



# **Digital Archive of Drilling Mud Weight Pressures and Wellbore Temperatures from 49 Regional Cross Sections of 967 Well Logs in Louisiana and Texas, Onshore Gulf of Mexico Basin**

By Lauri A. Burke, Scott A. Kinney, and Temidayo B. Kola-Kehinde

Open-File Report 2011–1266

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

**U.S. Department of the Interior**  
KEN SALAZAR, Secretary

**U.S. Geological Survey**  
Marcia K. McNutt, Director

U.S. Geological Survey, Reston, Virginia: 2011

For product and ordering information:  
World Wide Web: <http://www.usgs.gov/pubprod>  
Telephone: 1-888-ASK-USGS

For more information on the USGS—the Federal source for science about the Earth,  
its natural and living resources, natural hazards, and the environment:  
World Wide Web: <http://www.usgs.gov>  
Telephone: 1-888-ASK-USGS

Suggested citation:  
Burke, L.A., Kinney, S.A., and Kola-Kehinde, T.B., 2011, Digital archive of drilling mud weight pressures and wellbore temperatures from 49 regional cross sections of 967 well logs in Louisiana and Texas, onshore Gulf of Mexico basin: U.S. Geological Survey Open-File Report 2011–1266, 14 p.

Any use of trade, product, or firm names is for descriptive purposes only and does not imply endorsement by the U.S. Government.

Although this report is in the public domain, permission must be secured from the individual copyright owners to reproduce any copyrighted material contained within this report.

## Contents

Introduction.....	1
Data Organization.....	1
Data Summary.....	2
Acknowledgments.....	2
References Cited.....	2

## Figures

<b>Figure 1.</b> Map depicting the locations of the 20 regional cross sections spanning onshore Louisiana. Pressure, temperature, and depth data were acquired from subsurface geophysical logging headers from the 387 wells in these cross sections. Permission to show approximate well surface locations given by IHS Energy Group (K. Winner, IHS Energy Group, written commun., 2011).....	4
<b>Figure 2.</b> Location map depicting the 29 regional strike and dip cross sections spanning onshore Texas. Pressure, temperature, and depth data were acquired from subsurface geophysical logging headers from the 580 wells in these cross sections. Permission to show approximate well surface locations given by IHS Energy Group (K. Winner, IHS Energy Group, written commun., 2011).....	5
<b>Figure 3.</b> Temperature versus depth for the study wellbores located in Louisiana, onshore Gulf of Mexico basin.....	6
<b>Figure 4.</b> Drilling mud weight pressures versus depth for the study wellbores located in Louisiana, onshore Gulf of Mexico basin.....	7
<b>Figure 5.</b> Temperature versus depth for the study wellbores located in Texas, onshore Gulf of Mexico basin.....	8
<b>Figure 6.</b> Drilling mud weight pressures versus depth for the study wellbores located in Texas, onshore Gulf of Mexico basin.....	9

## Tables

<b>Table 1.</b> Summary of temperature and pressure data compiled for the digital archive of 967 wells from 49 regional cross sections that span the onshore portions of Texas and Louisiana, Gulf of Mexico basin.....	10
<b>Table 2.</b> Temperature data from the wells in the onshore Louisiana region. The minimum, arithmetic average, and maximum temperatures are given in degrees Fahrenheit (°F) for each 1,000-foot (ft) depth increment.....	11
<b>Table 3.</b> Temperature data from the wells in the onshore Texas region. The minimum, arithmetic average, and maximum temperatures are given in degrees Fahrenheit (°F) for each 1,000-foot (ft) depth increment.....	11
<b>Table 4.</b> Drilling mud weight pressures from the wells in the onshore Louisiana region. The minimum, arithmetic average, and maximum pressures are given in pounds per gallon (ppg) for each 1,000-foot (ft) depth increment.....	13
<b>Table 5.</b> Drilling mud weight pressure data from the wells in the onshore Texas region. The minimum, arithmetic average, and maximum pressures are given in pounds per gallon (ppg) for each 1,000-foot (ft) depth increment.....	14

# Conversion Factors

Inch/Pound to SI

<b>Multiply</b>	<b>By</b>	<b>To obtain</b>
	Length	
foot (ft)	0.3048	meter (m)
	Density	
pound per gallon (ppg)	119.8264	kilogram per cubic meter (kg/m <sup>3</sup> )

Temperature in degrees Fahrenheit (°F) may be converted to degrees Celsius (°C) as follows:  
 $^{\circ}\text{C}=(^{\circ}\text{F}-32)/1.8$

# Digital Archive of Drilling Mud Weight Pressures and Wellbore Temperatures from 49 Regional Cross Sections of 967 Well Logs in Louisiana and Texas, Onshore Gulf of Mexico Basin

By Lauri A. Burke, Scott A. Kinney, and Temidayo B. Kola-Kehinde

## Abstract

This document provides the digital archive of *in-situ* temperature and drilling mud weight pressure data that were compiled from several historical sources. The data coverage includes the states of Texas and Louisiana in the Gulf of Mexico basin. Data are also provided graphically, for both Texas and Louisiana, as plots of temperature as a function of depth and pressure as a function of depth. The minimum, arithmetic average, and maximum values are tabulated for each 1,000-foot depth increment for temperature as well as pressure in the Texas and Louisiana data.

