

GEOLOGICAL SURVEY OF CANADA



OPEN FILE 1514

SINGLE CHANNEL SEISMIC DATA, FOR THE STRAIT OF GEORGIA:  
BRITISH COLUMBIA, CANADA AND WASHINGTON, U.S.A.

PROJECT 820017

T.S. HAMILTON, G. JEWSBURY and I.I. FRYDECKY

Geological Survey of Canada  
Cordilleran and Pacific Margin Division  
P.O. Box 6000 Sidney, B.C. V8L 4B2

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## Abstract

This report announces the availability of approximately 2300 km of seismic reflection profiles in the Strait of Georgia, and provides a subset of that data. The survey extends from Texada Island in British Columbia, Canada to Lummi Island in Washington, U.S.A. These geophysical records are relevant to geological, environmental and marine geotechnical investigations of this populous marine basin on the Canada-U.S.A. border. These data were acquired in 1982 and 1983 by the Geological Survey of Canada in a series of cruises on board the CSS Vector and the CFAV Endeavour. They provide one second reflection records over portions of the Comox, Nanaimo and Whatcom basins. Figure 1, a 1:250,000 scale program map shows the approximate coverage of the survey. Trackline locations are shown with respect to the coastline of the Strait of Georgia. Table 1 includes line designations with start and end positions for all of the lines. For convenience in ordering individual lines, or portions thereof, lines are labelled at their starting ends, with tic marks corresponding to navigational fixes for hourly intervals. The lines shown in Figures 2 and 3 are highlighted on Figure 1. A listing of 5-minute navigation fixes for those lines is given in Table 2. Navigation for the lines is by Loran-C; precise to about 50 m in the Strait. These CSP lines were collected by firing on time. For a ship speed of 4 knots, the typical shot spacing is about 2m. For most lines, the seismic system consisted of two small airguns fired simultaneously (Bolt:PAR 1 and 5 cu.in.), a short single channel hydrophone array (17.5 m active length, 50 Benthos Aquadyne AQ-1 hydrophones with a 35 cm interelement spacing and a pre-amp with a constant gain of X1000) a Kronhite filter and an EPC recorder. Data were recorded with pre-amp and Kronhite filter settings of 80 hz - out. The typical band width is 80 to 500 hz, permitting resolution of 2 to 10 m layering in the modern muds, glacial and interglacial sediments.

Eleven example seismic lines cross prominent subsurface physiographic features and demonstrate the average data quality. Most lines are oriented NE-SW, across strike for many of the glacial and older geological structures. The vertical scale in Figures 2 and 3 is given in two way reflection time and as equivalent water depth (at a water velocity of 1483 m/s). The horizontal scale is in ship-track time for an average vertical exaggeration of about x21. The one second sweep usually permits penetration through the entire unconsolidated Quaternary section, with acoustic basement identical to bedrock. Figure 2 shows sections from the northern half of the survey area between Hornby Island and Porlier Pass. It contains 5 cross-strait lines and 1 basinal tie line which detail portions of the southernmost Comox Basin and Ballenas Basin with their hemipelagic fill, the older drumlinized glacial deposits of McCall and Halibut Banks, and the foreslope of the Fraser Delta with older "core" deposits and examples of recent slumping. Figure 3 shows sections from the southern half of the survey area from Active Pass to Lummi Island, approximately 2/3 of which is in U.S. waters. It contains 4 cross-strait lines (the southernmost of which is in two sections) and 1 basinal tie line which detail portions of Roberts Swell, Boundary Basin, and Alden Bank. Strong bottom reflections from the older Quaternary deposits, and a thinner Quaternary interval, characterize the southern section. It lacks the veneer of acoustically transparent modern muds derived from the Fraser River. As a corollary to the thinner package of unconsolidated sediments, the lines of the southern section show more underlying bedrock geology with dipping reflectors in the Tertiary sedimentary strata of the Whatcom Basin.

