

Glaciological Data
Collected by the 30th, 31st and 32nd
Japanese Antarctic Research Expeditions
in 1989-1991

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1. Outline of the Glaciological Field Work in 1989-1991

Glaciological field observations were carried out on Mizuho Plateau and around Asuka Station by the 30th, 31st and 32nd Japanese Antarctic Research Expeditions in 1989, 1990 and 1991 respectively. Glaciological observations related to sea ice studies and satellite data reception were done as a part of the ACR (Antarctic Climate Research) project during this period, but those data are not presented in this report.

The 30th party carried out four oversnow traverses from Syowa to Mizuho Stations to measure snow stakes along the route, to maintain the unmanned meteorological station set up at Mizuho and to measure gravity and total intensity of the geomagnetic field.

At and around Asuka Station, they did glaciological field work both in summer and winter. In the summer of 1988/1989, a test of an ice core drill developed for deep ice coring at Dome Fuji was conducted on blue ice near Seal Rock. Observation on ice sheet dynamics and sampling of snow were carried out on Nansen Ice Field and a mountain glacier in the Sør Rondane Mountains with the Norwegian glaciologist, Dr. Y. Gjessing. In winter, they did routine observations of snow accumulation with both 16- and 36-stake farms and obtained a 103-m deep core with an electromechanical drill. Other shallow ice corings were carried out to depths of 65 m at L0 Point and 50 m at A165 on Nansen Ice Field.

The 31st party conducted two traverses from Syowa to Mizuho for similar purposes. They tested a deep ice core drill on Jenningsbreen and conducted glaciological observations related to mass balance and glacier flow in the Sør Rondane Mountains in the summer of 1989/1990 (Motoyama and Azuma, 1990). At Asuka Station, they continued snow accumulation observations with a 36-snow stake farm through the winter.

The 32nd JARE extended the oversnow traverse route 372 km from Mizuho Station toward the summit of Dome Fuji. The location of the new route, MD, was reported in the JARE Data Reports (Kamiyama *et al.*, 1994). They conducted three oversnow traverses from Syowa to and beyond Mizuho and snow stake measurements along the route and at Mizuho. Shallow ice coring to a depth of 120 m was carried out at H15 (69°04'46"S, 40°46'54"E, 1050 m a.s.l.). Aerophotographs were taken along the ice sheet margin from Akarui Point (68°28'S, 41°26'E) to Kaya Glacier (69°50'S, 37°06'E) for the purpose of the study on ice sheet fluctuation.

At Asuka Station, snow accumulation measurement was continued until the middle of December 1991, when the station was unmanned. The oversnow traverse was planned and conducted from Asuka to Syowa through Advance Camp (74°12'02"S, 34°59'08"E, 3193 m a.s.l.) and Mizuho in December 1991-January 1992.

The outlines of the glaciological field activities are involved in each expedition report as follows; for JARE-30 by Ejiri and Meshida (1991), for JARE-31 by Shiraishi (1992) and for JARE-32 by Fujii (1992) and Makita (1993). Tables 1-1 and 1-2 summarize the oversnow traverses carried out by JARE-30, -31 and -32 and Figs. 1 and 2 show the routes.

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Table 1-1. Summary of the glaciological field activities carried out on Mizuho Plateau in 1989-1991.

JARE	Purpose	Period	Place	Leader
30th	traverse	Jan 7-15	S16-Mizuho	Takegawa, H.
(1989)	traverse	Sep 11-Oct 12	Syowa-Mizuho	Takegawa, H.
31st	traverse	Jan 11-20	S16-Mizuho	Kanzawa, H.
(1990)	traverse	Oct 3-15	Syowa-Mizuho	Katsuta, Y.
32nd	traverse	Jan 20-27	S16-Mizuho	Kawamura T.
(1991)	traverse	Apr 26-May18	Syowa-Mizuho	Abe, T.
	ice coring	Sep 4-13	H15	Fujii, Y.
	ice coring	Oct 2-10	H15	Fujii, Y.
	traverse	Oct 13-Dec 9	Syowa-Relay P.	Fujii, J.

Table 1-2. Summary of the glaciological field activities carried out around Asuka Station in 1989-1991.

JARE	Purpose	Period	Place	Leader
30th	traverse	Dec 26	30 mile P.-Asuka	Azuma, N.
(1989)	drill test	Jan 2-14	near Seal Rock	Azuma, N.
	traverse	Jan 15-27	Nansen Ice F.	Azuma, N.
	traverse	Jan 29-Feb 5	near Brattnipene	Azuma, N.
	ice coring	Oct 4-26	L0	Yoshida, J.
	traverse	Nov 1-27	Nansen Ice F.	Azuma, N.
31st	traverse	Dec 27	30 mile P.-Asuka	Motoyama, H.
(1990)	drill test	Jan 2-21	Jenningsbreen	Motoyama, H.
	traverse	Jan 22-28	Brattnipene	Motoyama, H.
	traverse	Mar 13-17	Mefjell	Shiraishi, K.
	traverse	May 23-29	Tvitaggen	Shiraishi, K.
	traverse	Sep 24-28	Austhjelmen	Shiraishi, K.
	traverse	Oct 26-29	Gunner Isachsen	Shiraishi, K.
	traverse	Nov 2-4	Birger Bergersen	Kagawa, J.
	traverse	Nov 12-29	Balchen	Shiraishi, K.
32nd	traverse	Dec 28	30 mile P.-Asuka	Ishizawa, K.
(1991)	traverse	Dec 22-Jan 18	Asuka-AC-S16	Ishizawa, K.

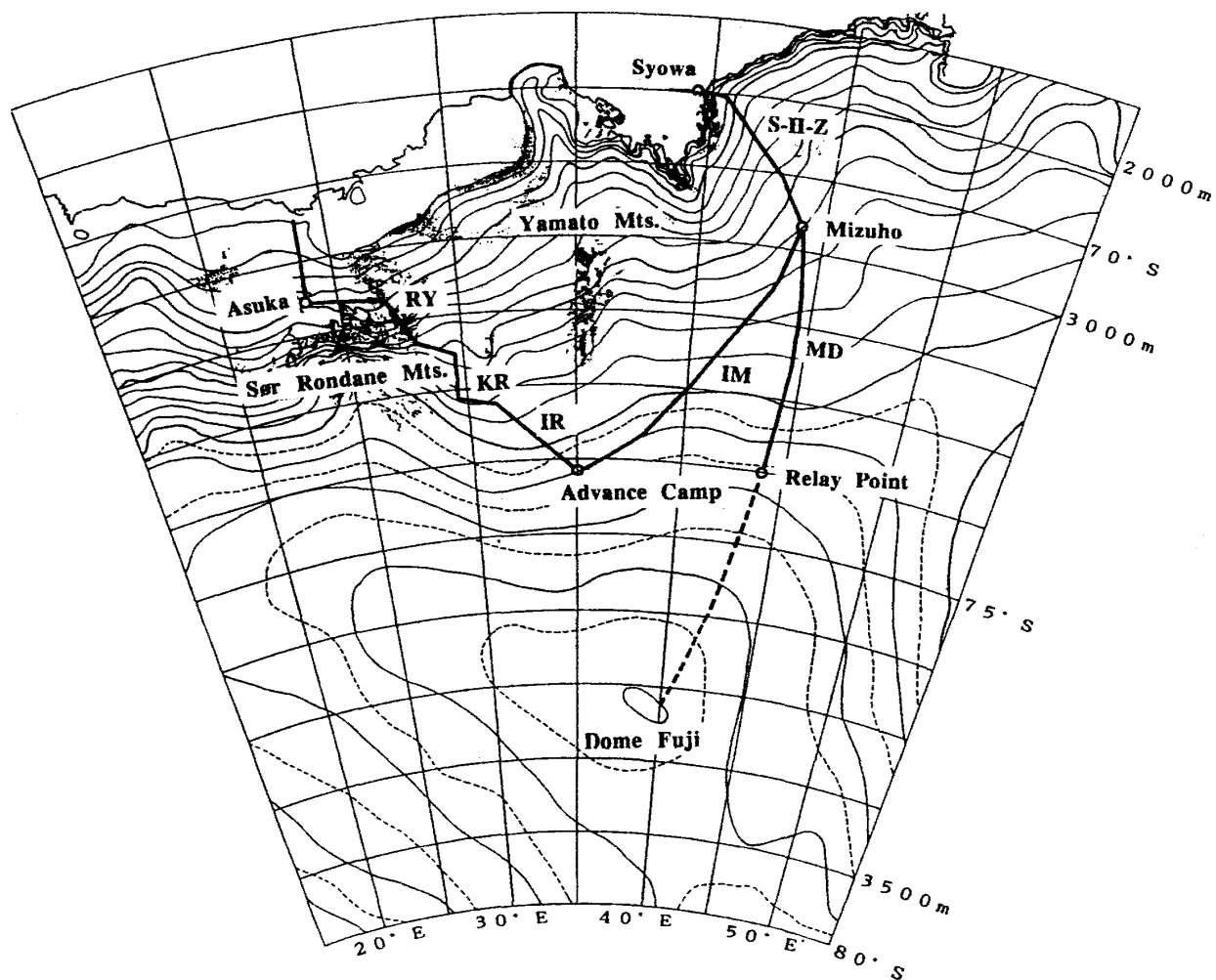


Fig. 1. Traverse routes on Mizuo Plateau and around Asuka Station carried out by JARE-30, -31 and -32 in 1989-1991.

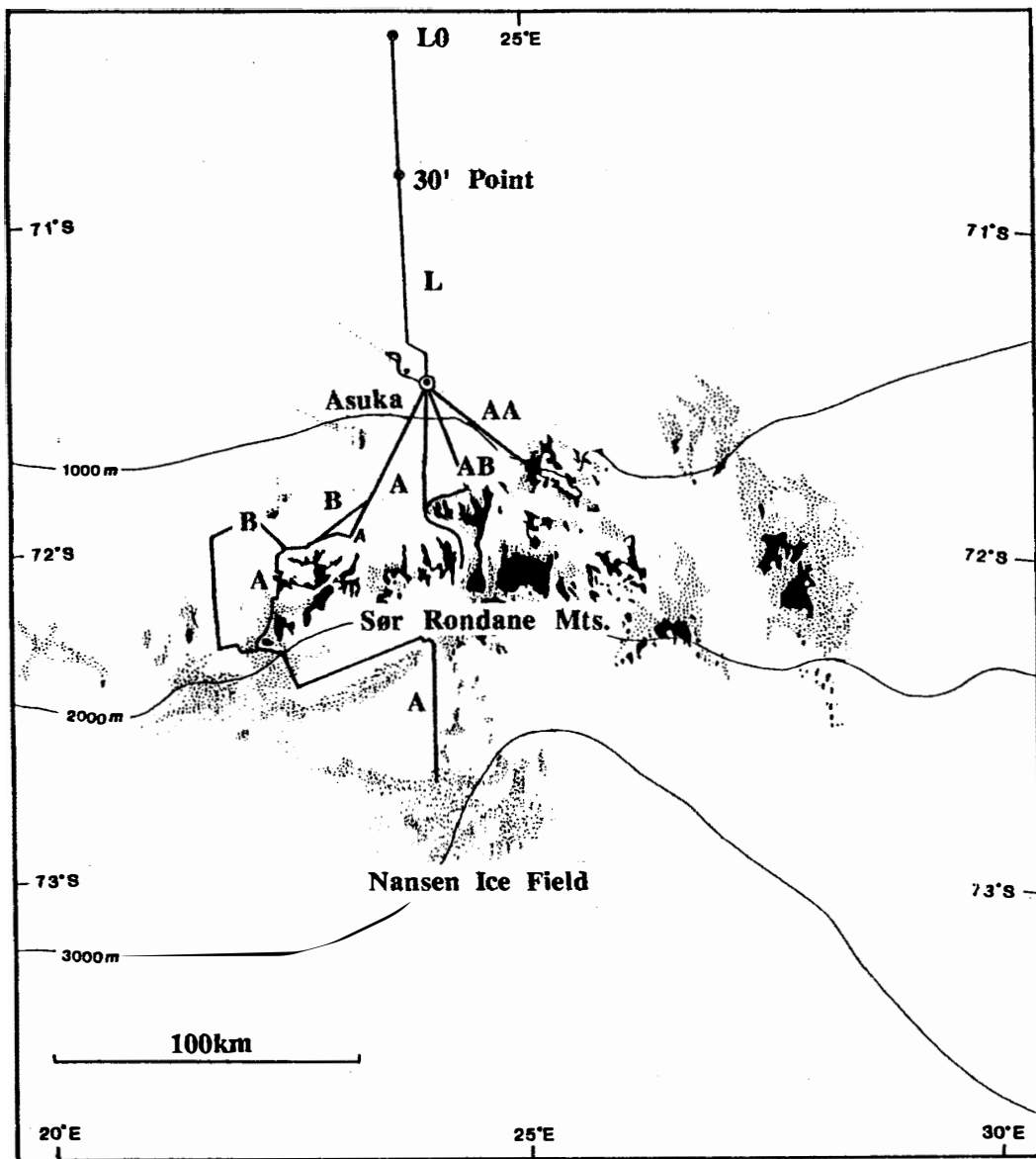


Fig. 2. Traverse routes around Asuka Station carried out by JARE-30, -31 and -32 in 1989-1991.

2. Net Accumulation of Snow on Mizuho Plateau

Observers: JARE-30 Hideo KAKEGAWA and others
JARE-31 Shuki USHIO and Seiji
SHIBATA
JARE-32 Toshiyuki KAWAMURA,
Toyoo ABE and Kazuhiro NEBU

Net accumulation of snow was measured by the snow stake method along several traverse routes during oversnow traverses on Mizuho Plateau carried out in 1989-1991 as listed in Table 1-1. The traverse routes are shown in Figs. 1 and 2.

(1) Route S-H-Z

Route S-H-Z extends from S16 to Mizuho Station. Snow stakes were set at intervals of 2 km along the traverse route. The positions are given by Naruse and Yokoyama (1975) and Watanabe *et al.* (1992). The measurements were done at least twice a year in 1989-1991; the results are shown in Tables 2-1 for 1989, 2-2 for 1990 and 2-3 for 1991.

(2) Route Tottuki

Along the route from Tottuki Point to S16, snow stakes were reset at intervals of 2 km in March 1991 and their height remeasured in September and December 1991. The results are shown in Table 2-4. The route has been used by traverse parties since 1973 but snow accumulation has not been measured yet because the stakes fell due to melting in summer and strong wind in winter. Only the snow accumulation in the coastal region was obtained before, along the route from Mukai Rock to S16, the previous route to S16, in August 1971 to January 1972 by Yamada *et al.* (1975).

(3) Route between Syowa Station and Tottuki Point

This route, set on sea ice, has been used since 1973 but the stakes were reset every year because of the difficulty of maintenance due to melting in summer and strong wind in winter. The height of snow stakes was measured on March 17 and September 4, 1991; the results are shown in Table 2-5. The snow accumulation data on sea ice were reported only before by Yamada *et al.* (1975). Snow accumulation on sea ice was measured in 1990 and 1991 as part of the ACR (Antarctic Climate Research) project

around Syowa Station and will be reported in JARE Data Reports (Glaciology) by Kawamura *et al.*

(4) Mizuho Station

Net accumulation of snow was measured with a 201- stake farm at Mizuho Station in January, May and October 1991 and is shown in Table 2-6. The stake farm consisted of two rows of stakes set at intervals of 1 m, one perpendicular and the other parallel to the direction of prevailing wind. They cross each other, forming an X shape as shown in Fig. 2 of Ageta *et al.* (1987). Some of them have been buried in snow and could not be measured in 1991.

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Table 2-1. Net accumulation of snow along Route S-H-Z in 1989.

		(depth in cm)		
PERIOD		DEC. 1988 - SEP. 1989	SEP. 1989 - JAN. 1990	DEC. 1988 - JAN. 1990
		252-268	117-122	376-385
STAKE	NO	DAYS	DAYS	DAYS
S	16			27
	17	57.5	11.5	69
	18	63	-2	61
	19	64	9	73
	20	107	10	117
	21	59.5	-3.5	56
	22	105.5	1.5	107
	23	92	-22	70
	24	69	-6	63
	25	64.5	-6.5	58
	26	67.5	15.5	83
	27	49	9	58
	28	67.5	-2.5	65
	29	62.5	-6.5	56
	30	75	11	86
H	3	61.5	8.5	70
	9	49	10	59
	15	67.5	7.5	75
	21	63	-14	49
	27	53.5	15.5	69
	35	58.5	2.5	61
	42	56	-2	54
	48	34	35	69
	54	55.5	-1.5	54
	60	64	7	71
	64	38.5	5	43.5
	68	22.5	-7	15.5
	72	73.5	8.5	82
	76	39	-4	35
	80	46	-7.5	38.5
	84	35	-2.5	32.5
	88	42	2.5	44.5
	92	43	-3	40
	96	43	2	45

(depth in cm)

PERIOD	DEC. 1988 -	SEP. 1989 -	DEC. 1988 -
	SEP. 1989	JAN. 1990	JAN. 1990
STAKE NO	252-268	117-122	376-385
	DAYS	DAYS	DAYS
100	31	0	31
104	38	-3	35
108	36.5	-4.5	32
112	44	-2	42
116	28	10.5	38.5
120	21.5	10	31.5
124	28	-3	25
128	29	0	29
132	45.5	-6	39.5
136	40.5	2	42.5
140	30	-2	28
144	20	-7.5	12.5
148	37	-9	28
152	35.5	-7.5	28
156	23	-12	11
160	22	-2.5	19.5
164	32	-7	25
168	48.5	-4.5	44
172	11	5	16
176	34	-13	21
180	48.5	-7	41.5
184	39.5	-6.5	33
188	36	-3.5	32.5
192	47.5	5	52.5
196	34.5	3.5	38
200	32	-5	27
204	42	-6	36
208	27	-4	23
212	39	-1	38
216	37	1.5	38.5
220	29	-15	14
224	16	5	21
228	38	-3	35
232	30	-4	26

(depth in cm)

PERIOD	DEC. 1988-	SEP. 1989-	DEC. 1988-
	SEP. 1989	JAN. 1990	JAN. 1990
STAKE NO	252-268	117-122	376-385
	DAYS	DAYS	DAYS
236	26.5	-10	16.5
240	31.5	-0.5	31
244	15	1	16
248	32	-3.5	28.5
252	33	-7.5	25.5
256	50	-1	49
260	26	-7	19
264	55	-1	54
268	51	6	57
272	64	-8	56
276	46	-5.5	40.5
280	27.5	-3.5	24
284	45	-7	38
288	29	-6	23
293	28.5	-5	23.5
297	37.5	-5	32.5
301	11	-3.5	7.5
S 122	16.5	2	18.5
Z 2	16.5	-4.5	12
4	9.5	24	33.5
6	4	-4.5	-0.5
8	43	-6	37
10	13	5	18
12	1	-6	-5
14	68	-3	65
16	37	-9	28
18	4	-5	-1
20	21	-5	16
22	22	-4	18
24	17	3.5	20.5
26	2	-7.5	-5.5
28	39	-8	31
30	13	-4.5	8.5
32	5	-5	0

(depth in cm)

PERIOD	DEC. 1988 -	SEP. 1989 -	DEC. 1988 -
	SEP. 1989	JAN. 1990	JAN. 1990
STAKE NO	252-268	117-122	376-385
	DAYS	DAYS	DAYS
34	1	-3.5	-2.5
36	3	-8.5	-5.5
38	9	-5	4
40	-1	-0.5	-1.5
42	-2	-6	-8
46	3	-6.5	-3.5
50	5	40	45
54	42	-9	33
58	41	-9	32
62	33	0.5	33.5
66	-2	4	2
70	-2	-5	-7
72	44	-7.5	36.5
74	21	4.5	25.5
76	0	2	2
78	51	-5	46
80	11	0	11
82	8	-4	4
84	12	2.5	14.5
86	-2	-3	-5
88	7	-5	2
90	7	-6	1
92	16	1.5	17.5
94	9	-7	2
96	14	3	17
98	-1	-4.5	-5.5
100	-2	-1.5	-3.5
102	-2	-4.5	-6.5

Table 2-2. Net accumulation of snow along Route S-H-Z in 1990.

