Geophysical Research Abstracts
Vol. 17, EGU2015-10492, 2015
EGU General Assembly 2015

Explorations on the Hershfield Factor

Simon Michael Papalexiou (1), Yannis Dialynas (2), and Salvatore Grimaldi (3)

(1) National Technical University of Athens, Water Resources and Environmental Engineering, Athens, Greece (smp@itia.ntua.gr), (2) School of Civil and Environmental Engineering, Georgia Institute of Technology, Atlanta, GA, USA, (3) Università degli Studi della Tuscia, Viterbo, Italy

The Hershfield factor (H) essentially constitutes a multiplier aiming to correct the error between fixed time interval maxima (F-maxima) and sliding maxima (S-maxima) as a direct consequence of temporal discretization of hydrometeorological time series. Rainfall is typically recorded as an accumulated value in fixed non-overlapping time intervals, e.g., in daily intervals, and thus the annual maximum value expresses the maximum value of these fixed recordings over a year period. Yet if measurements at a finer time scale are available, e.g., hourly, then the annual daily S-maximum, i.e. the annual maximum value resulting by sliding a 24-hour time interval starting at any hour of the year, in general, is different than the F-maximum value. The H factor attempts to correct for this error. Multiplying the F-maximum, which can be considered as a random variable, with the H factor, theoretically should result in the S-maximum random variable. This implies that the location and scale characteristics of the S-maximum distribution are explicitly related to the value of H and to the characteristics of the F-maximum random variable, while its shape characteristics will be exactly the same as those of the F-maximum distribution. This study further explores the validity of this well-accepted assumption. In order to verify or discard this assumption we perform an unprecedentedly large empirical analysis based on thousands of hourly rainfall records across the USA.