

## I. Introduction

The 23rd Japanese Antarctic Research Expedition 1981-1983 (JARE-23) initiated the field work of the East Queen Maud Land Glaciological Project (abbreviated to EQGP). The details of the project were described by Higashi (1981) and Associate Committee on Glaciological Research Program in East Queen Maud Land (1982 a,b). The major activities in 1982 involved shallow depth boring of ice cores at various places, and oversnow traverses along flow line of the Shirase Glacier and in the Meteorite Ice Field in the Yamato Mountains (Nishio, 1984 a).

The oversnow traverse was the biggest operation of JARE-23 and nine oversnow traverses were carried out as shown in Fig. A (see the end of this volume), and listed in Table 1. During these traverses, the following data were obtained and already published by Nishio (1984 b): position, elevation and ice thickness of stations between Syowa Station and Mizuho Station; net accumulation of snow measured by the stake method; density of surface snow cover between Syowa Station and Mizuho Station; stratigraphy and density data of ice cores drilled at G 2 grid station; surface slope of the ice sheet; surface meteorological data during the oversnow traverses; and direction of long axis of a sastrugi. The data such as surface flow velocity and surface strain rate will be presented in other publications.

Compiled in this volume are the following data obtained by JARE-23 during oversnow traverses: position, elevation and ice thickness of along new routes. Position, elevation and ice thickness of stations obtained by JARE-24 were already published by Nakawo et al. (1984).

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## References

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Table 1. Oversnow traverses carried out by JARE-23, 1982-1983.

Period	Traverse route	Distance (km)	Number of personnel	Position, elevation and ice thickness	Route
14-26 January 1982	S16-Mizuho Station -S16	540	8	Table 1 in Nishio et al. (1984)	Routes S,H and Z
30 January -15 February 1982	S16-Mizuho Station	270	5	"	"
3-16 March 1982	Mizuho Station-G1 -Mizuho Station	180	5	Table 4 (this volume)	Route IM
28 March-16 April 1982	Mizuho Station-YM102 -Mizuho Station	440	5	Table 2 ( " )	Route YM
10-17 April 1982	Syowa Station-Mizuho Station	270	6	Table 1 in Nishio et al. (1984)	Routes S,H and Z
29 April-3 May 1982	Mizuho Station-Syowa Station	300	9	"	"
1-8 September 1982	Syowa station-Mizuho Station	300	11	"	"
17-22 September 1982	Mizuho Station-Syowa Station	300	5	"	"
12 October 1982- 1 February 1983	Mizuho Station-G2- G7-Yamato Mountains -Mizuho Station-S16	1800	8	Table 2 } Table 3 } (this volume) Table 4 }	Route YM Route SS Route SY

## II. Position, Elevation and Ice Thickness of Stations

### 1. Position along new routes

Observer: Fumihiko NISHIO

Five routes were newly established in 1982 by JARE-23 (see Fig. A). Route SS runs along a flow line of the Shirase Glacier. Route YM connects the Yamato Mountains with Mizuho Station along 2000 m contour line, and Route SY extends from YM 179 (1 km south of the Massif A in the Yamato Mountains) towards the Minami Yamato Nunataks, where the datum points of triangulation network are installed and the route is called Route K. Route IM is extended from Mizuho Station towards the inland station ( $74^{\circ}12'S$ ,  $34^{\circ}59'E$ : 3193 m) established by JARE-25 (Fujii et al., 1985). Route IM between Mizuho Station and G1 grid station was established by JARE-23.

In every route except the Route K of triangulation network, the marker stakes were installed every 1 km, as the short distance between stakes will be helpful for the next visit scheduled in 1986-1987. Every other marker stake was numbered from the beginning to the end of the routes. These numbered stakes were to be used for snow accumulation measurements. The stakes between the numbered stakes were called with prime, for example, a stake between YM 1 and YM 2 was called YM 1'.

Navigational data, the distance and the azimuth between neighbouring stations, were obtained with a magnetic hand compass and an odometer of a vehicle. By operating a doppler satellite positioning system (JMR 4A), the positions of stations were determined from place to place along the routes. The JMR data, which were calculated on the WGS-72 earth ellipsoid with broadcasted ephemeris, were interpolated by the help of the navigational data using a standard spherical trigonometry. The positions of the stations were thus obtained on the new routes as shown in Tables 2 for Route YM, 3 for Route SS, 4 for Route IM and 5 for Route SY. For positioning with JMR, the number of pass was 10 to 50 at most stations, and the error would be 10 to 30 m (Shibuya et al., 1982), which approximately corresponds to  $\pm 1''$  in latitude and  $\pm 3''$  in longitude.

## 2. Elevation along new routes

Observers: Fumihiko NISHIO and Hirokazu OHMAE

The measurements with barometric altimeters (American Paulin Altimeter MM1) were made every 1 km along the new routes (YM, SS, IM and SY. See Table 1).

The observations with JMR also gave the data on elevation. These data are much more precise than those by barometric altimeter, and are considered as basic data for elevation. They were obtained, however, only sporadically along the routes, and hence the JMR data were interpolated by the use of barometric data for stations between the JMR stations.

The errors in determining elevation by JMR would be about  $\pm 10$  m for the pass number of 10 to 50 (Shibuya et al., 1982).

## 3. Ice thickness along new routes

Observers: Masao ISHIKAWA and Hirokazu OHMAE

The ice thickness was measured using a radio echo sounder equipped on an oversnow vehicle. The instrument was an NIPR type consisting of a 60 MHz transmitter and a receiver with an oscilloscope as an indicator. Their specifications were given by Nishio et al. (1984). A pair of 3-element Yagi antennas (8db) was used, each for transmitting and for receiving, in observations mainly on every route.

The antennas were set up on a sledge facing each other at a distance of about 2.5 m.

The measurements were made on the moving oversnow vehicle. A reflective wave was displayed on an oscilloscope, showing a time-intensity curve (A-scope) and photographed at 1 km intervals. Continuous records on 35-mm films (Z-scope) were also obtained on the running oversnow vehicle and the ice thickness was calculated from the readings of the echo time on these continuous records with using the electromagnetic wave velocity of  $168 \text{ m s}^{-1}$  (Robin et al., 1969).

The results are shown Tables 2, 3, 4 and 5. Although the measurements were made at every station, there were many stations where no echo was obtained. When no reflective echo was noticeable on Z-scope, the ice thickness was obtained by the

reading of echo time on the A-scope at the same station. A blank in Tables 2, 3, 4 and 5 shows no echo was observed at the station.

#### References

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Table 2. Position, elevation, bedrock elevation and ice thickness of stations along Route YM.

\*JMR stations

Station	Latitude (S)	Longitude (E)	Elevation (m)	Bedrock Elevation (m)	Ice Thickness (m)
Mizuho*	70° 42' 03"	44° 17' 39"	2256	254	2002
YM 0	70 42 22	44 16 32	2249		
YM 0'	70 42 40	44 15 14	2256		
YM 1	70 42 50	44 14 33	2259		
YM 1'	70 43 16	44 13 34	2270		
YM 2	70 43 26	44 12 10	2265	512	1753
YM 2'	70 43 42	44 10 47	2257	562	1695
YM 3	70 43 54	44 09 04	2248	440	1808
YM 3'	70 44 13	44 07 46	2234		
YM 4	70 44 29	44 06 23	2230		
YM 4'	70 44 48	44 05 03	2233		
YM 5	70 45 15	44 03 53	2234		
YM 5'	70 45 45	44 03 10	2238		
YM 6	70 46 15	44 02 21	2247		
YM 6'	70 46 45	44 01 42	2252		
YM 7	70 47 09	44 00 34	2259		
YM 7'	70 47 29	43 59 12	2260		
YM 8	70 47 51	43 58 03	2253	501	1752
YM 8'	70 48 16	43 56 58	2236	484	1752
YM 9	70 48 41	43 55 59	2237	419	1818
YM 9'	70 49 01	43 54 53	2236	470	1766
YM 10	70 49 24	43 53 47	2229	397	1832
YM 10'	70 49 49	43 52 37	2219		
YM 11	70 50 10	43 51 26	2230	455	1775
YM 11'	70 50 35	43 50 20	2237		
YM 12	70 50 59	43 49 10	2245		
YM 12'	70 51 18	43 48 17	2245		
YM 13	70 51 43	43 46 58	2240		
YM 13'	70 52 04	43 45 44	2244		
YM 14	70 52 28	43 44 40	2237		
YM 14'	70 52 51	43 43 21	2251	407	1844
YM 15	70 53 11	43 42 17	2251	282	1969
YM 15'	70 53 34	43 41 08	2252	526	1726
YM 16	70 53 55	43 39 58	2248	430	1818
YM 16'	70 54 17	43 38 47	2240	395	1845
YM 17	70 54 39	43 37 34	2232	349	1883

