

UNITED STATES DEPARTMENT OF THE INTERIOR
GEOLOGICAL SURVEY

Bouguer gravity anomaly map of the Glacier Peak Wilderness
and vicinity; Chelan, Skagit, and Snohomish Counties, Washington

by

Mark S. Sherrard and Vincent J. Flanigan

Open-File Report 83-595

1983

This report is preliminary and has not been reviewed for conformity with U.S. Geological Survey editorial standards and stratigraphic nomenclature. Any use of trade names is for descriptive purposes only and does not imply endorsement by the U.S.G.S.

Table of Contents

	Page
Introduction.....	1
Data Collection.....	1
Elevation Control.....	2
Data Reduction.....	2
Principal Facts.....	3
References.....	5

Illustrations

Figure 1. Index map showing the location of the Glacier Peak Wilderness.	4
--	---

Appendices

Appendix A: Gravity base station descriptions.

B: Bouguer gravity data listing.

Plates

Plate 1. Bouguer gravity anomaly map of the Glacier Peak Wilderness and vicinity; Chelan, Skagit, and Snohomish Counties, Washington.

Studies Related to Wilderness

The Wilderness Act (Public Law 88-577, September 3, 1964) and related acts require the U.S. Geological Survey and the U.S. Bureau of Mines to survey certain areas on Federal lands to determine their mineral resource potential. Results must be made available to the public and be submitted to the President and the Congress. This report presents the data from a gravity survey of the Glacier Peak Wilderness and vicinity in the Mt. Baker-Snoqualmie and Wenatchee National Forest, Washington. The Glacier Peak Roadless Area D-1 was classified as a further planning area during the Second Roadless Area Review and Evaluation (RARE II) by the U.S. Forest Service, January 1979.

Introduction

This report presents part of the work undertaken by the U.S. Geological Survey to evaluate the mineral-resource potential of the Glacier Peak Wilderness area. During the summer field seasons of 1979-1982, 436 gravity stations were established in the Glacier Peak Wilderness Area and vicinity, Chelan, Skagit, and Snohomish Counties, Washington. The Glacier Peak Wilderness is located in the Northern Cascades, Washington, and covers approximately 464,740 acres (fig. 1). This report presents the principal facts for these data and includes a complete Bouguer gravity anomaly map (plate 1).

Data Collection

Gravity observations were made using five gravity meters. Three of the meters were LaCoste Romberg gravity meters G-24, G-113, and G-328. The other two meters were Worden gravity meters W-90 and W-147. The gravity stations were referenced to the U.S. Department of Defense (DOD) base at Wenatchee, Washington, which is part of the International Gravity Standardization Net (IGSN-71). A value of 980697.05 mgals was used for the base at Wenatchee for gravity data compiled and presented in this report. Secondary bases established in the study area were tied to the DOD base in Wenatchee. Gravity loops were started and closed daily by making repeat observations at one or more of the primary or secondary bases. Access was by helicopter and ground traverses into the roadless areas and by vehicle along highways and secondary roads outside of the wilderness area.

Elevation Control

The survey area is bound by lat. $47^{\circ}45'-48^{\circ}30'$ N and long. $120^{\circ}30'-121^{\circ}40'$ W. The station elevations were obtained from benchmarks, spot elevations, or section corners on 1:62,500-scale USGS topographic maps and on preliminary 1:24,000-scale USGS topographic maps. The uncertainty for elevations based on benchmarks is assumed to be 0.15 m; for spot elevations and section corners with map elevations, the uncertainty is assumed to be one-third of the contour interval. Maps at a scale of 1:62,500 having a contour interval of 40 ft (12.2 m) have an uncertainty of about 13.3 ft (4 m). At a density of 2.67 g/cm^3 the elevation uncertainties translate to maximum uncertainties in Bouguer values of 0.8 mgal.

Data Reduction

Computer programs existing on the USGS Honeywell Multics computer system were used to obtain principal facts, terrain-corrected gravity values, and anomaly contour maps for this survey. Station coordinates were determined using program "digit" (R. Sweeney, unpub. program, 1979). Program "gravity red" (D. A. Dansereau and R. R. Wahl, unpub. program, 1968) calculated earth tides and corrected for linear meter drift to give observed gravity values using the 1967 geodetic reference system (IUGG, 1967) and the 1971 Potsdam gravity value (Morelli, 1971).

Hand terrain corrections were calculated from each station out to a radius of 2.615 km (Hammer zones A through H) using the method of Hammer (1939). Complete terrain corrections were then computed using program "Bouguer" (R. H. Godson, unpub. program, 1978) correcting for the terrain from 2.615 km to a radius of 166.7 km from each station, using the method of Plouff (1977). These computed terrain corrections are based on mean elevation data

digitized on a 30-second grid for corrections from 2.615 to 5 km; 1-minute terrain data for corrections from 5 to 21 km; and 3-minute terrain data for corrections from 21 to 166.7 km. An assumed density of 2.67 gm/cm^3 was used to calculate terrain corrections. Program "bouguer" also calculated earth curvature corrections and complete (terrain-corrected) Bouguer anomaly values. For brevity, we refer to "Bouguer anomaly" instead of "complete Bouguer anomaly" to refer to these values.

A grid based on the Bouguer anomaly values was formed with 2 km spacing between grid points using program "minc" (Webring, 1981). "Minc" forms a surface of minimum curvature (Briggs, 1974) through existing data points. Computer plotted contour maps of the gridded data were produced using program "contour" (Godson, 1982), which uses a linear interpolation technique for positioning contours, with optional contour smoothing with splines under tension. The contour maps produced for this report make use of the smoothing option with a spline factor $\sigma = 5$. A search radius of 5 km was also used to trim the grid to eliminate areas with no data.

Principal Facts

The principal facts of the data within the present survey area are tabulated in Appendix B. The data are shown as a contoured Bouguer gravity anomaly map in plate 1.

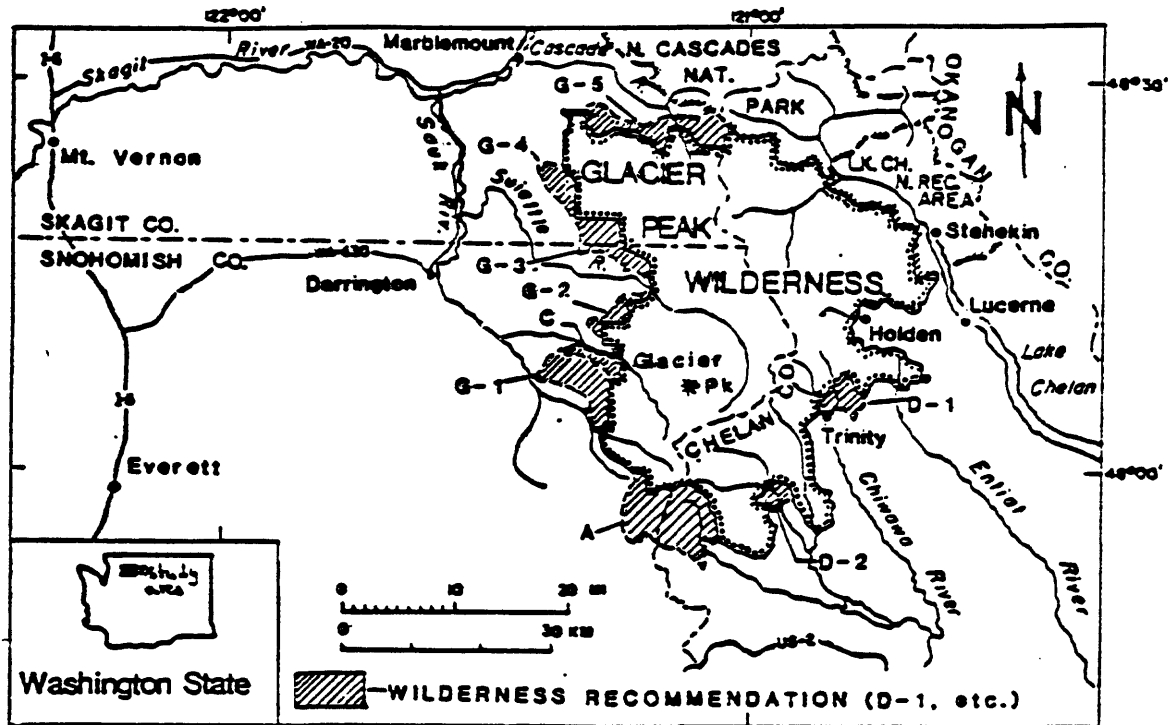


Figure 1. Index map showing the location of the Glacier Peak Wilderness.

References

- Briggs, I. C., 1974, Machine contouring using minimum curvature: Geophysics, v. 39, no. 1, p. 39-48.
- Defense Mapping Agency Aerospace Center, 1974, World Relative Gravity Reference Network, North America, Part 2: DMAAC Reference Publication 25, with supplement updating gravity values to the International Gravity Standardization Net 1971, 1635 p.
- Godson, Richard H., and Webring, Michael W., 1982, Contour: U.S. Geological Survey Open-file Report 82-797.
- Hammer, S., 1939, Terrain corrections for gravimeter stations: Geophysics, v. 4, pp. 184-194.
- International Association of Geodesy, 1967, Geodetic Reference System, 1967: International Association of Geodesy Special Publication 3, 74 p.
- IUGG, 1967, Geodetic Reference System 67: Paris Bureau central de L'Association Internationale de G  d  sique '71 Publication speciale no. 3, p. 115.
- Morelli, Carlo, 1971, The International Gravity Standardization Net 1971 (IGSN. 71): International Association of Geodesy Special Publication 3, 116 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.
- Webring, Michael, 1981, Minc: A gridding program based on minimum curvature: U.S. Geological Survey Open-File Report 81-1224.

Appendix A

Gravity base station descriptions.

