

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

Principal facts for one-hundred-six gravity stations near the
Goat Rocks Wilderness Area, Washington

by

Carol Finn

and

D. L. Williams

Open File Report 83-176

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

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

STATION IDENTIFICATION	All stations were taken with LaCoste and Romberg ¹ gravity meter G-24. 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. These positions were surveyed in with a laser theodolyte for all stations.
ELEVATION	Elevations are in feet to the nearest tenth. All elevations were surveyed in with a laser theodolyte and are accurate to the nearest tenth of a foot.
OBSERVED GRAVITY	Values are to the nearest hundredth of a milligal. All stations are relative to IGSN-71 (Morelli, 1974) tied to a base at Pearson Airport, Washington having observed gravity equal

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

to 980632.54 mgals (based on Portland Customs House value of 980632.64 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Most of the stations were corrected for terrain by computer from Hammer (1939) zone D to 166.7 km (Richard Godson, unpublished program, U.S. Geological Survey), implementing the procedure of Plouff (1977). Some of the inner zone (Hammer zones D-F, Hammer, 1939) terrain corrections were done by template. The density used in these corrections was 2.43 g/cm^3 . This density was obtained by a modified Nettleton profiling technique described in Finn and Williams (1982).

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 2.43 and 2.67 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.

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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.

BOUGUER GRAVITY DATA

good rocks gravity
collected 1982
Meter ID: a-24

Date: 12/01/82

STATION IDENTIFICATION	L O C A T I O N S		E L E M E N T (in ft)	O B S E R V E D	T H E O R E T I C A L	C O R R E C T I O N S		S P E C I A L	F R E E A I R	A N O M A L I E S	
	lat	lon				TERRAIN BOUGUER CURV	SPECIAL			COMPLETE-BOUGUER	SPEC
grw102	46 38.43	-121 34.08	4701.0	980362.18	980767.47	23.34	-145.92	-1.25	0.00	36.66	-87.17
grw103	46 38.23	-121 29.38	5072.0	980354.67	980767.16	10.46	-157.44	-1.29	0.00	64.32	-83.96
grw104	46 32.19	-121 23.62	4033.0	980404.69	980758.06	9.97	-125.19	-1.15	0.00	25.79	-90.58
grw105	46 32.99	-121 23.07	3394.0	980436.54	980759.27	8.61	-105.35	-1.03	0.00	-1.63	-99.41
grw107	46 28.21	-121 21.72	5254.0	980325.27	980752.07	5.34	-163.09	-1.31	0.00	67.12	-91.94
grw108	46 29.28	-121 22.00	6085.0	980266.67	980753.68	15.30	-188.89	-1.37	0.00	84.99	-89.96
grw109	46 27.74	-121 20.24	6563.0	980226.31	980751.36	20.37	-203.72	-1.38	0.00	91.86	-92.87
grw110	46 27.07	-121 25.83	5710.0	980309.37	980750.35	7.75	-177.25	-1.35	0.00	95.78	-75.05
