

V. CORRECTED RESULT OF ALTIMETRIC SURVEYS OF ICE SHEET SURFACE MADE IN 1969 - 1975

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A series of altimetric surveys of ice sheet surface in the Mizuho Plateau-West Enderby Land area was carried out by a number of oversnow traverses during the period from 1969 to 1975 (Shimizu et al., 1972; Naruse and Yokoyama, 1975; Watanabe et al., 1976). Most of the surveys were conducted by means of barometric altimetry, while precise surveys were made along three limited routes by means of either traverse-survey or triangulation-chain, as shown in Figs. 1 and 2.

As the barometric method involves some problems in the accuracy of the results when applied to a vast field, especially in the presence of the polar cap anticyclone, the results of the altimetric survey conducted during the period described above were corrected in the following way:

1) The elevation of stations of Routes S, H and Z from Syowa Station to Mizuho Camp, measured by the traverse survey was taken as the base.

2) For a closed circuit track which was initiated and terminated at a station (junction station) on the base route (Routes S, H and Z), the error of closure of elevation at the junction station was uniformly distributed over the track subjected to the barometric method; as for the traverse-survey track, the previous result of an elevation difference between the neighboring stations was used. (Circuit tracks: S 30-S 70-S 122-H 184-S 30 along Routes S and H; Z 16-M 33-H 184-S 122-Z 16 along Routes M, H and Z; S 122-Mizuho Camp-S 169-S 122 along Routes Z, X and S; and Mizuho Camp-Y 200-Sandercock Nunataks-W 55-Mizuho Camp along Routes Y and W)

3) This way of correction was deductively applied to a circuit track which has no junction station on the base Routes S, H and Z. (Circuit tracks: S 169-S 240-Yamato Mountains-S 169 along Routes S, A, B and C; B 12-B 18-D 34-B 12 and B 18-B 37-D 10-B 18 along Routes B and D; B 18-N 10-B 12-B 18 along Routes N and B; and Y 20-Y 200-I 365-Y 20 along Routes Y, I and J)

4) For the open tracks I (I 365-I 600) and D (D 10-D 0), barometric results were simply superposed upon the corrected elevations of I 365 and B 40, respectively.

The elevation of stations thus corrected are given in Table 1.

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References

- Naruse, R. and Yokoyama, K. (1975): Position, elevation and ice thickness of stations. JARE Data Rep., 28 (Glaciol.), 7 - 47.
- Shimizu, H., Naruse, R., Omoto, K. and Yoshimura, A. (1972): Position of stations, surface elevation and thickness of the ice sheet, and snow temperature at 10 m depth in the Mizuho Plateau-West Enderby Land area, East Antarctica, 1969 - 1971. JARE Data Rep., 17 (Glaciol.), 12 - 37.
- Watanabe, O., Satow, K. and Inoue, M. (1977): Positions and elevations of stations along the Highland Traverse and items of observation conducted there, 1974 - 1975. JARE Data Rep., 36 (Glaciol.), 7 - 13.

