Geophysical Research Abstracts, Vol. 7, 00375, 2005
SRef-ID: 1607-7962/gra/EGU05-A-00375

The Available Potential Energy in the Arctic Continental Shelf Seas due to Air-Sea Fluxes

R.C. Levine, D.J. Webb
Southampton Oceanography Centre (rclevine@soc.soton.ac.uk)

We present a new theory for calculating the Available Potential Energy (APE) on the continental shelves for driving local currents in the Arctic Ocean, using the mean offshore density structure as a reference state. Data is analyzed from a high-resolution simulation of the OCCAM global ocean model. The prescribed air-sea fluxes on the continental shelves are found to play an important role in dense water formation, and produce a large amount of APE for driving the circumpolar boundary current and meso-scale eddies in the Arctic Ocean. The main areas of APE production are found in the Barents and Chukchi Seas. In the Barents Sea the through flow of Atlantic Water (AW) is severely cooled and freshened leading to a net gain of APE, which is converted to KE in the St Anna Trough at the formation region of the boundary current. The Barents Sea route in the model is found to act as a short circuit for AW to pass through the Arctic front via a boundary current. In the Chukchi Sea APE is gained via cooling and an increase in salinity of the through flow of Pacific Water (PW). Particle trajectories of PW show this energy is transported into the Artic Ocean via eddies as it flows off the continental shelf.