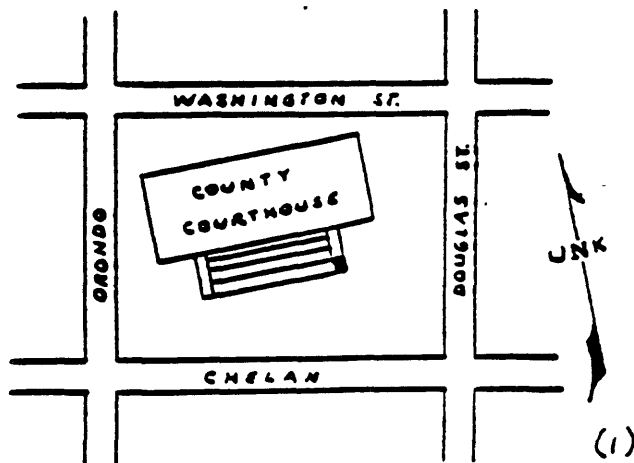
GRAVITY BASE STATION

LATITUDE 47° 25' N (1)		STATION DESIGNATION WENATCHEE	
LONGITUDE 120° 18' W (1)		COUNTRY/STATE USA/Washington	
ELEVATION 221.5 METERS (1)		ADOPTED GRAVITY VALUE	
REFERENCE CODE NUMBERS		ESTIMATED ACCURACY	
ACIC 2105-1		± 0.1 mgals	
IGB 15770B		DATE	
		MONTH/YEAR	
		1971	

DESCRIPTION AND/OR SKETCH

The station is located in Wenatchee, at the county courthouse. Approaching the entrance, the site is on the lowest block to the right of the steps.

It is marked with a USC&GS bronze disk. (1)



REFERENCE SOURCE

(1) 02615

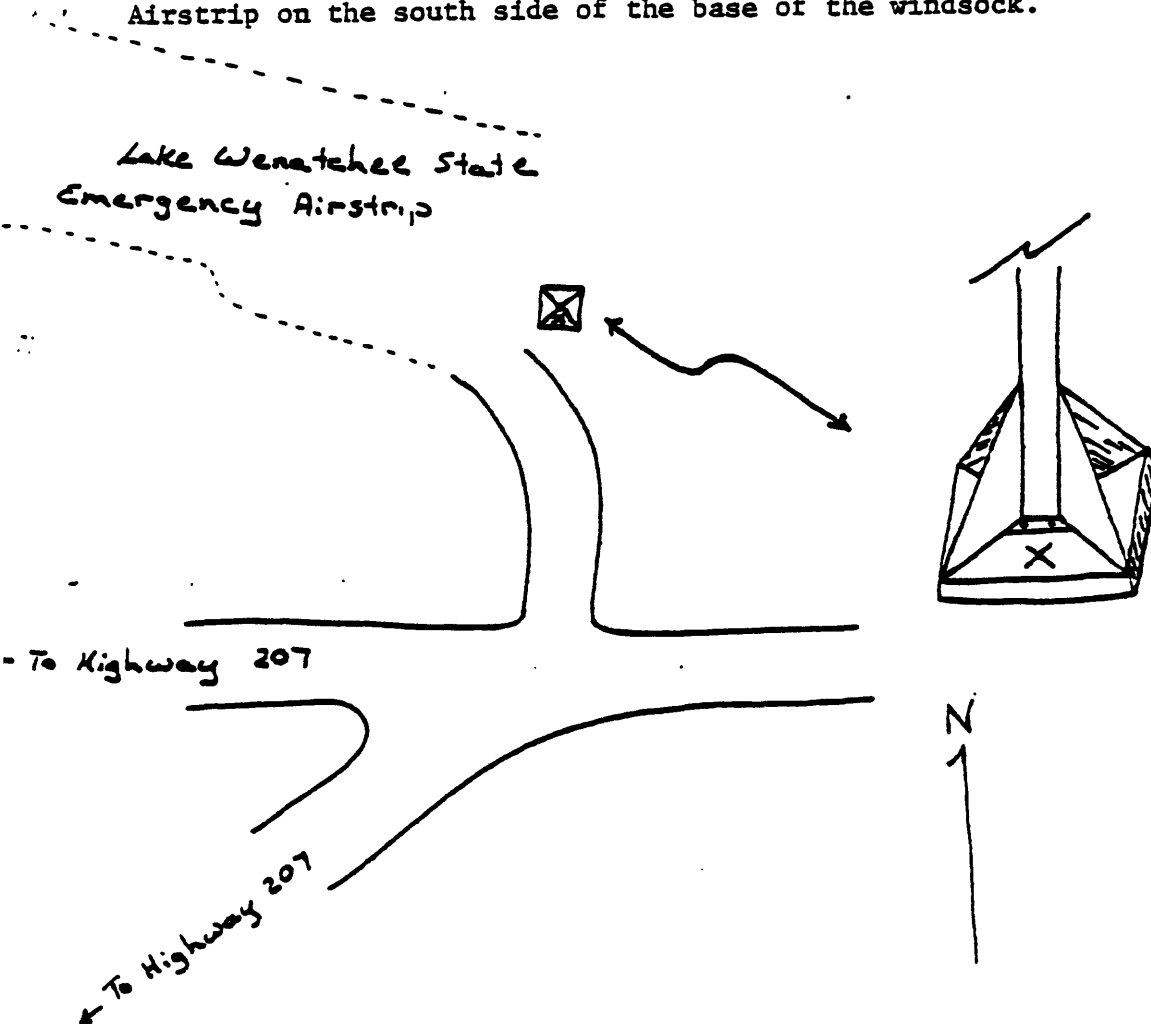
U.S. GEOLOGICAL SURVEY
GRAVITY BASE STATION

STATE/COUNTRY Washington	STATION DESIGNATION Base 02	OBSERVED GRAVITY 980 646.97 mgals
NEAREST TOWN Telma	LONGITUDE 120 42'51"	LATITUDE 47 49'05"
ELEVATION 1922'	TOPOGRAPHIC MAP(S) Plain 1:24,000	

DATE	OBSERVER	METER	REFERENCE STATION	REFERENCE VALUE

DESCRIPTION/SKETCH

The station is located in the SE 1/4 of section 21 T.27N., R17E.
It is located at the SE end of the Lake Wanatchee State Emergency
Airstrip on the south side of the base of the windsock.



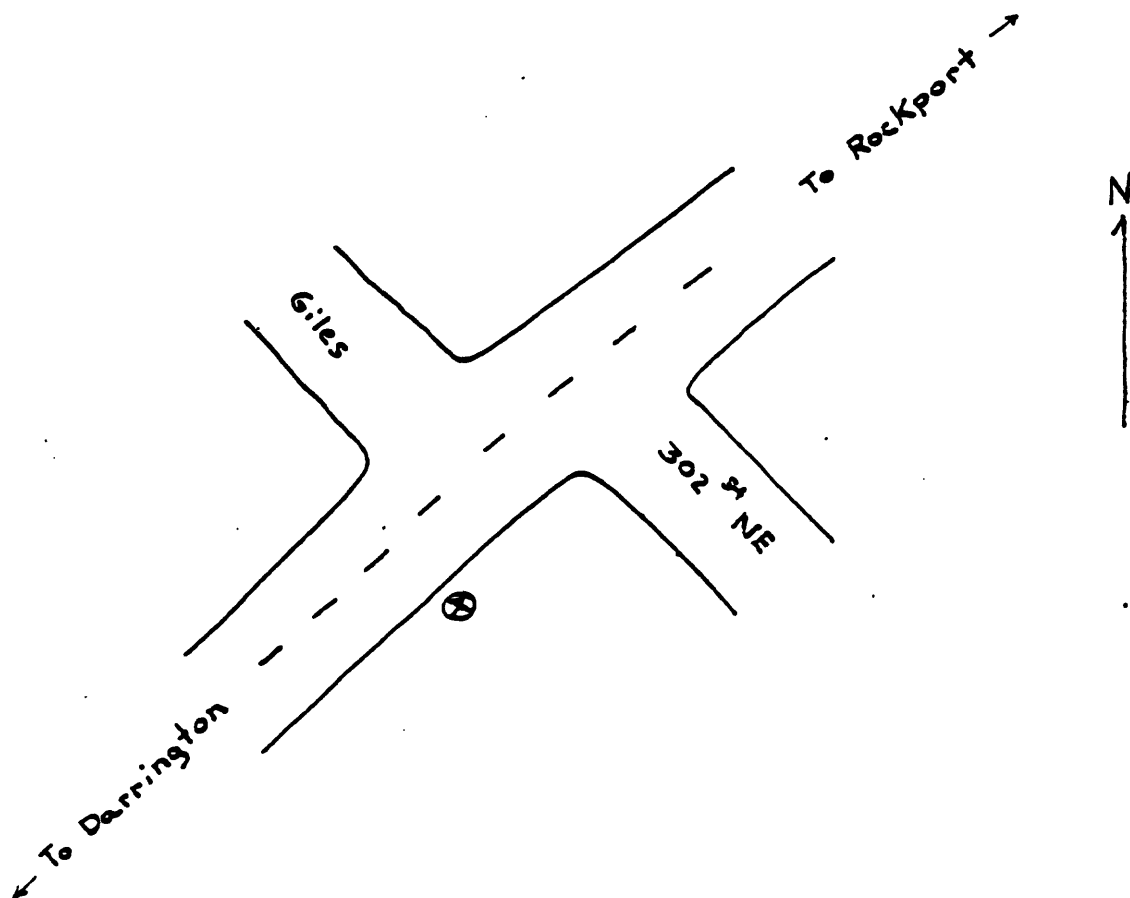
U.S. GEOLOGICAL SURVEY
GRAVITY BASE STATION

STATE/COUNTRY Washington	STATION DESIGNATION base 05	OBSERVED GRAVITY 980 773.30 mgals
NAREST TOWN Darrington	LONGITUDE 121 35'43"	LATITUDE 48 16'24"
ELEVATION 514'	TOPOGRAPHIC MAP(S) Darrington 1:24,000	

DATE	OBSERVER	METER	REFERENCE STATION	REFERENCE VALUE

DESCRIPTION/SKETCH

The gravity base station base05 is located .9 miles north of the ranger station in Darrington Washington, along the highway connecting Darrington and Rockport. The station is marked by a brass disk in a concrete post. (Benchmark elev. 517' stamped "B 381 1958")



Appendix B

Bouguer gravity data.

Appendix B: Principal Facts of Gravity Data

Explanation of headings

Identification

proj	Project name.
sta id	Gravity station identification number.

