EXPLANATION

Gravity Data Reduction

This map presents Bouguer gravity anomaly data assembled for the Joplin 1° x 2° quadrangle as part of the work done by the U.S. Geological Survey in a cooperative effort with the Kansas Geological Survey and Missouri Geological Survey for the Conterminous United States Mineral Assessment Program.

Data for the Kansas part of the quadrangle were compiled from surveys conducted by the Kansas Geological Survey. The Kansas gravity stations are located on a 1.6 km grid (1 mile spacing). Data were collected along roads and section corners. Data for the Missouri portion of the map were taken from the Department of Defense Data bank (NOAA National Geophysical Data Center). Station spacing in Missouri averages 4 km and typically ranges from 1 to 7 km. Station locations are shown as small dots.

Theoretical gravity values were calculated using the 1967 formula of the Geodetic Reference System (International Association of Geodesy, 1967). Terrain corrections were computed using a program by R. H. Godson (USGS unpublished program, 1978), correcting for the gravity effects of terrain from each station to a radial distance of 166.7 km using the method of Plouff (1977). The program also calculates corrections for the earth's curvature and complete (terrain-corrected) Bouguer anomaly values. These computed terrain corrections use mean elevation data digitized on a 15-second grid for corrections from 0 to 5 km, 1-minute terrain data for corrections from 5 to 21 km, and 3-minute terrain data for corrections from 21 to 166.7 km. The reduction density for this map is 2.67 g/cm³. A complete description of the gravity reduction procedures currently in use by the USGS for defining the anomalies are explained by Cordell et al. (1982). These data have a UTM projection with a central meridian of 95 0'W and a base latitude of 36 0'N.

The Bouguer data were gridded to 1 km spacing using a minimum curvature algorithm (Webring, 1981) and contoured at a 1 mCal interval using a modified version of the computer program by Godson and Webring (1982).

References

Cordell, Lindrith, Keller, G. R., and Hildenbrand, T. G., 1982, Bouguer gravity anomaly map of the Rio Grande rift: U.S. Geological Survey Geophysical Investigations Map GP-949.
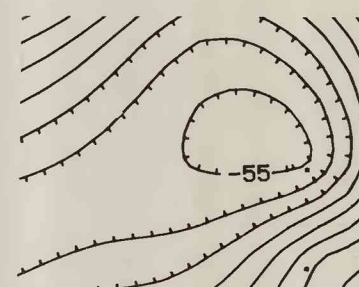
Godson, R. H., and Webring, M. W., 1982, CONTOUR: A modification of G. I. Evenden's general purpose contouring program: U.S. Geological Survey Open-File Report 82-797.

International Association of Geodesy, 1967, Geodetic Reference System 1967: International Association of Geodesy Special Publication, no. 3, 116 p.

Plouff, Donald, 1977, Preliminary documentation for a FORTRAN program to compute gravity terrain corrections based on a geographic grid: U.S. Geological Survey Open-File Report 77-535, 45 p.

Webring, M. W., 1981, MINC: A gridding program based on minimum curvature: U.S. Geological Survey Open-File Report 81-1224.

· Gravity station

Gravity contour line. Hachures indicate areas of gravity lows.

Contour interval is 1 milligal.

SCALE 1:250 000

5   0   5   10   15   20   25 MILES

5   0   5   10   15   20   25 KILOMETERS

*Interactive Concepts Inc. 2500 W. 6th Ave. Lawrence, Kansas 66044

**Chevron U.S.A., Inc. 1301 McKinney Blvd. Houston, Texas 77010

Complete Bouguer gravity anomaly map of the Joplin 1 X 2 quadrangle,

Kansas and Missouri

by

A.E. McCafferty, D. Adkins-Heljeson*, and H.L. Yarger **

1989