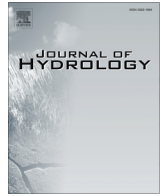


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Editorial

Drought processes, modeling, and mitigation



Accurate assessment of droughts is crucial for proper planning and management of our water resources, environment, and ecosystems. The combined influence of increasing water demands and the anticipated impacts of global climate change has already raised serious concerns about worsening drought conditions in the future and their social, economic, and environmental impacts. As a result, studies on droughts are currently a major focal point for a broad range of research communities, including civil engineers, hydrologists, environmentalists, ecologists, meteorologists, geologists, agricultural scientists, economists, policy makers, and water managers. There is, therefore, an urgent need for enhancing our understanding of droughts (e.g. occurrence, modeling), making more reliable assessments of their impacts on various sectors of our society (e.g. domestic, agricultural, industrial), and undertaking appropriate adaptation and mitigation measures, especially in the face of global climate change.

Droughts are triggered by a combination of multiple climatologic and hydrologic parameters and, therefore, identification of their causes and assessment of their impacts remain tremendously challenging. This problem will likely become even more complicated in the future, since global climate change is anticipated to further intensify the global hydrologic cycle, leading to greater spatio-temporal variability in precipitation and unexpected changes in timing and characteristics of rainfall, including distribution of rainy days and intensity and duration of rain, all of which play significant roles in the occurrence and propagation of droughts and their impacts.

Significant progress has indeed been made, especially in recent decades, in terms of development of new drought concepts, advancement in drought modeling and monitoring methodologies, improvement in impact assessment, and progression in adaptation and mitigation strategies; see, for example, [Mishra and Singh \(2010, 2011\)](#) for recent reviews. Notwithstanding this progress, one of the many key remaining challenges is the transfer of methodologies and strategies from one region to another. This is primarily due to the differences in local hydro-meteorologic patterns, differences in sectoral water uses, and differences in socio-economic conditions. This is clearly evident from, for example, more than 100 drought definitions that currently exist around the world. Another important factor that is also making matters complicated is the scattered and fragmented nature of the literature on drought studies.

This special issue is intended to bring together many of the ongoing, yet scattered, frontier research activities on droughts into a single platform. The special issue consists of 23 papers, contributed by a total of about 70 authors. The contributions cover a broad spectrum of topics in drought research, including, but not limited

to: (a) advances in statistical methods for drought detection and modeling; (b) spatio-temporal drought analysis under large-scale global teleconnection patterns (e.g. El-Niño Southern Oscillation); (c) remote sensing applications for drought monitoring and assessment; (d) anthropogenic impacts on drought patterns (e.g. land cover/land use); (e) climate change impacts on droughts; (f) application of GRACE (Gravity Recovery and Climate Experiment) satellite data for drought monitoring; and (g) developments in drought management, adaptation, and mitigation tools. The contributions also cover drought studies conducted for many regions around the world, including regions that are frequently affected by droughts and have high vulnerable population and socio-economic conditions (e.g. Africa, Asia).

For many decades, *Journal of Hydrology* has been serving as an excellent medium for disseminating research activities and initiatives in the field of hydrology and water resources, including water-based management and policy issues that impact economics and society. We, the guest editors, believe that the current special issue, bringing together a wide range of research activities on droughts from around the world, is an important contribution for advancing water research even further. We clearly recognize that the articles and topics compiled in this special issue constitute only a small portion of drought studies undertaken around the world, and this limited compilation has been due to space, time, and other constraints. There are indeed many other topics that also deserve serious consideration for inclusion as part of drought research, including development of robust and accurate drought indexes, prediction of real-time droughts, study of coupled climate-human-water interactions, and translation of drought information to decision making, among others. We hope to have an opportunity to address these in the future.

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