

ABSTRACT

The U.S. National Committee-I.G.Y. supported a research station on the McCall Glacier, Alaska, at 2298/m asl. The station was in operation in the periods May-October 1957, and February-August 1958.

Synoptic and micrometeorological observations were taken as well as ice temperatures, to be used in a study of the energy exchanges between the glacier and its environment. The present paper deals with the ice heat transfer component, based on the ice temperature observations.

In July 1957 a hole was melted into the firn of the highest cirque's accumulation basin, to a depth of 91-1/2 m. Temperatures were measured by ten thermocouples from 31 July 1957 to 7 July 1958, except during November-February. In addition, temperatures were obtained between the surface and 3 m in another shallow hole. These temperatures were measured at ten different depths from 15 March to 24 June 1958.

Measurements at frequent intervals during the 11-month period showed a very small temperature gradient between 14 m and 91 m. The average of 17 measurements at 1372 cm was -0.9°C ; the average at 9144 cm was -1.1°C . Observations indicate that at 7620 cm there was no change of temperature with depth during the period 26 October - 7 July. The shallow hole showed that the 0°C isothermal layer had descended below 3 m by 24 June. The heat transfer through the glacier surface has been computed for eleven periods from 26 October to 7 July, by using the change in mean temperature of each layer of firn and ice within each period. The heat flux has been compared to measured net radiation flux above the surface for periods when melting took place. Enough heat was available by radiation alone to melt 0.6 cm firn per day between 9 June and 7 July.