

Study project/master's thesis @HFM: **Bias correcting interpolated model input grids**

Problem description

It is known that the variance of interpolation points away from observations points drops as the distance between them increases in general. This has many causes. This decrease in variance affects the results of model that uses the interpolated points as input. Specifically, this effect leads to underestimation of the precipitation volume for big events in general. We would like to reduce this discrepancy between the observation and interpolation locations in an efficient manner for the specific case of conceptual rainfall-runoff modeling of various rivers of Bavaria. It is not needed to apply the correction everywhere in space-time. Only a subset of events e.g., some flood events that were a result of precipitation in a relatively short duration. Selection of the events may be automated.

Steps

The general setup would be as follows: Preparation of input data for a gridded conceptual rainfall-runoff model. These are precipitation and temperature. Calibrating and validating the model using these data on river flows. Selection of events that were simulated by the model in an unsatisfactory manner. Going back to the interpolation and bias correcting these and then recalibrating. Evaluating the resulting change in precipitation volumes and model performance after recalibration and then concluding if such procedures are important or not.

Requirements

The student is expected to have some background in rainfall-runoff modeling, statistics, geostatistics and programming in python as everything mentioned above is coded in it. The required background could be acquired before and/or during the study.

Contact

Interested students may write to me (faizan.anwar@tum.de) for further discussion. The work load can be adjusted depending on the student if they want to pursue a study project or a master's thesis.