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Principal Facts for Gravity Stations in the Dry Valley Area, West-Central Nevada and East-Central California

By Elizabeth A. Sanger¹ and David A. Ponce¹

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¹ U.S. Geological Survey, 345 Middlefield Road, Menlo Park, CA 94025

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INTRODUCTION

In June, 2002, the U.S. Geological Survey (USGS) established 143 new gravity stations and 12 new rock samples in the Dry Valley area, 30 miles north of Reno, Nevada, on the California - Nevada border (fig. 1). This study reports on gravity, magnetic, and physical property data intended for use in modeling the geometry and depth of Dry Valley for groundwater analysis. It is part of a larger study that aims to characterize the hydrologic framework of several basins in Washoe County. Dry Valley is located south of the Fort Sage Mountains and south-east of Long Valley, on USGS 7.5' quadrangles Constantia and Seven Lakes (fig. 2). The Cretaceous granitic rocks and Tertiary volcanic rocks that bound the sediment filled basin (fig. 3) may be especially important to future modeling because of their impact on groundwater flow. The granitic and volcanic rocks of Dry Valley exhibit densities and magnetic susceptibilities higher than the overlying sediments, and create a distinguishable pattern of gravity and magnetic anomalies that reflect these properties.

ACKNOWLEDGMENTS

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GRAVITY AND AEROMAGNETIC DATA

Gravity stations collected during June 2002 consist of 143 stations concentrated in Dry Valley and the surrounding area. Data include one north-south profile of 38 stations at 100 m (300 ft) spaced intervals and 86 additional valley stations with approximately 800 m (1/2 mile) spacing (fig 2). Data also include 19 gravity stations located on granitic basement to the west, north, and south of the valley (fig. 3). All data are tied to the secondary base station RENO-A on the University of Nevada, Reno (UNR) campus at 39° 32.30' N and 119° 48.70' W, with an observed gravity value of 979,674.69 mGal. The value of RENO-A was calculated from the primary base RENO (39° 32.30' N, 119° 48.70' W, with an observed gravity value of 979,674.65 mGal), also on the UNR campus. The gravity data used in this study also include 150 previously collected stations from USGS digital datasets (Ponce, 1997; Jewel and others, 2000). Stations were located between latitudes 39° 52.5' and 40° 07.5' N and longitudes 119° 45' and 120° 15' W. Principal facts of all data are shown in the appendix. These data were then combined with gravity data from the surrounding USGS quadrangles and gridded at an interval of 1 km using a computer program (Webring, 1982) based on a minimum curvature algorithm by Briggs (1974). This grid was then subgridded to the boundaries of the study area, and regridded to 100 m grid interval to minimize pixel size (fig. 4).

The aeromagnetic data used in this study is from a total intensity magnetic anomaly map of Nevada (Hildenbrand and Kucks, 1988). Surveys were flown at various flight-line spacings and elevations. Some parts of the map are covered by more recent and detailed aeromagnetic surveys flown at a flight-line spacing of 400 m (1/4 mi) and a nominal flight-line elevation of 122 m (400 ft) above the ground. Older surveys were flown at flight-line spacings of 800 to 1,600 m (1/2 to 1 mi) and at constant barometric elevations of about 2,440 m (8,000 ft). Magnetic anomalies

were derived by subtracting an International Geomagnetic Reference Field (Langel, 1992) appropriate for the year of each survey. Aeromagnetic surveys were continued downward, if necessary, to a flight-line elevation of 122 m (400 ft) above the ground, adjusted to a common datum, and merged to produce a uniform map that allows interpretations across survey boundaries (see Hildenbrand and Kucks, 1988). Because of the high elevation and wide flight line spacing, caution should be exercised when interpreting short-wavelength anomalies that cross the original survey boundaries. The digital data set was gridded at an interval of 2 km using the Webring, 1982 computer program and then interpolated to a 100 m grid, to minimize pixel size and color contoured (fig. 5).

PHYSICAL PROPERTY DATA

Density and magnetic properties of rock samples are used for gravity and magnetic modeling, as well as gravity inversion calculations. Thirteen samples were collected in the Dry Valley area in 2002 and seven during 2000 (Jewel and others, 2000). The locations of all rock samples are shown in figure 3. Sample weights were measured in the laboratory with a precision electronic balance and used to calculate the grain, saturated bulk, and dry bulk density of each sample. Magnetic susceptibilities were measured using a Geophysica KT-5 susceptibility meter. These data along with the rock identification and mapped geologic units (Bonham, 1969) are shown in tables 1a and 1b.

GRAVITY METHODS

All gravity data were reduced using standard gravity corrections (Blakely, 1995) including: (a) the earth-tide correction, which corrects for tidal effects of the moon and sun; (b) instrument drift correction, which compensates for drift in the instrument's spring; (c) the latitude correction, which incorporates the variation of the Earth's gravity with latitude; (d) the free-air correction, which accounts for the variation in gravity due to elevation relative to sea-level; (e) the Bouguer correction, which corrects for the attraction of material between the station and sea-level; (f) the curvature correction, which corrects the Bouguer correction for the effect of the Earth's curvature; (g) the terrain correction, which removes the effect of topography to a radial distance of 166.7 km; and (h) the isostatic correction, which removes long-wavelength variations in the gravity field inversely related to topography.

Conversion of meter readings to milligals was made using factory calibration constants as well as an additional calibration factor determined by multiple gravity readings over the Mt. Hamilton calibration loop east of San Jose, California (Barnes and others, 1969). The gravity meter used in this survey, LaCoste and Romberg G614, has an additional calibration factor of 1.00036. Observed gravity values were based on a time-dependent linear drift between successive base readings and were referenced to the International Gravity Standardization Net 1971 (IGSN 71) gravity datum (Morelli, 1974, p. 18). Free-air gravity anomalies were calculated using the Geodetic Reference System 1967 formula for theoretical gravity on the ellipsoid (International Union of Geodesy and Geophysics, 1971, p. 60) and Swick's formula (1942, p. 65) for the free-air correction. Bouguer, curvature, and terrain corrections were added to the free-air anomaly to determine the complete Bouguer anomaly at a standard reduction density of 2.67 g/cm^3 . Finally, a regional isostatic gravity field was removed from the Bouguer field assuming an Airy-Heiskanen model for isostatic compensation of topographic loads (Jachens and Roberts, 1981)

with an assumed crustal thickness of 25 km, a crustal density of 2.67 g/cm³, and a density contrast across the base of the model of 0.4 g/cm³. Gravity values are expressed in milligals (mGal), a unit of acceleration or gravitational force per mass equal to 10⁻⁵ m/s².

Station locations and elevations for the 2002 data were obtained with a differential Global Positional System (GPS); Trimble Real Time Kinematic (RTK) Series 4400 GPS receivers. These measurements have a vertical and horizontal accuracy of about 2 cm. Stations were surveyed in real time kinematic with post-process infill and reduced using Trimble Geomatic Office 1.6. Base station locations were determined by the National Geodetic Survey (NGS) through their Online Positioning User Service (OPUS, <http://www.ngs.noaa.gov/OPUS/>). Precise OPUS Solutions were solved using three Continuously Recording Stations (CORS), Quincy, 39° 58.47297' N, 120° 56.66478' W; Garlic, 40° 24.99132' N, 119° 21.326517' W; and Upsal Hogback, 39° 37.63098' N, 118° 48.140883' W and are accurate to within 3 - 5 cm. Multiple occupations of base stations in Dry Valley yielded OPUS solutions within 6 mm.

Terrain corrections, which account for the variation of topography near a gravity station, were computed using a combination of manual and digital methods. Terrain corrections consist of a three-part process: the innermost or field terrain correction (estimated in the field and extending to a radial distance of 68 m), inner-zone terrain correction, and outer-zone terrain correction. Inner-zone terrain corrections were made using the Hayford and Bowie (1912) system that divides the terrain surrounding a gravity station into zones and equal area compartments. Average elevations for each compartment were estimated from Digital Elevation Models (DEMs) with a 30 m resolution derived from USGS 7.5' topographic maps. Inner-zone terrain corrections extend from 68 m to a radial distance of 0.59 km. Outer-zone terrain corrections, to a radial distance of 166.7 km, were computed using a DEM derived from USGS 1:250,000-scale topographic maps and an automated procedure (Plouff, 1966; Plouff, 1977; Godson and Plouff, 1988). Digital terrain corrections are calculated by computing the gravity effect of each grid cell using the distance and difference in elevation of each grid cell from the gravity station.

DISCUSSION AND RESULTS

In general, isostatic gravity anomalies reflect lateral (horizontal) density variations in the middle to upper crust. Thus, gravity anomalies can be used to infer the subsurface structure of known or unknown geologic features. Gravity anomalies often reflect carbonate rocks, calderas, deep sedimentary basins, and linear geologic features such as faults. Many of these features play an important role as aquifers or confining units, and their distribution is important to the understanding of a region's hydrogeologic framework. Pre-Cenozoic granitic rocks underlie most of the Dry Valley region, and their subsurface distribution is especially important in evaluating the hydrogeology of this area. Tertiary volcanic rocks and Quaternary and Tertiary alluvial deposits that occur throughout the study area may also play a role in the region's hydrology.

In the Dry Valley area, gravity highs occur over pre-Cenozoic granitic rocks of the Diamond Mountains, Fort Sage Mountains, Dogskin Mountain, and over Tertiary volcanic rocks of the Virginia Mountains (fig. 4). Table 1b shows that the average saturated bulk density (SBD) for granites is 2.71 g/cm³ and the SBD of volcanic rocks is 2.81, 2.31 and 2.09 g/cm³ for basalt, rhyolite and tuff, respectively. Gravity lows occur over Long Valley, western Red Rock Valley,

and western Honey Lake Valley. These lows reflect sedimentary basins filled with lower density alluvial and volcanic deposits.

Aeromagnetic anomalies represent changes in the Earth's magnetic field and are generally used to infer lateral variations in the magnetization of rocks. Magnetic highs occur in the study area over the Diamond Mountains, Fort Sage Mountains, Dry Valley, northern Virginia Mountains, and the Dogskin Mountains (fig. 5). Areas where the magnetic field is lower include Red Rock Valley, northern Long Valley, and southern Honey Lake Valley. These anomalies can be explained by the variations in rock type across the region. Magnetic highs are likely due to granitic and basaltic rocks that have average magnetic susceptibilities of 1.33×10^{-3} and 4.78×10^{-3} cgs units, respectively, whereas magnetic lows are probably associated with less magnetic rhyolitic, tuffaceous, and sedimentary rocks (table 1b).

