UNITED STATES DEPARTMENT OF THE INTERIOR

GEOLOGICAL SURVEY

Principal facts for gravity stations near Crater Lake, Oregon

by

Carol Finn

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Explanation of the headings of the accompanying table of principal facts are as follows.

STATION IDENTIFICATION — The first eight numbers and letters are used to identify the station, and the last three refer to the LaCoste[1] meter used (G-235). Stations with only four numbers and letters were taken with LaCoste meter G-550. For a complete description of the gravity reduction procedures currently in use by the U.S. Geological Survey (USGS) for defining the corrections and anomalies, see Cordell and others (1982).

LATITUDE AND LONGITUDE — Values listed are in degrees and minutes to the nearest one hundredth of a minute. To obtain these postions, gravity stations were transferred from U.S. National Park Service and U.S. Geological Survey aerial photographs to USGS 1:62,500 topographic quadrangle maps and then were digitized.

ELEVATION — Elevations are in feet to the nearest tenth. Elevations were read on a Kern[1] PG2 stereo plotter from USGS aerial photographs. Several

[1]Use of tradenames is for descriptive purposes only and does not imply endorsement by the U.S. Geological Survey.

elevation readings were taken for each station and averaged to obtain the station elevation. Errors associated with this method are: (1) errors in the setup of the photogrammetric model, (2) possible errors in benchmark or spot-elevation values, (3) the difference between our reading of benchmarks and the actual value; about 10-15 feet, and (4) the scatter of elevation data collected for each gravity station about some mean value, assumed to be the real station elevation. These errors were not evaluated due to a lack of information for analysis.

OBSERVED GRAVITY

Values are to the nearest hundredth of a milligal. These are relative to IGSN-71 (Morelli, 1974) tied to a base at Klamath Falls, Oregon, having observed gravity equal to 979981.91 mgals.

THEORETICAL GRAVITY

Values were calculated using the Geodetic Reference System 1967 (International Association of Geodesy, 1971).

TERRAIN CORRECTIONS

Most of the stations were corrected for terrain by computer from the station to 166.7 km (Richard Godson, unpublished program , U.S. Geological Survey), 1977, implementing the procedure of Plouff. Some of the inner zone (Hammer zones D-F, Hammer, 1939) terrain corrections were done by template. The density used in these corrections

was 2.2 g/cm^3. This density was obtained by a modified Nettleton profiling technique described in Finn and Williams (in press).

FREE-AIR ANOMALY — Free-air anomaly values are in milligals. The free-air correction was obtained by the following calculation: observed gravity - theoretical gravity - free-air anomaly = free-air correction.

COMPLETE BOUGUER ANOMALY — Complete Bouguer anomaly values are in milligals using densities of 2.2 and 2.43 g/cm^3.

REFERENCES CITED

Cordell, L., Keller, G. R, and Hildenbrand, T., 1982, Bouguer gravity map of the Rio Grande Rift: U.S. Geological Survey Geophysical Investigations Map GP-949, in press.

Finn, Carol, and Williams, D. L., 1982, Gravity evidence for a shallow intrusion under Medicine Lake Volcano in northern California: Geology, in press.

Hammer, Sigmund, 1939, Terrain corrections for gravimeter stations: Geophysics, v. 4, p. 184-194.

International Association of Geodesy, 1971, Geodetic reference system 1967: International Association of Geodesy Special Publication no. 3 (Bureau Central Association International Geodesie, Paris), 116 p.

Morelli, C., ed., 1974, The International Gravity Standardization Net 1971: International Association of Geodesy Special Publication no. 4, 194 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.

cl gravity
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Meter ID: Date: 06/15/82

