Geophysical Research Abstracts
Vol. 21, EGU2019-5301, 2019
EGU General Assembly 2019

Assessing uncertainties for predictions in ungauged catchments

Fabrizio Fenicia and Marco Dal Molin
Eawag, SIAM, Dübendorf, Switzerland (fabrizio.fenicia@eawag.ch)

A common approach for predicting streamflow or other quantities of interest in catchments where no direct observations are available, is to calibrate models on so called “signatures” of catchment response, where such signatures are not directly observed, but are extrapolated from other time periods or other catchments. Quantifying predictive uncertainties in such scenarios is a complex task. First, there is the problem that although calibration takes place on signatures, model predictions are needed for the time series, and not for the signatures themselves. This issue renders a non-trivial inference problem, which requires propagating uncertainties between streamflow and corresponding signatures. Second, there is the issue that the signatures used for model calibration are not directly observed, but modelled, for example by regionalizing signatures observed in other catchments. Hence, such signatures are themselves uncertain. This research outlines an overall framework grounded on Bayesian inference which enables model calibration on uncertain signatures. The inference problem uses Approximate Bayesian Computation as a numerical technique for propagating uncertainties. The ability to perform reliable and precise predictions in ungauged conditions is tested in a set of catchments. We consider different ungauged scenarios, including signatures derived from a different time period or regionalized from other catchments. We show that depending on the model used to transfer signatures to the ungauged catchment of interest, reliable and precise streamflow predictions can be achieved.