Profiles across Long Valley and Dry Valley illustrate the relationship between isostatic gravity anomalies, aeromagnetic anomalies, topography, and rock type. Profile A-A' (fig. 6), shows the gravity and magnetic highs associated with dense granitic and basaltic rocks of the Fort Sage Mountains. Profile B-B' (fig. 7) illustrates the steep gravity and magnetic gradients observed over Dry Valley and suggests that the sedimentary basin is relatively shallow.

The diverse physical properties of lithologies that underlie this region are well suited to geophysical investigations. The contrast in density and magnetic properties between pre-Cenozoic basement and overlying volcanic rocks and unconsolidated alluvium, for example, produces a distinctive pattern of gravity and magnetic anomalies that can be used to determine the depth of pre-Cenozoic basement in three dimensions. In most parts of the study area, this surface corresponds to the top of the granitic rocks, and thus plays an important role in the hydrogeologic framework of the area.

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Table 1a. Physical property measurements of rocks in the Dry Valley area.

[Latitudes (north) and longitudes (west) on the North American Datum 1927 (NAD27). BA, basalt; DBD, dry bulk density; GD, grain density; GT, granitic. All samples except those labeled DAP correspond with gravity station locations]

Station ID	Latitude		Longitude		Density (g/cm ³)			Susceptibility (10 ⁻³ cgs units)
	deg	min	deg	min	GD	SBD	DBD	
Basalt								
02REN070	39	58.97	119	57.23	2.84	2.83	2.83	3.98
02REN071	39	59.49	119	57.43	2.78	2.78	2.77	5.57
Granitic								
00REN076A	39	53.79	119	47.91	2.79	2.78	2.77	1.70
00REN076B	39	53.79	119	47.91	2.73	2.71	2.69	1.81
02REN022	39	59.53	120	1.34	2.74	2.68	2.64	1.27
02REN121	39	59.68	119	57.29	2.67	2.65	2.64	0.06
02REN129	39	55.40	120	0.02	2.67	2.62	2.59	0.64
02REN130	39	55.19	120	0.10	2.64	2.61	2.60	0.40
02REN132	39	58.33	120	5.45	2.71	2.68	2.66	1.59
02REN133A	39	58.39	120	5.97	2.86	2.78	2.74	2.63
02REN133B	39	58.39	120	5.97	2.90	2.89	2.88	2.71
DVGPS1	39	59.02	119	59.69	2.75	2.73	2.72	0.51
Rhyolite								
00DAP104	39	53.68	119	56.67	2.40	2.36	2.34	0.13
00DAP105	39	54.89	119	56.53	2.19	2.11	2.05	0.04
00REN016	39	55.01	119	54.04	2.47	2.28	2.15	0.11
00REN020	39	57.44	119	53.25	2.32	2.19	2.09	0.01
00REN104	39	53.36	119	54.44	2.62	2.60	2.60	0.53
Tuff								
02REN078	39	55.56	119	59.49	2.40	2.12	1.92	0.00
LOOKPK	39	55.44	120	0.27	2.35	2.05	1.83	0.01

Table 1b. Average physical property data by rock type

Rock Type	No. samples	Grain	Density (g/cm ³)		Susceptibility (10 ⁻³ cgs units)
			Saturated bulk	Dry bulk	
Basaltic rocks	2	2.81	2.81	2.80	4.78
Granitic rocks	10	2.75	2.71	2.69	1.33
Rhyolite	5	2.40	2.31	2.25	0.16
Tuff	2	2.38	2.09	1.88	0.01

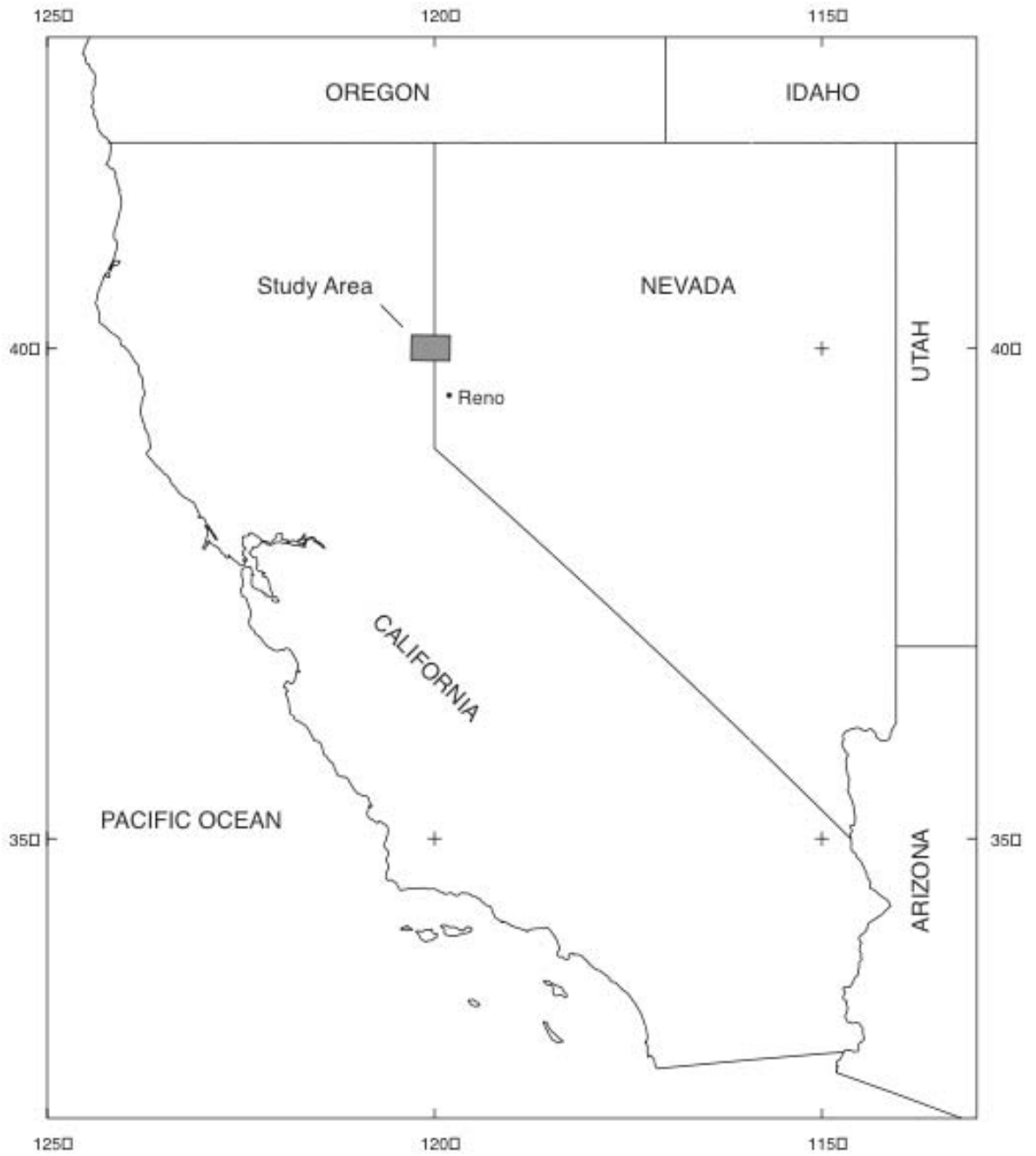


Figure 1. Index map of study area along the California - Nevada border.

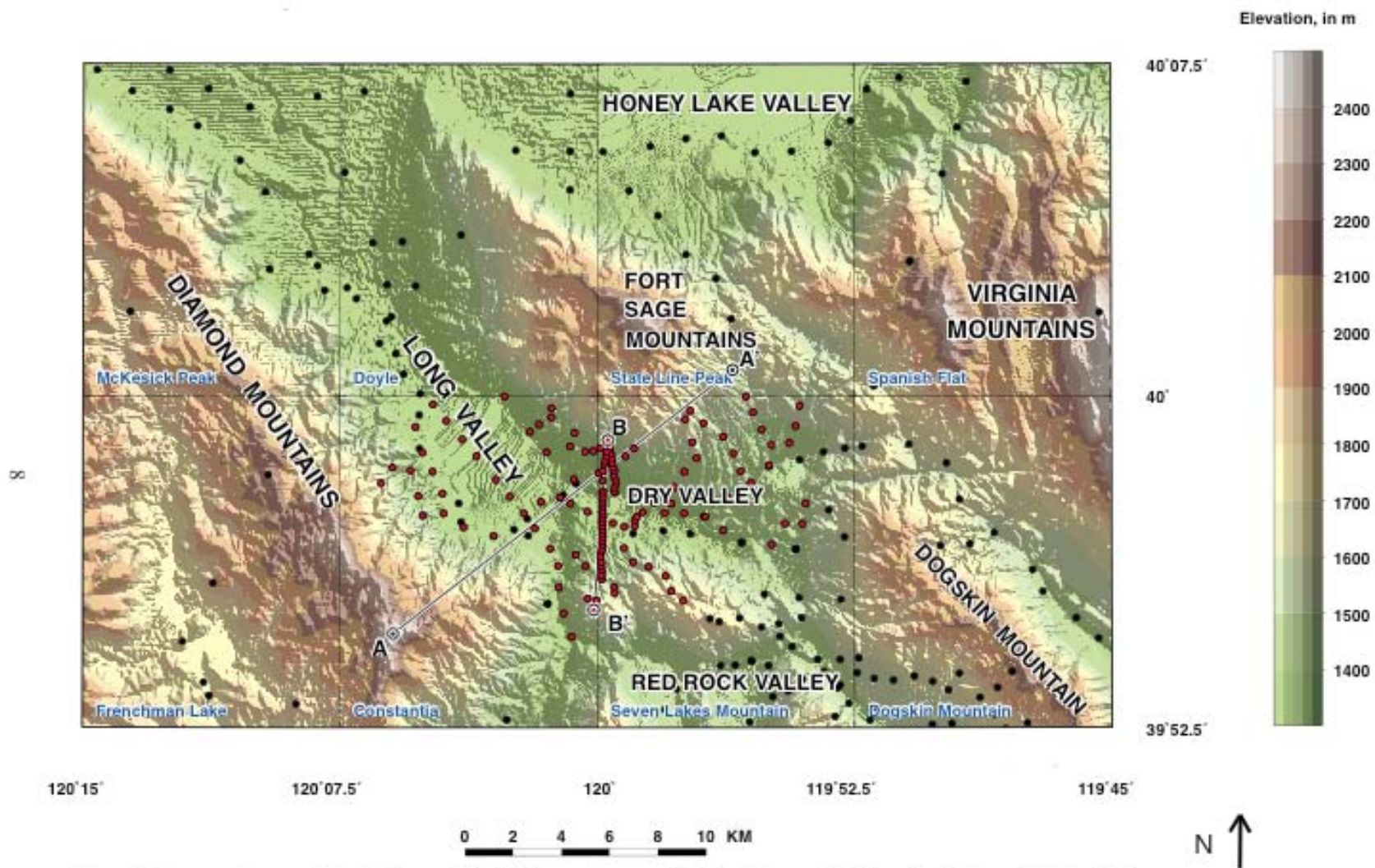


Figure 2. Topographic map of the study area. Black dots, previous gravity data (Ponce, 1997; Jewel and others, 2000); red dots; new USGS gravity data. USGS 7.5' quadrangle names in blue.

