

DEPARTMENT OF THE INTERIOR

U.S. GEOLOGICAL SURVEY

Principal Facts for 113 Gravity Stations in the Salton Sea
1 by 2 Degree Quadrangle, Southern California

by

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This report is preliminary and has not been reviewed for conformity with
U.S. Geological Survey editorial standards.

¹U.S. Geological Survey, Menlo Park CA

TABLE OF CONTENTS

	Page
Introduction.....	1
Methods.. ..	2
References.....	3
Fig. 1 Index Map Showing BLM Wilderness Study Areas.....	4
Fig. 2-5 Plots of Station Locations.....	5
Table 1. Principal Facts Format.....	9
Table 2. Principal Facts for 113 Gravity Stations.....	10
Appendix Updated Base Station Description.....	13

Principal Facts for 113 Gravity Stations in the Salton Sea
1 by 2 Degree Quadrangle, Southern California

Introduction

Principal facts are presented for 113 recently established gravity stations in the Salton Sea Quadrangle. Regional gravity surveys were conducted in 1983 and 1984 as part of the mineral resource appraisals for Bureau of Land Management (BLM) Wilderness Study Areas shown in Figure 1. The purpose of this report is to provide succinct documentation for the contoured geophysical maps and mineral resource bulletins to be published later. The data set extends from lat 32°55' N. to lat 34°00' N. and lon 114°30' W to lon 116°5' W

The format of the data set is shown in Table 1. Various corrections have been applied to the gravity data yielding the complete bouguer and isostatic residual anomalies listed in Table 2. Identification labels of the new stations are plotted in Figures 2 through 5.

Methods

Principal facts are listed for the 113 USGS stations and include the latitude, longitude, elevation, observed gravity, accuracy code, and terrain corrections as well as the free air, simple bouguer, complete bouguer, and isostatic anomalies. Errors in residual gravity values may arise from inaccuracies in station location, gravimeter drift and flaws in the digital terrain model. The combined effect of such errors is probably less than 1.0 to 1.5 mGal based on the discussion of estimated gravity effects of such errors in Snyder and others, 1982.

The reference spheroid used for theoretical gravity was the GRS 1967 (International Union of Geodesy and Geophysics, 1971). The gravity datum used

is the (International Gravity Standardization Network) IGSN 1971 (Morelli, 1974). Two IGSN 1971 observed gravity base stations were used in the survey. For the western study areas, data was reduced relative to the observed gravity of 979 526.07 mGal at INDIO J (IGB: 12036K) at the Indio Airport, California. Base Station YUMA¹ (ACIC Reference Number 0446-1) along Ave 3E in Yuma, Arizona (Jablonski, 1974) was used for the eastern study areas with an observed gravity of 979 508.84 mGal.

The inner zone terrain corrections were manually calculated to a radius of 0.59 km, equivalent to the outer radius of the Hayford-Bowie zone D (Swick, 1942). Computer calculated terrain corrections from 0.59 to 166.7 km were made using a FORTRAN program by Plouff (1977). This computation of the complete Bouguer anomaly assumes a density of 2.67 g/cm. Isostatic anomalies were calculated based on a sea level crustal thickness of 25 km; topographic density of 2.67 g/cm; and a lower crust-upper mantle density contrast of 0.4 g/cm (Jachens and Roberts, 1981).

