

Glacierfront surveys in the Swedish mountains 2002

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Introduction

In this report, glacier front surveys of 2002 are presented. The exceptionally warm summer of 2002 exposed most of the glacier tongues included in our monitoring programme. It thus gave us an opportunity to survey a number of glacier fronts and at the same time make some transferring mapping of fixed points used in different years. This “cleaning up” was carried out on the Sarek glaciers while we had no opportunity to do the corresponding mapping at the front field of the Kebnekaise glaciers. In addition to the surveys this year we made oblique arial photographic documentation on a substantial number of glaciers. This documentation will be kept at the glacier photo collection in connection to Tarfala Research Station.

Methods

During the front surveys in 2002 exclusively traditional surveying equipment with theodolite and a distance meter was used. The determination of front retreats in table 1 was evaluated along lines parallel to the direction of the estimated ice-flow direction. The date of the surveys is important in the evaluation of the results and the survey date has been reported when it has been available. The results in table 1 present the glacier retreat of the glacier front, hence the negative value. The table is subdivided geographically, from north to south. The footnotes indicate time between surveys and additional information. If no indication is given the result is calculated from the last survey.

Abisko and northern Kebnekaise

The front of Riukojieta was surveyed at Sept. 10, 2002. The front has retreated 24.7 m since it was surveyed in 2000.

Västra Pässusglaciären, Östra Pässusglaciären, Stour Räitaglaciären and Unna Räitaglaciären were not visited during 2002.

The data from Kårsaglaciären is not available at present.

Central Kebnekaise and Tarfala

Storglaciären and Isfallsglaciärens front were surveyed at Sept. 8, 2002. Storglaciärens front has retreated 2.1 m since 2001. Isfallsglaciärens front has retreated 5.8 m since 2001. Rabots Glaciär was surveyed at Sept. 10, 2002 and the glacier shows a retreat of 31.3 m since 2000.

Sydöstra Kaskasatjäkkaglaciären was surveyed at Sept. 10, 2002, but the change in front position is not available at present. The frontal change could not be calculated because of lack of geodetic support. Next coming survey can solve this problem and the frontal change of the glacier this year can be evaluated.

Northern Sarek and Akka

Suottasglaciären and Ruotesglaciären were visited at Aug. 9, 2002. The front retreat of Suottasglaciären has been calculated to 26.8 m since 1997, when the glacier front at last was snow free. At Aug. 9, 2002 the glacier front of Vartasjekna was still covered with snow (Figure 1), which made any surveys impossible. The retreat of the front of Ruotesglaciären was 33.7 m since 1998, when the glacier last was visited. Mikkaglaciären was also surveyed at Aug. 9, 2002. The front retreat since 2001 was calculated to 14.8 m. It is important to pay attention of the front position change of Mikkaglaciären during the last five years (Table 2). In 2000 a huge avalanche has passed the glacier front. The disaster from the avalanche made a

Figure 1. Vartasjekna in August 9, 2002 during the glacierfront surveys.

Photo Per Holmlund.



Table 1. Change in glacier front position of the observed Swedish glaciers in the front monitoring programme, between 2001 and 2002.

Area Glacier	Change (m)
Abisko and northern Kebnekaise	
Riukojietna	-24.7 ^I
Central Kebnekaise and Tarfala	
Storglaciären	-2.1
Isfallsglaciären	-5.8
S.Ö. Kaskasatjäkkaglaciären	progr.
Rabots glaciär	-31.3 ^{II}
Northern Sarek and Akka	
Suottasglaciären	-26.8 ^{III}
Vartasjekna	~
Mikkajekna	-14.8
Ruotesglaciären	-33.7 ^{IV}
Southern Sarek and Sulitelma	
Pärteglaciären	-7.4
Salajekna	-15.1 ^V

I 2000 – 2002 II 2000 – 2002
 III 1997 – 2002 IV 1998 – 2002
 V 2000 – 2002 progr. data in progress
 ~ the glacier front covered with snow

radical change of the total appearance of the glacier front. This makes it impossible to implement the measurements of 2000. The front change measured in the 2001 will hence not be comparably to earlier measurements. The result is yet present for the year 2001, but has to be used with caution.

Hyllglaciären and Ruopsokglaciären were not visited during 2002, though Hyllglaciären was photographically documented on August 9.

Southern Sarek and Sulitelma

The front positions of Pärteglaciären and Salajekna were surveyed at Aug. 9, 2002. The front retreat for Pärteglaciären was 7.4 m since the survey last year. The front retreat of Salajekna since 2000 was calculated to 15.1 m.

Table 2. Change in glacier front position of Mikkajekna in northern Sarek during 1998 to 2002. The change in front position is calculated from previous year.

Year	Change (m) and comments
1998	-22.5
1999	not been possible to survey
2000	a huge avalanche passed
2001	-52.1 [^]
2002	-14.8

[^] 1998 – 2001

Concluding remarks

The last years high ablation rate have caused substantial recession of glacier fronts. The low accumulation rates allow most fresh snow to melt off the glacier tongues during the summer which at all sites under observation causes a recession. If this is a trend towards more exposed glacier fronts in the

future we may have to reorganize our field program, which until now has been relying on the fact that 30–40 % of the tongues are snow covered and thus show no change. From the field season 2003 and onwards we will target on a selection of glaciers corresponding to maximum 50% of the total number and successive years we survey the remaining in a rolling scheme.