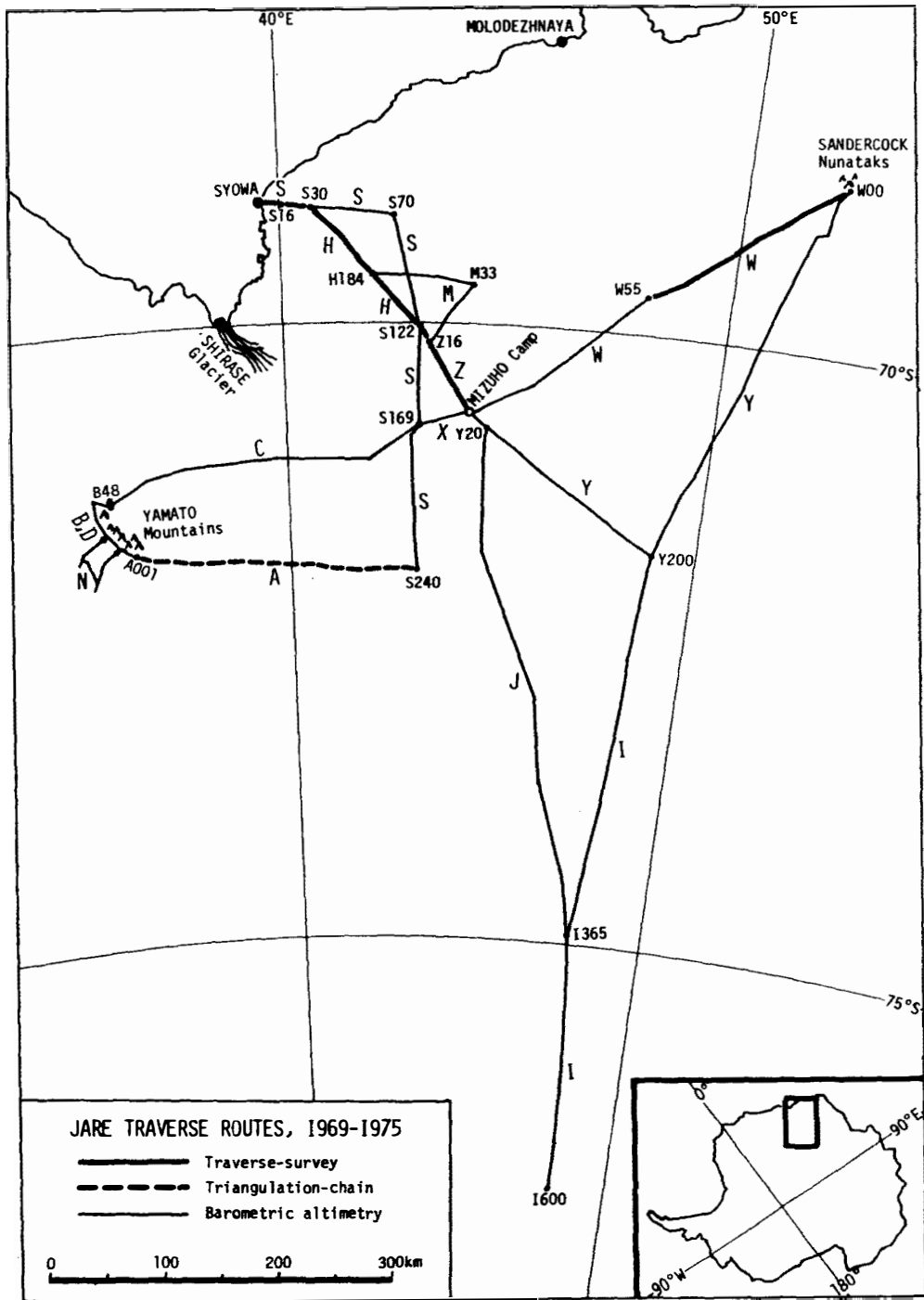


Fig. 1. JARE oversnow traverse routes in Mizuho Plateau-West Enderby Land, 1969 - 1975. Capital letter gives the name of the route.