		(depth in cm)			
PERIOD		JAN. 1990 -	OCT. 1990 -	JAN. 1990 -	
		OCT. 1990	JAN. 1991	JAN. 1991	
		265-266	108-109	374-375	
STAKE	NO	DAYS	DAYS	DAYS	
S	16	33	-1	32	
	17	65.5	-4.5	61	
	18	89	-2	87	
	19	89	5.5	94.5	
	20	80	7	87	
	21	80.5	-11.5	69	
	22	137	-2	135	
	23	119.5	5	124.5	
	24	100	12	112	
	25	101	7	108	
	26	85	0.5	85.5	
	27	75	0.5	75.5	
	28	77.5	-8	69.5	
	29	78.5	18.5	97	
	30	90	5.5	95.5	
	H	3	94	1	95
		9	80.5	-10.5	70
		15	91.5	-4.5	87
		21	85	-6.5	78.5
		27	84	-8	76
		35	89.5	5	94.5
		42	46	1	47
		48	93.5	7	100.5
		54	64.5	0.5	65
		60	52	-5	47
		64	66	-3.5	62.5
		68	30.5	-4	26.5
		72	97	7	104
		76	64.5	-13	51.5
		80	62.5	-11	51.5
84		57.5	-3	54.5	
88	64	-9.5	54.5		
92	59	-6	53		
96	58	-7.5	50.5		

(depth in cm)			
PERIOD	JAN. 1990 -	OCT. 1990 -	JAN. 1990 -
	OCT. 1990	JAN. 1991	JAN. 1991
STAKE NO	265-266	108-109	374-375
	DAYS	DAYS	DAYS
100	55	-4	51
104	50	-4	46
108	43	11	54
112	51	-1	50
116	51.5	-10	41.5
120	51	-9.5	41.5
124	20	3	23
128	59	-2	57
132	53.5	-1	52.5
136	33	0	33
140	65.5	-5.5	60
144	46.5	-4	42.5
148	47	-3	44
152	28	-3	25
156	33	9	42
160	41	-5.5	35.5
164	58.5	8.5	67
168	50	-3	47
172	45	8	53
176	40.5	0.5	41
180	27	12	39
184	40.5	0.5	41
188	40	-2.5	37.5
192	33	1	34
196	62	2	64
200	28.5	5.5	34
204	34	4.5	38.5
208	38	-11	27
212	30	0	30
216	41	-1.5	39.5
220	40	15	55
224	56.5	-12.5	44
228	34	8	42
232	44	1.5	45.5

				(depth in cm)		
PERIOD		JAN. 1990 - OCT. 1990	OCT. 1990 - JAN. 1991	JAN. 1990 - JAN. 1991		
STAKE NO		265-266 DAYS	108-109 DAYS	374-375 DAYS		
	236	57	7.5	64.5		
	240	33.5	-8	25.5		
	244	51.5	-6	45.5		
	248	49	-2.5	46.5		
	252	33.5	-8	25.5		
	256	55.5	7	62.5		
	260	56.5	-5	51.5		
	264	47	-2	45		
	268	31.5	-6.5	25		
	272	17.5	-3.5	14		
	276	41.5	-5	36.5		
	280	46.5	13	59.5		
	284	14.5	-7.5	7		
	288	27	-10.5	16.5		
	293	17	-10.5	6.5		
	297	35	-3.5	31.5		
	301	64	-26.5	37.5		
S	122	3	-5.5	-2.5		
Z	2	24	-3.5	20.5		
	4	18.5	16	34.5		
	6	20	22	42		
	8	29	-1.5	27.5		
	10	20	-9	11		
	12	31	5	36		
	14	40.5	-8	32.5		
	16	25.5	-13	12.5		
	18	23	-8	15		
	20	21.5	0.5	22		
	22	23.5	-4.5	19		
	24	18.5	-2	16.5		
	26	20.5	-7.5	13		
	28	1	-6	-5		
	30	8	10	18		
	32	3.5	3.5	7		

(depth in cm)

PERIOD	JAN. 1990 -	OCT. 1990 -	JAN. 1990 -
	OCT. 1990	JAN. 1991	JAN. 1991
STAKE NO	265-266	108-109	374-375
	DAYS	DAYS	DAYS
34	13	-4.5	8.5
36	37	26.5	63.5
38	13	-11	2
40	14.5	-9	5.5
42	14	8	22
46	15	1.5	16.5
50	14	32	46
54	19	-7	12
58	30.5	-15.5	15
62	5.5	-3.5	2
66	-1	9	8
70	3	20	23
72	-1	-6.5	-7.5
74	33.5	6	39.5
76	25.5	5.5	31
78	2	-3.5	-1.5
80	23.5	2.5	26
82	55.5	-13.5	42
84	52	-11.5	40.5
86	50.5	2.5	53
88	21.5	3	24.5
90	22.5	-3.5	19
92	18.5	-13	5.5
94	7	-19.5	-12.5
96	13	-8	5
98	10	-7.5	2.5
100	45	38.5	83.5
102	31	10.5	41.5

Table 2-3. Net accumulation of snow along Route S-H-Z in 1991.

		(depth in cm)			
PERIOD		OCT., 1990- JAN., 1991	JAN.- MAY, 1991	MAY, - OCT., 1991	OCT., 1990- OCT., 1991
		108-116	97-107	161-169	376-378
STAKE NO		DAYS	DAYS	DAYS	DAYS
S	16	-1	← 41.5 (259 days) →		40.5
	17	-4.5	15.5	107.5	118.5
	18	-2	6	63	67
	19	5.5	30	48	83.5
	20	7	38	70.5	115.5
	21	-11.5	25	37	50.5
	22	-2	50.5	71.5	120
	23	-5	31		
	24	12	31	37	80
	25	7	20	40	67
	26	0.5	27.5	52	80
	27	0.5	34	37.5	72
	28	-8	31	38	61
	29	18.5	33		
	30	5.5	28	32	65.5
H	3	1	25	35.5	61.5
	9	-10.5	22	31.5	43
	15	-4.5	38	45	78.5
	21	-6.5	16	22	31.5
	27	-8	26	30	48
	35	5	13	25	43
	42	1	3	18	22
	48	-7	8	34	35
	54	0.5	14	33.5	48
	60	-5	28	44.5	67.5
	64	-3.5	20	23	39.5
	68	-4	21	1	18
	72	7	33	26	66
	76	-13	5	30	22
	80	-11	7	18	14
	84	-3	41	5.5	43.5
	88	-9.5	2.5		
	92	-6	11	15.5	20.5
	96	-7.5	21	16	29.5

(depth in cm)

PERIOD	OCT., 1990-	JAN. -	MAY, -	OCT., 1990-
	JAN., 1991	MAY, 1991	OCT., 1991	OCT., 1991
STAKE NO	108-116	97-107	161-169	376-378
	DAYS	DAYS	DAYS	DAYS
100	-4	3	26.5	25.5
104	-4	-3	22.5	15.5
108	11	22	3	36
112	-1	13	37	49
116	-10	6	20	16
120	-9.5	0	22	12.5
124	3	6	10.5	19.5
128	-2	6	24.5	28.5
132	-1	6	41	46
136	0	14	14.5	28.5
140	-5.5	9.5	19.5	23.5
144	-4	7	37.5	40.5
148	-3	3.5	35.5	36
152	-3	8.5	25	30.5
156	9	7	10	26
160	-5.5	25	5	24.5
164	8.5	9	20	37.5
168	-3	10	17	24
172	8	5	29.5	42.5
176	0.5	19	16.5	36
180	12	22	0.2	34.2
184	-0.5	13	11.5	24
188	-2.5	0	16.5	14
192	1	14	14	29
196	2	4	13.5	19.5
200	5.5	11	6	22.5
204	4.5	-0.5	25	29
208	-11	4	7	0
212	0	11	24	35
216	-1.5	10	11.5	20
220	15	3	4.5	22.5
224	-12.5	5.5	1	-6
228	8	-2	21.5	27.5
232	1.5	8.5	19	29

(depth in cm)

PERIOD	OCT., 1990-	JAN.-	MAY,-	OCT., 1990-
	JAN., 1991	MAY, 1991	OCT., 1991	OCT., 1991
STAKE NO	108-116	97-107	161-169	376-378
	DAYS	DAYS	DAYS	DAYS
236	7.5	4	2.5	14
240	-8	21.5	7	20.5
244	-6	12.5	14	20.5
248	-2.5	3	13.5	14
252	-8	2.5	12	6.5
256	7	-0.5	25.5	32
260	-5	11	4	10
264	-2	7	26.5	31.5
268	-6.5	25	28	46.5
272	-3.5	3	37	36.5
276	-5	3	11.5	9.5
280	13	20.5	3	36.5
284	-7.5	5.5	14	12
288	-5	2	25	22
293	-10.5	-2	8	-4.5
297	-3.5	9.5	1	7
301	-26.5	-3	4.5	-25
S 122	-5.5	3	8	5.5
Z 2	-3.5	2.5	2.5	1.5
4	-16	-1	0.5	-16.5
6	-18	14.5	0	-3.5
8	-1.5	4.5	14	17
10	-9	23	-4.5	9.5
12	5	0	-1	4
14	-8	28	20	40
16	-13	19.5	1	7.5
18	-8			-8
20	-0.5	14	9	22.5
22	-4.5	9	19	23.5
24	-2	15	-4.5	8.5
26	-7.5	2.5	-2.5	-7.5
28	-6	-20	21.5	-4.5
30	10	-22	15	3
32	3.5	11	3.5	18

(depth in cm)

PERIOD STAKE NO	OCT., 1990-	JAN.-	MAY,-	OCT., 1990-
	JAN., 1991	MAY, 1991	OCT., 1991	OCT., 1991
	108-116	97-107	161-169	376-378
	DAYS	DAYS	DAYS	DAYS
34	-4.5	0	0	-4.5
36	26.5	-3	0	23.5
38	-11	6	3	-2
40	-9	1	1	-7
42	8	1	3	12
46	1	0	-0.5	0.5
50	32	3	5	40
54	-7	5	17.5	15.5
58	-15.5			-5
62	-3.5	24	-19	1.5
66	9	14	14	37
70	20	5	6.5	31.5
72	-6.5	15	11	19.5
74	-6	-5	5.5	-5.5
76	5.5	2	16	23.5
78	-3.5	-0.5	13	9
80	2.5	0	0.5	3
82	-13.5	-1	19.5	5
84	-11.5	-1	10	-2.5
86	2.5	14	1	17.5
88	3	6.5	-7	2.5
90	-3.5	7	-3.5	0
92	-13	16	0	3
94	-19.5	-3	2.5	-20
96	-8	32	1.5	25.5
98	-7.5	9	1.5	3
100	38.5	7	1.5	47
102	10.5	-1	2	11.5

Table 2-4. Net accumulation of snow along Route Tottuki in 1991.

PERIOD	(depth in cm)	
	MAR. 8- SEP. 4, 1991	SEP. 4- DEC 12, 1991
	180 DAYS	99 DAYS
STAKE NO		
2	29	-25
5	51	9
10	51	
15	8	-4
20	55	-8
25	26	-6
30	38	-6
35	71	-4
40	69	7
45	35	2
50	30	-14

Table 2-5. Net accumulation of snow along route between Syowa Station and Tottuki Point in 1991.

PERIOD	(depth in cm)	
	MARCH 7- SEP. 4, 1991	
	180 DAYS	
STAKE NO.		
1		
2		-4
3		20
4		
5		66
6		
7		70
8		73
9		86
10		40
11		36
12		38
13		36
14		21
15		6
16		32
17		50
18		66
19		51
20		67
21		68
22		42
23		44
24		18
25		37
26		61
27		54
28		3
29		-4
30		

Table 2-6. Net accumulation of snow in a 201-stake farm
at Mizuho Station in 1991.

PERIOD STAKE NO	(depth in cm)		
	21 JAN 1991 - 11 MAY 1991	11 MAY 1991 20 OCT 1991	21 JAN 1991 - 20 OCT 1991
	110 DAYS	162 DAYS	272 DAYS
1	-2	0.5	-1.5
2	-4	1	-3
3	-1.5	1	-0.5
4	-1	1	0
5	-1	1	0
6	-0.5	0	-0.5
7	-1.5	0.5	-1
8	-2	0.5	-1.5
9	-3.5	0.5	-3
10	-4	0.5	-3.5
11	-1	0	-1
12	-2	1	-1
13	0	-1	-1
14	-4.5	0	-4.5
15	-1	1.5	0.5
16	-1	1	0
17	-3	2.5	-0.5
18	-5	1	-4
19	-8	1.5	-6.5
20	-4	2	-2
21	-1	0.5	-0.5
22	-2	1	-1
23	-1	1	0
24	-1.5	0.5	-1
25	-2	1	-1
26	-1	0.5	-0.5
27	-1.5	0.5	-1
28	-1	0	-1
29	-1	0.5	-0.5
30	-1.5	1	-0.5
31	-2	1	-1
32	-1	0.5	-0.5
33	-1.5	0.5	-1
34	-2	1.5	-0.5
35	1.5	0	1.5
36	-2	2.5	0.5
37	-2.5	3	0.5
38	-2	1	-1
39	-0.5	0.5	0
40	-1	1	0

(depth in cm)

PERIOD	21 JAN 1991 -	11 MAY 1991	21 JAN 1991 -
	11 MAY 1991	20 OCT 1991	20 OCT 1991
STAKE NO	110 DAYS	162 DAYS	272 DAYS
41	-1.5	1	-0.5
42	-2	1.5	-0.5
43	1	1	2
44	0.5	-1	-0.5
45	-1	1	0
46	-1.5	0.5	-1
47	7.5	1	8.5
48	11	1.5	12.5
49	10.5	1.5	12
50	12	1	13
51	14	0.5	14.5
52	13	0	13
53	19	6	25
54	22	16.5	38.5
55	4	3	7
56	0.5	6.5	7
57			
58			
59	2.5	> 3	> 5.5
60			
61			
62			
63			
64			
65			
67	-0.5	16	15.5
68	> 2		
69			
70			
71			
72			
73			
74			
75			
76	> 1.5		
77	> 3.5		
78			
79			
80	> 0.5		

(depth in cm)

PERIOD	21 JAN 1991- 11 MAY 1991	11 MAY 1991 20 OCT 1991	21 JAN 1991- 20 OCT 1991
	110 DAYS	162 DAYS	272 DAYS
STAKE NO			
81			
82			
83			
84			
85			
86			
87			
88			
89			
90			
91			
92			
93			
94			
95	2.5	1.5	4
96	1.5		1.5
97	5	> 0.2	> 5.2
98	5	3.5	8.5
99	-1.5	1	-0.5
100	0	0.5	0.5
101	0	1.5	1.5
102	-1	2	1
103	-1.5	2	0.5
104	-1	2	1
105	0	1	1
106	0	0.5	0.5
107	-1	1	0
108	-0.5	0.5	0
109	-1	0	-1
110	3	1	4
111	-11	9.5	-1.5
112	-4	1	-3
113	-1.5	1	-0.5
114	-8.5	0	-8.5
115	-2	1.5	-0.5
116	-2	1.5	-0.5
117	-5.5	1	-4.5
118	0	-0.5	-0.5
119	-1	0.5	-0.5
120	-2	-1.5	-3.5

(depth in cm)

PERIOD	21 JAN 1991-	11 MAY 1991	21 JAN 1991-
	11 MAY 1991	20 OCT 1991	20 OCT 1991
STAKE NO	110 DAYS	162 DAYS	272 DAYS
121	-2	1.5	-0.5
122	-2	1.5	-0.5
123	-2	2	0
124	-1	5	4
125	-1	11	10
126	13	9	22
127	5	11.5	16.5
128	13	7.5	20.5
129	16.5	8	24.5
130	15	1.5	16.5
131	13	5	18
132	12	8.5	20.5
133	14	7	21
134	13.5	10	23.5
135	23	-4.5	18.5
136	5	14.5	19.5
137	22	-1	21
138	19	-4	15
139	11.5	10	21.5
140	9	7	16
141	22	-8.5	13.5
142	13	7.5	20.5
143	13	-1.5	11.5
144	9	2	11
145	2.5	0.5	3
146	-2	4.5	2.5
147	5	5.5	10.5
148	2	6	8
149	4	-0.5	3.5
150	8	-3.5	4.5
151	9	0	9
152	12	1	13
153	6	2	8
154	5	-3	2
155	0	0.5	0.5
156	-2	1.5	-0.5
157	-2	2	0
158	-1	1.5	0.5
159	-0.5	1.5	1
160	-1	1	0

(depth in cm)

PERIOD	21 JAN 1991-	11 MAY 1991	21 JAN 1991-
	11 MAY 1991	20 OCT 1991	20 OCT 1991
STAKE NO	110 DAYS	162 DAYS	272 DAYS
161	-4	1	-3
162	-2	0.5	-1.5
163	-2	2.5	0.5
164	0	1	1
165	3.5	-5	-1.5
166	-5	3	-2
167	0	0.5	0.5
168	-1.5	1	-0.5
169	-1	0.5	-0.5
170	0	1.5	1.5
171	-2	1	-1
172	-1	-0.5	-1.5
173	-1	0.5	-0.5
174	-1	0	-1
175	3	0	3
176	1	0.5	1.5
177	2.5	0.5	3
178	1	1	2
179	2	0	2
180	-1	0.5	-0.5
181	0.5	0.5	1
182	1	0.5	1.5
183	2	1	3
184	-6	7	1
185	-0.5	0.5	0
186	-1	0.5	-0.5
187	4	0	4
188	-1.5	0.5	-1
189	-3	3.5	0.5
190	1	-2.5	-1.5
191	-0.5	1.5	1
192	1	0.5	1.5
193	4.5	-3.5	1
194	0	2.5	2.5
195	-2	2	0
196	-1.5	2	0.5
197	0	1.5	1.5
198	0	1	1
199	3.5	1	4.5
200	7.5	1	8.5
201	5	0	5

3. Net Accumulation of Snow at and around Asuka Station

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Net accumulation of snow at Asuka Station and along oversnow traverse routes around the station was measured by snow stake method.