\*JMR stations

Station	Latitude (S)	Longitude (E)	Elevation (m)	Bedrock Elevation (m)	Ice Thickness (m)
YM 17'	70° 55' 04"	43° 36' 16"	2240	290	1950
YM 18	70 55 29	43 35 06	2252	276	1976
YM 18'	70 55 53	43 33 55	2253	290	1963
YM 19	70 56 13	43 33 02	2255	384	1871
YM 19'	70 56 37	43 31 54	2240		
YM 20	70 56 58	43 30 52	2233	270	1963
YM 20'	70 57 20	43 29 42	2221		
YM 21	70 57 37	43 28 16	2209		
YM 21'	70 57 55	43 26 56	2206	177	2029
YM 22	70 58 18	43 25 45	2222	208	2014
YM 22'	70 58 34	43 24 27	2226		
YM 23	70 58 54	43 23 09	2229		
YM 23'	70 59 16	43 21 60	2232		
YM 24	70 59 38	43 20 54	2237		
YM 24'	70 59 59	43 19 42	2242		
YM 25	71 00 23	43 18 24	2244		
YM 25'	71 00 43	43 17 11	2236		
YM 26	71 01 04	43 15 57	2233	236	1997
YM 26'	71 01 25	43 14 46	2237	287	1950
YM 27	71 01 45	43 13 44	2229	279	1950
YM 27'	71 02 07	43 12 33	2230	372	1858
YM 28	71 02 29	43 11 22	2224	445	1779
YM 28'	71 02 51	43 10 12	2217	530	1687
YM 29	71 03 11	43 08 55	2205	558	1647
YM 29'	71 03 32	43 07 48	2183	338	1845
YM 30*	71 03 56	43 06 44	2164	332	1832
YM 30'	71 04 16	43 05 40	2165	162	2003
YM 31	71 04 39	43 04 19	2165	294	1871
YM 31'	71 05 01	43 03 08	2172	472	1700
YM 32	71 05 21	43 01 51	2176	463	1713
YM 32'	71 05 45	43 00 44	2175	396	1779
YM 33	71 06 05	42 59 28	2173	328	1845
YM 33'	71 06 26	42 58 13	2169	443	1726
YM 34	71 06 45	42 56 55	2169	403	1766
YM 34'	71 07 05	42 55 39	2172	354	1818
YM 35	71 07 27	42 54 24	2171	379	1792



\*JMR stations

Station	Latitude (S)	Longitude (E)	Elevation (m)	Bedrock Elevation (m)	Ice Thickness (m)
YM 35'	71° 07' 47"	42° 53' 04"	2172	433	1739
YM 36	71 08 11	42 52 01	2176	450	1726
YM 36'	71 08 31	42 50 45	2173	368	1805
YM 37	71 08 52	42 49 30	2172	393	1779
YM 37'	71 09 15	42 48 22	2170	325	1845
YM 38	71 09 37	42 47 11	2169	311	1858
YM 38'	71 09 59	42 46 01	2169	34	2135
YM 39	71 10 23	42 44 48	2173	52	2121
YM 39'	71 10 41	42 43 26	2172		
YM 40	71 11 02	42 42 11	2173		
YM 40'	71 11 21	42 40 50	2171		
YM 41	71 11 39	42 39 30	2167	454	1713
YM 41'	71 11 57	42 38 10	2163	490	1673
YM 42	71 12 14	42 36 48	2160	473	1687
YM 42'	71 12 31	42 35 25	2151	570	1581
YM 43	71 12 54	42 34 13	2146	710	1436
YM 43'	71 13 15	42 33 01	2142	627	1515
YM 44	71 13 36	42 31 43	2145	590	1555
YM 44'	71 13 56	42 30 25	2153	796	1357
YM 45	71 14 15	42 29 10	2160	895	1265
YM 45'	71 14 38	42 28 03	2179	888	1291
YM 46	71 14 59	42 27 01	2185	881	1304
YM 46'	71 15 24	42 25 36	2189	792	1397
YM 47	71 15 43	42 24 31	2191	676	1515
YM 47'	71 16 07	42 23 23	2191	847	1344
YM 48	71 16 29	42 22 15	2191	742	1449
YM 48'	71 16 51	42 21 01	2192	664	1528
YM 49	71 17 13	42 19 46	2197	484	1713
YM 49'	71 17 35	42 18 31	2202	94	2108
YM 50	71 17 53	42 17 22	2201		
YM 50'	71 18 19	42 16 09	2194		
YM 51	71 18 39	42 15 08	2188		
YM 51'	71 19 05	42 13 52	2185		
YM 52	71 19 26	42 12 44	2183		
YM 52'	71 19 52	42 11 28	2184	273	1911
YM 53	71 20 08	42 10 22	2185	182	2003

\*JMR stations

Station	Latitude	Longitude	Elevation	Bedrock Elevation	Ice Thickness
	(S)	(E)	(m)	(m)	(m)
YM 53'	71° 20' 20"	42° 08' 47"	2184	405	1779
YM 54	71 20 27	42 07 12	2188	277	1911
YM 54'	71 20 38	42 05 41	2188		
YM 55	71 20 52	42 04 12	2192		
YM 55'	71 21 06	42 02 41	2194		
YM 56	71 21 19	42 01 15	2197		
YM 56'	71 21 28	41 59 40	2197		
YM 57	71 21 35	41 58 09	2200		
YM 57'	71 21 44	41 56 36	2198	511	1687
YM 58	71 21 53	41 55 08	2194	666	1528
YM 58'	71 22 02	41 53 34	2191	807	1384
YM 59	71 22 11	41 52 04	2184	866	1318
YM 59'	71 22 21	41 50 29	2181	705	1476
YM 60*	71 22 27	41 48 52	2180	652	1528
YM 60'	71 22 46	41 47 32	2180	678	1502
YM 61	71 22 52	41 45 51	2176	621	1555
YM 61'	71 23 07	41 44 23	2175	449	1726
YM 62	71 23 21	41 43 00	2178	465	1713
YM 62'	71 23 33	41 41 27	2179	334	1845
YM 63	71 23 39	41 39 59	2179	400	1779
YM 63'	71 23 45	41 38 21	2180	401	1779
YM 64	71 23 49	41 36 49	2180	493	1687
YM 64'	71 23 50	41 35 11	2178	465	1713
YM 65	71 23 58	41 33 35	2175	515	1660
YM 65'	71 24 05	41 31 58	2176	424	1752
YM 66	71 24 14	41 30 31	2176	358	1818
YM 66'	71 24 24	41 28 56	2176		
YM 67	71 24 37	41 27 32	2173	317	1856
YM 67'	71 24 45	41 25 56	2173		
YM 68	71 24 59	41 24 35	2175		
YM 68'	71 25 13	41 23 04	2175		
YM 69	71 25 19	41 21 34	2178	198	1980
YM 69'	71 25 31	41 20 01	2177	345	1832
YM 70	71 25 39	41 18 32	2175	423	1752
YM 70'	71 25 47	41 16 56	2176	437	1739
YM 71	71 25 58	41 15 38	2174	435	1739

\*JMR stations

Station	Latitude (S)	Longitude (E)	Elevation (m)	Bedrock Elevation (m)	Ice Thickness (m)
YM 71'	71° 26' 05"	41° 14' 24"	2175	423	1752
YM 72*	71 26 12	41 13 17	2176	331	1845
YM 72'	71 26 25	41 11 46	2176	397	1779
YM 73	71 26 33	41 10 20	2181	389	1792
YM 73'	71 26 46	41 08 48	2176	371	1805
YM 74	71 26 55	41 07 20	2189	410	1779
YM 74'	71 27 07	41 05 48	2192	466	1726
YM 75	71 27 17	41 04 25	2184	392	1792
YM 75'	71 27 28	41 02 52	2176	397	1779
YM 76	71 27 39	41 01 27	2189	450	1739
YM 76'	71 27 47	40 59 52	2186	434	1752
YM 77	71 28 03	40 58 31	2186	420	1766
YM 77'	71 27 59	40 57 19	2168	416	1752
YM 78	71 28 06	40 55 31	2181	402	1779
YM 78'	71 28 20	40 54 04	2173		
YM 79	71 28 34	40 52 41	2173	460	1713
YM 79'	71 28 54	40 51 21	2189	476	1713
YM 80*	71 28 49	40 49 27	2163	595	1568
YM 80'	71 28 58	40 47 54	2167	652	1515
YM 81	71 29 16	40 45 52	2174	646	1528
YM 81'	71 29 14	40 44 27	2178	610	1568
YM 82	71 29 35	40 43 38	2181	587	1594
YM 82'	71 29 51	40 42 15	2181	455	1726
YM 83	71 30 05	40 41 07	2187	435	1752
YM 83'	71 30 15	40 39 37	2188	409	1779
YM 84	71 30 27	40 38 25	2190	464	1726
YM 84'	71 30 43	40 36 57	2196	483	1713
YM 85	71 30 54	40 35 50	2196	470	1726
YM 85'	71 31 02	40 34 16	2198	485	1713
YM 86	71 31 16	40 32 60	2200	500	1700
YM 86'	71 31 34	40 31 42	2204	491	1713
YM 87	71 32 00	40 30 45	2212	499	1713
YM 87'	71 32 19	40 29 33	2216	490	1726
YM 88	71 32 45	40 28 32	2218	479	1739
YM 88'	71 32 56	40 27 25	2222	483	1739
YM 89	71 33 09	40 25 57	2220	468	1752