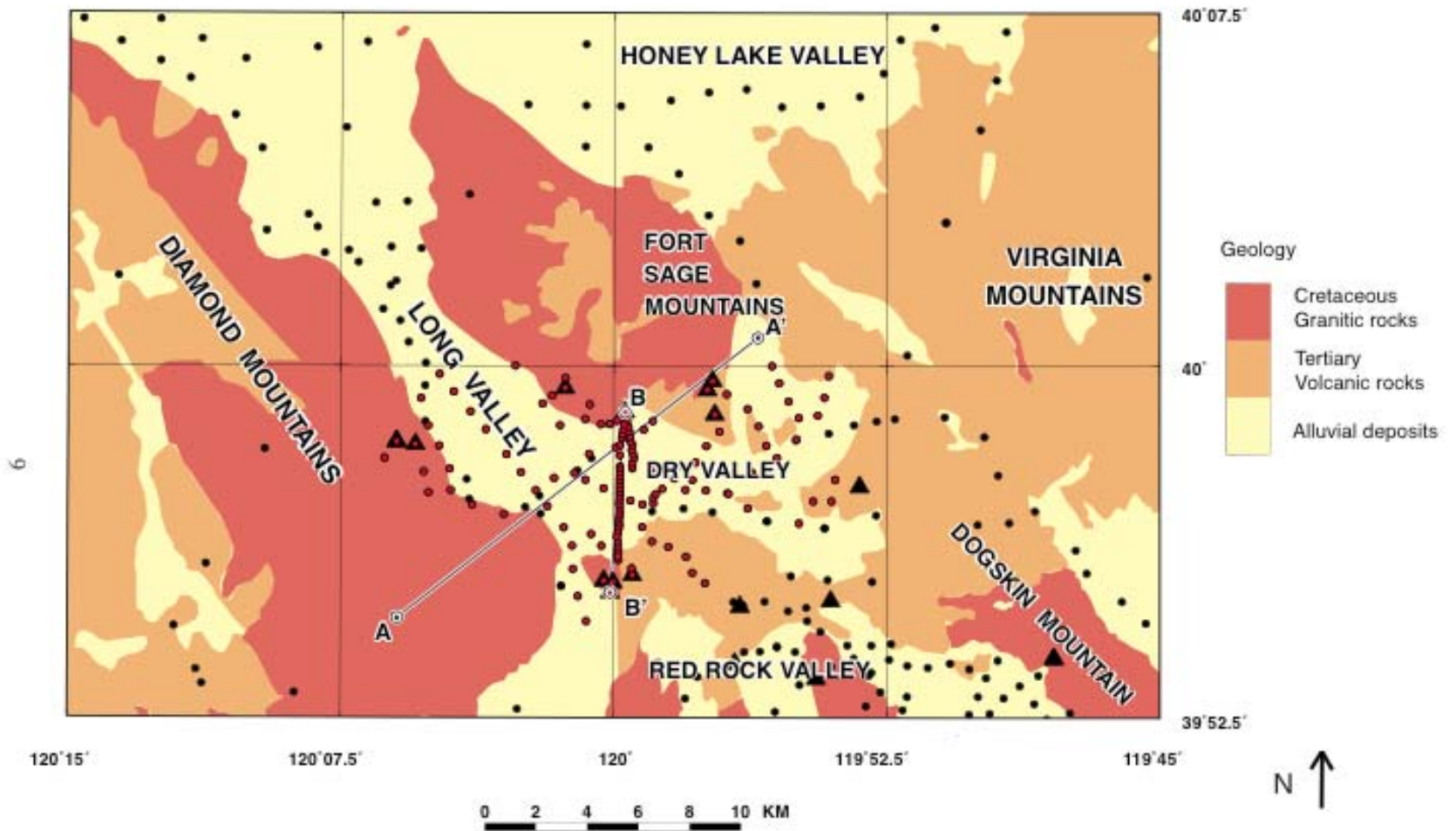


Figure 3. Simplified 3-layer geologic map of the study area (modified from Bonham, 1969). See figure 2 for explanation. Triangles, location of rock samples.

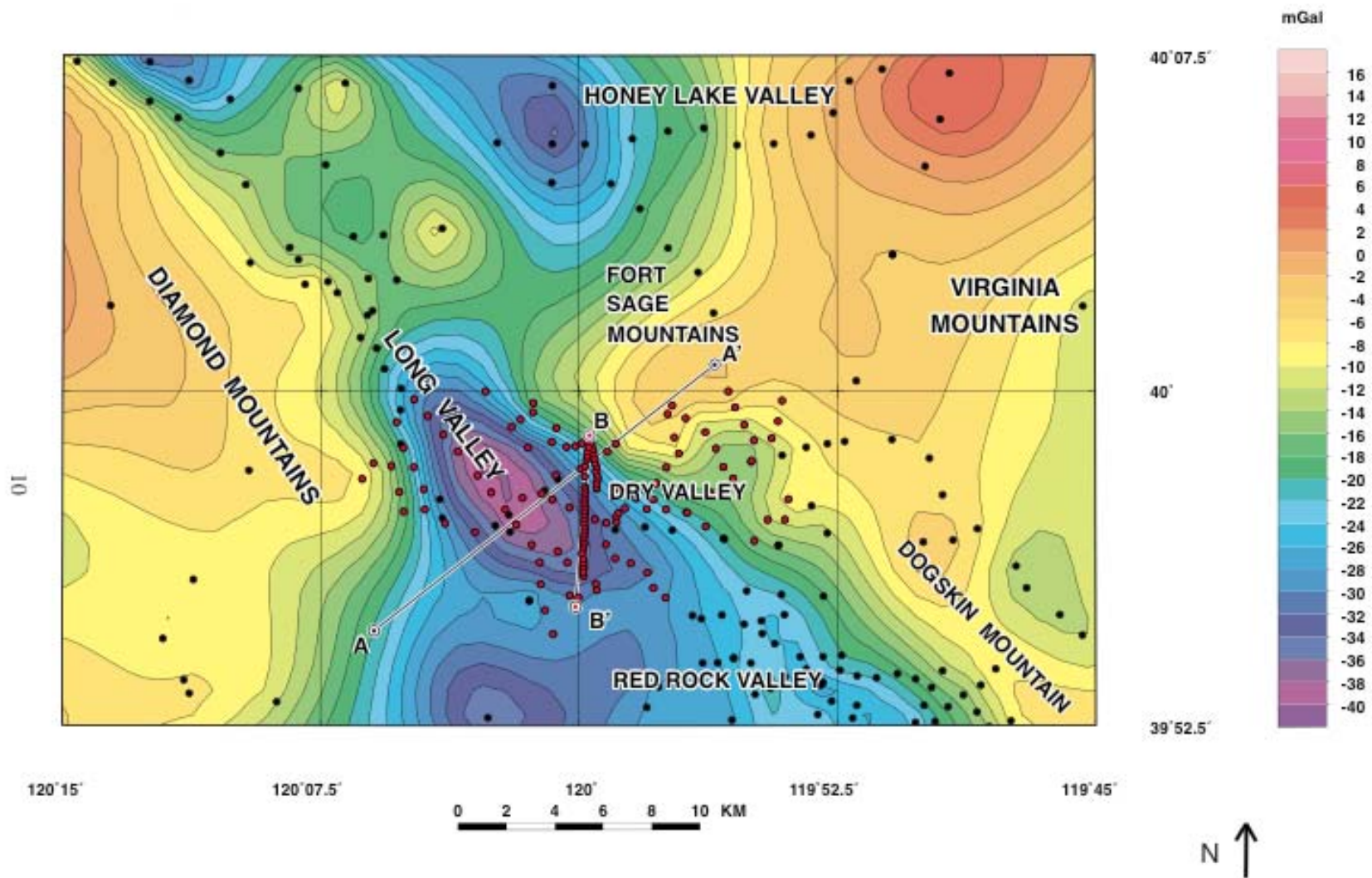


Figure 4. Isostatic gravity map of the study area. See figure 2 for explanation.

