EGU21-5040
https://doi.org/10.5194/egusphere-egu21-5040
EGU General Assembly 2021

Hydrological modeling in data sparse environments

Faizan Anwar, András Bárdossy, and Jochen Seidel
University of Stuttgart, Institute for Modelling Hydraulic and Environmental Systems, Dept. of Hydrology and Geohydrology, Stuttgart, Germany (faizan.anwar@iws.uni-stuttgart.de)

We demonstrate that in data sparse environments, model parameter uncertainty is not the only cause of concern. To get a meaningful outcome, input data uncertainty has to be taken into account as well. The procedure involved calibration of a hydrological model using recent daily data rich time period along with validation. A historical flood was simulated (after warmup) for which the input data were relatively sparse in space, namely precipitation and temperature, using the calibrated model parameters. Precipitation was assumed to be the main driver of this event. Results showed that by only using interpolated precipitation (e.g. IDW or Kriging), the magnitude and timing of the peak were incorrect, even after using very many different parameter vectors that performed equally well for the recent times. Subsequently, the model was inverted for precipitation i.e. input fields that produced the correct timing, magnitude, dependence in space and distributions were searched for. This was done using a previously developed simulation algorithm. The new fields showed that the same hydrograph could have been produced by two main types of conditions, namely, early snow cover that melted and heavy rain. The plausibility of the simulated fields was also assessed by comparing their structure in space to events in recent times.