Geophysical Research Abstracts, Vol. 8, 06120, 2006
SRef-ID: 1607-7962/gra/EGU06-A-06120

Marine Isotope Stage 11 - A Key Case for Future Climate Prediction?

H.A. Bauch (1), J.P. Helmke (2), E.S. Kandiano (2)

Mainz Academy of Sciences, Humanities and Literature c/o IFM-GEOMAR, Kiel, Germany (hbauch@ifm-geomar.de), (2) IFM-GEOMAR, Germany

Paleoclimatic interpretations often depend on observations drawn from the study of modern/historical processes. Although considerable progress has been made in understanding the overall glacial-interglacial climate system, still little is known in detail about climate forcing and feedback mechanisms of the interglacial past. In order to better estimate the ”natural range” of climatically important mechanisms, it seems crucial to make detailed comparison of the present interglaciation (Holocene) with previous warm periods of the late Quaternary, such as marine isotope stage (MIS) 11. Recently, this interval has received enhanced attention as possible analogue for the climatic future. As the impact of climate change is usually strongest in more extreme environments, the temperature-sensitive northern high latitudes are a suitable region for such comparative studies.

On the basis of sediment proxy data from the subpolar and polar North Atlantic quantitative reconstructions of surface ocean conditions during MIS 11 indicate that, despite overall boundary conditions such as global ice volume and orbital forcing were quite comparable to the younger Holocene and the forthcoming millennia, this interval was characterized by a rather weak propagation of ocean warmth into polar latitudes. Moreover, the glacial-interglacial transition from MIS 12 into MIS 11 was comparatively long, as seen in a continuous input of ice-rafted debris (IRD). Only after IRD and associated meltwater ceased to occur did full interglacial conditions with a proper meridional overturning circulation develop. However, such conditions were established relatively late during MIS 11, and they had a maximum duration of only 10,000 years, similar to the elapsed Holocene time so far. This peak warm interval during MIS 11 terminated more or less time-coeval with the regrowth of global ice. Thus, contrary to some recent suggestions all our evidence strongly implies that the specific

orbital configuration within the next millennia will have little or no direct effect on the further Holocene climate development.