Geophysical Research Abstracts,
Vol. 11, EGU2009-12377, 2009
EGU General Assembly 2009

Constraints on the evolution of climate during marine isotope stage 11

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Marine Isotope Stage 11 (MIS11) is the interglacial period dated around 400 kyr ago. It has been the subject of great attention as a possible "analogue" to the Holocene due to its orbital configuration, close to that of the present period. In this study, we will present data on MIS11 and the last 30 kyr from marine sediment cores from different basins, in order to be able to have a global view of these periods and to compare timing of different climatic records in different hemispheres.
The work presented here is based on new data from core MD07-3077 and MD07-3076 that were collected in the Atlantic sector of the Southern Ocean (44°09'S, 14°13'W, 3770 m water depth), and its comparison with cores ODP 980 (55°29'N, 14°42'W, 2179 m water depth) and NA87-22 (55°30'N, 14°42'W, 2161 m water depth) from the North Atlantic (Oppo et al., 1998; Waelbroeck et al., 2001). A new chronology for MIS11 will be presented, based on correlation with the age scale of EPICA Dome C ice core age scale (EDC3). This chronology is common for all cores, which allows the comparison of the phasing of events between the two hemispheres.
The benthic isotopic records from these cores reveal a different timing of circulation changes in the North Atlantic than in the South Atlantic site, as well as a general increase in the benthic carbon isotopic ratio during MIS11 with respect to the Holocene. Periods of increased ventilation of deep waters in the South Atlantic are interpreted as augmentations in the strength of North Atlantic Deep Water (NADW) production. The sequence of events during Termination V shows a lead of the changes in water mass properties at the North Atlantic site with respect to the South Atlantic site. We interpret this lead as reflecting an inflow of brine-generated waters from the Nordic Seas, similarly to what is observed over the last deglaciation. Conversely, circulation changes during the glacial inception towards MIS10 first occur in the Southern Ocean, as previously observed during MIS5-4 transition (Govin et al., 2008) and could likewise be explained by progressive cooling and expansion of sea ice around Antarctica.