TABLE 1. START AND END TIMES WITH POSITION CO-ORDINATES  
FOR STRAIT OF GEORGIA SEISMIC SURVEY.

LINE	DAY	TIME		START POSITION		END POSITION	
		START	END				
FRASER	47	0925	1315	48 58.72	123 19.07	49 19.66	123 22.55
BOWEN	47	1330	1430	49 19.29	123 22.74	49 15.15	123 18.55
McCALL	47	1435	2140	49 15.32	123 18.97	49 30.92	124 12.48
GABRIOLA	48	0810	1510	49 24.30	124 13.32	49 9.36	123 19.95
VALDEZ	48	1610	1750	49 10.95	123 33.99	49 3.71	123 26.58
1	48	2040	2110	48 34.87	122 24.11	49 2.68	123 16.60
2	48	2120	2300	49 3.32	123 17.36	48 56.10	123 25.39
3	48	2310	0100	48 56.63	123 26.49	49 4.31	123 18.19
4	49	0145	0340	49 4.77	123 19.59	48 57.19	123 28.28
5	49	0350	0535	48 57.69	123 29.43	49 4.23	123 21.33
6	49	0720	0850	49 4.45	123 22.25	48 58.49	123 31.01
7	49	0900	1100	48 59.30	123 31.80	49 5.48	123 19.57
8	49	1105	1310	49 5.89	123 19.47	49 0.44	123 33.27
9	49	1635	1850	49 6.86	123 19.29	49 1.15	123 33.57
10	49	1905	2140	49 1.99	123 34.74	49 7.60	123 18.20
11	49	2155	0000	49 9.05	123 17.75	49 3.94	123 33.74
12	50	0250	0550	49 10.77	123 17.91	49 4.02	123 36.24
13	50	0720	1015	49 11.90	123 18.51	49 4.52	123 37.57
14	50	1025	1335	49 5.31	123 38.60	49 12.56	123 17.89
14A	50	1355	1640	49 10.51	123 18.10	49 6.31	123 39.04
15	51	0340	0735	49 6.50	123 38.69	49 19.90	123 16.38
16	51	0825	0930	49 16.06	123 17.71	49 15.81	123 26.38
17	51	1055	1210	49 14.98	123 25.61	49 14.84	123 17.68
18	51	1220	1345	49 13.91	123 17.79	49 13.64	123 29.18
19	51	1420	1615	49 11.11	123 30.74	49 19.48	123 22.82
20	51	1630	1940	49 19.68	123 24.33	49 5.08	123 37.26
21	51	1955	2250	49 6.13	123 38.67	49 20.36	123 26.49
22	51	2315	0205	49 19.74	123 28.14	49 8.37	123 37.92
23	52	0245	0535	49 9.27	123 39.00	49 21.17	123 29.11
24	52	0555	0835	49 22.57	123 30.55	49 9.86	123 40.75
26	52	1150	1450	49 23.31	123 34.07	49 10.14	123 44.39
27	52	1505	1755	49 10.69	123 45.90	49 23.71	123 35.75
28	52	1810	2105	49 23.99	123 37.43	49 11.46	123 48.14
29	52	2105	2335	49 11.46	123 48.14	49 24.77	123 39.15
30	52	2345	0225	49 25.02	123 40.49	49 12.27	123 49.69
31	53	0240	0520	49 12.43	123 51.53	49 25.48	123 41.87
32	53	0530	0800	49 25.57	123 43.39	49 13.30	123 52.93
33	53	0815	1105	49 12.94	123 54.30	49 26.75	123 44.70
34	53	1135	1425	49 27.58	123 45.11	49 14.04	123 55.92
35	53	1440	1710	49 14.11	123 59.09	49 26.81	123 48.41
36	53	1735	2010	49 27.42	123 49.80	49 14.74	123 58.48
37	53	2220	0050	49 27.45	123 51.29	49 14.99	124 0.39
38	54	0100	0310	49 15.39	124 1.36	49 27.66	123 53.12
39	54	0330	0550	49 27.41	123 55.31	49 15.66	124 3.23
40	54	0620	0815	49 17.60	124 3.93	49 27.70	123 56.64
41	54	0830	1020	49 27.79	123 58.72	49 17.77	124 5.69

