4. Snow Temperatures at a Depth of 10 Meters

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Between October 1974 and February 1975, snow temperatures at 10-m depth were measured at 33 stations. Observing holes were drilled with either a steam-drill (made by Takahashi Kikan Co., Ltd., Nagoya) or a SIPRE type core auger. The measurement of 10-m snow temperature must be done at least 10 hours after drilling the hole with a steam-drill (Naruse and Suzuki, 1975). The specification of the steam-drill is as follows:

Type : CHIN type I-1973
Size : 55 cm(L) × 25 cm(W) × 75 cm(H)
(Without fuel tank and steam hose)
Weight : about 45 kg
(Without water and propane fuel)
Pressure-proof rubber hose: 25 mm in outer diameter, 15 mm in inner diameter and 15 m long with 0.3 m steel guide tube.
Arrangement of nozzle holes: 2.3 mm in diameter (center hole) and 1.2 mm in diameter (6 radiating holes at an angle of 60° from the center hole)
Operating steam pressure: 1 - 3 kg/cm^2
Operating propane pressure: 0.5 - 1 kg/cm^2
Time attained to operating steam pressure: 15 - 20 minutes (-20° - -45°C in air temperature)
Time required for 10-m drilling: 5 - 7 minutes (in snow cover)

The results are given in Table 1.

Reference

Naruse, R. and Suzuki, Y. (1975): A steam-operated drill used by the 14th Japanese Antarctic Research Expedition (1972 - 1974). Nankyoku Shiryo (Antarct. Rec.), **53**, 53 - 56.

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Table 1. 10-m snow temperatures measured from October 1974 to February 1975.

Station No.	Date	Temperature (°C)
H 228	Oct. 8,1974	−26.0
S 40	Feb.10,1975	−21.2
S 122	Oct. 9,1974	(−27.4)
Z 30	Feb. 7,1975	−31.0
W 32	Dec.28,1974	(−29.1)
W 44	" 30, "	(−31.5)
W 46	" " "	−31.7
W 52	Jan. 2,1975	−33.6
W 260	" 4, "	(−34.7)
W 280	" 5, "	−35.3
W 340	" 6, "	(−34.2)
Y' 65	Oct.16,1974	(−36.2)
Y'100	" 18, "	−38.2
Y'210	" 26, "	−42.4 (−40.9)
I 75	" 29, "	(−43.5)
I 115	" 30, "	−45.4
I 235	Nov. 2, "	−48.9 (−48.3)
I 315	" 5, "	(−49.8)
I 355	" 6, "	−51.9
I 365	" 17, "	(−51.8)
I 435	" 8, "	(−52.8)
I 485	" 9, "	−54.1
"	" 15, "	(−53.8)
I 540	" 14, "	(−54.9)
I 600	" 13, "	(−55.8)
J 45	" 18, "	(−51.0)
J 95	" 19, "	(−49.3)
J 145	" 20, "	(−47.9)
J 225	" 23, "	−45.7
J 275	" 24, "	(−42.6)
J 318	" 25, "	(−40.8)
J 364	" 27, "	−39.6 (−39.7)
J 408	" 28, "	(−37.5)
J 460	" 29, "	(−35.5)

( ) : in a hole bored with a steam-operated drill.