\*JMR stations

Station	Latitude			Longitude			Elevation (m)	Bedrock Elevation (m)	Ice Thickness (m)
	(S)			(E)					
YM 89'	71°	33'	20"	40°	24'	45"	2224	485	1739
YM 90	71	33	44	40	23	40	2222	483	1739
YM 90'	71	33	59	40	22	34	2229	519	1710
YM 91	71	34	00	40	21	02	2231	413	1818
YM 91'	71	34	16	40	19	41	2230	425	1805
YM 92	71	34	28	40	18	11	2229	490	1739
YM 92'	71	34	43	40	16	37	2232	466	1766
YM 93	71	34	60	40	15	17	2229	477	1752
YM 93'	71	35	10	40	14	16	2229	477	1752
YM 94	71	35	24	40	12	29	2232	519	1713
YM 94'	71	35	30	40	11	10	2226	447	1779
YM 95	71	35	37	40	09	37	2222	377	1845
YM 95'	71	35	42	40	08	04	2217	372	1845
YM 96*	71	35	52	40	06	28	2214	277	1937
YM 96'	71	36	10	40	05	02	2214		
YM 97	71	36	20	40	03	25	2215	305	1910
YM 97'	71	36	25	40	01	45	2214		
YM 98	71	36	35	40	00	09	2215		
YM 98'	71	36	43	39	58	30	2217	372	1845
YM 99	71	36	50	39	56	52	2219	401	1818
YM 99'	71	37	02	39	55	16	2222	443	1779
YM100	71	37	11	39	53	39	2222	496	1726
YM100'	71	37	19	39	52	01	2225		
YM101	71	37	31	39	50	26	2225	499	1726
YM101'	71	37	41	39	48	50	2225	617	1608
YM102*	71	37	51	39	47	10	2225	710	1515
YM102'	71	38	26	39	47	09	2236	671	1565
YM103	71	38	56	39	46	21	2246	582	1664
YM103'	71	39	00	39	46	08	2249	585	1664
YM104	71	39	16	39	44	37	2252		
YM104'	71	39	38	39	43	29	2254		
YM105	71	39	50	39	41	51	2253	458	1795
YM105'	71	39	58	39	40	07	2248	403	1845
YM106	71	40	05	39	38	20	2252	457	1795
YM106'	71	40	13	39	36	45	2250	504	1746
YM107	71	40	26	39	35	05	2258	314	1944

\*JMR stations

Station	Latitude (S)	Longitude (E)	Elevation (m)	Bedrock Elevation (m)	Ice Thickness (m)
YM107'	71° 40' 38"	39° 33' 42"	2259	497	1762
YM108	71 40 44	39 32 00	2264	469	1795
YM108'	71 40 53	39 30 25	2267	455	1812
YM109	71 40 58	39 28 42	2268	473	1795
YM109'	71 41 01	39 27 04	2265	470	1795
YM110	71 41 08	39 25 20	2263	468	1759
YM110'	71 41 12	39 23 43	2262		
YM111	71 41 12	39 21 54	2260		
YM111'	71 41 14	39 20 20	2260		
YM112	71 41 20	39 18 35	2259		
YM112'	71 41 21	39 16 58	2248		
YM113	71 41 21	39 15 12	2248		
YM113'	71 41 28	39 13 33	2250		
YM114	71 41 35	39 11 45	2253		
YM114'	71 41 39	39 10 12	2253		
YM115	71 41 46	39 08 30	2257		
YM115'	71 42 10	39 07 14	2265		
YM116	71 42 14	39 05 31	2259		
YM116'	71 42 20	39 03 53	2257	626	1631
YM117	71 42 27	39 02 11	2259	645	1614
YM117'	71 42 33	39 00 34	2259	595	1664
YM118	71 42 03	39 00 14	2261	630	1631
YM118'	71 42 13	38 58 34	2267	636	1631
YM119	71 42 24	38 56 55	2270		
YM119'	71 42 35	38 55 20	2274	545	1729
YM120	71 42 47	38 53 37	2276	599	1677
YM120'	71 42 55	38 52 11	2279		
YM121	71 43 10	38 50 36	2283	603	1680
YM121'	71 43 19	38 49 00	2286		
YM122	71 43 30	38 47 16	2294		
YM122'	71 43 40	38 45 41	2297	632	1665
YM123	71 43 51	38 43 56	2299		
YM123'	71 44 02	38 42 33	2302		
YM124	71 44 15	38 40 50	2305	631	1674
YM124'	71 44 26	38 39 15	2308		
YM125	71 44 46	38 37 50	2311		

\*JMR stations

Station	Latitude (S)	Longitude (E)	Elevation (m)	Bedrock Elevation (m)	Ice Thickness (m)
YM125'	71° 44' 55"	38° 36' 03"	2309		
YM126	71 45 09	38 34 28	2316		
YM126'	71 45 17	38 32 13	2317	736	1581
YM127	71 45 34	38 30 41	2317	802	1515
YM127'	71 45 44	38 29 02	2320	706	1614
YM128	71 45 58	38 27 25	2322	807	1515
YM128'	71 46 17	38 25 57	2328	928	1400
YM129	71 46 29	38 24 19	2334	819	1515
YM129'	71 46 43	38 22 48	2340	742	1598
YM130	71 46 55	38 21 11	2341	743	1598
YM130' *	71 47 11	38 19 37	2340	891	1449
YM131	71 47 22	38 18 01	2329	814	1515
YM131'	71 47 30	38 16 22	2333	604	1729
YM132	71 47 45	38 14 51	2343	679	1664
YM132'	71 47 51	38 13 10	2349	784	1565
YM133	71 47 53	38 11 28	2344	977	1367
YM133'	71 48 09	38 09 52	2343	943	1400
YM134	71 48 32	38 08 31	2337	1102	1235
YM134'	71 48 31	38 06 43	2351	1066	1285
YM135	71 48 47	38 05 14	2363	1227	1136
YM135'	71 48 52	38 03 22	2377	1059	1318
YM136	71 49 05	38 01 47	2381	1014	1367
YM136'	71 49 11	38 00 01	2386	887	1499
YM137	71 49 22	37 58 25	2388	724	1664
YM137'	71 49 28	37 56 49	2386	904	1482
YM138	71 49 36	37 55 09	2386	755	1631
YM138'	71 49 47	37 53 32	2386	739	1647
YM139	71 50 07	37 52 13	2391	777	1614
YM139'	71 50 09	37 50 15	2383	1230	1153
YM140	71 50 06	37 48 32	2390	875	1515
YM140'	71 50 03	37 46 56	2397	849	1548
YM141	71 50 09	37 45 15	2401	770	1631
YM141'	71 50 08	37 43 33	2401	1039	1362
YM142*	71 50 09	37 41 50	2404	1133	1271
YM142'	71 50 14	37 40 13	2405	1073	1332
YM143	71 50 10	37 38 26	2406	1135	1271

