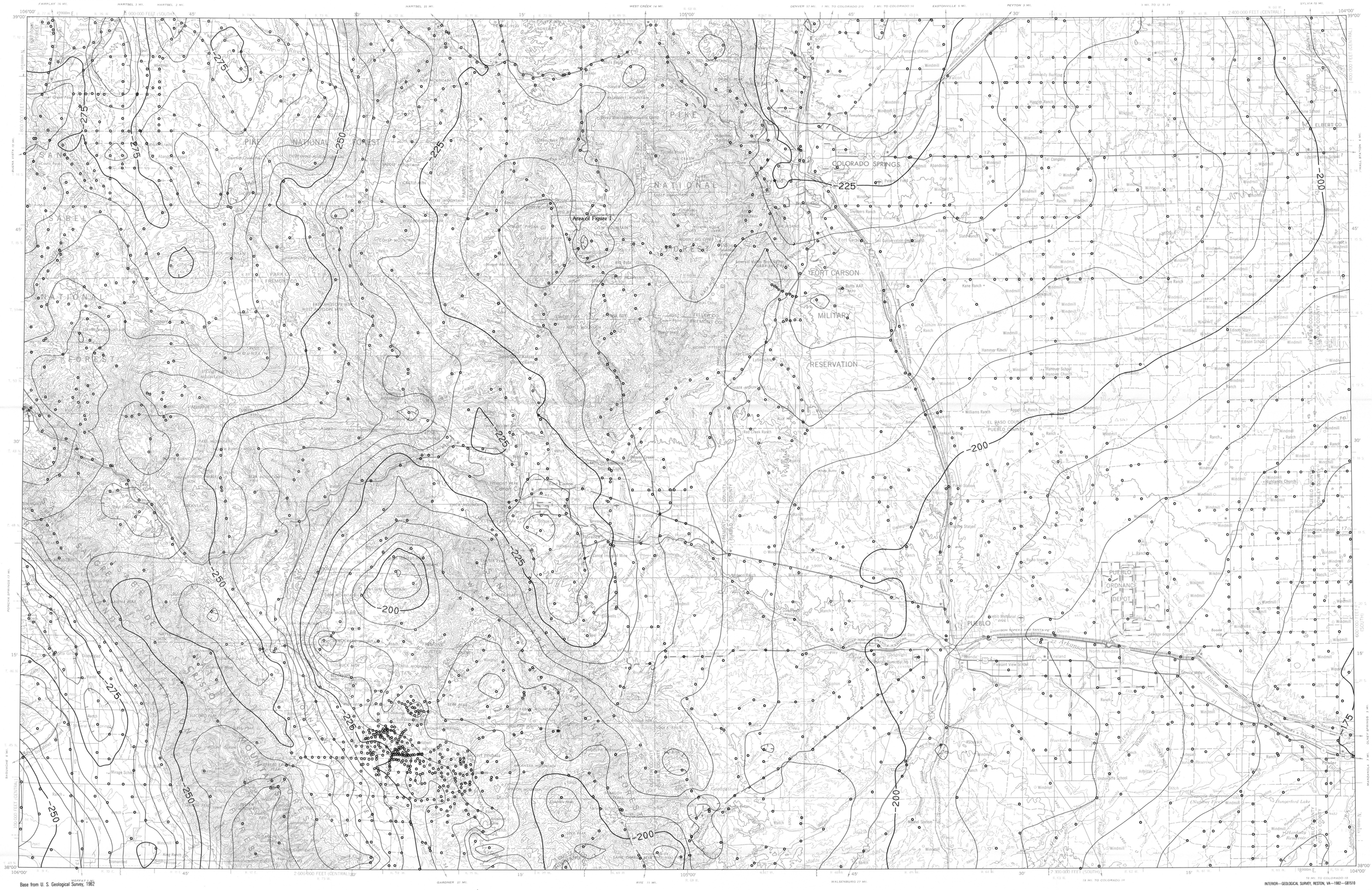
DEPARTMENT OF THE INTERIOR
U.S. GEOLOGICAL SURVEY

MISCELLANEOUS INVESTIGATIONS SERIES
MAP I–1419 –A



Base from U. S. Geological Survey, 1982

INTERIOR—GEOLOGICAL SURVEY, RESTON, VA—1982—GB1510

EXPLANATION

GRAVITY CONTOUR—Contour interval 5 milligals. Hachures indicate closed area of low gravity values.