## Introduction

The digital archive of data given in this publication is a compilation of wellbore temperature and pressure data for oil and gas wells drilled in the onshore portions of Texas and Louisiana, Gulf of Mexico basin. The data were derived from several paper-based sources (Bebout and Gutiérrez, 1982; 1983; Dodge and Posey, 1981; Eversull, 1984; Foote and others, 1990), and are compiled in this report to provide the information in an organized, digital format. For the onshore portions of the states of Texas and Louisiana, table 1 provides a summary of the number of cross sections, wells, temperature data points, and pressure data points included in this publication. As such, the two digital files provide 2,765 *in-situ* temperature measurements and 3,369 pressure measurements spanning an extensive range of depths across the Gulf Coast states of Texas and Louisiana.

The approximate surface locations of these oil and gas wells from Louisiana are illustrated in figure 1. Figure 2 shows the approximate surface locations of the Texas wells. Note that these well surface locations are for display purposes only and have been modified by a randomized algorithm in order to maintain the proprietary nature of the actual well surface locations.

## Data Organization

This document and the associated digital files serve as a digital archive of the data used in the U.S. Geological Survey investigation of temperature and overpressure relations in the Gulf of Mexico basin. These digital files were constructed from information located in the geophysical well logging header files for wells drilled in the onshore portions of Texas and Louisiana. The standardized American Petroleum Institute (API) well numbers or the unique well identification (UWI) numbers are decoupled from these data sets in order to preserve the ambiguity of the well operators and the exact surface

locations of the wells. Consequently, the data for the well information in these files are systematically labeled based on (1) the regional cross section letter (or number for the along-strike cross sections in Texas) and (2) the sequential well location within the cross section. For example, the second well in the Louisiana J to J' regional cross section is labeled with cross section J–J' and study well number 2; the third well in the 1 to 1' strike cross section spanning Texas is labeled with cross section 1–1' and study well number 3.

The temperature and pressure data for Texas and Louisiana are provided in the two files, *TX\_Temp\_Pressure.xls* and *LA\_Temp\_Pressure.xls*, respectively. These files are provided in digital Microsoft Excel format. The Texas data, *TX\_Temp\_Pressure.xls*, are tabulated into eight columns of information that provide (1) the regional cross section label, (2) the study well number, (3) Texas land survey name, (4) Texas land survey section number, (5) temperature, (6) depth, (7) pressure measurements, and (8) the source of the original data for a given wellbore. The Louisiana data, *LA\_Temp\_Pressure.xls*, are tabulated into nine columns of information that provide (1) the regional cross section letter, (2) the study well number, (3) section, (4) township, (5) range, (6) temperature, (7) depth, (8) pressure measurement, and (9) the original source of the data for a given wellbore.

Temperatures, in degrees Fahrenheit (°F), presented in this report, represent the raw temperature measurements as given in the well log header files. Pressure measurements, in pounds per gallon (ppg), are from the drilling mud weights provided in the well log header files. Depth measurements, in feet (ft), represent the driller depth measurements, or in some cases, the bottom of the logged interval. Due to the historical nature of the paper-based data sources, the depth measurements were manually determined based on the printed depth scales available in the margins of the cross section folios. As such, these databases represent a unique data contribution.

## Data Summary

In addition to these digital files, the temperature and pressure data are also shown graphically. Figure 3 illustrates the subsurface temperature characteristics of Louisiana, in which the temperature data are plotted against depth; figure 4 illustrates the pressure characteristics of Louisiana, in which the drilling mud weight pressures are graphed against depth. Figure 5 illustrates the temperature distribution as a function of depth for Texas; figure 6 illustrates the pressure distribution as a function of depth for Texas. Tables 2 and 3 show the number of data points, as well as the minimum, arithmetic average, and maximum temperatures by 1,000-ft depth increments, for the states of Louisiana and Texas, respectively. Tables 4 and 5 provide the number of data points, as well as the minimum, arithmetic average, and maximum drilling mud weight pressures by 1,000-ft depth increments for the states of Louisiana and Texas, respectively.

## Acknowledgments

Reviews by U.S. Geological Survey research geologists K. Lewis and J. Eoff resulted in improvements to the manuscript. Permission to show approximate well surface locations was given by IHS Energy Group (K. Winner, IHS Energy Group, written commun., 2011).

