Geophysical Research Abstracts,
Vol. 10, EGU2008-A-03346, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-03346
EGU General Assembly 2008

Fingerprinting the 8.2 ka BP event climate response in a coupled climate model

A.P. Wiersma (1,3), D.M. Roche (1,2), **H. Renssen** (1)

(1) Department of Paleoclimatology and Geomorphology, Faculty of Earth & Life Sciences, VU University Amsterdam, The Netherlands, (2) IPSL/ Laboratoire des Sciences du Climat et de l'Environnement (LSCE), Gif-sur-Yvette, France, (3) Deltares, Subsurface and Groundwater systems, Utrecht, The Netherlands. (ane.wiersma@falw.vu.nl, didier.roche@falw.vu.nl, hans.renssen@falw.vu.nl)

The most distinct Holocene climatic event – with a duration of about 150 years – occurred around 8.2 ka BP (thousand calendar years before present). This '8.2 ka BP event' is clearly registered as a cooling in high resolution proxy data around the North Atlantic region, such as Greenland ice cores, ocean sediments, European lake cores and tree-ring records. The main hypothesis is that the 8.2 ka BP event was caused by a perturbation of the North Atlantic thermohaline circulation (THC) by a catastrophic release of meltwater associated with the final deglaciation stages of the Laurentide ice sheet. Using results from coupled climate model simulations of the 8.2 ka BP event that produced a cold period over Greenland in agreement with the ice cores, we investigate the typical pattern of climate anomalies (fingerprint) for such an event. For this purpose we developed an analysis method that isolates the forced temperature response and provides information on spatial variations in magnitude, timing and duration that characterize the climate event. Our analysis shows that delays in the temperature response to the freshwater forcing are present, mostly in the order of decades (30 years over central Greenland). The North Atlantic Ocean initially cools in response to the freshwater perturbation, followed in certain parts by a warm response. This delay, occurring more than 200 years after the freshwater pulse, hints at an overshoot in the recovery to the freshwater perturbation. The South Atlantic and the Southern Ocean show a warm response reflecting the 'bipolar seesaw' effect. Also the duration of the simulated event shows spatial variation, and the highest probability of recording the

event in proxy archives is in the North Atlantic Ocean area north of 40ºN. Our results are essential for the interpretation of proxy-archives recording the 8.2 ka BP event, as they show that timing and duration cannot be assumed to agree with the timing and duration of the event as recorded in Greenland ice cores.