GRAVITY STATION

SCALE 1:250 000

5 0 5 10 15 20 25 MILES

5 0 5 10 15 20 25 KILOMETERS

CONTOUR INTERVAL 200 FEET
WITH SUPPLEMENTARY CONTOURS AT 100 FOOT INTERVALS
NATIONAL GEODETIC VERTICAL DATUM OF 1929

1980 MAGNETIC DECLINATION FOR THIS SHEET VARIES 17° 30' EASTERLY FOR THE CENTER OF THE WEST EDGE TO 11° 30' EASTERLY FOR THE CENTER OF TH EAST EDGE. MEAN ANNUAL CHANGE IS 0° 7.5' WESTERLY

MAP OF COLORADO SHOWING SURVEY AREA

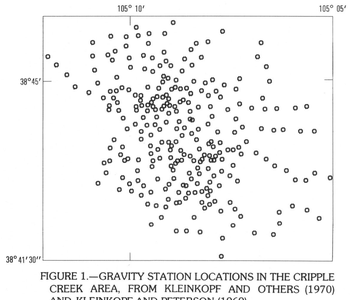
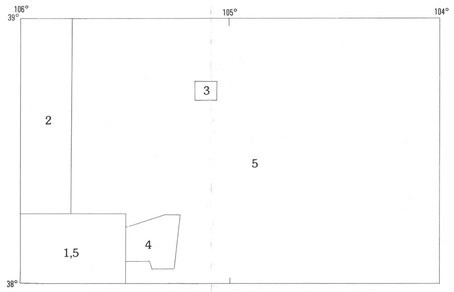


FIGURE 1.—GRAVITY STATION LOCATIONS IN THE CRIPPLE CREEK AREA, FROM KLEINKOPF AND OTHERS (1970) AND KLEINKOPF AND PETERSON (1969)



INDEX MAP SHOWING SOURCES OF GEOLOGIC DATA

SOURCES OF DATA

Area	Source(s)	Fundamental base station
1	Davis (1979)	Alamosa, Colorado, IGSN Base 4016-1 (Defense Mapping Agency Aerospace Center, 1970).
2	Defense Mapping Agency Aerospace Center (1975).	Washington, D. C., IGSN Base 165-0 (U. S. Air Force, 1966).
3	Kleinkopf and others (1970); Kleinkopf and Peterson (1969).	Golden, Colorado, Colorado School of Mines Station WU-7 (Behrendt and Woollard, 1961).
4	Kleinkopf and others (1979); Kleinkopf and Peterson (1977).	Do.
5	Kleinkopf, M. D., Peterson, D. L., and Wilson, D. L., unpub. data, 1974; Defense Mapping Agency Aerospace Center (1975).	Golden, Colorado, Colorado School of Mines Station WU-7 (Behrendt and Woollard, 1961). Washington, D. C., IGSN Base 165-0 (U. S. Air Force, 1966).

DISCUSSION

This map is part of a folio of maps of the Pueblo 1° x 2° quadrangle, Colorado, prepared under the U. S. Geological Survey's Conterminous United States Mineral Assessment Program.

Gravity investigations within the Pueblo quadrangle have been brought together and updated to form this new complete Bouguer gravity map. The present update reflects the 1971 International Gravity Standardization Net (IGSN–71) adjustment (Morelli, 1971), and uses theoretical gravity calculated from the 1967 Gravity Reference System (GRS–67) (International Association of Geodesy, 1971).

The data include 584 stations in the Cripple Creek and Silver Cliff-Rosita Hills mineral districts (Kleinkopf and others, 1979, 1970, Kleinkopf and Peterson, 1969, 1977); 115 stations collected by Davis (1979) in the San Luis Valley and Wet Mountain Valley; 1082 stations throughout the area collected by M. D. Kleinkopf, D. L. Peterson, and D. L. Wilson (unpub. data, 1974); and 614 stations from the files of the Department of Defense (Defense Mapping Agency Aerospace Center, 1975).

Except for several recent Department of Defense stations in the Sangre de Cristo Mountains and Davis's (1979) San Luis Valley and Wet Mountain Valley stations, all the stations included on this map are included on a previous Bouguer gravity map of the Pueblo 1° x 2° quadrangle by Peterson and others (1974). A listing of the updated principal facts and an explanation of the data reduction for the stations included in this update are given by Boler (1981).

The reduction density for this map is 2.67 gm/cm^3. Two-thirds of the stations had hand terrain corrections for Hammer (1939) zones D through H (0.053 to 2.615 km). Additional terrain corrections were obtained using a computer program based on the algorithm of Plouff (1977) to calculate the corrections from 2.615 to 166.7 km for stations with inner hand terrain corrections, and from the station out to 166.7 km for stations without inner hand terrain corrections. The computer program uses mean elevation data on a 30 second grid for corrections from 0 to 5 km; 1 minute elevation data for corrections from 5 to 21 km; and 3 minute elevation data for corrections from 21 to 166.7 km. The computer program also applies the earth-curvature correction and calculates the complete (terrain-corrected) Bouguer anomaly values; it uses the GRS–67 formula (International Association of Geodesy, 1971) for theoretical gravity. An estimate of the uncertainty in the Bouguer anomaly values given by Boler (1981) is 2 mgal.

A minimum curvature grid (Briggs, 1974) based on the Bouguer anomaly values was formed with a spacing between grid points of 1.5 km. The grid does not extend beyond the quadrangle boundaries.

The Bouguer anomaly map was plotted by computer with a contour interval of 5 mgal. Station locations are shown by small circles, except those in the Cripple Creek area taken by Kleinkopf and others (1970) and Kleinkopf and Peterson (1969), which are shown in Figure 1.

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BOUGUER GRAVITY MAP OF THE PUEBLO 1° X 2° QUADRANGLE, SOUTH-CENTRAL COLORADO

By

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1982

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