Geophysical Research Abstracts,
Vol. 11, EGU2009-11093, 2009
EGU General Assembly 2009

Depth variations of the Greenland-Scotland Ridge: A driver for Miocene ocean circulation changes and marine carbon cycling?

M. Butzin (1,2), T. Bickert (1), G. Lohmann (2,1)

(1) University of Bremen, MARUM - Center for Environmental Sciences, Bremen, Germany (contact: mbutzin@marum.de),
(2) Alfred Wegener Institute for Polar and Marine Research, Bremerhaven, Germany

It has been proposed that temporal depth variations of the Greenland-Scotland Ridge (GSR) had a significant influence on properties and fluxes of Cenozoic North Atlantic Deep Water (NADW). Wright and Miller [1996] concluded that southward overflow of Cenozoic NADW decreased or even diminished during several high stands of the GSR between 14.5-11.0 Ma, 9.8-8.5, Ma, and 7.3-6.0 Ma. Similarly, Poore et al. [2006] found that Myr-scale variations of Cenozoic NADW formation after 12 Ma are controlled by vertical motions of the GSR, which are generated by temperature fluctuations associated with the Iceland Plume. On the other hand, there are also studies pointing to major deep water overflow at times of a shallow GSR at 11.5 Ma [Wei and Peleo-Alampey, 1997] and between 8-7 Ma [Wold, 1994]. Here, we present results of a numerical modeling study in which we explore the effects of GSR depth variations during the Miocene on ocean currents and associated heat transports as well as on the evolution of the marine carbon isotopic record.