



Dynamic Emulators as Tools for Improving Calibration and Uncertainty Analysis in Hydrology

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Mechanistic hydrological simulation models are computationally very demanding. This often limits the application of sensitivity and uncertainty analysis techniques. This is particularly the case for Bayesian inference using Markov chain Monte Carlo simulation. Emulators are statistical approximations of deterministic simulation models that can be used to interpolate the output of these models between outputs calculated at design input conditions. Besides improving the efficiency of the codes and of the analysis techniques, such emulators may be an option to make systems analytical techniques applicable to computationally demanding hydrological simulation models. The talk will give an overview of recent development in the construction of statistical and mechanism-based emulators with an emphasis on the potential for application in hydrology. In particular, the relationship to issues that gained recent attention in hydrology, such as input uncertainty and model smoothing, will be discussed. This will demonstrate the usefulness of this technique but also show the need for further development.