

3. Rising of Water Level in a Drill Hole in Glacier Ice, Sôya Coast in 1972.

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Melting takes place at the surface of snow or ice in summer in Sôya Coast, where the elevation is lower than about 700m above sea level; while in the area where the elevation is lower than about 400m, no snow layers exist at the surface but a bare ice is exposed.

The present author observed that the surface ablation of the ice sheet in this area was most active in the end of December, when the solar altitude was maximum. The surface ablation of the ice sheet in the bare ice area, Sôya Coast, ranged approximately from 10 to 30g/cm² within a summer (Yamada, et al., 1975). The melt water ran the surface of the ice sheet down to the ocean in rapid streams, making channels occasionally 2.5m wide and 1.5m deep, and large ponds on the way.

On January 28, 1972, an observation of the rising rate of the free surface of water in a vertical drill hole was carried out in the bare ice area near Mukai Rocks. The observations site was selected on a top of a broad bare ice ridge, 2.5km NE of Mukai Rocks, where the elevation was 92m above sea level. The diameter of the hole was 10cm and the depth was 270cm. The general structure of the ice wall of the hole was: from the surface to 45cm was loose ice-grains with fully water soaked boundaries; from 45 cm to 160cm was bubbly ice not so wet as the above, but some water seepage from the wall; the rest was perfect dry ice.

Water came into the hole out of the surrounding ice wall of the hole, and the free surface of the permeated water rose with the lapse of time. The level of the free surface of the permeated water in the hole (measured from the surface of the ice sheet) was recorded with the lapse of time. The observation was started at 1429LT when the water level was 170cm below the surface of the ice sheet. The results is given in Table 1.

Reference

Yamada, T., H. Narita, F. Okuhira, H. Fukutani, I. Fujisawa and T. Shiratsuchi: Net accumulation of snow stake measurement in Sôya Coast and Mizuho Plateau in 1971 - 1973. JARE Data Rep., No.27 (Glaciology), 10 - 67.

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Table 1. Rising rate of the free surface of water in a vertical hole bored at the surface of the coastal ice sheet, Sôya Coast, January 28, 1972. (*Levels of the free surface of water in the hole were measured in reference to the surface of the ice sheet.)

Time	Time duration Δt (min)	Free surface of water in the hole		
		Level* h(cm)	Rise Δh (cm)	Rising rate $\Delta h / \Delta t$ ($\times 10^{-2}$ cm/s)
14 ^h 29 ^m		170		
	18		15	1.4
47		155		
	23		17	1.2
15 10		138		
	6		5	1.4
16		133		
	26		20	1.3
42		113		
	25		21	1.4
16 07		92		
	13		10	1.3
20		82		
	6		5	1.4
26		77		
	9		8	1.5
35		69		
	7		8	1.9
42		61		
	19		16	1.4
17 01		45		
	7		7	1.7
08		38		
	13		13.5	1.7
21		24.5		
	20		8	0.7
41		16.5		
	9		0.5	0.1
50		16.0		