Location

latitude	North latitude in degrees, minutes, and hundredths of minutes.
----------	---

longitude	West longitude in degrees, minutes, and hundredths of minutes.
-----------	---

ele	Station elevation in feet.
-----	----------------------------

st	State where station is located.
----	---------------------------------

Gravity

observed	Observed gravity in milligals.
----------	--------------------------------

theoretical	Theoretical gravity in milligals.
-------------	-----------------------------------

Corrections

terrain	Terrain correction out to 166.7km in milligals.
---------	--

Bouguer	Elevation correction in milligals.
---------	------------------------------------

curv	Curvature correction in milligals.
------	------------------------------------

special	Not used.
---------	-----------

Anomalies

free-air	Free-air anomaly in milligals.
----------	--------------------------------

complete-Bouguer	Complete Bouguer anomaly in milligals for designated densities.
------------------	--

spec fields	Not used.
-------------	-----------

●

Date: 03/24/83

12

ROUGHIER GRAVITY DATA

glacier neck

gravity

Meter ID: obsgrv

Date: 03/24/83

STATION IDENTIFICATION	L LATITUDE	O LONGITUDE	C deg	A min	T min	I ELE	N (in ft)	S ST	G OBSERVED	R THEORETICAL	C TERRAIN	O BOUGUER	R CURV	S SPECIAL	A FREE	M COMPLIE	O -BOUGUER	R SPEC
	sta-id	deg	min	deg	min	deg	min	ft										
:	d018	48	16.05	-121	20.17	1067.0	wa		980719.11	980914.23	18.51	-36.39	-0.44	0.00	-94.78	-113.10	-111.94	
:	d019	48	15.54	-121	18.96	1088.0	wa		980710.85	980913.46	19.25	-37.11	-0.45	0.00	-100.30	-118.61	-117.44	
:	d020	48	15.41	-121	18.26	1131.0	wa		980706.70	980913.27	18.72	-36.58	-0.46	0.00	-100.21	-120.53	-119.24	
:	d021	48	15.33	-121	17.60	1167.0	wa		980704.56	980913.14	18.35	-39.80	-0.48	0.00	-98.85	-120.78	-119.38	
:	d022	48	15.27	-121	16.25	1247.0	wa		980697.68	980913.05	19.02	-42.53	-0.51	0.00	-98.12	-122.13	-120.61	
:	d023	48	15.28	-121	15.24	1364.0	wa		980687.03	980913.07	24.27	-46.52	-0.55	0.00	-97.78	-120.58	-119.13	
:	d024	48	15.56	-121	13.49	1415.0	wa		980683.22	980913.49	21.61	-48.26	-0.57	0.00	-97.22	-124.44	-122.70	
:	d025	48	15.41	-121	12.42	1504.0	wa		980673.78	980913.27	21.30	-51.30	-0.60	0.00	-98.06	-128.66	-126.71	
:	d026	48	22.39	-121	31.98	564.0	wa		980787.84	980923.73	9.44	-19.24	-0.24	0.00	-82.85	-92.89	-92.25	
:	d027	48	21.52	-121	32.33	382.0	wa		980796.41	980922.42	5.97	-13.03	-0.17	0.00	-90.09	-97.31	-96.85	
:	d028	48	23.51	-121	32.94	332.0	wa		980806.06	980925.41	8.27	-11.32	-0.14	0.00	-88.12	-91.32	-91.12	
:	d029	48	24.40	-121	33.47	321.0	wa		980811.14	980926.74	6.99	-10.95	-0.14	0.00	-85.41	-89.51	-89.25	
:	d030	48	25.18	-121	33.57	293.0	wa		980813.20	980927.91	8.59	-9.99	-0.13	0.00	-87.15	-88.68	-88.59	
:	d031	48	25.78	-121	33.98	279.0	wa		980815.88	980928.81	5.08	-9.52	-0.12	0.00	-86.69	-91.25	-90.96	
:	d032	48	26.54	-121	34.72	269.0	wa		980822.16	980929.95	7.12	-9.17	-0.12	0.00	-82.49	-84.66	-84.52	
:	d033	48	27.29	-121	35.43	251.0	wa		980826.31	980931.07	5.00	-8.56	-0.11	0.00	-81.16	-84.83	-84.59	
:	d034	48	27.13	-121	33.82	947.0	wa		980789.51	980930.83	6.13	-32.30	-0.39	0.00	-52.27	-78.88	-77.15	
:	d035	48	26.23	-121	33.06	1062.0	wa		980782.31	980929.48	4.96	-36.22	-0.44	0.00	-47.31	-79.01	-76.99	
:	d036	48	25.96	-121	32.30	1502.0	wa		980755.41	980929.08	7.11	-51.23	-0.60	0.00	-32.43	-77.15	-74.30	
:	d037	48	25.67	-121	31.89	1750.0	wa		980741.74	980928.64	7.87	-59.69	-0.68	0.00	-22.36	-74.85	-71.51	
:	d038	48	23.04	-121	30.47	3190.0	wa		980642.51	980924.70	16.06	-108.80	-1.09	0.00	17.72	-76.11	-70.14	
:	d039	48	27.97	-121	35.14	240.0	wa		980822.50	980932.09	5.31	-8.19	-0.11	0.00	-87.02	-90.00	-89.81	
:	d040	48	28.08	-121	33.25	254.0	wa		980828.71	980932.26	7.66	-8.66	-0.11	0.00	-79.66	-80.77	-80.70	
:	d041	48	28.80	-121	32.11	246.0	wa		980821.44	980933.34	16.50	-8.39	-0.11	0.00	-88.76	-80.76	-81.27	
:	d042	48	29.23	-121	29.90	285.0	wa		980816.56	980933.98	20.17	-9.72	-0.12	0.00	-90.61	-80.29	-80.95	
:	d043	48	29.35	-121	28.69	270.0	wa		980818.43	980934.16	24.42	-9.21	-0.12	0.00	-90.34	-75.24	-76.20	
:	d044	48	29.33	-121	35.01	265.0	wa		980821.07	980934.13	19.07	-9.04	-0.12	0.00	-88.14	-78.22	-78.85	
:	d045	48	29.52	-121	34.17	274.0	wa		980818.78	980934.41	25.93	-9.35	-0.12	0.00	-89.86	-73.40	-74.45	
:	d046	48	29.69	-121	32.36	251.0	wa		980823.31	980934.66	21.67	-8.56	-0.11	0.00	-87.75	-74.75	-75.58	
:	d047	48	17.57	-121	31.79	512.0	wa		980778.47	980916.50	9.41	-17.46	-0.22	0.00	-89.89	-98.16	-97.63	
:	d048	48	17.37	-121	30.42	1110.0	wa		980745.29	980916.20	11.38	-37.86	-0.45	0.00	-66.54	-93.47	-91.76	
:	d049	48	16.17	-121	30.87	2472.0	wa		980657.51	980914.41	12.14	-44.31	-0.90	0.00	-24.47	-97.55	-92.90	
:	d050	48	15.81	-121	30.08	2758.0	wa		980642.90	980913.87	10.24	-94.07	-0.98	0.00	-11.66	-96.47	-91.07	
:	d051	48	16.34	-121	29.81	3083.0	wa		980622.77	980914.66	13.47	-105.15	-1.06	0.00	-2.03	-94.77	-88.87	
:	d052	48	18.45	-121	31.30	505.0	wa		980782.87	980917.82	8.37	-17.22	-0.22	0.00	-87.47	-96.54	-95.96	
:	d053	48	18.43	-121	30.29	560.0	wa		980777.89	980917.79	11.67	-19.10	-0.24	0.00	-87.24	-94.71	-94.23	
:	d054	48	18.97	-121	31.56	512.0	wa		980779.73	980918.60	7.32	-17.46	-0.22	0.00	-90.72	-101.08	-100.42	
:	d055	48	19.62	-121	30.58	477.0	wa		980785.44	980919.54	8.57	-16.27	-0.21	0.00	-89.28	-97.19	-96.68	
:	d056	48	10.93	-121	28.21	901.0	wa		980737.17	980906.55	13.12	-30.73	-0.38	0.00	-84.65	-102.64	-101.49	
:	d058	48	9.83	-121	28.58	1980.0	wa		980672.66	980904.90	12.63	-47.53	-0.75	0.00	-46.06	-101.72	-98.17	

