

Abstract of the field projects from the Tarfala student course 2009

Abstract compiled by Håkan Grudd

*Department of Physical Geography and Quaternary Geology,
Stockholms University, SE-106 91 Stockholm, Sweden.*

Kartering av isfronten på Sydöstra Kaskasatjåkkaglaciären och dess koppling till klimatet

Therese Medeby, Susanne Sirén, and Anna Svensson

Sydöstra Kaskasatjåkkaglaciären is a smaller glacier in the Tarfala valley which compared to Storglaciären and Rabots glacier has a shorter response time to changes in climate. It is therefore a better indicator of climatic change. The frontal position of the glacier was measured and compared with older data. The glacier front showed a negative trend in movement and a connection to climate change. The largest retreat rate was between year 1946 and 1958, after that the rate decreased with one exception between year 1979 and 1989, which showed a peak in rate. The last two decades the glaciers seems to have stabilized.

Radarmätningar på Sydöstra Kaskasatjåkkaglaciären

Elin Högström, Sara Lundqvist, Maria Tuomi, and Mattias Ågren

Glaciers can be used as indicators, or proxies, of climate change in the past as well as the present. Especially small to medium-sized glaciers tend to react quite fast and in an easily observed way if the local environmental conditions change, whereas the full response time is considerably longer, which makes them suitable for climatological studies on all time scales. This study presents results from a brief survey of Sydöstra Kaskasatjåkkaglaciären, a small niche glacier in the Tarfala area, northern Sweden. The main objective of the survey was to map the current ice thickness, as well as the cold layer, of the glacier. It was performed using a method of profiling with ground penetrating radar and GPS. The resulting radar profiles were interpreted and used to create a map where gaps in measurement data were fixed by manual interpolation and represented geographically in ArcGIS.

Our survey shows that the maximum depth of Sydöstra Kaskasatjåkkaglaciären is about 90 m, which means its central part has not thinned much since the mid-1980's when it was last mapped. Furthermore,

the mapping of the cold layer and its extension gave results which corresponded well with our hypothesis about the South East margins being inactive.

Sydöstra Kaskasatjåkkaglaciären. En profil av isyta och botten i den antagna centrala flödeslinjen

Karin Lundström, and Erika Rönnbäck

After alarming report over the melting of glaciers is it of big importance to investigate the status of the small glaciers such as Sydöstra Kaskasatjåkkaglaciären in the Swedish mountain chain. Small glaciers can be indicators of climatic changes due to shorter response time (Grudd 1990). Methods of investigating the surface and depth profile is performed with dGPS and radar. Plotting the results from these measurements gives the cross cut profile along the assumed central flow line. Comparing the areas on both side, of the equilibrium line, show that the ablation area is larger than the accumulation area. Comparing surface profiles from 1990 with 2009 shows a retreat of the glacier. The conclusion is that this glacier is not in steady state and is retreating.

Sydöstra Kaskasatjåkkaglaciären. Kartering av isyta och botten i centrala flödeslinjen

Barbara Kern

To examine the mass balance of the Sydöstra Kaskasatjåkkaglaciären a profile of the central flow line has been constructed. Measurements have been conducted using differential GPS and radar.

Differences in the size of accumulation- and ablation area can be used to estimate the relationship between melting and mass accumulation. A larger ablation area, such as the one of the Kaskasatjåkkaglaciären shows a negative mass balance meaning the glacier is not in a steady state.

Sedimenttransport till och från Tjåkkisjaure

Carl Gilljam, Elin Nyström, Johan Olsson, and Calle Österlin

Pro-glacial lakes are fed by melt water from glaciers and their lifespan are often determined by the amount of sediments that are released by the glacier. This study aimed to map and measure sediment levels in the inflow and outflow of an unnamed pro-glacial lake in front of Sydöstra Kaskasatjåkkaglaciären in the Tarfala valley, Northern Sweden. The lake, named “Tjåkkisjaure” by the authors has existed at least since the 1950’s. The lake was found to

receive a larger quantity of sediments than it releases and will subsequently be filled with sediments eventually. When this occurs, it will have an effect on the hydrological system downstream in the Tarfala valley. The time frame for this event was hard to determine with the data collected for this study, but the maximum number of years was calculated to 904. Pro-glacial lakes were also discussed as possible proxies for glacial activity.