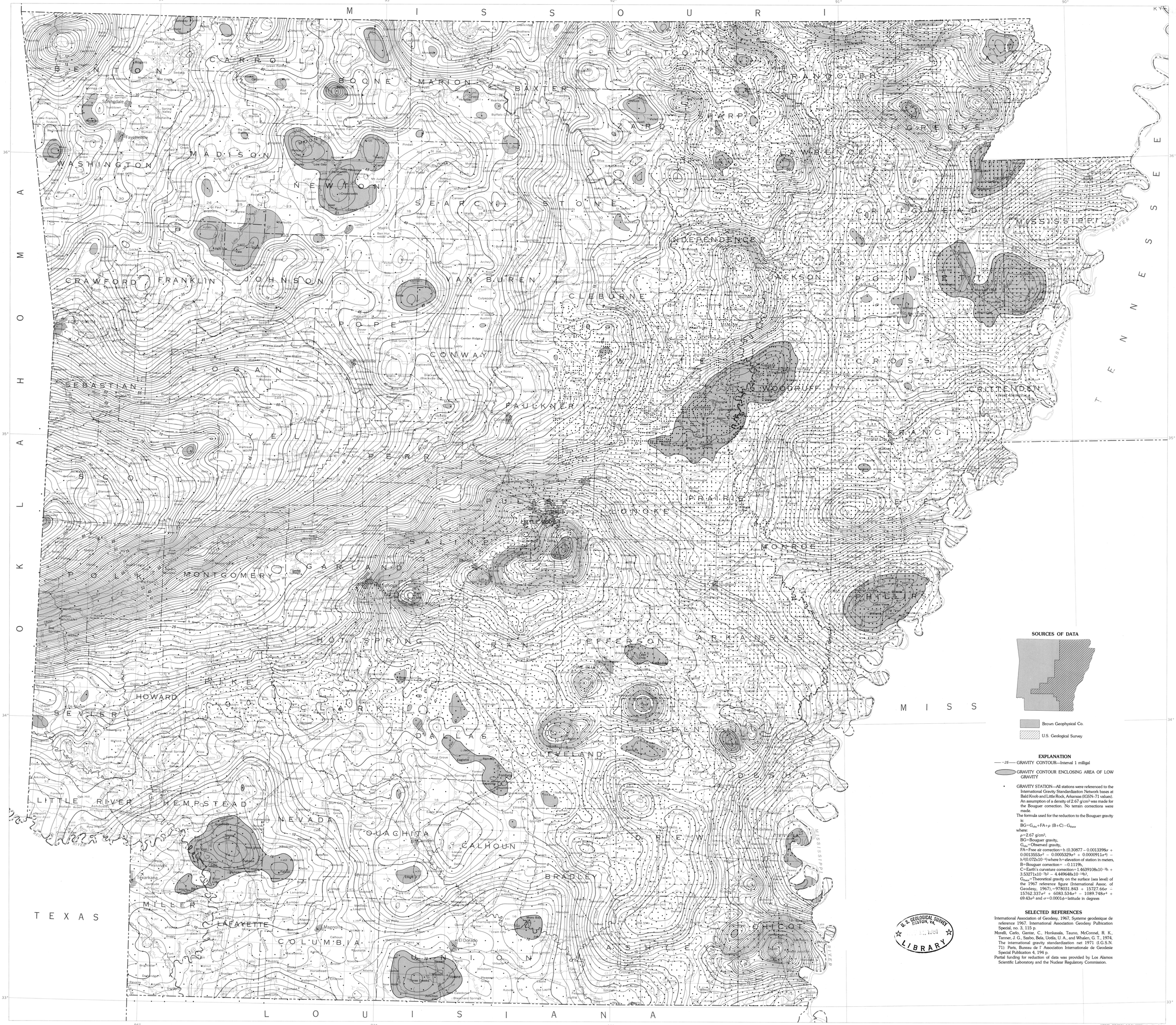
DEPARTMENT OF THE INTERIOR
UNITED STATES GEOLOGICAL SURVEY

PREPARED IN COOPERATION WITH THE
ARKANSAS GEOLOGICAL COMMISSION

GEOPHYSICAL INVESTIGATIONS
MAP GP-944



Base from U.S. Geological Survey, 1967

SCALE 1:500 000

10 0 10 20 30 40 50 MILES

10 0 10 20 30 40 50 KILOMETERS

NATIONAL GEODETIC VERTICAL DATUM OF 1929

BOUGUER GRAVITY MAP OF ARKANSAS

By

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1981

SOURCES OF DATA

Brown Geophysical Co.

U.S. Geological Survey

EXPLANATION

—25— GRAVITY CONTOUR—Interval 1 milligal

GRAVITY CONTOUR ENCLOSING AREA OF LOW GRAVITY

• GRAVITY STATION—All stations were referenced to the International Gravity Standardization Network bases at Bald Knob and Little Rock, Arkansas (IGSN-71 values). An assumption of a density of 2.67 g/cm³ was made for the Bouguer correction. No terrain corrections were made.

The formula used for the reduction to the Bouguer gravity is:

$BG = G_{obs} + FA + \rho\,(B+C) - G_{theor}$

where:

$\rho = 2.67$ g/cm³,

BG=Bouguer gravity,

G_{obs}=Observed gravity,

FA=Free air correction=$h\,(0.30877 - 0.0013398\sigma + 0.0013553\sigma^2 - 0.0005329\sigma^3 + 0.0000911\sigma^4) - h^2(0.072\times10^{-6})$ where h=elevation of station in meters,

B=Bouguer correction= $-0.1119h$,

C=Earth's curvature correction=$1.4639108\times10^{-7}h + 3.5327\times10^{-7}h^2 - 4.449648\times10^{-14}h^3$,

G_{theor}=Theoretical gravity on the surface (sea level) of the 1967 reference figure (International Assoc. of Geodesy, 1967), =$978031.843 + 15727.66\sigma - 15762.337\sigma^2 + 6083.534\sigma^3 - 1089.748\sigma^4 + 69.43\sigma^5$ and $\sigma = 0.0001d$=latitude in degrees

SELECTED REFERENCES

International Association of Geodesy, 1967, Systeme geodesique de reference 1967. International Association Geodesy Publication Special, no. 3, 115 p.

Morelli, Carlo, Gantar, C., Honkasala, Tauno, McConnel, R. K., Tanner, J. G., Szabo, Bela, Uotila, U. A., and Whalen, G. T., 1974, The international gravity standardization net 1971 (I.G.S.N. 71): Paris, Bureau de l' Association Internationale de Geodesie Special Publication 4, 194 p.

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For sale by Branch of Distribution, U.S. Geological Survey, Box 25286, Federal Center, Denver, CO 80225

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