Geophysical Research Abstracts,
Vol. 10, EGU2008-A-03272, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-03272
EGU General Assembly 2008

Bottom Currents in Straits as a Source of Atlantic Water Masses.

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Specific water masses are formed in contact zones of basins with different hydrological regimes. The bottom topography is very important in this case because it makes difficult water exchange between basins. This takes place in North Atlantic ocean (NA) connection with Greenland, Norwegian and Mediterranean seas. Water exchanges in Denmark, Faroe - Shetland and Gibratar straits are analyzed in the NA ocean circulation model (from 20S) which includes the Mediterranean sea, Arctic Ocean and Bering sea. The ocean circulation model is based on splitting-up technique in physical processes and spatial coordinates. It has 27 vertical sigma- coordinate levels and 0.25 degree steps in latitude and longitude. The model uses sea level function and spherical grid transformation procedure in order to avoid the problem of converging meridians over the Arctic Ocean. The global version of this model participates in IPCC programme. The model was integrated for 15 years with CORE seasonal data. High horizontal resolution and sea level function allow us to adequate reproduce currents and hydrological regimes in narrow straits. Sigma coordinate system leads to high quality simulation of currents at the bottom and in case of abrupt depth change. As a result bottom currents (BC) of high density waters were obtained and analyzed. The NA inflow of BC from Denmark, Faroe - Shetland and Gibratar straits is 16 Sv. Such waters differ significantly from surrounding NA water masses, they penetrate in intermediate and deep layers and influence stratification, circulation, heat and salt transport in NA. For each current in straits and in general the comparison was made with other authors model results as well as with data observations. In BC the velocity increases from virtual upper and/or lateral boundary to bottom core of 25 - 35 cm/s. The Gibraltar water transport is influenced by a free convection in the Mediterranean Sea. The

bottom Faroe current has marked thermohaline variability due to nearby arctic polar front fluctuations, where water outflow to NA is formed. The countercurrent from NA significantly varies upper boundary of the Denmark Strait BC. All these phenomena of convective and frontal impact on BC and basin exchanges are of great importance and require additional investigation.

This research was supported by the Russian Foundation for Basic research (grants 06-05-64477a and 06-05-64246a)