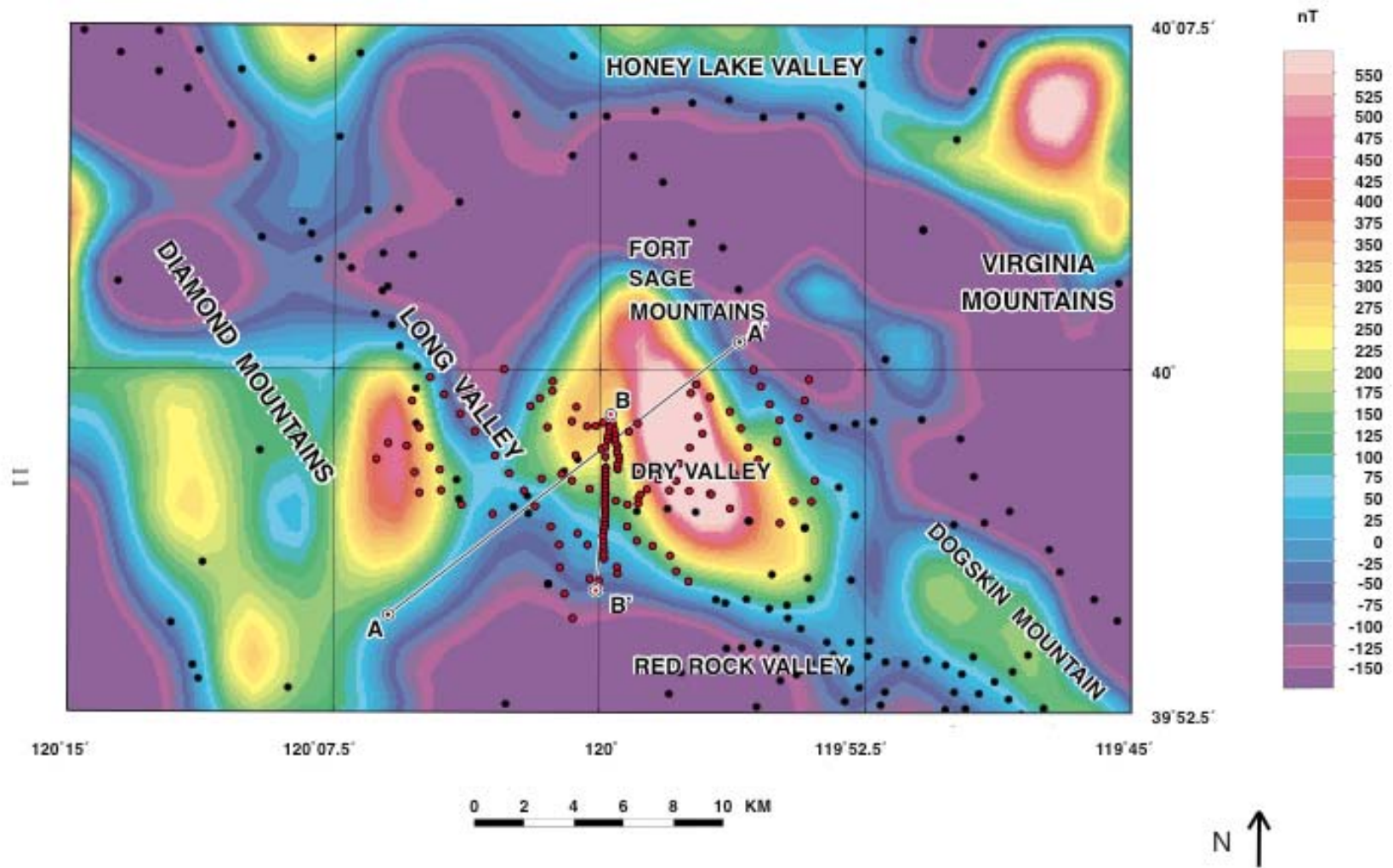
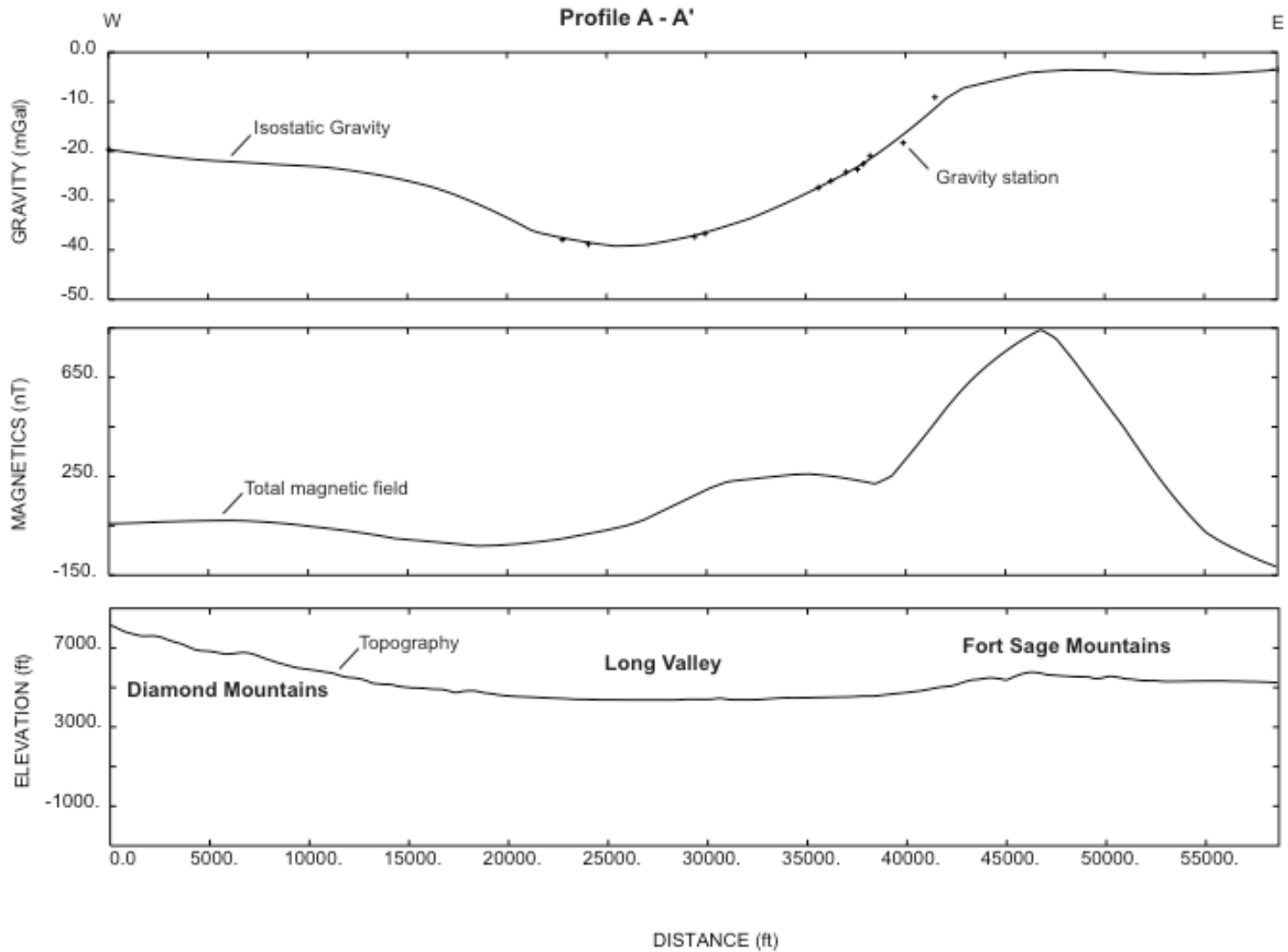


Figure 5. Aeromagnetic map of the study area (modified from Hildenbrand and Kucks, 1988). See figure 2 for explanation.



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Figure 6. Isostatic gravity, magnetic, and topographic profiles across Long Valley. Crosses, scattered gravity stations along the profile. Vertical exaggeration = 1.

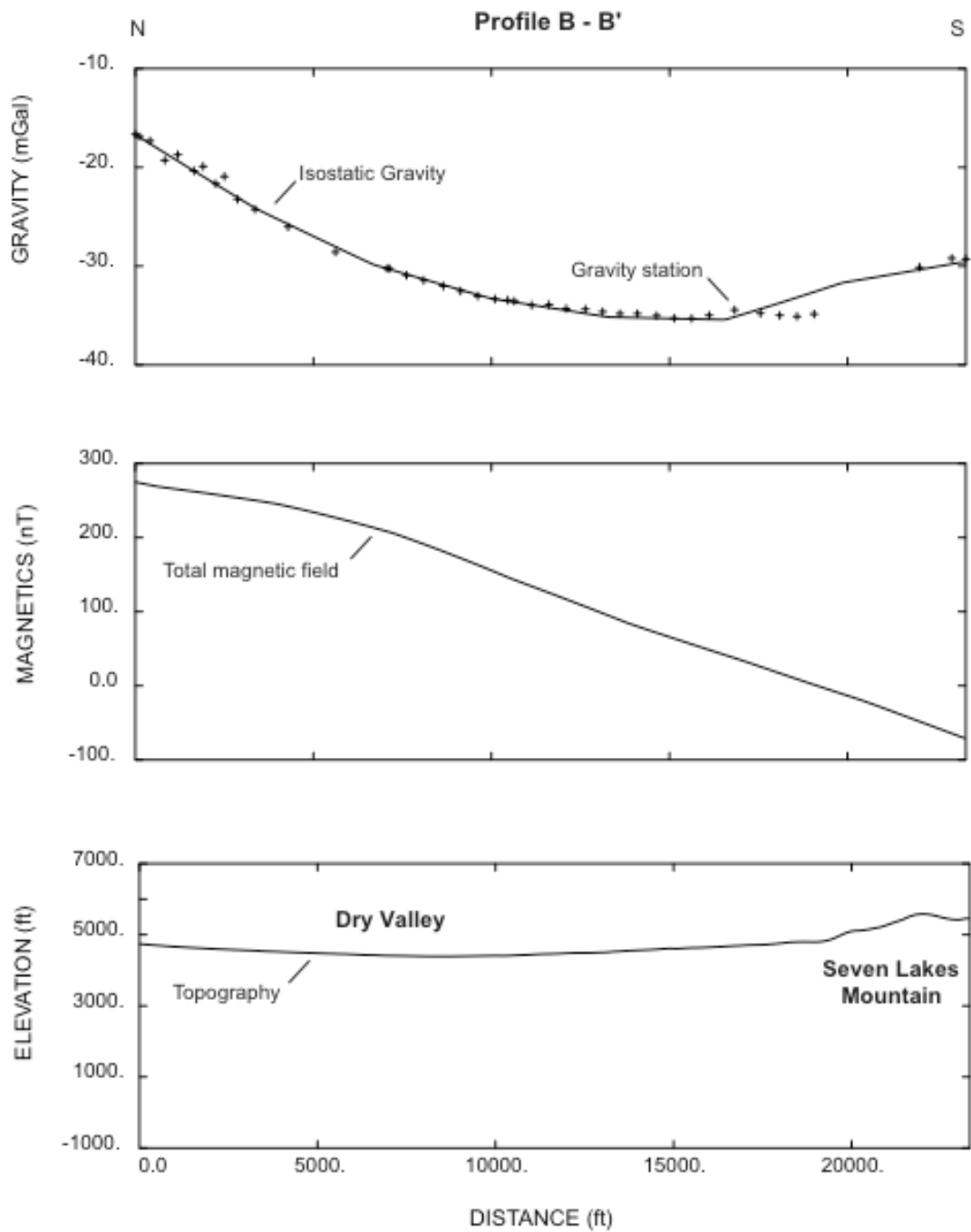


Figure 7. Isostatic gravity, magnetic, and topographic profiles across Dry Valley. Crosses, scattered gravity stations along the profile. Vertical exaggeration = 1.