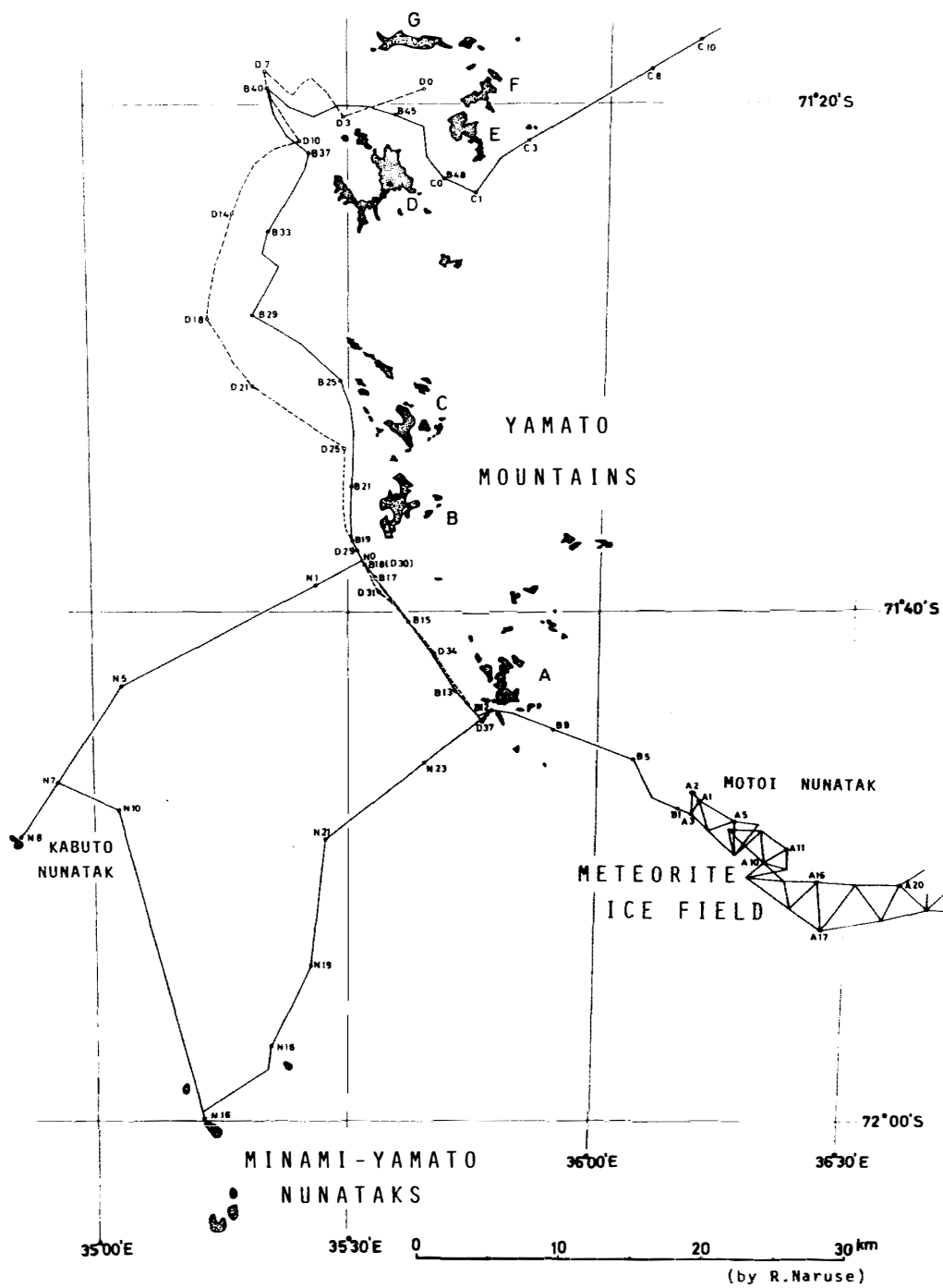


Fig. 2. JARE oversnow traverse routes in Yamato Mountains area, 1969 - 1970 and 1973 - 1974. Route A (a triangulation-chain) was set up in 1969, Routes B and C in 1970, and Routes D and N in 1973. Capital letters A ... G indicate the massif of the Yamato Mountains.

Table 1. Corrected elevation of stations in Mizuho Plateau- West Enderby Land, 1976.

* : A station of which elevation (specific elevation for Routes A and W) was surveyed by means of either traverse-survey or triangulation-chain.

Station	Surface elevation (m)	Station	Surface elevation (m)	Station	Surface elevation (m)	Station	Surface elevation (m)
* S15-1	510	S40	1,142	S75	1,477	S110	1,749
* 16	554	41	1,155	76	1,486	111	1,777
* 16-3	578	42	1,169	77	1,493	112	1,790
17	597	43	1,179	78	1,502	113	1,801
* 17-3	600	44	1,196	79	1,511	114	1,808
18	618	45	1,211	80	1,516	115	1,813
* 18-3	627	46	1,220	81	1,520	116	1,818
* 19	638	47	1,217	82	1,533	117	1,829
20	659	48	1,233	83	1,543	118	1,872
* 20-3	683	49	1,241	84	1,563	119	1,889
21	708	50	1,249	85	1,567	120	1,901
* 21-3	740	51	1,251	86	1,571	121	1,907
22	757	52	1,261	87	1,580	* 122	1,910
* 22-1	764	53	1,267	88	1,589	123	1,916
23	788	54	1,294	89	1,597	124	1,922
* 23-4	814	55	1,306	90	1,607	125	1,932
24	831	56	1,309	91	1,616	126	1,939
* 24-1	843	57	1,312	92	1,615	127	1,942
* 25	868	58	1,323	93	1,618	128	1,943
26	895	59	1,343	94	1,627	129	1,956
* 26-5	915	60	1,369	95	1,636	130	1,955
27	919	61	1,372	96	1,643	131	1,962
28	942	62	1,378	97	1,654	132	1,979
* 28-1	945	63	1,386	98	1,663	133	1,978
29	962	64	1,394	99	1,667	134	1,972
* 30	988	65	1,400	100	1,680	135	1,963
31	1,008	66	1,405	101	1,681	136	1,968
32	1,022	67	1,402	102	1,686	137	1,977
33	1,042	68	1,419	103	1,694	138	1,978
34	1,058	69	1,421	104	1,702	139	1,979
35	1,075	70	1,428	105	1,707	140	1,988
36	1,093	71	1,443	106	1,712	141	1,996
37	1,103	72	1,450	107	1,725	142	1,997
38	1,118	73	1,460	108	1,736	143	1,998
39	1,129	74	1,463	109	1,743	144	1,998

