

XI. DENSITY AND HARDNESS OF SNOW IN MIZUHO PLATEAU IN 1969 - 1970

Renji NARUSE *

In the previous report (Naruse, 1972), the result of the stratigraphic observation of the surface snow cover was given only by graphical descriptions. For the sake of convenience for calculation, numerical data of density and hardness of snow measured by JARE-10 in 1969 - 1970 are given in Tables 1 and 2.

Reference

Naruse, R. (1972): Stratigraphic observation of the surface snow cover in Mizuho Plateau, East Antarctica, 1969 - 1970. JARE Data Rep., 17 (Glaciology), 77 - 87.

Table 1. Snow density of the surface snow cover in Mizuho Plateau in 1969 - 1970.

Station	Level (cm)	Density (g/cm ³)	Station	Level (cm)	Density (g/cm ³)
S20	3 - 10	0.49	S35	0 - 8	0.44
	22 - 30	0.45		10 - 18	0.39
	45 - 51	0.43		21 - 31	0.39
	64 - 70	0.45		35 - 45	0.42
	83 - 90	0.44		49 - 60	0.44
	100 - 104	0.62		64 - 79	0.45
	110 - 115	0.47		83 - 95	0.47
	125 - 130	0.50	S40	1 - 8.7	0.40
	140 - 146	0.46		12 - 20.9	0.42
	155 - 164	0.48		22 - 31.6	0.42
	170 - 176	0.51		32 - 41.7	0.41
	185 - 190	0.50		42 - 51.7	0.42
200 - 206	0.52	52 - 60.1		0.44	
S30	4 - 10	0.40	65 - 72.7	0.43	
	15 - 28	0.38	85 - 92.5	0.44	
	40 - 51	0.43	95 - 110.0	0.44	
	55 - 75	0.42	110 - 121.1	0.49	
	77 - 100	0.46	125 - 133.9	0.45	

* The Institute of Low Temperature Science, Hokkaido University, Sapporo.

Station	Level (cm)	Density (g/cm ³)
S40	140 - 148.3	0.44
	149 - 164.8	0.45
	165 - 179.4	0.49
	180 - 193.4	0.48
	198 - 220.4	0.46
	222 - 239.4	0.50
	240 - 260.0	0.49
	260 - 279.3	0.51
	280 - 298.8	0.51
	304 - 324.4	0.51
	328 - 348.0	0.52
	348 - 367.7	0.51
	368 - 387.2	0.49
	388 - 393.2	0.50
	398 - 417.6	0.52
	418 - 438.2	0.52
	442 - 458.0	0.56
	458 - 470.4	0.56
	474 - 492.9	0.53
	494 - 512.2	0.54
	520 - 538.2	0.54
	544 - 555.0	0.56
	555 - 575.0	0.56
	575 - 597.8	0.56
	603 - 621.8	0.56
	622 - 640.6	0.57
	641 - 659.4	0.55
	663 - 674.8	0.56
	680 - 700.0	0.56
	700 - 716.9	0.54
	718 - 736.3	0.56
	737 - 753.4	0.56
	758 - 765.4	0.56
770 - 788.0	0.57	
792 - 804.7	0.58	
805 - 814.1	0.57	
815 - 831.0	0.56	

Station	Level (cm)	Density (g/cm ³)
S40	833 - 846.5	0.58
	850 - 864.5	0.60
	865 - 872.1	0.57
	878 - 891.7	0.59
	892 - 905.2	0.59
	908 - 927.2	0.58
	928 - 945.4	0.57
	947 - 963.6	0.59
	968 - 980.2	0.61
981 - 991.3	0.59	
S45	2 - 6	0.37
	9 - 17	0.47
	18 - 24	0.34
	24 - 32	0.38
	34 - 42	0.43
	45 - 50	0.42
	59 - 69	0.44
	74 - 78	0.43
86 - 95	0.42	
S55	2 - 6	0.43
	19 - 27	0.40
	30 - 40	0.39
	43 - 57	0.40
	61 - 77	0.44
S60	6 - 13	0.37
	17 - 30	0.41
	31 - 45	0.42
	45 - 59	0.45
	59 - 69	0.46
	75 - 86	0.41
S65	1 - 6	0.43
	14 - 28	0.39
	31 - 45	0.42
	57 - 79	0.41
	79 - 86	0.46