grw111	46 25.08	-121 26.86	3926.0	980410.14	980747.35	6.31	-121.87	-1.13	0.00	31.90	-84.80
grw112	46 25.37	-121 28.34	3926.0	980413.40	980747.79	4.82	-121.87	-1.13	0.00	34.72	-83.46
grw113	46 24.04	-121 27.69	5712.0	980287.26	980745.79	10.12	-177.31	-1.35	0.00	78.43	-90.11
grw114	46 23.43	-121 23.77	5736.0	980281.92	980748.87	7.39	-178.05	-1.35	0.00	76.27	-95.74
grw115	46 25.58	-121 26.92	5345.0	980323.09	980748.11	10.26	-165.92	-1.32	0.00	77.46	-79.52
grw116	46 27.55	-121 33.16	3980.0	980411.80	980751.08	5.62	-123.54	-1.14	0.00	34.91	-84.16
grw117	46 27.40	-121 31.33	4530.0	980381.11	980750.85	4.83	-140.62	-1.23	0.00	56.14	-80.88
grw118	46 30.70	-121 19.10	5293.0	980319.56	980755.82	5.73	-164.30	-1.31	0.00	61.32	-98.56
grw119	46 27.59	-121 17.94	5646.0	980290.97	980751.13	6.57	-175.26	-1.34	0.00	70.59	-99.44
grw120	46 28.49	-121 17.97	6109.0	980257.64	980752.49	13.42	-189.63	-1.37	0.00	79.40	-98.17
grw121	46 29.78	-121 18.90	4230.0	980386.87	980754.44	4.72	-131.30	-1.18	0.00	30.11	-97.65
grw122	46 30.18	-121 17.98	4261.0	980384.57	980755.04	5.17	-132.27	-1.19	0.00	30.13	-98.16
grw123	46 36.09	-121 26.81	3362.0	980456.03	980763.95	7.57	-104.36	-1.03	0.00	8.19	-89.63
grw124	46 26.71	-121 30.69	3810.0	980425.89	980749.81	3.30	-118.27	-1.11	0.00	34.29	-81.79
grw125	46 28.60	-121 31.77	3935.0	980417.81	980749.64	2.69	-122.15	-1.14	0.00	38.12	-82.46
grw126	46 25.79	-121 33.45	4682.0	980367.06	980748.42	5.70	-145.34	-1.25	0.00	58.80	-82.08
grw127	46 26.19	-121 35.05	4984.0	980337.18	980749.02	14.95	-154.71	-1.28	0.00	56.70	-84.34
grw128	46 25.27	-121 35.79	3333.0	980439.30	980747.64	8.52	-103.46	-1.02	0.00	5.03	-90.94
grw129	46 27.55	-121 35.61	3489.0	980437.22	980751.08	6.93	-108.30	-1.05	0.00	14.18	-88.25
grw130	46 28.72	-121 30.43	5712.0	980304.87	980752.84	14.61	-177.31	-1.35	0.00	88.98	-75.06
grw131	46 32.88	-121 30.35	5965.0	980288.18	980759.11	18.63	-185.16	-1.36	0.00	89.80	-78.09
grw132	46 34.10	-121 34.72	4884.0	980361.46	980760.95	10.59	-151.61	-1.27	0.00	59.66	-82.62
grw133	46 32.36	-121 32.62	3915.0	980420.05	980758.32	10.09	-121.53	-1.13	0.00	29.80	-82.77
grw134	46 31.81	-121 30.45	5665.0	980313.62	980757.49	11.46	-175.85	-1.34	0.00	88.66	-77.07
grw135	46 31.46	-121 31.22	4350.0	980393.20	980756.97	12.81	-135.03	-1.20	0.00	45.20	-78.22
grw136	46 30.24	-121 30.95	4510.0	980382.22	980755.13	12.57	-140.00	-1.22	0.00	51.09	-77.56
grw137	46 36.84	-121 32.58	4624.0	980388.87	980765.07	9.19	-143.54	-1.24	0.00	58.51	-77.08
grw138	46 39.30	-121 21.53	4207.0	980400.61	980768.78	3.68	-130.59	-1.18	0.00	27.35	-100.75
grw139	46 39.58	-121 20.40	4102.0	980404.62	980769.20	6.73	-127.33	-1.16	0.00	17.07	-104.70
grw140	46 39.18	-121 17.70	3536.0	980441.82	980768.59	5.72	-109.76	-1.06	0.00	5.67	-99.43
grw141	46 38.02	-121 17.10	2988.0	980472.55	980766.85	6.53	-92.75	-0.95	0.00	-13.37	-100.53
grw142	46 36.09	-121 20.14	3124.0	980452.68	980763.95	11.24	-96.97	-0.98	0.00	-17.54	-104.23

