

Top Arbuckle, Kansas — Depth Structure Map

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The primary objective of this work is to develop internally consistent statewide faulted framework geocellular models that will provide the basis for resource evaluations within the Phanerozoic section of Kansas. The first model was created in 2025 and represents a reasonable resolution for the entire state and for the distribution of available well data, primarily well tops from the Kansas Geological Survey (KGS) database and wireline well logs from selected wells. The 2025 top Arbuckle and top Precambrian basement depth structure maps were extracted from a geocellular model that included zones from the surface (ground level) to the top Arbuckle (or basement where the Arbuckle is absent), the Arbuckle Group, and the Precambrian crystalline basement. These depth structure maps and the underlying geocellular model represent the first statewide faulted framework interpretation that honors Arbuckle well tops, newly interpreted faults, and the Arbuckle isochore.

Data

The data used to generate these maps are public data from the Oil and Gas database of Kansas hosted at the KGS (Kansas Geological Survey, 2025, Oil and Gas Well Database).

- i. Well tops: Arbuckle well tops from the KGS Oil and Gas Wells database imported in Petrel as point data with X, Y, and Z coordinates. About 62,000 Arbuckle well tops.
- ii. Well tops associated with wells loaded in Petrel: Top Arbuckle well tops (a subset of the KGS database) associated with about 400 wells with wireline logs. The geocellular model horizons are tied to these well tops as a final step in model construction.
- iii. Timing: The Top Arbuckle well tops from the KGS Oil and Gas database were extracted in February and March 2024. Additional well tops in areas of poor coverage were appended to the original dataset in June 2025.

Methodology

- i. Faulted framework model: The geocellular faulted framework pillar-gridded model was built in Petrel using well tops and well log data following standard workflows established for subsurface evaluation. A top Arbuckle surface (which is an input to the model building process) was gridded using well-top data from the KGS Oil and Gas Wells database (about 62,000 Arbuckle well tops). An Arbuckle isochore, generated from wells that contain both Arbuckle and Precambrian basement well tops, was used in the modeling to increase control where wells only penetrate the top Arbuckle.
- ii. Fault Definition: The faults in the model are built based on a minimum vertical separation of greater than 200 ft between top Arbuckle and/or Precambrian basement well tops from the KGS database. The horizontal distance between well tops that define a fault varies

depending on the magnitude of the fault offset but is generally less than 10,000 feet laterally.

Results

Top Arbuckle Depth Structure Map (PDF; this OFR); also provided as a GeoTIFF through the KGS GIS Data Hub (<https://kgs-gis-data-and-maps-ku.hub.arcgis.com/>). Note: Faults and contours do not exist where the Arbuckle Group is absent.

Coordinate Reference System

- i. Units: **Field-UTM**. The units of distance in x, y, and z (lateral and vertical) directions are in feet.
- ii. Datum: **NAD83** (North American Datum 1983) with “**KS83-SF**” as the coordinate reference system (CRS) and “**SIS, 501270**” as the authority code.