## References Cited

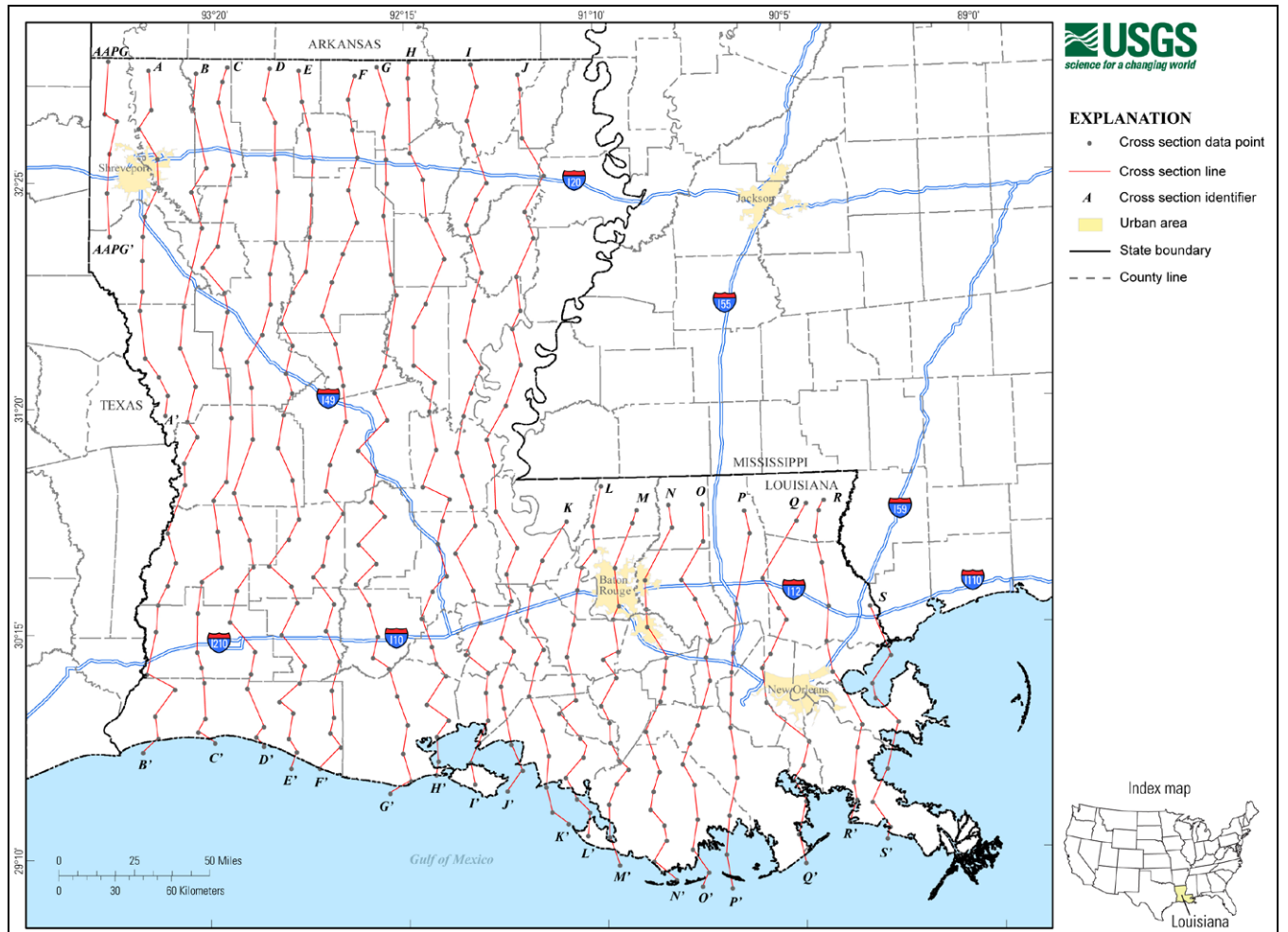
- Bebout, D.G., and Gutiérrez, D.R., 1982, Regional cross sections, Louisiana Gulf Coast, western part: Baton Rouge, Louisiana, Louisiana Geological Survey Folio Series No. 5, 11 panels.
- Bebout, D.G., and Gutiérrez, D.R., 1983, Regional cross sections, Louisiana Gulf Coast, eastern part: Baton Rouge, Louisiana, Louisiana Geological Survey Folio Series No. 6, 10 panels.

- Dodge, M.M., and Posey, J.S., 1981, Structural cross sections, Tertiary formations, Texas Gulf Coast: Austin, The University of Texas at Austin, Bureau of Economic Geology Cross Section Series No. 2, 33 plates, 6 p.
- Eversull, L.G., 1984, Regional cross sections, Northern Louisiana: Baton Rouge, Louisiana, Louisiana Geological Survey Folio Series No. 7, 11 panels.
- Foote, R.Q., Stoudt, D.L., McCulloh, R.P., and Eversull, L.G., 1990, Gulf Coast regional cross section—Southwest Arkansas-northwest Louisiana sector: Tulsa, Oklahoma, American Association of Petroleum Geologists, 3 sheets.

