Special Issue

Compound Extreme Events in a Changing Climate: Atmospheric Mechanisms and Hydrological Consequences

Message from the Guest Editors

These compound events, such as concurrent heatwaves and droughts, and storm sequences leading to floods, often lead to cascading impacts that are disproportionately larger than the sum of their individual parts. Understanding the atmospheric processes that drive these phenomena and their subsequent hydrological consequences is therefore critical for risk assessment and the development of effective adaptation strategies. This Special Issue aims to bridge the gap between atmospheric science and hydrology by providing a platform for cutting-edge research on this critical topic. It will focus on elucidating the atmospheric mechanisms (e.g., persistent blocking patterns, land–atmosphere feedback, atmospheric rivers) that trigger and amplify compound extremes. The scope encompasses studies that investigate hydrological impacts, including flash flooding, watershed inundation, water quality degradation, and alterations to the terrestrial water cycle. We encourage submissions that employ novel methodologies, including high-resolution modeling, AI and machine learning, remote sensing, paleoclimatology, and risk assessment frameworks.

Guest Editors

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About the Journal

Message from the Editor-in-Chief

Continued developments in instrumentation and modeling have driven atmospheric science to become increasingly more complex with a deeper understanding of concepts, mechanisms, and interactions. This is the field that innovation built and it has led to a better appreciation for the complexity with atmosphere. Human life is intertwined in this complexity as we strive to better understand our atmosphere. Climate change is constantly stretching the limits of our thinking and forcing new ideas and concepts to be played out. Welcome to the Anthropocene!

Editor-in-Chief

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