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The ice sheet history in northern Russia during the last glacial cycle

J.I. Svendsen (1), V.A. Astakhov (2), M. Henriksen (1), J. Mangerud (1) and D. Nazarov (2)

(1) Bjerknes Centre for Climate Research & Department of Earth Science, University of Bergen, Norway (John.Svendsen@geo.uib.no / Phone +47 55583510), (2) Geological Faculty, St. Petersburg University, Russia

The timing and dimensions of the glaciations in the Arctic have been much debated over the past decades. A main objective of the former ESF program QUEEN (Quaternary Environment of the Eurasian North) was to study the glacial history in northern Russia and the adjacent continental shelves. As a result of a comprehensive field campaign the outline of the Eurasian ice sheets were reconstructed for four major glaciations: 1) the Late Saalian (MIS 6), 2) the Early Weichselian (90-80 ka), 3) the Middle Weichselian (60-50 ka) and 4) the Late Weichselian (20 ka). Perhaps the most important conclusion was that the Barents-Kara Ice Sheet reached its maximum extent during an early stage (90-80 ka) of the last Ice Age when large ice-dammed lakes formed on the Russian lowlands whereas during the Last Glacial Maximum (LGM) the ice margin did not reach the mainland and there was a free northbound drainage. The QUEEN reconstructions are currently subjected to rigorous testing by several research teams, including this one. So far, our field investigations seem to confirm the broad picture outlined above. However, there is evidence to suggest that the ice sheet history may have been more complex than shown in the previous reconstructions and there are still many chronological problems that needs to be solved. Here we report some new findings that may elucidate the glacial and climate history during the last glacial cycle: (1) An exceptionally warm interlude with a forest environment may have followed the Early Weichselian glacial maximum. (2) The Middle Weichselian glaciation(s) seems to have been more extensive and complex than previously thought. (3) Traces of several ice-dammed lakes that may correspond with the postulated glaciations have been found in West Siberia, but we have not been able to confirm that they were as big as

predicted. (4) It remains enigmatic that we have not been able to differentiate between the Early- and Middle Weichselian glaciations by means of gemorphological mapping. (5) Sizeable mountain glaciers probably existed in the Urals during the Weichselian, but the LGM glaciers seem to have been very small. (6) The OSL chronology should not *a priori* be considered as calendar years, and a correlation with the deep sea record is therefore not straight forward.