ROUGER GRAVITY DATA

STATION IDENTIFICATION		L O C A T I O N S		G R A V I T Y		C O R R E C T I O N S		A N O M A L I E S								
proj	sta-ld	lat	long	ele	st	observed	theoretical	terrain	bouguer	curv	special	free air	complete	spec		
		deg	min	(in ft)									d1=2.43	d2=2.67		
		deg	min										fields	fields		
grw	grw143	46	34.63	-121	21.20	3246.0	W	980443.19	980761.74	11.06	-100.76	-1.00	0.00	-13.36	-104.07	-113.03
grw	grw144	46	37.34	-121	16.68	3063.0	W	980465.47	980765.83	8.23	-95.70	-0.97	0.00	-10.49	-98.93	-107.66
grw	grw145	46	38.34	-121	23.25	4470.0	W	980386.18	980767.33	3.70	-138.76	-1.22	0.00	39.08	-97.19	-110.65
grw	grw146	46	37.74	-121	25.03	4106.0	W	980406.81	980766.43	7.85	-127.46	-1.16	0.00	26.41	-94.36	-106.28
grw	grw147	46	37.70	-121	26.68	3715.0	W	980433.91	980766.37	6.36	-115.32	-1.10	0.00	16.82	-93.23	-104.10
grw	grw148	46	38.31	-121	27.08	3544.0	W	980444.15	980767.29	8.14	-110.01	-1.06	0.00	10.66	-92.87	-103.04
grw	grw149	46	38.75	-121	27.61	3406.0	W	980456.58	980767.95	8.55	-105.73	-1.04	0.00	8.86	-89.36	-99.06
grw	grw150	46	40.20	-121	29.30	3065.0	W	980483.60	980770.13	9.74	-95.14	-0.96	0.00	1.64	-84.72	-93.25
grw	grw151	46	41.10	-121	34.65	1565.0	W	980576.13	980771.49	8.19	-48.58	-0.56	0.00	-48.20	-89.15	-93.19
grw	grw152	46	39.21	-121	36.18	1226.0	W	980590.21	980768.64	9.77	-38.06	-0.45	0.00	-63.15	-91.88	-94.72
grw	grw153	46	36.38	-121	40.42	1053.0	W	980595.70	980764.38	6.51	-32.69	-0.39	0.00	-69.66	-96.23	-98.86
grw	grw154	46	26.67	-121	32.66	3828.0	W	980423.12	980749.75	4.50	-118.83	-1.12	0.00	33.27	-82.18	-93.58
grw	grw155	46	26.03	-121	31.84	3766.0	W	980425.61	980748.78	2.93	-116.90	-1.11	0.00	30.90	-84.18	-95.55
grw	grw156	46	24.18	-121	31.95	3295.0	W	980450.61	980746.00	5.06	-102.28	-1.01	0.00	14.41	-83.82	-93.52
grw	grw001	46	28.88	-121	34.10	3753.0	W	980425.82	980753.08	5.31	-116.50	-1.10	0.00	25.59	-86.71	-97.80
grw	grw002	46	33.00	-121	34.47	2910.0	W	980482.30	980759.29	14.54	-90.33	-0.93	0.00	-3.38	-80.10	-87.67
grw	grw003	46	32.45	-121	27.35	6788.0	W	980234.51	980756.46	24.57	-210.09	-1.38	0.00	112.22	-74.67	-93.13
grw	grw004	46	36.05	-121	30.75	5165.0	W	980357.35	980763.88	7.61	-160.33	-1.38	0.00	79.02	-75.00	-90.21
grw	grw005	46	36.70	-121	31.03	4315.0	W	980408.16	980764.86	9.52	-133.94	-1.20	0.00	48.97	-76.65	-89.06
grw	grw006	46	36.22	-121	36.37	3845.0	W	980428.80	980764.14	9.47	-119.35	-1.12	0.00	26.15	-84.85	-95.82
grw	grw008	46	31.65	-121	20.67	7336.0	W	980167.19	980757.25	28.96	-227.72	-1.37	0.00	99.47	-100.66	-120.43
grw	grw009	46	30.93	-121	22.57	6748.0	W	980219.86	980756.16	17.10	-209.47	-1.38	0.00	97.99	-95.76	-114.90
grw	grw011	46	29.97	-121	24.05	6418.0	W	980256.45	980754.72	9.35	-199.22	-1.38	0.00	105.02	-86.23	-105.12
grw	grw012	46	28.92	-121	22.85	6290.0	W	980262.40	980753.14	11.04	-195.25	-1.37	0.00	100.52	-85.06	-103.39
grw	grw013	46	34.63	-121	22.85	5708.0	W	980288.41	980761.74	17.84	-177.18	-1.34	0.00	63.25	-97.44	-113.31
grw	grw014	46	27.88	-121	31.88	4440.0	W	980388.63	980751.57	4.48	-137.82	-1.21	0.00	54.48	-80.08	-93.37
grw	grw015	46	29.62	-121	28.16	5830.0	W	980292.75	980754.20	7.48	-180.97	-1.35	0.00	86.60	-88.25	-105.51
grw	grw016	46	26.05	-121	23.60	5195.0	W	980328.96	980748.81	8.61	-161.26	-1.30	0.00	68.52	-85.44	-100.64
grw	grw017	46	27.37	-121	24.48	5701.0	W	980301.14	980750.80	7.66	-176.97	-1.34	0.00	86.26	-84.39	-101.25
grw	grw018	46	38.05	-121	19.82	5970.0	W	980271.86	980766.90	22.37	-145.32	-1.36	0.00	66.16	-98.15	-114.37
grw	grw019	46	36.93	-121	29.53	5697.0	W	980309.99	980765.21	19.10	-176.84	-1.34	0.00	80.33	-78.76	-94.47
grw	grw020	46	38.37	-121	28.25	3655.0	W	980448.38	980767.38	4.68	-113.46	-1.09	0.00	24.64	-85.22	-96.07
grw	grw020A	46	32.09	-121	26.49	6311.0	W	980272.04	980757.91	10.93	-195.90	-1.37	0.00	107.36	-78.99	-97.39
grw	grw021	46	31.87	-121	26.84	6921.0	W	980224.80	980757.59	18.31	-214.84	-1.38	0.00	117.76	-80.15	-99.69
grw	grw022	46	31.51	-121	28.84	6949.0	W	980224.78	980757.04	22.07	-215.71	-1.38	0.00	120.92	-74.10	-93.36
grw	grw023	46	30.13	-121	26.49	7222.0	W	980200.62	980754.96	16.46	-224.18	-1.38	0.00	124.48	-84.61	-105.26
grw	grw024	46	30.52	-121	27.05	7675.0	W	980167.27	980753.55	23.09	-238.24	-1.36	0.00	133.11	-83.40	-104.79
grw	grw025	46	29.98	-121	24.67	7358.0	W	980186.04	980754.73	22.35	-228.40	-1.37	0.00	122.91	-84.52	-105.00
grw	grw026	46	29.56	-121	23.78	7434.0	W	980179.04	980754.10	23.91	-230.76	-1.37	0.00	123.68	-84.54	-105.11
grw	grw027	46	30.70	-121	23.65	7768.0	W	980141.14	980755.82	39.94	-241.13	-1.35	0.00	115.44	-87.10	-107.10