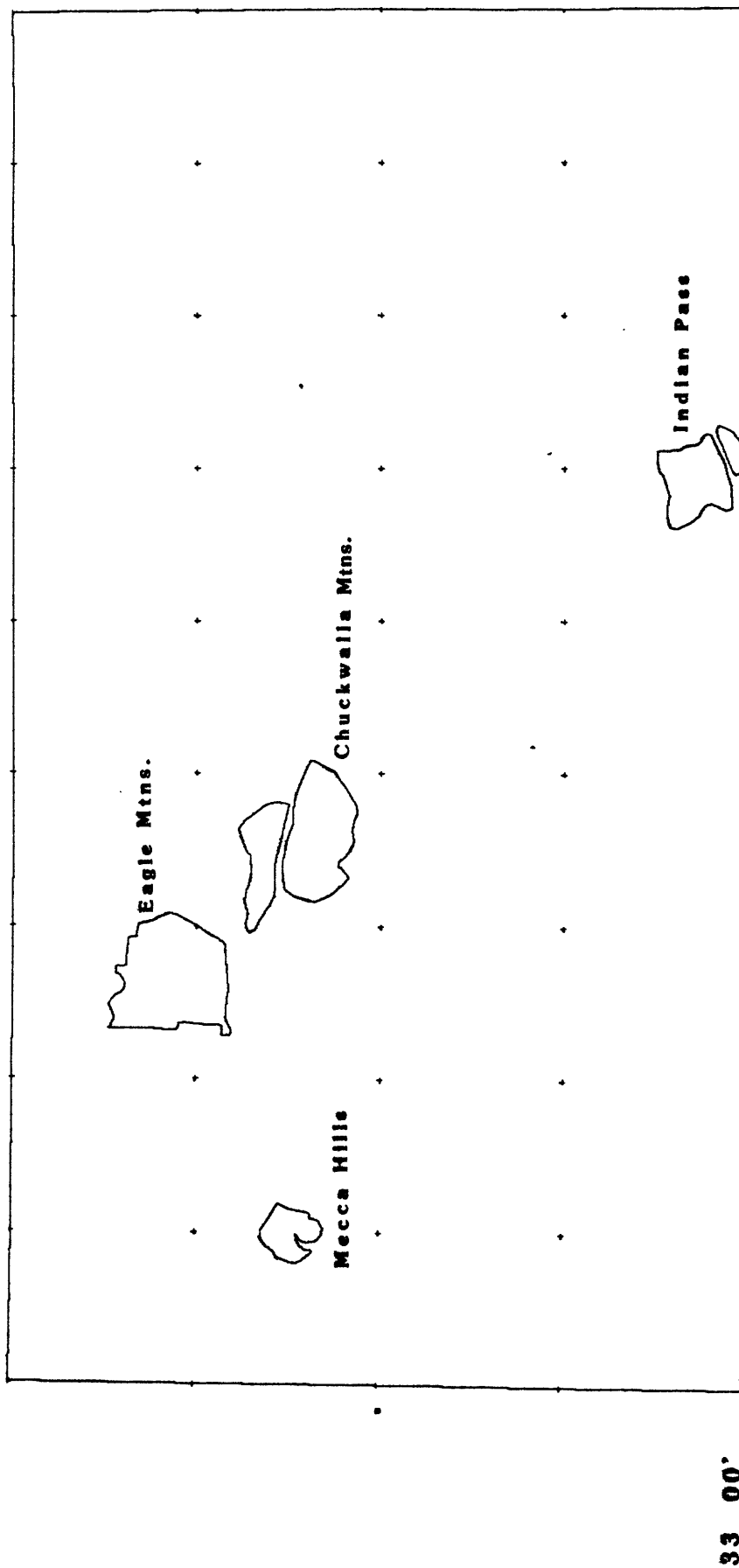
¹See appendix for an updated description of this station location.

References

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- Morelli, C. (Ed.), 1974, The International Gravity Standardization Net, 1971: International Association of Geodesy Special Publication no. 4, 194 p.
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- Swick, C. A., 1942, Pendulum gravity measurements and isostatic reductions: U.S. Coast and Geodetic Survey Special Publication 232, 82 p.

114 00'

34 00'



scale 1:1,000,000

116 15'

33 00'

Figure 1. BLM Wilderness Study Areas in the Salton Sea Quadrangle, Southern California

