Geophysical Research Abstracts,
Vol. 10, EGU2008-A-08446, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-08446
EGU General Assembly 2008

Nordic Seas' Overflow and its dependence on the interplay between hydraulic control and atmospheric forcing

C. B. Rodehacke (1), N. Serra (1), D. Quadfasel (1), R. Käse (1,2)

(1) Universität Hamburg, Institut für Meeresforschung, Hamburg, Germany, (2) IFM-Geomar Kiel, Germany

The Greenland-Scotland Ridge controls the exchange of deep water masses between the North Atlantic and regions further north. There northward flowing surface water masses are transformed into deep and bottom water masses by several processes. The southward directed return flow into the Atlantic has to overcome the ridge system through gaps in the ridge before it feeds the lower cell of the global meridional overturning circulation. In our study we analyze how the interplay of both processes at and near the gaps and the atmospheric forcing in the Greenland, Iceland and Norwegian Seas (GIN Seas) affect the overflow.

We present the results of a general ocean circulation model that comprises the GIN Seas and the northern subtropical Atlantic. Since the overflow regions are highly resolved and the vertical coordinate system follows the topography, the model represents sufficiently the essential overflow processes. The strength of the simulated overflows is controlled by both ocean internal processes, like hydraulic control of the overflow, and temporal changing forcing fields, like wind stress or the density driven exchange between the Arctic Ocean and the GIN Seas. The temporal evolution of the wind fields pattern, described by the NAO-index, triggers variations in the overflow strength as well as circulation changes in the GIN Seas. The validation of the model results are based on comparisons between simulated and observed overflow rates. Furthermore the 1996 in the Greenland Sea released Sulfur Hexafluoride (SF_6) patch allows us to verify the simulated influence of the forcing fields on the spreading paths of freshly

formed water masses.