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*Editorial*

# Advances in Modelling of Rainfall Fields

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Rainfall is the main input for all hydrological models, such as rainfall–runoff models and the forecasting of landslides triggered by precipitation, with its comprehension being clearly essential for effective water resource management as well. The need to improve the modelling of rainfall fields constitutes a key aspect both for efficiently realizing early warning systems and for carrying out analyses of future scenarios related to occurrences and magnitudes for all induced phenomena.

The aim of this Special Issue was to provide a collection of innovative contributions for rainfall modelling, focusing on hydrological scales and a context of climate changes. The first group of papers regarded the study of global precipitation products and their downscaled versions [1], the estimation of peak discharges in rainfall–runoff modeling under different rainfall depth–duration–frequency formulations [2], stormwater infiltration practices in rapidly urbanizing cities with the aim of designing resilient urban environments [3], and a novel temporal stochastic rainfall simulator [4] aiming to generate long and high-resolution rainfall time series, with the advantage of being strongly user friendly and parsimonious in terms of employed input parameters. Moreover, other works focused on determining the quantities of runoff by knowing the amount of rainfall in order to calculate the required quantities of water storage in reservoirs and to determine the likelihood of flooding [5], some analyzed intrastorm pattern recognition through fuzzy clustering [6], and others investigated the use and combination of pluviograph and daily records to assess rain behavior in urban areas, selecting a suitable method that would provide the best results of IDF relationships [7]. Finally, a sensitivity analysis of the rainfall–runoff modeling parameters in data-scarce urban catchment areas was performed aiming to improve the rainfall–runoff model calibration process [8], satellite-based rainfall estimations were compared with ground data [9], machine learning and process-based models for rainfall–runoff simulations were applied [10], and deep convective systems associated with extreme rainfall storms were examined in tropical regions [11].

We believe that the contribution from the latest research outcomes presented in this Special Issue can shed novel insights on the comprehension of the hydrological cycle and all the phenomena that are a direct consequence of rainfall.

Moreover, all these proposed papers can clearly constitute a valid base of knowledge for improving specific key aspects of rainfall modelling, mainly concerning climate change and how it induces modifications in properties such as magnitude, frequency, duration, and the spatial extension of different types of rainfall fields. The goal should also consider providing useful tools to practitioners for quantifying important design metrics in transient hydrological contexts (quantiles of assigned frequency, hazard functions, intensity–duration–frequency curves, etc.).

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