\*JMR stations

Station	Latitude	Longitude	Elevation	Bedrock Elevation	Ice Thickness
	(S)	(E)	(m)	(m)	(m)
YM143'	71° 50' 10"	37° 36' 48"	2403	1132	1271
YM144	71 50 14	37 35 06	2403	1071	1332
YM144'	71 50 18	37 33 23	2402	1040	1362
YM145	71 50 18	37 31 40	2403	937	1466
YM145'	71 50 22	37 29 57	2404	1086	1318
YM146	71 50 24	37 28 14	2406	1138	1268
YM146'	71 50 25	37 26 37	2412	1160	1252
YM147	71 50 30	37 24 50	2416	1084	1332
YM147'	71 50 36	37 23 13	2416	1054	1362
YM148	71 50 42	37 21 32	2417		
YM148'	71 50 44	37 19 49	2420	1020	1400
YM149	71 50 48	37 18 06	2423	1039	1384
YM149' *	71 50 41	37 16 21	2423	941	1482
YM150	71 50 41	37 14 34	2423	957	1466
YM150'	71 50 39	37 12 47	2423	1270	1153
YM151	71 50 36	37 11 00	2423	1171	1252
YM151'	71 50 27	37 09 18	2423	1352	1071
YM152	71 50 20	37 07 33	2423	924	1499
YM152'	71 50 19	37 05 40	2423	875	1548
YM153	71 50 50	37 05 10	2423	809	1614
YM153'	71 51 20	37 04 43	2422	808	1614
YM154	71 51 50	37 04 23	2422	858	1564
YM154'	71 52 20	37 04 04	2422	871	1551
YM155	71 52 55	37 03 39	2422	1001	1421
YM155'	71 53 22	37 03 14	2427	1096	1331
YM156	71 53 52	37 02 44	2433	934	1499
YM156'	71 53 48	37 00 60	2434	770	1664
YM157	71 53 42	36 59 14	2426	746	1680
YM157'	71 53 37	36 57 28	2426	762	1664
YM158	71 53 31	36 55 43	2429	1029	1400
YM158'	71 53 27	36 53 56	2433	1132	1301
YM159	71 53 24	36 52 08	2437	971	1466
YM159'	71 53 24	36 50 22	2435	986	1449
YM160	71 53 22	36 48 32	2429	848	1581
YM160'	71 53 19	36 46 49	2429	815	1614
YM161	71 53 15	36 44 60	2423	792	1631

\*JMR stations

Station	Latitude (S)	Longitude (E)	Elevation (m)	Bedrock Elevation (m)	Ice Thickness (m)
YM161'	71° 53' 12"	36° 43' 16"	2414	882	1532
YM162	71 53 08	36 41 26	2409	861	1548
YM162'	71 53 02	36 39 43	2414	833	1581
YM163	71 52 58	36 37 57	2414	800	1614
YM163'	71 52 55	36 36 09	2412	1094	1318
YM164	71 52 52	36 34 20	2408	1700	708
YM164'	71 52 50	36 32 35	2411	1785	626
YM165	71 52 30	36 31 57	2407	1798	609
YM165'	71 52 17	36 30 20	2399	1954	445
YM166	71 51 56	36 28 57	2400	1576	824
YM166'	71 51 36	36 27 31	2398	1410	988
YM167	71 51 14	36 25 57	2359	1423	972
YM167'	71 50 55	36 24 31	2389	1533	856
YM168	71 50 43	36 23 38	2379	1638	741
YM168'	71 50 24	36 22 10	2378	1637	741
YM169	71 50 06	36 20 42	2377	1863	514
YM169'	71 49 47	36 19 17	2375	1940	435
YM170	71 49 34	36 18 18	2364	2068	296
YM170'	71 49 15	36 16 50	2340	1895	445
YM171	71 48 53	36 15 27	2316	1861	455
YM171'	71 48 29	36 14 10	2308	1853	455
YM172	71 48 05	36 12 53	2298	1853	445
YM172'	71 47 42	36 11 41	2285	1900	385
YM173	71 47 20	36 10 21	2268	2021	247
YM173'	71 47 03	36 08 53	2247	1970	277
YM174	71 46 42	36 07 31	2243	1788	455
YM174' *	71 46 25	36 05 56	2247	1674	573
YM175	71 46 19	36 05 36	2238	1467	771
YM175'	71 46 04	36 04 03	2226	1534	692
YM176	71 45 43	36 02 40	2214	1611	603
YM176'	71 45 20	36 01 26	2208	1338	870
YM177	71 44 56	36 00 22	2200	1686	514
YM177'	71 44 42	35 58 47	2180	>1982	<198
YM178	71 44 28	35 57 13	2155	1918	237
YM178'	71 44 19	35 55 32	2153	>1955	<198
YM179*	71 44 15	35 54 21	2157	1870	287



Table 3. Position, elevation, bedrock elevation and ice thickness of stations along Route SS.

\*JMR stations

Station	Latitude (S)	Longitude (E)	Elevation (m)	Bedrock Elevation (m)	Ice Thickness (m)
SS 0* (G2)	71° 02' 25"	39° 51' 47"	1789	469	1318
SS 0'	71 03 07	39 51 44	1791	309	1482
SS 1	71 03 46	39 51 41	1801	302	1499
SS 1'	71 04 25	39 51 36	1814	200	1614
SS 2	71 05 03	39 51 24	1820	74	1746
SS 2'	71 05 42	39 51 07	1824	-4	1828
SS 3	71 06 20	39 51 31	1832	152	1680
SS 3'	71 07 02	39 51 18	1852	73	1779
SS 4	71 07 39	39 50 53	1860	81	1779
SS 4'	71 08 21	39 50 40	1864	184	1680
SS 5	71 08 60	39 50 42	1872	340	1532
SS 5'	71 09 39	39 50 39	1893	262	1631
SS 6	71 10 18	39 50 44	1904	-40	1944
SS 6'	71 10 57	39 50 47	1901		
SS 7	71 11 34	39 50 17	1897	-79	1976
SS 7'	71 12 13	39 50 12	1891	-3	1894
SS 8	71 12 52	39 49 59	1894	-66	1960
SS 8'	71 13 31	39 49 58	1896	51	1845
SS 9	71 14 09	39 49 53	1899	-61	1960
SS 9'	71 14 47	39 49 29	1901	122	1779
SS 10*	71 15 29	39 49 14	1905	406	1499
SS 10'	71 16 07	39 49 14	1908	607	1301
SS 11	71 16 45	39 49 11	1923	688	1235
SS 11'	71 17 23	39 49 05	1958	772	1186
SS 12	71 18 01	39 48 53	2002	816	1186
SS 12'	71 18 39	39 49 04	2019	685	1334
SS 13	71 19 17	39 49 15	2024	575	1449
SS 13'	71 19 55	39 49 16	2026	511	1515
SS 14	71 20 33	39 49 02	2035	536	1499
SS 14'	71 21 11	39 48 52	2039	606	1433
SS 15*	71 21 57	39 48 50	2051	602	1449
SS 15'	71 22 35	39 48 04	2065	566	1499
SS 16	71 23 06	39 48 14	2078	563	1515
SS 16'	71 23 37	39 48 05	2076	528	1548
SS 17	71 24 25	39 48 04	2078	546	1532

\*JMR stations

Station	Latitude (S)	Longitude (E)	Elevation (m)	Bedrock Elevation (m)	Ice Thickness (m)
SS 17'	71° 24' 56"	39° 47' 56"	2086	587	1499
SS 18	71 25 29	39 47 50	2095	530	1565
SS 18'	71 25 60	39 47 46	2102	603	1499
SS 19	71 26 31	39 47 38	2116	551	1565
SS 19'	71 27 04	39 48 12	2123	492	1631
SS 20	71 27 29	39 47 26	2129	498	1631
SS 20'	71 27 58	39 47 36	2132	518	1614
SS 21	71 28 31	39 47 43	2140	493	1647
SS 21'	71 29 01	39 47 40	2148	484	1664
SS 22	71 29 34	39 47 53	2157	461	1696
SS 22'	71 30 04	39 47 34	2161	415	1746
SS 23	71 30 34	39 47 51	2170	375	1795
SS 23'	71 31 04	39 47 27	2166	354	1812
SS 24	71 31 36	39 47 58	2164	336	1828
SS 24'	71 32 01	39 47 23	2168	389	1779
SS 25*	71 32 32	39 47 21	2175	396	1779
(G3)					
SS 25'	71 33 08	39 47 20	2179	450	1729
SS 26	71 33 36	39 47 16	2184	455	1729
SS 26'	71 34 09	39 47 11	2193	447	1746
SS 27	71 34 41	39 47 15	2193	398	1795
SS 27'	71 35 13	39 47 02	2193		
SS 28	71 35 44	39 47 34	2189	488	1701
SS 28'	71 36 16	39 47 46	2197		
SS 29	71 36 52	39 47 40	2213	674	1539
SS 29'	71 37 22	39 47 08	2216		
SS 30*	71 37 51	39 47 10	2225	710	1515
SS 30'	71 38 28	39 47 20	2248	716	1532
SS 31	71 39 05	39 47 09	2264	539	1725
SS 31'	71 39 42	39 46 60	2275		
SS 32	71 40 19	39 46 50	2279	434	1845
SS 32'	71 40 57	39 46 43	2279	401	1878
SS 33	71 41 34	39 46 28	2281	388	1893
SS 33'	71 42 13	39 46 38	2285		
SS 34	71 42 50	39 46 33	2295	637	1658
SS 34'	71 43 27	39 46 26	2306		