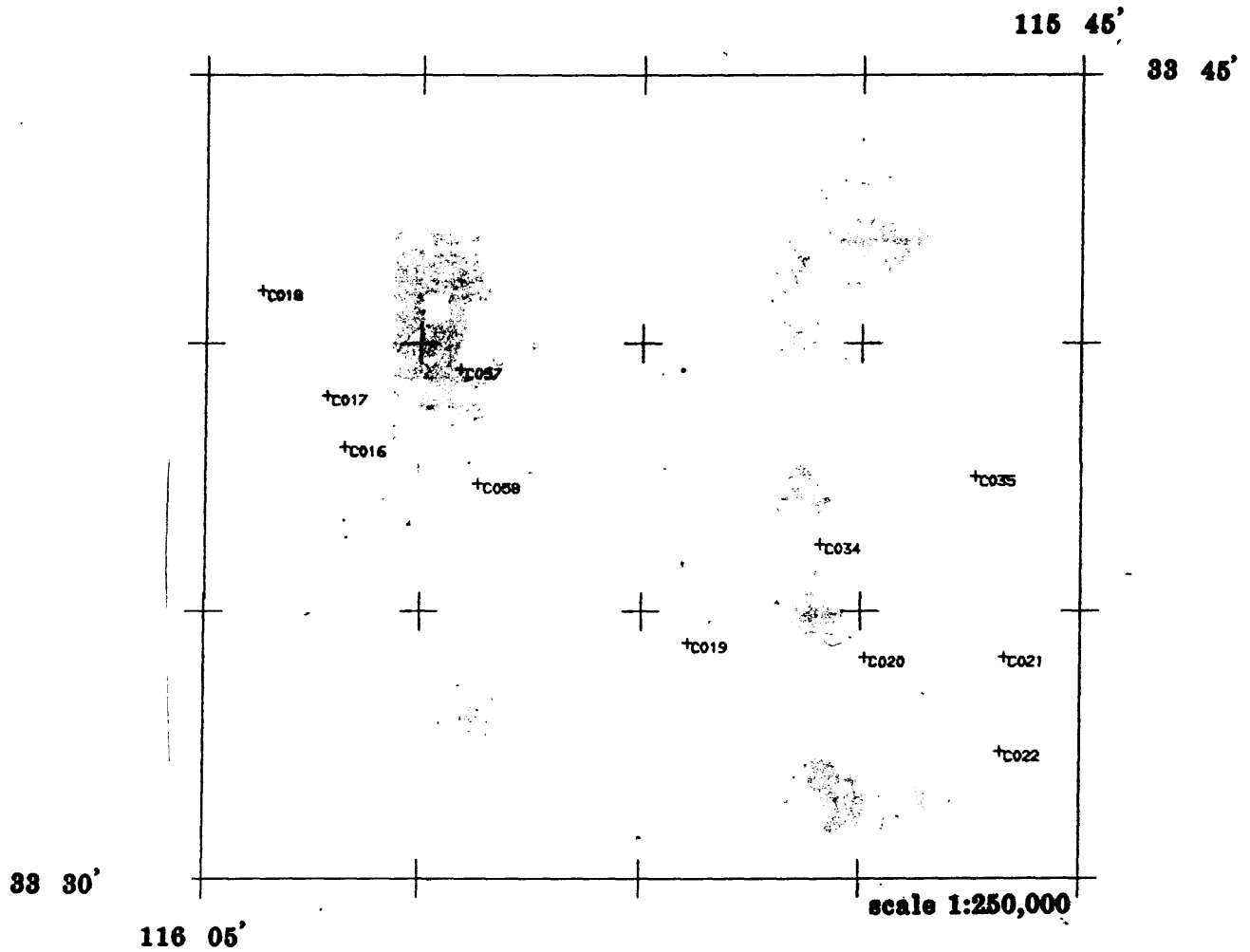


Figure 2. USGS Gravity stations in the Mecca Hills and western part of the Chuckwalla Mtns.

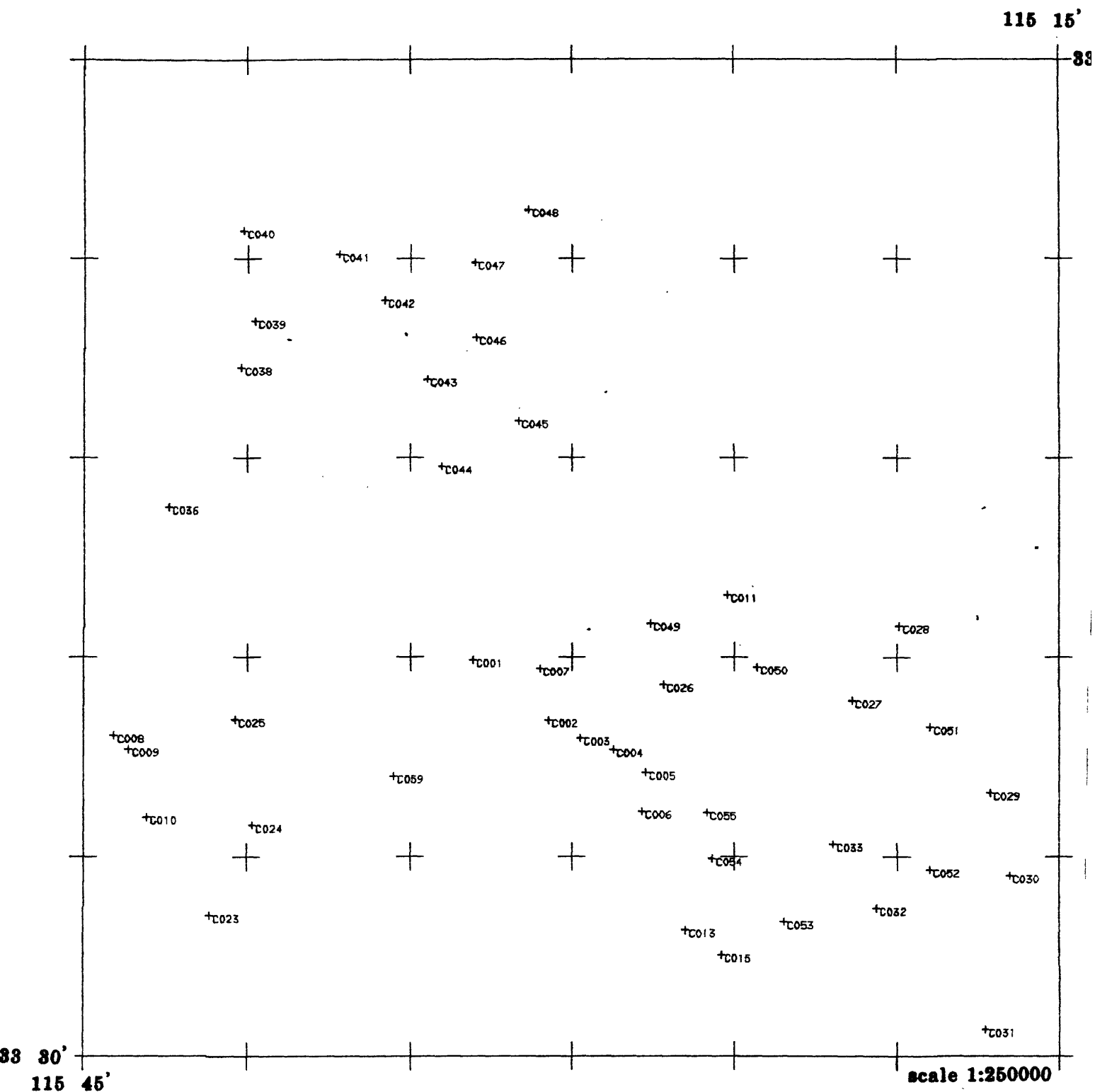


Figure 8. USGS Gravity stations in the Eagle Mtns and eastern part of the Chuckwalla Mtns.

