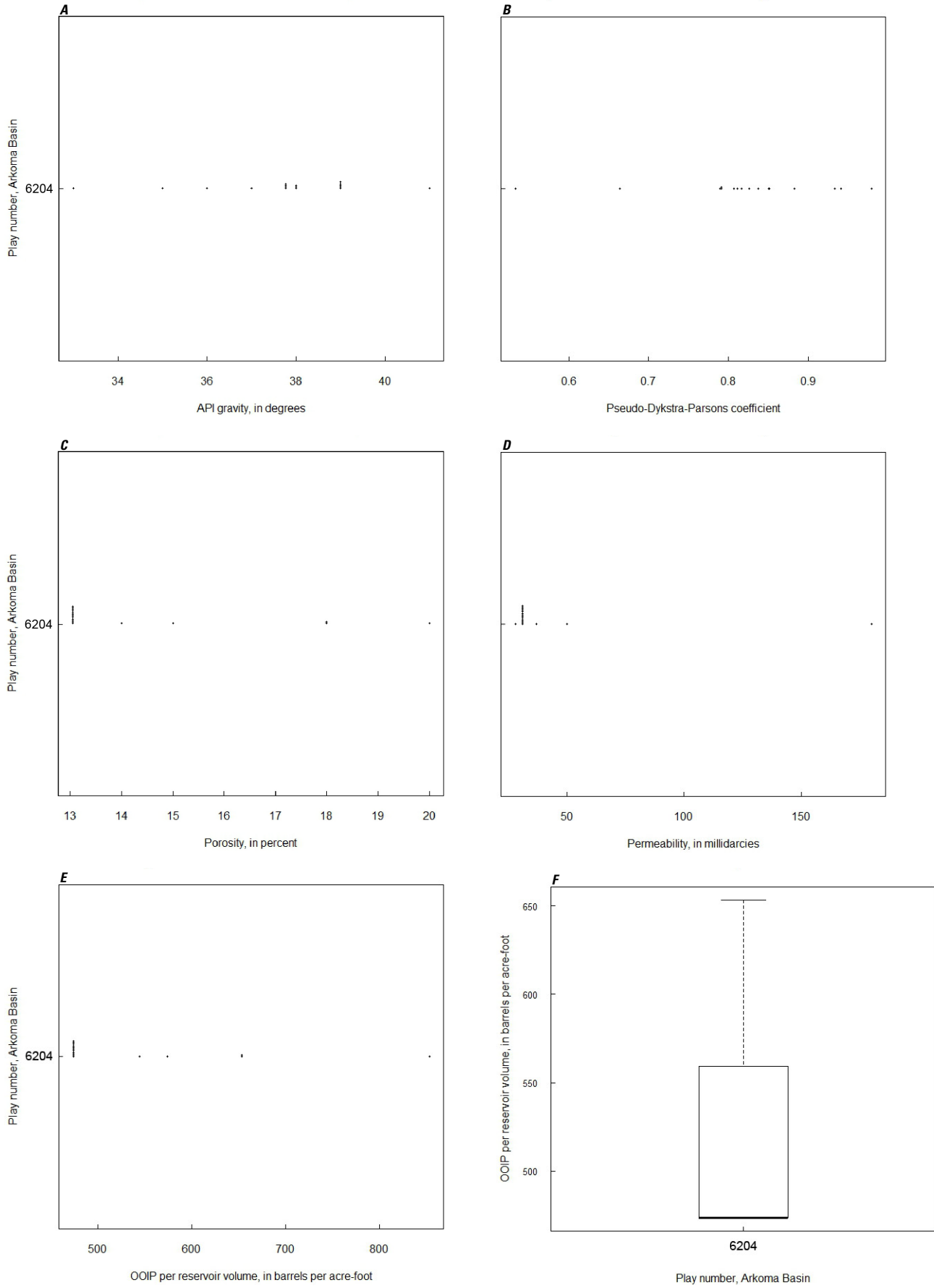


Figure 31. See caption on page 62.

