



Hurst-Kolmogorov dynamics applied to temperature fields for small turbulence scales

Panayiotis Dimitriadis (1), Panos Papanicolaou (2), and Demetris Koutsoyiannis (3)

(1) Department of Water Resources and Environmental Engineering, School of Civil Engineering, National Technical University of Athens (NTUA) (dimitriadispanos@yahoo.gr), (2) Department of Water Resources and Environmental Engineering, School of Civil Engineering, National Technical University of Athens (NTUA) (panospap@itia.ntua.gr), (3) Department of Water Resources and Environmental Engineering, School of Civil Engineering, National Technical University of Athens (NTUA) (dk@itia.ntua.gr)

Two-dimensional (2D) spatio-temporal temperature records obtained from tracer concentration measurements on the plane of symmetry of heated jets (small turbulence scale) are statistically analyzed and the presence of Hurst-Kolmogorov (HK) dynamics is detected. The 2D HK process is then fitted to the data and synthetic time-varying and/or spatial fields are generated for temperature, which are consistent with the observed. Moreover, the 2D HK process is formulated assuming anisotropy, so as to take into account possibly different autocorrelation decay rates (Hurst coefficients) in each dimension of the field. In addition, the results are also investigated in comparison with Kolmogorov's power spectrum model K41.