\*JMR stations

Station	Latitude (S)	Longitude (E)	Elevation (m)	Bedrock Elevation (m)	Ice Thickness (m)
SS 35	71° 44' 05"	39° 46' 30"	2310	515	1795
SS 35'	71 44 43	39 46 36	2317	541	1776
SS 36	71 45 21	39 46 31	2323		
SS 36'	71 45 59	39 46 15	2327	584	1743
SS 37	71 46 36	39 46 16	2338	569	1769
SS 37'	71 47 14	39 46 14	2350	610	1740
SS 38	71 47 52	39 46 06	2356	533	1823
SS 38'	71 48 30	39 46 12	2363	504	1859
SS 39	71 49 07	39 46 20	2371	566	1805
SS 39'	71 49 42	39 45 40	2371	583	1788
SS 40*	71 50 20	39 45 39	2379	650	1729
SS 40'	71 50 58	39 45 33	2384	655	1729
SS 41	71 51 37	39 45 28	2389	758	1631
SS 41'	71 52 12	39 44 56	2397	766	1631
SS 42	71 52 50	39 45 05	2405	791	1614
SS 42'	71 53 27	39 45 05	2407	793	1614
SS 43	71 54 05	39 45 11	2420	806	1614
SS 43'	71 54 44	39 45 16	2434	733	1701
SS 44	71 55 21	39 45 18	2448	806	1642
SS 44'	71 55 58	39 45 01	2450	764	1686
SS 45	71 56 36	39 45 04	2455	709	1746
SS 45'	71 57 15	39 44 38	2461	796	1665
SS 46	71 57 53	39 45 00	2468	683	1785
SS 46'	71 58 31	39 44 54	2472	609	1863
SS 47	71 59 09	39 45 03	2478	585	1893
SS 47'	71 59 47	39 45 01	2481	833	1648
SS 48	72 00 25	39 45 08	2483	721	1762
SS 48'	72 01 03	39 45 10	2489	743	1746
SS 49	72 01 40	39 45 08	2499	737	1762
SS 49'	72 02 18	39 45 06	2505	759	1746
SS 50*	72 02 56	39 45 04	2521	759	1762
(G4)					
SS 50'	72 03 34	39 45 01	2531	653	1878
SS 51	72 04 11	39 44 59	2538	562	1976
SS 51'	72 04 49	39 45 00	2542	499	2043
SS 52	72 05 26	39 45 00	2546	465	2081

## \*JMR stations

Station	Latitude	Longitude	Elevation	Bedrock Elevation	Ice Thickness
	(S)	(E)	(m)	(m)	(m)
SS 52'	72° 06' 04"	39° 44' 55"	2547	485	2062
SS 53	72 06 41	39 45 10	2551	446	2105
SS 53'	72 07 19	39 45 19	2552	588	1964
SS 54	72 07 56	39 45 16	2558	461	2097
SS 54'	72 08 34	39 45 13	2564	543	2021
SS 55	72 09 12	39 45 15	2568	591	1977
SS 55'	72 09 50	39 45 12	2573	588	1985
SS 56	72 10 27	39 45 07	2575	599	1976
SS 56'	72 11 04	39 45 18	2580	686	1894
SS 57	72 11 42	39 45 13	2586	708	1878
SS 57'	72 12 20	39 45 10	2595	635	1960
SS 58	72 12 57	39 45 08	2601	592	2009
SS 58'	72 13 35	39 45 11	2604	562	2042
SS 59	72 14 13	39 45 04	2610	634	1976
SS 59'	72 14 51	39 44 59	2616	522	2094
SS 60*	72 15 29	39 44 52	2625	223	2402
SS 60'	72 16 08	39 44 52	2633	232	2401
SS 61	72 16 46	39 44 46	2638		
SS 61'	72 17 24	39 44 42	2640		
SS 62	72 18 02	39 44 49	2643	598	2045
SS 62'	72 18 40	39 44 38	2645	669	1976
SS 63	72 19 18	39 44 59	2646	752	1894
SS 63'	72 19 55	39 44 46	2654	697	1957
SS 64	72 20 33	39 45 06	2659	831	1828
SS 64'	72 21 11	39 44 56	2667	794	1873
SS 65	72 21 49	39 44 52	2671	909	1762
SS 65'	72 22 27	39 44 59	2673	927	1746
SS 66	72 23 05	39 44 52	2690	1191	1499
SS 66'	72 23 42	39 45 19	2702		
SS 67	72 24 21	39 45 24	2706		
SS 67'	72 24 58	39 45 05	2706		
SS 68	72 25 36	39 45 14	2708		
SS 68'	72 26 14	39 45 05	2713		
SS 69	72 26 51	39 44 50	2712		
SS 69'	72 27 30	39 44 57	2720		
SS 70	72 28 08	39 45 06	2722	894	1828

## \*JMR stations

Station	Latitude			Longitude			Elevation (m)	Bedrock Elevation (m)	Ice Thickness (m)
	(S)			(E)					
SS 70'	72°	28'	45"	39°	44'	37"	2726	1013	1713
SS 71	72	29	23	39	44	46	2734	955	1779
SS 71'	72	30	01	39	44	40	2742	996	1746
SS 72	72	30	40	39	44	40	2753		
SS 72'	72	31	18	39	44	42	2757		
SS 73	72	31	56	39	44	47	2764		
SS 73'	72	32	35	39	44	40	2764		
SS 74	72	33	12	39	44	36	2767		
SS 74'	72	33	50	39	44	41	2773		
SS 75*	72	34	31	39	44	41	2770	1008	1762
(G5)									
SS 75'	72	35	09	39	44	38	2778		
SS 76	72	35	47	39	44	35	2785		
SS 76'	72	36	26	39	44	33	2789		
SS 77	72	37	04	39	44	30	2793	1047	1746
SS 77'	72	37	42	39	44	27	2796	1182	1614
SS 78	72	38	21	39	44	24	2805	1092	1713
SS 78'	72	38	59	39	44	21	2816	826	1990
SS 79	72	39	37	39	44	18	2818		
SS 79'	72	40	16	39	44	15	2827	744	2083
SS 80	72	40	54	39	44	12	2829	809	2020
SS 80'	72	41	32	39	44	09	2840	916	1924
SS 81	72	42	10	39	44	07	2849		
SS 81'	72	42	48	39	44	04	2852		
SS 82	72	43	27	39	44	01	2852		
SS 82'	72	44	05	39	43	58	2856	769	2087
SS 83	72	44	43	39	43	55	2858	713	2145
SS 83'	72	45	21	39	43	52	2858	760	2098
SS 84	72	45	60	39	43	49	2862	753	2109
SS 84'	72	46	38	39	43	46	2864	740	2124
SS 85*	72	47	18	39	43	43	2865	1317	1548
SS 85'	72	47	56	39	43	46	2870	1256	1614
SS 86	72	48	35	39	43	48	2872	1241	1631
SS 86'	72	49	15	39	43	51	2879	1528	1351
SS 87	72	49	53	39	43	54	2892	1459	1433
SS 87'	72	50	31	39	43	57	2899	1087	1812

\*JMR stations

Station	Latitude (S)	Longitude (E)	Elevation (m)	Bedrock Elevation (m)	Ice Thickness (m)
SS 88	72° 51' 10"	39° 43' 55"	2903	894	2009
SS 88'	72 51 48	39 44 02	2907	802	2105
SS 89	72 52 27	39 44 07	2912		
SS 89'	72 53 05	39 44 10	2910		
SS 90	72 53 43	39 44 15	2900		
SS 90'	72 54 23	39 44 20	2917	1196	1721
SS 91	72 55 02	39 44 18	2937	1088	1849
SS 91'	72 55 41	39 44 23	2946	1196	1750
SS 92	72 56 20	39 44 28	2951	937	2014
SS 92'	72 56 60	39 44 33	2956		
SS 93	72 57 39	39 44 37	2955	740	2215
SS 93'	72 58 18	39 44 40	2959	710	2249
SS 94	72 58 56	39 44 43	2963		
SS 94'	72 59 34	39 44 45	2970		
SS 95	73 00 13	39 44 48	2974	628	2346
SS 95'	73 00 52	39 44 50	2973		
SS 96	73 01 30	39 44 55	2977		
SS 96'	73 02 09	39 45 00	2979		
SS 97	73 02 48	39 45 08	2985		
SS 97'	73 03 26	39 45 12	2990		
SS 98	73 04 06	39 45 20	2994		
SS 98'	73 04 44	39 45 27	2990		
SS 99	73 05 23	39 45 34	2999		
SS 99'	73 06 02	39 45 32	3003		
SS100*	73 06 41	39 45 30	3005	650	2355
(G6)					
SS100'	73 07 19	39 45 17	3014		
SS101	73 07 59	39 45 20	3024		
SS101'	73 08 39	39 45 28	3022		
SS102	73 09 18	39 45 46	3023	621	2402
SS102'	73 09 56	39 46 15	3034		
SS103	73 10 35	39 46 30	3022		
SS103'	73 11 13	39 46 40	3032		
SS104	73 11 52	39 46 29	3048		
SS104'	73 12 30	39 46 28	3054		
SS105	73 13 09	39 46 24	3052		

