

Report from snow studies on Kinnvika spring 2008- expedition

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April 11th

Helicopter flight to Kinnvika with AirLift for April 11th

April 11th – 19th

The expedition prepared for activity and transported the drilling team to the Vestfonna icecap sometimes under difficult weather conditions. Meanwhile first snow samples for black carbon research were gathered from the area near the station. On 19th of April an attempt was made to transport PhD Gerit Rotchky and myself up to the icecap to for snow research. The attempt failed due to the large amount of new soft snow on the terrain.



Image 1 *Shuttling people and equipment up to Vestfonna ice cap from the Kinnvika station*



Image 2 *Sampling snow for black carbon near the Kinnvika station. Black carbon samples were collected from each snowpit location.*

April 20th – 23rd

I assisted in various tasks of the expedition. On 23rd of April second attempt was made to shuttle Me and Gerit to Vestfonna icecap. This second attempt was successful. Even though the shuttling team had to do a long day with a return trip from Vestfonna, the trip was made when the weather conditions were favorable.



Image 3 *Field camp on top of the Vestfonna icecap. Several visits were done to the drilling camp from Kinnvika.*



Image 4. *Measuring the physical properties of the snow on Vestfonna. The site is next to the drilling camp.*

April 24th – May 1st

On 24th the snow research was started with first 2m deep snow pit at the drilling site at Vestfonna. After two days at the icecap I returned to the Kinnvika station. Few more sites for black carbon analysis were taken in the vicinity of the station. On 28th of April next trip to Vestfonna started together with Prof. Veijo Pohjola and PhD Rickard Petterson. After a long day with one snow pit excavated and PAR- sensors collected from the Swedish weather station the team returned to Kinnvika. The same team returned to Vestfonna on 30th of April. Two more snow pits were excavated on the northwestern slope of Vestfonna. This time we stayed on the Vestfonna icecap and camped at the drilling site. The next day, 1st of May, I managed to investigate one more snow pit on the southern side of Vestfonna. The weather didn't allow proceeding further down the glacier, so ice radar profiles were made on the top of the ice cap. In the evening we received new people from an exchange flight of expedition members on 30th of April.



Image 5 *Swedish weather station on the northwestern slope of the icecap. The station was heavily buried in snow and took a good effort to be maintained.*



Image 6 Part of the team changed halfway through the season. This is the first part of the team, excluding the drilling team, a few days before the switch.

May 2nd – May 14th

The weather didn't allow working on 2nd of May. On the 3rd large part of the team returned to Kinnvika due to worrying weather forecast. On 5th of May I joined with PhD Piotr Glowacki and PhD Student Bartek Luks to continue snow pit work to the eastern summit of Vestfonna. PhD student Adrian McCallum reinforced the team of Veijo and Rickard. Additionally to the snow pit work and glacier radar work, Veijo and Piotr collected some fuel from a depot down on the southern side of the icecap. Some mass balance stakes were checked on the way back to the drilling camp. On 6th of May the snow and glacier teams returned to Kinnvika. After couple of days resting on the 9th of May the same team of Veijo, Rickard, Adrian, Piotr, Bartek and myself headed up to the icecap again. Another pit was excavated on the northern summit of Vestfonna. Next day 10th of May the snow team returned to Kinnvika. After couple of days packing up and miscellaneous tasks I returned to Longyearbyen with few others. The spring season was over for this time. The snowpit sites are listed in Table 1. and their locations are indicated on the map in Figure 1.

Table 1. Locations for investigated snow pits and black carbon sampling.

Site	Latitude	Longitude	Elevation (m a.s.l)	Pit depth (cm)
S1	N79.98047	E020.12090	600	200
S2	N79.93422	E019.18546	250	108
S3	N79.94332	E019.12802	200	58
S4	N79.90719	E019.33910	500	170
S5	N79.93295	E020.51876	450	200
S6	N79.94265	E021.27518	550	200
S7	N80.12846	E020.61716	500	200

