

II. Net Accumulation of Snow by Stake Measurements in
Mizuho Plateau, East Antarctica, 1968-1971

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1. Introduction

The observations of the net accumulation of snow by stake measurements along Routes S and Z (see Fig. A attached to the end of this volume) were made by the oversnow traverse parties of JARE 9, 10 and 11, during a period from October 1968 to January 1971, as shown in Table II-1.

The position of each station is indicated in the location sheet (Table I-2 of Report I of this volume). The extent of the observed area

Table II-1. Measurement of net accumulation of snow by stakes, by JARE 9, 10 and 11, in 1968-1971.

	Route	Period
J A R E 9	S171 (70°51.1'S, 43°05'E) → S240 (72°00.1'S, 43°10'E)	Oct. 12 - Oct. 16, 1968
	S170 (70°50.5'S, 43°07'E) → S16 (69°02.0'S, 40°03'E)	Feb. 8 - Feb. 15, 1969
J A R E 10	S16 → S170	Sept. 5 - Sept. 18, 1969
	S16 → S240	Nov. 1 - Nov. 21, 1969
	S170 → S16	Jan. 22 - Jan. 29, 1970
J A R E 11	S16 → S70 (69°06.9'S, 42°29'E)	May 12 - May 15, 1970
	S16 → S122 (70°01.1'S, 43°06'E) → Z100 (70°40.5'S, 44°14'E)	June 30 - July 10, - July 15, 1970
	S70 → S16	Aug. 4 - Aug. 7, 1970
	S16 → S122 → Z100	Nov. 3 - Nov. 11 - Nov. 15, 1970
	S169 (70°49.4'S, 43°07'E) → S16	Jan. 12 - Jan. 22, 1971

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was roughly 69°S - 72°S in latitude, 40°E - 44°E in longitude, 500 - 2600 m in altitude and 10 - 300 km in distance from the coast line (Fig. A). The distance between two neighboring stations was approximately 2 km for Route S, S16 - S240, 1 km for Z0 (S122) - Z43 and Z70 - Z104, and 0.5 km for Z43 - Z70.

2. Net Accumulation of Snow

Table II-2 shows the annual net accumulation of snow in 1969 (February 1969 - January 1970) and in 1970 (January 1970 - January 1971), together with the net accumulation during the 5 subdivisional periods (*i.e.*, February - September 1969, September - November 1969, November 1969 - January 1970, January - November 1970, and November 1970 - January 1971), along Route S from S16 to S173, measured by JARE 10 and 11.

The annual accumulation at each station was measured by a stake set up by the previous traverse party: the annual accumulation in 1969 was measured by JARE 10 by means of a stake set up by JARE 8 in 1967, and that in 1970 by JARE 11 by means of a stake set up by JARE 10 in 1969, at each station.

The net accumulation during the subdivisional periods of a year at each station was measured whenever a traverse party passes over there, by use of both stakes set up in previous years and a new stake set up by the party itself: JARE 10 measured two stakes, and JARE 11 three stakes. These stakes were set up on a line at intervals of about 1 m. And it was occasionally observed that one stake showed a positive accumulation, while another stake a negative accumulation due to erosion by wind during the same subdivisional period even at the same station. This could be the reason why the annual net accumulation obtained by summing the net accumulation during the subdivisional periods by use of several stakes does not always coincide with that obtained by a single stake through an annual reading in Table II-2.

The annual net accumulation of snow in 1969 (October 1968 - November 1969) along Route S from S171 to S240 measured by JARE 10 is shown in Table II-3. The net accumulation of snow during subdivisional periods in 1970 measured by JARE 11 along Route S from S16 to S70 is given in Table II-4, and that along Route S and Z, S71 - S122 - Z100, in Table II-5.

It can be seen from Tables II-2, 3, 4 and 5 that the net accumulation of snow is greater in the coastal region than in the inland area, and that the bulk of net accumulation of snow is deposited during winter, and that there are considerable differences between the annual net accumulations of snow in 1969 and those in 1970.