Publishing support provided by:  
Denver Publishing Service Center

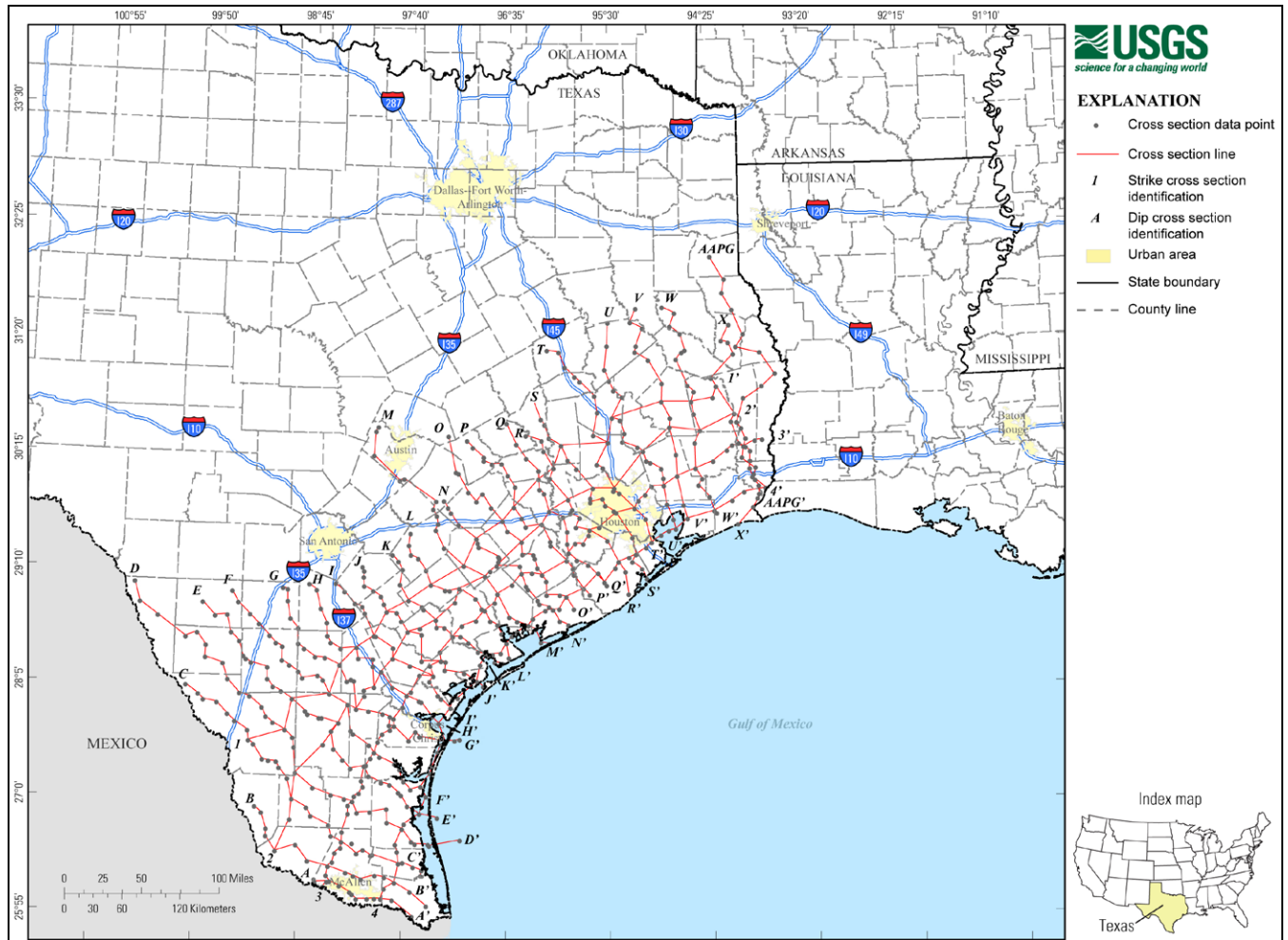
For more information concerning this publication, contact:  
Center Director, USGS Central Energy Resources Science Center  
Box 25046, Mail Stop 939  
Denver, CO 80225  
(303) 236-1647

Or visit the Central Energy Resources Science Center Web site at:  
<http://energy.cr.usgs.gov/>