42	54	1025	1220	49	17.82	124	6.52	49	28.55	123	59.66
43	54	1230	1425	49	29.21	124	0.55	49	18.53	124	8.56
44	54	1455	1640	49	20.61	124	8.66	49	30.22	124	2.03
45	54	1705	1915	49	33.27	124	2.29	49	21.07	124	10.53
46	54	1935	2220	49	19.71	124	12.54	49	35.44	124	2.21
47	54	2355	0055	49	25.30	124	12.39	49	19.77	124	14.56
48	55	0115	0225	49	20.45	124	17.14	49	27.07	124	14.90
49	55	0255	0355	49	26.64	124	18.83	49	21.42	124	20.30
50	55	0420	0525	49	22.44	124	23.83	49	28.01	124	21.41
51	55	0555	0710	49	29.41	124	24.11	49	22.66	124	27.53
52	55	0730	0840	49	23.09	124	30.94	49	28.79	124	26.14
53	55	0940	1210	49	23.62	124	34.46	49	34.64	124	21.56
54	55	1240	1510	49	36.29	124	25.00	49	25.59	124	37.18
55	55	1605	1720	49	32.00	124	34.08	49	37.35	124	27.78
56	55	1740	1925	49	39.46	124	28.86	49	32.70	124	37.68
BALLENAS	56	1815	2245	49	35.01	124	35.19	49	12.21	123	40.00
BALLENAS	56	2330	0220	49	20.60	123	59.89	49	12.54	123	39.95
25	57	0255	0620	49	10.00	123	42.76	49	22.69	123	32.70
BALLENAS	57	0800	1200	49	13.51	123	41.22	48	59.94	123	19.27
FIN	57	1245	1510	49	5.74	123	19.23	49	1.17	123	33.67
80	80	1610	1720	48	54.70	123	20.93	49	1.08	123	13.89
81	80	1730	1845	49	1.86	123	15.04	48	55.25	123	22.46
82	80	1855	2015	48	55.57	123	24.04	49	3.04	123	16.88
83	80	2025	2210	49	3.74	123	18.06	48	58.51	123	30.56
84	80	2220	0005	48	59.12	123	31.61	49	5.04	123	19.14
85	81	0020	0205	49	6.25	123	19.49	49	0.24	123	32.65
86	81	0215	0435	49	1.04	123	33.48	49	8.70	123	17.61
87	81	0440	0700	49	9.21	123	17.65	49	2.05	123	34.59
88	82	1515	1720	49	28.41	124	3.37	49	37.22	124	11.49
89	82	1740	1945	49	36.73	124	12.01	49	28.56	124	4.10
90	82	1950	2120	49	28.37	124	4.75	49	35.84	124	12.02
91	82	2135	2240	49	35.05	124	12.18	49	38.31	124	7.43
92	82	2300	0000	49	37.21	124	6.05	49	34.44	124	11.32
93	83	0010	0115	49	33.97	124	10.45	49	36.67	124	4.48
94	83	0130	0225	49	35.80	124	3.85	49	33.12	124	9.15
95	83	0240	0340	49	32.20	124	8.18	49	34.60	124	2.61
96	83	0355	0500	49	33.57	124	2.34	49	31.04	124	7.50
97	83	0510	0605	49	30.04	124	7.00	49	32.85	124	0.44
98	83	0625	0755	49	34.53	124	1.26	49	28.56	124	7.18
ROBERTS	348	0355	0910	48	59.00	123	10.40	48	46.82	122	43.60
57	348	0910	1030	48	46.79	122	43.63	48	41.89	122	48.93
58	348	1040	1145	48	42.69	122	49.61	48	48.95	122	43.87
59	348	1150	1305	48	49.50	122	43.73	48	45.12	122	49.56
60	348	1340	1540	48	43.42	122	53.08	48	51.25	122	45.29
61	348	1550	1710	48	51.68	122	46.48	48	46.61	122	51.74
62	348	1730	1905	48	46.93	122	53.29	48	52.95	122	48.56
63	348	1910	2110	48	52.87	122	49.31	48	46.39	122	56.44
64	348	2130	2305	48	47.94	122	56.23	48	54.22	122	49.61
65	348	2320	0210	48	55.35	122	49.92	48	44.53	123	1.96
66	349	1650	1930	48	44.68	123	3.44	48	56.42	122	51.27
67	349	1940	2140	48	57.09	122	52.74	48	48.55	123	2.67
68	349	2145	2340	48	48.69	123	3.16	48	59.00	122	52.58
69	349	2350	0145	48	59.78	122	53.65	48	48.37	123	5.96
70	350	0155	0330	48	48.66	123	7.57	48	56.60	122	59.30

