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Probabilistic Analysis of Daily Precipitation Maxima over Greece

Katerina K. Argyrouli (1), Elissavet G. Feloni (1,2), and Panagiotis T. Nastos (1)

(1) Laboratory of Climatology & Atmospheric Environment, Faculty of Geology & Geoenvironment, University of Athens, University Campus, 157 84, Athens, Greece, (2) Department of Water Resources and Environment, Faculty of Civil Engineering, National Technical University of Athens, 5 Iroon Polytechniou, 157 73, Athens, Greece

Urbanization constitutes an important factor inducing extreme weather conditions, such as heavy precipitation, which can lead to serious consequences for the environment and society. The study of the maximum precipitation totals is linked to proper hydrological planning, associated to the optimized adaptation procedures.
The objective of this research is the probabilistic analysis of daily precipitation maxima over Greece. For this purpose, the data analyzed concerns the maximum daily precipitation (MDP) from 40 rain gauges, uniformly distributed over the examined area, within a 50 years period (1951-2000). A statistical analysis was applied to the datasets by investigating the fitting of 61 continuous distributions, using the Kolmogorov-Smirnov test at 95% confidence level. The MDP probability of occurrence and the return period for specific precipitation thresholds (20 mm, 30 mm, 50 mm and 100 mm) were estimated by the best fitting distribution for each station.
The findings of the performed analysis revealed significant spatial variability of return period, especially for higher MDP thresholds. Further, it was found that the best continuous distribution is Burr (Singh-Maddala) for the majority of stations, followed by Generalized Extreme Value, Dagum, Log-Logistic, Pearson 5, Pearson 6 and Generalized Pareto.