



A 1600-year reconstruction of summer temperatures in Fennoscandia from conifer tree ring chronologies

I. Gouirand(1), H. Linderholm (2), A. Moberg (3), B. Wohlfarth (1)

(1) Department of Physical Geography and Quaternary Geology, Stockholm University, SE-106 91 Stockholm Sweden, (2)Dept. of Earth Sciences, Göteborg University, (3) Department of Meteorology, Stockholm University, SE-106 91 Stockholm Sweden.
(isabelle.gouirand@natgeo.su.se)

A 1600-year (AD 442-1970) summer (June-August) temperature reconstruction for Fennoscandia is inferred from both tree ring width and density data, using the 1901-1970 calibration period. Seven sub-reconstructions for different sub-periods have been made. According to the decreasing number of tree ring chronologies back in time. These were merged to obtain the final reconstruction for the whole period. The robustness of the reconstruction is assessed. The main uncertainties appear before the 17th century when rather few chronologies are available. Correlations between the seven sub-reconstructions and the observed (gridded) air temperatures for Fennoscandia show that the final reconstruction is well representative for the northern part of this area before the 17th century, with the highest correlations ($r > 0.80$) in N Sweden at about 67N. The later part of the series better represents a larger Fennoscandian area, with the highest correlations ($r > 0.85$) in large parts of N and C Sweden and SW Finland. The 100-year smoothed temperatures show that the warmest period appears during the 10-11th centuries. Other warm periods are seen in the 8th and 15th-16th centuries. The coldest period culminates in the late 17th and early 18th centuries, in general agreement with the climate evolution described by e.g. Lamb (1977, 1982) and Burroughs (2002). This reconstruction presents similarities with the NEUR series of Briffa *et al.* (2001) in long time resolution, mainly during 1700-1970, but also some discrepancies related to the fact that they are not really representing the same area. This work demonstrates a strong potential for reconstructing the temperature in large parts of N and C of Fennoscandia based on tree ring data and it should be possible to improve the temperature reconstruction quality before the 17th century by sampling

more tree-ring data for this period from only a relatively small number of sites.