How can we better quantify drought in a warming climate?

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A lot of attention has been focussed on metrics for quantifying drought recently. A problem that has recieved lesser attention is the unsuitability of current metrics in quantifying drought in a changing climate due to the clear non-stationarity in potential and actual evapotranspiration well into the future (Asadi-Zarch et al, 2015). This talk argues for a new basis for simulating drought designed specifically for use with climate model simulations. Given the known uncertainty of climate model rainfall simulations, along with their inability to represent low-frequency variability attributes, the approach here adopts a predictive model for drought designed using selected atmospheric indicators. This model is based on a wavelet decomposition of relevant predictor variables to filter out less relevant frequencies and formulate a better characterisation of the drought metric chosen as response. Using simulations from a range of GCMs across Australia, we show here that this new method offers considerable advantages in representing drought compared to traditionally followed alternatives that rely on modelled rainfall instead.

Reference:
Asadi Zarch, M. A., B. Sivakumar, and A. Sharma (2015), Droughts in a warming climate: A global assessment of Standardized precipitation index (SPI) and Reconnaissance drought index (RDI), Journal of Hydrology, 526, 183-195.