Table II-2. Net accumulation of snow at S16- S173 from February 1969 to January 1971. (unit: cm in depth)

Station No.	Period Feb. - Sept. 1969 (202 - 222 days)	Sept. - Nov. 1969 (57 - 58 da_ys)	Nov. 1969 - Jan. 1970 (68 - 89 da_ys)	Jan. - Nov. 1970 (278 - 291 days)	Nov. 1970 - Jan. 1971 (68 - 80 days)	Feb. 1969 - Jan. 1970 (348 days)	Jan. 1970 - Jan. 1971 (355 - 358 days)
S 16		-5	-5	91	-1		90
17	19	2	0	31	-7	19	24
18		9	-8	21	-5		16
19	42	5	-9	69	-10	33	59
20		12	4	147	17		164
21			-5	33	10	32	43
22	5	17	-3	105	-11	20	99
23		29	-8	70	25		84
24	-27	9	-3	115	5	-22	110
25		8	-8	56	7		54
26	41	-2	-6	76	13	34	89
27	10	-1	-9	70	-11	-4	59
28		4	-7	83	-10	24	65
29	35	6	-1	50	-8	42	53
30	34	11	0	92	-4	43	88
Mean: 21 - 30	16	9	-5	75	2	21	74
S 31		3	3	71	-2		69
32		-1	-2	76	6		82
33	41	-2	-3	73	-8	36	65
34	35	12	-9	103	-12	37	88
35	31	8	-2			36	85
36	18	3	-3	101	-16	15	84
37	29	9	-5	117	-8	34	106
38	29	12	-7	63	-5	35	56
39	50	-10	8	59	2	47	60
40	7	-1	13	65	-5	18	64
Mean: 31 - 40	30	3	-1	81	-5	32	76
S 41	11	13	-3	70	5	25	78
42	32	-2	5	80	-1	35	79
43	16	6	-3	59	8	17	64
44	17	9	1	47	-3	26	46
45	30	9	8	60	4	49	63
46	36	-17	9	65	-6	34	62
47	32	-6	5	61	12	30	62
48	16	14	-1	40	7	29	36
49	6	0	1	93	-2	9	89
50	45	14	-8	85	1	52	86
Mean: 41 - 50	24	4	2	66	3	31	67

Period Station No.	Feb. - Sept. 1969	Sept. - Nov. 1969	Nov. 1969 - Jan. 1970	Jan. - Nov. 1970	Nov. 1970 - Jan. 1971	Feb. 1969 - Jan. 1970	Jan. 1970 - Jan. 1971
S 51	20	15	-4	88	-3	32	88
52	42	-2	-5	71	5	36	75
53	42	2	-4	98	-5	42	94
54	26	6	-3	41	4	27	44
55	35	-1	-5	71	8	29	76
56	40	7	-11	87	4	35	87
57	50	-3	14	97	-7	59	91
58	50	-9	-2	103	4	38	98
59	14	-1	2	74	-11	12	66
60	20	8	-7	93	-21	20	77
Mean: 51 - 60	34	2	-2	82	-2	33	80
S 61	47	-1	0	106	-9	46	88
62	44	-1	-4	86	-2	43	81
63	28	5	12	62	13	41	72
64	43	8	4	61	10	54	118
65	17	-1	-3	80	1	14	77
66	29	-12	-2	66	-7	18	59
67	36	16	-2	84	-17	49	80
68	10	11	-2	81	-9	22	69
69		9	-2	122	-2		131
70	45	-1	10	92	-7	45	94
Mean: 61 - 70	33	3	1	84	-3	37	87
S 71		14	-6	76	-3		67
72		14	-6	66	-6		60
73	31	4	-2	89	-5	33	80
74	18	0	-3	73	-6	13	60
75	15	-1	-3	54	-3	9	61
76	7	-9	-5	61	1	-5	55
77	39	-14	-4	49	-2	21	44
78	31	-1	8	77	-18	39	59
79	11	5	-7	52	6	9	49
80	23	11	12	62	-9	46	53
Mean: 71 - 80	22	2	-2	66	-5	21	59
S 81	29	-2	-1	71	-5	23	62
82	7	0	-2	65	-11	4	58
83	29	-2	-4	43	5	24	45
84	3	5	-7	71	-7	2	62
85	24	1	-10			14	60
86		4	-5	43	-7		34
87	14	10	6	28	-4	30	21
88	11	-1	-5	61	-7	4	50
89	29	3	-6	34	-5	25	36
90	16	-8	10	41	-4	17	38
Mean: 81 - 90	18	1	-3	51	-5	16	47

