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An Empirical Mode Decomposition (EMD) model for stochastic generation of hydro-climatological time series

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The current drought in Eastern Australia, which is unprecedented historically, has caused practitioners to revisit the modeling of hydrological time series linked to SOI and PDO time series. An annual time series model for stochastic generation is presented that incorporates these phenomena which can be used as a short term forecaster or a simulator. The procedure consists of applying EMD to separate a rainfall time series into intra- and inter-decadal components, which are then modelled separately using an AR(1) process in conjunction with SOI and PDO as climatological forcing functions. It is suggested that this method might be useful as a phenomenological model incorporating observed or modeled climate change.