

# Gravity and Magnetic Investigations of the Mojave National Preserve and Adjacent Areas, California and Nevada

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## **Readme**

The digital data and text of this Open-File Report are available from the following U.S. Geological Survey URL:

<http://pubs.usgs.gov/of/2009/1117/>

## **Data Contents**

The digital dataset consists of one file (090215-iso.txt) containing the 4,804 point data that were gridded and contoured to produce gravity contours on figures in the report. The file contains the principal facts of the gravity stations, with one measurement (or gravity station) point coded per line.

The format of the data is described below. Each gravity station has a station name, location (latitude and longitude, NAD27 datum), elevation, an observed gravity value, followed by free-air, Bouguer, and isostatic anomalies and terrain correction values.

The data are on the IGSN71 gravity datum and the reference ellipsoid is the Geodetic Reference System 1967 (GRS67). The free-air gravity anomalies were calculated using standard formulas (Telford and others, 1976). The Bouguer, curvature, and terrain corrections were applied to the free-air anomaly at each station to determine the complete Bouguer gravity anomalies at a reduction density of 2670 kg/m<sup>3</sup> (Plouff, 1977). An isostatic correction was then applied to remove the long-wavelength effect of deep crustal and/or upper mantle masses that isostatically support regional topography (Jachens and Roberts, 1981).

## Explanation of Principal Fact Format

Item .....	Explanation
STAT .....	Station Name--An alphanumeric combination of up to 8 characters used for station identification
LaD .....	Degree Latitude North
LaM.....	Decimal Minute
LoD .....	Degree Longitude West
LoM .....	Decimal Minute
ELEV .....	Elevation in feet
OG.....	Observed gravity, in mGal
FAA .....	Free-air anomaly, in mGal
SBA.....	Simple Bouguer anomaly, in mGal
ITC .....	Inner terrain correction for a density of 2,670 kg/m <sup>3</sup> , in mGal. See Code column for radius of correction.
TTC.....	Total terrain correction from the station to 166.7 km for a density of 2,670 kg/m <sup>3</sup> , in mGal.
Code .....	Letter denoting the zone (radius) of the correction, "D"= 0.59 km; "G" = 3.52 km; "M"= 58.8 km.
CBA .....	Complete Bouguer anomaly reduced for a density of 2,670 kg/m <sup>3</sup> , in mGal.
ISO .....	Isostatic residual anomaly,in mGal,assuming an Airy model for isostatic compensation of topographic loads. This model assumes a crustal thickness of 25 km, a topographic load density of 2,670 kg/m <sup>3</sup> , and a density contrast across the base of the model crust of 400 kg/m <sup>3</sup> . Isostatic correction would be difference between CBA and ISO values.

## Example of format

98023 34 3.49 118 16.50 272.5 979573.64 -54.12 -63.42 0.03 0.68 D -62.85 -39.12

STAT: 98023  
LaD: 34 degrees North  
LaM: 3.49 minutes  
LoD: 118 degrees West  
LoM: 16.50 minutes  
ELEV: 272.5 feet  
OG: 979573.64 mGal  
FAA: -54.12 mGal  
SBA: -63.42 mGal  
ITC: 0.03 mGal  
TTC: 0.68 mGal  
Code: D (0.59 km)  
CBA: -62.85 mGal  
ISO: -39.12 mGal

Another file, rock\_property.txt, contains the physical property data presented in the report, separated into three categories. Each sample has measured grain (D1), dry bulk (D2), and saturated bulk (D3) densities (units kg/m<sup>3</sup>), an average magnetic susceptibility, k (x 10<sup>-3</sup> SI units), and a rock type. See report for details of measurements.

## References

- Jachens, R.C., and Roberts, C.W., 1981, Documentation of a Fortran program, 'ISOCOMP', for computing isostatic residual gravity: U.S. Geological Survey Open-File Report 81-574, 26 p.
- Plouff, Donald, 1977, Preliminary documentation for a FORTRAN program to compute gravity terrain corrections based on topography digitized on a geographic grid: U.S. Geological Survey Open-File Report 77-535, 45 p.
- Telford, W.M., Geldart, L.O., Sheriff, R.E., and Keyes, D.A., 1976, Applied Geophysics: New York, Cambridge University Press, 960 p.