Station No.	Period	Feb. - Sept. 1969	Sept. - Nov. 1969	Nov. 1969 - Jan. 1970	Jan. - Nov. 1970	Nov. 1970 - Jan. 1971	Feb. 1969 - Jan. 1970	Jan. 1970 - Jan. 1971
S 91		2	-1	-4	42	-12	-3	30
92		32	-3	-5	60	8	22	67
93		21	-2	0	68	-17	18	50
94		20	-1	-6	54	5	12	59
95		35	-2	-8	59	4	27	63
96		20	-8	-5	51		7	
97		19	-1	-8	31	-9	12	21
98		10	-1	1	41	-10	12	31
99		4	-1	-5	26	-5	-5	19
100		20	-2	-4	25	-8	14	14
Mean: 91 - 100		18	-2	-5	46	-5	12	39
S 101		42	6	5	43	-13	51	47
102		-7	-6	-5	77	-14	-19	68
103		4	-2	2	42	-11	2	34
104		23	-3	-7	70	-9	14	40
105		5	-3	0	42	-11	-3	31
106		35	-6	-3	57	-19	24	48
107		15	-2	-6	66	-4	6	57
108		9	-7	-7	16	12	-6	23
109		11	-2	-10	69	-11	-2	54
110		3	-3	-5	43	-5	-5	49
Mean: 101 - 110		14	-3	-3	53	-9	6	45
S 111		5	-1	-7	12	-5	-4	11
112		2	-1	-4	47	-2	-3	45
113		-12	-1	-4	11	-16	-18	-2
114		17	-5	-8	48	-17	5	27
115			-1	-3	35	-29		6
116		0	-1	-6	4	-8	-7	-5
117		11	-3	-7	11	0	1	9
118			-1	-3	12	-5		-6
119		10	-1	-6		-6	3	9
120		1	0	-5	17	-13	-4	4
Mean: 111 - 120		4	-2	-5	22	-10	-3	10
S 121		6	0	-5	57		-1	43
122		-22	-1	1	31	0	-22	28
123		6	-4	0			1	24
124		3	1	-4			0	28
125		1	0	-2			-4	-3
126		1	0	-4			-3	16
127		24	-1	-6			17	-2
128		9	-2	-5			3	34
129		26	1	-4			25	-6
130		3	0	-5			-3	43
Mean: 121 - 130		6	-1	-3			1	21

Period Station No.	Feb. - Sept. 1969	Sept. - Nov. 1969	Nov. 1969 - Jan. 1970	Jan. - Nov. 1970	Nov. 1970 - Jan. 1971	Feb. 1969 - Jan. 1970	Jan. 1970 - Jan. 1971
S 131	1	-1	-5			-4	25
132	0	-1	-5			-6	-5
133	32	17	-6			47	23
134	55	19	-6			67	32
135	39	20	-8			51	25
136	16	3	4			26	10
137		-1	-7				6
138	17	-1	-9			8	28
139	22	1	8			30	37
140	-1	0	-4			-5	14
Mean: 131 - 140	20	6	-4			24	20
S 141	23	-1	-5			19	36
142	9	-3	-5			1	10
143	8	-1	1			8	28
144	19	2	-2			19	34
145	9	10	-2			18	54
146	14	-2	-4			6	16
147	1	0	-4			-4	13
148	1					-4	17
149	11	-3	-5			4	87
150	-8	-1	0			-11	14
Mean: 141 - 150	9	0	-3			6	31
S 151	4	0	-2			3	46
152	7	-1	-5			0	26
153	1	-1	4			3	34
154	0	0	-5			-5	28
155	35	-8	-4			21	43
156	34	-3	6			36	24
157	2	-1	-5			-6	13
158	43	15	-4			55	26
159	7	0	9			16	34
160	15	-5	2			11	42
Mean: 151 - 160	15	0	0			13	32
S 161	10	0	2			12	48
162		-2	5				26
163	22	-11	-3			8	34
164	2	-1	4			5	12
165	48	-19	-3			23	33
166	47	-2	-6			38	32
167	39	-1	-5			33	8
168	37	-1	-3			31	17
169	28	-5	-2			16	43
170		3	-4				
Mean: 161 - 170	29	-4	-2			21	28
S 171			21				
172			-2				
173			-2				

Table II-3. Net accumulation of snow at S171-S240 from October 1968 to November 1969. (unit: cm in depth)