(1) Asuka Station

Snow accumulation was measured at least once a month in a 36-stake farm (100X100 m in area), established at Asuka Station in 1985, from 1989 to 1991, and every week in a 16-stake farm (30X30 m in area), established in 1987, in 1989. Net accumulation of snow in the 36-stake farm is shown in Tables 3-1 for 1989, 3-2 for 1990 and 3-3 for 1991. That in the 16-stake farm is shown in Table 3-4. Previous data obtained in 1987 and 1988 were reported by Sakai *et al.* (1989) and Fujita *et al.* (1990) respectively.

(2) Routes L, A, B, AA and AB

Snow accumulation along the routes around Asuka Station was measured in 1989-1991. The results are shown in Tables 3-5 for Route L, 3-6 for Route A and B, 3-7 for Route AA and 3-8 for Route AB. The positions of snow stakes for route L were reported by Nishio and Ohmae (1989) and for routes A and B by Watanabe *et al.* (1990).

References

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- Sakai, R., Ayukawa, M. and Shibuya, K. (1989): Net accumulation of snow around Asuka Camp in 1987. JARE Data Rep., **148** (Glaciology 17), 51-57.
- Watanabe, O., Furukawa, T. and Fujita, S. (1990): Position and elevation of stations. JARE Data Rep., **156** (Glaciology 18), 4-18.

Table 3-1. Net accumulation of snow in a 36-stake farm at Asuka Station in 1989.

(depth in cm)				
PERIOD	21 DEC 1988- 20 JAN 1989	20 JAN 1989- 20 FEB 1989	20 FEB 1989- 20 MAR 1989	20 MAR 1989- 20 APR 1989
STAKE NO.	30 days	31 days	28 days	31 days
I-1	13	19	10	-1
2	6	30	4	-2
3	22	6	9	1
4	7	11	-2	-2
5	5	15	2	3
6	16	5	1	-3
II-1	21	-5	18	16
2	-3	33	-2	-1
3	6	6	0	-7
4	8	20	-1	-1
5	5	-2	-2	1
6	14	16	-2	27
III-1	17	1	19	9
2	-5	14	7	-1
3	23	30	-3	-2
4	16	29	-4	-2
5	4	16	-5	-8
6	21	33	2	20
IV-1	11	1	11	8
2	18	26	11	-8
3	17	30	-3	-2
4	8	9	-4	-3
5	14	27	7	-10
6	23	42	-1	24
V-1	12	18	12	3
2	7	22	12	15
3	-1	28	-5	-4
4	13	25	-2	4
5	12	38	-4	-2
6	11	35	5	3
VI-1	8	25	7	16
2	12	22	-11	30
3	13	26	5	-2
4	10	30	1	-1
5	16	37	3	0
6	15	27	4	-3
MEAN	11.5	20.7	2.8	3.2

(depth in cm)

PERIOD	20 APR 1989- 19 MAY 1989	19 MAY 1989- 23 JUN 1989	23 JUN 1989- 18 JUL 1989	18 JUL 1989- 18 AUG 1989
STAKE NO.	29 days	35 days	25 days	31 days
I -1	-1	0	-2	0
2	-1	1	-1	0
3	-4	0	-1	0
4	0	1	0	-1
5	-7	0	0	-2
6	14	-7	-1	-3
II -1	-21	-5	0	-2
2	-1	0	0	0
3	0	-1	0	-2
4	0	0	-1	-1
5	-1	-1	0	-2
6	-6	0	0	-3
III -1	-11	-1	0	0
2	0	-1	1	-2
3	-1	0	-1	-3
4	0	-2	-1	-2
5	0	-1	0	-2
6	-12	0	-1	-2
IV -1	-10	0	0	-1
2	0	-2	-1	-2
3	2	0	-1	0
4	0	-2	-1	-3
5	0	0	-1	-1
6	-1	-5	-1	-4
V -1	-2	0	0	-1
2	-3	-2	0	-2
3	5	-1	0	0
4	-1	-1	1	-5
5	0	-1	1	-2
6	0	-5	1	-2
VI -1	-1	-3	-1	-1
2	-1	-2	0	-2
3	0	-1	1	-3
4	-1	0	0	0
5	1	-2	1	-1
6	-1	0	-1	0
MEAN	-1.8	-1.2	-0.3	-1.6

(depth in cm)

PERIOD	18 AUG 1989- 19 SEP 1989	19 SEP 1989- 20 OCT 1989	20 OCT 1989- 20 NOV 1989	21 DEC 1988- 20 NOV 1989
STAKE NO.	32 days	31 days	31 days	334 days
I -1	-4	-2	2	34
2	-2	-4	-1	30
3	-1	0	0	32
4	-1	-3	-2	8
5	-2	-1	3	16
6	1	-3	1	21
II -1	-1	-2	1	20
2	-2	0	0	24
3	-2	-3	2	-1
4	-1	-2	-3	18
5	-1	-1	-1	-5
6	0	-3	2	45
III -1	-1	-2	3	34
2	-1	-3	2	11
3	0	-1	0	42
4	0	-2	0	32
5	-2	0	2	4
6	-1	-4	2	58
IV -1	-2	-4	-1	13
2	0	-2	-1	39
3	-2	-3	1	39
4	-1	-3	0	0
5	0	-1	3	38
6	1	-3	2	77
V -1	-2	-2	1	39
2	-2	-4	2	45
3	-1	-3	0	18
4	0	-2	-1	31
5	-2	-5	1	36
6	-5	-3	2	42
VI -1	-1	-3	0	46
2	-2	-1	2	47
3	-2	-2	0	35
4	-1	-3	3	38
5	0	-2	2	55
6	-1	-3	-1	36
MEAN	-1.2	-2.4	0.8	30.5

Table 3-2. Net accumulation of snow in a 36-stake farm
at Asuka Station in 1990.

(depth in cm)

PERIOD	20 NOV 1989- 20 DEC 1989	20 DEC 1989- 20 JAN 1990	20 JAN 1990- 3 FEB 1990	3 FEB 1990- 10 FEB 1990
STAKE NO.	30 days	31 days	14 days	7 days
I -1	26	-3	13	9
2	2	-1	1	20
3	16	13	10	-12
4	5	17	-2	-4
5	15	14	1	18
6	18	0	-4	17
II -1	19	-2	-3	0
2	11	0	-2	4
3	7	4	0	1
4	1	28	-3	0
5	19	8	2	-6
6	3	-5	4	-6
III -1	10	3	6	-9
2	27	7	-3	-1
3	2	13	9	-10
4	4	4	6	4
5	25	4	-3	0
6	-1	-1	4	13
IV -1	21	3	4	-6
2	14	5	0	-3
3	6	-8	-1	3
4	6	11	11	5
5	18	7	5	-5
6	0	9	4	-7
V -1	17	-4	-3	1
2	-2	-1	20	-12
3	4	-6	9	11
4	6	5	1	-2
5	-2	25	7	-5
6	4	18	-2	0
VI -1	-1	7	3	4
2	-4	18	8	-11
3	13	1	-3	12
4	8	-2	1	-2
5	0	19	8	-7
6	17	15	-1	-3
MEAN	9.3	6.3	3.0	0.3

(depth in cm)

PERIOD	10 FEB 1990- 17 FEB 1990	17 FEB 1990- 20 FEB 1990	20 FEB 1990- 24 FEB 1990	24 FEB 1990- 3 MAR 1990
STAKE NO.	7 days	3 days	4 days	7 days
I -1	-1	-1	0	1
2	4	-2	25	-18
3	0	0	-2	0
4	0	0	1	0
5	-3	-1	-2	7
6	-1	0	13	-14
II -1	6	0	27	-3
2	-5	1	12	-2
3	-1	0	0	5
4	-1	0	0	-1
5	0	-1	31	-31
6	6	0	12	-9
III -1	0	0	23	-4
2	0	0	-3	6
3	-1	0	4	6
4	-1	-1	8	7
5	-1	0	13	-14
6	2	-2	-1	-2
IV -1	1	0	4	3
2	0	0	12	3
3	-1	0	0	0
4	-2	0	0	-1
5	-1	0	0	0
6	0	0	0	8
V -1	3	0	16	-9
2	0	0	29	-14
3	-3	-1	2	1
4	-1	0	40	-21
5	-2	0	7	-7
6	4	-4	-1	8
VI -1	-1	0	10	-1
2	0	0	18	-4
3	1	0	5	7
4	-1	0	21	5
5	-1	0	14	-15
6	1	-1	6	-7
MEAN	0.0	-0.4	9.6	-3.1

(depth in cm)

PERIOD	3 MAR 1990- 11 MAR 1990	11 MAR 1990- 18 MAR 1990	18 MAR 1990- 20 MAR 1990	20 MAR 1990- 25 MAR 1990
STAKE NO.	8 days	7 days	2 days	5 days
I -1	-2	-4	2	-2
2	2	-2	1	0
3	-3	-4	1	2
4	-5	-4	0	-1
5	-8	-4	1	-1
6	-1	-1	0	-1
II -1	-1	-1	0	0
2	-6	-2	0	0
3	-2	-1	1	-1
4	0	-2	1	-1
5	-2	-1	0	-1
6	-6	-4	1	0
III -1	-11	-3	0	0
2	-8	-3	1	0
3	-2	-1	1	-1
4	-5	-3	0	0
5	-5	-1	0	0
6	-1	-2	0	0
IV -1	-9	-2	0	-1
2	-16	-1	0	2
3	-3	-1	1	-1
4	-1	-1	1	-1
5	0	-1	0	-5
6	-9	-1	1	-2
V -1	-5	-5	0	0
2	-7	-2	0	0
3	-1	-1	0	0
4	-18	-4	1	0
5	-2	-3	1	-1
6	-2	-1	0	0
VI -1	-8	-2	0	0
2	-1	-1	1	-1
3	-13	-5	1	4
4	-2	-2	1	-1
5	0	-1	0	-1
6	-2	-1	0	0
MEAN	-4.6	-2.2	0.5	-0.4

(depth in cm)

PERIOD	25 MAR 1990- 30 MAR 1990	30 MAR 1990- 9 APR 1990	9 APR 1990- 13 APR 1990	13 APR 1990- 20 APR 1990
STAKE NO.	5 days	10 days	4 days	7 days
I -1	1	13	-3	-9
2	8	-8	-1	0
3	13	5	-10	-6
4	32	-6	0	-1
5	16	-5	-8	0
6	5	0	0	-1
II -1	15	-9	-1	-2
2	9	-4	4	-6
3	12	1	0	-1
4	15	-7	-7	-1
5	24	-11	0	-7
6	18	-1	0	-4
III -1	26	-5	0	-1
2	14	3	0	-3
3	0	8	0	-2
4	-2	0	2	-3
5	18	-13	1	0
6	7	2	-1	-2
IV -1	19	1	0	-1
2	24	1	-3	-3
3	16	6	-1	-2
4	2	7	3	-2
5	23	-1	0	-2
6	19	3	0	-2
V -1	14	4	9	-1
2	18	-2	-2	-3
3	-6	5	0	-1
4	21	-1	0	-1
5	27	25	0	-3
6	2	22	0	-4
VI -1	20	-3	0	-4
2	0	0	0	0
3	10	4	0	-1
4	2	17	-6	-2
5	13	2	0	-2
6	22	2	-5	-1
MEAN	13.3	1.5	-0.8	-2.3

(depth in cm)

PERIOD	20 APR 1990- 27 APR 1990	27 APR 1990- 5 MAY 1990	5 MAY 1990- 11 MAY 1990	11 MAY 1990- 18 MAY 1990
STAKE NO.	7 days	5 days	6 days	7 days
I-1	-2	3	-4	-1
2	-1	0	0	0
3	0	-9	-1	-1
4	-1	0	-1	-4
5	0	0	-1	0
6	0	0	-1	-1
II-1	-3	-1	0	0
2	0	4	-3	-1
3	0	0	0	-1
4	0	0	-1	0
5	-2	9	-11	0
6	0	4	-5	-1
III-1	0	1	-2	0
2	-2	1	0	0
3	0	0	-1	-1
4	1	-1	0	-1
5	0	0	-1	0
6	-1	2	-2	-1
IV-1	0	0	0	-2
2	-3	-4	2	-6
3	0	-1	0	0
4	0	0	0	0
5	0	-1	0	-1
6	0	-1	0	-1
V-1	0	0	-1	0
2	0	-1	0	0
3	0	19	-20	0
4	-1	0	0	-1
5	-1	0	0	-1
6	0	0	0	-2
VI-1	0	-1	0	0
2	0	-1	0	-1
3	0	4	-5	0
4	1	-1	-2	2
5	0	0	-1	0
6	0	0	0	-1
MEAN	-0.4	0.7	-1.7	-0.8

(depth in cm)

PERIOD	18 MAY 1990- 20 MAY 1990	20 MAY 1990- 25 MAY 1990	25 MAY 1990- 4 JUN 1990	4 JUN 1990- 9 JUN 1990
STAKE NO.	2 days	5 days	10 days	5 days
I -1	0	0	46	-35
2	0	0	0	0
3	1	-1	34	-4
4	-3	3	39	-52
5	-11	10	24	-18
6	1	0	55	-45
II -1	0	0	22	-10
2	-1	1	6	10
3	0	0	8	1
4	0	0	-1	1
5	0	1	21	0
6	-1	1	48	-48
III -1	1	-1	0	38
2	-1	1	6	26
3	0	0	21	-22
4	1	0	29	-30
5	0	0	0	6
6	-1	0	0	-2
IV -1	1	0	-1	0
2	1	-1	33	-13
3	0	0	2	21
4	0	0	1	-2
5	0	0	4	43
6	0	0	-8	59
V -1	0	0	21	-21
2	0	-2	26	-25
3	0	0	6	22
4	0	0	13	-2
5	0	0	-1	23
6	1	-1	0	25
VI -1	-1	0	61	-58
2	1	0	9	-9
3	-2	1	11	-12
4	-1	1	-2	5
5	0	0	19	-7
6	0	0	13	-3
MEAN	-0.4	0.4	15.7	-3.8

(depth in cm)

PERIOD	9 JUN 1990- 16 JUN 1990	16 JUN 1990- 25 JUN 1990	25 JUN 1990- 2 JUL 1990	2 JUL 1990- 12 JUL 1990
STAKE NO.	7 days	9 days	7 days	10 days
I -1	-10	0	-2	47
2	0	0	-2	21
3	-8	0	-1	9
4	8	-5	-4	7
5	-15	1	-2	28
6	-1	-4	0	32
II -1	-8	-1	0	-1
2	-2	-2	0	16
3	1	-1	0	20
4	0	0	0	-1
5	-3	-16	1	35
6	4	-5	0	57
III -1	-38	0	-1	27
2	-11	0	0	-1
3	0	0	0	31
4	1	-1	-1	22
5	-2	-4	-1	39
6	19	0	-2	26
IV -1	0	0	0	-1
2	-20	1	-1	12
3	-12	-2	0	2
4	0	0	0	39
5	-43	-3	-1	44
6	-42	0	0	38
V -1	0	0	-1	0
2	0	0	1	6
3	-11	-11	4	27
4	-13	1	0	55
5	-4	-3	-1	19
6	-13	-4	0	14
VI -1	-6	0	-1	14
2	0	-1	1	5
3	1	1	-1	49
4	9	-5	0	26
5	-4	0	0	9
6	-2	0	-1	41
MEAN	-6.3	-1.8	-0.4	22.6

(depth in cm)

PERIOD	12 JUL 1990- 21 JUL 1990	21 JUL 1990- 27 JUL 1990	27 JUL 1990- 6 AUG 1990	6 AUG 1990- 11 AUG 1990
STAKE NO.	9 days	6 days	10 days	5 days
I -1	-31	0	0	6
2	-4	-3	-1	0
3	3	0	-9	0
4	52	-5	0	-1
5	24	-6	-2	-1
6	8	-7	-3	0
II -1	-2	0	11	-3
2	1	-7	-10	-1
3	22	-15	-7	1
4	50	-15	7	-15
5	33	-10	-4	-3
6	0	-5	-1	-3
III -1	-14	-9	4	-9
2	9	-8	2	-2
3	9	-4	-5	0
4	33	-11	-5	-3
5	14	-2	2	-1
6	20	-6	-4	0
IV -1	10	-2	2	-1
2	19	1	-5	1
3	26	-1	-8	5
4	-2	-1	-4	-3
5	7	-5	5	-5
6	-4	-2	4	-8
V -1	23	-22	0	0
2	28	1	-8	-4
3	11	-1	-10	6
4	-8	-4	1	0
5	11	-4	-6	0
6	13	-6	2	-3
VI -1	28	-6	-1	-13
2	18	-3	2	-10
3	-12	2	-2	-1
4	8	-5	-1	0
5	13	1	6	-7
6	-11	-5	16	-23
MEAN	11.3	-4.9	-0.9	-2.8

(depth in cm)