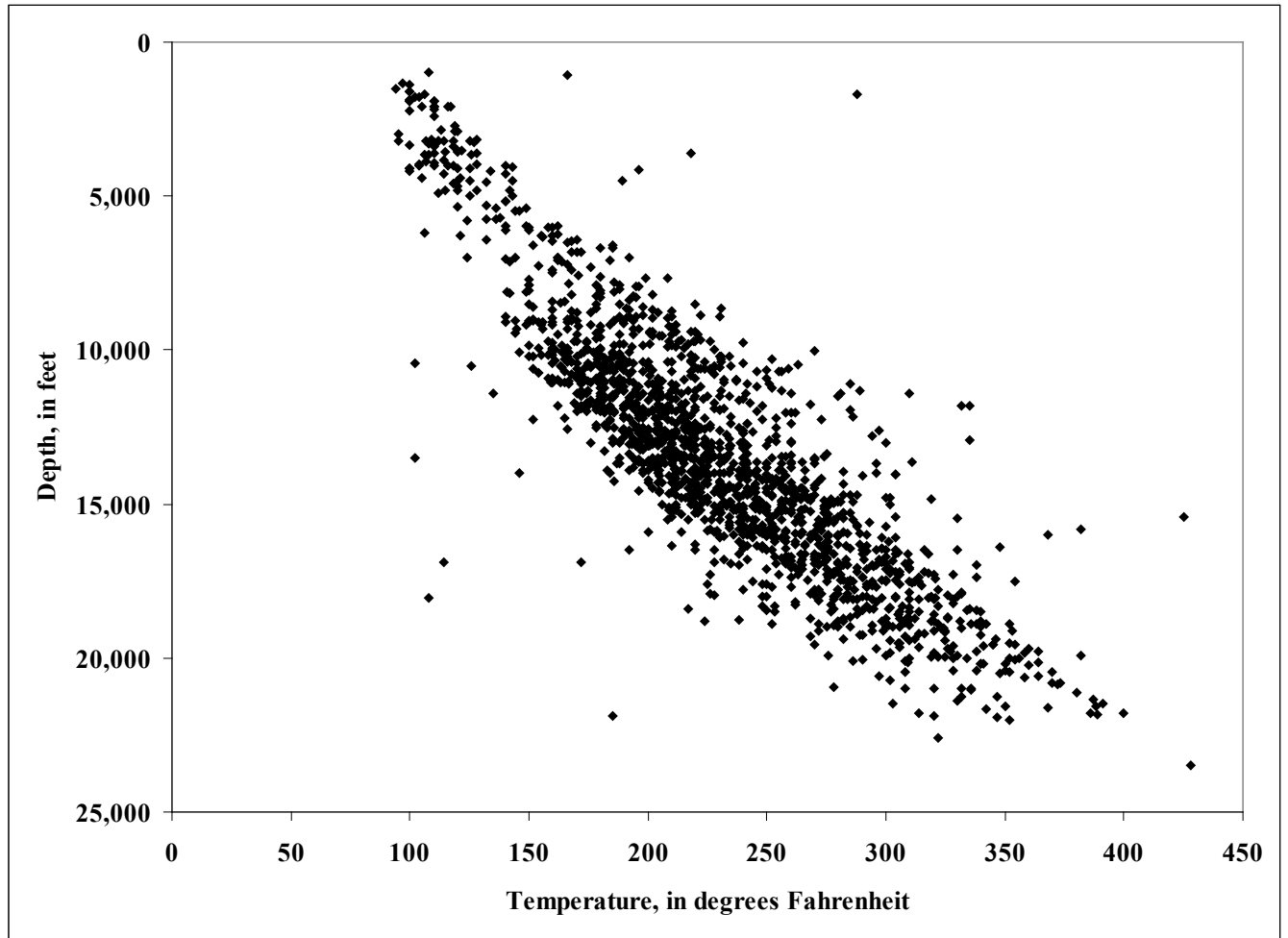


**Figure 1.** Map depicting the locations of the 20 regional cross sections spanning onshore Louisiana. Pressure, temperature, and depth data were acquired from subsurface geophysical log headers from the 387 wells in these cross sections. The data source for the AAPG–AAPG’ cross section is Foote and others (1990). The data sources for the A–A’ through S–S’ cross sections are Bebout and Gutiérrez (1982, 1983) and Eversull (1984). Permission to show approximate well surface locations given by IHS Energy Group (K. Winner, IHS Energy Group, written commun., 2011).

