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Hydrologic models calibration: how much are we hampered by uncertain observations?

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Lately, major attention has been devoted to the estimation of uncertainty in hydrologic modeling to make users aware of application limits. In this work, a simple numerical experiment is proposed, that allows an analysis of uncertainty in model's parameters calibration. A distributed model based on geomorphological concepts has been used for the experiment. An artificial truth (observation) using the model in a known configuration is first created. Uncertainty in parameters calibration, deriving from the intrinsic structure of the model, is then studied by assuming "perfect observations". Eventually, the way in which uncertainty increases when uncertain observations are used is assessed. The numerical experiment gives useful indications about the sample size needed for calibrating the model carefully in both ideal and more realistic conditions. The experiment involves the analysis of an ensemble of model runs. Therefore, its set up holds even if a different hydrologic model is used.