PERIOD	11 AUG 1990- 17 AUG 1990	17 AUG 1990- 24 AUG 1990	24 AUG 1990- 1 SEP 1990	1 SEP 1990- 10 SEP 1990
STAKE NO.	6 days	7 days	8 days	9 days
I -1	-3	-1	0	-1
2	0	-1	1	-2
3	0	0	-1	0
4	0	0	-3	-2
5	1	-4	0	-1
6	0	0	0	-1
II -1	5	-8	-5	0
2	0	1	-1	0
3	0	-1	1	-1
4	-1	1	-9	0
5	0	0	-4	-1
6	5	-1	0	-1
III -1	13	0	0	0
2	0	0	0	-1
3	0	-1	-1	0
4	0	0	-1	-1
5	0	1	-2	0
6	0	-1	0	0
IV -1	7	0	0	0
2	0	0	0	-1
3	0	-6	-3	0
4	0	0	-1	0
5	0	0	-1	0
6	0	-1	-3	0
V -1	0	0	-1	1
2	0	0	-1	-1
3	-6	0	0	0
4	0	-1	0	-1
5	-1	0	0	0
6	-5	0	0	0
VI -1	3	0	-1	0
2	1	-1	0	0
3	0	-1	0	-1
4	0	-1	0	0
5	1	-1	0	0
6	0	-1	-1	0
MEAN	0.6	-0.8	-1.0	-0.4

(depth in cm)

PERIOD	10 SEP 1990- 15 SEP 1990	15 SEP 1990- 24 SEP 1990	24 SEP 1990- 29 SEP 1990	29 SEP 1990- 9 OCT 1990
STAKE NO.	5 days	9 days	5 days	10 days
I -1	0	0	-1	-2
2	1	0	0	0
3	0	0	-1	-1
4	0	-1	-3	0
5	0	-2	0	-1
6	0	-1	0	-1
II -1	0	-1	1	-1
2	0	-1	1	0
3	0	0	-1	0
4	0	-1	1	-1
5	0	-2	0	0
6	0	0	0	0
III -1	0	0	-1	0
2	0	-1	-3	-1
3	-1	0	-1	2
4	1	-2	0	-1
5	-1	-2	-8	-2
6	0	0	-1	0
IV -1	0	-1	0	0
2	1	-1	0	0
3	0	-1	0	-2
4	0	0	-1	0
5	-1	0	-3	1
6	-1	0	0	0
V -1	-1	0	0	0
2	1	-2	-1	1
3	-1	0	0	-1
4	0	0	-1	0
5	0	-1	-1	-1
6	0	-1	0	-1
VI -1	1	-2	1	0
2	0	-1	0	0
3	0	-1	0	-1
4	0	-1	1	-1
5	0	-2	-1	0
6	0	0	-3	-1
MEAN	0.0	-0.8	-0.7	-0.4

(depth in cm)

PERIOD	9 OCT 1990- 15 OCT 1990	15 OCT 1990- 22 OCT 1990	22 OCT 1990- 26 OCT 1990	26 OCT 1990- 2 NOV 1990
STAKE NO.	6 days	7 days	4 days	7 days
I-1	27	-28	-3	-1
2	6	-10	2	-3
3	4	-5	0	-1
4	-1	0	-1	-2
5	-1	0	-2	-1
6	-2	0	-2	-2
II-1	16	-16	-2	-1
2	8	-3	-1	-1
3	8	-6	0	-2
4	14	-1	-1	-14
5	-1	-1	0	0
6	-1	0	-3	-1
III-1	-2	-1	-1	-1
2	-2	2	0	-1
3	-1	-2	0	0
4	1	-2	-3	-2
5	0	-4	-1	0
6	-1	0	-1	-3
IV-1	-1	0	0	-1
2	1	-2	-2	1
3	0	0	-1	0
4	-1	-2	-1	0
5	-4	-1	0	-1
6	0	-3	-1	-1
V-1	-1	0	0	-1
2	-1	0	-2	0
3	-1	0	-1	0
4	-2	-4	0	-1
5	-3	0	-1	0
6	0	0	-1	-2
VI-1	-1	0	0	-1
2	-4	0	0	0
3	-2	1	0	-1
4	3	-4	0	-1
5	-1	0	-1	0
6	-4	3	0	-1
MEAN	1.4	-2.5	-0.8	-1.3

(depth in cm)

PERIOD	2 NOV 1990- 9 NOV 1990	9 NOV 1990- 17 NOV 1990	17 NOV 1990- 23 NOV 1990	23 NOV 1990- 30 NOV 1990
STAKE NO.	7 days	8 days	6 days	7 days
I-1	0	-5	0	-1
2	-1	0	-1	-1
3	0	-2	-3	0
4	0	0	-2	0
5	-1	0	-3	-1
6	1	-2	-4	0
II-1	0	-1	0	-4
2	0	-5	-1	-3
3	-1	-1	-1	-2
4	0	-1	-1	-1
5	-1	-1	-3	-2
6	0	0	0	-1
III-1	0	-2	-2	-1
2	0	-5	-2	2
3	-1	-1	-2	-3
4	0	0	-2	-1
5	0	-1	-1	-1
6	0	-2	-1	-2
IV-1	0	-1	-1	-1
2	0	-2	-1	-3
3	-1	-1	-1	-1
4	0	-3	-1	-1
5	-1	-2	0	-3
6	0	-1	-2	-2
V-1	0	-2	-1	-1
2	0	0	-2	-1
3	0	-1	-3	-1
4	-1	-2	-3	-1
5	0	-2	-2	0
6	0	0	-5	-2
VI-1	0	-1	-4	1
2	0	-1	-6	-1
3	0	-2	-2	-1
4	0	-1	-3	-2
5	0	-2	-2	-1
6	-1	-3	-2	0
MEAN	-0.2	-1.6	-1.9	-1.2

(depth in cm)

PERIOD	30 NOV 1990- 8 DEC 1990	8 DEC 1990- 14 DEC 1990	14 DEC 1990- 20 DEC 1990	20 DEC 1990- 22 DEC 1990
STAKE NO.	8 days	6 days	6 days	2 days
I -1	6	-3	-5	0
2	-2	-1	0	0
3	0	-2	-1	0
4	-1	-1	-2	0
5	1	0	-1	0
6	3	-3	-3	0
II -1	0	-3	3	0
2	3	-1	-2	0
3	0	1	-2	0
4	0	0	-1	0
5	-1	0	-7	5
6	-2	-1	-2	0
III -1	7	-2	-2	0
2	1	-4	-1	0
3	0	-2	1	0
4	-1	-2	-1	0
5	-1	-2	1	0
6	-1	-1	-1	0
IV -1	-1	0	-1	0
2	-1	-1	-1	0
3	-1	-1	-1	0
4	-2	-5	-6	0
5	-1	-2	1	0
6	1	-2	1	0
V -1	-1	0	-2	0
2	-1	-1	-1	0
3	1	-1	-1	0
4	10	-3	-2	0
5	2	-4	0	0
6	7	-2	-2	0
VI -1	2	-3	-2	0
2	7	-8	-1	0
3	-1	-3	-2	0
4	1	-1	-2	0
5	1	-2	-1	0
6	-2	-2	-1	0
MEAN	0.9	-1.9	-1.4	0.1

(depth in cm)

PERIOD	20 NOV 1988- 22 DEC 1990
STAKE NO.	397 days
I -1	36
2	29
3	23
4	46
5	55
6	47
II -1	32
2	19
3	46
4	31
5	56
6	46
III -1	37
2	41
3	41
4	37
5	50
6	48
IV -1	42
2	40
3	26
4	42
5	64
6	43
V -1	26
2	32
3	39
4	55
5	85
6	56
VI -1	33
2	19
3	53
4	60
5	46
6	47
MEAN	42.4

Table 3-3. Net accumulation of snow in a 36-stake farm
at Asuka Station in 1991.

(depth in cm)

PERIOD	22 DEC 1990- 28 DEC 1990	28 DEC 1990- 4 JAN 1991	4 JAN 1991- 10 JAN 1991	10 JAN 1991- 20 JAN 1991
STAKE NO.	6 days	7 days	6 days	10 days
I -1	0	1	1	-2
2	3	2	-5	6
3	10	1	2	12
4	-1	4	-3	9
5	0	1	-1	9
6	0	1	0	5
II -1	0	0	0	5
2	7	3	-8	9
3	8	-1	-5	21
4	-1	1	0	28
5	2	1	-3	5
6	1	-1	1	-2
III -1	-1	2	-2	-3
2	4	1	-5	22
3	-1	1	-1	16
4	-1	1	-1	6
5	8	1	-4	9
6	-1	3	-3	-1
IV -1	0	0	0	-3
2	0	-2	1	-1
3	0	1	-1	3
4	2	1	-2	13
5	-1	3	-3	-1
6	0	-1	1	7
V -1	0	2	-3	10
2	0	1	-2	-1
3	0	0	-1	-1
4	-1	1	-2	5
5	-2	3	-3	10
6	-1	-1	1	3
VI -1	6	3	-7	-2
2	3	-2	-1	0
3	-1	2	-2	-2
4	1	0	-1	0
5	1	-1	-1	8
6	-2	4	-1	4
MEAN	1.2	1.0	-1.8	5.4

(depth in cm)

PERIOD	20 JAN 1991- 24 JAN 1991	24 JAN 1991- 1 FEB 1991	1 FEB 1991- 23 FEB 1991	23 FEB 1991- 22 MAR 1991
STAKE NO.	4 days	8 days	22 days	28 days
I -1	-1	21	5	34
2	-1	27	-18	43
3	-2	-3	0	45
4	-3	-2	6	13
5	-1	-1	6	10
6	3	9	-9	17
II -1	-2	9	9	30
2	-2	17	2	22
3	-3	-2	5	9
4	-1	8	-15	4
5	-8	11	-1	21
6	0	0	4	23
III -1	-1	13	-10	31
2	-9	0	5	17
3	-5	9	-8	14
4	12	-2	1	8
5	-4	11	-5	18
6	-1	1	9	32
IV -1	3	19	-17	15
2	-1	18	-14	28
3	-6	13	-7	16
4	-1	-1	5	18
5	0	23	-15	26
6	-8	-3	14	38
V -1	-3	10	-8	24
2	-1	5	-8	32
3	-2	4	3	14
4	5	-2	5	8
5	-3	-2	10	27
6	-5	-1	5	43
VI -1	-1	-1	8	23
2	-2	-1	-1	25
3	0	12	-5	18
4	-2	-1	3	38
5	-1	-3	-4	17
6	-4	3	4	36
MEAN	-1.7	6.1	-1.0	23.3

(depth in cm)

PERIOD	22 MAR 1991- 26 APR 1991	26 APR 1991- 23 MAY 1991	23 MAY 1991- 20 JUN 1991	20 JUN 1991- 20 JUL 1991
STAKE NO.	35 days	27 days	28 days	30 days
I -1	12	-2	-5	0
2	23	-7	-2	-3
3	7	-1	-4	0
4	34	-9	-10	-4
5	20	-2	1	1
6	26	-2	0	-1
II -1	25	-7	-14	3
2	41	-5	-37	5
3	33	-3	-4	0
4	34	-2	-1	0
5	33	-5	-4	0
6	49	-2	-6	-1
III -1	49	-5	-6	-1
2	15	-3	1	-4
3	34	-12	-13	0
4	4	-9	21	-1
5	33	-3	-11	-4
6	15	-2	-3	0
IV -1	36	-13	-27	1
2	51	-4	-2	0
3	11	-2	4	-7
4	3	-11	7	0
5	35	-6	8	-1
6	1	-9	10	0
V -1	31	-15	-18	0
2	21	-5	1	-1
3	0	0	-2	0
4	3	-11	16	1
5	28	-4	-21	2
6	-1	-1	-1	0
VI -1	39	-13	-31	0
2	13	-3	32	0
3	2	-2	7	1
4	0	-1	-8	-1
5	11	-1	-1	2
6	1	-10	10	-2
MEAN	21.4	-5.3	-3.1	-0.4

(cm in depth)

PERIOD	20 JUL 1991- 25 AUG 1991	25 AUG 1991- 24 SEP 1991	24 SEP 1991- 24 OCT 1991	24 OCT 1991- 21 NOV 1991
STAKE NO.	36 days	30 days	30 days	28 days
I -1	21	-19	-4	-4
2	24	-25	-5	1
3	0	-1	-2	-3
4	1	-2	-3	-1
5	0	0	-4	-4
6	1	-8	-5	-4
II -1	19	-23	-5	-2
2	9	5	-1	-3
3	0	-1	-2	-2
4	0	0	-3	-3
5	0	-1	-3	-5
6	0	0	-6	-12
III -1	0	0	-3	-4
2	8	0	-5	-4
3	-1	0	-4	-2
4	13	-6	-7	-7
5	2	-4	-6	-2
6	-1	-7	-5	-10
IV -1	8	-5	-3	-3
2	-1	-1	-3	-6
3	0	0	-4	-4
4	11	-4	-4	11
5	-1	-1	-3	-3
6	-1	0	-4	-1
V -1	12	10	-5	-6
2	0	0	-2	-4
3	1	-1	-2	-4
4	-2	-3	-5	-5
5	14	9	-8	-10
6	0	0	-2	-6
VI -1	5	3	-3	-4
2	-1	0	-6	-3
3	0	0	-2	-3
4	0	0	-2	-5
5	4	0	-8	-6
6	0	-1	-3	-10
MEAN	4.0	-2.4	-3.9	-4.0

(depth in cm)

PERIOD	22 DEC 1990- 21 NOV 1991
STAKE NO.	335 days
I -1	58
2	63
3	61
4	29
5	35
6	33
II -1	47
2	64
3	53
4	49
5	47
6	48
III -1	59
2	43
3	27
4	32
5	39
6	26
IV -1	10
2	59
3	17
4	46
5	60
6	44
V -1	38
2	36
3	9
4	13
5	50
6	33
VI -1	25
2	53
3	22
4	21
5	21
6	32
MEAN	39.1

Table 3-4. Net accumulation of snow in a 16-stake farm at Asuka Station in 1989.

(depth in cm)

PERIOD	16 DEC 1988- 24 DEC 1988	24 DEC 1988- 30 DEC 1988	30 DEC 1988- 6 JAN 1989	6 JAN 1989- 13 JAN 1989
STAKE NO.	8 days	6 days	7 days	7 days
I -1	-2	0	-3	54
2	-2	-1	-1	63
3	-4	-3	-2	37
4	-9	-10	-4	30
II -1	-2	-1	6	61
2	-4	-2	-1	59
3	-2	-3	-2	49
4	-1	0	-2	19
III -1	-2	-1	7	45
2	-2	0	-1	43
3	3	-3	1	65
4	-19	-1	-1	27
IV -1	-1	-1	1	40
2	-8	-1	-1	36
3	-1	-2	-1	58
4	-1	-2	3	44
MEAN	-3.6	-1.9	0	45.5
PERIOD	13 JAN 1989- 20 JAN 1989	20 JAN 1989- 27 JAN 1989	27 JAN 1989- 5 FEB 1989	5 FEB 1989- 10 FEB 1989
STAKE NO.	7 days	7 days	9 days	5 days
I -1	-7	-4	32	-4
2	-9	-5	26	-7
3	-3	-2	42	-1
4	-6	-4	41	-9
II -1	-10	-9	52	-11
2	-9	-5	38	-22
3	-8	-4	45	-5
4	-2	-3	44	1
III -1	-8	-4	52	-18
2	-5	-3	39	-7
3	-18	-3	44	-13
4	-5	-3	63	-10
IV -1	-5	-2	54	-9
2	-1	-3	58	-10
3	-9	-9	48	-14
4	-17	5	52	-14
MEAN	-7.6	-3.6	45.6	-9.6

(depth in cm)

PERIOD	10 FEB 1989- 18 FEB 1989	18 FEB 1989- 26 FEB 1989	26 FEB 1989- 3 MAR 1989	3 MAR 1989- 11 MAR 1989
STAKE NO.	8 days	8 days	5 days	8 days
I -1	-4	-2	-1	-1
2	-8	0	-2	9
3	-4	2	-4	9
4	-2	-2	-1	20
II -1	-1	-2	-1	4
2	11	-1	0	4
3	-2	0	-3	0
4	-5	1	-6	17
III -1	-4	-2	-1	15
2	-6	-1	-1	5
3	-2	-1	-1	-1
4	-12	3	-1	-1
IV -1	-5	-3	-1	12
2	-8	-4	-1	5
3	0	-1	0	-1
4	-4	-2	-1	-1
MEAN	-3.5	-0.9	-1.6	5.9
PERIOD	11 MAR 1989- 18 MAR 1989	18 MAR 1989- 24 MAR 1989	24 MAR 1989- 31 MAR 1989	31 MAR 1989- 7 APR 1989
STAKE NO.	7 days	6 days	7 days	7 days
I -1	0	-1	0	-1
2	-8	-2	-1	0
3	-9	-2	-1	0
4	-1	-7	-4	-2
II -1	-6	-1	-1	-1
2	0	-2	0	-2
3	-1	-1	0	-1
4	-12	-5	-2	-1
III -1	-16	-1	-1	-1
2	-6	-1	-1	-2
3	-1	0	0	-1
4	0	-1	0	-2
IV -1	-10	-4	-1	-1
2	-6	-2	0	-1
3	0	-1	0	-1
4	0	-1	0	-2
MEAN	-4.8	-2	-0.8	-1.2

(depth in cm)

PERIOD	7 APR 1989- 15 APR 1989	15 APR 1989- 21 APR 1989	21 APR 1989- 28 APR 1989	28 APR 1989- 5 MAY 1989
STAKE NO.	8 days	6 days	7 days	7 days
I -1	0	0	0	0
2	0	0	-1	1
3	0	16	-5	0
4	0	0	0	-1
II -1	0	0	0	0
2	-1	0	0	0
3	0	0	0	0
4	0	0	0	0
III -1	0	0	0	0
2	2	-1	0	0
3	0	0	0	-1
4	0	8	-8	0
IV -1	5	-4	0	0
2	0	0	0	-1
3	0	-1	1	-1
4	-1	1	0	-1
MEAN	0.3	1.2	-0.8	-0.3
PERIOD	5 MAY 1989- 13 MAY 1989	13 MAY 1989- 19 MAY 1989	19 MAY 1989- 27 MAY 1989	27 MAY 1989- 4 JUN 1989
STAKE NO.	8 days	6 days	8 days	8 days
I -1	0	-1	0	0
2	-1	0	0	0
3	-1	0	-1	-4
4	1	-1	-1	0
II -1	-1	-3	-1	0
2	0	-1	0	0
3	0	0	0	0
4	0	0	0	-1
III -1	0	-1	0	0
2	-1	-1	1	-1
3	1	-1	0	0
4	0	-1	1	0
IV -1	-1	0	0	0
2	0	-1	0	0
3	0	0	0	0
4	0	0	0	0
MEAN	-0.2	-0.7	-0.1	-0.4

(depth in cm)