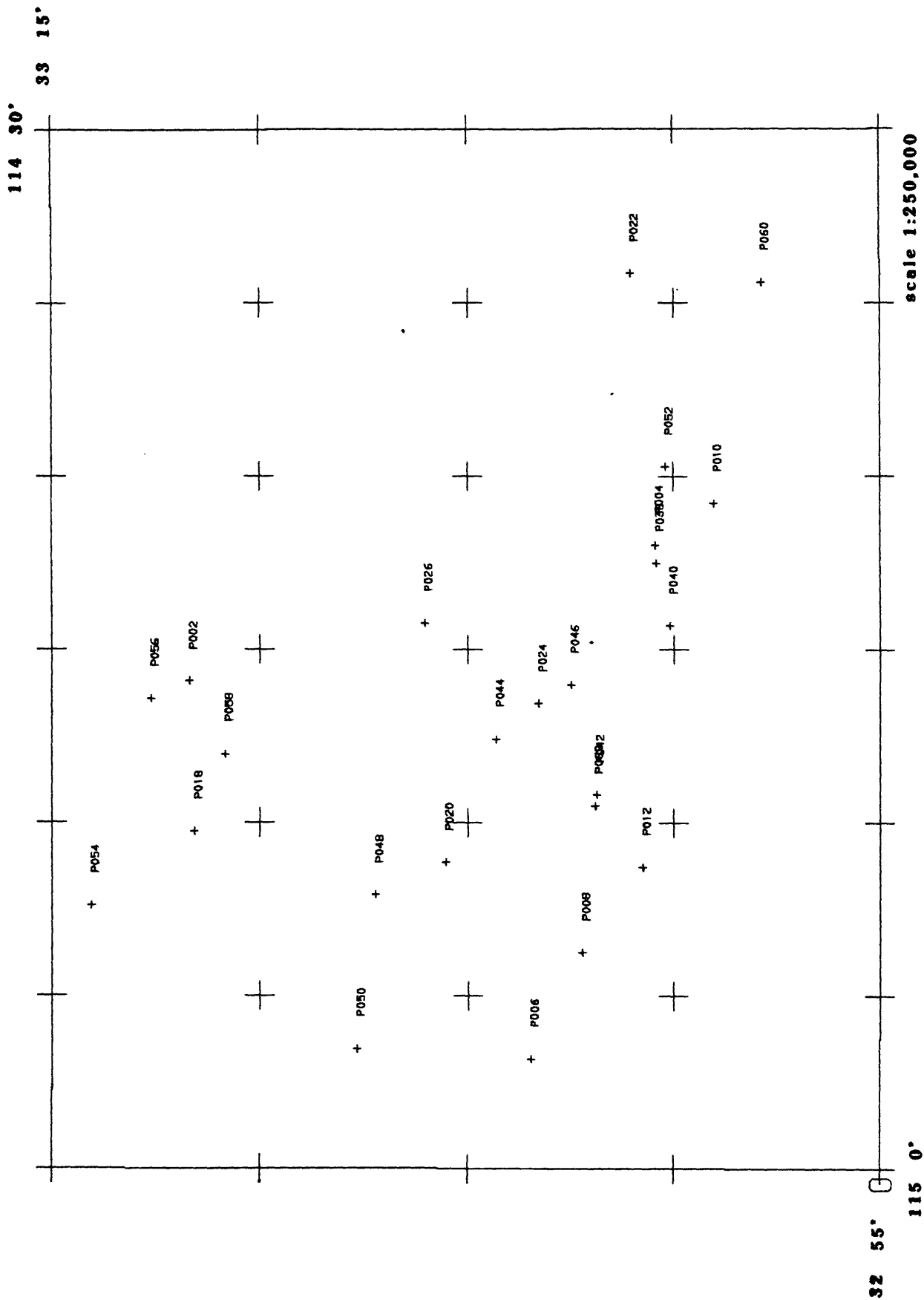


Figure 4. USGS Gravity stations in the Peter Kane and Indian Pass Wilderness Study Areas

