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Spatiotemporal patterns of US drought awareness

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ABSTRACT Drought is a creeping climatological phenomenon with persistent precipitation deficits. Unlike rapid onset natural hazards such as floods and wildfires, the intangible and gradual characteristics of drought cause a lack of social response during the onset. The level of awareness of a local drought increases rapidly through mass media reports and online information searching activities when the drought reaches its peak severity. This high level of local drought awareness drives concerns for water shortage and support for water policy. However, spatiotemporal patterns of national-scale drought awareness have never been studied due to constraints imposed by time-consuming and costly survey data collection and surveys' limited sample sizes. Here, we present the national-scale study to reveal the spatiotemporal patterns of drought awareness over the contiguous United States (CONUS) using Google Trends data and Principal Component Analysis (PCA). Results show that the first two PC modes can explain 48% (38% for PC1 and 10% for PC2) of the total variance of state-level drought awareness. We find that the PC1 mode relates to a national pattern of drought awareness across the CONUS. The spatiotemporal patterns further imply that residents in the Northeastern US region are the most aware of the emergence of drought, regardless of the geographic location of the occurrence. The results illustrate how big data, such as search query and social media data, can help develop an effective and efficient plan for drought mitigation in the future.

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