Station	Surface elevation (m)	Station	Surface elevation (m)	Station	Surface elevation (m)	Station	Surface elevation (m)
S145	1,996	S180	2,123	S215	2,422	*A018	2,425
146	2,003	181	2,133	216	2,425	*020	2,436
147	2,007	182	2,148	217	2,436	*022	2,423
148	2,004	183	2,181	218	2,449	*023	2,430
149	2,005	184	2,187	219	2,451	*025	2,425
150	2,022	185	2,162	220	2,458	*027	2,424
151	2,025	186	2,198	221	2,470	*029	2,443
152	2,029	187	2,206	222	2,481	*031	2,458
153	2,030	188	2,207	223	2,491	*033	2,457
154	2,037	189	2,221	224	2,501	*035	2,469
155	2,043	190	2,228	225	2,510	*037	2,474
156	2,048	191	2,231	226	2,516	*039	2,467
157	2,052	192	2,243	227	2,521	*041	2,459
158	2,055	193	2,255	228	2,533	*043	2,452
159	2,056	194	2,259	229	2,542	*045	2,446
160	2,058	195	2,256	230	2,554	*047	2,457
161	2,062	196	2,265	231	2,559	*049	2,460
162	2,069	197	2,288	232	2,563	*051	2,462
163	2,074	198	2,299	233	2,570	*053	2,457
164	2,082	199	2,305	234	2,576	*055	2,453
165	2,083	200	2,309	235	2,582	*057	2,447
166	2,069	201	2,308	236	2,598	*059	2,440
167	2,074	202	2,309	237	2,615	*061	2,445
168	2,073	203	2,322	238	2,622	*063	2,435
169	2,083	204	2,342	239	2,628	*065	2,432
170	2,082	205	2,351	*240	2,639	*067	2,452
171	2,074	206	2,358	*A001	2,302	*069	2,454
172	2,088	207	2,360	*002	2,327	*071	2,465
173	2,082	208	2,363	*003	2,299	*073	2,462
174	2,066	209	2,365	*004	2,317	*075	2,460
175	2,084	210	2,380	*006	2,366	*077	2,466
176	2,111	211	2,390	*008	2,334	*079	2,472
177	2,112	212	2,394	*010	2,386	*081	2,468
178	2,109	213	2,404	*014	2,399	*083	2,478
179	2,110	214	2,417	*016	2,418	*085	2,492

Station	Surface elevation (m)	Station	Surface elevation (m)	Station	Surface elevation (m)	Station	Surface elevation (m)
*A087	2484	*A158	2,588	B32	1,742	C19	1,810
* 089	2,475	* 160	2,613	33	1,728	20	1,812
* 091	2,474	* 162	2,633	34	1,711	21	1,814
* 093	2,465	*164(S240)	2,639	35	1,697	22	1,804
* 095	2,501	B 1	2,290	36	1,683	23	1,807
* 097	2,501	2	2,272	37	1,680	24	1,819
* 099	2,511	3	2,265	38	1,691	25	1,830
* 101	2,517	4	2,250	39	1,686	26	1,827
* 103	2,521	5	2,230	40	1,689	27	1,834
* 105	2,527	6	2,218	41	1,678	28	1,835
* 107	2,529	7	2,204	42	1,695	29	1,835
* 109	2,533	8	2,192	43	1,719	30	1,840
* 111	2,547	9	2,191	44	1,719	31	1,846
* 113	2,546	10	2,205	45	1,733	32	1,846
* 115	2,555	11	2,170	46	1,753	33	1,847
* 117	2,559	12	2,039	47	1,791	34	1,845
* 119	2,552	13	1,981	48(C0)	1,848	35	1,849
* 121	2,578	14	1,966	C 1	1,861	36	1,851
* 123	2,577	15	1,936	2	1,880	37	1,853
* 125	2,581	16	1,925	3	1,896	38	1,854
* 127	2,583	17	1,905	4	1,876	39	1,856
* 129	2,569	18	1,895	5	1,856	40	1,861
* 131	2,568	19	1,867	6	1,844	41	1,863
* 133	2,562	20	1,848	7	1,842	42	1,859
* 135	2,557	21	1,841	8	1,838	43	1,856
* 137	2,557	22	1,813	9	1,827	44	1,855
* 139	2,551	23	1,798	10	1,816	45	1,847
* 141	2,548	24	1,788	11	1,812	46	1,841
* 143	2,539	25	1,772	12	1,805	47	1,847
* 145	2,575	26	1,761	13	1,802	48	1,841
* 147	2,584	27	1,753	14	1,806	49	1,840
* 149	2,590	28	1,752	15	1,811	50	1,844
* 151	2,583	29	1,753	16	1,807	51	1,834
* 153	2,581	30	1,766	17	1,807	52	1,816
* 156	2,592	31	1,748	18	1,816	53	1,805