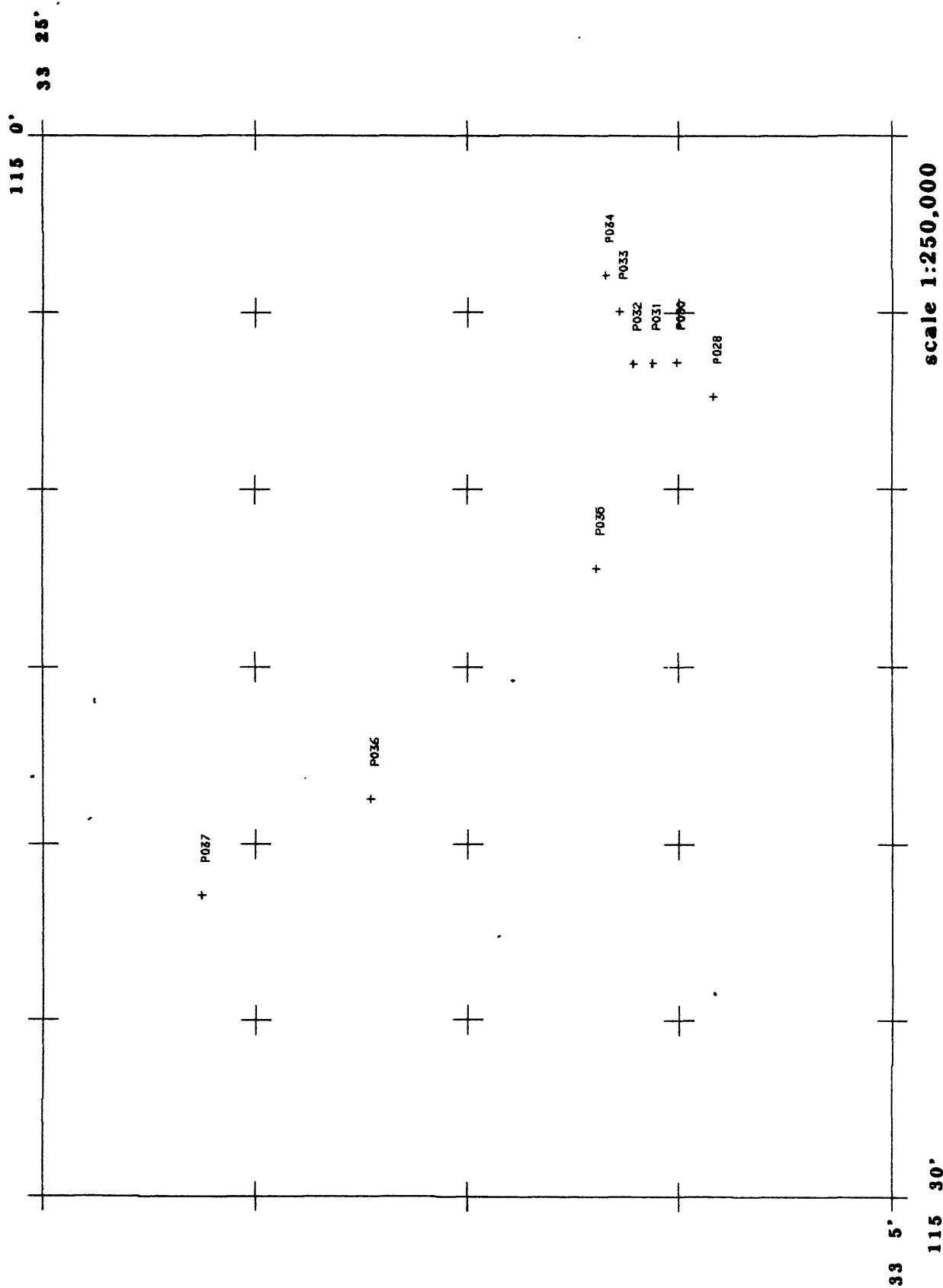


Figure 5. USGS Gravity stations in the southern Chocolate Mtns.

Table 1. Principal Facts Format

STATION	-abbreviated station identification consisting of 5 characters
LAT	-latitude in degrees and decimal minutes
LONG	-longitude in degrees and decimal minutes
ELEV	-elevation to 0.01 ft
OG	-observed gravity to 0.01 mGal
AC	-accuracy code consisting of one letter and three digits representing elevation, location and observed gravity accuracies as discussed by Snyder and others, 1982
FAA, SBA	-Free air and simple Bouguer anomalies, respectively, each to 0.01 mGal
INNER, TC	-Terrain correction, to 0.01 mGal. INNER column represents correction calculated outward from each station to 0.59 km; TC column represents total correction to 166.7 km
CBA1	-complete Bouguer anomaly, to 0.01 mGal
ISO	-isostatic residual anomaly, to 0.01 mGal

