Geophysical Research Abstracts
Vol. 12, EGU2010-15573, 2010
EGU General Assembly 2010

Vortex structure in strongly stratified flows

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Turbulence decaying experiments have been performed, with the aim of focusing in the middle of a strongly stratified density interface. The experiments have been done under different external conditions[1]:
Non-Rotating Decaying 2D Turbulence experiments , Rotating Decaying 2D Turbulence experiments, And steady rotating stratified experiments. Non-Rotating experiments were performed in a 1mx1m tank, while the Rotating experiments were performed in a rectangular tank of 4mx 2m; this rectangular tank was placed in the middle of the
Coriolis Rotating platform at the Trondheim Marine Systems Research Infrastructure supported by the European Union TMR Project HydraLab. The set of stirred experiments is a compilation of several series of traversing grid mixing experiments, dependent on the initial interface Richardson number [2].

PIV was used to map the velocity and vorticity plots in time. The density of the brine used in the experiments to create a sharp density interface. The boundary conditions for all the rotating experiment are related to initial Reynolds Rer, Rossby Ro, Ekman Ek and Richardson gradient Rig numbers, the results are summarized and presented in a 3D parameter map using power relationships. The experimental results of the strongly non-homogeneous turbulent dynamics shows the different decay of the strongest vortices as a function of the local Richardson number and the interaction mechanisms between inertial and internal waves. A study of vortex decay number indicates a strong non linear
relationship with a slower decay due to the internal wave activity at intermediate Richardson number experiments. The intermittency of the flow is studied using a generalized intermitency parameter family that
depends on the order.[3,4]

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