Appendix. Principal data of gravity stations in the Dry Valley area

[Latitudes (north) and longitudes (west) are on the North American Datum 1927 (NAD27). Elevations are on the North American Vertical Datum 1929 (NAVD29). CBA, complete Bouguer anomaly; Elev, elevation, FAA, free-air anomaly; ISO, isostatic anomaly; ITC, inner terrain correction; OG, observed gravity; SBA, simple Bouguer anomaly; TTC, total terrain correction.]

Station	Latitude		Longitude		Elevation ft	OG mGal	FAA mGal	SBA mGal	ITC mGal	TTC mGal	CBA mGal	ISO mGal
	deg	min	deg	min								
New USGS data												
02REN001	39	57.85	119	59.49	4418.7	979716.49	-33.80	-184.51	0.02	1.69	-184.14	-28.68
02REN002	39	57.94	119	59.49	4442.0	979715.96	-32.27	-183.77	0.03	1.69	-183.41	-27.98
02REN003	39	58.04	119	59.45	4453.9	979716.31	-30.95	-182.86	0.03	1.76	-182.43	-27.04
02REN004	39	58.12	119	59.47	4466.4	979716.55	-29.66	-181.99	0.03	1.80	-181.52	-26.17
02REN005	39	58.21	119	59.51	4486.8	979716.35	-28.07	-181.10	0.03	1.84	-180.60	-25.29
02REN006	39	58.32	119	59.49	4516.2	979715.73	-26.09	-180.12	0.04	1.93	-179.54	-24.27
02REN007	39	58.39	119	59.54	4532.9	979715.41	-24.95	-179.55	0.04	1.98	-178.92	-23.69
02REN008	39	58.49	119	59.56	4565.1	979714.70	-22.78	-178.48	0.04	2.06	-177.77	-22.57
02REN009	39	58.60	119	59.58	4590.6	979714.88	-20.37	-176.93	0.05	2.22	-176.06	-20.92
02REN010	39	58.70	119	59.60	4622.3	979714.03	-18.38	-176.03	0.06	2.37	-175.01	-19.90
02REN011	39	58.82	119	59.64	4659.2	979713.02	-16.10	-175.01	0.07	2.59	-173.78	-18.72
02REN012	39	58.95	119	59.66	4710.8	979711.24	-13.23	-173.89	0.15	2.95	-172.31	-17.31
02REN013	39	59.00	119	59.68	4732.2	979710.31	-12.22	-173.62	0.21	3.11	-171.88	-16.89
02REN014	39	58.89	119	59.80	4662.0	979712.26	-16.70	-175.71	0.11	2.74	-174.33	-19.28
02REN015	39	58.84	119	59.91	4634.0	979712.63	-18.89	-176.94	0.08	2.57	-175.73	-20.65
02REN016	39	58.77	120	0.11	4585.1	979712.89	-23.12	-179.50	0.05	2.38	-178.47	-23.36
02REN017	39	58.76	120	0.36	4538.5	979713.22	-27.16	-181.95	0.05	2.36	-180.93	-25.80
02REN018	39	58.87	120	0.79	4488.3	979714.50	-30.76	-183.84	0.07	2.55	-182.63	-27.50
02REN019	39	58.74	120	1.48	4351.5	979716.24	-41.69	-190.10	0.02	2.22	-189.19	-34.00
02REN020	39	59.20	120	1.96	4352.8	979719.88	-38.61	-187.07	0.04	2.62	-185.76	-30.69
02REN021	39	59.37	120	1.70	4464.0	979721.12	-27.17	-179.42	0.28	3.12	-177.63	-22.65
02REN022	39	59.53	120	1.34	4609.5	979716.91	-17.94	-175.15	0.58	3.95	-172.55	-17.66
02REN023	39	59.74	120	1.33	4887.0	979701.84	-7.24	-173.91	0.52	3.76	-171.54	-16.82
02REN024	39	57.72	120	1.08	4387.4	979709.54	-43.50	-193.14	0.01	1.58	-192.88	-37.32
02REN025	39	57.62	120	1.64	4366.4	979708.30	-46.57	-195.49	0.00	1.68	-195.12	-39.52
02REN026	39	57.58	120	0.78	4418.9	979708.16	-41.71	-192.42	0.03	1.51	-192.24	-36.63
02REN027	39	57.40	120	0.28	4416.4	979709.56	-40.28	-190.90	0.03	1.51	-190.72	-35.06
02REN028	39	57.30	119	59.83	4418.2	979710.90	-38.62	-189.31	0.01	1.52	-189.12	-33.44
02REN029	39	57.14	119	59.54	4450.1	979709.56	-36.73	-188.50	0.02	1.51	-188.32	-32.61
02REN030	39	57.06	119	59.21	4435.7	979711.24	-36.28	-187.56	0.04	1.70	-187.20	-31.47
02REN031	39	57.08	119	58.91	4447.5	979711.77	-34.67	-186.36	0.02	1.70	-185.99	-30.28
02REN032	39	57.20	119	58.91	4422.7	979714.00	-34.95	-185.79	0.00	1.70	-185.42	-29.74
02REN033	39	57.28	119	58.85	4425.0	979714.72	-34.13	-185.05	0.00	1.66	-184.71	-29.06
02REN034	39	57.39	119	58.67	4426.9	979716.55	-32.29	-183.27	0.00	1.67	-182.93	-27.32

Station	Latitude		Longitude		Elevation	OG	FAA	SBA	ITC	TTC	CBA	ISO
	deg	min	deg	min	ft	mGal	mGal	mGal	mGal	mGal	mGal	mGal
New USGS data - Continued												
02REN035	39	57.61	119	58.34	4452.8	979718.57	-28.16	-180.03	0.01	1.65	-179.71	-24.18
02REN036	39	57.82	119	58.32	4483.1	979718.37	-25.82	-178.72	0.02	1.65	-178.41	-22.96
02REN037	39	57.86	119	59.83	4412.2	979715.36	-35.56	-186.04	0.02	1.65	-185.72	-30.23
02REN038	39	58.10	119	59.84	4470.6	979713.98	-31.80	-184.28	0.02	1.67	-183.94	-28.57
02REN039	39	58.27	119	59.95	4498.3	979713.76	-29.67	-183.09	0.02	1.75	-182.68	-27.38
02REN040	39	58.32	119	59.83	4512.3	979714.33	-27.86	-181.76	0.03	1.82	-181.28	-26.02
02REN041	39	58.47	119	59.78	4546.1	979714.19	-25.05	-180.10	0.04	1.99	-179.45	-24.25
02REN042	39	58.55	119	59.76	4565.6	979714.13	-23.39	-179.11	0.03	2.08	-178.38	-23.22
02REN043	39	58.65	119	59.74	4596.8	979713.87	-20.87	-177.65	0.04	2.23	-176.77	-21.65
02REN044	39	58.75	119	59.72	4628.4	979713.27	-18.65	-176.50	0.06	2.42	-175.44	-20.35
02REN045	39	57.85	119	59.83	4411.4	979715.38	-35.60	-186.05	0.02	1.64	-185.73	-30.24
02REN046	39	57.77	119	59.83	4402.0	979715.15	-36.59	-186.73	0.01	1.62	-186.43	-30.92
02REN047	39	57.69	119	59.83	4400.2	979714.63	-37.16	-187.24	0.01	1.59	-186.97	-31.43
02REN048	39	57.60	119	59.84	4402.1	979713.80	-37.68	-187.82	0.01	1.56	-187.58	-32.01
02REN049	39	57.52	119	59.84	4401.5	979713.20	-38.22	-188.34	0.01	1.55	-188.11	-32.51
02REN050	39	57.44	119	59.84	4407.6	979712.18	-38.54	-188.87	0.01	1.53	-188.66	-33.03
02REN051	39	57.36	119	59.84	4413.5	979711.41	-38.64	-189.17	0.01	1.52	-188.97	-33.32
02REN052	39	57.27	119	59.84	4424.5	979710.37	-38.51	-189.42	0.02	1.51	-189.23	-33.54
02REN053	39	57.19	119	59.84	4442.9	979708.75	-38.29	-189.82	0.02	1.49	-189.65	-33.94
02REN054	39	57.11	119	59.85	4464.6	979707.40	-37.48	-189.75	0.02	1.45	-189.63	-33.90
02REN055	39	57.03	119	59.85	4482.4	979705.81	-37.28	-190.15	0.04	1.45	-190.04	-34.30
02REN056	39	56.94	119	59.84	4498.3	979704.62	-36.84	-190.26	0.07	1.48	-190.12	-34.36
02REN057	39	56.86	119	59.84	4514.4	979703.22	-36.61	-190.57	0.11	1.51	-190.40	-34.61
02REN058	39	56.78	119	59.85	4571.7	979699.56	-34.76	-190.68	0.09	1.41	-190.62	-34.81
02REN059	39	56.70	119	59.86	4576.5	979699.12	-34.63	-190.72	0.06	1.41	-190.65	-34.81
02REN060	39	56.61	119	59.85	4600.1	979697.35	-34.05	-190.94	0.07	1.44	-190.86	-35.01
02REN061	39	56.53	119	59.87	4629.2	979695.21	-33.33	-191.22	0.07	1.44	-191.14	-35.28
02REN062	39	56.45	119	59.89	4652.7	979693.63	-32.59	-191.27	0.09	1.47	-191.17	-35.30
02REN063	39	56.37	119	59.91	4662.5	979693.16	-32.02	-191.04	0.11	1.52	-190.88	-34.98
02REN064	39	57.58	119	57.84	4474.4	979719.50	-25.15	-177.76	0.01	1.58	-177.51	-22.00
02REN065	39	57.36	119	57.47	4484.0	979718.10	-25.33	-178.26	0.01	1.54	-178.06	-22.47
02REN066	39	57.37	119	58.03	4450.5	979718.09	-28.50	-180.29	0.00	1.65	-179.97	-24.36
02REN067	39	57.95	119	57.75	4561.2	979717.49	-19.55	-175.12	0.05	1.55	-174.92	-19.56
02REN068	39	58.30	119	57.46	4709.7	979716.96	-6.65	-167.28	0.08	1.56	-167.08	-11.91
02REN069	39	58.61	119	57.10	4874.3	979711.12	2.53	-163.72	0.19	1.65	-163.46	-8.49
02REN070	39	58.97	119	57.23	5179.9	979696.34	15.93	-160.73	0.44	2.22	-159.94	-5.16
02REN071	39	59.49	119	57.43	5451.0	979681.94	26.24	-159.67	0.29	2.64	-158.48	-3.93
02REN072	39	55.88	119	59.87	4849.6	979680.80	-26.06	-191.47	0.35	2.02	-190.83	-34.85
02REN073	39	56.25	119	59.88	4692.6	979691.65	-30.52	-190.57	0.11	1.59	-190.35	-34.43
02REN074	39	56.13	119	59.88	4735.7	979688.48	-29.46	-190.98	0.11	1.64	-190.71	-34.77