Region 8 Profiles

Michigan Basin Province

Table 28. Number of oil reservoirs, amount of original oil in place, amount of known recovery, and other data for each conventional oil-bearing play containing at least 10 oil reservoirs in the Michigan Basin Province.

[The number of oil reservoirs and the known recovery are from the database by Nehring Associates, Inc. (2012). The known recovery (KR) is the sum of estimated reserves as of the end of 2010 plus cumulative oil production through the end of 2010. The original oil in place (OOIP) for each play is the sum of the Comprehensive Resource Database (CRD) estimates for that play's oil reservoirs. The CRD is based on the database by Nehring Associates, Inc. (2012), and contains updates made by the U.S. Geological Survey and INTEK, Inc. Values for API gravity, porosity, and permeability for each play are from the CRD; they are default values derived from INTEK's algorithms unless otherwise indicated. mD, millidarcies; MMBO, millions of barrels of oil]

Play number	Number of oil reservoirs	OOIP (MMBO)	KR (MMBO)	API gravity (degrees)	Porosity (percent)	Permeability (mD)	Play name
6308	37	540	64	37.4	8.0	18	Southern Niagaran Reef.
6307	211	1,122	348	44.5	7.3	17	Northern Niagaran Reef.
6301	114	1,855	600	40.7	12.8	14	Anticline.

Figure 32 (page 65). Plots of reservoir-fluid and reservoir properties for oil reservoirs by play number for the Michigan Basin Province. *A*, Oil density (American Petroleum Institute [API] gravity in degrees). *B*, Computed pseudo-Dykstra-Parsons coefficient. *C*, Reservoir porosity (in percent). *D*, Reservoir permeability (in millidarcies). *E*, Estimates of the original oil in place (OOIP) per unit volume of reservoir rock (in barrels per acre-foot). *F*, Distribution of OOIP per unit volume of reservoir rock (in barrels per acre-foot). The boxplot in part *F* is explained in the text. ►