glacier peak
gravity
Meter ID: obsgrv

Date: 03/24/83

ROUGHER GRAVITY DATA

page

3

Appendix B

STATION		L O C A T I O N		E L E V		C 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 N O M A L I E S	
IDENTIFICATION	prol	sta-id	LATITUDE	LONGITUDE	deg min	deg min	deg min	deg min	deg min	deg min	deg min	deg min	deg min	deg min	deg min
prol	sta-id	LATITUDE	LONGITUDE	deg min	deg min	deg min	deg min	deg min	deg min	deg min	deg min	deg min	deg min	deg min	deg min
d059	48	9.41	-121	28.17	2375.0	980647.13	980904.27	12.69	-81.00	-0.87	0.00	-33.83	-103.02	-98.61	
d060	48	8.95	-121	27.74	2645.0	980633.10	980903.58	11.62	-90.21	-0.95	0.00	-21.79	-101.33	-96.27	
d061	48	10.94	-121	29.06	875.0	980741.45	980906.56	11.61	-29.84	-0.37	0.00	-82.83	-101.43	-100.24	
d062	48	11.65	-121	28.93	1630.0	980699.21	980907.63	9.83	-55.59	-0.64	0.00	-55.15	-101.55	-98.60	
d063	48	11.73	-121	27.84	1970.0	980679.02	980907.74	8.92	-67.19	-0.75	0.00	-43.49	-102.51	-98.75	
d064	48	11.56	-121	26.55	2961.0	980618.05	980907.49	11.93	-100.99	-1.03	0.00	-11.05	-101.15	-95.41	
d065	48	12.30	-121	28.58	1980.0	980680.22	980908.60	7.39	-67.53	-0.75	0.00	-42.21	-103.11	-99.23	
d066	48	12.71	-121	28.94	2108.0	980675.18	980909.21	7.23	-71.90	-0.79	0.00	-35.83	-101.29	-97.12	
d067	48	13.35	-121	27.72	3552.0	980592.68	980910.17	10.61	-121.15	-1.17	0.00	16.45	-95.26	-88.15	
d068	48	14.33	-121	29.68	2385.0	980666.19	980911.64	6.59	-81.35	-0.88	0.00	-21.21	-96.84	-92.03	
d069	48	14.46	-121	28.91	2748.0	980643.09	980911.84	10.05	-93.73	-0.98	0.00	-10.38	-95.03	-89.64	
d070	48	10.83	-121	25.56	1178.0	980714.02	980906.40	12.05	-40.18	-0.48	0.00	-81.60	-110.21	-108.39	
d071	48	10.42	-121	24.16	1965.0	980670.35	980905.78	14.61	-67.02	-0.75	0.00	-50.67	-103.83	-100.44	
d072	48	10.63	-121	21.14	1668.0	980679.70	980906.09	17.57	-56.89	-0.65	0.00	-69.55	-109.53	-106.98	
d073	48	10.37	-121	19.81	1840.0	980666.37	980905.70	19.50	-62.76	-0.71	0.00	-66.33	-110.30	-107.50	
d074	48	10.18	-121	27.14	1154.0	980720.63	980905.42	11.41	-39.36	-0.47	0.00	-76.26	-104.70	-102.89	
d075	48	9.87	-121	26.13	1205.0	980714.82	980904.95	11.88	-41.10	-0.49	0.00	-76.83	-106.54	-104.65	
d076	48	5.24	-121	23.20	1420.0	980686.81	980898.01	18.45	-48.43	-0.57	0.00	-77.67	-108.22	-106.28	
d077	48	4.43	-121	23.81	1408.0	980680.78	980896.80	23.44	-48.02	-0.56	0.00	-83.62	-106.76	-107.16	
d078	48	3.88	-121	24.58	1530.0	980672.07	980895.97	20.75	-52.18	-0.61	0.00	-80.03	-112.07	-110.03	
d079	48	9.39	-121	25.75	1164.0	980714.66	980904.23	16.92	-39.70	-0.47	0.00	-80.12	-103.37	-101.89	
d080	48	8.42	-121	25.18	1210.0	980709.07	980902.78	18.88	-41.27	-0.49	0.00	-79.93	-102.81	-101.36	
d081	48	7.66	-121	24.69	1179.0	980707.49	980901.64	17.63	-40.21	-0.48	0.00	-83.28	-106.15	-104.69	
d082	48	6.99	-121	24.15	1241.0	980703.07	980900.63	18.19	-42.33	-0.50	0.00	-80.87	-105.51	-103.94	
d083	48	6.21	-121	23.20	1277.0	980698.43	980899.46	14.54	-43.55	-0.52	0.00	-80.96	-110.49	-108.61	
d084	48	5.93	-121	22.21	1600.0	980676.36	980899.05	20.57	-54.57	-0.63	0.00	-72.24	-106.87	-104.67	
d085	48	5.82	-121	21.23	1710.0	980662.16	980898.88	24.44	-58.32	-0.67	0.00	-75.93	-110.48	-108.28	
d086	48	5.63	-121	20.13	1846.0	980654.90	980898.59	18.97	-62.96	-0.71	0.00	-70.12	-114.83	-111.98	
d087	48	5.30	-121	18.57	1897.0	980651.32	980898.10	15.84	-64.70	-0.73	0.00	-68.41	-118.00	-114.84	
d088	48	2.46	-121	9.11	7030.0	980318.34	980893.84	35.89	-239.77	-1.52	0.00	85.27	-120.13	-107.05	
d089	48	2.04	-121	8.85	5904.0	980404.32	980893.20	13.11	-201.37	-1.49	0.00	66.09	-123.66	-111.58	
d090	48	2.25	-121	10.49	5135.0	980448.57	980893.52	5.31	-175.14	-1.43	0.00	37.76	-133.49	-122.59	
d091	48	2.54	-121	12.79	2810.0	980580.84	980893.96	8.36	-95.84	-0.99	0.00	-48.92	-137.39	-131.76	
d092	48	2.66	-121	13.72	2780.0	980583.61	980894.14	27.43	-94.82	-0.99	0.00	-49.15	-117.53	-113.17	
d093	48	3.17	-121	16.06	2327.0	980611.68	980894.91	23.33	-79.37	-0.86	0.00	-64.43	-121.33	-117.71	
d094	48	11.27	-121	22.17	2558.0	980634.95	980907.05	11.88	-87.25	-0.93	0.00	-31.59	-107.89	-103.03	
d095	48	12.85	-121	23.54	2827.0	980622.54	980909.42	18.16	-96.42	-1.00	0.00	-21.09	-100.35	-95.30	
d096	48	4.23	-121	17.53	1978.0	980639.11	980896.49	19.71	-67.46	-0.75	0.00	-71.40	-119.91	-116.82	
d097	48	3.81	-121	17.42	2075.0	980633.03	980895.86	16.40	-70.77	-0.78	0.00	-67.73	-122.89	-119.37	
d098	48	3.51	-121	17.18	2072.0	980631.90	980895.41	16.70	-70.67	-0.78	0.00	-68.69	-123.45	-119.96	

BOUGUER GRAVITY DATA

glacier peak

gravity

Water ID: obsrv

Date: 03/24/83

STATION IDENTIFICATION		L U 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 F S				
proj	sta-id	LATITUDE deg min	LONGITUDE deg min	ELE (in ft)	ST	UNRSERVED	THEORETICAL	TERRAIN BOUGUER CURV (dl=2.67)	SPECIAL	FREE AIR	COMPLETE-ROUGHER	SPEC FIELDS
:	d099	48 3.14	-121 17.29	2218.0	wa	980625.06	980894.86	14.52 -75.65 -0.83	0.00	-61.25	-123.21	-119.26
:	d100	48 2.70	-121 17.39	2301.0	wa	980619.22	980894.20	17.18 -78.48 -0.85	0.00	-58.63	-120.78	-116.83
:	d101	48 1.88	-121 17.45	2323.0	wa	980615.43	980892.97	17.80 -79.23 -0.86	0.00	-59.12	-121.41	-117.44
:	d102	48 1.35	-121 16.41	2808.0	wa	980587.20	980892.17	18.06 -95.77 -0.99	0.00	-40.96	-119.67	-114.65
:	d103	48 3.36	-121 24.89	1711.0	wa	980663.93	980895.19	15.96 -58.36 -0.67	0.00	-70.38	-113.44	-110.70
:	d104	48 3.29	-121 25.73	1976.0	wa	980647.94	980895.09	15.73 -67.40 -0.75	0.00	-61.35	-113.77	-110.43
:	d105	48 3.12	-121 24.43	2028.0	wa	980646.43	980894.83	14.04 -69.17 -0.77	0.00	-57.72	-113.61	-110.06
:	d106	48 3.58	-121 24.27	2211.0	wa	980636.86	980895.52	15.17 -75.41 -0.83	0.00	-50.77	-111.84	-107.95
:	d107	48 2.75	-121 23.69	2596.0	wa	980613.28	980894.27	14.27 -88.54 -0.94	0.00	-36.91	-112.12	-107.33
:	d108	48 2.49	-121 23.12	2794.0	wa	980603.42	980893.88	13.17 -95.30 -0.99	0.00	-27.77	-110.88	-105.59
:	d109	48 1.95	-121 26.16	2172.0	wa	980637.21	980893.07	13.89 -74.08 -0.81	0.00	-51.64	-112.64	-108.76
:	d110	48 1.61	-121 26.58	2361.0	wa	980631.94	980892.56	10.97 -80.53 -0.87	0.00	-38.64	-109.06	-104.58
:	d111	48 1.01	-121 26.56	2321.0	wa	980629.02	980891.66	15.60 -79.16 -0.86	0.00	-44.41	-108.83	-104.73
:	d112	48 0.22	-121 26.23	2346.0	wa	980627.89	980890.48	11.14 -80.02 -0.87	0.00	-42.01	-111.75	-107.31
:	d113	47 59.99	-121 25.25	2475.0	wa	980615.91	980890.13	15.60 -84.42 -0.90	0.00	-41.51	-111.23	-106.79
:	d114	47 59.56	-121 24.17	2630.0	wa	980603.10	980889.48	17.15 -89.70 -0.95	0.00	-39.11	-112.61	-107.93
:	d115	47 59.17	-121 23.60	2756.0	wa	980596.42	980888.90	5.11 -94.00 -0.98	0.00	-33.36	-123.23	-117.50
:	d116	48 2.48	-121 26.96	2205.0	wa	980643.97	980893.87	10.73 -75.21 -0.82	0.00	-42.58	-107.88	-103.72
:	d117	48 2.76	-121 28.30	2030.0	wa	980657.69	980894.29	11.40 -69.24 -0.77	0.00	-45.73	-104.34	-100.61
:	d118	48 3.27	-121 29.44	1875.0	wa	980668.50	980895.05	11.59 -63.95 -0.72	0.00	-50.25	-103.38	-99.96
:	d119	48 4.18	-121 30.98	1718.0	wa	980686.86	980896.42	8.50 -58.60 -0.67	0.00	-48.02	-98.78	-95.55
:	d120	48 5.17	-121 32.33	1615.0	wa	980695.56	980897.91	8.57 -55.08 -0.64	0.00	-50.49	-97.63	-94.63
:	n029	48 20.32	-120 50.92	6625.0	wa	980345.99	980920.63	36.32 -225.96 -1.52	0.00	48.08	-143.08	-130.91
:	n044	48 13.94	-121 7.73	6735.0	wa	980333.71	980911.06	44.60 -229.71 -1.52	0.00	55.70	-130.93	-119.05
:	n045	48 17.63	-121 8.01	7030.0	wa	980321.73	980916.59	50.76 -239.77 -1.52	0.00	65.90	-124.63	-112.50
:	n046	48 16.75	-120 56.54	5926.0	wa	980395.64	980915.27	25.06 -202.12 -1.49	0.00	37.40	-141.15	-129.78
:	n047	48 18.08	-120 58.69	6367.0	wa	980389.97	980917.27	20.46 -217.16 -1.51	0.00	71.17	-127.04	-114.42
:	n049	48 18.67	-120 56.75	7060.0	wa	980319.31	980918.15	56.39 -240.80 -1.51	0.00	64.74	-121.18	-109.34
:	n051	48 23.58	-121 3.32	5830.0	wa	980437.07	980925.52	13.76 -198.84 -1.49	0.00	59.57	-127.00	-115.12
:	n052	48 22.53	-121 2.07	5070.0	wa	980478.37	980923.98	16.56 -172.92 -1.42	0.00	31.03	-126.75	-116.70
:	n053	48 22.92	-121 4.91	6390.0	wa	980385.17	980924.52	15.18 -217.94 -1.51	0.00	61.28	-143.00	-129.99
:	n054	48 22.24	-121 4.31	5292.0	wa	980468.92	980923.50	10.98 -180.49 -1.44	0.00	42.68	-128.08	-117.19
:	n056	48 25.81	-121 6.40	5808.0	wa	980406.17	980928.85	45.70 -198.09 -1.48	0.00	23.27	-130.61	-120.82
:	n058	48 27.41	-121 6.52	6246.0	wa	980397.40	980931.25	33.86 -213.03 -1.51	0.00	53.25	-127.43	-115.93
:	n059	48 23.42	-121 24.86	4345.0	wa	980562.56	980925.27	12.53 -148.20 -1.32	0.00	45.76	-91.22	-82.50
:	n060	48 23.20	-121 22.28	4907.0	wa	980581.66	980924.95	15.40 -133.26 -1.24	0.00	24.03	-95.07	-87.49
:	n061	48 25.80	-121 20.77	3110.0	wa	980613.53	980928.84	15.83 -106.07 -1.07	0.00	-22.91	-114.23	-108.41
:	n062	48 24.28	-121 17.26	7425.0	wa	980320.29	980926.56	49.75 -253.25 -1.50	0.00	91.59	-113.41	-100.35
:	n063	48 25.45	-121 15.74	4460.0	wa	980522.25	980928.31	11.45 -152.12 -1.34	0.00	13.21	-128.79	-119.75