PERIOD	4 JUN 1989- 11 JUN 1989	11 JUN 1989- 18 JUN 1989	18 JUN 1989- 23 JUN 1989	23 JUN 1989- 3 JUL 1989
STAKE NO.	7 days	7 days	5 days	10 days
I -1	0	0	0	0
2	0	0	0	0
3	-2	0	0	-1
4	1	-1	0	1
II -1	-2	-2	0	0
2	0	0	0	3
3	0	0	0	0
4	-1	0	0	0
III -1	0	0	0	0
2	1	-1	1	0
3	0	1	0	-1
4	0	-1	0	1
IV -1	-1	0	0	1
2	0	1	0	0
3	-1	0	0	1
4	-2	0	2	0
MEAN	-0.4	-0.2	0.2	0.3
PERIOD	3 JUL 1989- 7 JUL 1989	7 JUL 1989- 17 JUL 1989	17 JUL 1989- 23 JUL 1989	23 JUL 1989- 28 JUL 1989
STAKE NO.	4 days	10 days	6 days	5 days
I -1	0	0	0	-1
2	0	0	0	-1
3	1	0	-1	0
4	0	0	-1	-1
II -1	0	0	0	0
2	-3	0	-1	0
3	0	-1	0	0
4	0	0	-1	-1
III -1	0	0	0	0
2	0	0	-1	-1
3	5	-3	-1	0
4	-1	1	-1	0
IV -1	0	1	-1	-2
2	0	0	0	0
3	0	-1	0	0
4	16	-1	0	0
MEAN	1.1	-0.3	-0.5	-0.4

(depth in cm)

PERIOD	28 JUL 1989- 4 AUG 1989	4 AUG 1989- 12 AUG 1989	12 AUG 1989- 18 AUG 1989	18 AUG 1989- 25 AUG 1989
STAKE NO.	7 days	8 days	6 days	7 days
I -1	1	-2	0	0
2	0	-1	-1	0
3	0	0	-2	0
4	1	0	-1	-1
II -1	-2	0	-1	0
2	0	-1	0	0
3	0	-2	0	0
4	0	0	0	0
III -1	0	-1	0	0
2	0	-1	-1	0
3	0	-1	0	0
4	0	-1	0	-1
IV -1	0	0	-1	0
2	-2	0	0	0
3	-1	0	0	0
4	-1	-1	0	0
MEAN	-0.3	-0.7	-0.4	-0.1
PERIOD	25 AUG 1989- 1 SEP 1989	1 SEP 1989- 9 SEP 1989	9 SEP 1989- 15 SEP 1989	15 SEP 1989- 22 SEP 1989
STAKE NO.	7 days	8 days	6 days	7 days
I -1	0	-1	1	0
2	0	0	0	-1
3	-1	1	0	0
4	0	0	2	-1
II -1	0	0	0	-1
2	0	0	-1	0
3	0	0	-1	-1
4	0	0	-1	0
III -1	0	0	-1	0
2	0	0	0	1
3	0	0	-1	0
4	0	0	0	-1
IV -1	0	0	1	-1
2	0	-1	1	-1
3	0	0	-2	-1
4	0	-1	0	0
MEAN	-0.1	-0.1	-0.1	-0.4

(depth in cm)

PERIOD	22 SEP 1989- 29 SEP 1989	29 SEP 1989- 6 OCT 1989	6 OCT 1989- 12 OCT 1989	12 OCT 1989- 19 OCT 1989
STAKE NO.	7 days	7 days	6 days	7 days
I -1	-2	0	-1	0
2	0	-1	0	-3
3	-1	-2	0	-2
4	-1	0	0	-2
II -1	0	-1	-2	0
2	-1	0	0	-1
3	-1	-1	0	-2
4	-1	-2	-1	-1
III -1	-1	0	-2	-1
2	-2	-2	0	0
3	-1	-1	0	-2
4	-2	-1	-1	0
IV -1	-1	-2	-1	-3
2	-1	0	-2	-2
3	0	-2	-1	-2
4	-1	-1	-2	-1
MEAN	-1	-1	-0.8	-1.4

PERIOD	19 OCT 1989- 26 OCT 1989	26 OCT 1989- 3 NOV 1989	3 NOV 1989- 10 NOV 1989	10 NOV 1989- 17 NOV 1989
STAKE NO.	7 days	8 days	7 days	7 days
I -1	2	-3	-1	0
2	16	-4	-2	-1
3	8	0	1	-1
4	0	-2	0	-1
II -1	2	0	-1	0
2	23	-8	-2	-2
3	4	-3	-2	-1
4	6	0	-1	0
III -1	0	-2	2	1
2	0	-1	-2	0
3	-2	-2	-1	-2
4	12	-10	0	-1
IV -1	6	-2	0	-1
2	3	-2	-1	0
3	-3	-1	-1	1
4	-1	0	-1	-2
MEAN	4.9	-2.5	-0.8	-0.6

(depth in cm)

PERIOD	17 NOV 1989- 24 NOV 1989	24 NOV 1989- 1 DEC 1989	1 DEC 1989- 8 DEC 1989	8 DEC 1989- 15 DEC 1989
STAKE NO.	7 days	7 days	7 days	7 days
I -1	12	-4	-1	0
2	28	-8	-2	-3
3	32	-7	-2	-1
4	27	4	-2	-7
II -1	18	-2	-1	-3
2	-3	0	-1	-3
3	22	8	-2	-3
4	26	0	-5	-2
III -1	2	0	-1	-1
2	16	-1	-1	-1
3	22	6	-2	-1
4	43	-12	-3	-4
IV -1	25	-2	0	0
2	20	0	-1	-2
3	23	2	-1	-5
4	18	-3	0	-2
MEAN	20.7	-1.2	-1.6	-2.4

PERIOD	15 DEC 1989- 23 DEC 1989	23 DEC 1989- 31 DEC 1989	16 DEC 1988- 31 DEC 1989
STAKE NO.	8 days	8 days	380 days
I -1	-1	-2	52
2	-2	6	71
3	-2	-8	70
4	-5	4	42
II -1	-1	-7	66
2	-2	2	61
3	-3	0	73
4	-1	3	59
III -1	-1	8	61
2	-1	3	56
3	-2	-5	74
4	-3	-9	42
IV -1	-4	9	85
2	-3	4	62
3	-2	3	71
4	0	2	76
MEAN	-2.1	0.8	63.8

Table 3-5. Net accumulation of snow along Route L in 1988-1990.

(depth in cm)

PERIOD		SEP 1988 -OCT 1989	OCT 1989 -DEC 1989	OCT 1989 -OCT 1990
STAKE NO.		393 days	56 days	363 days
L	0			
	2		-5	
	4		-1	
	6		2	
	8		29	
	10		-3	
	12		5	
	14		26	
	16		8	
	18		41	
	20		20	
	22		-10	
	24		18	
	26		15	
	28		-2	
	30		14	
	32		-6	
	34		23	
	36		-5	
	38		-1	
	40		-4	
	42		25	
	44		-2	
	46		-3	
	48			
	50			83
	52			91
	54			80
	56			96
	58			72
	60			104
	62	74		99

(depth in cm)

PERIOD	SEP 1988 -OCT 1989	OCT 1989 -DEC 1989	OCT 1989 -OCT 1990
STAKE NO.	393 days	56 days	363 days
L 64			100
66			90
68	79		149
70	84		85
72			99
74	101		78
76	58		79
78	68		97
80	80		67
82	54		48
84			118
86	27		83
88	35		79
90	29		81
92	6		-58
94	46		61
96	16		36
98	19		51
100	10		19
102	23		50
104	37		79
106	62		44
108	68		62
110	9		30
112	17		36
114	-1		-38
116	52		90
118	5		69
120	5		-62

Table 3-6. Net accumulation of snow along Route A and B
in 1988-1990.

(depth in cm)

PERIOD		DEC 1988 -JAN 1989	JAN 1989 -NOV 1989	NOV 1989 -AUG 1990
STAKE NO.		30 days	300 days	268 days
A	2	5	37	65
	4	14	55	18
	6	28	27	33
	8	-5	20	3
	10	-9	58	20
	12	-5	23	45
	14	-2	37	50
	16	3	57	88
	18	26	20	56
	20	1	63	52
	22	3	42	72
	24	12	47	80
	26	-2	46	39
	28	4	35	64
	30	-1	26	68
	32	-6	32	44
	34	1	56	66
	36	-7	41	60
	38	-7	47	59
	40	0	32	62
B	2	-2	17	
	4	-3	35	
	6	2	34	
	8	-3	41	
	10	12	11	
	12	-8	6	
	14	20	-13	
	16	-6	20	
	18	12	-5	
	20	6	5	
	22	7	2	
	24	-5	14	
	26	-6	5	
A	70	0	8	
	72	-5	-5	
	74	1	-11	
	76	-4	3	

(depth in cm)

(depth in cm)

PERIOD	(depth in cm)		PERIOD	(depth in cm)	
	DEC 1988 -JAN 1989	JAN 1989 -NOV 1989		DEC 1988 -JAN 1989	JAN 1989 -NOV 1989
STAKE NO.	30 days	300 days	STAKE NO.	30 days	300 days
A 78			B 108	14	-2
B 36	-2	4	110	-3	-9
38	23	3	112	-6	-13
40	-6	17	A 118	-7	-5
42	-5	23	120	-4	-7
44	-2	22	122	-5	-5
46	3	9	124	-5	-4
48	-2	15	126	-4	-4
50	5	30	128	-7	-8
52	-4	-3	130	-11	-2
54	-12	0	132	-4	-3
56	-1	18	134	-5	-1
58	-6	31	136	-2	-1
60	0	27	138	-4	-1
62	-3	27	140	-3	-3
64	1	16	142	-3	3
66	-4	24	144	-3	2
68	-12	26	146	-5	4
70	-4	23	148	-2	18
72	0	-6	150	-4	6
74	-3	3	152	-3	-1
76	-3	2	154	-3	5
78	-1	8	156	-3	10
80	2	8	158	-4	9
82	-3	7	160	-3	6
84	2	1	162	-4	12
86	-2	4	164	4	15
88	-1	-3	166	-4	5
90	0	28	168	-4	1
92	-4	-1	170	2	6
94	-4	18	172	3	19
96	-4	2	174	-13	8
98	-3	14	176	7	5
100	-3	4	178	-2	0
102	-5	8	180	-3	10
104	-4	19	182	-7	24
106	-6	1	184	-2	-4

(depth in cm)

PERIOD	DEC 1988 -JAN 1989	JAN 1989 -NOV 1989
STAKE NO.	30 days	300 days
A 186	-5	7
188	-3	-1
190	-7	38
192	-2	18
194	-8	47
196	-1	12
198	-2	27
200	-2	7
202	-2	6
204	-4	0
206	7	1
208	-2	0
210	-2	3
212	4	-5
214	-4	-4
216	-3	3
218	-3	-1
220	-6	1
222	-4	10
224	-3	1
226	-3	1
228	-3	13
230	-5	3
232	-3	-2
234	-6	2
236	-3	-1
238	-2	0
240	-2	0
242	-2	1
244	0	2
246	-3	1

Table 3-7. Net accumulation of snow along Route AA in 1988-1990.

(depth in cm)			
PERIOD	APR 1988 -DEC 1989	DEC 1989 -MAR 1990	MAR 1990 -OCT 1990
STAKE NO.	618 days	89 days	217 days
AA 0			
2			
4			
6	71	-9	136
7			
8	53	42	37
9			
10	14	23	11
12	64	10	30
14	113	-1	74
15	77	-10	50
17	166	34	39
19	81	-1	60
21	43	-20	42
23	33	6	58
25	16	22	42
27	15	33	36
29	53	-14	32
31	16	-2	37
33	-11	-2	22
35	-34	-17	39

Table 3-8. Net accumulation of snow along Route AB
in 1989-1990.

		(depth in cm)			
PERIOD		JAN 1989 -FEB 1989	FEB 1989 -JAN 1990	JAN 1990 -MAR 1990	MAR 1990 -NOV 1990
STAKE NO.		7 days	357 days	44 days	236 days
AB	2	33	12	17	47
	4	8	35	10	46
	6	11	9	6	57
	8	41	-14	10	36.5
	10	39	22	3.5	66.5
	12	63	8	8	36
	14	17	37	14	31
	16	-2	26	19	36
	18	21	22	2.5	36.5
	20	27	-5	9.5	64.5
	22	47	18	14	50
	24	23	18	12.5	51
	26	47	9	12	46
	28	0	19	12.5	43.5
	30	25	4	-2	61
	32	7	19	4.5	57.5
	34	25	2	4	31

4. Surface Meteorological Data Observed during Oversnow Traverses in 1989-1991

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JARE-32 Hiroshi INAYOSHI, Toyoo ABE, Sairo
NAKAJIMA, Masamichi AONO, and
Yoshitaka SUKEGAWA

Surface meteorological observations were carried out during oversnow traverses listed in Table 1-1. The items, instruments and accuracy of the observations are given in Table 4-1. The notations used in the tables of this section are shown in Table 4-2. The results are shown in Tables 4-3 to 4-14.

Table 4-1. Instruments and accuracy of meteorological observation carried out in 1991.

Item	Instrument	Accuracy
Air temperature	Alcohol or mercury	+/- 0.2°C
Wind speed	Portable 3-cup anemometer	+/- 1m/s
Wind direction	Magnetic compass	+/- 5°
Visibility	Visual observation	-----
Cloud	Visual observation	-----
Weather	Visual observation	-----

Table 4-2. Notations used in tables in this section.

Notation	Explanation
LT	Local standard time at Syowa Station (GMT+3h)
Ta	Air temperature (°C)
WS	wind speed (m/s)
WD	Wind direction
V	Visibility (km)
N	Amount of cloud (in tenth)
W	Present weather
○	Clear
⊙	Fine
●	Cloudy
⊕	Cloudy (Upper cloud is predominant)
*	Snow
†	Blowing snow
‡	Drifting snow
✦	Snowstorm
⊕	Halo

Table 4-3. Surface meteorological data obtained during oversnow traverse from S16 to Mizuho Station in January 1989.

Date	LT	Point	Ta	WD	WS	V	N	W	CL
JAN 7	12	S20	-1.7	NE	3	5	9	⊙	1St, 9Ac
	15	H5	-1	—	0	30	2	⊕	0+St Sc, 2Ac
	18	H100	-1.5	—	0	30	0+	○	0+St, 0+Ac
8	21	H100	-10.8	ENE	1	30	0+	○	0+St, 0+Ac
	06	H100	-14.2	SE	5	20	5	⊕	0+St, 5Ci
	09	H118	-8.2	SE	4	20	4	⊕	4Ci
	12	H194	-6.5	SE	3	20	0+	○	0+Ci
	15	H253	-9	--	0	20	0+	○	0+Ci
	18	H288	-12	SSE	1	20	0+	○	0+Ci
	21	H288	-17.5	ESE	3	20	0	○	0-
9	06	H288	-20.5	SE	7	30	0	○	0-
	09	H301	-15.3	SE	8	30	0	○	0-
	12	H224	-12.3	SSE	6	30	0	○	0-
	15	Z42	-13	SE	5	30	0+	○	0-
	18	Z80	-15.5	SSE	3.5	30	0+	○	0+Ci
10	21	Z80	-19.5	ESE	5.5	30	0+	○	0+Ci
	06	Z80	-20.5	SE	4.5	20	9	⊕	9Ci
	09	Z89	-14.8	SE	8	5	6	⊕	6Ci
	12	MIZUHO	-12.5	SE	8	5	8	⊕	8Ci
	15	MIZUHO	-11.6	SSE	8	10	10-	⊕	5Cs, 7Ci
	18	MIZUHO	-13.8	SE	9	10	10-	⊕	2As, 9Cs, Ci
11	21	MIZUHO	-15.5	SE	11	10	10-	+	10-As, Ci
	06	MIZUHO	-18.2	SE	12	0.1	10-	+	Ci
	09	MIZUHO	-14.2	ESE	11	0.1	10-	+	X As, X Cs, X Ci
	12	MIZUHO	-11.2	ESE	11	0.1	10-	+	X As, X Ci
	15	Z100	-10.7	ESE	10	1	10-	+	X Cc, 10Ci
	18	Z77	-10.3	ESE	7	5	10-	⊙	9As, X Ac, X Ci
	21	Z77	-10.5	ESE	5.5	3	10-	×	10-As
12	06	Z77	-17.2	SE	8.5	10	8	⊕	8Ci
	09	Z77	-12.7	SE	9	10	9	⊕	9Ci
	12	Z30'	-7.2	ESE	9.5	3	8	+	8Ci
	15	Z5'	-7.1	SE	9	5	4	+	4Ci
	18	H260	-7	ESE	11	1	3	+	2Ci, 1Cc
13	21	H260	-7.4	SE	10	3	6	+	6Ac
	06	H260	-13.2	SE	12	0.05	X	+	X Ac
	09	H242	-10.2	SE	14	0.03	X	+	X Ac
	12	H177	-6.8	ESE	13	0.1	X	+	X Ac
	15	H111	-6.5	E	11	0.2	1	+	0+St, 1Ac
	18	H50	-6.6	E	12.5	0.5	0+	+	0+Ac
	21	H50	-8.7	ESE	10	5	9	⊙	9Ac

Date	LT	Point	Ta	WD	WS	V	N	W	CL
JAN 14	06	H50	-9.8	SE	8	10	10-	●	10-St
	09	H50	-8.3	ESE	7	10	10-	●	10-St
	12	S27	-5.5	ESE	8	1	10	✕	10St
	21	S16	-5.2	E	6	10	10	●	10-St
15	06	S16	-8.3	SE	8	10	4	⊕	1Sc,4Ci

Table 4-4. Surface meteorological data obtained during oversnow traverse from S16 to Mizuho Station in August 1989.