STATION IDENTIFICATION proj	sta-id	LOCATIONS LATITUDE deg	min	LONGITUDE deg	min	ELE (in ft)	ST	GRAVITY OBSERVED	THEORETICAL	CORRECTIONS TERRAIN	BOUGUER	CURV	SPECIAL	ANOMALIES FREE AIR	COMPLETE-BOUGUER d1=2.20	d2=2.43	SPEC FIELDS
cl	:c101	42	58.75	-122	4.68	6170.0		979907.55	980436.32	6.72	-173.40	-1.24	0.00	51.27	-116.65	-134.20	
cl	:c102	42	58.40	-122	7.50	6170.0		979906.22	980435.80	5.55	-173.40	-1.24	0.00	50.46	-118.62	-136.30	
cl	:c103	42	56.20	-122	3.36	6170.0		979902.53	980432.48	11.10	-173.40	-1.24	0.00	50.09	-113.45	-130.55	
cl	:c104	42	56.75	-122	3.36	6170.0		979903.96	980433.31	8.59	-173.40	-1.24	0.00	50.69	-115.36	-132.72	
cl	:c105	42	57.91	-122	3.72	6170.0		979907.04	980435.05	5.40	-173.40	-1.24	0.00	52.02	-117.22	-134.91	
cl	:c106	42	54.45	-122	6.60	6170.0		979908.97	980429.85	6.98	-173.40	-1.24	0.00	59.16	-108.50	-126.03	
cl	:c107	42	54.65	-122	5.16	6171.0		979905.24	980430.16	8.76	-173.43	-1.24	0.00	55.22	-110.68	-128.03	
cl	:c108	42	56.00	-122	9.78	6172.0		979908.19	980432.19	7.24	-173.45	-1.24	0.00	56.25	-111.22	-128.72	
cl	:c109	42	56.58	-122	8.52	6170.0		979909.40	980433.05	3.43	-173.40	-1.24	0.00	56.38	-114.83	-132.73	
cl	:c110	42	56.00	-122	8.94	6178.0		979910.78	980432.19	3.21	-173.62	-1.24	0.00	59.39	-112.26	-130.21	
cl	:c111	42	54.80	-122	7.98	6170.0		979906.15	980430.38	7.42	-173.40	-1.24	0.00	55.81	-111.40	-128.88	
cl	:c112	42	54.70	-122	4.92	6170.0		979906.07	980430.23	12.31	-173.40	-1.24	0.00	55.88	-106.44	-123.42	
cl	:1006235	42	53.42	-122	8.16	6440.0		979895.57	980428.30	3.08	-180.98	-1.25	0.00	72.68	-106.47	-125.20	
cl	:1201235	42	51.04	-122	0.41	5564.0		979941.89	980424.73	2.01	-156.37	-1.21	0.00	40.26	-115.31	-131.57	
cl	:1203235	42	52.24	-122	1.42	5855.0		979927.84	980426.53	2.02	-164.54	-1.23	0.00	51.75	-112.00	-129.12	
cl	:1204235	42	52.79	-122	2.24	5971.1		979920.85	980427.36	2.24	-167.81	-1.23	0.00	54.85	-111.95	-129.39	
cl	:1205235	42	53.15	-122	2.38	6097.0		979915.19	980427.90	2.63	-171.35	-1.24	0.00	60.47	-109.48	-127.25	
cl	:1206235	42	53.32	-122	2.52	6208.0		979910.88	980428.16	2.94	-174.47	-1.24	0.00	66.34	-106.42	-124.49	
cl	:1207235	42	53.52	-122	3.10	6315.0		979905.66	980428.45	3.79	-177.47	-1.24	0.00	70.87	-104.05	-122.34	
cl	:1208235	42	54.06	-122	3.26	6409.0		979900.12	980429.27	3.54	-180.11	-1.25	0.00	73.35	-104.47	-123.06	
cl	:1209235	42	54.18	-122	3.37	6423.0		979897.68	980429.45	3.62	-180.51	-1.25	0.00	72.05	-106.09	-124.71	
cl	:1210235	42	54.52	-122	4.04	6810.0		979870.02	980429.96	4.66	-191.38	-1.25	0.00	80.24	-107.73	-127.38	
cl	:1211235	42	54.39	-122	3.53	6902.0		979865.19	980429.77	8.20	-193.97	-1.25	0.00	84.24	-102.77	-122.33	
cl	:1212235	42	58.50	-122	8.19	7369.0		979832.46	980435.95	8.59	-207.09	-1.24	0.00	89.21	-110.53	-131.41	
cl	:1213235	42	59.00	-122	8.60	6860.0		979868.55	980436.70	5.20	-192.79	-1.25	0.00	76.72	-112.12	-131.86	
cl	:1214235	42	59.57	-122	8.02	6427.0		979898.97	980437.55	4.37	-180.62	-1.25	0.00	65.60	-111.90	-130.45	
cl	:1215235	43	0.51	-122	7.37	6129.0		979915.73	980438.97	4.10	-172.24	-1.24	0.00	52.95	-116.43	-134.14	
cl	:1216235	43	1.89	-122	6.98	5961.3		979930.80	980441.05	1.67	-167.53	-1.23	0.00	50.18	-116.91	-134.38	
cl	:1217235	43	3.40	-122	7.13	6003.0		979926.41	980443.32	1.69	-168.70	-1.23	0.00	47.44	-120.81	-138.40	
cl	:1218235	43	2.19	-122	6.58	6035.0		979923.81	980441.50	1.68	-169.60	-1.23	0.00	49.67	-119.49	-137.17	
cl	:1219235	42	57.23	-122	10.06	7575.0		979819.70	980434.04	10.27	-212.88	-1.23	0.00	97.72	-106.13	-127.44	
cl	:1220235	42	57.00	-122	10.19	7645.0		979812.83	980433.69	11.09	-214.65	-1.23	0.00	97.77	-107.22	-128.65	
cl	:1221235	42	55.36	-122	9.59	7117.0		979847.07	980431.23	11.92	-200.01	-1.25	0.00	84.87	-104.47	-124.26	
cl	:1222235	42	55.06	-122	9.36	7078.0		979855.04	980430.77	9.21	-198.91	-1.25	0.00	89.62	-101.33	-121.29	
cl	:2000235	42	57.02	-122	2.07	6819.0		979870.93	980433.72	4.05	-191.64	-1.25	0.00	78.23	-110.61	-130.35	
cl	:2002235	42	57.25	-122	1.02	6279.0		979904.23	980434.06	5.43	-176.46	-1.24	0.00	60.45	-111.82	-129.83	
cl	:2003235	42	58.06	-122	0.13	5968.0		979923.02	980435.28	2.46	-167.72	-1.23	0.00	48.80	-117.70	-135.10	
cl	:2004235	42	58.19	-121	59.56	5836.0		979933.41	980435.48	2.16	-164.01	-1.22	0.00	46.59	-116.49	-133.54	
cl	:2005235	42	58.31	-121	59.34	5719.0		979940.48	980435.66	2.13	-160.72	-1.22	0.00	42.48	-117.32	-134.03	
cl	:2006235	42	58.44	-121	58.56	5530.0		979953.09	980435.85	4.42	-155.41	-1.21	0.00	37.13	-115.06	-130.97	

