Geophysical Research Abstracts, Vol. 7, 01208, 2005 SRef-ID: 1607-7962/gra/EGU05-A-01208 © European Geosciences Union 2005



## On the cyclonic-anticyclonic asymmetry in decaying rotating turbulence

C. Morize, F. Moisy and M. Rabaud

FAST, Bât. 502, Campus Universitaire, 91405 Orsay Cedex, France ; morize@fast.u-psud.fr

The transition between three-dimensional and quasi-two-dimensional turbulence in a rotating frame is experimentally investigated. Turbulence is generated by rapidly towing a grid in a rotating water tank, and the velocity field in a plane perpendicular to the rotation axis is measured by means of particle image velocimetry. During the decay, strong cyclonic coherent vortices emerge, as the result of enhanced stretching of the cyclonic vorticity by the background rotation, and the selective instability of the anticyclonic vorticity by the Coriolis force. This asymmetry towards cyclonic vorticity is maximum for the micro Rossby number  $Ro_{\omega} = \omega'/2\Omega \simeq 0.25$  (where  $\Omega$  is the rotation axis becomes steeper as  $Ro_{\omega}$  decreases below 1.5, with an exponent that increases from its classical Kolmogorov value 5/3 up to  $2.3 \pm 0.1$ . Below the same threshold, the velocity derivative skewness decreases as  $|S| \propto Ro_{\omega}$ , reflecting the inhibition of the energy transfers by the background rotation, with a net inverse energy cascade that develops at large scales.