BOUGUER GRAVITY DATA

glacier peak
gravity
meter ID: obsarv

Date: 03/24/83

STATION IDENTIFICATION	L U C A T I O N LATITUDE LONGITUDE	N M S ELE (in ft)	G R A V I T Y OBSERVED THEORETICAL	C O R R E C T I O N S TERRAIN BOUGUER CURV (d1=2.67)	A N O M A L I E S FREE COMPLIF-BOUGUER SPEC AIR d1=2.67 d2=2.50 FIELDS
: n065	48 27.92 -121 18.03	5969.0 wa	980437.54	32.12 -203.59 -1.49	66.60 -106.36 -95.35
: n066	48 26.92 -121 18.61	6363.0 wa	980408.67	32.49 -217.02 -1.51	76.25 -109.80 -97.95
: n073	48 19.38 -121 12.71	4430.0 wa	980515.89	5.28 -151.09 -1.33	13.13 -134.01 -124.65
: n075	48 20.97 -121 8.50	5235.0 wa	980468.12	19.60 -178.55 -1.44	38.62 -121.76 -111.55
: n076	48 21.47 -121 7.14	5885.0 wa	980434.95	21.87 -200.72 -1.49	65.79 -114.55 -103.07
: n077	48 21.64 -121 6.09	4605.0 wa	980522.02	14.04 -157.06 -1.36	32.32 -112.06 -102.87
: n083	48 16.00 -121 4.89	6353.0 wa	980360.65	41.71 -216.68 -1.51	43.65 -132.83 -121.59
: n084	48 18.15 -121 1.53	8788.0 wa	980197.93	73.15 -299.73 -1.39	106.45 -121.52 -107.01
: n085	48 15.75 -121 3.20	6868.0 wa	980328.51	40.03 -234.25 -1.52	60.28 -135.46 -123.00
: n087	48 17.72 -121 4.99	6099.0 wa	980388.08	12.03 -208.02 -1.50	44.64 -152.85 -140.27
: n088	48 18.88 -121 6.39	5395.0 wa	980456.58	11.66 -184.01 -1.45	45.26 -128.55 -117.48
: n115	48 27.04 -121 0.98	5973.0 wa	980405.83	10.06 -203.72 -1.49	36.58 -158.57 -146.15
: n116	48 26.44 -121 0.65	4165.0 wa	980527.30	15.96 -142.06 -1.29	-10.95 -138.33 -130.22
: n118	48 25.76 -120 57.89	5964.0 wa	980405.53	8.74 -203.42 -1.49	37.36 -158.81 -146.32
: n121	48 24.17 -120 57.34	6062.0 wa	980382.98	40.51 -206.76 -1.50	26.40 -141.34 -130.66
: n122	48 24.42 -120 53.82	5975.0 wa	980397.54	25.72 -203.79 -1.49	32.41 -147.16 -135.72
: n128	48 22.74 -120 59.97	6687.0 wa	980356.27	13.93 -228.07 -1.52	60.56 -155.10 -141.37
: n129	48 23.04 -120 58.31	6954.0 wa	980337.48	34.12 -237.18 -1.52	66.40 -138.18 -125.15
: n131	48 21.98 -120 58.57	6546.0 wa	980374.39	24.21 -223.27 -1.51	66.56 -134.01 -121.24
: n132	48 21.91 -120 56.71	6825.0 wa	980343.02	30.97 -232.78 -1.52	61.51 -141.81 -128.87
: n135	48 18.20 -120 58.48	7070.0 wa	980332.82	35.02 -241.14 -1.51	79.89 -127.74 -114.52
: n136	48 18.58 -120 49.31	6860.0 wa	980341.57	30.67 -233.98 -1.52	68.34 -136.48 -123.44
: n137	48 19.49 -120 48.72	6831.0 wa	980344.95	29.61 -232.99 -1.52	67.64 -137.26 -124.21
: n138	48 20.76 -120 48.26	7120.0 wa	980313.54	39.36 -242.84 -1.51	61.47 -143.53 -130.48
: n139	48 21.03 -120 44.50	7349.0 wa	980618.73	21.93 -80.12 -0.87	-86.09 -145.15 -141.39
: n140	48 18.92 -120 41.82	3037.0 wa	980572.92	24.13 -103.58 -1.05	-60.07 -140.58 -135.45
: n141	48 16.96 -120 41.67	6245.0 wa	980359.99	36.73 -213.00 -1.51	31.41 -146.36 -135.04
: n142	48 22.57 -120 54.15	5926.0 wa	980401.39	20.36 -202.12 -1.49	34.43 -148.82 -137.16
: n143	48 22.93 -120 52.73	5455.0 wa	980431.33	22.19 -186.05 -1.46	19.57 -145.75 -135.23
: n160	48 15.39 -120 41.17	7096.0 wa	980320.01	29.25 -242.09 -1.51	73.92 -140.43 -126.79
: n161	48 17.46 -120 41.38	5481.0 wa	980413.70	31.43 -186.94 -1.46	12.59 -144.38 -134.39

BUNGIER GRAVITY DATA

alacier peak

gravity

Meter ID: obsrv

Date: 03/24/83

STATION IDENTIFICATION proj sta-id	LATITUDE deg min	LONGITUDE deg min	ELEVATION (in ft)	OBSERVED GRAVITY	TERRAIN CORRECTION (d1=2.67)	SPECIAL CORRECTION	FREE AIR	COMPLETE-ROUGHER d1=2.67 d2=2.50	SPEC FIFLDS
162	48 18.52	-120 43.91	5010.0	980917.93	15.30	-170.68	-1.41	13.86	-143.13
164	48 17.52	-120 45.59	7484.0	980916.43	18.90	-255.26	-1.50	88.42	-149.44
165	48 15.68	-120 43.03	7660.0	980913.67	43.15	-261.26	-1.49	87.06	-132.55
170	48 10.37	-121 10.89	6702.0	980905.70	14.96	-228.59	-1.52	74.77	-140.37
171	48 8.74	-121 8.37	6952.0	980903.26	29.71	-237.11	-1.52	76.86	-132.06
173	48 4.86	-121 13.83	6735.0	980897.44	36.26	-229.71	-1.52	77.87	-117.10
174	48 3.28	-121 11.39	6910.0	980895.07	39.12	-235.68	-1.52	81.34	-116.73
175	48 8.66	-121 18.03	6882.0	980903.14	17.01	-166.51	-1.40	42.96	-107.94
182	48 8.02	-121 16.18	5226.0	980902.18	26.49	-178.24	-1.44	37.93	-115.26
184	48 3.37	-121 8.30	6754.0	980895.20	24.85	-230.36	-1.52	86.07	-120.96
185	48 3.88	-121 5.45	8197.0	980895.97	41.43	-279.58	-1.45	118.27	-121.33
187	48 4.84	-121 4.36	7723.0	980897.41	40.96	-263.41	-1.49	102.38	-121.55
188	48 6.73	-121 4.05	7135.0	980900.24	31.79	-243.35	-1.51	75.55	-137.52
189	48 5.26	-121 2.87	6420.0	980898.04	13.17	-218.97	-1.51	70.95	-136.36
192	48 1.43	-120 56.80	6300.0	980892.29	9.72	-214.87	-1.51	72.96	-133.70
194	48 0.36	-121 0.24	5873.0	980890.69	22.95	-200.31	-1.49	64.81	-114.04
195	48 0.31	-121 9.37	5703.0	980890.61	22.74	-194.51	-1.48	51.61	-121.64
am056	48 15.43	-120 57.94	5930.0	980913.30	11.28	-202.25	-1.49	60.14	-132.32
am056	48 15.80	-120 59.11	5326.0	980913.85	20.21	-181.65	-1.45	37.00	-125.89
am060	48 16.21	-120 57.06	6535.0	980914.46	28.95	-222.89	-1.51	65.39	-130.07
am061	48 16.76	-120 56.57	5926.0	980915.29	35.16	-202.12	-1.49	38.99	-129.46
am062	48 18.09	-120 58.79	6363.0	980917.28	20.51	-217.02	-1.51	72.30	-125.72
am063	48 21.90	-120 56.71	6825.0	980922.99	30.99	-232.78	-1.52	62.51	-140.80
am064	48 21.98	-120 58.57	6540.0	980923.12	24.17	-223.06	-1.51	67.36	-133.05
ha002	47 49.09	-120 42.84	1922.0	980873.77	12.71	-65.55	-0.74	-46.08	-99.66
ba003	47 53.85	-121 25.24	1154.0	980880.91	35.44	-39.36	-0.47	-90.76	-95.15
h1125	47 52.73	-121 19.36	2589.0	980879.23	8.76	-88.30	-0.94	-33.46	-113.93
h1126	47 53.44	-121 19.88	1596.0	980884.57	20.96	-54.43	-0.63	-81.66	-115.76
h1208	47 56.22	-121 21.23	5319.0	980884.47	30.20	-181.42	-1.44	42.82	-109.85
h1209	47 56.77	-121 22.41	5476.0	980885.30	32.62	-186.77	-1.46	46.56	-109.05
h1210	47 56.97	-121 22.07	5582.0	980885.59	25.06	-190.39	-1.47	27.44	-139.35
h1212	47 58.31	-121 18.90	5779.0	980887.61	27.47	-197.11	-1.48	63.13	-107.99
h1213	47 58.55	-121 18.48	5527.0	980887.97	27.82	-188.51	-1.46	52.11	-110.05
h1214	47 59.11	-121 16.32	4965.0	980888.81	15.73	-169.34	-1.41	41.22	-113.80
h1215	47 58.15	-121 15.50	5721.0	980887.37	25.89	-195.13	-1.48	58.10	-112.62
h1216	47 55.84	-121 17.69	4401.0	980883.90	24.33	-150.10	-1.33	25.05	-102.05
h1217	47 57.09	-121 17.92	5120.0	980885.77	28.96	-174.63	-1.42	42.82	-104.27
h1218	47 56.74	-121 15.61	5491.0	980885.25	8.45	-187.28	-1.46	51.66	-128.63
h1219	47 54.90	-121 15.44	4761.0	980882.49	4.41	-162.34	-1.38	36.45	-122.91
h1220	47 54.67	-121 17.34	4832.0	980882.14	28.97	-164.81	-1.39	27.05	-110.18
h1220	47 54.67	-121 17.34	4832.0	980882.14	28.97	-164.81	-1.39	27.05	-110.18

