A new Holocene ice core record from Academy of Sciences ice cap, Severnaya Zemlya?


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Drilling site

The possibility of using ice cores for past climatic reconstruction is well known from Greenland and Antarctica, but only one ice cap has ice caps.

The anthopology of Severnaya Zemlya is the most eastern Eurasian area covered by considerable ice caps. The Academy of Sciences ice cap (Severnaya Zemlya) was chosen for a new, deep ice core drilling because it is the thickest and coldest one on Severnaya Zemlya. The ice core was continuously glaciated through the whole Holocene, because proxies from Academy of Sciences ice cap represent the time period back to the Younger Dryas (Koschny et al., 1999). The new core should be drilled to get past climate information with very high resolution.

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First results

Snow pit studies

The Glacier is characterized by large melting events in summer producing infiltration ice layers. Snow of the winter 1983/84 is accumulated in the upper 60 cm (Figure 4). It has a homogeneous density. Its D delay values have a large dynamic range of nearly 15%, probably caused by single events of precipitation. Depth hoar is well known from Central Greenland characterizing the late summer to occur on Academy of Sciences ice cap in 1999 (Figure 2).

In deeper horizons mixing of infiltrating melt water with firn is smoothing the texture signal. Ice lenses and layers exist as micromorphous pattern. Ice layers of more than 10 cm could be observed (Figure 4).

Field activities

Tower with the KEMS-112 drill on Academy of Sciences ice cap

The drilling was started in May 1999 as a joint project of the Alfred Wegener Institute (Germany), the Arctic and Antarctic Research Institute, and the Mining Institute (Russia, St. Petersburg). Camp and tower were erected and the first 4 m of core were drilled using the KEMS-112 electromechanical drill. Explosives were used at Vostok Station, Antarctica. In 2000 drilling will be continued in hoping to reach bedrock.