Geophysical Research Abstracts
Vol. 12, EGU2010-1567, 2010
EGU General Assembly 2010

On the numerical resolution of the bottom layer in simulations of oceanic gravity currents

Achim Wirth and Nabil Laanaia
CNRS, LEGI, Grenoble, France (achim.wirth@hmg.inpg.fr)

The realism of the numerical modelling of the ocean dynamics depends on the capability of the numerical models to correctly represent the important processes, at large and also at small scales. The dynamics of gravity currents was identified as a key process governing the the strength of the thermohaline circulation and its heat transport from low to high latitudes. Oceanic gravity currents are small scale processes, only about100km wide and a few hundred meters thick, that have a substantial impact on the global climate dynamics.

Using the hydrostatic ocean model NEMO-OPA9, we demonstrate for the case of an idealised gravity current (on an inclined plane), that its dynamics is well captured when a few (less than ten) sigma-coordinate levels are added near the ocean floor. Results from integrations with z- and sigma-coordinate grids are evaluated and compared to non-hydrostatic calculations, laboratory experiments and observations. The results correctly represent the descent of the vein and the Ekman dynamics near the ocean floor, including the important effect of Ekman veering which is usually neglected in today's simulations of the ocean dynamics.