glacier peak
gravity
Meter ID: obsgrv

Date: 03/24/03

BUIGUER GRAVITY DATA

page

7

STATION IDENTIFICATION		LATITUDE		LONGITUDE		ELEVATION		GRAVITY		CORRECTION		SPECIAL		FREE AIR		ANOMALIES	
proj	sta-id	deg	min	deg	min	deg	min	observed	theoretical	terrain	Bouguer	curvature	special	air	comp	d1=2.67	d2=2.50
	h1221	47	54.73	-121	20.56	5427.0	wa	980415.56	980882.23	10.07	-185.10	-1.46	0.00	43.48	-133.00	-121.76	
	h1222	47	53.04	-121	17.65	4872.0	wa	980456.32	980879.70	20.94	-166.17	-1.40	0.00	34.63	-112.00	-102.66	
	h1223	47	53.51	-121	16.26	4450.0	wa	980492.42	980880.40	13.60	-151.78	-1.34	0.00	30.36	-109.15	-100.27	
	h1503	47	54.08	-121	19.14	1724.0	wa	980648.75	980881.26	11.80	-58.80	-0.67	0.00	-70.40	-118.08	-115.04	
	hm026	47	58.68	-121	10.50	6172.0	wa	980374.62	980888.16	25.93	-210.51	-1.50	0.00	66.61	-119.47	-107.63	
	hm031	47	59.52	-121	9.50	5209.0	wa	980448.53	980889.42	8.89	-177.66	-1.43	0.00	48.77	-121.43	-110.60	
	hm032	47	59.12	-121	10.58	5194.0	wa	980451.35	980888.83	8.50	-177.15	-1.43	0.00	50.79	-119.30	-108.47	
	hm033	47	58.62	-121	11.27	5946.0	wa	980390.50	980888.07	25.07	-202.80	-1.49	0.00	61.35	-117.88	-106.47	
	hm034	47	58.59	-121	13.39	5697.0	wa	980409.89	980888.03	20.78	-194.31	-1.48	0.00	57.39	-117.62	-106.48	
	hm035	47	57.45	-121	14.99	5685.0	wa	980406.43	980886.32	27.38	-193.90	-1.48	0.00	54.51	-113.49	-102.79	
	hm036	47	57.13	-121	11.96	5298.0	wa	980435.66	980885.84	18.42	-180.70	-1.44	0.00	47.86	-115.86	-105.44	
	hm037	47	57.14	-121	10.42	6193.0	wa	980370.72	980885.85	25.03	-211.23	-1.50	0.00	67.00	-120.70	-108.75	
	hm039	47	58.23	-121	8.82	5905.0	wa	980397.45	980887.49	17.70	-201.40	-1.49	0.00	65.43	-119.76	-107.97	
	hm040	47	59.26	-121	7.71	6121.0	wa	980384.91	980889.03	26.42	-208.77	-1.50	0.00	71.24	-112.61	-100.90	
	cc084	47	54.47	-120	43.24	2438.0	wa	980617.95	980881.84	9.09	-83.15	-0.89	0.00	-34.66	-109.62	-104.85	
	cc085	47	53.96	-120	42.47	2047.0	wa	980618.60	980881.08	12.81	-69.82	-0.78	0.00	-70.00	-127.79	-124.11	
	cc128	47	53.19	-120	43.88	2911.0	wa	980591.26	980879.92	7.31	-99.29	-1.02	0.00	-14.97	-107.97	-102.05	
	cc129	47	52.84	-120	42.50	2552.0	wa	980608.36	980879.40	9.17	-87.04	-0.92	0.00	-31.09	-109.89	-104.87	
	cc130	47	53.37	-120	43.29	2556.0	wa	980611.85	980880.20	8.10	-87.18	-0.93	0.00	-28.02	-108.02	-102.93	
	cc142	47	57.46	-120	44.00	3572.0	wa	980555.88	980886.34	6.91	-121.83	-1.18	0.00	5.37	-110.72	-103.33	
	cc143	47	57.96	-120	43.35	3596.0	wa	980555.57	980887.09	9.07	-122.65	-1.18	0.00	6.57	-108.19	-100.89	
	cc144	47	52.71	-120	40.46	2881.0	wa	980592.70	980879.20	8.36	-98.26	-1.01	0.00	-15.62	-106.54	-100.75	
	cc145	47	54.01	-120	40.66	3286.0	wa	980572.81	980881.16	7.88	-112.08	-1.11	0.00	0.60	-104.71	-98.00	
	cc201	47	57.31	-120	39.97	4508.0	wa	980380.03	980886.11	18.61	-221.97	-1.51	0.00	105.65	-99.22	-86.18	
	cc204	47	58.30	-120	40.70	6602.0	wa	980370.09	980887.59	28.23	-225.18	-1.52	0.00	103.06	-95.41	-82.77	
	cc205	47	59.04	-120	40.25	6543.0	wa	980375.61	980888.70	23.09	-223.16	-1.51	0.00	101.92	-99.67	-86.84	
	cc206	47	59.43	-120	40.50	6634.0	wa	980367.08	980889.29	27.71	-226.27	-1.52	0.00	101.35	-98.72	-85.98	
	cc207	47	59.81	-120	40.82	6716.0	wa	980360.70	980889.86	28.79	-229.06	-1.52	0.00	102.11	-99.68	-86.83	
	cs105	48	22.53	-121	2.09	5070.0	wa	980480.97	980923.94	13.89	-172.92	-1.42	0.00	33.63	-126.82	-116.60	
	dm103	48	21.50	-121	6.09	4605.0	wa	980508.10	980922.39	14.20	-157.06	-1.36	0.00	18.61	-125.61	-116.43	

ROUGHNER GRAVITY DATA

page 8

glacier peak
gravity
water ID: obsrv

Date: 03/24/83

STATION IDENTIFICATION proj sta-id	L LATITUDE deg min	A LONGITUDE deg min	T TIME min	N ELEVATION (in ft)	S STATION TYPE	GRAVITY UNSERVED THEORETICAL	CORRECTION TERRAIN ROUGHNER CURV (dl=2.67)	SPCTAL	AIR	COMPLTF-ROUGHNER SPEC dl=2.67 d2=2.50 FIELDS
dm104	48 22.21	-121 4.39	5292.0	wa	980470.38	980923.46	16.15 -180.49 -1.44	0.00	44.39	-121.40 -110.84
dm106	48 22.21	-121 0.99	6435.0	wa	980390.85	980923.46	24.79 -219.48 -1.51	0.00	72.25	-123.95 -111.46
dm107	48 17.91	-121 5.24	5015.0	wa	980473.44	980917.02	17.28 -171.05 -1.41	0.00	27.86	-127.32 -117.44
dm108	48 15.91	-121 4.30	4648.0	wa	980488.01	980914.02	15.83 -158.53 -1.37	0.00	10.94	-133.12 -123.95
dm111	48 15.75	-121 3.19	6868.0	wa	980329.78	980913.77	40.02 -234.25 -1.52	0.00	61.55	-134.20 -121.73
dm112	48 20.45	-121 3.17	6196.0	wa	980411.13	980920.82	17.79 -211.33 -1.50	0.00	72.72	-122.33 -109.91
dm113	48 21.11	-121 1.71	7411.0	wa	980312.61	980921.81	47.52 -252.77 -1.50	0.00	87.35	-119.40 -106.24
dm114	48 19.60	-121 1.00	4974.0	wa	980478.61	980919.55	15.03 -169.65 -1.41	0.00	26.65	-129.38 -119.45
dm115	48 19.65	-121 0.21	6528.0	wa	980364.71	980919.62	40.24 -222.65 -1.51	0.00	58.69	-125.24 -113.53
dm116	48 16.43	-121 0.20	6522.0	wa	980372.37	980914.80	27.74 -222.45 -1.51	0.00	70.61	-125.61 -113.12
dv096	48 17.39	-121 10.06	5808.0	wa	980428.48	980916.23	20.65 -198.09 -1.48	0.00	58.20	-120.73 -109.33
dv097	48 17.06	-121 9.14	5988.0	wa	980410.76	980915.73	22.99 -204.23 -1.50	0.00	57.88	-124.86 -113.22
dv098	48 19.19	-121 7.72	5430.0	wa	980442.23	980918.93	25.00 -185.20 -1.46	0.00	33.73	-127.92 -117.63
dv099	48 20.85	-121 8.44	5235.0	wa	980468.74	980921.42	15.83 -178.55 -1.44	0.00	39.43	-124.73 -114.27
eq121	47 50.21	-121 18.34	1904.0	wa	980639.64	980875.45	13.53 -64.94 -0.73	0.00	-56.78	-108.92 -105.60
eq122	47 49.64	-121 18.54	2169.0	wa	980626.56	980874.59	11.13 -73.98 -0.81	0.00	-44.09	-107.75 -103.70
eq123	47 50.53	-121 19.09	2711.0	wa	980594.86	980875.93	9.02 -92.46 -0.97	0.00	-26.18	-110.59 -105.21
eq124	47 51.33	-121 18.63	2154.0	wa	980626.40	980877.13	12.39 -73.47 -0.81	0.00	-48.20	-110.09 -106.14
op009	48 2.03	-121 8.85	5901.0	wa	980405.35	980893.20	13.98 -201.27 -1.49	0.00	66.85	-121.93 -109.91
op010	48 3.41	-121 8.32	6754.0	wa	980348.11	980895.27	24.75 -230.36 -1.52	0.00	87.68	-119.45 -106.26
op011	48 3.50	-121 10.16	6247.0	wa	980380.98	980895.40	22.62 -213.07 -1.51	0.00	72.79	-119.17 -106.94
op013	48 0.77	-121 13.74	5660.0	wa	980414.70	980891.30	21.60 -193.05 -1.47	0.00	55.45	-117.47 -106.46
op014	48 0.36	-121 11.33	6265.0	wa	980373.49	980890.69	26.27 -213.68 -1.51	0.00	71.70	-117.22 -105.19
op015	48 0.32	-121 9.36	5703.0	wa	980407.82	980890.63	22.74 -194.51 -1.48	0.00	53.28	-119.97 -108.94
op016	48 4.18	-121 6.33	7829.0	wa	980274.28	980896.42	35.34 -247.02 -1.48	0.00	113.68	-119.48 -104.64
op017	48 5.26	-121 2.88	6420.0	wa	980367.12	980898.04	24.82 -218.97 -1.51	0.00	72.53	-123.13 -110.67
op018	48 6.61	-121 3.51	6549.0	wa	980346.90	980900.06	13.18 -273.37 -1.51	0.00	62.41	-149.29 -135.81
op019	48 7.96	-121 5.73	7717.0	wa	980265.82	980902.09	39.14 -263.20 -1.49	0.00	89.03	-136.52 -122.16
op020	48 8.48	-121 4.17	6100.0	wa	980360.77	980902.87	30.89 -208.05 -1.50	0.00	31.29	-147.37 -136.00
op021	48 10.23	-121 5.31	6030.0	wa	980381.09	980905.49	33.39 -205.67 -1.50	0.00	42.41	-131.36 -120.30
op022	48 11.33	-121 6.55	6596.0	wa	980344.18	980907.15	39.40 -224.97 -1.52	0.00	57.02	-130.06 -118.15
op023	48 9.82	-121 7.19	6182.0	wa	980381.35	980904.88	24.70 -210.85 -1.50	0.00	57.56	-130.09 -118.14
op024	48 8.67	-121 10.51	5779.0	wa	980410.92	980903.16	20.80 -197.11 -1.48	0.00	50.99	-126.79 -115.47
op025	48 0.91	-121 7.59	5378.0	wa	980436.51	980891.51	5.89 -183.43 -1.45	0.00	50.54	-128.44 -117.05
op027	48 6.49	-121 13.31	6345.0	wa	980374.05	980899.88	29.65 -216.41 -1.51	0.00	70.57	-131.70 -105.71
op028	48 7.31	-121 13.73	5889.0	wa	980407.35	980901.12	10.85 -200.86 -1.49	0.00	59.80	-131.70 -119.50
op029	48 10.00	-121 11.55	6591.0	wa	980358.96	980905.15	13.66 -224.80 -1.52	0.00	73.33	-139.33 -125.79
op030	48 13.76	-121 12.80	5768.0	wa	980414.40	980910.79	33.13 -196.73 -1.48	0.00	45.80	-119.28 -108.77