Date	LT	Point	Ta	WD	WS	V	N	W	CL
AUG 12	13	S16	-15.5	--	6	0.1	10-	⊕+	Ci-1
	17	H27	-19	--	7	0.1	9	⊕+	Ci
13	09	H27	-30.2	SE	7	50	10-	⊕+	C3,Ac
	12	H111	---	SE	6	50	3	⊕+	Ci
	15	H172	---	SE	6	50	3	⊕	Ci
14	18	H202	-32.5	SE	6	50	5	⊕	
	08	H202	-32.2	SE	6	3	10-	⊕+	
	12	H266	-34.5	SE	8	0.2	6	⊕+	
	15	H290	-35.5	SE	8	0.2	8	⊕+	
15	18	Z10	-36.6	SE	9	3	10+	⊕+	Ci
	08	Z10	-37.2	SE	11	0.1	10+	⊕+	
	12	Z30	-37	SE	16	0.3	10+	⊕+	
16	18	Z50	-40.2	SSE	18	0.1	7	⊕+	
	09	Z50	-30.5	SE	6	0.5	10	⊕+	
	12	Z50	-26.3	ESE	11	0.02	10	⊕+	
	15	Z50	-27.5	ESE	17	0.02	10	⊕+	
	18	Z50	-30.6	ESE	16	0.03	10	●	
	21	Z50	-30.5	ESE	11	0.1	10	⊕+	
17	08	Z50	-41.1	SE	10	0.3	10+	⊕+	
	13	Z81	-40.6	ESE	10	0.1	4	⊕+	
	18	Z93'	-30.7	SE	10	0.05	10	⊕+	
18	08	Z93'	-26.2	ESE	17	0.05	--	✕+	
	12	Z93'	-22.6	SE	12	0.05	--	✕+	
	15	Z93'	-22.3	SE	13	0.05	--	✕+	
	18	Z93'	-25.2	SE	15	0.05	--	✕+	
	21	Z93'	-25.2	SE	9	0.1	--	✕+	
19	08	Z93'	-33.4	SE	5	1	6	⊕+	Cc,Ci,Cs
	13	MIZUHO	-31.7	SE	13	1	6	⊕+	
	17	MIZUHO	-36.4	SE	12	0.15	4	⊕+	
	21	MIZUHO	-36.4	ESE	10	0.2	2	⊕+	
20	09	MIZUHO	-40.9	SE	8	3	10+	⊕+	
	13	MIZUHO	-36.6	ESE	8	5	10+	⊕+	
	16	MIZUHO	-40.2	SE	10	5	--	⊕+	
	18	MIZUHO	-40.6	SE	8	5	--	⊕	
	21	08	MIZUHO	-33.8	SE	9	0.1	10	●
12		MIZUHO	-27.6	ESE	7	0.1	10	●	
18		Z65	-23.4	SE	9	0.05	10	●	
21		Z65	-26.3	ESE	10	0.1	10	⊕	
22	08	Z65	-28.2	SE	9	1	10	⊕+	
	12	Z30	-24.7	ESE	8	0.4	10	⊕+	
	18	H304	-22.9	ESE	10	0.1	10	⊕+	

Date	LT	Point	Ta	WD	WS	V	N	V	CL
AUG 22	21	H304	-23.6	SE	11	0.1	10	⊙†	
	23	H304	-23.2	SE	16	0.03	10	×†	
	12	H304	-22.4	SE	13	0.05	10	⊙†	
	15	H304	-23.3	SE	17	0.07	10	⊙†	
	21	H235	-22.5	SSE	16	0.1	--	⊙†	
24	09	H235	-25.6	SE	23	0.05	10	⊙†	
	12	H235	-26.5	SSE	22	0.03	10	⊙†	
	15	H235	-26.9	SSE	22	0.02	10	⊙†	
	18	H235	-28.8	SE	23	0.15	10	⊙†	
	21	H235	-29.8	SE	25	0.02	10	⊙†	
25	09	H235	-34.8	ESE	17	0.03	10	⊙†	
	13	H200	-32.2	SE	17	0.15	6	⊙†	
	20	H41	-29.5	SE	5	1	2	⊙	
26	09	H41	-28.2	SE	5	0.04	10	⊙	
	12	H41	-25.4	SE	12	0.05	10	⊙	
	16	H41	-24.8	ESE	12	0.1	10	⊙	
	20	S25-3	-23.7	SSE	16	0.03	10+	⊙†	
	22	S25-3	-22.2	SE	15	0.03	10	⊙†	
27	09	S25-3	-22.4	SE	10	0.1	10	⊙†	
	12	S16	-19.3	ESE	14	0.15	10	⊙†	

Table 4-5. Surface meteorological data obtained during oversnow traverse from S16 to Mizuho Station in September- October 1989.

Date	LT	Point	Ta	WD	WS	V	N	W	CL
SEP 11	12	S16	-28.1	E	4.5	50	0	○	
	15	S16	-30.5	ESE	4	50	0+	○	0+Sc
	18	S26	-33.8	ESE	5	40	0	○	
12	21	H35	-35.8	ENE	6	30	0	○	
	06	H35	-36.4	ENE	7	20	0	○	
	09	H35	-32	NE	8	20	0+	○	0+Sc
	12	H74	-29.7	E	9	2	0+	○	0+Sc
	15	H109	-30.5	NE	10	0.5	0	○	
	18	H167	-37.8	ENE	4.5	20	0+	○	0+Sc
	21	H172	-41.3	ENE	6	2	0	○	
13	06	H172	-38.8	E	4	20	10-	⊕	1Sc, 3Ac, 10-Ci
	09	H172	-37.8	E	6	20	10-	●	5Ac, 10-Ci
	12	H249	-32.8	ENE	4	20	10-	⊕	10-Ci
	15	H275	-32.2	ENE	4	5	10-	✖	3As, 10-Ci
	18	Z4	-36	E	7	3	10-	✖	10-As
14	21	Z4	-36.5	E	5	3	10-	✖	2As, 10-Ci
	06	Z4	-38.5	E	7	0.8	10-	†	10-Ci
	09	Z4	-40	E	11	0.6	2	†	2Ci
	12	Z21'	-38.5	E	14	0.05	0	†	
	15	Z21'	-38	ESE	16	0.03	0	†	
15	18	Z21'	-39.5	ESE	15	0.03	10	†	
	21	Z21'	-39.5	E	18	0.01	10	†	
	06	Z21'	-39.5	E	20	0.01	10	†	
	09	Z21'	-35.5	E	22	0.01	10	†	
	12	Z21'	-33	E	22	0.01	10	†	
	15	Z21'	-30.3	E	18	0.05	10	†	
	18	Z21'	-28	E	18	0.03	10	†	
16	21	Z21'	-28	E	20	0.03	10	†	
	06	Z21'	-30.8	E	15	0.05	10	†	
	09	Z21'	-28.7	ESE	16	0.06	10	†	
	12	Z21'	-28.4	ESE	16	0.1	10-	†	10-Ci
	15	Z21'	-27.8	ESE	13	0.3	0+	○	0+Ac, 0+Ci
17	18	Z21'	-36.7	E	16	0.3	0	○	
	21	Z21'	-39	ESE	13	0.2	0	○	
	06	Z21'	-42	E	16	0.03	10	†	
	09	Z21'	-39.7	E	16	0.01	10	†	
	12	Z21'	-37.2	E	15	0.08	10	†	
	15	Z21'	-33.2	ENE	10	0.02	10	✖	
	18	Z21'	-32	E	12	0.01	10	✖	
21	Z21'	-34.5	ENE	9	0.05	10	✖		

Date	LT	Point	Ta	WD	WS	V	N	W	CL
SEP 18	06	Z21'	-44	E	4	3	0	○	
	09	Z21'	-39	ENE	7	0.3	0+	○	0+Ci
	12	Z21'	-35	E	8	0.3	0+	○	0+Ci
	15	Z21'	-35.5	ENE	10	0.6	0+	○	0+Ci
	18	Z36'	-39.7	E	11	0.3	0+	○	0+Ci
19	21	Z38'	-41.7	ESE	11	0.2	0	○	
	06	Z38'	-40	E	9	0.3	0	○	
	09	Z38'	-35.5	ESE	14	0.2	0	○	
	12	Z42'	-32	E	13	0.2	0	○	
	15	Z74'	-32.2	E	10	0.4	1	○	1Ac, 0+Ci
20	18	Z88	-36	E	14	0.05	1	○	1Ac
	21	Z91'	-38.5	E	16	0.03	0	○	
	06	Z91'	-37.2	E	9	2	2	⊕	2Ac, 0+Ci
	09	Z91'	-32.4	E	11	1.5	1	○	1Ci
	12	Z96	-29.5	E	11	5	10-	⊕	10-Ci
21	15	MIZUHO	-32	E	10	10	3	⊕	3Ci
	18	MIZUHO	-35.7	E	10	20	7	⊕	0+Ac, 7Ci
	21	MIZUHO	-37	E	8	20	0+	○	0+Ci
	06	MIZUHO	-35.7	E	9	5	10-	●	10-As
	09	MIZUHO	-31.2	E	9	5	10-	●	10-As
22	12	MIZUHO	-30.2	E	8	5	10-	●	6As, 4Ac
	15	MIZUHO	-31.4	E	7	20	1	○	1Ac, 0+Ci
	18	MIZUHO	-35	E	7	15	8	⊕	8Ac
	21	MIZUHO	-36.4	E	8	5	3	⊕	3Ac
	06	MIZUHO	-41.2	E	8	1.5	0	○	
23	09	MIZUHO	-36.5	E	9	2	0	○	
	12	MIZUHO	-32.5	E	10	5	0	○	
	15	MIZUHO	-32.3	E	9	30	0	○	
	18	MIZUHO	-35	E	11	20	0	○	
	21	MIZUHO	-35.8	E	10	10	0	○	
24	06	MIZUHO	-39	E	9	20	0+	○	0+Ac
	09	MIZUHO	-33.8	E	11	20	0+	○	0+Ac, 0+Ci
	12	MIZUHO	-32.7	E	8	20	0+	○	0+Ac, 0+Ci
	15	MIZUHO	-33.7	E	10	20	0+	○	0+Ac, 0+Ci
	18	MIZUHO	-36	E	11	20	0+	○	0+Ac
24	21	MIZUHO	-37.7	E	9	10	0+	○	0+Ac
	06	MIZUHO	-42.5	E	7	20	0+	○	0+Ac
	09	MIZUHO	-38.5	E	10	3	0	○	
	12	MIZUHO	-35.1	E	11	2	1	○	1Ci
	15	MIZUHO	-35.5	E	10	5	3	⊕	3Ci

Date	LT	Point	Ta	WD	WS	V	N	W	CL
SEP 24	18	MIZUHO	-37.5	E	10	5	10-	⊕	1Ac, 10-Ci
	21	MIZUHO	-38	E	10	5	6	⊕	2Ac, 5Ci
25	06	MIZUHO	-36	ENE	9	0.5	10	✱	10As
	09	MIZUHO	-32.5	E	10	1	10	✱	10As
	12	MIZUHO	-31.7	E	10	3	10-	⊕	2As, 10-Cs
	15	MIZUHO	-30.2	E	9	3	10	●	10As
	18	MIZUHO	-31.7	E	9	3	10	✱	10As
	21	MIZUHO	-32.5	E	10	5	10-	●	10-As
	26	06	MIZUHO	-36	E	5	10	10-	⊕
09		MIZUHO	-33	E	5	20	6	⊕	1Ac, 6Ci
12		MIZUHO	-31.5	E	5	30	3	⊕	1Ac, 3Ci
15		MIZUHO	-22.5	E	7	30	8	⊕	8Ci
18		MIZUHO	-36.5	E	4	30	0+	○	0+Ac, 0+Ci
21		MIZUHO	-40	E	3	30	0+	○	0+Ac
27		06	MIZUHO	-43.7	E	1	20	10-	⊕
	09	MIZUHO	-38.5	E	5	20	10-	⊕	0+As, 10-Ci
	12	MIZUHO	-32.3	E	4	20	10-	✱	0+Ac, 10-Ci
	15	MIZUHO	-36	NE	4	30	8	✱	8Ci
	18	MIZUHO	-39.5	NE	4	20	8	✱	6As, 2Ac
	21	MIZUHO	-44	E	6	30	0+	○	0+Ac
	28	06	MIZUHO	-48.3	E	7	0.8	0	○
09		MIZUHO	-42.4	E	10	0.5	0	○	
12		MIZUHO	-39.2	E	12	0.5	0	○	
15		MIZUHO	-37.4	E	12	0.8	0	○	
18		MIZUHO	-40.2	E	9	0.8	0	○	
21		MIZUHO	-42	E	9	0.8	0	○	
29		06	MIZUHO	-39.2	E	9	0.8	2	⊕
	09	MIZUHO	-35.1	E	10	0.6	8	⊕	0+Ac, 8Ci
	12	MIZUHO	-33.3	E	8	1.5	8	⊕	8Ci
	15	MIZUHO	-32	E	6	30	3	⊕	1Ac, 3Ci
	18	MIZUHO	-37	E	7	30	1	○	0+Ac, 1Ci
	21	MIZUHO	-39	E	8	20	3	⊕	0+Ac, 3Ci
	30	06	MIZUHO	-42.5	E	9	20	0	○
09		MIZUHO	-38	E	10	10	0+	○	0+Ac
12		MIZUHO	-33	E	7	20	0+	○	0+Ci
15		MIZUHO	-33.5	E	6	30	0+	○	0+Ci
18		MIZUHO	-36.9	ESE	7	30	0+	○	0+Ci
21		MIZUHO	-39	E	6	30	0+	○	0+Ac, 0+Ci
OCT 1		06	MIZUHO	-40	E	8	2	1	○
	09	MIZUHO	-35.2	E	9	2	.4	⊕	4Ci

Date	LT	Point	Ta	WD	WS	V	N	W	CL	
OCT	1	12	MIZUHO	-32	E	8	2	8	⊙	8Ci
		15	MIZUHO	-31.5	E	7	20	4	⊙	1Ac,4Ci
		18	MIZUHO	-32.6	E	8	10	10-	⊙	3As,10-Ci
		21	MIZUHO	-30.9	E	8	2	10-	⊙	4As,10-Ci
	2	06	MIZUHO	-35.2	E	9	2	10-	⊙	0+As,10-Ci
		09	MIZUHO	-31.5	E	8	5	10-	⊙	10-Ci
		12	MIZUHO	-28.9	E	8	10	10-	⊙	10-Cs
		15	MIZUHO	-28.6	ENE	9	5	10-	⊙	10-Cs
		18	MIZUHO	-31.8	E	7	20	10-	⊙	0+Ac,10-Ci
		21	MIZUHO	-35	E	10	20	0+	○	0+Ac,0+Ci
		3	06	MIZUHO	-38.2	E	11	5	4	⊙
	09		MIZUHO	-35.3	E	10	3	7	⊙	7Ci
	12		MIZUHO	-31.5	E	11	10	10-	⊙	10-Ci
	15		MIZUHO	-30.3	E	11	20	10-	⊙	10-Ci
	18		MIZUHO	-33.1	E	10	20	10-	⊙	0+Ac,10-Ci
	21		MIZUHO	-34.5	E	13	5	2	⊙	2Ci
	4		06	MIZUHO	-36.1	E	10	5	10-	⊙
		09	MIZUHO	-31.3	E	13	0.8	10	✱	10As
		12	MIZUHO	-29.4	ENE	9	0.8	10-	✱	7As,10-Ci
		15	MIZUHO	-28.6	E	10	10	10-	⊙	10-Cs
		18	MIZUHO	-32	E	6.5	30	10-	⊙	0+Ac,10-Ci
21		MIZUHO	-33.3	E	11	30	3	⊙	0+Ac,3Ci	
5		06	MIZUHO	-35.6	E	14	0.3	0	○	
	09	MIZUHO	-30.3	E	15	0.3	0	○		
	12	MIZUHO	-28	E	11	1.5	0	○		
	15	MIZUHO	-27.7	E	11	10	3	⊙	3Ac,0+Ci	
	18	MIZUHO	-31.2	E	9.5	30	8	⊙	0+Ac,8Ci	
	21	MIZUHO	-31.5	E	9	20	10-	⊙	10-Ci	
	6	06	MIZUHO	-34.2	E	12	5	10-	⊙	10-Ci
09		MIZUHO	-30.3	E	7	20	2	⊙	0+Ac,2Ci	
12		MIZUHO	-28.5	E	7.5	30	3	⊙	0+Ac,3Ci	
15		MIZUHO	-29.3	E	7	30	2	⊙	0+Ac,2Ci	
18		MIZUHO	-33.4	E	7.5	30	1	○	0+Ac,1Ci	
21		MIZUHO	-37.9	E	9.5	30	0+	○	0+Ci	
7		06	MIZUHO	-42	E	10	5	0	○	
	09	MIZUHO	-36.6	E	8	10	0	○		
	12	MIZUHO	-33.2	E	5.5	30	0	○		
	15	MIZUHO	-32.4	E	8	30	0	○		
	18	MIZUHO	-36.7	E	7	30	0+	○	0+Ci	
	21	MIZUHO	-40.2	E	8	30	0+	○	0+Ac	

Date	LT	Point	Ta	WD	WS	V	N	W	CL
OCT 8	09	MIZUHO	-38.8	E	9.5	20	0+	○	0+Ci
	12	MIZUHO	-34.5	ENE	7.5	30	0+	○	0+Ci
	15	MIZUHO	-33	E	4.5	30	0+	○	0+Ci
	18	MIZUHO	-37.5	E	7.5	30	0+	○	0+Ac
	21	MIZUHO	-40.5	E	7.5	30	0+	○	0+Ac
9	06	MIZUHO	-44	E	10	2	0	○	
	09	MIZUHO	-39.5	E	10	3	0	○	
	12	MIZUHO	-34.8	E	9	10	0	○	
	15	Z101	-34.5	E	7.5	30	0	○	
	18	Z83'	-37	E	7.5	30	0	○	
10	21	Z74	-40.6	SE	7.5	30	0+	○	0+Ac
	06	Z74	-43	E	7.5	0.8	0	○	
	09	Z74	-39.5	SE	10	0.8	0	+	
	12	Z47	-35.6	ESE	10	5	0	○	
	15	Z30	-34.5	ESE	7.5	30	0	○	
11	18	Z6'	-36.2	E	6.5	30	0+	○	0+Ac
	21	S122	-40.3	E	9	30	0+	○	0+Ac
	06	S122	-42.5	ESE	6	30	0+	○	0+Ac
	09	H291	-35.8	ESE	6	30	0+	○	0+Ac
	12	H225	-28.9	E	4.5	30	0+	○	0+Ac
12	15	H150	-29.1	ENE	3.5	20	0+	○	0+Sc,0+Ac,0+Ci
	18	H78	-33.7	SSE	2	20	0+	○	0+Sc,0+Ac,0+Ci
	21	H15	-33	ESE	5	20	1	○	0+Sc,0+Ac,1Ci
	06	H15	-30.6	E	6.5	30	0+	○	0+Sc,0+Ac,0+Ci
	09	H15	-26	ENE	5.5	20	0+	○	0+Sc,0+Ac,0+Ci
	12	S16	-19.8	ESE	5	30	1	○	1Sc,0+Ac,0+Cc,0+Ci

Table 4-6. Surface meteorological data obtained during oversnow traverse. from S16 to Mizuho Station in October 1989.

