Geophysical Research Abstracts,
Vol. 10, EGU2008-A-02931, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-02931
EGU General Assembly 2008

Fractal dimension of atmospheric turbulent fluxes in the bidimensional physical space of the components of wind velocity.

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The atmospheric turbulent fluxes in the boundary layer at large Reynolds numbers are assumed to be a superposition of periodic perturbations and nonperiodic behaviour that can obey a chaotic flow. It is of crucial importance to find a parametrization of those periodic perturbations. In this work the u, v and w components of velocity series of the wind have been measured by a sonic anemometer which was mounted on a height of 15 m in the zone of the Almaraz Nuclear Power Plant (Cáceres, Spain). The goal is to determine a model of periodic perturbations that may describe a part of the periodic character of these series and develop a technique to filter these perturbations. From the results obtained with the application of this method, we calculate the fractal dimension (Komolgorov capacity or box- counting dimension) of the bidimensional components ((u,v), (u,w), (v,w)) and also these physical spaces once filtered the perturbations. Analysis indicates that the fractal dimension decrease roughly between 14 % and 7 % once filtered all perturbations in the considered physical spaces. This decrease depends on the number of the perturbations filtered and on the perturbation parameters of the proposed model as the amplitude, frequency and damping coefficients of the amplitude and the frequency. The obtained values of the fractal dimension are in a range from 1.15 to 1.45 in the lower atmosphere in most of the bidimensional physical spaces (velocity-velocity) of the 540 analysed series. Detailed studies of the representation of the components of the velocity in the physical spaces (u,v) (u,w) and (v,w) indicate that the atmospheric turbulence at a height of 15 m is

isotropic and homogeneous.