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# Do uncertainty reductions in climate change assessments really impact the predicted hydrological response?

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Uncertainties in assessing large-scale climate change impacts on streamflow arise from the chosen climate model, representative concentration pathway, applied bias correction and the catchment properties. These uncertainties can be assessed and quantified by comparing hindcasted simulations to observations. We investigated these uncertainties in three mesoscale catchments in different ecoregions in Germany (northern lowlands, mid-range mountains and alpine region) by comparing hydrological indicators of magnitude, duration, frequency, rate and timing of streamflow. We found that the uncertainties are ecoregion- and indicator-specific so that some models and methods performed better than others in different regions or in depicting different indicators.

Based on this observation, we investigated the impact of a subsequent uncertainty reduction on the hydrological prediction of future streamflow indicators. Therefore, we started with the full ensemble of all models and methods and carried out a stepwise exclusion of the most uncertain methods and models until arriving at the least uncertain climate forcing dataset. For each change in the ensemble, predicted hydrological indicator values are calculated. Changes in these values follow a trajectory which represents the change in predictions depending on the uncertainty reduction.

Analyzing the path of these trajectories in more details shows at what point and to which extent uncertainty reductions alter the hydrological response. We found that, independent from the selected combinations of models and methods, the signs of changes of the indicators are not impacted. Thus, the overall tendency of change in different hydrological indicators is stable in the three catchments.