Kansas Geological Survey
Lawrence, Kansas

MAP M-41B
1995

Bouguer Gravity Map of Kansas

Second Vertical Derivative Calculated

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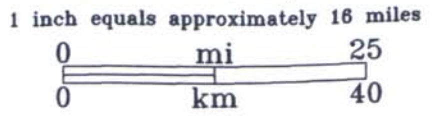
This map is based on the gravity data of the Kansas Geological Survey (C. K. Lam, 1986, "Interpretation of statewide gravity survey of Kansas," Ph.D. dissertation, University of Kansas, Kansas Geological Survey, Open-file Report 87-1; Xia et al., 1992, "Bouguer gravity anomaly map of Kansas," Kansas Geological Survey, Map M-31). The gravity measurements were taken every 1.6 km along parallel east-west roads spaced 3.2 km apart in western Kansas (west of longitude 98.30°) and every 1.6 km along parallel east-west roads spaced 1.6 km in eastern Kansas. The number of gravity-station measurements in Kansas is 62,606, and measurements extend 3 to 8 km into the surrounding states. The data were used to generate 1.6 km by 1.6 km grids. The final grid is 205 rows and 408 columns. Bouguer gravity data are first reduced onto a horizontal plane of 700 m above sea level (Xia et al., 1993, "Correction of topographic distortions in potential-field data: a fast and accurate approach," Geophysics, v. 58, p. 515-523). Then the second vertical derivative is calculated. The calculation is performed in the frequency domain and edge effects are present, such as anomalies parallel to the southern border from longitudes 98.20° to 97.40°. In order to shade the map, a smoothing operator, with a weighting function of 1/distance (SURFACE III) over 5 row by 5 column grids, is applied to the second vertical derivative data.

Scale 1:1,000,000
1 inch equals approximately 16 miles



Shading interval is 0.05 mGal/km/km.

Lambert Conformal Conic Projection
with standard parallels of 33° and 45°

The data were gridded and shaded using SURFACE III developed by Robert Sampson at the Kansas Geological Survey, with the assistance of Dana Adkins-Heljeson.

The second vertical derivative of gravity data attenuates low-frequency signals, enhances high-frequency signals usually caused by near-surface sources, separates anomalies horizontally, and delineates near-vertical density contacts (potentially as fault planes) often indicated by near-zero values on the second vertical derivative map. High-low pairs of relatively high values on this map normally indicate contacts with relatively high density contrast. The location of the positive amplitude indicates which side of contact has high density.