Abstract Submitted
for the DFD12 Meeting of
The American Physical Society

Pathways to dissipation in strongly rotating and stratified turbulent systems[1] ENRICO DEUSEBIO, ERIK LINDBORG, Linné FLOW Centre, Royal Institute of Technology, KTH — Geophysical flows are strongly affected by rotation and stratification at very large scales ($\approx 10^3$ km). As the flow scale is reduced, first rotation (at $\approx 10^2$ km) and then also stratification (at ≈ 1 km) become of secondary importance. Understanding the transitions between different regimes is crucial in order to evaluate the global circulating models which nowadays start to resolve them. We mainly focus on how energy is transferred from the large scales, at which it is injected, to the small-scales, where it is dissipated, in strongly rotating and stratified systems by means of numerical simulations of the Boussinesq equations. The large resolution employed, $N_x = N_y = N_z = 1024$, allows us to resolve more than one dynamical regime. Large scale dynamic closely resembles quasi-geostrophic dynamics. However, departure from a quasi-geostrophic regime may also be recognized. We show the presence of a leakage of energy which starts from the largest scales and it is entirely supported by a non-geostrophic dynamics, which is possibly stratified turbulence. Despite the idealized set considered in the study, the results surprisingly agree with observations in the atmosphere, suggesting that the presented mechanism may play a crucial role in geophysical dynamics.

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Date submitted: 13 Aug 2012 Electronic form version 1.4