Station	Latitude		Longitude		Elevation	OG	FAA	SBA	ITC	TTC	CBA	ISO
	deg	min	deg	min	ft	mGal	mGal	mGal	mGal	mGal	mGal	mGal
New USGS data - Continued												
02REN075	39	56.04	119	59.87	4782.4	979685.26	-28.16	-191.27	0.14	1.71	-190.93	-34.98
02REN076	39	55.96	119	59.88	4799.3	979683.79	-27.92	-191.61	0.27	1.92	-191.06	-35.09
02REN077	39	55.70	119	59.51	5028.8	979673.24	-16.51	-188.03	0.52	2.19	-187.24	-31.28
02REN078	39	55.56	119	59.49	5145.4	979667.42	-11.17	-186.66	1.03	2.63	-185.45	-29.50
02REN079	39	56.18	120	0.34	4651.2	979691.82	-34.14	-192.77	0.13	1.66	-192.48	-36.52
02REN080	39	56.43	120	0.62	4475.1	979701.85	-41.03	-193.66	0.13	1.87	-193.13	-37.18
02REN081	39	54.58	120	0.75	4487.0	979706.23	-32.79	-185.82	0.03	2.38	-184.77	-28.21
02REN082	39	55.11	120	0.98	4460.1	979706.93	-35.40	-187.52	0.23	3.27	-185.59	-29.20
02REN083	39	55.69	120	1.12	4430.1	979710.59	-35.42	-186.52	0.17	3.30	-184.54	-28.36
02REN084	39	56.18	120	1.14	4420.5	979706.68	-40.96	-191.73	0.05	2.47	-190.59	-34.56
02REN085	39	56.57	120	1.37	4422.2	979705.17	-42.89	-193.72	0.12	2.19	-192.85	-36.93
02REN086	39	57.02	120	1.82	4402.9	979705.46	-45.08	-195.25	0.02	1.97	-194.61	-38.82
02REN087	39	57.36	120	2.14	4369.5	979707.14	-47.05	-196.08	0.00	1.92	-195.48	-39.79
02REN088	39	57.74	120	2.55	4353.6	979708.66	-47.59	-196.07	0.00	1.90	-195.49	-39.94
02REN089	39	58.12	120	2.95	4341.1	979710.24	-47.75	-195.80	0.01	1.94	-195.18	-39.73
02REN090	39	58.65	120	3.52	4322.2	979713.82	-46.73	-194.14	0.02	2.03	-193.42	-38.14
02REN091	39	59.03	120	3.94	4312.3	979717.17	-44.87	-191.95	0.01	2.07	-191.19	-36.04
02REN092	39	59.45	120	4.40	4296.1	979722.10	-42.09	-188.61	0.01	2.12	-187.80	-32.77
02REN093	39	59.82	120	4.79	4289.1	979727.12	-38.28	-184.56	0.01	2.12	-183.75	-28.85
02REN094	39	59.31	120	5.30	4328.2	979729.87	-31.09	-178.71	0.02	2.77	-177.25	-22.20
02REN095	39	58.73	120	5.10	4358.2	979728.85	-28.43	-177.08	0.24	3.35	-175.04	-19.83
02REN096	39	58.30	120	4.80	4352.1	979725.93	-31.29	-179.72	0.11	3.29	-177.75	-22.38
02REN097	39	57.81	120	4.51	4348.9	979722.91	-33.88	-182.21	0.24	3.70	-179.83	-24.27
02REN098	39	57.36	120	4.48	4396.5	979719.92	-31.73	-181.68	0.22	4.45	-178.55	-22.86
02REN099	39	57.05	120	3.89	4424.7	979714.85	-33.69	-184.60	0.10	3.82	-182.10	-26.31
02REN100	39	56.85	120	3.02	4476.2	979707.56	-35.84	-188.51	0.14	3.06	-186.79	-30.94
02REN101	39	56.58	119	59.22	4664.8	979696.56	-28.71	-187.81	0.30	1.77	-187.41	-31.59
02REN102	39	56.27	119	58.95	4991.0	979675.88	-18.27	-188.50	0.28	1.88	-188.02	-32.24
02REN103	39	56.16	119	58.50	5236.8	979661.57	-9.32	-187.92	0.36	2.31	-187.05	-31.31
02REN104	39	55.95	119	58.01	5502.7	979645.60	0.02	-187.66	0.39	2.75	-186.37	-30.67
02REN105	39	55.61	119	57.84	5688.6	979635.85	8.24	-185.77	0.15	2.80	-184.45	-28.71
02REN106	39	55.39	119	57.49	5670.8	979637.30	8.35	-185.06	0.06	2.41	-184.13	-28.35
02REN107	39	57.73	119	56.20	4590.6	979719.47	-14.48	-171.05	0.17	1.45	-170.95	-15.58
02REN108	39	58.05	119	55.52	4660.2	979716.53	-11.36	-170.30	0.31	1.58	-170.08	-14.88
02REN109	39	58.45	119	54.99	4714.4	979713.92	-9.47	-170.26	0.09	1.34	-170.28	-15.25
02REN110	39	58.90	119	54.92	4790.9	979711.91	-4.95	-168.35	0.02	1.24	-168.49	-13.66
02REN111	39	59.25	119	55.20	4871.6	979710.24	0.44	-165.71	0.02	1.25	-165.85	-11.14
02REN112	39	59.64	119	55.46	4968.7	979708.71	7.46	-162.00	0.03	1.36	-162.05	-7.50
02REN113	40	0.00	119	55.66	5079.9	979706.45	15.12	-158.14	0.03	1.43	-158.12	-3.70
02REN114	39	58.95	119	54.40	4819.0	979712.12	-2.18	-166.53	0.01	1.26	-166.66	-11.89

Station	Latitude		Longitude		Elevation	OG	FAA	SBA	ITC	TTC	CBA	ISO
	deg	min	deg	min	ft	mGal	mGal	mGal	mGal	mGal	mGal	mGal
New USGS data - Continued												
02REN115	39	59.33	119	54.22	4905.8	979711.64	4.94	-162.38	0.03	1.32	-162.46	-7.82
02REN116	39	59.79	119	54.10	4981.6	979707.81	7.55	-162.35	0.10	1.59	-162.17	-7.70
02REN117	39	58.31	119	55.81	4760.2	979711.02	-7.85	-170.21	0.03	1.11	-170.48	-15.42
02REN118	39	58.72	119	56.02	4851.8	979707.11	-3.76	-169.24	0.03	1.17	-169.45	-14.55
02REN119	39	59.09	119	56.33	4962.6	979702.68	1.67	-167.58	0.04	1.36	-167.62	-12.84
02REN120	39	59.40	119	56.90	5160.9	979696.40	13.57	-162.45	0.11	1.83	-162.04	-7.38
02REN121	39	59.68	119	57.29	5436.3	979682.41	25.05	-160.36	0.35	2.67	-159.14	-4.65
02REN122	39	57.13	119	54.52	4679.7	979716.65	-8.04	-167.65	0.11	1.50	-167.51	-12.05
02REN123	39	57.59	119	53.92	4759.4	979716.78	-1.10	-163.43	0.22	1.76	-163.04	-7.80
02REN124	39	57.13	119	54.02	4789.3	979710.76	-3.63	-166.97	0.15	1.56	-166.79	-11.38
02REN125	39	56.66	119	54.91	4681.1	979711.66	-12.20	-171.85	0.03	1.25	-171.97	-16.35
02REN126	39	56.98	119	56.32	4599.8	979712.34	-19.64	-176.52	0.09	1.33	-176.54	-20.91
02REN127	39	57.29	119	56.85	4503.5	979719.67	-21.82	-175.42	0.04	1.48	-175.27	-19.69
02REN128	39	57.83	119	58.94	4426.8	979718.49	-31.01	-181.99	0.03	1.80	-181.52	-26.04
02REN129	39	55.40	120	0.02	5585.5	979638.00	1.01	-189.49	0.86	4.98	-185.97	-30.11
02REN130	39	55.19	120	0.10	5490.5	979643.78	-1.82	-189.08	1.80	5.28	-185.26	-29.28
02REN131	39	55.25	120	0.02	5518.1	979643.17	0.07	-188.13	0.97	4.45	-185.14	-29.20
02REN132	39	58.33	120	5.45	4667.2	979715.41	-12.23	-171.42	0.32	3.58	-169.20	-13.96
02REN133	39	58.39	120	5.97	5050.2	979696.11	4.38	-167.87	0.73	4.12	-165.16	-10.08
02REN134	39	58.04	120	6.30	5316.5	979680.90	14.71	-166.61	0.63	4.76	-163.30	-8.19
02REN135	39	57.75	120	5.22	4777.1	979706.58	-9.87	-172.80	0.18	3.59	-170.60	-15.18
02REN136	39	57.31	120	5.09	4944.7	979693.77	-6.28	-174.92	0.36	4.10	-172.23	-16.73
02REN137	40	0.00	120	2.71	4322.0	979726.69	-35.88	-183.29	0.10	3.69	-180.91	-26.06
02REN138	39	59.18	120	0.66	4646.4	979711.42	-19.44	-177.91	0.57	3.65	-175.62	-20.64
02REN139	39	58.13	120	0.68	4393.0	979713.77	-39.35	-189.18	0.02	1.74	-188.76	-33.36
02REN140	39	58.65	119	59.18	4728.3	979709.22	-13.16	-174.42	0.21	2.39	-173.40	-18.33
02REN141	39	58.83	119	58.93	4938.6	979705.49	2.61	-165.82	0.75	3.21	-164.02	-9.10
DVGPS1	39	59.02	119	59.69	4746.3	979709.70	-11.53	-173.41	0.24	3.16	-171.62	-16.65
LOOKPK	39	55.44	120	0.27	5567.7	979636.45	-2.27	-192.16	1.76	6.46	-187.16	-31.29
Previous data (Jewel and others, 2000)												
00REN001	39	56.71	119	55.80	4573.5	979714.41	-19.64	-175.62	0.02	1.48	-175.49	-19.81
00REN002	39	56.90	119	57.29	4488.2	979714.60	-27.75	-180.82	0.03	1.91	-180.25	-24.53
00REN003	39	56.97	119	58.08	4445.5	979714.15	-32.32	-183.93	0.05	2.08	-183.19	-27.45
00REN004	39	56.91	119	58.95	4452.1	979710.75	-35.01	-186.85	0.07	1.91	-186.27	-30.50
00REN005	39	52.94	119	58.03	4773.6	979687.20	-22.44	-185.25	0.09	1.93	-184.71	-27.82
00REN006	39	53.71	119	58.78	4662.1	979690.66	-30.61	-189.61	0.02	1.86	-189.12	-32.41
00REN016	39	55.01	119	54.04	5079.1	979677.45	-6.55	-179.78	0.75	1.68	-179.52	-23.56
00REN017	39	55.46	119	54.12	4886.7	979691.74	-11.01	-177.68	0.06	1.23	-177.84	-21.98
00REN018	39	55.42	119	52.90	5265.2	979672.59	5.47	-174.10	0.15	1.69	-173.85	-18.16
00REN019	39	56.83	119	52.79	5282.4	979678.17	10.58	-169.59	0.26	2.32	-168.71	-13.46