71	350	0335	0530	48	56.83	123	0.25	48	49.41	123	8.96
72	350	0540	0720	48	49.87	123	9.86	48	57.50	123	2.45
ACTIVE	350	0735	0900	48	57.53	123	4.31	48	54.33	123	15.80
INSIDE	350	1810	2145	48	45.68	123	11.57	48	43.24	122	43.83
LUMMI	350	2150	0105	48	43.57	122	44.16	48	54.83	123	8.54
73	351	0135	0210	48	53.78	123	8.23	48	50.35	123	11.49
74	351	0220	0350	48	50.81	123	12.88	48	58.11	123	5.70
75	351	0400	0525	48	58.94	123	6.30	48	52.15	123	14.57
76	351	0535	0715	48	52.49	123	14.68	48	59.72	123	8.43
77	351	0720	0840	49	0.03	123	9.04	48	53.37	123	16.64
78	351	0850	1000	48	53.98	123	17.83	49	0.41	123	11.04
79	351	1010	1145	49	0.79	123	12.32	48	54.46	123	19.60
80	351	1155	1325	48	54.98	123	20.53	49	1.61	123	14.56
81	351	1335	1540	49	1.94	123	15.72	48	55.01	123	22.27

TABLE 2. 5-MINUTE NAVIGATIONAL FIXES.

