Geophysical Research Abstracts, Vol. 9, 11253, 2007
SRef-ID: 1607-7962/gra/EGU2007-A-11253

Scaling properties of fine resolution point rainfall and inferences for its stochastic modelling

S. Papalexiou (1), A. Montanari (2) and D. Koutsoyiannis (3)

(1) Department of Water Resources, National Technical University of Athens, Greece (sp@itia.ntua.gr); (2) Department DISTART, Faculty of Engineering, University of Bologna; (3) Department of Water Resources, National Technical University of Athens, Greece (dk@itia.ntua.gr)

The well-known data set of the University of Iowa comprising fine temporal resolution measurements of seven storm events is analysed. Scaling behaviours are observed both in state and in time. Utilizing these behaviours, it is concluded that a single and rather simple stochastic model can represent all rainfall events and all rich patterns appearing in each of the separate events making them look very different one another. From a practical view point, such a model is characterized by distribution tails decreasing slowly (in an asymptotic power-type law) with rainfall intensity, as well as by high autocorrelation at fine time scales, decreasing slowly (again in an asymptotic power-type law) with lag. Such a distributional form can produce enormously high rainfall intensities at times and such an autocorrelation form can produce hugely different patterns among different events. Both these behaviours are just opposite to the more familiar processes resembling Gaussian white noise, which would produce very "stable" events with infrequent high intensities. In this respect, both high distribution tails and high autocorrelation tails can be viewed as properties enhancing randomness and uncertainty, or entropy.