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Editorial

Integration of Advanced Soft Computing Techniques in Hydrological Predictions

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Recently, extreme events have been occurring more frequently, a possible result of climate change, and have resulted in both significant economic losses as well as loss of life around the world. It is important to have the capability to accurately predict both the occurrence times and magnitudes of peak river flows in advance of an impending extreme weather event. The integration of soft computing techniques in hydrological predictions is a growing field of study in water resource engineering and management [1–7]. Such techniques can optimally calibrate data-driven hydrological models to enhance forecasting accuracy. This special edition of *Atmosphere* is tailored to fill the existing gap by including papers on advances in the contemporary use of soft computing techniques in hydrological modelling.

This *Atmosphere* Special Issue collected five original papers focused on research associated with the integration of advanced soft computing techniques in hydrological predictions. Han et al. [8] of Xiamen University and the University of New South Wales presented three models, including a nonparametric *k*-nearest neighbor model, which employs a parameter selection method based on partial information coefficient to simulate the rainfall–runoff generation relationship in the Jiulong River catchment, China. Tayyab et al. [9] of China Three Gorges University and the Huazhong University of Science and Technology developed a novel hybrid artificial neural networks model based on ensemble empirical mode decomposition and discrete wavelet transform to predict riverflow, validating its efficiency at the Upper Indus Basin. Wu et al. [10] of the Taiwan Typhoon and Flood Research Institute proposed quantitative real-time forecasts of 24 h cumulative rainfall during typhoons by integrating an ensemble numerical weather prediction system with an evolutionary algorithm, namely, a genetic algorithm, to determine the optimal weights for coupling these ensemble forecasts. Seo et al. [11] of Kyungpook National University and Texas A&M University devised a novel approach for simulating daily rainfall–runoff and coupled two hybrid machine learning models, namely, a least-squares support-vector regression and an extreme learning machine with variational mode decomposition. They indicated that these two novel models outperformed other benchmark conventional models. Zhang et al. [12] of Tsinghua University and The University of Hong Kong undertook a quantitative analysis of effects of the uncertainty of areal rainfall on hydrological modeling in the Longxi River basin by employing a bootstrap method.

Extreme weather events will continue to be a hot issue in global climate discussions. The articles selected in this Special Issue underline the contemporary use of soft computing techniques in hydrological modelling across the globe. The information and analyses will contribute to the development and implementation of effective hydrological prediction and, accordingly, appropriate precautionary measures.

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