Station	Surface elevation (m)	Station	Surface elevation (m)	Station	Surface elevation (m)	Station	Surface elevation (m)
C 54	1,811	C 89	1,854	C 124	2,030	D 8	1,692
55	1,805	90	1,850	125	2,016	9	1,688
56	1,793	91	1,853	126	2,006	10	1,685
57	1,778	92	1,849	127	2,011	11	1,682
58	1,773	93	1,835	128	2,013	12	1,684
59	1,769	94	1,842	129	2,014	13	1,704
60	1,777	95	1,844	130	2,026	14	1,720
61	1,792	96	1,838	131	2,033	15	1,728
62	1,797	97	1,857	132	2,042	16	1,748
63	1,796	98	1,872	133	2,052	17	1,758
64	1,789	99	1,886	134	2,051	18	1,760
65	1,785	100	1,871	135	2,046	19	1,762
66	1,789	101	1,875	136	2,041	20	1,774
67	1,788	102	1,875	137	2,036	21	1,777
68	1,767	103	1,886	138	2,042	22	1,776
69	1,791	104	1,885	139	2,048	23	1,784
70	1,795	105	1,884	140	2,050	24	1,786
71	1,761	106	1,901	141	2,054	25	1,804
72	1,781	107	1,904	142	2,060	26	1,818
73	1,782	108	1,908	143	2,064	27	1,832
74	1,781	109	1,923	144	2,073	28	1,848
75	1,797	110	1,937	145	2,079	29	1,874
76	1,801	111	1,938	146	2,077	30(B18)	1,895
77	1,799	112	1,937	147	2,088	31	1,917
78	1,805	113	1,965	148	2,102	32	1,929
79	1,820	114	1,982	149	2,092	33	1,942
80	1,815	115	1,978	S 170	2,082	34	1,966
81	1,815	116	1,967	D 0	1,726	35	1,968
82	1,823	117	1,952	1	1,739	36	2,008
83	1,828	118	1,985	2	1,730	37	2,054
84	1,841	119	2,017	3	1,719	38(B12)	2,039
85	1,842	120	2,032	4	1,692	*S 30	988
86	1,847	121	2,039	5	1,692	H 0	990
87	1,865	122	2,039	6	1,699	* 6-1	1,021
88	1,865	123	2,041	7	1,690	12	1,022

Station	Surface elevation (m)	Station	Surface elevation (m)	Station	Surface elevation (m)	Station	Surface elevation (m)
*H 17	1.035	H134	1.387	H216	1.625	H294	1.873
* 20-1	1.050	136	1.392	* 219	1.630	* 295-1	1.881
* 27	1.071	* 137	1.396	222	1.641	298	1.883
* 34-1	1.090	140	1.408	* 225	1.649	* 302	1.896
39	1.096	* 143	1.416	226	1.655	304	1.898
* 45	1.124	146	1.425	230	1.659	*S122	1.910
* 48-1	1.133	* 148-1	1.441	* 231	1.667	Y200	2.880
54	1.143	150	1.440	234	1.670	I 10	2.890
* 59	1.145	* 155	1.465	* 237	1.684	20	2.907
62	1.168	156	1.468	238	1.687	30	2.917
* 65	1.162	* 159	1.488	240	1.692	40	2.934
68	1.176	160	1.486	* 243	1.696	50	2.943
* 70	1.186	164	1.483	* 245-1	1.715	60	2.968
72	1.187	* 166	1.492	250	1.732	70	2.977
* 74-1	1.207	168	1.487	* 251-1	1.736	80	3.000
* 77	1.217	172	1.508	* 253	1.739	90	3.009
80	1.224	* 174	1.524	254	1.740	100	3.026
* 83	1.243	176	1.529	* 256	1.742	110	3.040
* 84	1.247	* 178	1.536	258	1.742	120	3.058
86	1.245	180	1.540	260	1.748	130	3.086
* 89	1.256	182	1.546	* 262	1.759	140	3.105
* 93	1.270	* 184	1.546	264	1.759	150	3.121
* 97-1	1.280	186	1.556	* 266	1.769	160	3.134
100	1.298	* 189	1.556	268	1.769	170	3.162
* 101-1	1.309	192	1.562	270	1.780	180	3.166
* 104-1	1.322	* 194	1.560	* 272	1.789	190	3.166
106	1.321	196	1.571	274	1.798	200	3.176
110	1.318	* 198	1.572	* 275-1	1.804	210	3.184
* 113-1	1.339	200	1.586	278	1.806	220	3.174
* 114-1	1.344	* 201	1.586	280	1.811	230	3.197
116	1.341	204	1.596	* 283	1.827	240	3.203
120	1.360	* 207	1.602	286	1.840	250	3.211
* 124	1.373	209	1.607	* 289	1.857	260	3.219
* 127	1.378	212	1.615	290	1.865	270	3.222
* 131-1	1.385	* 213	1.617	* 291-1	1.869	280	3.240