\*JMR stations

Station	Latitude (S)	Longitude (E)	Elevation (m)	Bedrock Elevation (m)	Ice Thickness (m)
SS105'	73° 13' 47"	39° 46' 22"	3049		
SS106	73 14 25	39 46 42	3055		
SS106'	73 15 05	39 46 40	3059		
SS107	73 15 44	39 46 48	3062		
SS107'	73 16 22	39 46 42	3062		
SS108	73 17 01	39 46 50	3067	1195	1872
SS108'	73 17 40	39 46 51	3067	1326	1741
SS109	73 18 18	39 46 45	3085	1216	1869
SS109'	73 18 57	39 46 43	3098	1212	1886
SS110	73 19 36	39 46 49	3105	1225	1880
SS110'	73 20 15	39 46 59	3112	1198	1914
SS111	73 20 54	39 47 05	3123		
SS111'	73 21 33	39 47 15	3125		
SS112	73 22 11	39 47 18	3128	1221	1907
SS112'	73 22 50	39 47 26	3137	1030	2107
SS113	73 23 29	39 47 36	3142	866	2276
SS113'	73 24 08	39 47 42	3142		
SS114	73 24 47	39 47 52	3139		
SS114'	73 25 25	39 47 52	3141		
SS115*	73 26 04	39 48 08	3140	1246	1894
SS115'	73 26 43	39 48 09	3143	1232	1911
SS116	73 27 23	39 48 26	3146	1235	1911
SS116'	73 28 01	39 48 15	3148	1336	1812
SS117	73 28 40	39 48 40	3154	1342	1812
SS117'	73 29 19	39 48 40	3161	1349	1812
SS118	73 29 58	39 48 41	3165	1224	1941
SS118'	73 30 37	39 48 49	3171	1227	1944
SS119	73 31 16	39 48 50	3180	1370	1810
SS119'	73 31 55	39 48 50	3188	1217	1971
SS120	73 32 33	39 48 56	3190	1082	2108
SS120'	73 33 13	39 49 04	3187		
SS121	73 33 53	39 49 12	3190		
SS121'	73 34 32	39 49 19	3193	1382	1811
SS122	73 35 11	39 49 25	3199		
SS122'	73 35 51	39 49 30	3203	1391	1812
SS123	73 36 30	39 49 43	3212	1334	1878

\*JMR stations

Station	Latitude (S)	Longitude (E)	Elevation (m)	Bedrock Elevation (m)	Ice Thickness (m)
SS123'	73° 37' 09"	39° 49' 36"	3218	1176	2042
SS124	73 37 48	39 49 42	3220	1260	1960
SS124'	73 38 26	39 49 47	3224	1116	2108
SS125*	73 39 09	39 49 48	3227	1267	1960
(G7)					
SS125'	73 39 08	39 46 56	3227	1379	1848
SS126	73 39 07	39 45 10	3227	1218	2009
SS126'	73 39 06	39 42 50	3228	1103	2125
SS127	73 39 07	39 40 31	3225	1100	2125
SS127'	73 39 08	39 38 12	3222	1114	2108
SS128	73 39 09	39 35 50	3220	1029	2191
SS128'	73 39 09	39 33 33	3221	948	2273
SS129	73 39 09	39 31 13	3223	983	2240
SS129'	73 39 08	39 28 54	3226	920	2306
SS130	73 39 08	39 26 35	3221	948	2273
SS130'	73 39 07	39 24 16	3218	1026	2192
SS131	73 39 13	39 21 57	3218	1225	1993
SS131'	73 39 20	39 19 38	3221	1245	1976
SS132	73 39 17	39 17 19	3218	1126	2092
SS132'	73 39 15	39 15 01	3218	1110	2108
SS133	73 39 06	39 12 48	3217	1175	2042
SS133'	73 38 58	39 10 34	3219	1407	1812
SS134	73 38 58	39 08 16	3216	1487	1729
SS134'	73 38 57	39 05 56	3224	1050	2174
SS135	73 38 60	39 03 37	3226	1026	2200
SS135'	73 39 02	39 01 11	3221		
SS136	73 39 00	38 58 57	3218		
SS136'	73 38 59	38 56 39	3219		
SS137	73 39 02	38 54 20	3216		
SS137'	73 39 06	38 52 01	3214		
SS138	73 39 04	38 49 42	3215		
SS138'	73 39 03	38 47 24	3214	1106	2108
SS139	73 39 00	38 45 06	3214	1089	2125
SS139'	73 38 57	38 42 48	3212	1087	2125
SS140	73 38 59	38 40 29	3209	1134	2075
SS140'	73 39 02	38 38 09	3204	1162	2042



\*JMR stations

Station	Latitude (S)	Longitude (E)	Elevation (m)	Bedrock Elevation (m)	Ice Thickness (m)
SS141	73° 39' 01"	38° 35' 44"	3200	1158	2042
SS141'	73 39 01	38 33 31	3195		
SS142	73 38 59	38 31 13	3196	1391	1805
SS142'	73 38 59	38 28 55	3194	1382	1812
SS143	73 38 56	38 26 36	3193	1595	1598
SS143'	73 38 54	38 24 18	3193	1513	1680
SS144	73 38 53	38 21 60	3193	1217	1976
SS144'	73 38 52	38 19 41	3192	1216	1976
SS145*	73 38 49	38 17 24	3184		
SS145'	73 38 45	38 15 00	3184	944	2240
SS146	73 38 51	38 12 46	3185	959	2226
SS146'	73 38 57	38 10 27	3184		
SS147	73 38 53	38 08 09	3182	928	2254
SS147'	73 38 50	38 05 51	3183		
SS148	73 38 46	38 03 34	3183		
SS148'	73 38 42	38 01 17	3183		
SS149	73 38 37	37 58 59	3183		
SS149'	73 38 37	37 56 40	3182		
SS150*	73 38 37	37 54 21	3181		
SS150'	73 38 33	37 52 03	3174		
SS151	73 37 53	37 52 00	3161	1333	1828
SS151'	73 37 13	37 51 57	3154	1329	1762
SS152	73 36 34	37 52 32	3144	1382	1762
SS152'	73 35 56	37 53 08	3145	1416	1729
SS153	73 35 16	37 53 10	3145	1267	1878
SS153'	73 34 36	37 53 11	3140		
SS154	73 33 56	37 53 18	3138		
SS154'	73 33 17	37 53 25	3134		
SS155	73 32 37	37 53 25	3129		
SS155'	73 31 59	37 53 24	3131		
SS156	73 31 17	37 53 41	3133		
SS156'	73 30 37	37 53 57	3136		
SS157	73 29 58	37 53 54	3138		
SS157'	73 29 18	37 53 52	3133		
SS158	73 28 40	37 54 12	3129	1362	1767
SS158'	73 27 58	37 54 33	3134	1059	2075

\*JMR stations

Station	Latitude (S)	Longitude (E)	Elevation (m)	Bedrock Elevation (m)	Ice Thickness (m)
SS159	73° 27' 19"	37' 54' 26"	3131	1122	2009
SS159'	73 26 39	37 54 18	3125	1214	1911
SS160	73 25 59	37 54 30	3102	1554	1548
SS160'	73 25 19	37 54 41	3087	1522	1565
SS161	73 24 40	37 55 11	3087	1226	1861
SS161'	73 24 01	37 55 41	3086	1225	1861
SS162	73 23 22	37 55 10	3082		
SS162'	73 22 43	37 54 39	3083		
SS163	73 22 04	37 55 14	3085		
SS163'	73 21 25	37 55 48	3083		
SS164	73 20 45	37 55 58	3080		
SS164'	73 20 05	37 56 07	3075		
SS165	73 19 26	37 56 25	3071	1010	2061
SS165'	73 18 46	37 56 43	3067	1156	1911
SS166	73 18 06	37 56 50	3062	1283	1779
SS166'	73 17 27	37 56 57	3064		
SS167	73 16 47	37 56 54	3064		
SS167'	73 16 07	37 56 51	3062		
SS168	73 15 27	37 57 02	3063		
SS168'	73 14 48	37 57 14	3057		
SS169	73 14 08	37 57 25	3051	1437	1614
SS169'	73 13 28	37 57 36	3040	1393	1647
SS170*	73 12 47	37 57 36	3030	1350	1680
SS170'	73 12 08	37 57 36	3018	1354	1664
SS171	73 11 30	37 57 14	3011	1413	1598
SS171'	73 10 52	37 56 53	3008		
SS172	73 10 14	37 56 23	3008		
SS172'	73 09 37	37 55 53	3006		
SS173	73 08 59	37 55 31	3009		
SS173'	73 08 21	37 55 10	3009		
SS174	73 07 42	37 54 49	3002		
SS174'	73 07 04	37 54 28	2999	1281	1718
SS175*	73 06 22	37 54 20	2998		
SS175'	73 05 43	37 54 13	2997		
SS176	73 05 04	37 54 00	2991		
SS176'	73 04 25	37 53 49	2981		