Table. 2. Principal Facts for 114 Gravity Stations in the Salton Sea Sheet

STATION NAME	LAT deg min	LONG deg min	ELEV feet	OG mGal	AC CODE	FAA mGal	SBA mGal	INNER mGal	TC mGal	CBA1 2.67	ISO 2.67
C001	33 39.93	115 33.09	1453.0	979453.78	G543	-30.12	-79.68	0.01	0.70	-79.56	-31.26
C002	33 38.42	115 30.75	1708.0	979444.32	G543	-13.50	-71.76	0.01	0.69	-71.73	-24.96
C003	33 37.98	115 29.74	1827.0	979438.91	G543	-7.10	-69.42	0.01	0.87	-69.25	-22.97
C004	33 37.68	115 28.72	1946.0	979432.75	G543	-1.66	-68.03	0.01	1.05	-67.72	-21.88
C005	33 37.11	115 27.73	2184.0	979418.98	G543	7.74	-66.75	0.70	1.91	-65.65	-20.36
C006	33 36.14	115 27.84	2310.0	979407.70	G543	9.67	-69.12	1.12	2.54	-67.44	-22.64
C007	33 39.71	115 31.02	1551.0	979456.22	G543	-18.16	-71.06	0.01	0.76	-70.91	-23.32
C008	33 38.04	115 44.07	1823.0	979441.89	G543	-4.58	-66.76	0.01	1.06	-66.41	-18.26
C009	33 37.70	115 43.62	1879.0	979438.82	G543	-1.92	-66.01	0.01	1.04	-65.69	-17.97
C010	33 35.01	115 43.07	2147.0	979427.99	G543	14.81	-58.42	0.29	1.64	-57.59	-11.84
C011	33 41.56	115 25.21	1235.0	979484.59	G543	-22.08	-64.20	0.71	1.91	-62.79	-16.45
C013	33 33.15	115 26.51	2243.0	979411.49	G543	11.30	-65.20	0.73	2.20	-63.83	-20.96
C015	33 32.53	115 25.41	2628.0	979388.19	G543	25.07	-64.57	2.17	4.41	-61.10	-18.78
C016	33 38.05	116 1.72	1642.0	979442.56	G543	-20.95	-76.96	2.05	8.42	-69.18	-20.28
C017	33 39.01	116 2.15	1068.0	979488.64	G543	-30.19	-66.61	3.27	4.98	-62.07	-11.91
C018	33 40.97	116 3.70	1109.0	979486.46	G543	-31.24	-69.06	1.89	4.14	-65.38	-12.61
C019	33 34.41	115 53.93	1224.0	979500.33	G543	2.56	-39.19	2.48	5.71	-33.98	9.35
C020	33 34.14	115 49.90	1880.0	979454.91	G543	19.21	-44.91	2.37	6.67	-38.96	4.03
C021	33 34.14	115 46.73	3815.0	979322.17	B543	68.43	-61.69	3.89	20.48	-42.44	0.63
C022	33 32.36	115 46.81	1832.0	979452.12	G543	14.37	-48.11	5.16	11.20	-37.62	3.24
C023	33 33.51	115 41.15	2175.0	979423.92	G543	16.84	-57.34	2.93	5.77	-52.39	-9.50
C024	33 35.78	115 39.84	2221.0	979413.28	G543	7.38	-68.38	2.16	3.84	-65.36	-19.84
C025	33 38.43	115 40.37	2760.0	979371.87	B543	12.97	-81.16	3.69	0.38	-73.76	-26.57
C026	33 39.30	115 27.18	3766.0	979314.29	B543	48.78	-79.67	4.60	18.70	-62.19	-16.26
C027	33 38.89	115 21.39	3149.0	979360.68	B543	37.72	-69.68	3.06	12.77	-57.99	-14.14
C028	33 40.79	115 19.93	1397.0	979408.41	G543	-10.24	-57.89	2.72	4.27	-54.18	-10.33
C029	33 36.61	115 17.14	2418.0	979408.41	B543	19.88	-62.59	2.49	7.83	-55.65	-13.92
C030	33 34.52	115 16.55	2940.0	979367.54	G543	31.00	-69.28	6.46	14.96	-55.34	-14.44
C031	33 30.68	115 17.29	3285.0	979337.56	M543	38.78	-73.26	3.24	11.32	-63.05	-23.24
C032	33 33.69	115 20.63	4504.0	979257.43	B543	69.09	-84.53	4.11	23.25	-62.62	-20.87
C033	33 35.31	115 21.96	4216.0	979284.79	G543	67.12	-76.67	3.12	16.57	-61.40	-18.61
C034	33 36.23	115 50.92	2984.0	979380.97	G543	46.19	-55.58	2.39	12.51	-44.11	1.63
C035	33 37.50	115 47.40	2379.0	979413.57	B543	20.13	-61.01	3.03	5.61	-56.27	-8.80
C036	33 43.77	115 42.41	4179.0	979279.39	G543	46.49	-96.04	7.13	17.94	-79.39	-26.28
C038	33 47.26	115 40.19	3418.0	979342.69	G543	33.38	-83.19	2.49	6.27	-78.07	-23.20
C039	33 48.43	115 39.77	3294.0	979356.40	B543	33.80	-78.55	3.41	7.96	-71.70	-16.38
C040	33 50.69	115 40.11	2866.0	979386.27	G543	20.29	-77.47	2.47	6.06	-72.41	-15.87
C041	33 50.10	115 37.20	2677.0	979404.91	G543	21.97	-69.33	2.47	4.36	-65.93	-10.97
C042	33 48.95	115 35.79	3902.0	979322.11	B543	55.96	-77.13	4.14	14.12	-64.25	-10.63
C043	33 46.98	115 34.48	3358.0	979357.97	G543	43.41	-71.12	3.68	9.19	-63.06	-10.78
C044	33 44.77	115 34.04	2938.0	979377.53	G543	26.56	-73.65	2.27	5.41	-69.27	-18.15
C045	33 45.93	115 31.68	3229.0	979372.42	G543	47.19	-62.94	2.49	9.87	-54.17	-3.65
C046	33 48.02	115 32.98	2739.0	979405.50	G543	31.29	-62.13	1.86	4.15	-58.95	-6.88
C047	33 49.90	115 33.02	3348.0	979367.93	G543	48.36	-65.83	2.80	7.79	-59.17	-6.51
C048	33 51.24	115 31.36	2209.0	979440.06	G543	11.52	-63.82	2.58	4.39	-60.26	-7.85
C049	33 40.84	115 27.59	2597.0	979384.91	G543	7.33	-81.24	5.87	13.28	-68.90	-22.08
C050	33 39.74	115 24.29	3292.0	979339.96	G543	29.27	-83.01	9.25	22.98	-61.15	-16.00
C051	33 38.24	115 18.97	2906.0	979373.63	G543	28.69	-70.43	3.19	13.99	-57.45	-14.67
C052	33 34.67	115 18.99	2625.0	979391.67	G543	25.30	-64.23	2.34	5.79	-59.39	-17.54
C053	33 33.34	115 23.49	3552.0	979328.61	G543	51.25	-69.90	3.51	9.91	-61.16	-18.80