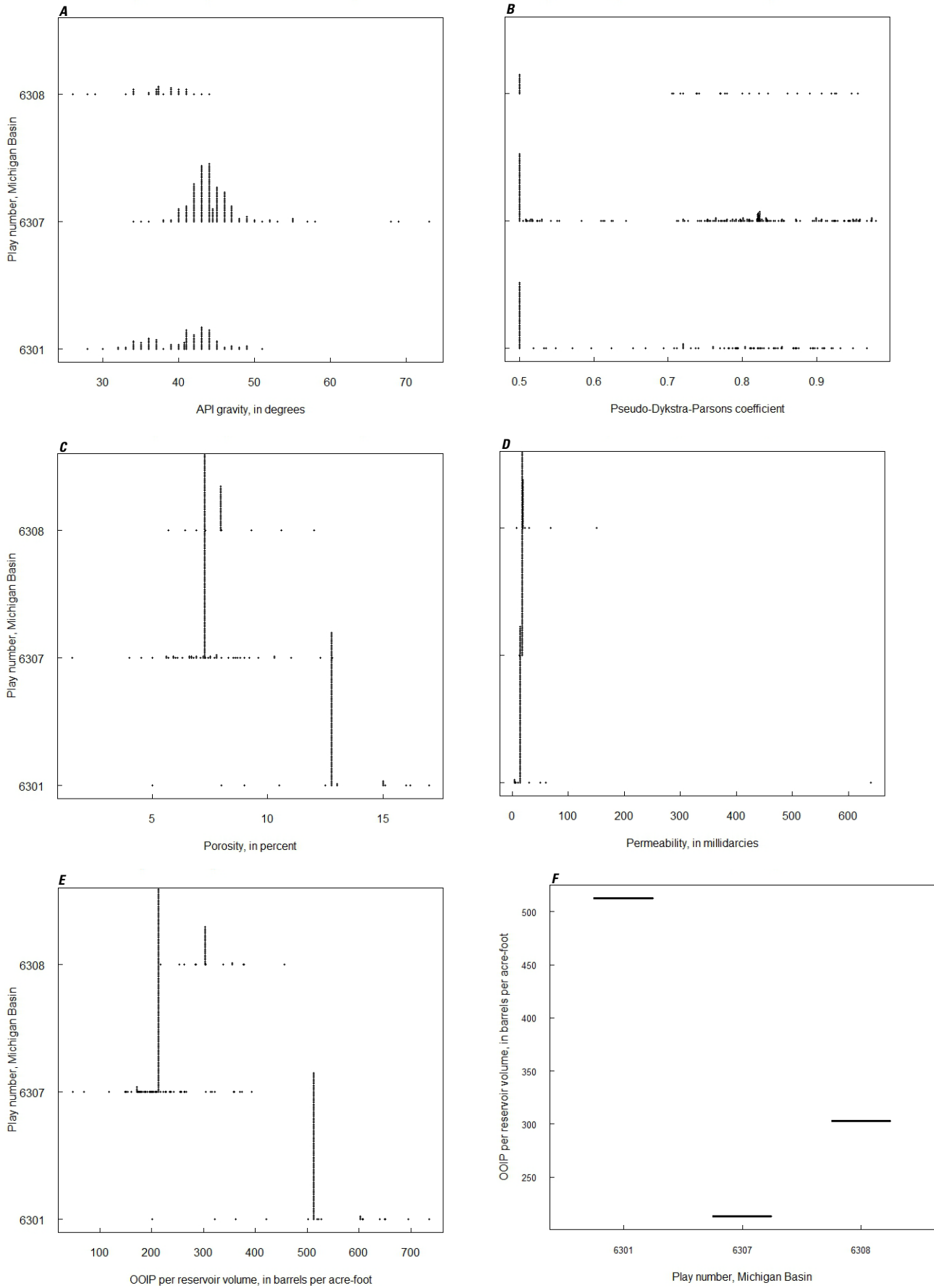


Figure 32. See caption on page 64.

Illinois Basin Province

Table 29. Number of oil reservoirs, amount of original oil in place, amount of known recovery, and other data for each conventional oil-bearing play containing at least 10 oil reservoirs in the Illinois Basin Province.

[The number of oil reservoirs and the known recovery are from the database by Nehring Associates, Inc. (2012). The known recovery (KR) is the sum of estimated reserves as of the end of 2010 plus cumulative oil production through the end of 2010. The original oil in place (OOIP) for each play is the sum of the Comprehensive Resource Database (CRD) estimates for that play's oil reservoirs. The CRD is based on the database by Nehring Associates, Inc. (2012), and contains updates made by the U.S. Geological Survey and INTEK, Inc. Values for API gravity, porosity, and permeability for each play are from the CRD; they are default values derived from INTEK's algorithms unless otherwise indicated. mD, millidarcies; MMBO, millions of barrels of oil; ND, no default value needed]

Play number	Number of oil reservoirs	OOIP (MMBO)	KR (MMBO)	API gravity (degrees)	Porosity (percent)	Permeability (mD)	Play name
6404	12	438	15	ND	10.0	9	Illinois Basin-Middle and Upper Ordovician Carbonate.
6403	18	259	56	ND	14.3	71	Illinois Basin-Silurian Reef.
6402	39	471	107	38.1	14.1	49	Illinois Basin-Hunton.
6401	453	29,532	3,858	36.7	17.2	99	Illinois Basin-Post-New Albany.

Figure 33 (page 67). Plots of reservoir-fluid and reservoir properties for oil reservoirs by play number for the Illinois Basin Province. *A*, Oil density (American Petroleum Institute [API] gravity in degrees). *B*, Computed pseudo-Dykstra-Parsons coefficient. *C*, Reservoir porosity (in percent). *D*, Reservoir permeability (in millidarcies). *E*, Estimates of the original oil in place (OOIP) per unit volume of reservoir rock (in barrels per acre-foot). *F*, Distribution of OOIP per unit volume of reservoir rock (in barrels per acre-foot). The boxplot in part *F* is explained in the text