Date	LT	Point	Ta	WD	WS	N	V
OCT 3	12	S16	-13.2	NE	6.5	8	⊖
	20	H120	-25.5	ESE	8	10	●
4	06	H120	-29.4	ESE	8	6	⊖
	09	H120	-25.3	E	9.5	7	⊖
	13	H230	-24.6	E	10	5	⊖
	16	S122	-25.8	E	9	8	⊖
	18	Z21	-29.5	E	9	10-	⊖+
5	06	Z29	-32.5	E	13.5	8	+
	09	Z29	-29.4	E	15	1	+
	13	Z71	-27.3	E	13.5	1	+
	15	Z84	-27	E	9	2	+⊖

Table 4-7. Surface meteorological data obtained during oversnow traverse from S16 to Mizuho Station in January 1990.

Date	LT	Point	Ta	WS	V	V
JAN 11	19	S30	-7.4	—	30	○
12	09	H35	-8.7	3	10	⊖
13	09	H180	-12.3	5	30	○
14	09	S122	-14.6	5	30	○
15	09	MIZUHO	-14.5	4	10	●
16	12	MIZUHO	-17.3	8	10	○+
17	09	MIZUHO	-18.2	7	30	○
18	09	MIZUHO	-12.5	9	10	○+
19	09	H180	-5.5	10	1	●+
20	09	S16	-1.5	10	10	●

Table 4-8. Surface meteorological data obtained during oversnow traverse from S16 to H180 in April 1990.

Date	LT	Point	Ta	WS	V	W
APR 11	18	H94	-25.1	11	20	○+
12	18	H180	-32	11	0.1	○+
13	18	H179	-28	10	0.05	⊕+
14	17	S87	-24.6	13	0.05	●+
15	18	S16	-11.6	12	0.3	●+
16	17	S16	-8	18	0.05	✕+
17	07	S18	-9	10	20	●

Table 4-9. Surface meteorological data obtained during oversnow traverse from S16 to Mizuho Station in October 1990.

Date	LT	Point	Ta	WS	V	W
OCT 3	21	S18	-14.6	4	8	●
4	21	H180	-27.5	9.5	15	○
5	21	H259	-25	11	0.2	+
6	21	MIZUHO	-34.2	9.5	0.5	+
7	21	Z39	-26.5	10	0.7	+
8	21	H274	-20.2	11.5	0.2	+
9	21	H274	-21.3	14.5	0.07	+
10	21	H274	-26.5	11	0.9	+
11	21	H180	-24.1	10.5	0.05	+
12	21	H180	-19.5	18	0.02	+
13	21	H180	-17.5	18	0.07	+
14	21	H61	-20.4	10	5	⊕
15	12	S21	-11.6	6	20	●

Table 4-10. Surface meteorological data obtained during oversnow traverse from S16 to Mizuho Station in January 1991.

Date	LT	Point	Pa	Ta	WD	WS	V	W
JAN 20	12	S20	894	-1.9	ENE	6	30	
	15	S25	870	-3.5	E	5	30	○
	18	H45	842	-7.3	SE	5	30	
21	21	H68	835	-11.2	ESE	4	30	○
	09	H77	831	-10.1	NE	8	30	○
	12	H132	820	-9.4	NNE	10	30	●
	15	H180	804	-10.9	NNE	10	0.2	✦
	18	H225	793	-11.0	NE	8	0.6	
22	09	H253	784	-11.7	ENE	9	0.2	✦
	12	S122	769	-10.8	ENE	9	0.6	
	15	Z12	760	-12.5	ENE	7	30	
23	18	Z40	753	-15.9	ENE	5	30	○
	21	Z47	749	-20.3	E	4	30	○
	09	Z47	751	-21.2	ENE	11	30	○
	12	Z82	743	-18.9	ENE	9	30	○
	16	MIZUHO	740	-18.3	E	8	30	○
	17	MIZUHO	739	-18.6	E	8	30	○
	18	MIZUHO	740	-19.6	ENE	7	30	○
	19	MIZUHO	741	-20.5	ENE	7	30	○
	20	MIZUHO	741	-21.4	ENE	6	30	○
	21	MIZUHO	742	-23.3	ENE	6	30	○
24	22	MIZUHO	742	-25.0	ENE	6	30	○
	07	MIZUHO	746	-25.0	NE	6	30	●
	08	MIZUHO	746	-23.8	ENE	7	30	○
	09	MIZUHO	745	-23.0	ENE	12	10	
	10	MIZUHO	744	-22.9	E	12	10	
	11	MIZUHO	746	-21.6	ENE	11	20	
	12	MIZUHO	746	-20.5	NE	11	20	
	15	MIZUHO	745	-19.8	ENE	11	30	
	18	MIZUHO	745	-19.9	ENE	8	30	○
	21	MIZUHO	745	-23.5	ENE	6	30	○
25	09	MIZUHO	745	-20.4	ENE	11	30	
	12	MIZUHO	742	-14.9	ENE	8	20	
	15	Z75	747	-14.9	ENE	8	20	●
26	18	Z26	760	-14.4	ENE	7	20	●
	09	S122	773	-16.1	ENE	9	1	
	12	S225	799	-10.7	NE	7	30	
	15	S180	811	-10.0	NE	5	10	●
	18	H102	835	-10.3	NE	3	30	
27	21	H77	844	-15.3	NE	4	30	○
	09	H77	844	-11.1	NE	5	20	○
	12	S26	880	-6.0	ENE	5	5	●
	15	S16	917	-4.1	NE	4	30	●

Table 4-11. Surface meteorological data obtained during oversnow traverse from S16 to Mizuho Station in April- May 1991.

Date	LT	Point	Ta	WD	WS	V	N	W	CL
APR 26	15	S16	-22.0	ESE	7	30	0+	○+	0+Ci
	18	S16	-23.0		10.5	5	0+	○+	0+Ci
27	08	S16	-20.0					○	
	15	S16	-18.5	ENE	11	20		○	
28	18	S19-4	-19.0	E	12	15		○+	
	09	S19-4	-22.5	E	8	20	0+	○+	0+Ci
	12	S23	-23.0	E	9	15	1	○+	1 Ci
	15	S26-4	-25.1	ESE	7.5	20	1	○	1 Ci
29	18	H1	-27.0		8.5	20		○+	
	09	H1	-25.5	ENE	12	1	3	⊕+	2 Ac, 1 Ci
30	16	H1	-19.5	E	15	0.05	10	✦	10 As
	09	H1	-17.3	E	10	0.2	10-	●+	3 As, 6 Ac, x Ci
	15	H1	-16.4	ENE	8.5	0.3	10	●+	10 As
MAY 1	19	H20	-18.5	ESE	7	0.5	10	✦	10 As
	08	H20	-25.5	ESE	8	5	10-	●+	4 Ac, x As, x Ci
	10	H42	-28.9	ESE	8	5	9	●+	7 Ac, x Ci
	12	H68	-30.5	ESE	8.5	5	7	⊕+	1 Sc, 3 Ac, 6 Ci
	15	H88	-29.2	E	7.5	5	10	●+	10-As, x Ci
2	19	H107	-31.0	E	8	10	10-	●+	4 Ac, 6 As, x Ci
	09	H107	-29.3	E	7	0.5	10	●+	10 As
	12	H130	-23.5	NE	4.5	0.1	10	✦	10 As
3	19	H155	-24.0	ENE	4.5	0.3	10	✦	10 As
	08	H155	-28.6	ESE	5.5	10	10-	●	8 Ac, x Ci
	10		-33.6	ESE	4.5	30	1	○	1 Ac, 0+Ci
	12	H192	-33.6	ESE	3	30	0+	○	0+Ac, 0+Ci
	15	H220	-33.5	ESE	6.5	5	1	○+	0+Ac, 1 Ci
4	20	H240	-36.8	ESE	5	10	1	○	1 Ci
	07	H240	-30.5	E	4.5	20	10	⊕	2 Ac, 10 Cs
	10	H256	-27.0	E	5.5	15	10	●	10As
	12	H276	-26.9	E	7	5	10	●+	6 Ac, 10 As
	15	H293	-28.4	E	9	1.5	10	⊕+	10 Cs
5	19	H300	-31.0	ENE	11	0.2		+	
	08	H300	-23.0	-	15	0.03	10	✦	
6	09	H300	-24.1	E	6	10	10	⊕	4 Ac, 10 Cs
	12	S122	-25.5	E	10.5	0.5	10-	●+	10-Ac
	15	Z1'	-25.5	ENE	11.5	0.03		✦	
7	21	Z10'	-29.2	ENE	8	0.3		✦	
	07	Z10'	-31.7	E	5.5	5	10	✦	10 As
	10	Z18	-39.7	ESE	6	30	2	⊕	2 Ci
	12	Z30	-42.0	E	7.5	30	2	⊕+	2 Ci
	15	Z42	-43.9	E	8	15	2	⊕+	2 Ci

Date	LT	Point	Ta	WD	WS	V	N	V	CL
MAY 7	20	Z47	-45.6	E	7	20	0+	○	0+Ci
8	08	Z47	-45.0	E	5	30	4	⊙	4 Ci
	11	Z47	-45.6	E	6	30	2	⊙	2 Ci
	12	Z58	-44.1	E	7	30	3	⊙	0+Ac, 3 Ci
	15	Z74	-47.5	E	6.5	20	3	⊙	0+Ac, 3 Ci
	18	Z86'	-46.0	E	6	20	1	○	1 Ci
9	08	Z86'	-37.8	E	10	1	10	✱	10 As
	17	Z91'	-35.6	E	14	0.03	10-	⊙+	
10	08	Z91'	-38.3	E	6	5	3	⊙+	3 Ci
	10	Z98	-39.9	ENE	6	1	7	⊙+	1 Ac, 7 Ci
	12	MIZUHO	-39.1	E	7	1	10-	✱	x As, x Ci
	21	MIZUHO	-40.0	ENE	8.5	0.1		+	
11	09	MIZUHO	-36.2	E	7	1	10-	⊙+	3 Ac, 10-Ci
	15	MIZUHO	-34.1	ENE	9	0.05	10	⊙+	10 As
	20	Z89	-34.2	ENE	10	0.03	10	+	
12	08	Z89	-38.0	E	11.5	0.05	10-	⊙+	10-Ci
	10	Z87	-37.5	E	11.5	0.05	10-	⊙+	10-Ci
	12	Z79'	-38.7	E	10	0.2	10-	⊙+	3 Ac, 10-Ci
	15	Z67	-39.0	E	11.5	0.1	7	⊙+	3 Ac, 7 Ci
	20	Z36	-37.5	ENE	14	0.05	10-	⊙+	4 Ac, 10-Ci
13	08	Z36	-33.5	ENE	8	5	3	⊙+	3 Ci
	10	Z30	-31.6	E	8.5	0.3	10	⊙+	10 As
	12	Z20	-31.3	E	10.5	0.4	10-	⊙+	4 As, 10-Ci
	15	Z9	-29.4	E	10	0.6	10-	⊙+	2 As, 10-Ci
	21	H256	-27.5	ENE	7	0.5	2	⊙+	2 Ci
14	10	H256	-31.5	E	8	10	3	⊙	0+Ac, 3 Ci
	12	H234	-31.5	E	8	3	3	⊙+	1 Ac, 3 Ci
	15	H200	-30.5	E	11	1	2	⊙+	1 Ac, 2 Ci
	21	H133	-31.0	E	11.5	0.3	2	⊙+	2 Ci
15	08	H133	-32.8	E	12	0.3	0	○+	
	10	H116	-32.4	E	10.5	1	0+	○+	0+Ci
	12	H91	-32.1	E	10.5	1	0+	○+	0+Ci
	15	H47	-30.6	E	7	4	0+	○+	0+Ac, 0+Ci
	23	S16	-24.5	E	8.5	3	0+	○+	0+Ci
16	08	S16	-21.4	E	12	3	10-	⊙+	0+Ac, 10-Ci
	12	No.50	-18.6	ESE	14	0.5	10-	⊙+	10-Ci
17	10	No.8	-10.8	ESE	18	0.03	10	✱	
18	09	TOTSUKI	-9.2	E	11	10	10-	⊙+	10-Ac, x Ci

Table 4-12. Surface meteorological data obtained during oversnow traverse from S16 to Relay Point in October- November 1991.

Date	LT	Point	Ta	WD	WS	V	N	V
OCT 13	16	S16	-13.2	E	3	40	2	⊕
	20	S30	-24.0	E	5	40	9	●
14	08	S30	-19.3	E	5	20	10	●
	15	H45	-15.8	E	3	20	10	✱
15	08	H97	-21.6	ENE	3	20	10	●
	15	H148	-20.2	NNE	4	5	7	●
	21	H201	-22.4	E	2	5	10	✱
16	08	H201	-28.0	ESE	6	0.3	2	⊕+
	15	H219	-22.8	ENE	6	40	0	○
	21	H272	-29.2	E	8	40	1	○
17	10	H272	-26.0	ENE	6	20	10	⊕
	15	Z15'	-27.3	NE	4	40	0	○
	21	Z62	-33.8	ENE	7	20	3	●
18	08	Z62	-34.5	ENE	6	2	2	⊕
	13	Z62	-29.8	E	7	40	4	⊕
19	08	MIZUHO	-35.3	E	5	20	9	⊕
	11	MIZUHO	-30.0	E	6	10	10	⊕
	15	MIZUHO	-28.5	ENE	3	20	9	⊕
20	08	MIZUHO	-38.5	ENE	6	2	0	○+
21	09	MIZUHO	-36.5	E	9	2	0	○+
	14	MD0	-33.5	E	6	20	2	○
	15	MD1	-33.6	E	5	20	1	○
	21	MD20	-40.8	E	6	40	1	○
22	10	MD20	-31.2	ENE	5	2	9	●
	15	MD36	-28.0	ENE	4	2	10	✱
	20	MD50	-31.6	NE	5	3	10	✱
23	10	MD50	-27.5	E	5	2	10	●
	13	MD70	-24.5	ENE	1~2	10	10	⊕
	21	MD84	-34.0	E	3	10	10	⊕
24	13	MD84	-29.5	ENE	3	10	10	●
	15	MD94	-30.0	E	1~2	10	10	⊕
25	09	MD100	-34.9	E	1~2	20	6	⊕
	15	MD118	-32.5	SE	1~2	20	2	○
	21	MD134	-46.2	SE	5	10	0	○
26	08	MD134	-46.3	ESE	5	2	1	○+
	15	MD148	-37.2	E	8	2	0	○+

Date	LT	Point	Ta	WD	WS	V	N	W
OCT 26	21	MD168	-43.2	ESE	9	1	3	⊙
27	15	MD168	-31.2	E	7	10	3	⊙
28	09	MD168	-37.8	ESE	4	20	9	⊙
	15	MD184	-33.6	ESE	3	20	7	●
	19	MD200	-40.8	SE	1~2	20	4	⊙
29	10	MD200	-40.1	SE	5	20	2	○
	15	MD216	-37.6	SE	5	20	2	○
	22	MD234	-47.0	SE	8	20	3	⊙
30	09	MD234	-42.7	SE	8	3	2	○
	15	MD248	-39.2	ESE	7	4	4	⊙
	20	MD268	-45.5	ESE	5	20	4	⊙
31	10	MD268	-42.2	SE	3	10	3	⊙
	15	MD280	-40.1	SE	4	20	3	⊙
	23	MD300	-54.0	SE	3	20	2	⊙
NOV 1	14	MD300	-42.3	SE	3	20	2	○
	21	MD300	-50.2	SE	3	20	2	○
2	10	MD300	-46.7	SE	8	0.5	5	⊙+
	15	MD314	-41.7	ESE	8	1	6	⊙
	21	MD338	-49.6	SE	7	2	3	⊙
3	15	MD346	-42.1	SE	8	0.6	3	⊙+
	21	MD346	-50.2	SE	8	1	4	⊙+
4	14	MD346	-41.7	SE	8	2	3	⊙+
	20	MD346	-45.5	SE	7	2	3	⊙+
5	14	MD364	-41.0	SE	8	0.5	6	⊙+
	21	MD364	-48.5	ESE	5	5	3	⊙
6	14	MD364	-39.2	SE	6	2	7	⊙
	23	MD364	-49.6	SE	5	2	6	⊙
7	16	MD364	-36.6	ESE	6	2	6	⊙
	20	MD364	-41.6	SE	7	1	6	⊙
8	10	MD364	-40.7	SE	7	1	4	⊙+
	15	MD340	-34.6	ESE	9	1	4	⊙+
9	10	MD314	-38.5	ESE	9	1	5	⊙+
	15	MD266	-35.1	ESE	9	0.5	3	⊙+
	21	MD224	-38.3	ESE	9	1	1	○+
10	10	MD224	-32.2	ESE	8	1	5	⊙+
	15	MD186	-30.1	E	10	0.5	7	⊙+

Date	LT	Point	Ta	VD	WS	V	N	V
NOV 10	21	MD144	-30.4	E	8	5	9	●+
11	10	MD144	-28.5	E	10	0.5	5	⊕+
	15	MD118	-27.3	E	8	1	5	⊕+
	21	MD84	-29.8	E	8	1	6	⊕+
12	16	MD84	-28.2	E	5	20	1	○
	23	MD84	-30.1	E	5	20	1	○
13	10	MD84	-27.3	E	7	20	4	⊕
	16	MD76	-23.5	ENE	4	30	0	○
	22	MD34	-27.2	E	4	30	1	○
14	10	MD34	-16.8	ENE	8	3	10	●
	15	MD6	-14.5	NE	7	3	10	●
17	09	MIZUHO	-24.7	E	7	20	9	●
19	10	Z60	-22.5	ENE	7	10	1	○
	15	Z20	-17.0	ENE	5	20	0	○
	23	H169	-24.0	E	7	20	0	○
20	09	H169	-17.2	E	7	20	1	○
	15	H27	-10.2	NE	5	20	0	○
21	10	S16	-6.5	ENE	5	40	2	○

Table 4-13. Surface meteorological data obtained during oversnow traverse from S16 to Relay Point in November-December 1991.