Table 3. Principal Facts for 118 Gravity Stations in the Salton Sea Sheet--Continued

STATION NAME	LAT deg min	LONG deg min	ELEV feet	OG mGal	AC CODE	FAA mGal	SBA mGal	INNER mGal	TC mGal	CBA1 2.67	ISO 2.67
C054	33 34.94	115 25.67	3065.0	979362.01	G543	36.64	-67.90	2.07	5.21	-63.75	-20.13
C055	33 36.10	115 25.85	3279.0	979346.61	G543	39.75	-72.09	3.60	9.03	-64.17	-19.94
C056	33 38.68	115 0.74	1135.0	979489.08	G543	-22.99	-61.70	1.73	3.18	-58.99	-9.46
C058	33 37.37	115 58.68	1280.0	979449.39	G543	-47.23	-90.88	1.29	3.32	-88.08	-40.51
C059	33 37.03	115 35.51	1904.0	979427.60	G543	-9.85	-74.79	0.83	1.66	-73.86	-27.31
P001	33 10.39	114 46.35	714.0	979488.21	B163	-24.30	-48.65	0.23	0.32	-48.63	-20.50
P002	33 11.68	114 45.26	617.0	979498.68	M163	-24.73	-45.78	0.05	0.11	-45.93	-17.44
P003	32 58.82	114 48.11	794.0	979474.34	G663	-14.71	-41.79	0.01	0.12	-42.01	-18.33
P004	33 0.43	114 46.89	1007.0	979463.48	T653	-7.75	-42.09	0.22	0.52	-41.99	-17.49
P005	33 2.54	114 42.88	571.0	979482.80	T653	-32.35	-51.82	1.04	1.24	-50.83	-25.16
P006	33 3.46	114 41.67	343.0	979492.50	G653	-45.36	-57.06	0.29	0.39	-56.82	-30.69
P007	33 4.10	114 41.25	213.0	979504.25	M153	-46.72	-53.99	0.03	0.20	-53.88	-27.49
P008	33 2.22	114 41.68	329.0	979494.72	X553	-42.74	-53.97	0.15	0.36	-53.75	-28.10
P009	32 58.54	114 44.68	865.0	979467.79	G653	-14.19	-43.70	0.07	0.22	-43.84	-19.99
P010	32 59.02	114 42.21	687.0	979482.07	X653	-17.32	-40.75	0.11	0.26	-40.78	-16.51
P011	33 0.23	114 42.27	661.0	979481.74	G644	-21.76	-44.31	0.61	0.75	-43.84	-19.06
P012	33 0.74	114 41.15	658.0	979475.22	G644	-29.26	-51.71	0.48	0.71	-51.28	-26.22
P017	33 8.85	114 49.71	926.0	979467.69	X653	-22.75	-54.34	0.06	0.29	-54.43	-26.74
P018	33 11.56	114 47.40	873.0	979478.81	X653	-20.36	-50.13	0.06	0.25	-50.25	-21.82
P019	33 14.35	114 44.47	450.0	979510.17	G643	-32.64	-47.99	0.08	0.07	-48.11	-19.03
P020	33 5.54	114 53.50	1005.0	979461.63	B153	-16.82	-51.10	0.01	0.35	-51.16	-24.81
P021	33 0.39	114 57.40	647.0	979496.81	B153	-8.22	-30.29	0.01	0.05	-30.52	-7.27
P022	33 1.03	114 56.58	713.0	979490.07	R153	-9.64	-33.96	0.02	0.10	-34.16	-10.43
P023	33 4.76	114 50.90	1792.0	979409.37	G653	6.01	-55.11	1.46	3.88	-51.92	-25.82
P024	33 3.28	114 49.60	2164.0	979385.50	V453	19.17	-54.64	2.87	8.87	-46.58	-21.06
P025	33 1.61	114 52.61	885.0	979476.96	G653	-7.37	-37.55	0.03	0.24	-37.68	-13.13
P026	33 6.03	114 57.59	1801.0	979414.99	G653	10.73	-50.70	3.87	7.15	-44.25	-18.02
P027	33 7.24	114 59.36	2264.0	979382.99	G653	20.61	-56.61	4.93	10.94	-46.51	-19.86
P028	33 9.19	115 7.36	1247.0	979460.12	G653	-0.60	-43.13	4.54	5.62	-38.01	-11.23
P029	33 3.55	115 1.99	990.0	979473.89	V453	-3.23	-37.00	3.03	4.17	-33.24	-9.02
P030	33 10.05	115 6.39	1561.0	979438.98	G653	6.61	-46.63	2.03	3.48	-43.77	-16.30
P031	33 10.61	115 6.41	2384.0	979380.42	G653	24.67	-56.64	3.56	10.18	-47.33	-19.55
P032	33 11.06	115 6.43	2700.0	979358.50	D253	31.85	-60.23	4.61	13.95	-47.25	-19.21
P033	33 11.38	115 4.97	2058.0	979401.85	G653	14.39	-55.81	3.01	5.72	-50.87	-22.43
P034	33 11.71	115 3.94	1824.0	979413.55	G653	3.63	-58.59	4.22	5.92	-53.37	-24.66
P035	33 11.93	115 12.21	2224.0	979400.79	G653	28.18	-47.68	4.06	9.27	-39.24	-11.63
P036	33 17.28	115 18.73	2203.0	979393.31	G653	11.33	-63.81	4.43	10.53	-54.10	-23.73
P037	33 21.27	115 21.45	2563.0	979376.95	V443	23.31	-64.11	4.04	11.73	-53.30	-19.91
P038	33 0.42	114 44.35	1400.0	979434.70	V443	0.45	-47.30	3.07	5.34	-42.52	-17.86
P039	32 58.24	114 39.58	1024.0	979459.29	G653	-7.32	-42.25	1.03	1.72	-40.95	-16.78
P040	33 0.08	114 38.53	795.0	979470.72	G653	-19.96	-47.08	2.32	3.10	-44.31	-19.24
P041	33 1.61	114 40.86	562.0	979478.71	V443	-36.00	-55.17	1.28	1.52	-53.89	-28.44
P042	33 1.87	114 42.92	867.0	979463.25	G643	-23.13	-52.70	3.07	3.87	-49.19	-23.79
P043	33 1.61	114 44.62	758.0	979478.07	G643	-18.20	-44.06	0.61	0.98	-43.40	-18.23
P044	33 4.31	114 44.15	889.0	979467.19	G643	-20.48	-50.80	2.77	3.58	-47.59	-21.35
P045	33 5.05	114 47.42	1023.0	979447.41	G653	-28.67	-63.56	0.71	1.19	-62.80	-36.42
P046	33 2.49	114 47.97	2043.0	979390.35	V453	13.73	-55.96	4.77	10.71	-46.02	-20.72
P047	33 6.03	114 46.26	1290.0	979441.30	G653	-11.02	-55.02	2.21	3.28	-52.26	-25.49
P048	33 7.21	114 45.43	1186.0	979450.50	G653	-13.23	-53.68	1.30	2.06	-52.10	-24.88