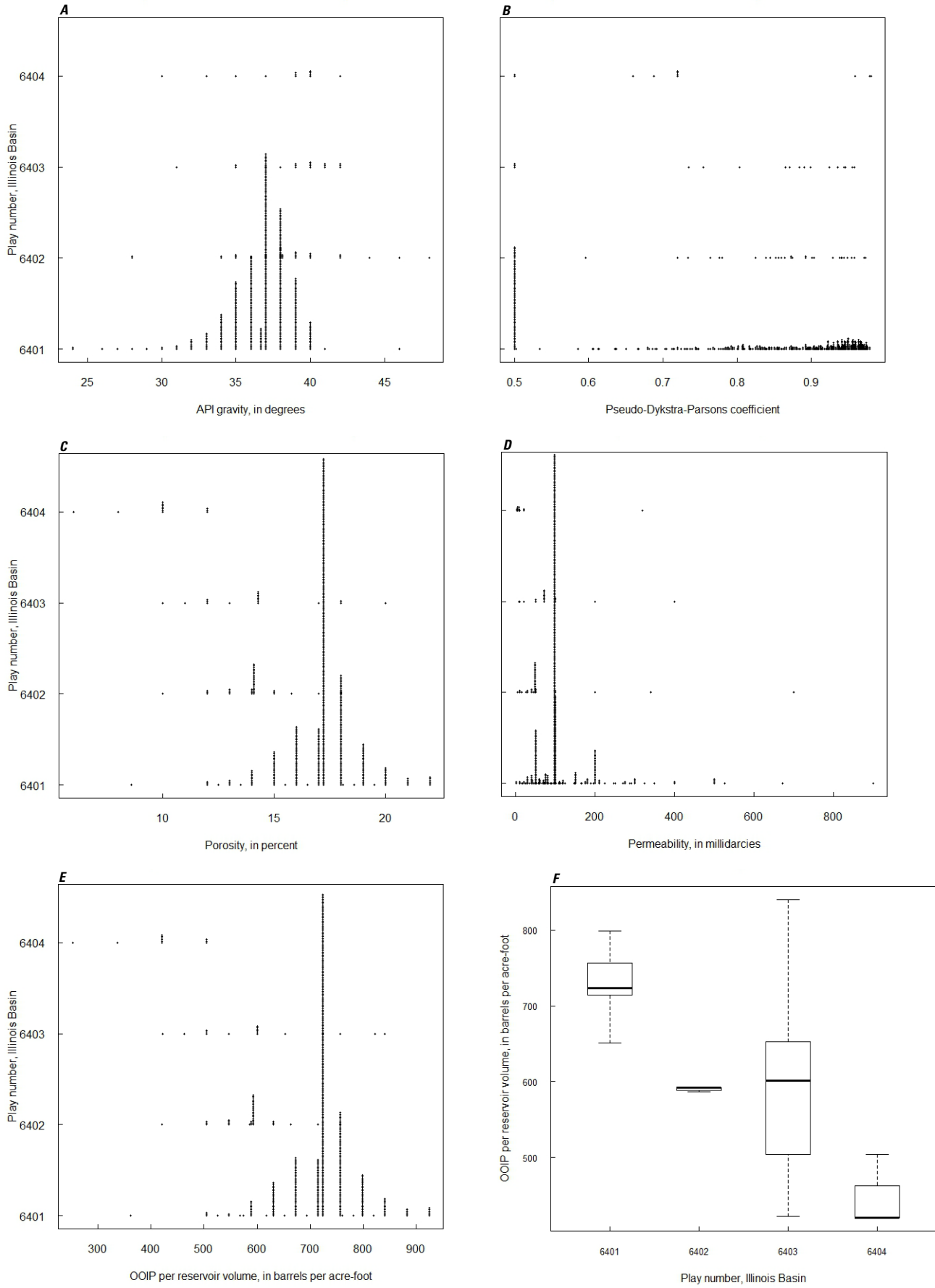


Figure 33. See caption on page 66.

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