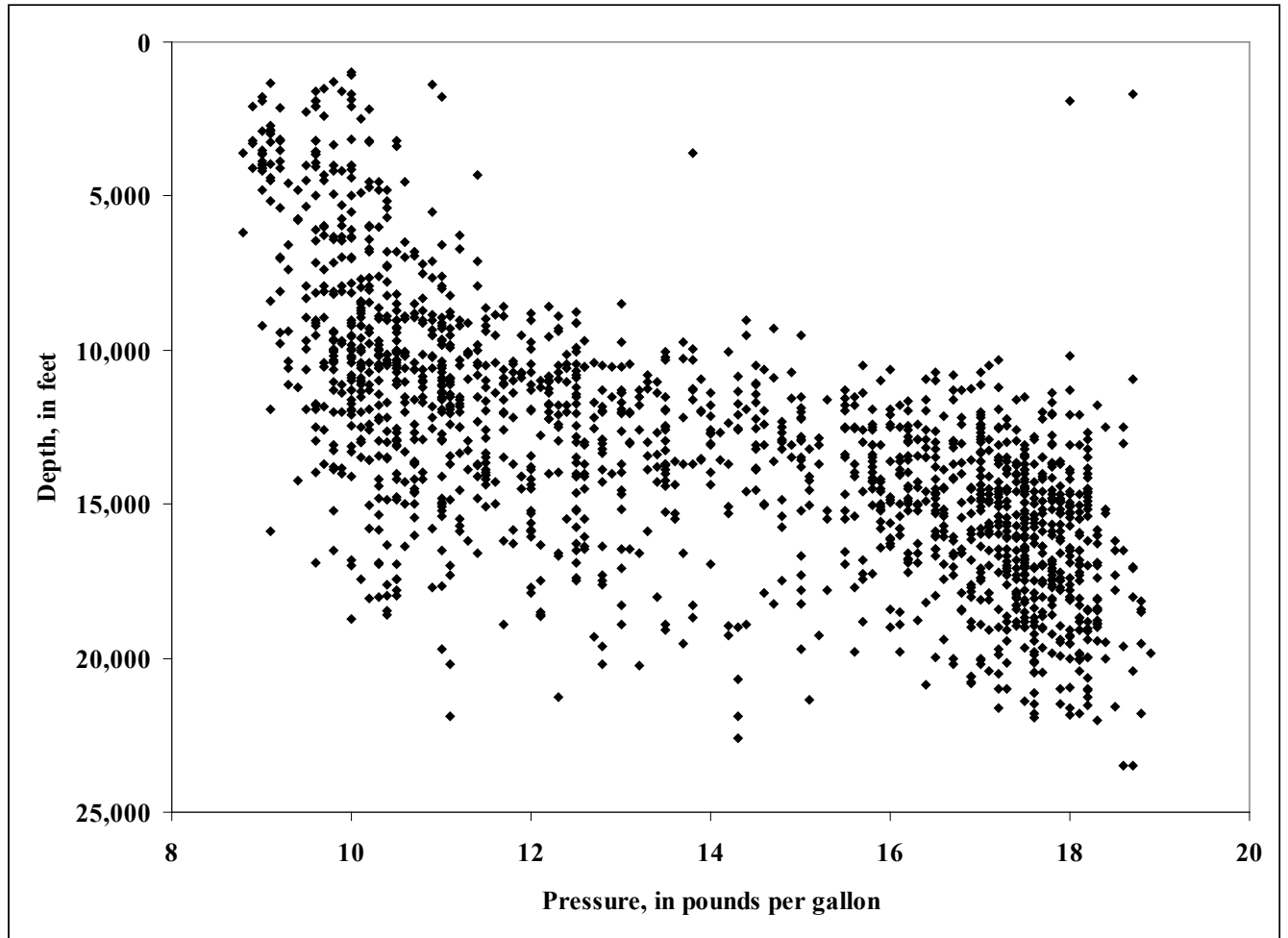




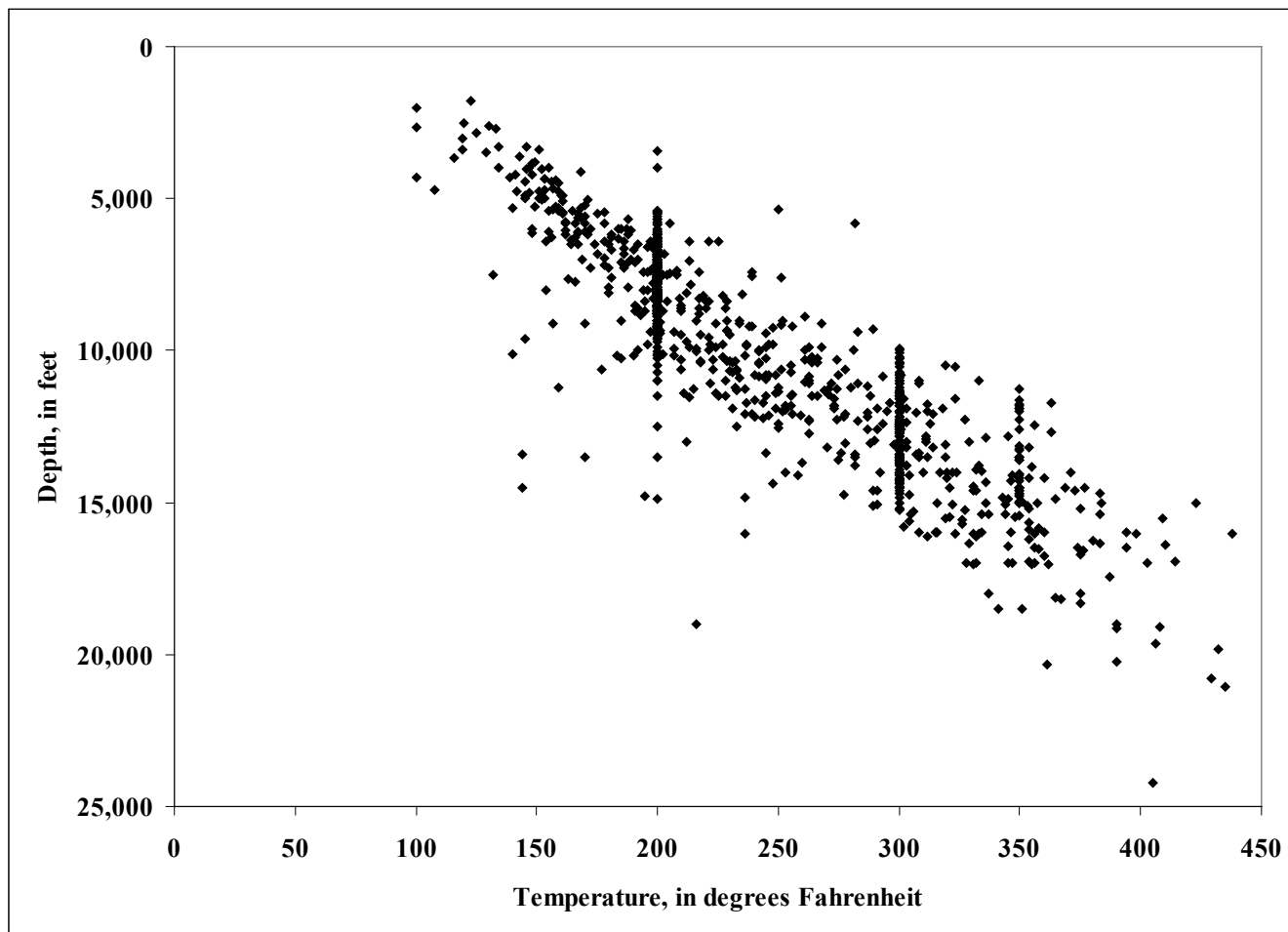
**Figure 2.** Map depicting the 29 regional strike and dip cross sections spanning onshore Texas. Pressure, temperature, and depth data were acquired from subsurface geophysical logging headers from the 580 wells in these cross sections. The data source for the AAPG–AAPG’ cross section is Foote and others (1990). The data sources for the A–A’ through X–X’ and the 1–1’ through 4–4’ cross sections are Dodge and Posey (1981). Permission to show approximate well surface locations given by IHS Energy Group (K. Winner, IHS Energy Group, written commun., 2011).