## LINE GABRIOLA

YR	DAY	TIME	LATITUDE	LONGITUDE	YR	DAY	TIME	LATITUDE	LONGITUDE
82	48	0810	49 24.3030	124 13.3170	82	48	1150	49 16.3740	123 44.0808
82	48	0815	49 24.2478	124 13.0146	82	48	1155	49 16.2006	123 43.3170
82	48	0820	49 24.1218	124 12.3828	82	48	1200	49 15.9150	123 42.6576
82	48	0825	49 23.9280	124 11.7768	82	48	1205	49 15.6840	123 41.9856
82	48	0830	49 23.7408	124 11.1330	82	48	1210	49 15.4998	123 41.3388
82	48	0845	49 23.1696	124 9.2292	82	48	1215	49 15.3552	123 40.6500
82	48	0850	49 23.0124	124 8.5542	82	48	1220	49 15.1638	123 39.9960
82	48	0855	49 22.8564	124 7.8786	82	48	1225	49 15.0342	123 39.2904
82	48	0900	49 22.6230	124 7.2846	82	48	1230	49 14.8404	123 38.6544
82	48	0905	49 22.4328	124 6.6294	82	48	1235	49 14.6778	123 37.9698
82	48	0910	49 22.2534	124 5.9784	82	48	1240	49 14.4876	123 37.4196
82	48	0915	49 22.1106	124 5.3040	82	48	1245	49 14.2572	123 36.8220
82	48	0920	49 21.9036	124 4.6362	82	48	1250	49 14.1774	123 36.1386
82	48	0925	49 21.7368	124 3.9870	82	48	1255	49 13.9848	123 35.5614
82	48	0930	49 21.5382	124 3.3408	82	48	1300	49 13.8228	123 34.9356
82	48	0935	49 21.3564	124 2.7222	82	48	1305	49 13.6536	123 34.3482
82	48	0940	49 21.2220	124 2.0244	82	48	1310	49 13.4760	123 33.7542
82	48	0945	49 21.0132	124 1.3890	82	48	1315	49 13.2822	123 33.1926
82	48	0950	49 20.8254	124 0.7014	82	48	1320	49 13.1196	123 32.6280
82	48	0955	49 20.7000	123 59.9628	82	48	1325	49 12.9924	123 31.9950
82	48	1000	49 20.4588	123 59.3472	82	48	1330	49 12.8100	123 31.4820
82	48	1005	49 20.2830	123 58.6620	82	48	1345	49 12.2466	123 29.7024
82	48	1010	49 20.0862	123 57.9840	82	48	1350	49 12.0840	123 29.0622
82	48	1015	49 19.8936	123 57.2862	82	48	1355	49 11.9394	123 28.4328
82	48	1020	49 19.6764	123 56.6148	82	48	1400	49 11.7918	123 27.8226
82	48	1025	49 19.5444	123 55.8840	82	48	1405	49 11.6220	123 27.1740
82	48	1030	49 19.3740	123 55.1928	82	48	1410	49 11.4714	123 26.5362
82	48	1035	49 19.2048	123 54.5010	82	48	1415	49 11.2644	123 25.9740
82	48	1040	49 18.9912	123 53.8254	82	48	1420	49 11.1102	123 25.3536
82	48	1045	49 18.7752	123 53.1678	82	48	1425	49 10.8870	123 24.7782
82	48	1050	49 18.5862	123 52.4808	82	48	1430	49 10.7088	123 24.1848
82	48	1055	49 18.3948	123 51.8124	82	48	1435	49 10.5744	123 23.5740
82	48	1100	49 18.1782	123 51.1704	82	48	1440	49 10.4412	123 23.0076
82	48	1105	49 18.0762	123 50.4222	82	48	1445	49 10.2822	123 22.4238
82	48	1110	49 17.8638	123 49.7154	82	48	1450	49 10.0500	123 21.8124
82	48	1115	49 17.5956	123 49.0824	82	48	1455	49 9.9012	123 21.1866
82	48	1120	49 17.4204	123 48.3516	82	48	1500	49 9.7404	123 20.5740
82	48	1125	49 17.2320	123 47.6424	82	48	1505	49 9.5538	123 19.9896
82	48	1130	49 17.0436	123 46.9332	82	48	1510	49 9.3624	123 19.9548
82	48	1145	49 16.5282	123 44.7882					

LINE 35

YR	DAY	TIME	LATITUDE	LONGITUDE	YR	DAY	TIME	LATITUDE	LONGITUDE
82	53	1440	49 14.1090	123 59.0874	82	53	1600	49 21.1956	123 52.1298
82	53	1445	49 14.4990	123 58.9896	82	53	1605	49 21.6054	123 51.8220
82	53	1450	49 15.3216	123 56.7762	82	53	1610	49 22.0302	123 51.5436
82	53	1455	49 15.7080	123 56.2122	82	53	1615	49 22.4562	123 51.3090
82	53	1500	49 16.1982	123 55.8612	82	53	1620	49 22.9224	123 51.0774
82	53	1505	49 16.6434	123 55.5726	82	53	1625	49 23.3532	123 50.6424
82	53	1510	49 17.0424	123 55.3026	82	53	1630	49 23.6964	123 50.3454
82	53	1515	49 17.4954	123 54.9156	82	53	1635	49 24.1458	123 50.0274
82	53	1520	49 17.8320	123 54.6372	82	53	1640	49 24.5652	123 49.7562
82	53	1525	49 18.2550	123 54.3426	82	53	1645	49 24.9678	123 49.5180
82	53	1530	49 18.7110	123 54.0888	82	53	1650	49 25.3584	123 49.2324
82	53	1535	49 19.1190	123 53.8104	82	53	1655	49 25.7388	123 48.9414
82	53	1540	49 19.5258	123 53.4282	82	53	1700	49 26.1192	123 48.6504
82	53	1545	49 19.9110	123 53.0994	82	53	1705	49 26.4996	123 48.3594
82	53	1550	49 20.2674	123 52.9224	82	53	1710	49 26.8062	123 48.4080
82	53	1555	49 20.7480	123 52.5234					

