Geophysical Research Abstracts, Vol. 7, 05651, 2005
SRef-ID: 1607-7962/gra/EGU05-A-05651

Entrainment parameterisations in geopotential and isopycnal coordinate models.

L. Jackson (1), R. Hallberg (2) and S. Legg (1)

(1) Atmospheric and Oceanic Sciences, Princeton University, USA., (2) GFDL, Princeton, USA. (Laura.Jackson@noaa.gov)

The parameterisation of entrainment for overflows due to shear driven mixing is dealt with in different ways for isopycnal and geopotential coordinate models. Geopotential models apply a diffusion of density, where the diffusivity is a function of the shear Richardson number. The form of this function, however, has been unclear. In isopycnal models Hallberg (2000) proposed and implemented an entrainment law for layer thickness based on the laboratory results of Ellison and Turner (1959). We show how these two parameterisations are linked and how the diffusivity can be calculated in terms of the isopycnal entrainment law. This gives a physically motivated diffusivity for use in geopotential models which is suitable for parameterising shear driven mixing in a wide variety of scenarios, and could replace the interior Richardson number dependent parameterisation in KPP.

Following on from this link we propose an alternative isopycnal entrainment law which is still consistent with the results of Ellison and Turner (1959), but is more physically plausible.