Table. 2. Principal Facts for 114 Gravity Stations in the Salton Sea Sheet--Continued

STATION NAME	LAT deg min	LONG deg min	ELEV feet	OG mGal	AC CODE	FAA mGal	SBA mGal	INNER mGal	TC mGal	CBA1 2.67	ISO 2.67
P050	33 7.65	114 49.07	1126.0	979451.83	G653	-18.15	-56.56	0.17	0.50	-56.52	-29.24
P051	33 5.33	114 49.31	2177.0	979382.23	V453	14.30	-59.95	3.47	9.55	-51.22	-24.83
P052	33 0.18	114 50.47	897.0	979471.91	V453	-9.32	-39.91	0.34	0.57	-39.72	-15.65
P053	33 11.76	114 49.73	1439.0	979449.35	G653	3.15	-45.94	2.66	4.21	-42.30	-13.79
P054	33 14.05	114 48.09	721.0	979489.04	G653	-27.86	-52.45	0.26	0.36	-52.40	-23.40
P055	33 12.64	114 43.86	502.0	979507.70	G643	-27.86	-44.98	0.10	0.14	-45.05	-16.30
P056	33 12.61	114 41.68	397.0	979512.39	G643	-33.00	-46.54	0.24	0.28	-46.43	-17.46
P057	33 10.88	114 42.36	954.0	979498.23	G643	7.62	-24.92	4.15	6.06	-19.26	9.17
P058	33 10.83	114 44.38	758.0	979484.92	G643	-24.06	-49.91	2.00	2.21	-48.02	-19.71
P059	33 7.15	114 44.43	1376.0	979440.07	G643	-5.70	-52.63	5.32	8.32	-44.87	-17.66
P060	32 57.86	114 38.12	634.0	979490.01	B243	-12.77	-34.40	0.05	0.24	-34.43	-10.28
P061	33 1.29	114 37.64	226.0	979504.88	B243	-40.99	-48.70	0.08	0.22	-48.58	-22.91
P062	33 1.90	114 38.64	207.0	979505.80	B243	-42.70	-49.76	0.20	0.35	-49.51	-23.70
P063	33 1.43	114 39.60	370.0	979492.82	B243	-39.70	-52.32	0.19	0.25	-52.23	-26.70

APPENDIX

Updated Description of Gravity Base Station Yuma:

Station is located at benchmark, 0.75 mi. north from the intersection of Ave. 3E and 32nd ST. (Business Route 8) in Yuma, AZ. Station is marked by a standard disc, stamped "R 257 1945", and is set in an irrigation canal culvert 20 ft east of the centerline of Ave. 3E, in the center of the top of the northwest headwall, 8 ft northeast of the southwest end, 0.7 foot southeast of the northwest edge, and 16 feet west of the west rail of the old Army railroad spur.