LINE 46

YR	DAY	TIME	LATITUDE	LONGITUDE	YR	DAY	TIME	LATITUDE	LONGITUDE
82	54	1935	49 19.7088	124 12.5442	82	54	2100	49 27.6156	124 7.5654
82	54	1940	49 20.0460	124 12.7224	82	54	2105	49 28.1058	124 7.2246
82	54	1945	49 20.5314	124 12.4200	82	54	2110	49 28.6302	124 6.8640
82	54	1950	49 20.9088	124 12.2346	82	54	2115	49 29.1594	124 6.5292
82	54	1955	49 21.5448	124 11.7468	82	54	2120	49 29.7036	124 6.1650
82	54	2000	49 22.0260	124 11.3940	82	54	2125	49 30.1662	124 5.8404
82	54	2005	49 22.4964	124 11.0376	82	54	2130	49 30.6450	124 5.5446
82	54	2010	49 23.0082	124 10.6830	82	54	2135	49 31.1160	124 5.2278
82	54	2015	49 23.5056	124 10.3440	82	54	2140	49 31.5738	124 4.9842
82	54	2020	49 24.0186	124 10.0344	82	54	2145	49 32.0748	124 4.6674
82	54	2025	49 24.5046	124 9.7542	82	54	2150	49 32.5512	124 4.3014
82	54	2030	49 24.9564	124 9.4788	82	54	2155	49 33.0132	124 3.8910
82	54	2035	49 25.4370	124 9.2196	82	54	2200	49 33.5244	124 3.6264
82	54	2040	49 25.8870	124 8.8878	82	54	2205	49 34.0728	124 3.3840
82	54	2045	49 26.2902	124 8.5152	82	54	2210	49 34.5216	124 2.9730
82	54	2050	49 26.7150	124 8.1354	82	54	2215	49 34.9860	124 2.5926
82	54	2055	49 27.1530	124 7.8636	82	54	2220	49 35.4396	124 2.2086



LINE 87

YR	DAY	TIME	LATITUDE	LONGITUDE	YR	DAY	TIME	LATITUDE	LONGITUDE
83	81	0440	49 9.2106	123 17.6538	83	81	0555	49 5.6082	123 26.4492
83	81	0445	49 9.5238	123 17.9370	83	81	0600	49 5.3382	123 27.0396
83	81	0450	49 9.2640	123 18.5976	83	81	0605	49 5.0400	123 27.7056
83	81	0455	49 9.0294	123 19.2732	83	81	0610	49 4.7322	123 28.3668
83	81	0500	49 8.7690	123 19.8858	83	81	0615	49 4.4460	123 29.0190
83	81	0505	49 8.5716	123 20.3088	83	81	0620	49 4.1238	123 29.6496
83	81	0510	49 8.3400	123 20.6634	83	81	0625	49 3.8196	123 30.2466
83	81	0515	49 8.0148	123 21.1194	83	81	0630	49 3.5010	123 30.8586
83	81	0520	49 7.7040	123 21.7716	83	81	0635	49 3.1722	123 31.4658
83	81	0525	49 7.3788	123 22.4376	83	81	0640	49 2.8842	123 32.0292
83	81	0530	49 7.0992	123 22.9944	83	81	0645	49 2.6268	123 32.6814
83	81	0535	49 6.8130	123 23.6184	83	81	0650	49 2.4006	123 33.3282
83	81	0540	49 6.5046	123 24.2976	83	81	0655	49 2.1840	123 33.9810
83	81	0545	49 6.1944	123 25.0224	83	81	0700	49 2.0496	123 34.5900
83	81	0550	49 5.9238	123 25.7034					