Station	Latitude		Longitude		Elevation	OG	FAA	SBA	ITC	TTC	CBA	ISO
	deg	min	deg	min	ft	mGal	mGal	mGal	mGal	mGal	mGal	mGal
Previous data (Jewel and others, 2000) - Continued												
00REN020	39	57.44	119	53.25	5158.9	979690.78	10.67	-165.28	0.34	1.85	-164.86	-9.74
00REN021	39	56.56	119	54.21	4792.3	979705.50	-7.76	-171.21	0.05	1.29	-171.30	-15.71
00REN072	39	52.62	119	49.67	5095.2	979675.93	-3.01	-176.79	0.07	1.63	-176.58	-20.26
00REN073	39	52.95	119	49.29	5306.5	979666.75	7.18	-173.81	0.34	2.32	-172.93	-16.79
00REN074	39	53.21	119	48.85	5683.2	979645.54	20.99	-172.85	0.60	3.28	-171.04	-15.12
00REN075	39	53.43	119	48.34	6259.8	979614.28	43.59	-169.91	0.76	5.21	-166.20	-10.57
00REN076	39	53.79	119	47.91	6842.9	979579.11	62.68	-170.71	1.29	8.75	-163.47	-8.17
00REN077	39	52.83	119	48.45	5571.8	979652.13	17.67	-172.36	0.64	3.28	-170.55	-14.53
00REN078	39	52.50	119	48.10	5568.6	979652.73	18.46	-171.46	0.39	2.76	-170.16	-14.09
00REN096	39	54.36	119	54.32	4804.9	979692.36	-16.45	-180.33	0.10	1.39	-180.31	-24.00
00REN097	39	54.04	119	55.51	4754.5	979696.59	-16.48	-178.64	0.05	1.44	-178.57	-22.10
00REN098	39	54.04	119	55.51	4742.5	979695.45	-18.75	-180.50	0.04	1.48	-180.39	-23.92
00REN099	39	53.94	119	55.98	4741.0	979692.67	-21.52	-183.22	0.08	1.54	-183.05	-26.51
00REN100	39	53.93	119	56.41	4807.8	979688.21	-19.69	-183.66	0.18	1.50	-183.55	-27.02
00REN101	39	53.57	119	57.05	4702.1	979692.83	-24.47	-184.84	0.48	1.90	-184.31	-27.61
00REN102	39	53.40	119	57.69	4693.4	979693.94	-23.93	-184.00	0.04	1.50	-183.86	-27.09
00REN103	39	53.62	119	54.02	4966.4	979682.35	-10.18	-179.57	0.23	1.29	-179.68	-23.22
00REN104	39	53.36	119	54.44	5036.0	979680.68	-4.92	-176.68	0.17	1.23	-176.87	-20.33
00REN105	39	53.23	119	54.89	4831.4	979689.21	-15.43	-180.21	0.15	1.41	-180.19	-23.53
00REN106	39	54.87	119	54.71	4950.6	979683.73	-12.14	-180.99	0.14	1.18	-181.20	-25.10
00REN107	39	54.80	119	55.21	5275.7	979665.20	-0.01	-179.95	0.82	2.20	-179.18	-23.13
00REN108	39	55.00	119	55.85	5601.1	979643.62	8.69	-182.34	0.40	2.82	-180.98	-25.09
00REN109	39	54.92	119	56.45	6052.7	979611.42	19.05	-187.38	1.33	7.05	-181.83	-26.04
00REN110	39	54.99	119	56.71	6016.3	979614.27	18.38	-186.81	0.86	5.84	-182.46	-26.67
00REN193	39	56.67	119	49.14	5299.0	979684.66	18.86	-161.87	1.03	3.41	-159.90	-4.90
00REN194	39	56.63	119	50.00	5518.0	979671.04	25.89	-162.31	0.91	3.80	-159.97	-4.94
00REN195	39	56.26	119	50.27	5797.0	979652.48	34.10	-163.62	1.71	4.79	-160.31	-5.24
Previous data (Ponce, 1997)												
108	39	52.63	119	47.47	5816.7	979641.35	30.20	-168.18	1.56	4.92	-164.74	-8.85
123	39	52.60	119	50.24	5041.5	979675.73	-8.23	-180.18	0.05	1.35	-180.24	-23.81
124	39	52.98	119	49.99	5151.0	979673.61	-0.62	-176.30	0.12	1.70	-176.02	-19.76
125	39	53.38	119	49.77	5300.4	979668.06	7.28	-173.50	0.15	2.22	-172.72	-16.65
126	39	53.75	119	49.45	5495.6	979659.36	16.37	-171.06	0.73	3.67	-168.85	-12.99
127	39	53.57	119	50.23	5380.8	979662.88	9.37	-174.15	0.13	1.90	-173.69	-17.65
128	39	53.69	119	50.76	5349.0	979663.74	7.06	-175.37	0.11	1.80	-175.01	-18.94
129	39	53.60	119	51.37	5172.0	979671.01	-2.17	-178.57	0.11	1.67	-178.32	-22.11
130	39	53.64	119	51.93	5038.1	979678.10	-7.72	-179.55	0.05	1.59	-179.37	-23.09
131	39	53.77	119	52.43	4962.6	979684.81	-8.30	-177.56	0.06	1.60	-177.36	-21.08
132	39	54.10	119	52.38	5090.6	979676.64	-4.93	-178.55	0.75	2.39	-177.57	-21.42
133	39	54.07	119	52.92	4887.6	979690.40	-10.21	-176.90	0.08	1.81	-176.49	-20.22

Station	Latitude		Longitude		Elevation	OG	FAA	SBA	ITC	TTC	CBA	ISO
	deg	min	deg	min	ft	mGal	mGal	mGal	mGal	mGal	mGal	mGal
Previous data (Ponce, 1997) - Continued												
134	39	54.07	119	53.58	4820.0	979690.21	-16.75	-181.14	0.03	1.53	-181.00	-24.66
135	39	53.79	119	53.40	4829.4	979687.45	-18.21	-182.92	0.03	1.63	-182.68	-26.25
136	39	53.43	119	52.99	4855.2	979683.76	-18.94	-184.53	0.08	1.90	-184.03	-27.55
137	39	53.08	119	52.67	4871.1	979681.71	-18.98	-185.11	0.23	2.30	-184.20	-27.67
138	39	52.78	119	53.07	5176.1	979667.06	-4.52	-181.05	1.72	3.24	-179.24	-22.69
139	39	52.70	119	52.06	4910.2	979680.23	-16.22	-183.69	0.08	1.91	-183.17	-26.58
140	39	52.98	119	51.94	4940.8	979678.22	-15.77	-184.28	0.03	1.47	-184.21	-27.71
382	39	52.71	120	2.64	4670.0	979685.05	-33.99	-193.27	0.98	2.08	-192.56	-50.66
383	39	55.33	120	1.44	4547.0	979704.55	-29.94	-185.02	3.54	4.51	-181.86	-40.68
394	39	53.06	120	8.77	6213.0	979618.38	43.84	-168.06	1.18	2.80	-166.77	-25.80
395	39	53.25	120	11.31	5524.0	979665.31	25.74	-162.67	0.37	1.41	-162.72	-21.75
396	39	53.55	120	11.47	5764.0	979650.66	33.20	-163.39	0.31	1.43	-163.45	-22.65
397	39	54.47	120	12.08	5734.0	979652.15	30.50	-165.07	0.29	1.44	-165.11	-24.57
101D	40	0.96	120	5.88	4278.6	979741.46	-26.62	-172.54	0.15	2.10	-171.75	-32.24
102D	40	1.20	120	6.35	4350.0	979742.81	-18.91	-167.27	0.31	2.14	-166.45	-27.06
103D	40	0.50	120	5.65	4298.1	979736.06	-29.50	-176.09	0.18	2.21	-175.19	-35.55
104D	40	0.06	120	5.17	4294.0	979731.63	-33.66	-180.12	0.04	2.10	-179.33	-39.53
105D	40	2.94	120	8.16	4198.1	979753.50	-25.08	-168.27	0.11	2.09	-167.47	-28.57
106D	40	3.21	120	8.41	4190.9	979753.12	-26.54	-169.48	0.02	1.99	-168.78	-29.96
107D	40	2.87	120	9.56	4305.0	979750.17	-18.26	-165.09	0.83	3.70	-162.70	-23.81
108D	40	2.39	120	7.96	4395.0	979747.16	-12.10	-162.00	0.83	2.61	-160.71	-21.72
1C	39	59.58	120	5.19	4321.0	979728.79	-33.25	-180.63	0.13	2.37	-179.57	-39.62
3C	39	58.04	120	0.62	4383.7	979715.37	-38.49	-188.00	0.05	1.68	-187.65	-47.29
4C	39	57.78	120	1.00	4395.3	979710.41	-41.98	-191.88	0.00	1.53	-191.68	-51.22
5C	39	57.24	120	2.04	4379.7	979706.36	-46.69	-196.07	0.08	1.90	-195.49	-54.83
6C	39	57.59	120	4.04	4354.0	979717.86	-38.13	-186.63	0.17	3.02	-184.93	-44.37
70D	40	6.88	120	6.80	4183.0	979767.29	-18.56	-161.23	0.00	0.56	-161.96	-24.23
71D	40	6.83	120	0.78	3988.0	979757.16	-46.95	-182.97	0.00	0.69	-183.54	-45.82
72D	40	5.55	120	2.38	4019.0	979753.66	-45.64	-182.71	2.73	4.22	-179.75	-41.66
73D	40	5.53	120	0.78	3985.0	979750.82	-51.64	-187.56	0.01	1.54	-187.27	-49.19
74D	40	4.66	120	0.79	4046.0	979749.28	-46.16	-184.15	1.40	3.88	-181.54	-43.23
75D	40	3.46	120	6.56	4226.0	979748.12	-28.61	-172.75	0.01	1.26	-172.79	-34.07
76D	40	3.49	120	5.69	4314.0	979745.46	-23.05	-170.18	0.11	1.27	-170.23	-31.56
77D	40	3.64	120	3.98	4833.0	979722.73	2.79	-162.05	0.45	1.67	-161.77	-23.30
7C	39	57.17	120	3.97	4391.1	979715.93	-35.94	-185.71	0.63	3.75	-183.29	-42.59
83D	40	7.35	120	12.49	4030.0	979753.36	-47.58	-185.02	0.00	1.74	-184.55	-46.91
84D	40	6.94	120	11.35	4048.0	979753.52	-45.11	-183.18	0.00	1.47	-182.98	-45.23
86D	40	6.76	120	8.17	4167.9	979760.70	-26.40	-168.55	0.00	0.67	-169.17	-31.39
87D	40	6.52	120	10.15	4106.0	979758.37	-34.19	-174.23	0.00	1.18	-174.33	-36.45
88D	40	6.10	120	11.67	4103.7	979761.87	-30.28	-170.24	0.30	2.63	-168.89	-30.90

