

Special Issue

Extreme Rainfall and Hydrological Extremes: Monitoring and Prediction Using Machine Learning and Physical Modeling

Message from the Guest Editors

Extreme rainfall events are becoming more frequent and severe due to climate variability and human activities, presenting considerable threats to water security, infrastructure, ecosystems, and human lives. Precisely monitoring and predicting these events is essential for effective disaster preparedness, early warning systems, and sustainable water resource management. This Special Issue seeks to unite innovative research and advanced methodologies that improve our understanding of extreme rainfall dynamics across different spatial and temporal scales. We invite submissions focused on remote sensing techniques, ground-based observational networks, statistical and machine learning models, hydrological modeling, and integrated climate systems for rainfall prediction. Special attention will be given to case studies from vulnerable and data-poor areas, uncertainty quantification, and blending traditional knowledge with contemporary tools. Interdisciplinary approaches that bridge atmospheric science, hydrology, climatology, and disaster risk reduction are strongly encouraged.

Guest Editors

Prof. Dr. Muhammad Abrar Faiz

School of Water Conservancy and Civil Engineering, Northeast Agricultural University, Harbin 150030, China

Dr. Zhaoqiang Zhou

School of Water Conservancy and Civil Engineering, Northeast Agricultural University, Harbin 150000, China

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Water
Editorial Office
MDPI, Grosspeteranlage 5
4052 Basel, Switzerland
Tel: +41 61 683 77 34
water@mdpi.com

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Message from the Editor-in-Chief

In the context of global changes, the sustainable management of water cycles, going from global and regional water cycles to urban, industrial and agricultural water cycles, plays a very important role on the water resources and on their relationships with food, energy, biodiversity, ecosystem functioning and human health. *Water* invites authors to provide innovative original full articles, critical reviews and timely short communications and to propose special issues devoted to new technological and scientific domains and to interdisciplinary approaches of the water cycles. We ensure a critical review process and a quick turnaround between submission and final decision.

Editor-in-Chief

Dr. Jean-Luc PROBST

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