Geophysical Research Abstracts,
Vol. 10, EGU2008-A-00702, 2008
SRef-ID: 1607-7962/gra/EGU2008-A-00702
EGU General Assembly 2008

Ombrian curves in a maximum entropy framework

S.M. Papalexiou (1), D. Koutsoyiannis (2)

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

Ombrian curves (from the Greek ombros, meaning rainfall) are most widely known as rainfall intensity-duration-frequency (IDF) curves or relationships. However, the former term may be preferable as the later is inaccurate. Namely, "frequency" is meant to be "return period" where as "duration" is in fact the "time scale" on which the rainfall process is averaged. Thus, ombrian relationships are nothing more than multiple time scale expressions of the rainfall probability. Three important issues regarding the mathematical form of the ombrian relationships are examined: (a) whether or not the effects of time scale and return period are separable so that the relationship could be written as the product of two scalar functions; (b) whether or not the rainfall intensity is a power function of return period and (c) whether or not the rainfall is a power function of time scale. All these questions are investigated using the principle of maximum entropy as a theoretical basis and a long rainfall data set as an empirical basis. It turns out that none of the above questions has a precisely positive answer, which makes the theoretical derivation of ombrian curves a complicated task. For this reason, consistent approximations are sought, which eventually do not depart significantly from commonly used forms in engineering practice.