Station	Latitude		Longitude		Elevation	OG	FAA	SBA	ITC	TTC	CBA	ISO
	deg	min	deg	min	ft	mGal	mGal	mGal	mGal	mGal	mGal	mGal
Previous data (Ponce, 1997) - Continued												
8C	39	56.86	120	2.01	4461.5	979703.03	-41.77	-193.93	0.28	2.06	-193.21	-52.47
90D	40	6.88	120	13.58	4029.0	979770.99	-29.34	-166.76	0.59	3.76	-164.26	-26.47
91D	40	5.32	120	10.43	4253.1	979752.10	-24.85	-169.91	0.32	2.15	-169.06	-30.92
92D	40	5.06	120	7.37	4201.8	979754.94	-26.44	-169.75	0.00	0.93	-170.12	-31.90
95D	40	2.49	120	5.30	4363.0	979741.08	-21.33	-170.14	0.05	1.40	-170.06	-31.08
96D	40	2.52	120	6.13	4249.5	979748.70	-24.43	-169.36	0.02	1.50	-169.17	-30.15
97D	40	2.45	120	7.30	4260.7	979751.68	-20.29	-165.61	0.27	2.01	-164.90	-25.88
98D	40	2.20	120	7.03	4273.9	979750.33	-20.03	-165.80	0.30	2.04	-165.06	-25.96
99LOV088	40	6.93	119	52.13	3999.0	979786.51	-16.72	-153.11	0.20	1.60	-152.77	-0.34
99LOV089	40	6.22	119	52.60	4024.0	979782.25	-17.57	-154.81	0.01	1.69	-154.38	-1.75
99LOV090	40	5.72	119	53.25	3983.0	979782.47	-20.46	-156.31	0.00	1.95	-155.61	-2.80
99LOV091	40	5.53	119	54.33	3981.0	979779.92	-22.92	-158.70	0.00	1.79	-158.15	-5.24
99LOV092	40	5.50	119	55.40	4001.0	979776.48	-24.43	-160.89	0.00	1.61	-160.54	-7.58
99LOV093	40	5.88	119	56.37	3994.0	979767.75	-34.39	-170.61	0.00	1.13	-170.73	-17.83
99LOV094	40	5.64	119	58.45	4000.0	979763.23	-37.99	-174.41	0.00	1.20	-174.46	-21.46
99LOV095	40	5.52	119	59.83	3983.0	979755.09	-47.55	-183.39	0.00	1.45	-183.19	-30.10
99LOV096	40	4.64	119	59.07	4087.0	979751.28	-40.27	-179.66	0.02	2.42	-178.52	-25.25
99LOV097	40	4.08	119	58.23	4287.0	979744.67	-27.25	-173.46	0.05	2.91	-171.86	-18.45
99LOV098	40	3.20	119	57.41	4787.0	979715.33	-8.28	-171.55	0.27	3.61	-169.32	-15.78
99LOV099	40	2.66	119	56.54	5110.0	979701.53	9.08	-165.21	0.09	2.69	-163.94	-10.37
99LOV100	40	1.75	119	56.09	5505.0	979680.52	26.54	-161.21	0.11	2.14	-160.53	-6.84
99LOV101	40	7.10	119	49.22	4260.0	979775.88	-3.06	-148.36	0.49	3.78	-145.88	6.29
99LOV102	40	6.07	119	49.49	4545.0	979756.67	6.05	-148.97	0.25	3.52	-146.79	5.58
99LOV103	40	5.02	119	49.93	4850.0	979728.74	8.34	-157.07	1.39	6.12	-152.34	0.23
9C	39	55.32	120	1.45	4546.8	979704.40	-30.09	-185.17	3.10	4.83	-181.69	-40.50
CH-25	40	1.80	120	6.00	4262.1	979744.99	-25.88	-171.25	0.03	1.72	-170.84	-31.60
CZ 59	39	58.23	120	9.59	7338.0	979557.41	80.91	-169.36	3.45	10.39	-160.48	-21.34
CZ 60	39	54.65	120	5.95	8197.0	979471.51	81.03	-198.54	10.73	25.71	-174.28	-34.31
CZ 61	39	55.79	120	11.20	6327.0	979616.46	48.58	-167.21	2.74	4.72	-164.00	-23.95
E0919	40	6.47	120	12.49	4057.0	979766.80	-30.29	-168.66	0.20	2.88	-167.05	-29.15
E0920	40	4.61	120	9.69	4224.1	979755.81	-22.81	-166.88	0.29	2.13	-166.05	-27.69
E0944	39	58.82	120	5.18	4335.3	979729.77	-29.80	-177.66	0.63	3.34	-175.64	-35.49
E0945	39	57.00	120	2.43	4454.9	979703.80	-41.83	-193.77	0.63	2.56	-192.54	-51.82
F 09	39	57.82	119	59.49	4418.0	979716.40	-33.91	-184.59	0.01	1.67	-184.25	-28.77
G 3X	39	57.81	119	58.30	4483.0	979719.68	-24.51	-177.41	0.02	1.68	-177.07	-21.61
G001D	39	54.54	119	45.39	4584.0	979714.98	-14.86	-171.20	0.43	4.47	-168.09	-12.61
G002D	39	55.00	119	46.04	4685.0	979709.48	-11.55	-171.34	0.50	4.55	-168.16	-12.78
G004D	39	55.60	119	47.01	4870.0	979699.18	-5.35	-171.45	0.09	4.22	-168.62	-13.40
G005D	39	56.09	119	47.31	4880.0	979700.28	-4.04	-170.48	0.04	3.67	-168.20	-13.07
G006D	39	56.92	119	48.43	5123.0	979694.38	11.67	-163.06	0.13	2.50	-161.98	-7.06

Station	Latitude		Longitude		Elevation	OG	FAA	SBA	ITC	TTC	CBA	ISO
	deg	min	deg	min	ft	mGal	mGal	mGal	mGal	mGal	mGal	mGal
Previous data (Ponce, 1997) - Continued												
G010D	39	58.92	119	50.91	5271.0	979689.98	18.21	-161.56	0.13	2.26	-160.74	-6.31
G012D	39	58.88	119	52.28	5124.0	979698.09	12.57	-162.20	0.08	1.96	-161.66	-7.10
G013D	39	58.83	119	52.78	4977.0	979706.38	7.11	-162.64	0.10	1.86	-162.18	-7.53
G014D	39	58.75	119	53.40	4867.0	979711.28	1.79	-164.20	0.08	1.62	-163.98	-9.22
G015D	39	58.57	119	54.10	4784.0	979711.98	-5.04	-168.21	0.03	1.35	-168.24	-13.36
G016D	39	58.42	119	55.00	4712.0	979713.88	-9.69	-170.40	0.08	1.36	-170.41	-15.38
G018D	39	57.30	119	56.89	4509.0	979718.78	-22.21	-175.99	0.02	1.46	-175.88	-20.31
G023D	39	56.70	119	55.78	4573.0	979714.18	-19.90	-175.87	0.02	1.50	-175.72	-20.05
G024D	39	55.54	119	55.13	4895.0	979690.28	-11.81	-178.76	0.11	1.44	-178.72	-22.80
G026D	39	54.59	119	54.68	4868.0	979689.59	-13.63	-179.66	0.08	1.26	-179.79	-23.55
G027D	39	53.93	119	55.01	4753.0	979696.38	-16.67	-178.78	0.05	1.36	-178.80	-22.31
G029D	39	52.66	119	55.56	4724.0	979691.09	-22.80	-183.92	0.01	1.34	-183.96	-27.10
G049D	39	53.49	119	52.92	4848.0	979685.38	-18.09	-183.44	0.04	1.88	-182.95	-26.50
G050D	39	56.56	119	54.21	4797.0	979705.68	-7.14	-170.75	0.04	1.28	-170.85	-15.26
H0023	40	5.81	119	57.41	4009.2	979765.14	-35.46	-172.20	0.00	1.10	-172.36	-19.41
H6314	40	1.89	119	45.35	8163.1	979500.46	96.05	-182.37	0.00	20.93	-162.89	-10.67
H6692	40	0.23	119	51.94	5368.1	979687.85	23.26	-159.82	0.00	2.90	-158.37	-4.30
H6694	40	0.60	119	56.05	5253.9	979697.03	21.16	-158.03	0.00	1.81	-157.66	-3.48
H6698	40	7.19	119	51.18	4042.7	979786.55	-12.95	-150.84	0.00	1.54	-150.56	1.73
SZ179	40	1.91	120	13.62	5982.0	979657.52	48.13	-155.89	0.43	2.29	-155.10	-16.65
V8056	40	3.05	119	50.88	6794.0	979603.11	68.34	-163.38	0.00	8.02	-156.87	-4.17
V8056	40	3.05	119	50.88	6794.0	979603.11	68.34	-163.38	0.00	8.02	-156.88	-4.18
X99D	40	1.70	120	6.15	4276.4	979745.14	-24.24	-170.09	0.05	1.77	-169.63	-30.39
XE918	40	7.36	120	14.61	4048.0	979772.90	-26.36	-164.42	1.06	4.35	-161.34	-23.71