BOUGIER GRAVITY DATA

Date: 03/24/83

STATION IDENTIFICATION proj	LATITUDE deg min	LONGITUDE deg min	ELEVATION (in ft)	GRAVITY OBSERVED THEORETICAL	CORRECTIONS (d1=2.67)		ANOMALIES FREE AIR	COMPLETE-ROUGHER d1=2.67 d2=2.50	SPEC FIELDS
					IRRAIN BOUGUER CURV	SPFCIAL			
: mc250	47 57.26	-121 27.59	5318.0 wa	980423.94	980886.03	41.27 -181.38 -1.44	0.00	37.82	-103.74 -94.73
: mc500	47 53.47	-121 26.39	1058.0 wa	980692.94	980880.34	23.35 -36.09 -0.44	0.00	-87.92	-101.09 -100.25
: mc501	47 52.87	-121 27.30	964.0 wa	980696.38	980879.44	19.79 -32.88 -0.40	0.00	-92.41	-105.90 -105.04
: mc502	47 53.89	-121 24.01	1304.0 wa	980677.04	980880.98	16.89 -44.48 -0.53	0.00	-81.32	-109.43 -107.64
: m1137	48 15.49	-120 50.43	6354.0 wa	980384.85	980913.38	24.39 -216.72 -1.51	0.00	68.72	-125.12 -112.78
: m1138	48 16.00	-120 49.13	6902.0 wa	980346.48	980914.15	31.24 -235.41 -1.52	0.00	81.07	-124.61 -111.52
: m1139	48 18.57	-120 49.33	6860.0 wa	980342.70	980918.00	30.68 -233.98 -1.52	0.00	69.49	-135.32 -122.28
: m1140	48 19.48	-120 48.72	6831.0 wa	980345.86	980919.37	29.59 -232.90 -1.52	0.00	68.56	-136.35 -123.31
: om041	47 58.49	-121 5.28	5840.0 wa	980403.99	980887.88	21.38 -199.19 -1.49	0.00	65.07	-114.22 -102.80
: om042	47 57.56	-121 4.29	6401.0 wa	980356.03	980886.48	36.03 -218.32 -1.51	0.00	71.22	-112.58 -100.88
: om043	47 56.76	-121 4.01	5895.0 wa	980400.07	980885.28	21.47 -201.06 -1.49	0.00	68.92	-112.16 -100.63
: om074	47 59.96	-121 3.98	6036.0 wa	980392.81	980890.09	24.02 -205.87 -1.50	0.00	70.10	-113.25 -101.57
: om075	47 58.04	-121 2.32	5579.0 wa	980417.10	980887.20	29.07 -190.28 -1.47	0.00	54.33	-108.35 -97.99
: om076	47 54.98	-121 2.77	5898.0 wa	980395.56	980882.55	23.71 -201.16 -1.49	0.00	67.42	-111.52 -100.13
: om077	47 55.14	-121 2.09	5880.0 wa	980394.16	980882.85	26.41 -200.55 -1.49	0.00	64.03	-111.60 -100.41
: om091	47 52.92	-121 2.91	2637.0 wa	980602.84	980879.52	10.47 -89.94 -0.95	0.00	-28.74	-109.16 -104.03
: om092	47 52.51	-121 1.37	2428.0 wa	980613.15	980878.90	15.06 -82.81 -0.89	0.00	-37.47	-106.11 -101.74
: om131	47 54.97	-121 3.67	6015.0 wa	980379.43	980882.59	29.18 -205.15 -1.50	0.00	62.44	-115.03 -103.73
: om001	47 49.07	-120 41.26	1938.0 wa	980645.57	980873.73	14.10 -66.10 -0.74	0.00	-45.94	-98.68 -95.32
: om003	47 48.00	-120 37.78	2020.0 wa	980639.46	980872.13	14.60 -68.90 -0.77	0.00	-42.73	-97.80 -94.29
: om004	47 47.27	-120 37.64	1985.0 wa	980640.76	980871.03	13.84 -67.70 -0.76	0.00	-43.63	-98.25 -94.77
: om005	47 45.87	-120 30.30	1880.0 wa	980647.22	980868.93	10.19 -64.12 -0.72	0.00	-44.94	-99.59 -96.11
: om006	47 45.45	-120 39.35	1859.0 wa	980647.06	980868.30	9.29 -63.40 -0.72	0.00	-46.44	-101.27 -97.78
: om007	47 46.55	-120 39.99	1882.0 wa	980648.63	980869.95	12.01 -64.19 -0.72	0.00	-44.36	-97.26 -93.89
: om008	47 48.22	-120 42.70	1872.0 wa	980647.62	980872.46	12.34 -63.85 -0.72	0.00	-48.82	-101.05 -97.72
: om069	47 47.28	-120 42.57	1989.0 wa	980640.53	980870.98	11.48 -66.48 -0.74	0.00	-47.19	-102.94 -99.39
: om079	47 50.56	-120 39.88	2137.0 wa	980638.09	980875.97	15.34 -72.89 -0.80	0.00	-40.95	-99.30 -95.58
: om080	47 50.88	-120 39.39	2200.0 wa	980629.85	980876.45	16.11 -75.04 -0.82	0.00	-39.75	-99.49 -95.69
: om127	47 52.35	-120 41.77	2561.0 wa	980608.17	980878.66	12.31 -87.35 -0.93	0.00	-29.70	-105.66 -100.83
: om243	48 13.28	-121 19.27	5983.0 wa	980806.79	980910.01	39.99 -284.06 -1.50	0.00	59.17	-106.39 -95.85
: om245	48 13.69	-121 19.28	4844.0 wa	980523.79	980910.69	12.46 -151.57 -1.33	0.00	30.88	-109.57 -100.62
: om246	48 12.08	-121 18.56	4885.0 wa	980526.33	980908.27	8.89 -152.97 -1.34	0.00	39.69	-105.73 -96.48
: om247	48 11.43	-121 17.90	4763.0 wa	980507.53	980907.30	12.97 -162.45 -1.38	0.00	47.99	-102.87 -93.27
: om248	48 11.18	-121 18.00	5345.0 wa	980460.45	980906.92	19.83 -182.30 -1.45	0.00	55.98	-107.94 -97.50
: sf166	47 59.38	-120 33.98	3709.0 wa	980545.67	980889.21	6.12 -126.50 -1.20	0.00	5.16	-116.43 -108.69
: sf167	47 59.53	-120 31.93	5542.0 wa	980486.29	980889.44	14.53 -189.02 -1.47	0.00	77.81	-98.15 -86.95
: sf169	47 57.72	-120 37.18	6820.0 wa	980358.62	980886.73	26.92 -232.61 -1.52	0.00	108.93	-98.28 -95.08
: sf170	47 58.16	-120 36.16	6518.0 wa	980369.86	980887.38	23.76 -222.31 -1.51	0.00	94.74	-105.32 -92.58