Date	LT	Point	Ta	WD	WS	V	N	V	CL
NOV 10	15	S22	-13.0	NE	7	30	10-	⊕+	0+Ac 10-C
	11	H100	-16.0	E	15	0.2	9	⊕+	9Ci
	15	H208	-16.5	E	11	0.5	8	⊕+	8Ci
	20	Z1	-22.5	ENE	7	20	1	⊕+	0+Ac 1Ci
12	08	Z1	-24.5	E	5	30	2	⊕+	0+Ac 2Ci
	13	Z40	-21.0	E	11	30	0	⊕+	
	15	Z58	-20.6	E	7	30	0	⊕+	
	20	MIZUHO	-30.5	E	9	30	0+	⊕+	0+Ci
13	11	MIZUHO	-23.3	E	8	30	0+	○	0+Ac
	14	MIZUHO	-32.0						
	16	MIZUHO	-20.5	E	5	30	0	○	
14	11	MIZUHO	-16.0	E	6	5	10-	✱	10-Ac
	15	MIZUHO	-15.5	E	8	5	10-	●	8Ac 9Ci
15	12	MIZUHO	-19.8	E	9	5	8	⊕+	8Ci
	16	MIZUHO	-19.5	E	8	10	2	⊕+	2Ci
16	08	MIZUHO	-23.0	E	8	30	3	⊕	3Ci 0+Ac
	10	MIZUHO	-20.5	E	7	30	5	⊕	0+Ac 5Ci
	11	MIZUHO		E	7	30	6	⊕	0+Ac 6Ci
	18	MIZUHO	-20.1	E	6	30	8	⊕	0+Ac 8Ci
17	08	MIZUHO	-23.5	E	6	30	5	⊕	5Ci
	15	MIZUHO	-18.9	E	5	30	1	○	1Ci
18	09	MIZUHO	-24.5	E	7	30	0	○	
	22	MD6	-28.6	E	7	30	0+	○	0+Ac
19	08	MD6	-28.0	E	9	5	0	⊕+	
	15	MD16	-21.0	E	7	30	0	○	
	20	MD28	-27.5	E	6	30	0	○	
20	08	MD28	-27.2	E	8	5	0	⊕+	
	14	MD54	-21.8	E	10	30	0	○	
	21	MD64	-26.9	E	7	30	0+	○	0+Ci
21	08	MD64	-26.0	E	9	5	0	⊕+	
	15	MD100	-21.0	E	10	2	0	⊕+	
	22	MD134	-28.5	E	9	5	0	⊕+	
22	08	MD134	-27.5	E	9	5	0	⊕+	
	16	MD164	-22.4	E	9	5	0	⊕+	
	23	MD214	-32.4	ESE	8	5	0	⊕+	
23	08	MD214	-31.4	ESE	10	5	0	⊕+	

Date	LT	Point	Ta	WD	WS	V	N	W	CL
NOV 23	15	MD246	-25.4	ESE	8	5	0-	⊙+	0+Ci
	23	MD290	-35.5	ESE	5	20	0	⊙	
24	01	MD290	-36.5						
	08	MD290	-33.5	ESE	7	20	0	⊙	
	15	MD320	-26.5	ESE	5	30	2	⊙	2Ci
	22	MD364	-33.5	ESE	4	30	9	⊙	9Ci
25	17	MD364	-30.5	ESE	7	5	4	⊙+	4Ci
26	01	MD364	-40.4	ESE	4	20	3	⊙	3Ci
	12	MD364	-30.5	ESE	8	2	10	⊙+	10Cs 4Ci
	15	MD364	-29.5	ESE	10	1	10	⊙+	8Ci 10Cs
	23	MD364	-35.7	ESE	7	2	3	⊙+	3Ci
27	02	MD364	-36.0	ESE	8	0.5	10-	+	10-Ci
	08	MD364	-30.1	ESE	9	1	10-	⊙+	10-Ci
	15	MD316	-24.0	ESE	10	0.5	10-	+	10-Ci
	23	MD260	-28.5	ESE	7	0.4	10-	×+	4Ac 10-Ci
28	08	MD269	-28.5	ESE	5	20	2	⊙	0+Ac 2Ci
	15	MD214	-22.4	ESE	6	20	0	⊙	
	23	MD150	-27.5	ESE	9	10	10-	⊙+	0+Ac 2Ci 10-Cs
29	08	MD150	-26.0	ESE	10	0.1	0	+	
	15	MD100	-15.9	E	12	0.08	10	×+	
30	08	MD100	-19.0	E	14	0.05	10	×+	
	16	MD100	-16.0	E	11	0.05	10	×+	
	24	MD100	-19.0	E	16	0.03	10	×+	
DEC 1	08	MD100	-17.5	E	10	0.2	10	+	10As
	15	MD48	-14.0	E	12	0.1	10-	+	10-Ac
2	01	MD40	-20.3	E	12	0.3	10-	+	10-Ac
	08	MD40	-17.9	E	16	0.1	10-	+	10-As
	15	MIZUHO	-13.4	E	15	0.4	6	+	4Ac 4Ci
	23	MIZUHO	-21.9	E	10	5	10-	⊙+	3Ac 10-Ci
3	09	MIZUHO	-19.9	E	16	0.2	10-	+	10-Ci
	15	MD24	-17.5	E	13	0.2	0+	+	0+Ci
	24	MIZUHO	-24.0	E	13	1.5	0+	+	0+Ci
4	08	MIZUHO	-22.0	E	12	0.8	0	+	
	15	MIZUHO	-13.0	E	8	20	0+	⊙	0+Ac
5	00	H280	-12.4	E	5	10		⊙	7Ac 0+Sc
	08	H280	-8.9	E	7	10	9	●	9Ac

Date	LT	Point	Ta	WD	WS	V	N	V	CL
DEC 5	15	H197	-5.4	E	8	10	10-	⊕	0+Ci 10-Ci
	24	H84	-11.0	E	10	5	2	⊕+	1Ac 1Ci
6	09	H84	-8.4	ENE	11	3	0+	○+	0+Ci
	15	S24	-2.8	ENE	9	20	0+	○	0+Ci
7	08	S16	-4.5	ENE	7	30	6	⊕	6Ac
	15	S16	-0.4	NNE	3	30	9	●	9Ac
	24	S16	-9.0	E	9	30	1	○+	1Ac
8	09	S16	-6.4	E	10	10	0	○+	
	16	S16	-3.5	NE	3	30	0+	○	0+Sc 0+Ac
	23	S16	-8.6	ENE	7	30	5	⊕	5Ac
9	08	S16	-2.9	E	8	20	10-	●+	10-Ac
	13	S16	-1.5	ENE	8	10	10-	●	10-Ac

Table 4-14. Surface meteorological data obtained during oversnow traverse from Asuka Station to S16 in December 1991- January 1992.

Date	LT	Point	Ta	WD	WS	V	N	W	CL
DEC 22	10	ASUKA	-3.1	ESE	11.5	50	7	⊙	0+Cu 7Ci
	15	RY246-3	-0.9	ESE	9	50	6	⊙	6Ci
	21	RY227	-1.8	ESE	4	50	5	⊙	5Ci
23	08	RY227	-1.7	ESE	5	50	3	⊙	3Ci
	14	RY220	-1.4	ESE	7	50	3	⊙	3Ci
	21	RY183	-4.3	SE	7	50	1	○	1Ci
24	09	RY183	-6.8	SE	9	30	10	●	2Sc 10As
	16	RY183	-4.7	ESE	13	10	10	●	2As 10As
	21	RY183	-6.2	E	13	0.5	10	✕	10
25	10	RY183	-6.5	ESE	10.5	0.05	10	✕	10
	15	RY183	-5.2	E	11	0.05	10	✕	10
	21	RY183	-5.7	E	8	0.3	10	✕	10
26	10	RY183	-6.1	E	8	1	10	✕	10
	15	RY183	-4.6	E	10	2	10	●	8St 10Ac
	21	RY183	-6.9	ESE	7.5	5	10	●	6St 10Ac
27	09	RY183	-8.5	SE	7	30	1	○	1Ci
	14	RY175	-6.7	SE	5	50	1	○	1Ci
		(CREVASSE)		SSE	10	5	1	○	1Ci
28	09	RY160	-14.2	SSE	18	0.05	0	+	0
	15	RY160	-11.0	SSE	15	0.05	0	+	0
	21	RY160	-13.7	SSE	13	0.1	1	+	1Ci
29	09	RY160	-14.7	SSE	13	0.3	1	+	0+Ac 1Ci
	15	RY155	-10.4	SE	11	2	5	⊙	5Ci
	21	RY135	-16.6	SE	8	50	9	●	9Ac
30	09	RY135	-14.5	SE	8	30	2	⊙	0+Ac 2Ci
	15	KR 9	-10.5	E	9	0.2	10	+	10
	21	KR 9	-11.3	ESE	7	10	10	●	10Ac
31	09	KR 9	-16.5	SE	7.5	30	8	⊙	0+Cu 8Ci
	15	KR 28	-12.0	SE	7	30	10	⊙	1Ac 10Cs
	21	KR 57	-16.1	ESE		30	10	⊙	10Cs
JAN 1	09	KR 57	-19.4	ESE	7	30	10	⊙	10Cs
	14	73° 28' S 31° 29' E	-15.4	E	5	30	9	⊙	9Ci
	22	73° 46' S 32° 56' E	-22.1	SE	3	30	2	⊙	2Ci
2	10		-19.7	SE	4	30	2	⊙	2Ci
	14	73° 57' S 33° 50' E	-15.6	SE	7	30	3	⊙	3Ci
	21	ADVANCE CAMP	-24.2	ESE	5	30	1	○	0+Ci

Date	LT	Point	Ta	WD	WS	V	N	W	CL
JAN 3	09	ADVANCE CAMP	-23.5	ESE	6	30	1	○	1Ci
	15	ADVANCE CAMP	-20.7	ESE	5	30	1	○	0+Ci
	21	ADVANCE CAMP	-25.3	ESE	<3	30	1	○	0+Ci
4	09	ADVANCE CAMP	-22.2	ESE	<3	30	3	⊙	3Ci
	14	IM236	-20.5	SSE	<3	30	1	○	1Ci
	21	IM217	-20.1	SE	<3	30	1	○	0+Ci
5	09	IM217	-22.5	ESE	6	30	1	○	0+Ci
	14	IM201	-19.6	ESE	5	30	2	⊙	2Ci
	21	IM180	-24.4	ESE	3.5	30	1	○	0+Ci
6	09	IM180	-24.5	ESE	8	30	1	○	0+Ci
	14	73° 09' S 39° 36' E	-20.2	E	6.5	30	1	○	0+Ac 1Ci
	21	IM139'		ESE	5	30	5	⊙	5Ac
7	09	IM139' 37	-23.3	ESE	4.5	30	1	○	0+Ci
	14	72° 37' S 40° 57' E	-19.5	ESE	4	30	1	○	0+Ci
	21	IM103'	-24.8	ESE	4	30	1	○	0+Ci
8	09	IM103'	-22.7	ESE	3.5	30	1	○	0+Ac 0+Ci
	14	72° 05' S 42° 12' E	-17.4	ESE	4	30	1	○	1Ci
	21	IM 73'	-25.5	ESE	<3	30	1	○	1Ci
9	09	IM 73'	-24.0	ESE	9.5	10	1	○	0+Ci
	14	71° 41' S 43° 05' E	-18.0	ESE	8	20	1	○	0+Ci
	21	IM 38'	-25.5	ESE	4	30	2	⊙	2Ac 0+Ci
10	09	IM 38'	-18.0	E	7	30	8	⊙	8Ac 0+Ci
	14	70° 42' S 44° 20' 4E	-13.4	NE	<3	20	10	✱	10Ac
	21	MIZUHO	-20.0	E	<3	30	6	⊙	6Ac
11	10	MIZUHO	-14.8	ENE	6	30	9	●	9Ac
	15	MIZUHO	-14.0	ENE	7.5	10	10	●	10Ac
	21	MIZUHO	-24.0	E	4	30	6	⊙	6Ac 0+Ci
12	09	MIZUHO	-13.3	ENE	3	5	10	✱	10Ac
	15	MIZUHO	-13.0	ENE	<3	10	10	✱	10-Ac
	21	MIZUHO	-17.7	WNW	<3	2	10	✱	10Ac
13	09	MIZUHO	-19.8	E	4.5	20	8	⊙	7Ac 1Ci
	14	Z 39	-13.3	ENE	4	30	9	●	9Ac
	21	H263	-17.4	ENE	5	20	10	✱	5Ac 10-Ci
14	09	H263	-12.5	ENE	6	20	8	⊙	3Ac 8Ci
	14	H169	-9.6	ENE	11	0.5	7	⊙	2Ac 3Ci 4Cc
	21	H110	-10.4	ENE	13	0.05	10	✱	10

Date	LT	Point	Ta	VD	VS	V	N	W	CL
JAN 15	10	H110	-9.0	ENE	14	0.05	10-	✕†	10-
	15	H110	-9.4	ENE	14	0.05	10-	✕†	10-
	21	H110	-10.4	ENE	12	0.05	10-	†	10-Ac
JAN 16	09	H110	-8.0	ENE	9	0.1	10-	†	10-Ac
	14	H 9	-4.2	ENE	8	0.2	10	✕†	8Ac 10Cs

5. Aerophotographic Courses along the Ice Sheet Margin near Syowa Station in 1991/1992

Aerophotographer: Sairo NAKAJIMA

Pilots: Hidenori HIROSE and Takeshi INOUE

Since 1957, the Japanese Antarctic Research Expedition has taken a number of aerophotographs along the coast near Syowa Station to compile topographic maps between 30°E and 45°E (Geographical Survey Institute, 1981). These aerophotographs are useful for glaciological studies of the ice sheet such as ice movement, ice discharge and fluctuation of the ice sheet margin (Nakawo *et al.*, 1978; Fujii, 1981).

For the glaciological purpose, aerophotographs were taken along the ice sheet margin in 1977, 1983 and 1991 when the flight courses covered the coast area from Akarui Point (68°28'S, 41°26'E) to Kaya Glacier (69°50'S, 37°06'E) as shown in Fig. 3. The aerophotograph data are summarized in Table 5. The camera used was a Wild RC-10.

References

- Fujii, Y. (1981): Aerophotographic interpretation of surface features and estimation of ice sheet discharge at the outlet of the Shirase Drainage Basin, Antarctica. *Nankyoku Shiryô (Antarct. Rec.)*, **72**, 1-15.
- Geographical Survey Institute, comp. (1981): *Geodetic Survey of Japanese Antarctic Research Expedition*. Tokyo, Natl Inst. Polar Res., 112 p. with Append. 13 p.
- Nakawo, M., Ageta, Y. and Yoshimura, A. (1978): Discharge of ice across the Sôya Coast. *Mem. Natl Inst. Polar Res., Spec. Issue*, **7**, 235-244.

Table 5. Aerophotograph data in 1991/1992.

Date	Course number	Altitude	Focal distance
Dec. 6, 1991	C1-C15	3000 m	151.85 mm
Jan. 18, 1992	C16-C26	3000 m	88.05 mm
Jan. 20, 1992	C27-C35	3000 m	88.05 mm

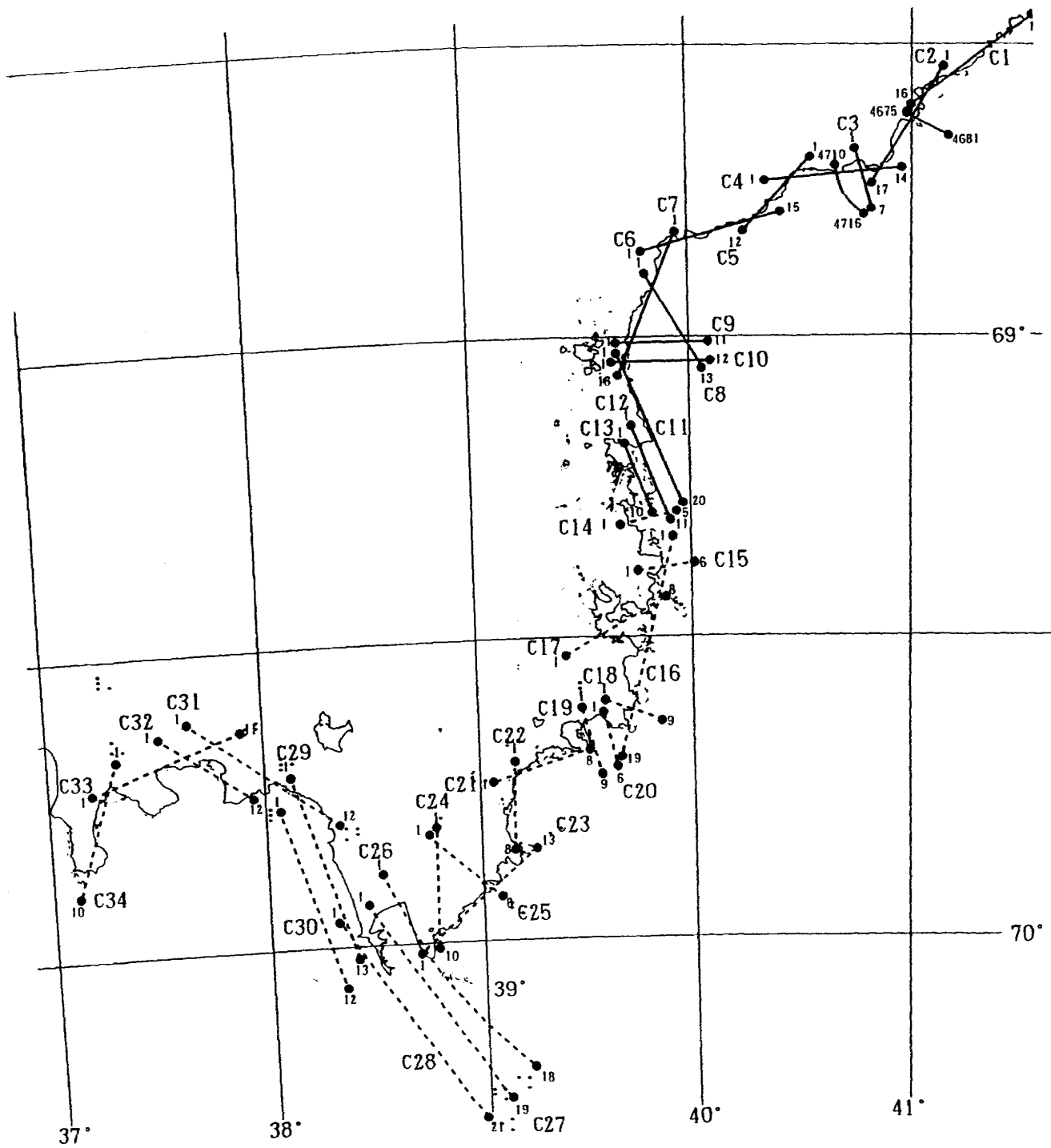


Fig. 3. Aerophotographic courses along the ice sheet margin near Syowa Station in 1991/1992.