Surface

The temperature of the actual snow surface is of immense interest, but there are almost insuperable difficulties in obtaining it. Because of the low density at the very surface, even a fine thermocouple cannot be expected to measure the snow temperature unaffected by radiation. Some sort of radiometric measurement of the snow surface temperature may be feasible.

Thickness

The total thickness of the firn-ice sheet being investigated should be determined, by seismic or other means.

General

Other variables enter into a complete analysis of the internal temperatures of firn and ice, depending on the particular circumstance. For floating shelf ice, the temperature, salinity and currents of the underlying water are important. For glaciers, grounded shelf ice and ice caps the rate of motion and the nature of the underlying rock are important.

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REFERENCES

1. Wade, F. Alton. The physical aspects of the Ross Shelf Ice. *Proceedings American Philosophical Society*, Vol. 89, No. 1, 1945, p. 160–73.
2. Fleming, W. L. S. Professor F. Alton Wade's Antarctic glaciological researches. *Journal of Glaciology*. Vol. 1, No. 1, 1947, p. 23–31.
3. Koch, J. P. and Wegener, A. Wissenschaftliche Ergebnisse der Dänischen Expedition nach Dronning Louises-Land und quer über das Inlandeis von Nordgrönland 1912–13. Part III. Die Temperaturmessungen im Eis des Storström. *Meddelelser om Grönland*, Bd. 75, 1930, p. 191–243.
4. Sorge, Ernst. Glaziologische Untersuchungen in Eismitte. *Wissenschaftliche Ergebnisse der Deutschen Grönland-Expedition Alfred Wegener 1929 und 1930–31*. Band III, Beitrag 5, 1935, p. 62. Leipzig: Brockhaus.
5. Jülg, Hugo. Die glaziologischen Beobachtungen an der Weststation. Beitrag 2 of reference 4 above.
6. Sverdrup, H. U. The temperature of the firn on Isachsen's Plateau, and general conclusions regarding the temperature of the glaciers on West-Spitsbergen. Part III of Scientific Results of the Norwegian-Swedish Spitsbergen Expedition in 1934. *Geografiska Annaler*, Årg 17, 1935, p. 53–88.
7. Wade, F. Alton. Sub-surface temperature measuring equipment. *Journal of Glaciology*, Vol. 1, No. 2, p. 73–74.
8. Hughes, T. P. and Seligman, G. The temperature, melt water movement and density increase in the névé of an Alpine glacier. *Monthly Notices Royal Astronomical Society, Geophysical Supplement*, Vol. 4, 1939, p. 616–47.

FRICTIONAL ELECTRIFICATION OF SAND

An article by Mr. E. W. B. Gill in *Nature* (Vol. 162, No. 4119, 1948, p. 568–69) describes an experiment in which sand was allowed to fall about 1 m. on to the floor. An electrometer plate was placed about 3 m. away. While the sand was falling there was no effect on the electrometer, but soon afterwards it showed a deflexion which increased for three or four minutes, then decreased the needle coming to rest near its original zero position. The inference drawn by Mr. Gill after describing the experiment in detail, is that "the sand rubbing on itself must produce positive charges on the smallest particles and negative charges on the larger." He goes on to say, "When sand is blown about on a big scale, very large charges must be produced. . . ."

This raises the question as to what happens during the drifting of snow and whether any charge present on the flakes as they come to rest has an influence on wind-packing.*

* Mr. Robert Moss writes: "Some such mechanism may explain the powerful electric shocks which were sometimes experienced at the Central Ice Cap Station of the Oxford University Arctic Expedition, North East Land, 1935–36 when the aerial lead-in wire inside the tent was touched during periods of drifting snow. The aerial itself was often well above the drifting snow and thus it is difficult to attribute its electrification to direct friction between the snow particles and the aerial itself."