glacier peak
gravity
meter 10: obsrv

Date: 03/24/63

ROUGHNER GRAVITY DATA

page 11

Appendix B

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-id	LATITUDE deg min	LONGITUDE deg min	ELE (in ft)	ST	THEORETICAL	TERRAIN BOUNDER CURV (d1=2.67)	SPECIAL	FREE AIR	COMPLTF-RUGHIER SPEC	d1=2.67	d2=2.50	FIELDS	
:	sf171	47 57.97	-120 35.56	6361.0	wa	980381.07	980887.10	24.04	-216.96	-1.51	0.00	91.88	-102.54	-90.16
:	sf172	47 57.59	-120 35.33	6205.0	wa	980389.02	980886.53	20.01	-211.63	-1.51	0.00	85.75	-107.38	-95.08
:	sf173	47 56.74	-120 34.68	5863.0	wa	980413.41	980885.25	18.43	-199.97	-1.49	0.00	79.28	-103.74	-92.09
:	sf174	47 57.18	-120 37.19	6368.0	wa	980396.77	980885.91	12.64	-217.19	-1.51	0.00	109.43	-96.63	-83.51
:	sf176	47 54.73	-120 36.09	6284.0	wa	980391.67	980882.23	15.23	-214.33	-1.51	0.00	100.12	-100.49	-87.72
:	sf177	47 55.12	-120 36.49	5704.0	wa	980436.23	980882.82	8.45	-194.55	-1.48	0.00	89.60	-97.98	-86.03
:	sf178	47 53.41	-120 35.71	6368.0	wa	980386.11	980880.25	16.55	-217.19	-1.51	0.00	104.43	-97.73	-84.85
:	sf179	47 53.48	-120 34.78	6701.0	wa	980361.55	980880.36	24.04	-228.55	-1.52	0.00	111.05	-94.98	-81.86
:	sf180	47 52.83	-120 34.28	6213.0	wa	980400.79	980879.38	11.34	-211.91	-1.51	0.00	105.42	-96.66	-83.79
:	sf181	47 53.66	-120 33.49	6464.0	wa	980382.50	980880.63	12.30	-220.47	-1.51	0.00	109.46	-100.22	-86.87
:	sf182	47 54.15	-120 33.01	6475.0	wa	980375.24	980881.36	11.66	-220.84	-1.51	0.00	102.50	-108.19	-94.78
:	sf183	47 54.10	-120 33.74	6522.0	wa	980374.87	980881.29	18.90	-222.45	-1.51	0.00	106.62	-98.44	-85.39
:	sf184	47 53.56	-120 32.43	6418.0	wa	980381.17	980880.48	17.20	-218.90	-1.51	0.00	103.96	-99.25	-86.31
:	sf185	47 53.77	-120 31.40	6519.0	wa	980334.70	980880.79	28.59	-222.34	-1.51	0.00	66.67	-128.60	-116.17
:	sf186	47 52.76	-120 32.77	5792.0	wa	980426.97	980879.27	11.47	-197.55	-1.48	0.00	92.14	-95.42	-83.48
:	sf187	47 53.13	-120 31.38	6998.0	wa	980332.62	980879.83	42.45	-238.68	-1.52	0.00	110.55	-87.20	-74.61
:	sf190	47 57.94	-120 32.15	3443.0	wa	980561.17	980887.05	12.89	-117.43	-1.15	0.00	-2.18	-107.87	-101.14
:	sf191	47 56.84	-120 30.99	3324.0	wa	980567.35	980885.40	19.93	-113.37	-1.12	0.00	-5.54	-100.10	-94.08
:	sf192	47 57.64	-120 30.72	4269.0	wa	980520.63	980886.60	11.78	-145.60	-1.31	0.00	35.36	-99.77	-91.17
:	sf193	47 57.63	-120 30.19	4001.0	wa	980528.53	980886.59	10.76	-136.46	-1.26	0.00	18.09	-108.88	-100.79
:	sf194	47 56.64	-120 30.74	5514.0	wa	980443.46	980888.10	19.58	-148.07	-1.46	0.00	73.69	-96.26	-85.44
:	sf509	47 58.55	-120 33.41	2556.0	wa	980605.93	980887.97	19.06	-87.18	-0.93	0.00	-41.72	-110.76	-106.37
:	sf510	47 57.42	-120 31.90	2411.0	wa	980612.56	980886.27	20.51	-82.23	-0.89	0.00	-47.02	-109.63	-105.64
:	sf513	47 55.29	-120 30.35	1981.0	wa	980634.23	980883.08	35.59	-67.57	-0.76	0.00	-62.57	-95.31	-93.22
:	sf125	48 1.18	-121 19.77	5936.0	wa	980399.26	980891.86	31.94	-202.46	-1.49	0.00	65.38	-106.63	-95.68
:	sf126	48 2.15	-121 20.43	6619.0	wa	980347.29	980893.38	41.27	-225.75	-1.52	0.00	76.07	-109.93	-98.09
:	sf128	48 2.97	-121 22.12	5498.0	wa	980408.07	980894.60	33.12	-187.52	-1.46	0.00	30.29	-125.57	-115.65
:	sf129	48 4.10	-121 20.46	4602.0	wa	980500.46	980896.30	11.43	-156.96	-1.36	0.00	36.79	-110.10	-100.75
:	sf130	48 6.67	-121 21.02	5770.0	wa	980405.76	980900.16	46.23	-196.80	-1.48	0.00	47.99	-104.06	-94.38
:	sf131	48 6.79	-121 21.50	5588.0	wa	980418.95	980900.34	11.57	-190.59	-1.47	0.00	43.90	-136.59	-125.10
:	sf132	48 7.31	-121 21.68	5714.0	wa	980413.47	980901.12	35.94	-194.89	-1.48	0.00	49.47	-110.95	-100.74
:	sf133	48 7.36	-121 17.10	6343.0	wa	980372.41	980901.19	36.91	-216.34	-1.51	0.00	67.44	-113.50	-101.98
:	sf134	48 6.91	-121 15.07	5890.0	wa	980404.06	980900.52	32.54	-200.89	-1.49	0.00	57.20	-112.64	-101.82
:	sf135	48 4.48	-121 15.14	6975.0	wa	980315.99	980896.87	49.31	-237.90	-1.52	0.00	74.72	-115.38	-103.28
:	sf136	48 4.26	-121 15.73	5439.0	wa	980437.12	980896.54	18.80	-145.51	-1.46	0.00	51.86	-116.31	-105.60

ROUGHNER GRAVITY DATA

glacier peak

gravity

Meter ID: obsgrv

Date: 03/24/83

STATION IDENTIFICATION proj	L U C A T I O N S		ELE (in ft)	G R A V I T Y UNSERVED THEORETICAL	C O R R E C T I O N S TERRAIN ROUGHNER CURV (d1=2.67)		SPECIAL	FREQ AIR	A N O M A L I E S COMPLETE-ROUGHNER SPEC d1=2.67 d2=2.50 FIELDS			
	LATITUDE deg min	LONGITUDE deg min			TERRAIN ROUGHNER CURV (d1=2.67)	SPECIAL			FREQ AIR	COMPLETE-ROUGHNER SPEC d1=2.67 d2=2.50 FIELDS		
:	s1237	48 5.11	-121 16.58	5470.0	980897.81	32.24	-146.57	-1.46	0.00	42.97	-112.81	-102.89
:	s1238	48 3.16	-121 18.27	4192.0	980894.89	15.57	-142.98	-1.29	0.00	11.94	-116.76	-108.57
:	s1239	48 2.19	-121 16.49	5432.0	980893.43	30.18	-145.27	-1.46	0.00	43.57	-112.97	-103.01
:	s1240	48 1.88	-121 15.96	5386.0	980892.91	25.02	-143.70	-1.45	0.00	42.92	-117.21	-107.01
:	s1241	48 1.55	-121 15.08	5404.0	980892.47	20.55	-144.31	-1.45	0.00	45.33	-119.88	-109.37
:	s1242	48 0.16	-121 16.69	5003.0	980890.38	20.38	-170.64	-1.41	0.00	37.24	-114.42	-104.77
:	w1070	47 51.06	-120 49.86	1902.0	980876.73	8.80	-64.87	-0.73	0.00	-47.81	-104.61	-100.99
:	w1072	47 51.01	-120 56.54	2146.0	980876.65	16.06	-73.19	-0.81	0.00	-38.69	-96.63	-92.94
:	w1082	47 58.24	-120 47.32	2515.0	980887.50	14.59	-85.78	-0.91	0.00	-30.79	-102.89	-98.50
:	w1083	47 56.99	-120 46.03	2474.0	980885.63	13.34	-84.38	-0.90	0.00	-31.79	-103.74	-99.16
:	w1086	47 51.28	-120 52.23	3022.0	980877.05	10.08	-103.07	-1.05	0.00	-2.69	-96.73	-90.75
:	w1087	47 51.02	-120 58.96	2530.0	980876.66	11.76	-86.29	-0.92	0.00	-19.37	-94.82	-90.02
:	w1088	47 51.86	-120 57.34	3232.0	980877.92	14.65	-110.23	-1.10	0.00	0.07	-96.61	-90.45
:	w1089	47 51.89	-120 58.99	2328.0	980877.97	15.84	-79.40	-0.86	0.00	-37.79	-102.22	-98.11
:	w1090	47 51.37	-120 59.22	2815.0	980877.19	20.58	-96.01	-1.00	0.00	-19.58	-96.01	-91.14
:	w1117	47 55.93	-120 54.61	1982.0	980884.04	19.38	-67.60	-0.76	0.00	-53.50	-102.47	-99.35
:	w1118	47 57.13	-120 56.37	2197.0	980885.84	20.56	-74.93	-0.82	0.00	-50.33	-105.52	-102.01
:	w1119	47 57.83	-120 56.59	2315.0	980886.89	23.49	-78.96	-0.86	0.00	-51.65	-107.97	-104.38
:	w1120	47 49.93	-120 46.47	1894.0	980875.02	10.37	-64.60	-0.73	0.00	-40.12	-95.07	-91.58
:	w1146	47 51.35	-120 47.89	5989.0	980877.16	41.97	-204.27	-1.50	0.00	65.48	-98.31	-87.88
:	w1147	47 52.07	-120 48.86	6223.0	980878.24	46.96	-212.25	-1.51	0.00	70.79	-96.01	-85.39
:	w1148	47 59.24	-120 55.15	5913.0	980889.01	18.83	-201.68	-1.49	0.00	85.92	-98.42	-86.68
:	w1149	47 58.58	-120 50.08	6124.0	980888.02	36.67	-208.87	-1.50	0.00	80.05	-93.66	-82.60
:	w1151	47 57.30	-120 51.03	6913.0	980886.09	47.19	-235.78	-1.52	0.00	98.63	-91.48	-79.37
:	w1153	47 56.38	-120 50.31	6930.0	980884.71	46.71	-236.36	-1.52	0.00	107.94	-83.23	-71.06
:	base02	47 49.08	-120 42.85	1922.0	980873.75	12.71	-65.55	-0.74	0.00	-46.06	-99.64	-96.23
:	base05	48 16.40	-121 35.72	517.0	980914.75	10.92	-17.63	-0.22	0.00	-92.84	-99.77	-99.33
:	base06	48 15.05	-121 35.98	565.0	980770.10	11.37	-19.27	-0.24	0.00	-89.49	-97.64	-97.12
:	base07	48 15.31	-121 36.09	550.0	980913.12	11.24	-18.76	-0.24	0.00	-91.44	-99.20	-98.70