Station	Level (cm)	Density (g/cm ³)
S70	2 - 7	0.36
	10 - 19	0.42
	25 - 38	0.43
	42 - 52	0.39
	56 - 80	0.42
	95 - 105	0.43
	106 - 120	0.46
	120 - 134	0.47
	136 - 150	0.44
	150 - 169	0.44
170 - 187	0.48	
S75	1 - 7.7	0.38
	23 - 36.0	0.38
	36 - 41.0	0.40
	41 - 51.7	0.36
	59 - 74.7	0.45
	75 - 90.3	0.42
92 - 102.9	0.42	
S80	0 - 4	0.37
	10 - 13	0.36
	17 - 20	0.35
	28 - 31	0.41
	40 - 43	0.40
	46 - 50	0.43
	60 - 64	0.42
	80 - 84	0.44
	90 - 93	0.38
S85	3 - 12.8	0.46
	15 - 22.5	0.41
	27 - 40.0	0.38
	40 - 53.9	0.38
	58 - 73.2	0.42
	74 - 87.0	0.45
S90	1 - 8.0	0.22
	16 - 26.2	0.40
	38 - 52.2	0.45

Station	Level (cm)	Density (g/cm ³)
S90	60 - 69.6	0.46
	70 - 79.3	0.38
	84 - 98.5	0.43
	99 - 109.6	0.43
S95	1 - 6	0.43
	10 - 21	0.44
	25 - 37	0.37
	44 - 53	0.43
	54 - 69	0.42
	74 - 83	0.50
	88 - 99	0.42
S110	2 - 10.8	0.39
	22 - 36.2	0.44
	43 - 58.5	0.40
	63 - 75.1	0.42
	84 - 101.9	0.47
S120	6 - 19.7	0.42
	23 - 38.5	0.46
	42 - 54.0	0.40
	55 - 64.5	0.44
	68 - 75.4	0.37
78 - 86.7	0.46	
S130	6 - 16.2	0.40
	20 - 26.0	0.44
	28 - 44.7	0.52
	49 - 68.2	0.47
	77 - 87.6	0.51
	92 - 105.2	0.44
	106 - 110.5	0.45
S140	8 - 17.5	0.41
	20 - 31.3	0.42
	36 - 47.8	0.42
	53 - 65.7	0.42
	68 - 78.0	0.47
	80 - 98.2	0.39

Station	Level (cm)	Density (g/cm ³)
S160	1 - 14.5	0.46
	18 - 22.8	0.43
	26 - 34.2	0.44
	38 - 49.1	0.39
	51 - 62.0	0.42
	62 - 73.7	0.41
	75 - 85.9	0.45
	94 - 100.1	0.37
	101 - 113.0	0.36
	113 - 123.7	0.39
	126 - 140.0	0.40
	140 - 156.2	0.41
	164 - 176.7	0.54
	181 - 194.9	0.47
	196 - 209.6	0.40
	210 - 224.2	0.46
	227 - 241.0	0.46
	241 - 251.1	0.45
	252 - 263.7	0.45
	264 - 278.2	0.43
	279 - 290.2	0.51
	310 - 313.9	0.44
	314 - 325.4	0.45
	326 - 342.3	0.45
	343 - 361.8	0.48
	366 - 380.7	0.46
	381 - 392.8	0.46
393 - 404.1	0.44	
414 - 430.6	0.43	
432 - 442.4	0.48	
443 - 456.7	0.47	
457 - 470.1	0.48	
482 - 499.6	0.46	
S186	12 - 14.2	0.45
	40 - 42.2	0.41
	60 - 62.2	0.44

Station	Level (cm)	Density (g/cm ³)
S233	1 - 10.2	0.42
	16 - 30.2	0.50
	39 - 52.7	0.41
	56 - 72.1	0.44
	82 - 102.8	0.44
S240	10 - 12.2	0.45
	20 - 22.2	0.44
	35 - 37.2	0.45
	45 - 47.2	0.46
	55 - 57.2	0.35
	70 - 72.2	0.48
A075	2 - 10	0.44
	38 - 47	0.47
	50 - 57	0.42
	62 - 75	0.43
	90 - 114	0.47
	123 - 130	0.49
	132 - 142	0.46
	148 - 157	0.40
	158 - 168	0.44
	172 - 186	0.43
	194 - 200	0.45
	200 - 204	0.44
	205 - 215	0.45
	217 - 227	0.46
	230 - 240	0.55
	240 - 250	0.56
	256 - 267	0.44
	281 - 292	0.49
	293 - 305	0.48
	311 - 320	0.62
322 - 334	0.47	
337 - 345	0.46	
351 - 360	0.46	
361 - 369	0.45	
370 - 380	0.51	

