Geophysical Research Abstracts, Vol. 8, 08948, 2006
SRef-ID: 1607-7962/gra/EGU06-A-08948

2700 years BP - Evidence for large-scale mode-shift in Atlantic atmospheric circulation. A coherent pattern from ocean and terrestrial archives at the Subboreal-Subatlanticum transition

Ø. Lie (1), J. Bakke (1,2), T. Dokken (1), E. Jansen (1), A. Nesje (1,3)

(1) Bjerknes Centre for Climate Research, Norway, (2) Department of Geography, Bergen, Norway, (3) Department of Geology, Bergen, Norway (oyvind.lie@bjerknes.uib.no / Fax: +47 5558-4330 / Phone: +47 5558-9830)

Here we compare the spatial distribution of winter-precipitation derived from Norwegian glacier records with results from marine sediment-core MD95-2011 from the Vøring Plateau (Risebrobakken et al., 2003). The record of δ18O measured on the bentic foraminifera C. teretis is interpreted to indicate the effect of water-mass advection to the site and production of dense water due to brine-formation, which is indicative of sea-ice production in the Nordic Seas (Dokken and Jansen, 1999). Also the sea-surface temperature record from δ18O from MD95-2011 reproduces the features of the glacier-derived signals closely, also capturing the change that occurred around 2700 yr BP. Applying synoptic-scale spatial changes to account for regional variations in Scandinavian winter precipitation, we show that at this transition is expressed as a shift from a monopole cyclonic centre located near the U.K. that gives increased vorticity over Scandinavia prior to 2.7. After 2.7 a zonal straight westerly geostrophic circulation type reminiscent of the leading bi-pole atmospheric structure over the North Atlantic ('NAO') is prevailing, causing a stronger Atlantic influence of the air-masses over Scandinavia. We will demonstrate this shift occurring 2700 years ago causes typical bi-pole atmospheric reflections known from the instrumental period, such as; decreased sea-ice extent in eastern Atlantic, increased sea-ice in the western Atlantic, migration of the Intertropical Convergence Zone and increased trade-winds in tropical regions. We therefore conclude that there is evidence for a consistent regime-change occurring over the entire North Atlantic region at 2.7 kyr

BP. This regime-shift occurs at the traditional boundary between the Subboreal and Subatlanticum and is consistent with the climatic interpretation of these periods.