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Acknowledgments

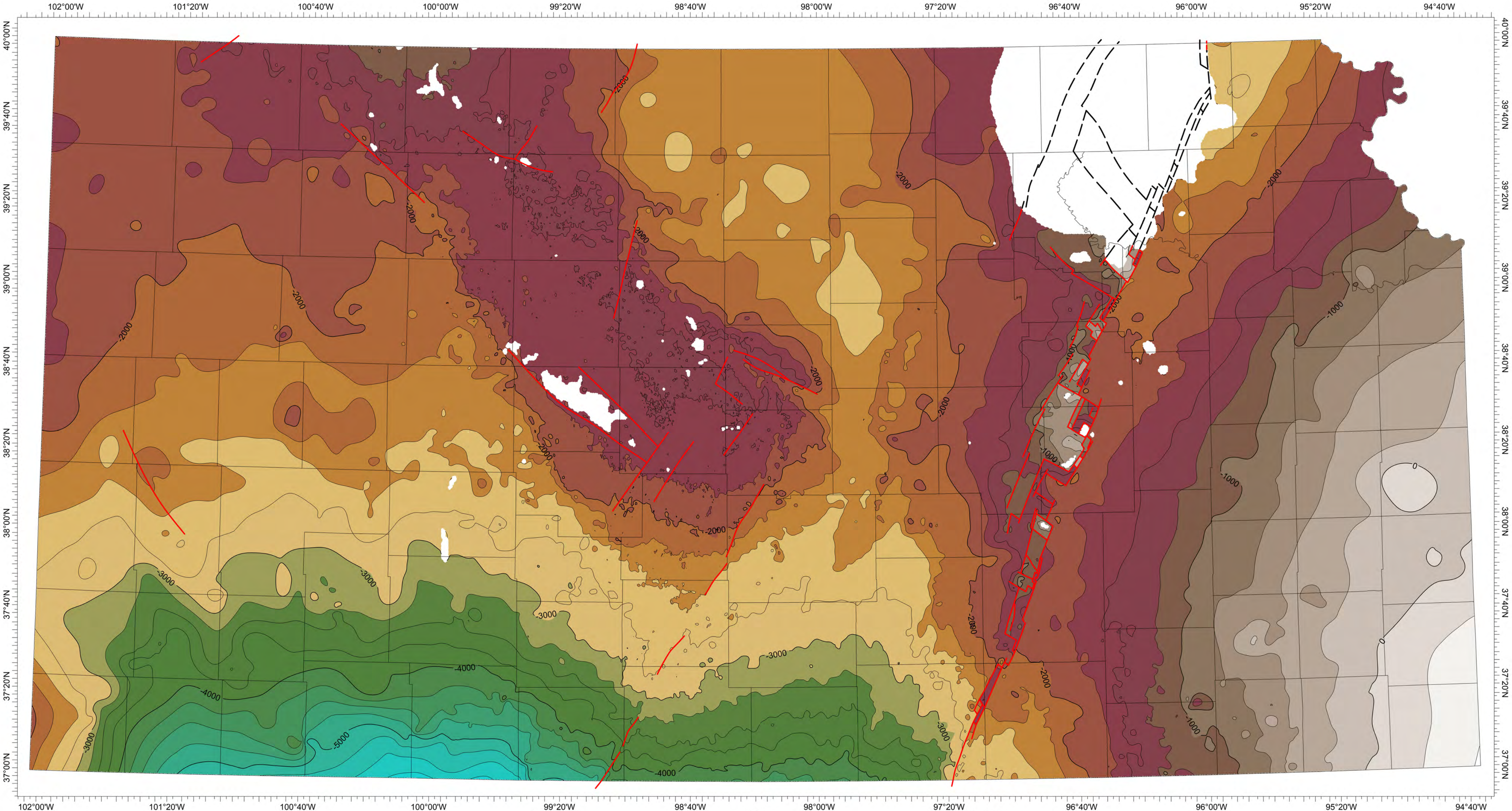
The authors would like to acknowledge the following KGS staff: those that have contributed to, refined, and steward the KGS Oil and Gas Wells Database and online mapper; Kolbe Andrzejewski converted the Petrel map to a GeoTIFF; Kristen Jordan and Katy Bream stewarded access to the GeoTIFF on the KGS GIS Data Hub; and Julie Tollefson reviewed and provided editorial feedback on earlier versions of this document. This map was produced using a Petrel subsurface software donation from SLB and the Adobe Creative Cloud Suite (Illustrator). The GeoTIFF version available through the KGS GIS Data Hub was created using ArcGIS developed by ESRI.

Suggested Reference to This Report

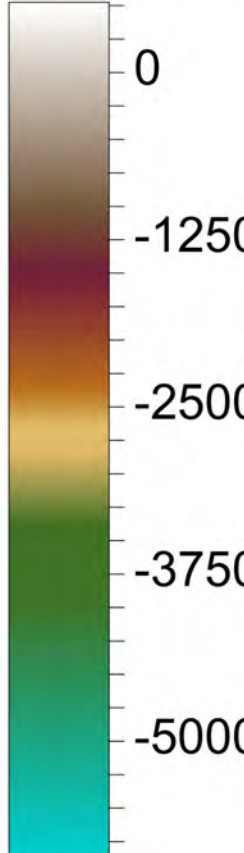
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<https://www.kgs.ku.edu/Publications/OFR/2025/OFR2025-50.pdf>

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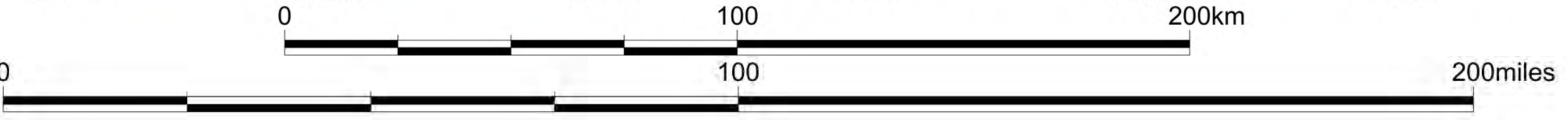


Depth [ft]



Contour interval (ft)	250
Projection	KS83-SF
Geographic datum	GCS_North_American_1983
Datum	MSL

Legend	
	Kansas Counties
	Basement Faults
	Arbuckle Faults & Basement Faults



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