LINE 60

YR	DAY	TIME	LATITUDE	LONGITUDE	YR	DAY	TIME	LATITUDE	LONGITUDE
82	348	1340	48 43.4196	122 53.0808	82	348	1445	48 47.5098	122 49.2402
82	348	1345	48 43.8486	122 52.7160	82	348	1450	48 47.7366	122 48.9294
82	348	1350	48 44.2542	122 52.1514	82	348	1455	48 48.1452	122 48.5388
82	348	1355	48 44.6046	122 51.8436	82	348	1500	48 48.5520	122 48.1494
82	348	1400	48 44.9550	122 51.5352	82	348	1505	48 48.9210	122 47.7870
82	348	1405	48 45.2544	122 51.2982	82	348	1510	48 49.2834	122 47.4468
82	348	1410	48 45.5472	122 51.0828	82	348	1515	48 49.6284	122 47.0946
82	348	1415	48 45.7998	122 50.7594	82	348	1520	48 49.9650	122 46.7364
82	348	1420	48 46.0374	122 50.4534	82	348	1525	48 50.1048	122 46.2318
82	348	1425	48 46.3992	122 50.2368	82	348	1530	48 50.2446	122 45.7272
82	348	1430	48 46.7544	122 50.0430	82	348	1535	48 50.7510	122 45.4992
82	348	1435	48 47.0256	122 49.7892	82	348	1540	48 51.2496	122 45.2946
82	348	1440	48 47.2824	122 49.5516					

LINE 68

YR DAY TIME	LATITUDE	LONGITUDE	YR DAY TIME	LATITUDE	LONGITUDE
82 349 2145	48 48.6852	123 3.1644	82 349 2245	48 53.9328	122 57.8952
82 349 2150	48 48.9534	123 3.3678	82 349 2250	48 54.3570	122 57.4602
82 349 2155	48 49.3554	123 2.6400	82 349 2255	48 54.8640	122 57.0090
82 349 2200	48 49.7508	123 1.9392	82 349 2300	48 55.3554	122 56.5746
82 349 2205	48 50.2914	123 1.4412	82 349 2305	48 55.7982	122 56.0556
82 349 2210	48 50.8212	123 0.9378	82 349 2310	48 56.2326	122 55.5324
82 349 2215	48 51.2724	123 0.5364	82 349 2315	48 56.6844	122 55.0488
82 349 2220	48 51.7230	123 0.1350	82 349 2320	48 57.1272	122 54.5604
82 349 2225	48 52.1496	122 59.6682	82 349 2325	48 57.5826	122 54.0576
82 349 2230	48 52.5696	122 59.2236	82 349 2330	48 58.0362	122 53.5554
82 349 2235	48 53.0364	122 58.7874	82 349 2335	48 58.5276	122 53.0568
82 349 2240	48 53.4936	122 58.3470	82 349 2340	48 59.0040	122 52.5750