Station	Surface elevation (m)	Station	Surface elevation (m)	Station	Surface elevation (m)	Station	Surface elevation (m)
I 290	3,246	J 110	3,229	J 420	2,484	M 28	2,103
300	3,266	120	3,213	430	2,455	29	2,125
310	3,271	140	3,186	440	2,431	30	2,151
320	3,284	145	3,179	450	2,386	Peak A	2,168
330	3,284	150	3,176	460	2,375	31	2,152
340	3,290	160	3,155	480	2,348	32	2,154
350	3,299	170	3,151	482 (Y20)	2,333	33	2,143
360	3,308	180	3,140	Z 16	1,988	34	2,103
370	3,312	190	3,126	M 1	1,992	35	2,075
380	3,322	200	3,107	2	1,997	36	2,071
390	3,328	210	3,085	3	2,004	37	2,066
300	3,329	220	3,041	4	2,010	Peak B	2,100
410	3,333	225	3,039	5	2,021	38	2,049
420	3,355	230	3,034	6	2,028	39	2,022
430	3,362	240	2,987	7	2,043	40	2,015
440	3,369	250	2,962	8	2,039	41	2,026
450	3,362	260	2,904	9	2,045	42	2,032
460	3,369	270	2,886	10	2,050	43	2,030
470	3,365	275	2,867	11	2,058	44	2,085
480	3,380	280	2,856	12	2,060	45	2,017
500	3,385	290	2,849	13	2,055	46	1,999
530	3,403	300	2,798	14	2,062	47	1,967
540	3,404	310	2,797	15	2,066	48	1,937
570	3,406	318	2,799	16	2,070	49	1,901
600	3,408	320	2,783	17	2,087	50	1,893
J0(I365)	3,309	330	2,741	18	2,099	51	1,866
10	3,307	340	2,697	19	2,110	52	1,825
20	3,305	350	2,667	20	2,117	53	1,825
30	3,304	360	2,637	21	2,118	54	1,787
40	3,302	364	2,613	22	2,127	55	1,784
50	3,299	370	2,603	23	2,122	56	1,780
60	3,290	380	2,565	24	2,124	57	1,765
70	3,279	390	2,551	25	2,119	58	1,751
95	3,253	400	2,523	26	2,115	59	1,731
100	3,245	408	2,504	27	2,109	60	1,737

Station	Surface elevation (m)	Station	Surface elevation (m)	Station	Surface elevation (m)	Station	Surface elevation (m)
M 61	1,739	N16	2,134	*W27	1,938	W235	2,338
62	1,740	17	2,116	* 28	1,932	240	2,346
63	1,713	18	2,106	* 29	1,917	245	2,359
64	1,705	19	2,090	* 30	1,908	250	2,373
65	1,700	21	2,070	* 31	1,919	255	2,377
66	1,696	22	2,060	* 32	1,920	260	2,399
67	1,672	23	2,043	* 33	1,912	265	2,403
68	1,650	24(B12)	2,039	* 34	1,925	270	2,400
69	1,635	*W 0. (Sandercock, Nunatak)	2,162	* 35	1,933	275	2,401
70	1,613	* 1	2,122	* 36	1,933	280	2,405
71	1,613	* 2	2,129	* 37	1,929	285	2,403
72	1,600	* 3	2,122	* 38	1,925	290	2,398
73	1,591	* 4	2,128	* 39	1,896	295	2,391
74	1,589	* 5	2,125	* 40	1,901	300	2,383
75	1,582	* 6	2,124	* 41	1,894	305	2,374
76	1,578	* 7	2,112	* 42	1,948	310	2,362
77	1,571	* 8	2,106	* 43	1,946	315	2,349
78	1,555	* 9	2,093	* 44	1,941	320	2,352
79	1,557	* 10	2,080	* 45	1,940	325	2,352
*H184	1,546	* 11	2,072	* 46	1,958	330	2,348
B 18	1,895	* 12	2,043	* 47	2,020	335	2,349
N 0	1,884	* 13	2,023	* 48	2,028	340	2,339
2	1,882	* 14	2,020	* 49	2,028	345	2,326
3	1,880	* 15	2,010	* 50	2,060	350	2,313
4	1,892	* 16	1,993	* 51	2,080	355	2,307
5	1,906	* 17	2,000	* 52	2,121	360	2,284
6	1,890	* 18	1,997	* 53	2,142	365	2,282
7	1,910	* 19	2,004	* 54	2,144	370	2,270
8	1,917	* 20	1,968	*55(W 200)	2,168	375	2,260
10	1,958	* 21	1,967	205	2,189	*Mizuho	2,230
11	1,982	* 22	1,970	210	2,253	*Mizuho	2,230
12	2,024	* 23	1,951	215	2,272	X 1	2,203
13	2,044	* 24	1,946	220	2,309	2	2,197
14	2,062	* 25	1,944	225	2,316	4	2,176
15	2,091	* 26	1,942	230	2,315	6	2,169