Station	Level (cm)	Density (g/cm ³)
A075	380 - 397	0.49
	403 - 412	0.50
	414 - 424	0.50
	424 - 436	0.54
	440 - 450	0.49
	451 - 461	0.46
	466 - 474.5	0.53
	480 - 490	0.51
	490 - 500	0.50
	501 - 507	0.47
	511 - 520	0.50
	524 - 533	0.50
	535 - 549	0.49
	558 - 561	0.46
	562 - 572	0.50
	575 - 583	0.50
	588 - 600	0.49
	600 - 613	0.50
	617 - 626.5	0.50
	633 - 657	0.55
	663 - 675	0.53
	675 - 685	0.52
	687 - 700	0.53
	700 - 705	0.50
	710 - 720	0.51
	722 - 732	0.51
	735 - 745	0.51
	746 - 754	0.52
	766 - 777	0.48
	778 - 789.5	0.47
791 - 800	0.50	
802 - 815	0.56	
815 - 826	0.54	
830 - 842	0.55	
843 - 852	0.54	
857 - 868	0.54	

Station	Level (cm)	Density (g/cm ³)
A075	871 - 880	0.53
	880 - 893	0.54
	897 - 913	0.52
	918 - 927	0.52
	930 - 935	0.52
	938 - 942.5	0.54
	945 - 954	0.53
	956 - 968	0.52
	970 - 983.5	0.53
	984 - 1000	0.55
C60	15 - 21	0.45
	35 - 42.5	0.52
	50 - 59	0.47
	65 - 82	0.43
C80 (Snow pit)	0 - 4	0.32
	20 - 23	0.48
	31 - 34	0.42
	36 - 39.5	0.42
	50 - 53.5	0.42
	60 - 64	0.45
	66 - 70	0.45
	80 - 84	0.52
C80* (Snow core)	80 - 97	0.49
	241 - 253	0.45
	310 - 327	0.51
	382 - 399	0.51
	430 - 449	0.52
	465 - 475	0.58
	580 - 595	0.54
	700 - 719	0.55
	805 - 819	0.57
	840 - 854	0.52
910 - 927	0.57	
975 - 990	0.59	

Table 2. Kinosita's hardness of the surface snow cover in Mizuho Plateau in 1969 - 1970.

Station	Level (cm)	Kinosita's hardness (kg/cm ²)	Station	Level (cm)	Kinosita's hardness (kg/cm ²)	
S-75	23	10	A075	192	18	
	37	10		205	20	
	-	17		216	16	
	59	15		228	140	
	75	8.6		240	140	
	-	30		292	37	
	92	8.0		310	75	
	-	26		323	58	
	S-80	10		4.3	336	18
		17		4.3	350	50
28		12	360	38		
-		14	370	58		
40		3.8	380	45		
-		4.6	390	50		
47		8.0	403	35		
-		9.0	414	20		
60		14	423	67		
70		50	440	44		
S-186	80	12	450	29		
	90	6.6	466	85		
	100	12	480	48		
	0	42	490	50		
	20	33	500	48		
	40	14	511	48		
	60	13	523	48		
	A 075	37	29	535	65	
		50	15	557	14	
		61	15	561	35	
90		17	574	67		
102		18	588	50		
122		38	601	50		
130		19	617	47		
157		9.5	632	140		
171	7.7	646	90			

Station	Level (cm)	Kinosita's hardness (kg/cm ²)	Station	Level (cm)	Kinosita's hardness (kg/cm ²)
A 075	662	140	C-55	25	26
	675	90		60	30
	687	77		80	20
	700	50	C-60	35	30
	710	77		50	26
	721	77		65	7.2
	734	100	C-65	5	15
	746	77		20	5.0
	765	34		40	20
	777	35	C-75	65	2.2
	790	31		0	6.2
	802	130		-	50
	815	130	C-80	35	9.0
	830	100		50	1.3
	842	100		60	50
	857	130	C-85	70	14
	870	130		10	2.5
	880	160		20	60
	897	67	C-111	31	29
	917	50		36	29
930	57	50		25	
939	100	C-55	60	77	
946	46		67	67	
956	50		81	77	
969	100	C-45	102	100	
985	100		116	7.8	
0	30		0	4.6	
C-50	60	3.0	C-85	-	8.7
	-	6.0		-	17
	15	11		3	11
C-55	70	2.0	C-111	70	5.6
	0	1.9		10	50
	-	4.8		65	15
	10	17			