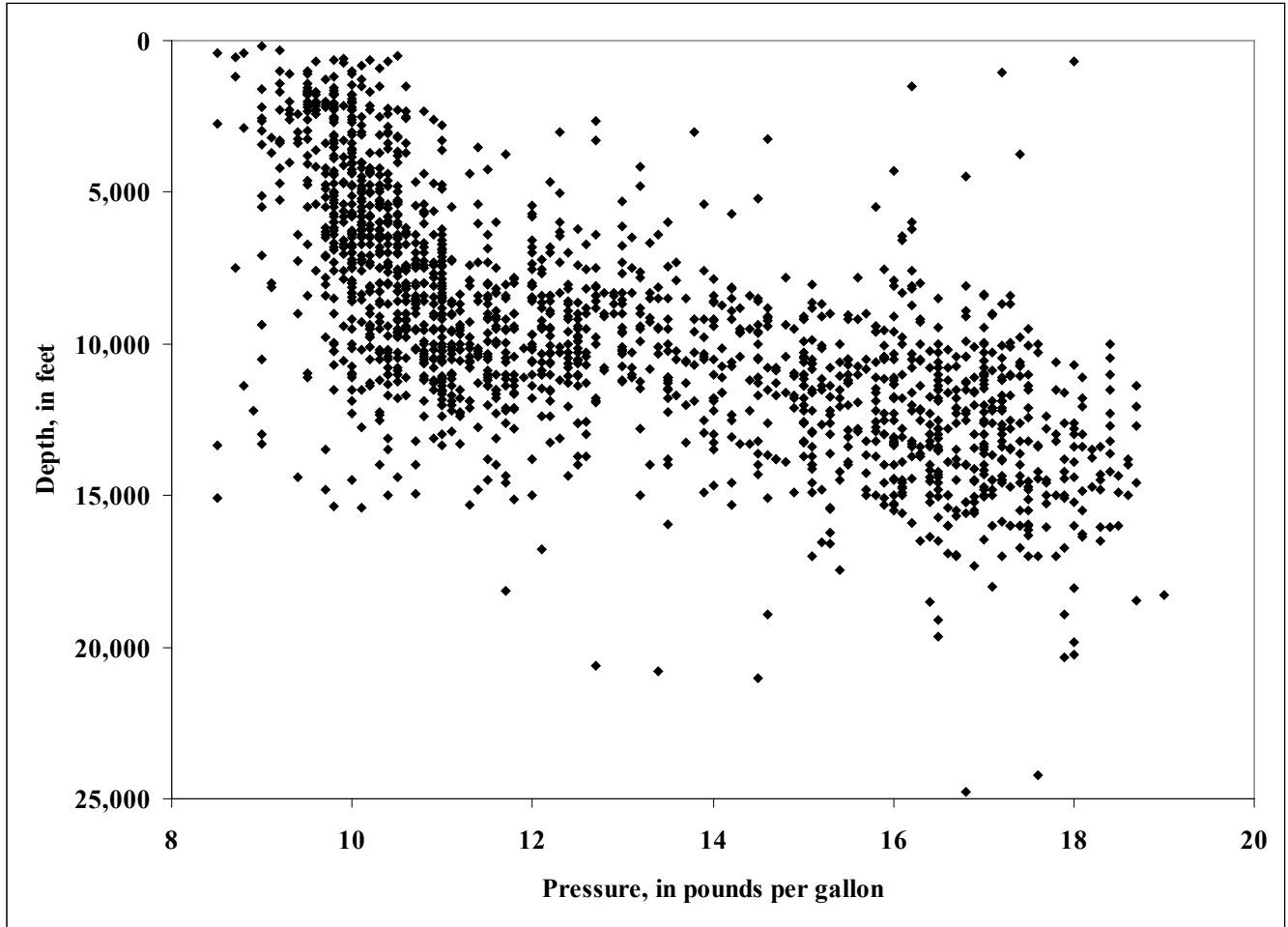
**Figure 3.** Temperature versus depth for the study wellbores located in Louisiana, onshore Gulf of Mexico basin.



**Figure 4.** Drilling mud weight pressures versus depth for the study wellbores located in Louisiana, onshore Gulf of Mexico basin.



**Figure 5.** Temperature versus depth for the study wellbores located in Texas, onshore Gulf of Mexico basin.



**Figure 6.** Drilling mud weight pressures versus depth for the study wellbores located in Texas, onshore Gulf of Mexico basin.

**Table 1.** Summary of temperature and pressure data compiled for the digital archive of 967 wells from 49 regional cross sections that span the onshore portions of Texas and Louisiana, Gulf of Mexico basin.

Location	Number of cross sections	Number of wells	Temperature data points	Pressure data points
Louisiana	20	387	1,705	1,692
Texas	29	580	1,060	1,677
Totals	49	967	2,765	3,369

**Table 2.** Temperature data from the wells in the onshore Louisiana region. The minimum, arithmetic average, and maximum temperatures are given in degrees Fahrenheit (°F) for each 1,000-foot (ft) depth increment.

