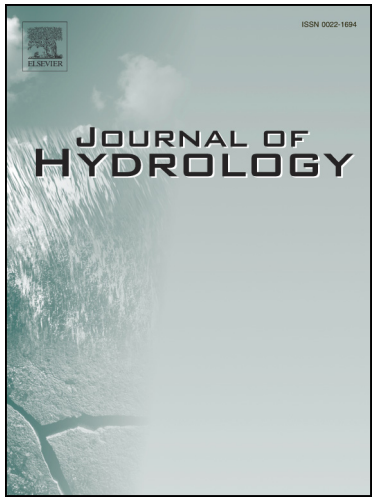

Research papers

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Quantifying spatial and temporal patterns of flow intermittency using spatially contiguous runoff data

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Key words: drought, intermittent flow, ephemeral, stream hydrology prediction, spatial distribution, temporal pattern.

Abstract

River channel drying caused by intermittent stream flow is a widely-recognized factor shaping stream ecosystems. There is a strong need to quantify the distribution of intermittent streams across catchments to inform management. However, observational gauge networks provide only point estimates of streamflow variation. Increasingly, this limitation is being overcome through the use of spatially contiguous estimates of the terrestrial water-balance, which can also assist in estimating runoff and streamflow at large-spatial scales. Here we proposed an approach to quantifying spatial and temporal variation in monthly flow intermittency throughout river networks in eastern Australia. We aggregated gridded (5x5 km) monthly water-balance data with a hierarchically nested catchment dataset to simulate catchment runoff accumulation throughout river networks from 1900-2016. We also predicted zero flow duration for the entire river network by developing a robust predictive model relating measured zero flow duration (% months) to environmental predictor variables (based