cl gravity
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Meter ID: Date: 06/15/82

STATION IDENTIFICATION		LOCATIONS					GRAVITY		CORRECTIONS				ANOMALIES		
prol	sta-id	LATITUDE deg	min	LONGITUDE deg	min	ELE ST (in ft)	OBSERVED	THEORETICAL	TERRAIN	BOUGUER	CURV	SPECIAL	FREE AIR	COMPLETE-BOUGUER d1=2.20	d2=2.43	SPEC FIELDS
cl	:2008235	42	56.09	-122	11.04	6776.0	979874.83	980432.32	4.56	-190.34	-1.25	0.00	79.21	-107.83	-127.38	
cl	:2009235	42	55.57	-122	11.33	6419.0	979890.89	980431.54	3.53	-180.39	-1.25	0.00	62.79	-115.32	-133.94	
cl	:2010235	42	55.54	-122	11.44	6284.0	979897.33	980431.49	3.03	-176.60	-1.24	0.00	56.59	-118.23	-136.50	
cl	:2011235	42	55.47	-122	12.11	6174.0	979906.74	980431.39	3.38	-173.51	-1.24	0.00	55.77	-115.60	-133.52	
cl	:2012235	42	55.35	-122	12.31	5994.0	979913.80	980431.21	2.36	-168.45	-1.23	0.00	46.09	-121.24	-138.73	
cl	:2013235	42	55.37	-122	12.53	5887.0	979930.32	980431.23	2.37	-165.44	-1.23	0.00	52.53	-111.77	-128.95	
cl	:2014235	42	55.31	-122	13.11	5793.0	979933.71	980431.15	2.11	-162.80	-1.22	0.00	47.18	-114.74	-131.67	
cl	:2015235	42	56.03	-122	13.09	5737.0	979942.20	980432.23	2.37	-161.23	-1.22	0.00	49.32	-110.75	-127.49	
cl	:2016235	42	56.23	-122	13.28	5644.0	979950.57	980432.53	2.36	-158.61	-1.21	0.00	48.65	-108.81	-125.28	
cl	:2301235	42	53.44	-122	15.13	5240.0	979967.49	980428.34	2.85	-147.26	-1.18	0.00	31.80	-113.79	-129.02	
cl	:2302235	42	53.05	-122	11.30	5910.0	979924.93	980427.75	2.55	-166.09	-1.23	0.00	52.79	-111.97	-129.20	
cl	:2303235	42	52.11	-122	9.08	6036.0	979917.51	980426.34	2.38	-169.63	-1.23	0.00	58.62	-109.86	-127.48	
cl	:2304235	42	53.06	-122	8.29	6333.0	979900.85	980427.77	2.83	-177.98	-1.24	0.00	68.45	-107.95	-126.39	
cl	:6000235	42	57.05	-122	18.06	4751.0	980009.81	980433.77	1.82	-133.52	-1.14	0.00	22.73	-110.10	-123.99	
cl	:6001235	42	56.55	-122	17.37	4849.0	980005.66	980433.02	1.62	-136.27	-1.15	0.00	28.55	-107.25	-121.44	
cl	:6003235	42	56.29	-122	15.51	5129.0	979985.66	980432.63	2.04	-144.14	-1.17	0.00	35.25	-108.02	-123.00	
cl	:6004235	43	0.25	-122	10.37	6181.0	979918.28	980438.58	3.16	-173.71	-1.24	0.00	60.78	-111.01	-128.97	
cl	:6005235	43	0.26	-122	11.16	6075.0	979921.46	980438.59	2.25	-170.73	-1.24	0.00	53.98	-115.73	-133.48	
cl	:6006235	43	1.13	-122	11.22	5948.0	979932.33	980439.90	1.91	-167.16	-1.23	0.00	51.60	-114.87	-132.28	
cl	:6007235	43	2.08	-122	11.40	5777.0	979950.26	980441.33	1.72	-162.35	-1.22	0.00	52.03	-109.82	-126.74	
cl	:6013235	43	0.04	-122	9.10	6332.0	979906.47	980438.27	3.16	-177.95	-1.24	0.00	63.47	-112.57	-130.97	