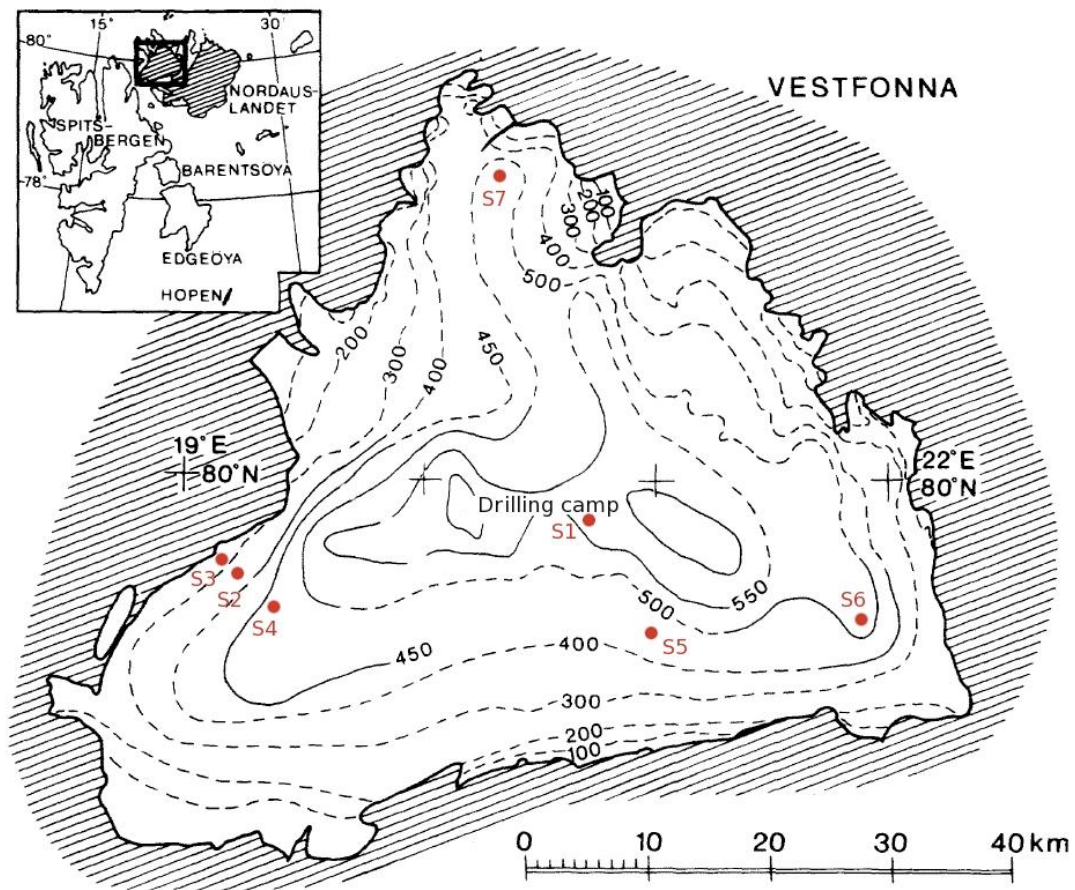


Figure 1. Map of the research area and the snow pit sites. (site on top of a map from Palosuo, 1987 in *Geografiska Annaler. Series A, Physical Geography, Vol. 69*)



Image 7 During the course of the season other things than science also needed attention. Here the local sewing club has gathered together.



Image 8 *Few days before first flights out for the later team everybody had gathered to the station.*

Summary of first results

7 snow pits were investigated over the icecap. Additionally black carbon samples were collected from each site. The seasonal snow layer on top of Vestfonna varied from 60 cm to 2 m in depth over the investigated sites. Climatic conditions on the icecap favor rapid fragmentation of newly precipitated snow and efficient packing of the surface snow layer. All the pits displayed fragmented precipitation crystals at the surface and thick and dens layers of well-rounded crystals. Due to exposure to passing weather systems the temperature over the icecap displays relatively strong variation. This enhances the rounding of the crystals. Ice lenses due to early melting events were also found and under the melt and wind crusts weak and porous layers of faceted crystals could be found. Under the seasonal snow a clear transition there was a clear transition into firn, which indicated that probably over the entire icecap the snow wets through out its depth. This is also supported by the SAR- images from the area.

Acknowledgements

I want to thank all the expedition members one more time for the companionship and effort that they put into making this expedition.