Geophysical Research Abstracts
Vol. 13, EGU2011-11557, 2011
EGU General Assembly 2011

A worldwide probabilistic analysis of rainfall at multiple timescales based on entropy maximization

Simon-Michael Papalexiou and Demetris Koutsoyiannis
National Technical University of Athens, Water Resources and Environmental Engineering, Athens, Greece (sp@itia.ntua.gr)

Rainfall, as a continuous time process, is useful to study in a multitude of time scales, although limitations are often imposed for the finest scales due to the rainfall recording apparatus. Practically, in hydraulic design, rainfall is studied at timescales ranging from a few minutes to a few days but coarser scales up to annual and beyond are also of interest in hydroclimatological studies. The ombrian curves (else known as intensity-duration-frequency curves) constitute a popular, usually empirical, hydraulic design tool. Essentially ombrian curves are just probabilistic expressions of rainfall intensity at multiple timescales. It seems that all those empirical or semi-empirical methods have prevailed in practice due to the lack of a unique theoretically consistent model able to describe rainfall intensity at multiple timescales. For example, in the literature many different probability models haven been proposed for specific timescales also varying with the location. Here we address the question if a single model exists able to describe rainfall at multiple timescales in virtually all areas of the world. To answer this question, we use as a theoretical background some new results regarding entropy maximizing distributions and a very large database of rainfall records. We assess the ability of the theoretically derived entropic models to describe rainfall at multiple timescales by comparing the shape characteristics between the model and the empirical samples.