Geophysical Research Abstracts
Vol. 12, EGU2010-1566, 2010
EGU General Assembly 2010

Turbulent fluxes in oceanic gravity currents

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The dynamics of oceanic gravity currents is governed by small scale turbulent fluxes of momentum and mass. The turbulent fluxes of momentum at the ocean floor and the interface between the gravity current and the ambient water determine the friction laws and parameters. The turbulent fluxes of mass at the interface lead to either mixing, entrainment or detrainment.

Using a non-hydrostatic numerical model the turbulent dynamics at the bottom and the interface is explored and their interaction investigated. The two key parameters varied between experiments are the Froud number, based on the thickness of the gravity current, and the gradient Richardson number based on the thickness of the interface. Several aspects of the numerical results are compared to results from laboratory experiments and other numerical experiments. Existing parametrisations of gravity current dynamics are evaluated based on the results obtained.