Geophysical Research Abstracts,
Vol. 11, EGU2009-677-2, 2009
EGU General Assembly 2009

The inertial range of atmospheric turbulence

R. Marino (1,2), L. Sorriso-Valvo (3), J.M. Redondo (4), C. Yague (5), V. Carbone (1), and A. Noullez (2)

(1) Università della Calabria, Dipartimento di Fisica, Rende, Italy, (2) Observatoire de la Côte d'Azur, Nice, France, (3) Licryl - INFM/CNR, Rende, Italy, (4) Universidad Politecnica de Cataluña, Barcelona, Spain, (5) Universidad Complutense de Madrid, Spain

A very important result on turbulence, due to Kolmogorov, is the so called "4/5-law" which is obtained from the Navier-Stokes equations under the hypothesis of homogeneity, isotropy, and, in the limit of infinite Reynolds number. From the Navier-Stokes, under similar hypotheses, is also possible obtain a Yaglom-like equation for the velocity field in fluid turbulence. Being exact relations, the 4/5 and the Yaglom laws can be used as formal definitions of the inertial range. We used these laws to identify in a very rigorous way the inertial range in two cases of atmospherical wind, with and without stratification. In the period in which we verified the existence of the Yaglom or Kolmogorov law, we evaluated the energy transfer rate in the non-linear energy cascade. We also discuss the intermittency properties as related to the observation of the Yaglom law.