Station	Surface elevation (m)	Station	Surface elevation (m)	Station	Surface elevation (m)	Station	Surface elevation (m)
X 8	2,155	Y140	2,716	Y315	2,662	Y490	2,179
10	2,151	145	2,736	320	2,665	495	2,180
12	2,142	150	2,754	325	2,652	500	2,187
14	2,123	155	2,763	330	2,646	505	2,187
16	2,115	160	2,768	335	2,638	510	2,169
18	2,104	165	2,780	340	2,629	515	2,152
S169	2,083	170	2,781	345	2,616	520	2,153
*Mizuho	2,230	175	2,830	350	2,602	525	2,168
Y 5	2,263	180	2,838	355	2,593	530	2,179
10	2,288	185	2,839	360	2,588	535	2,167
15	2,310	190	2,870	365	2,575	540	2,158
20	2,333	195	2,876	370	2,564	545	2,160
25	2,347	200	2,880	375	2,552	550	2,156
30	2,375	205	2,874	380	2,536	555	2,147
35	2,403	210	2,868	385	2,521	560	2,135
40	2,420	215	2,855	390	2,494	565	2,122
45	2,433	220	2,853	395	2,477	570	2,118
50	2,456	225	2,846	400	2,460	573	2,113
55	2,477	230	2,835	405	2,449	Sandercock Camp	2,117
60	2,499	235	2,825	410	2,427	*S122	1,910
65	2,505	240	2,820	415	2,417	Z 1	1,919
70	2,524	245	2,807	420	2,405	* 2	1,926
75	2,539	250	2,794	425	2,396	3	1,936
80	2,551	255	2,781	430	2,383	4	1,946
85	2,572	260	2,760	435	2,378	* 4-1	1,953
90	2,584	265	2,740	440	2,367	5	1,954
95	2,596	270	2,737	445	2,354	6	1,962
100	2,606	275	2,733	450	2,332	* 6-1	1,966
105	2,623	280	2,727	455	2,297	7	1,964
110	2,640	285	2,709	460	2,280	* 8	1,971
115	2,650	290	2,696	465	2,269	9	1,971
120	2,664	295	2,704	470	2,265	10	1,973
125	2,670	300	2,690	475	2,242	11	1,978
130	2,683	305	2,677	480	2,252	* 11-1	1,984
135	2,705	310	2,681	485	2,229	12	1,983

Station	Surface elevation (m)	Station	Surface elevation (m)	Station	Surface elevation (m)	Station	Surface elevation (m)
Z 13	1,981	Z 43	2,079	Z 74	2,163	* Mizuho	2,230
14	1,981	44	2,082	* 75	2,159		
15	1,983	45	2,086	76	2,159		
* 15-1	1,984	46	2,087	77	2,159		
16	1,988	* 46-1	2,107	78	2,160		
17	1,996	47	2,090	79	2,161		
18	2,006	48	2,087	* 79-2	2,166		
* 19	2,010	49	2,086	80	2,161		
20	2,013	50	2,085	81	2,162		
21	2,014	51	2,084	* 81-2	2,167		
22	2,016	52	2,084	82	2,161		
* 22-1	2,011	53	2,081	83	2,161		
23	2,020	* 53-1	2,104	84	2,161		
24	2,026	54	2,085	* 85	2,161		
25	2,031	55	2,086	86	2,163		
* 26	2,036	56	2,087	87	2,165		
27	2,041	57	2,090	88	2,169		
28	2,048	58	2,093	* 88-1	2,171		
* 29	2,052	59	2,097	89	2,172		
30	2,056	60	2,100	* 90	2,176		
* 31	2,059	* 60-1	2,118	91	2,179		
32	2,062	61	2,103	* 92	2,181		
* 33	2,064	62	2,107	93	2,183		
34	2,068	63	2,110	* 94	2,186		
* 35	2,070	64	2,115	95	2,188		
36	2,076	65	2,119	96	2,192		
* 37	2,074	* 66	2,133	97	2,195		
38	2,080	67	2,135	* 97-2	2,201		
* 38-1	2,089	68	2,136	98	2,199		
39	2,084	69	2,137	99	2,198		
* 39-1	2,095	* 70	2,139	100	2,199		
40	2,083	71	2,143	* 101	2,202		
41	2,080	72	2,146	102	2,208		
42	2,079	73	2,150	103	2,216		
* 42-1	2,097	* 73-1	2,157	104	2,226		