\*JMR stations

Station	Latitude (S)	Longitude (E)	Elevation (m)	Bedrock Elevation (m)	Ice Thickness (m)
SS177	73° 03' 48"	37' 53' 35"	2980		
SS177'	73 03 08	37 53 20	2976		
SS178*	73 02 29	37 53 13	2975	1163	1812
SS178'	73 01 49	37 53 00	2968	1272	1696
SS179	73 01 10	37 52 48	2962	1018	1944
SS179'	73 00 32	37 52 36	2962	1002	1960
SS180	72 59 53	37 52 21	2954	994	1960
SS180'	72 59 14	37 52 07	2949	1005	1944
SS181	72 58 35	37 52 06	2944	984	1960
SS181'	72 57 56	37 52 05	2946		
SS182	72 57 16	37 51 43	2942		
SS182'	72 56 38	37 51 23	2944		
SS183	72 55 59	37 51 10	2940	848	2092
SS183'	72 55 21	37 50 58	2939	880	2059
SS184	72 54 41	37 50 51	2936	976	1960
SS184'	72 54 03	37 50 43	2935	1123	1812
SS185	72 53 24	37 50 36	2924	1343	1581
SS185'	72 52 45	37 50 28	2920	1224	1696
SS186	72 52 06	37 50 16	2922	1011	1911
SS186'	72 51 27	37 50 04	2923	1610	1313
SS187	72 50 49	37 49 54	2916	1549	1367
SS187'	72 50 10	37 49 44	2910	1576	1334
SS188	72 49 31	37 49 39	2896	1792	1104
SS188'	72 48 52	37 49 34	2893	1641	1252
SS189	72 48 13	37 49 22	2890	1408	1482
SS189'	72 47 35	37 49 09	2879	1627	1252
SS190	72 46 56	37 49 16	2868	1732	1136
SS190'	72 46 17	37 49 22	2864	1497	1367
SS191	72 45 39	37 49 07	2864	1250	1614
SS191'	72 44 60	37 48 53	2859	1146	1713
SS192	72 44 21	37 48 55	2859		
SS192'	72 43 42	37 48 56	2859		
SS193	72 43 04	37 48 44	2857		
SS193'	72 42 24	37 48 32	2855	1076	1779
SS194	72 41 46	37 48 38	2848	1333	1515
SS194'	72 41 08	37 48 44	2839	1258	1581

\*JMR stations

Station	Latitude (S)	Longitude (E)	Elevation (m)	Bedrock Elevation (m)	Ice Thickness (m)
SS195	72° 40' 29"	37° 48' 43"	2837	1223	1614
SS195'	72 39 50	37 48 42	2833	988	1845
SS196	72 39 11	37 48 42	2829		
SS196'	72 38 32	37 48 41	2821	1421	1400
SS197	72 37 53	37 48 25	2817	1203	1614
SS197'	72 37 15	37 48 08	2812	1198	1614
SS198	72 36 35	37 48 14	2806	1208	1598
SS198'	72 35 56	37 48 20	2794	1394	1400
SS199	72 35 17	37 48 04	2785	1237	1548
SS199'	72 34 39	37 47 47	2784		
SS200	72 33 60	37 47 40	2781		
SS200'	72 33 21	37 47 35	2773		
SS201	72 32 42	37 47 39	2768		
SS201'	72 32 02	37 47 43	2768		
SS202	72 31 23	37 47 33	2764		
SS202'	72 30 45	37 47 23	2764		
SS203	72 30 06	37 47 05	2757		
SS203'	72 29 27	37 46 46	2750		
SS204	72 28 46	37 46 27	2750		
SS204'	72 28 09	37 46 09	2748		
SS205	72 27 30	37 46 13	2747		
SS205'	72 26 51	37 46 16	2743		
SS206	72 26 11	37 45 50	2737		
SS206'	72 25 34	37 45 26	2739	1059	1680
SS207	72 24 56	37 45 12	2734	1070	1664
SS207'	72 24 17	37 44 58	2716	1135	1581
SS208	72 23 38	37 44 57	2707	1027	1680
SS208'	72 22 59	37 44 56	2702		
SS209	72 22 21	37 44 31	2700		
SS209'	72 21 42	37 44 05	2694		
SS210	72 21 04	37 43 33	2695	1041	1654
SS210'	72 20 26	37 43 02	2695	1077	1618
SS211	72 19 47	37 42 52	2689		
SS211'	72 19 08	37 42 43	2687		
SS212	72 18 31	37 42 00	2683		
SS212'	72 17 54	37 41 18	2681		

\*JMR stations

Station	Latitude	Longitude	Elevation	Bedrock Elevation	Ice Thickness
	(S)	(E)	(m)	(m)	(m)
SS213	72° 17' 13"	37° 41' 08"	2676	1045	1631
SS213'	72 16 34	37 40 58	2666	1266	1400
SS214	72 16 03	37 40 51	2659	1374	1285
SS214'	72 15 24	37 40 41	2654	1205	1449
SS215	72 14 46	37 40 18	2648	1199	1449
SS215'	72 14 07	37 39 56	2644	1244	1400
SS216	72 13 29	37 39 46	2626	1506	1120
SS216'	72 12 49	37 39 36	2611	1475	1136
SS217	72 12 12	37 38 56	2612	1541	1071
SS217'	72 11 35	37 38 16	2599	1446	1153
SS218	72 10 56	37 37 53	2591	1553	1038
SS218'	72 10 18	37 37 31	2570	1417	1153
SS219	72 09 40	37 36 59	2569	1251	1318
SS219'	72 09 02	37 36 28	2572	1221	1351
SS220	72 08 23	37 36 05	2573	909	1664
SS220'	72 07 45	37 35 43	2564	1148	1416
SS221	72 07 06	37 35 42	2554	1220	1334
SS221'	72 06 27	37 35 41	2552	1103	1449
SS222	72 05 49	37 35 19	2550	1084	1466
SS222'	72 05 10	37 34 56	2545	914	1631
SS223	72 04 31	37 34 19	2548	1041	1507
SS223'	72 03 55	37 33 45	2541	1020	1521
SS224	72 03 16	37 33 18	2529	915	1614
SS224'	72 02 38	37 32 51	2519	1086	1433
SS225*	72 01 56	37 32 26	2510	1062	1448
SS225'	72 01 26	37 31 00	2493	955	1538
SS226	72 00 59	37 29 29	2479	1214	1265
SS226'	72 00 31	37 27 60	2480	939	1541
SS227	72 00 04	37 26 25	2475	1094	1381
SS227'	71 59 37	37 24 51	2478	1118	1360
SS228	71 59 10	37 23 20	2474	1089	1385
SS228'	71 58 43	37 21 51	2468	1101	1367
SS229	71 58 17	37 20 18	2467	1088	1379
SS229'	71 57 49	37 18 43	2459	1208	1251
SS230	71 57 20	37 17 20	2458		
SS230'	71 56 49	37 15 53	2458		

\*JMR stations

Station	Latitude (S)	Longitude (E)	Elevation (m)	Bedrock Elevation (m)	Ice Thickness (m)
SS231	71° 56' 21"	37° 14' 25"	2454		
SS231'	71 55 54	37 12 59	2456	758	1698
SS232	71 55 27	37 11 26	2455	726	1729
SS232'	71 55 01	37 09 53	2454	774	1680
SS233	71 54 30	37 08 33	2450	902	1548
SS233'	71 54 00	37 07 13	2443	1142	1301
SS234	71 53 32	37 05 39	2428	1110	1318
SS234'	71 53 06	37 04 10	2423	957	1466
SS235*	71 52 38	37 02 37	2420	905	1515

Table 4. Position, elevation, bedrock elevation and ice thickness of stations along Route IM.