good rocks gravity collected 1982 Meter ID: a-24 Date: 12/01/82

BOUGUER GRAVITY DATA

poat rocks gravity
collected 1982
Meter ID: g-24 Date: 12/01/82

STATION IDENTIFICATION	L U C A T I O N S	G R A V I T Y	T E R R A I N	C O R R E C T I O N S	F R E E A I R	A N O M A L I E S	S P E C
proj sta-id	LATITUDE deg min LONGITUDE deg min ELE (in ft)	OBSERVED THEORETICAL	TERRAIN BOUGUER CURV	SPECIAL	AIR	COMPLETE-BOUGHER	FIELDS
grw IGRM 028	46 30.51 -121 24.43	980256.17	10.10	0.00	102.24	-87.70	-106.46
grw IGRM 029	46 30.82 -121 25.95	980260.29	11.04	0.00	105.98	-83.05	-101.72
grw IGRM 030	46 31.10 -121 24.10	980228.93	21.80	0.00	97.87	-88.23	-106.61
grw IGRM 031	46 31.87 -121 26.20	980295.57	8.45	0.00	98.24	-79.67	-97.24
grw IGRM 032	46 31.19 -121 26.61	980246.54	12.55	0.00	115.16	-80.13	-99.41
grw IGRM 033	46 30.88 -121 26.67	980206.98	16.55	0.00	127.18	-80.98	-101.54
grw IGRM 034	46 32.18 -121 24.77	980335.74	9.27	0.00	65.87	-87.35	-102.49
grw IGRM 035	46 33.28 -121 24.96	980319.04	11.04	0.00	65.65	-91.82	-107.37
grw IGRM 036	46 30.65 -121 25.28	980333.90	16.37	0.00	56.84	-86.14	-100.26
grw IGRM 037	46 31.00 -121 24.97	980358.58	16.76	0.00	41.53	-87.99	-100.78
grw IGRM 038	46 36.36 -121 24.13	980259.25	12.41	0.00	89.73	-95.66	-113.97
grw IGRM 039	46 35.56 -121 23.37	980251.11	15.27	0.00	90.13	-94.83	-113.10
grw IGRM 040	46 34.46 -121 25.81	980366.90	7.50	0.00	51.49	-89.55	-103.48
grw IGRM 041	46 34.89 -121 27.61	980338.49	12.61	0.00	65.01	-85.03	-99.85
grw IGRM 042	46 34.96 -121 29.45	980252.12	24.21	0.00	96.27	-81.15	-98.67
grw IGRM 043	46 35.39 -121 29.91	980267.20	19.49	0.00	100.65	-78.16	-95.82
grw IGRM 044	46 36.90 -121 30.06	980248.44	55.24	0.00	59.98	-76.58	-90.07
grw IGRM 045	46 36.05 -121 28.10	980324.01	17.38	0.00	65.97	-85.00	-99.91
grw IGRM 046	46 31.92 -121 29.74	980210.97	24.72	0.00	114.10	-80.78	-100.03
grw IGRM 047	46 33.80 -121 28.57	980261.66	22.73	0.00	91.59	-82.02	-99.17
grw IGRM 048	46 33.59 -121 27.78	980376.79	8.89	0.00	52.83	-83.55	-97.02
grw IGRM 049	46 34.15 -121 27.18	980432.77	9.59	0.00	20.00	-86.48	-97.00
grw IGRM 050	46 36.70 -121 22.46	980354.59	6.72	0.00	43.61	-100.80	-115.07
grw IGRM 051	46 35.98 -121 24.32	980219.46	24.43	0.00	93.83	-93.86	-112.40