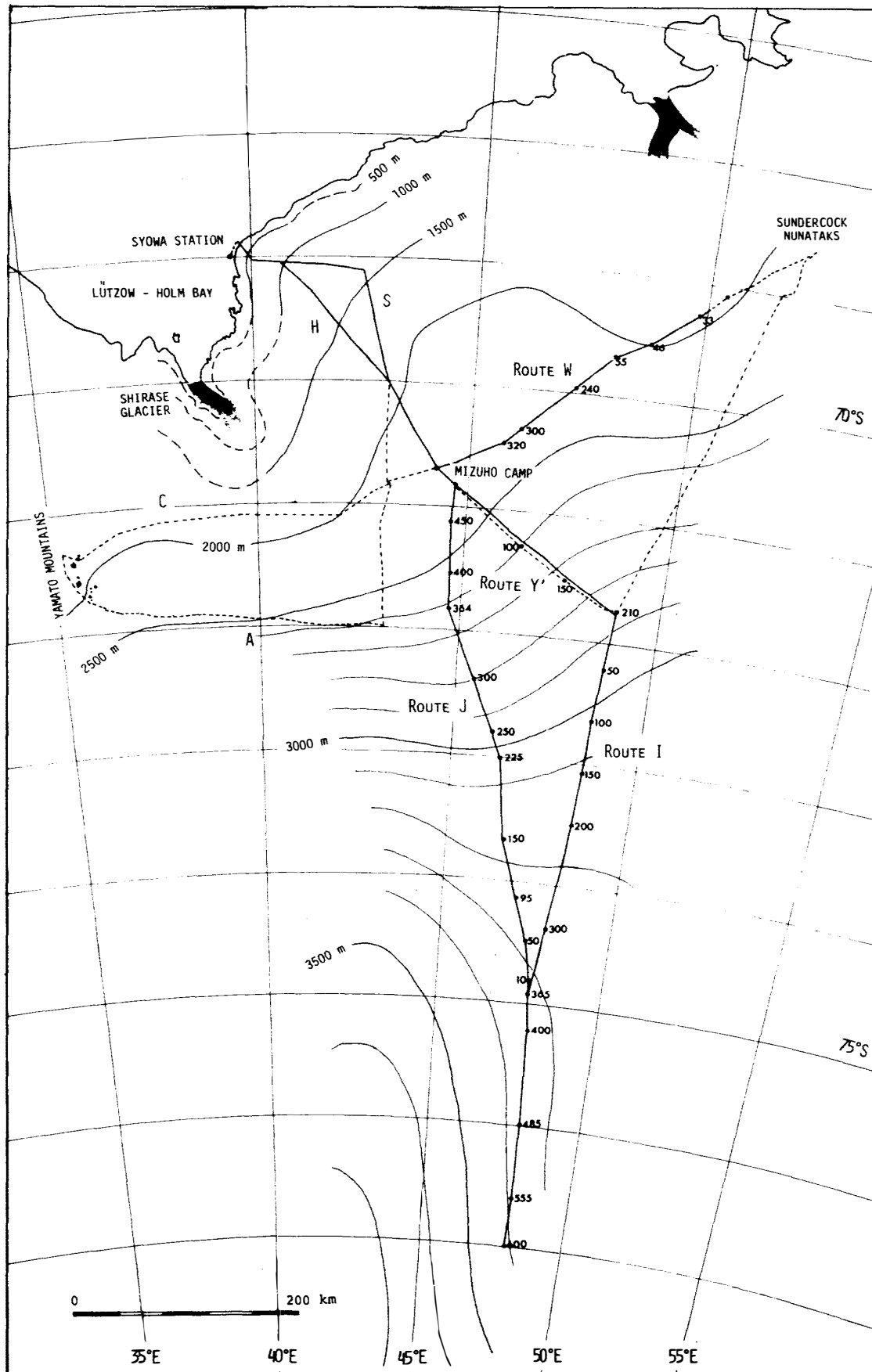


Fig. A. A map of the routes of the oversnow traverses by JARE-15 in Mizuho Plateau-West Enderby Land area, 1974-1975. Thick lines by JARE-15.