\*JMR stations

Station	Latitude (S)	Longitude (E)	Elevation (m)	Bedrock Elevation (m)	Ice Thickness (m)
Mizuho*	70° 42' 03"	44° 17' 39"	2256	254	2002
IM 0	70 42 34	44 17 13	2261	237	2024
IM 0'	70 43 05	44 16 46	2263		
IM 1	70 43 36	44 16 20	2265		
IM 1'	70 44 09	44 16 15	2272		
IM 2	70 44 37	44 15 30	2277		
IM 2'	70 45 07	44 14 59	2276	345	1931
IM 3	70 45 38	44 14 33	2275	326	1949
IM 3'	70 46 10	44 14 06	2271	377	1894
IM 4	70 46 42	44 13 35	2267	252	2015
IM 4'	70 47 13	44 13 10	2266		
IM 5	70 47 44	44 12 42	2265	408	1857
IM 5'	70 48 16	44 12 17	2273	499	1774
IM 6	70 48 47	44 11 49	2281	371	1910
IM 6'	70 49 18	44 11 22	2283	333	1950
IM 7	70 49 49	44 10 59	2286	402	1884
IM 7'	70 50 20	44 10 29	2288	430	1858
IM 8	70 50 52	44 10 09	2290	287	2003
IM 8'	70 51 23	44 09 46	2291	87	2204
IM 9	70 51 53	44 09 13	2291	207	2084
IM 9'	70 52 25	44 08 47	2289		
IM 10	70 52 57	44 08 15	2290	168	2122
IM 10'	70 53 27	44 07 44	2291		
IM 11	70 53 58	44 07 12	2290	179	2111
IM 11'	70 54 30	44 06 52	2292	-20	2312
IM 12	70 55 02	44 06 32	2290	135	2155
IM 12'	70 55 33	44 06 05	2292	208	2084
IM 13	70 56 04	44 05 38	2293	214	2079
IM 13'	70 56 36	44 05 15	2298	241	2057
IM 14	70 57 06	44 04 45	2300	214	2086
IM 14'	70 57 38	44 04 20	2303	212	2091
IM 15	70 58 09	44 03 56	2307		
IM 15'	70 58 41	44 03 31	2309		
IM 16	70 59 13	44 02 56	2314		
IM 16'	70 59 44	44 02 24	2315		
IM 17	71 00 15	44 02 01	2321		

\*JMR stations

Station	Latitude (S)	Longitude (E)	Elevation (m)	Bedrock Elevation (m)	Ice Thickness (m)
IM 17'	71° 00' 47"	44° 01' 35"	2327		
IM 18	71 01 18	44 00 59	2330		
IM 18'	71 01 50	44 00 37	2332		
IM 19	71 02 21	44 00 11	2333		
IM 19'	71 02 53	43 59 48	2334		
IM 20	71 03 25	43 59 18	2333	246	2087
IM 20'	71 03 55	43 58 43	2336		
IM 21	71 04 28	43 58 24	2338	238	2100
IM 21'	71 04 60	43 58 05	2340		
IM 22	71 05 31	43 57 33	2343		
IM 22'	71 06 04	43 57 14	2344		
IM 23	71 06 36	43 56 46	2347		
IM 23'	71 07 07	43 56 17	2347	265	2082
IM 24	71 07 37	43 55 40	2349	346	2003
IM 24'	71 08 09	43 55 18	2351		
IM 25	71 08 41	43 54 55	2357	262	2095
IM 25'	71 09 07	43 54 02	2362	267	2095
IM 26	71 09 41	43 53 52	2364	243	2121
IM 26'	71 10 11	43 53 16	2369	287	2082
IM 27	71 10 43	43 52 50	2368	273	2095
IM 27'	71 11 15	43 52 33	2370	249	2121
IM 28	71 11 46	43 52 02	2372	224	2148
IM 28'	71 12 18	43 51 37	2372	237	2135
IM 29	71 12 49	43 51 09	2374	253	2121
IM 29'	71 13 20	43 50 43	2375	254	2121
IM 30	71 13 52	43 50 15	2379	259	2120
IM 30'	71 14 23	43 49 46	2379		
IM 31	71 14 54	43 49 17	2382	339	2043
IM 31'	71 15 27	43 48 58	2388		
IM 32	71 15 58	43 48 28	2389	286	2103
IM 32'	71 16 30	43 47 59	2394		
IM 33	71 17 01	43 47 28	2396	181	2215
IM 33'	71 17 33	43 47 04	2397		
IM 34	71 18 04	43 46 36	2397	205	2192
IM 34'	71 18 36	43 46 10	2396		
IM 35	71 19 08	43 45 44	2398	181	2217



\*JMR stations

Station	Latitude (S)	Longitude (E)	Elevation (m)	Bedrock Elevation (m)	Ice Thickness (m)
IM 35'	71° 19' 41"	43° 45' 11"	2399		
IM 36	71 20 12	43 44 45	2404	224	2180
IM 36'	71 20 43	43 44 13	2408		
IM 37	71 21 14	43 43 49	2413		
IM 37'	71 21 46	43 43 26	2416		
IM 38	71 22 17	43 42 53	2415	280	2135
IM 38'	71 22 49	43 42 23	2418		
IM 39	71 23 21	43 41 50	2418		
IM 39'	71 23 53	43 41 20	2417	200	2217
IM 40*	71 24 25	43 40 57	2416	232	2184
(G1)					

Table 5. Position, elevation, bedrock elevation and ice thickness of stations along Route SY.

\*JMR stations

Station	Latitude (S)	Longitude (E)	Elevation (m)	Bedrock Elevation (m)	Ice Thickness (m)
YM179*	71° 44' 15"	35° 54' 21"	2157	1870	287
SY 1	71 44 44	35 53 34	2161	1874	287
SY 2	71 45 15	35 53 40	2119	<1840	<280
SY 3	71 45 48	35 53 28	2098	1782	316
SY 4	71 46 08	35 51 58	2098	1337	761
SY 5	71 46 31	35 50 44	2088	1495	593
SY 6	71 46 55	35 49 33	2081	1775	306
SY 7	71 47 07	35 47 60	2064	1688	376
SY 8	71 47 17	35 46 19	2061	<1863	198
SY 9	71 47 42	35 45 01	2063	1687	376
SY 10	71 47 53	35 43 22	2065	1403	662
SY 11	71 48 05	35 41 43	2062	1370	692
SY 12	71 48 20	35 40 07	2066	1473	593
SY 13	71 48 34	35 38 31	2075	1393	682
SY 14	71 48 56	35 37 14	2072	1410	662
SY 15	71 49 17	35 35 52	2071	1290	781
SY 16	71 49 36	35 34 26	2078	1139	939
SY 17	71 49 55	35 33 02	2074	1264	810
SY 18	71 50 15	35 31 38	2071	1271	800
SY 19	71 50 37	35 30 21	2078	1307	771
SY 20	71 50 55	35 28 53	2073	1450	623
SY 21	71 51 16	35 27 36	2072	1370	702
SY 22	71 51 43	35 26 39	2066	1325	741
SY 23	71 52 13	35 26 07	2075	1294	781
SY 24	71 51 54	35 24 42	2069	1328	741
SY 25	71 51 36	35 23 11	2068	1366	702
SY 26	71 51 17	35 21 43	2056	1443	613
SY 27	71 51 09	35 19 59	2045	1432	613
SY 28	71 51 24	35 18 11	2045	1442	603
SY 29	71 51 50	35 17 33	2050	1536	514
SY 30	71 52 19	35 16 44	2053	1529	524
SY 31	71 52 50	35 16 30	2055	1373	682
SY 32	71 53 20	35 15 45	2055	1027	1028
SY 33	71 53 49	35 14 60	2053	1332	721
SY 34	71 54 19	35 14 21	2063	1272	791
SY 35	71 54 48	35 13 37	2068	1268	800

\*JMR stations

Station	Latitude (S)	Longitude (E)	Elevation (m)	Bedrock Elevation (m)	Ice Thickness (m)
SY 36	71° 55' 18"	35° 12' 57"	2068	1198	870
SY 37	71 55 48	35 12 18	2070	1092	978
SY 38	71 56 19	35 11 41	2070	1289	781
SY 39	71 56 49	35 11 11	2077	1484	593
SY 40	71 57 21	35 10 55	2087		<280
SY 41	71 57 52	35 10 28	2102		<280
SY 42	71 58 23	35 09 59	2109	1803	306
SY 43	71 58 55	35 09 50	2110	1823	287
SY 44	71 59 26	35 10 12	2120	1636	484
SY 45	71 59 57	35 10 22	2122	1450	672
SY 46	72 00 29	35 10 15	2126	1316	810
SY 47	72 01 01	35 09 59	2132	1075	1057
SY 48	72 01 32	35 09 30	2140	974	1166
SY 49	72 02 03	35 09 18	2143	1036	1107
SY 50	72 02 35	35 09 12	2146	1049	1097
SY 51	72 03 07	35 09 18	2148	1219	929
SY 52	72 03 36	35 10 01	2163	1422	741
SY 53	72 04 00	35 11 05	2181	1568	613
SY 54*	72 04 28	35 11 53	2193	1442	751