Abstract of the field projects from the Tarfala student course 2006

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Tracer studies of the Tarfalajåkk at Rännan with different salt injection distances to the measurement point

Christoph Balmer, David Baric and Lena Schmider

To examine how different distant injection points affect the accuracy of discharge measurement at Rännan in Tarfalajåkk was the main aim of the study. The method used was sluginjection with salt as tracer. The measurements were done with discharge volumes between 2-4 m3/s. Lower or higher values could not be obtained. The results were used with earlier data obtained by Raphael Hubacher to compare the validity of older rating curves. The results from this study show that the best injection point in Tarfalajåkk is around 75m distance from the measuring station.

Surface profiles on Storglaciären

Seija Stenius and Florian Westreicher

Three topographic surface profiles have been measured in the years 1961, 1984, 1995 and 2006 on Storglaciären. The temporal comparison of these profiles should show how the glacier surface changes over a time period. Kinematic waves and different patterns of melting can likely be identified. This change in spatial behavior is related to changes in climate.

Tarfalaglaciären, levande eller död?

Emelie Axelsson, Katrin Lindbäck and Gustaf Peterson

Information of changes in the size of a glacier due to climate change can be obtained by mapping the perimeter of the glacier and compare it with other perimeters mapped at different time intervals. Mapping of the Tarfala glacier perimeter may be an indicator on the decreasing of the glacier area. A comparison of areas measured in 1959, 1986, 1990 and 2006 shows a 30% decrease since 1990. The perimeter was measured to 0.67 km2. The large ice-cored moraines located in front of the Tarfal glacier are discussed due their abnormal size compared to the glacier may be an indicator on the Tarfala glacier history. The morains also indicates on previous larger extent and volume change. The Lichen growth on the moraine gives a clue about were the glacier most likely was located in the beginning of the 20th century and how fast the retreat may have been.

Ice velocity and strain rates on the snout of Storglaciären

Arvid Bring, Hélène Grøndahl and Linda

Previous studies of surface ice velocities on Storglaciären have focused on the overall picture for the entire glacier. In order to gain understanding of the transition between the temperate ice and the cold surface layer, more detailed studies are needed at the lowermost part of the ablation area. 20 stakes placed in three lines were surveyed with Differential Global Positioning System (DGPS), and surface velocities and strain rates determined. The results show a continuously decreasing surface velocity along flow lines, with a distinct drop in the last 50 meters of the profiles. Compressive strain rates were nearly constantly low along the profiles, except between the lowermost stakes where they increased markedly. In order to establish any correlation with the cold surface layer, however, vertical temperature measurements and further surveys are necessary.

Mass balance measurements on Storglaciären

Robert Karlmark, Pontus Torpefält and Christine Wanker

Most glaciers are retreating at present and it is unclear if that is due to global warming or just normal fluctuations in the climate. Glaciers are sensitive systems where one can see small changes in climate over time. This report is about measuring the loss (or gain) of mass in Storglaciären, near the Kebnekaise massif in Sweden. This glacier has been retreating since the beginning of the 20th century except for some years in the 1980s during which net balance was positive due to increased winter accumulation. As data for the study probed snow depths in the spring and ablation measurements on a weekly basis during July 1 to August 8 is used. A simple prediction is done of the ablation measurements of August 14, and the result is displayed. Calculation

of mass balance shows that there has been a loss of mass in Storglaciären 2006. The mass loss is about 1.3 million m3 (0.4 m w.e.). This was expected due to relatively lower accumulation in the winter season compared to normal and high ablation during the summer. As the mass balance year 2006 does not end until sometime in September, the loss of mass will continue during the next month. This means that the total ablation is underestimated.