



## **Subjective modelling decisions significantly impact the simulation of hydrological extremes**

Lieke Melsen (1), Adriaan Teuling (1), Paul Torfs (1), Massimiliano Zappa (2), Naoki Mizukami (3), Pablo Mendoza (3), Martyn Clark (3), and Remko Uijlenhoet (1)

(1) Wageningen University, Hydrology and Quantitative Water Management, Wageningen, Netherlands (lieke.melsen@wur.nl), (2) WSL, Birmensdorf, Switzerland, (3) NCAR, Boulder (CO), USA

It is generally acknowledged in the environmental sciences that the choice of a computational model impacts the research results. We have showed, with an example of hydrological modelling of floods and drought, that modelling decisions during the model configuration, beyond the model choice, also impact the model results. In our carefully designed experiment we investigated four modelling decisions in ten nested basins: the spatial resolution of the model, the spatial representation of the forcing data, the calibration period, and the performance metric. The simulation of both hydrological extremes was affected by the four modelling decisions, with differing significance and magnitude. The flood characteristics were mainly affected by the performance metric, whereas the drought characteristics were mainly affected by the calibration period. Modelling decisions during model configuration introduce subjectivity from the modeller. Multiple working hypotheses during model configuration can provide insights on the impact of such subjective modelling decisions.