Stakes for measuring accumulation, ablation and movement of 'Amitsulôq ice cap' have been drilled into the ice this summer. Next field season it is the intention to extend the stake net and supplement the ablation measurements with runoff measurements at the front of the 'base camp glacier'. It is also the intention to drill stakes in Tasersiaq gletscher. Together with measurements already started at Qapiarfiup sermia at 65°36.3'N, 52°9.3'W this will give a profile ranging from the more humid coastal environment to the relatively arid climate near the Inland Ice margin.

References

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Glaciological investigations at Qamanârssûp sermia, West Greenland

Ole B. Olesen & Roger J. Braithwaite

As part of the GGU programme for the regional mapping of the hydropower potential of West Greenland, glaciological and climatological investigations were continued on the Qamanârssûp sermia (inventory number 1CH21002) in 1981. The station was first established in late summer 1979 (Olesen, 1981) so that records for two whole summers are now available.

Fieldwork

The field programme included measurement of transient balance in a network of twenty stakes extending from about 80 to 1300 m above sea level. The more remote stakes could only be visited a few times during the season, while daily readings were made at three stakes, the '751' stakes, on the glacier near to the base camp. Because of the delayed arrival of the field party in early June and possibly because May was exceptionally warm considerable ablation had already occurred on the lower parts of the glacier before the start of measurements. Consequently, it was not possible to determine separate winter and summer balances. However, on a short visit in early March it was observed that there was no winter snow on the glacier below about 1000 m so the observed annual balances probably reflect the annual ablation patterns quite closely.

In addition to the mass balance readings, the stake positions were surveyed in mid June and late August by intersection from fixed points on the bedrock. Analyses of the results will allow estimates to be made of 'winter' and 'summer' velocities.

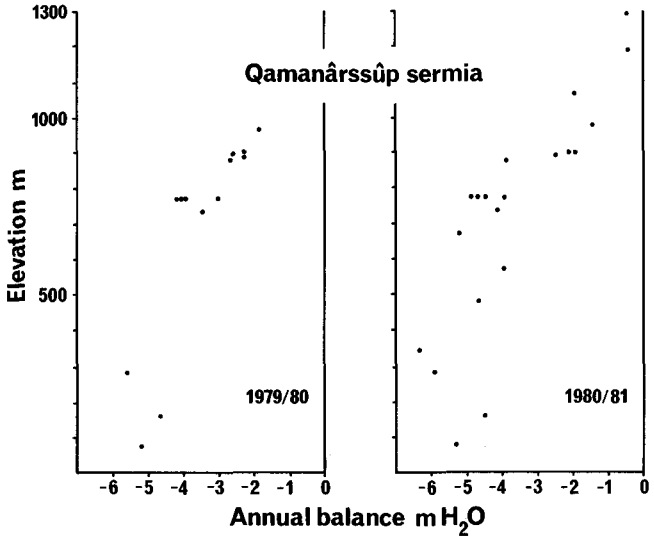

Fig. 31. Annual balances plotted against elevation for the Qamanârssûp sermia, 1979/80 and 1981/81. The balance year is 1st September to 31st August.

Routine measurements of simple climatic elements, e.g. temperature, humidity, wind and sunshine, were continued at the base camp while a thermohygrograph station was maintained at roughly the same elevation in the middle of the glacier. New additions to the programme in 1981 were the twice-daily readings of evaporation from a Type-A pan and the continuous recording of global radiation at the base camp.

Results

Preliminary results for the 1980/81 annual balances are plotted against elevation in fig. 31 together with the corresponding 1979/80 values. The data refer to a balance year extending from 1 September to 31 August. As the actual measurement periods for individual stakes are rather irregular, some adjustments had to be made to the data to fit them to a common time interval. For the purpose of these interpolations, the daily readings from the '751' stakes provided a useful key.

Although the 1980/81 annual balances shown in fig. 31 are based upon an extended stake network compared to the 1979/80 data, they show some similar features. For example, in both years there appears to be relatively low ablation near the snout of the glacier, while there is a maximum in the elevation range 300–400 m followed by a general decrease above about 700 m.

A summary of the main climatic elements for 1981 in comparison with those for 1980 are given in Table 5. In addition to monthly temperatures, precipitation and sunshine duration, approximate figures for the mean ablation of the '751' stakes are also given. From the table it is clear that the 1981 season was warmer and wetter than 1980 in both June and July, and was colder and wetter in August. Except for June, there was much less sunshine in 1981. However, there was slightly more ablation in 1981. The greater warmth of July 1981 seems to be the main cause.

Table 5. Climatological and glaciological data summary for base camp, Qamanârssûp sermia 1980 and 1981

	JUNE	JULY	AUGUST	SUMMER
Monthly mean temperature (°C)				
1980	4.7[a]	6.6	5.5	5.6
1981	5.2[b]	7.5	3.9	5.5
Difference	+0.5	+0.9	-1.6	-0.1
Monthly precipitation (mm)				
1980	20 [a]	61	64	145
1981	65 [b]	110	81	256
Difference	+45	+49	+17	+111
Sunshine duration (hrs)				
1980	(226)	258	327	811
1981	(252)	(214)	124	590
Difference	+26	-44	-203	-221
Mean ablation of three '751' stakes (mm)				
1980	(910)	1330	1010	3250
1981	(1110)	1860	800	3770
Difference	+200	+530	-210	+520

[a] = based on 26 days of record.
[b] = based on 29 days of record.
() = adjusted to full month.

Future outlook

Because of the difficulties of determining runoff from the Qamanârssûp sermia itself, an attempt was made to install a water-level recorder in the outflow from the glacier 1CH21001 which is immediately to the north of Qamanârssûp sermia. However, when the recorder was established in mid-June the streamflow was already too strong to allow the sensor to be fixed to the stream bed. Hopefully, this can be remedied in early 1982 so that a full runoff record will be collected for next summer. Some extra stakes should also be drilled into glacier 1CH21001, both for comparison with the runoff from that glacier and with the balances on Qamanârssûp sermia.

An earlier start to the 1982 fieldwork is also indicated for determination of separate winter and summer balances as well as for the extension of the stake network into the accumulation area above about 1400 m.

From the point of view of the long-term GGU objective of glacier runoff assessment in West Greenland, the results from 1980 and 1981 indicate both greater amounts and more irregular patterns of ablation than expected (Braithwaite, 1980). The proper inclusion of these effects in future runoff models must be attempted.

References

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