Depth interval (ft)	Minimum temperature (°F)	Average temperature (°F)	Maximum temperature (°F)	Data points
0–1,000	-	-	-	-
1,000–2,000	94	118	288	16
2,000–3,000	100	112	120	12
3,000–4,000	95	117	218	31
4,000–5,000	100	126	196	29
5,000–6,000	120	139	162	17
6,000–7,000	106	158	185	24
7,000–8,000	124	167	199	28
8,000–9,000	140	183	231	50
9,000–10,000	140	184	240	87
10,000–11,000	102	192	270	146
11,000–12,000	135	202	335	170
12,000–13,000	152	212	335	159
13,000–14,000	102	222	311	174
14,000–15,000	184	241	319	181
15,000–16,000	200	252	425	151
16,000–17,000	114	268	368	124
17,000–18,000	225	286	354	101
18,000–19,000	108	295	352	93
19,000–20,000	268	318	382	55
20,000–21,000	278	337	373	31
21,000–22,000	185	343	400	23
22,000–23,000	322	337	352	2
23,000–24,000	428	428	428	1
Overall	94	229	428	1,705

**Table 3.** Temperature data from the wells in the onshore Texas region. The minimum, arithmetic average, and maximum temperatures are given in degrees Fahrenheit (°F) for each 1,000-foot (ft) depth increment.

<b>Depth Interval (ft)</b>	<b>Minimum temperature (°F)</b>	<b>Average temperature (°F)</b>	<b>Maximum temperature (°F)</b>	<b>Data points</b>
0–1,000	-	-	-	-
1,000–2,000	123	123	123	1
2,000–3,000	100	118	133	6
3,000–4,000	116	141	200	11
4,000–5,000	100	149	200	27
5,000–6,000	140	178	282	44
6,000–7,000	148	191	225	99
7,000–8,000	132	199	251	166
8,000–9,000	154	202	261	140
9,000–10,000	145	216	300	79
10,000–11,000	138	250	323	74
11,000–12,000	159	277	363	88
12,000–13,000	200	295	363	82
13,000–14,000	200	306	355	73
14,000–15,000	144	316	383	73
15,000–16,000	289	339	452	39
16,000–17,000	236	356	438	30
17,000–18,000	331	352	387	8
18,000–19,000	337	359	375	7
19,000–20,000	216	374	432	6
20,000–21,000	361	411	463	4
21,000–22,000	435	435	435	1
22,000–23,000	-	-	-	-
23,000–24,000	-	-	-	-
24,000–25,000	405	453	500	2
Overall	100	244	500	1,060



**Table 4.** Drilling mud weight pressures from the wells in the onshore Louisiana region. The minimum, arithmetic average, and maximum pressures are given in pounds per gallon (ppg) for each 1,000-foot (ft) depth increment.

Depth Interval (ft)	Minimum Pressure (ppg)	Average Pressure (ppg)	Maximum Pressure (ppg)	Data Points
0–1,000	-	-	-	-
1,000–2,000	9.0	10.8	18.7	17
2,000–3,000	8.9	9.5	10.2	13
3,000–4,000	8.8	9.6	13.8	30
4,000–5,000	8.9	9.7	11.4	32
5,000–6,000	9.1	9.9	10.9	17
6,000–7,000	8.8	10.1	11.2	27
7,000–8,000	9.2	10.2	11.4	28
8,000–9,000	9.1	10.6	13.0	49
9,000–10,000	9.0	10.9	15.0	86
10,000–11,000	9.3	11.6	18.7	145
11,000–12,000	9.1	12.6	18.3	163
12,000–13,000	9.6	13.9	18.6	158
13,000–14,000	9.6	14.5	18.6	176
14,000–15,000	9.4	15.3	18.2	179
15,000–16,000	9.1	15.7	18.4	149
16,000–17,000	9.6	15.9	18.6	121
17,000–18,000	10.0	16.1	18.7	100
18,000–19,000	10.0	16.5	18.8	91
19,000–20,000	11.0	17.0	18.9	53
20,000–21,000	11.1	16.9	18.7	31
21,000–22,000	11.1	17.1	18.8	23
22,000–23,000	14.3	16.3	18.3	2
23,000–24,000	18.6	18.7	18.7	2
Overall	8.8	13.9	18.9	1,692

**Table 5.** Drilling mud weight pressure data from the wells in the onshore Texas region. The minimum, arithmetic average, and maximum pressures are given in pounds per gallon (ppg) for each 1,000-foot (ft) depth increment.

Depth Interval (ft)	Minimum Pressure (ppg)	Average Pressure (ppg)	Maximum Pressure (ppg)	Data Points
0–1,000	8.5	9.4	9.9	5
1,000–2,000	8.7	10.1	17.2	35
2,000–3,000	8.5	9.8	11.0	61
3,000–4,000	8.5	9.9	11.0	47
4,000–5,000	9.2	10.2	16.0	55
5,000–6,000	9.0	10.4	14.2	72
6,000–7,000	9.4	10.8	16.2	102
7,000–8,000	8.7	11.2	16.2	106
8,000–9,000	9.1	11.9	17.3	161
9,000–10,000	9.0	12.4	17.5	178
10,000–11,000	9.0	13.2	18.4	215
11,000–12,000	8.8	13.8	18.7	206
12,000–13,000	8.9	14.9	18.7	115
13,000–14,000	8.5	15.4	18.6	111
14,000–15,000	9.7	15.9	18.7	97
15,000–16,000	8.5	15.8	18.6	54
16,000–17,000	12.1	17.0	18.5	30
17,000–18,000	7.2	15.7	17.8	9
18,000–19,000	11.7	17.0	19.0	7
19,000–20,000	16.5	17.0	18.0	3
20,000–21,000	12.7	15.5	18.0	4
21,000–22,000	14.5	14.5	14.5	1
22,000–23,000	-	-	-	-
23,000–24,000	-	-	-	-
24,000–25,000	16.8	17.2	17.6	3
Overall	5.5	12.9	19.0	1,677