Geophysical Research Abstracts
Vol. 12, EGU2010-6545-2, 2010
EGU General Assembly 2010

High resolution measurements of CH_4 and $\delta^{15}N$ of N_2 during the MIS 3 period in the Berkner Island ice core

Francis Mani (1), Robert Mulvaney (2), William Sturges (1), Paul Dennis (1), Jérôme Chappellaz (3), Jean-Marc Barnola (deceased) (3), and Daphné Buiron (3)

(1) Laboratory for Global Marine and Atmospheric Chemistry, School of Environmental Sciences, University of East Anglia, Norwich, NR4 7TJ, United Kingdom (f.mani@uea.ac.uk), (2) British Antarctic Survey, Physical Sciences Division, Cambridge, CB3 0ET, United Kingdom, (3) CNRS, Laboratoire de Glaciologie et Géophysique de l'Environnement, 54 rue Molière, BP 96, 38402 Saint-Martin-d'Hères Cedex, France

An ice core from Berkner Island, a coastal site on the Weddell Sea facing the Southern Atlantic Ocean, provides a new climate record and further insights into north-south teleconnection. Isotopic measurements (δD and δ^{18}O) show two distinct peaks during MIS 3 corresponding to the AIM 8 and AIM 12 climate events. High resolution δ^{15}N measurements of air occluded in bubbles were carried out across these two events and changes of $\sim$ +0.07‰ in δ^{15}N were observed. The δ^{15}N data correlates with δD data (r^2 = 0.78) and therefore can be regarded as a climate proxy. Another δ^{15}N change of +0.18 ‰ was observed around 33,000 Yrs BP, which does not correlate to any events in the δD profile but correlates with the period where large altitudinal changes occurred in the ice sheet at Berkner Island. An important aspect of this study is the opportunity it provides to phase δ^{15}N with methane, the latter being considered as a proxy for climate change in the northern hemisphere. Since both climatic signals are in the gas phase it overcomes the need to take into account the uncertain Δage calculations. The data indicate that warming in Antarctica precedes Greenland warming. The time lag estimate between the onset of AIM 12 and the onset of DO 12 is 1600 $\pm$ 350 yrs and between AIM 8 and DO 8 is 1100 $\pm$ 360 yrs.