Period Station No.	Oct. 1968 - Nov. 1969 (399- 401 days)	Period Station No.	Oct. 1968 - Nov. 1969	Period Station No.	Oct. 1968 - Nov. 1969
S 171		S 196		S 220	56
172	- 8	197	27	Mean: 211 - 220	23
173	- 7	198	- 5	S 221	- 4
174	- 4	199	5	222	45
175	- 4	200	48	223	
176	- 2	Mean: 191 - 200	20	224	7
177	3	S 201	30	225	- 3
178	1	202		226	23
179	19	203		227	
180	108	204	- 6	228	- 5
Mean: 171 - 180	12	205	- 9	229	- 4
S 181	-20	206	3	230	- 6
182	-11	207	26	Mean: 221 - 230	7
183	- 5	208	40	S 231	- 6
184	-25	209	71	232	
185	9	210	15	233	15
186	- 5	Mean: 201 - 210	21	234	- 5
187	- 6	S 211	- 1	235	18
188	- 6	212	61	236	6
189	- 5	213	- 4	237	- 3
190	28	214	- 3	238	- 5
Mean: 181 - 190	- 5	215	24	239	- 1
S 191	27	216	6	240	5
192		217	- 4	Mean: 231-240	3
193		218	33		
194		219	57		
195					

Table II-4. Net accumulation of snow at S16-S70 from January to November 1970.
(unit: cm in depth)

Period Station No.	Jan. - May 1970 (103 - 109 days)	May - Nov. 1970 (175 - 177 days)	May - July 1970 (49 days)	July - Aug. 1970 (32 - 38 days)	Aug. - Nov. 1970 (88 - 96 days)
S 16	46	51	- 1	30	22
17	16	15			
18	15	6	← 17 →		23
19	28	41			
20	32			14	25
21	32	0			
22	42	62			
23	29	41	← 28 →		13
24	43	62			
25	44	13	← 1 →		12
26	42	34			
27	45	25			
28	50	33	← 21 →		12
29	37	13			
30	44	48	← 31 →		17
Mean: 21 - 30	41	33			
S 31	43	28	8	← 20 →	
32	51	25			
33	44	29	← 22 →		7
34	42	61			
35	41		1	36	
36	41	60			
37	48	72			
38	36	30			
39	34	26			
40	29	36	13	15	8
Mean: 31 - 40	41	41			
S 41	47	79	← 77 →		2
42	41	39			

Period Station No.	Jan. - May 1970	May - Nov. 1970	May - July 1970	July - Aug. 1970	Aug. - Nov. 1970
S 43	43	17			
44	37	10			
45	30	30	8	14	8
46	42				20
47	30	31			
48	29	11			
49	49	44			
50	41	44	4	6	34
Mean: 41 - 50	39	34			
S 51	37	54		22	32
52	41	30			
53	28	70	← 26 →		44
54	31	10			
55	37	34	7	1	26
56	52	36			
57	29	69			
58	48	55			
59	27	48			
60	44	50	4	14	32
Mean: 51 - 60	37	46			
S 61	49	58			
62	42	44			
63	45	17			
64	42	19			
65	40	40	21	← 19 →	
66	44	22			
67	23	60	← 6 →		54
68	35	46			
69	50	72	← 29 →		43
70	33	61	14	← 47 →	
Mean: 61 - 70	40	44			

Table II-5. Net accumulation of snow at S71-S122-Z100 from January to November 1970. (unit: cm in depth)

Period Station No.	Jan. - July 1970 (158 - 167 days)	July - Nov. 1970 (123 - 128 days)	Period Station No.	Jan. - July 1970	July - Nov. 1970
S 71	47	29	S 104	55	15
72	43	23	105	30	12
73	48	41	106	27	31
74	61	12	107	33	33
75	49	6	108	16	- 2
76	45	16	109	72	- 3
77	48	1	110	39	4
78	35	42	Mean:		
79	49	3	101 - 110	38	13
80	36	34			
Mean:			S 111	4	8
71 - 80	46	21	112	23	24
			113	- 1	12
S 81	47	24	114	32	16
82	56	9	115	30	5
83	28	15	116	2	3
84	40	31	117	12	- 1
85			118	11	1
86	30	13	119		
87	21	7	120	2	15
88	37	24	Mean:		
89	21	13	111 - 120	13	9
90	39	2			
Mean:			S 121	53	4
81 - 90	35	15	122	13	17
			Z 5		- 1
S 91	31	15	10		- 6
92	← 60 →		15		16
93	← 68 →		20		- 3
94	← 54 →		25		7
95	← 59 →		30		2
96	← 51 →		35		1
97	← 31 →		40		6
98	← 41 →		45		1
99	← 26 →		55		18
100	← 29 →		65		0
Mean:			75		27
91 - 100	← 47 →		80		
			85		1
S 101	← 43 →		90		6
102	← 77 →		95		- 1
103	31	11	100		- 1