LINE LUMMI

YR DAY TIME	LATITUDE	LONGITUDE	YR DAY TIME	LATITUDE	LONGITUDE
82 350 2150	48 43.5667	122 44.1560	82 350 2330	48 49.0227	122 55.1824
82 350 2155	48 43.8094	122 44.7969	82 350 2335	48 49.2320	122 55.9823
82 350 2200	48 44.1077	122 45.5567	82 350 2340	48 49.4345	122 56.7719
82 350 2205	48 44.4049	122 46.1502	82 350 2345	48 49.7568	122 57.3841
82 350 2210	48 44.6944	122 46.7379	82 350 2350	48 50.0714	122 57.9907
82 350 2215	48 44.9489	122 47.3796	82 350 2355	48 50.3209	122 58.7278
82 350 2220	48 45.2044	122 48.0201	82 351 0000	48 50.5704	122 59.4648
82 350 2225	48 45.5127	122 48.6171	82 351 0005	48 50.9601	123 0.1734
82 350 2230	48 45.8073	122 49.2298	82 351 0010	48 51.3430	123 0.8717
82 350 2235	48 46.0612	122 49.8115	82 351 0015	48 51.6725	123 1.6590
82 350 2240	48 46.3095	122 50.4147	82 351 0020	48 52.0035	123 2.4442
82 350 2245	48 46.6168	122 50.9526	82 351 0025	48 52.2961	123 3.2262
82 350 2250	48 46.9102	122 51.5064	82 351 0030	48 52.5815	123 4.0009
82 350 2255	48 47.1543	122 52.0235	82 351 0035	48 52.8938	123 4.7159
82 350 2300	48 47.3845	122 52.5562	82 351 0040	48 53.2015	123 5.4514
82 350 2305	48 47.6732	122 53.0241	82 351 0045	48 53.5585	123 6.0420
82 350 2310	48 47.9624	122 53.4920	82 351 0050	48 53.9105	123 6.6541
82 350 2315	48 48.2026	122 54.0292	82 351 0055	48 54.2296	123 7.3174
82 350 2320	48 48.4434	122 54.5654	82 351 0100	48 54.5412	123 7.9735
82 350 2325	48 48.7372	122 54.8762	82 351 0105	48 54.8275	123 8.5362

LINE 74

YR DAY TIME	LATITUDE	LONGITUDE	YR DAY TIME	LATITUDE	LONGITUDE
82 351 0220	48 50.8146	123 12.8838	82 351 0310	48 54.9468	123 8.7342
82 351 0225	48 51.2202	123 12.5160	82 351 0315	48 55.3752	123 8.3286
82 351 0230	48 51.6150	123 12.1488	82 351 0320	48 55.7976	123 7.9452
82 351 0235	48 51.9942	123 11.6484	82 351 0325	48 56.1924	123 7.4700
82 351 0240	48 52.3578	123 11.1648	82 351 0330	48 56.5722	123 7.0116
82 351 0245	48 52.7898	123 10.7274	82 351 0335	48 56.9454	123 6.5748
82 351 0250	48 53.2062	123 10.3062	82 351 0340	48 57.3042	123 6.1536
82 351 0255	48 53.6310	123 9.8910	82 351 0345	48 57.7164	123 5.7948
82 351 0300	48 54.0540	123 9.4770	82 351 0350	48 58.1112	123 5.6988
82 351 0305	48 54.5052	123 9.1080			

LINE 79

YR DAY TIME	LATITUDE	LONGITUDE	YR DAY TIME	LATITUDE	LONGITUDE
82 351 1010	49 0.7938	123 12.3204	82 351 1100	48 57.1830	123 16.7226
82 351 1015	49 0.4848	123 12.8784	82 351 1105	48 56.8002	123 17.2266
82 351 1020	49 0.2718	123 13.2900	82 351 1110	48 56.4162	123 17.7312
82 351 1025	48 59.9808	123 13.6500	82 351 1115	48 56.1354	123 18.1086
82 351 1030	48 59.6802	123 14.0058	82 351 1120	48 55.8546	123 18.4866
82 351 1035	48 59.2236	123 14.2584	82 351 1125	48 55.5636	123 18.4230
82 351 1040	48 58.7610	123 14.5338	82 351 1130	48 55.2666	123 18.3822
82 351 1045	48 58.3746	123 15.1038	82 351 1135	48 54.9318	123 18.7308
82 351 1050	48 57.9792	123 15.6672	82 351 1140	48 54.5952	123 19.0776
82 351 1055	48 57.5844	123 16.1838	82 351 1145	48 54.4602	123 19.5996