



## **Bayesian Spectral Likelihood for Hydrology**

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Parameter inference using the power-density spectrum offers new perspectives for environmental model calibration. This contribution presents a new Bayesian Spectral Likelihood (BSL) methodology for parameter inference in hydrology. While time-domain inferences tend to be sensitive to departures from distributional assumptions (usually Gaussianity) but do not penalize violations of autocorrelation assumptions, a power-density-spectral likelihood focuses directly on the autocorrelation properties of the model errors, and, moreover, is shown to be robust with respect to departures from Gaussianity. Moreover, it can be used for model calibration without concomitant time series. We compare BSL to traditional Bayesian time-domain inference, discuss opportunities for environmental model calibration and post-calibration assessment, address theoretical and practical implementation issues and demonstrate the application of BSL in a rainfall- runoff modeling case study.