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Using ensemble climate projections to assess probabilistic hydrological change in the Nordic region

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Effects on the local scale of human-induced global climate change is important for many parts of our society today to assess future hazards to human lives, infrastructure and buildings, agriculture et cetera. However, applying climate model output direct in impact studies is difficult because of the discrepancy in scales, and GCMs insufficient representation of important hydrological variables. In this study, response surfaces were created by running the hydrological HBV model with differentiated perturbations in the observed input data (e. g. temperature and precipitation). The probability for reaching an a priori determined threshold any given year calculated from the results and plotted as contour lines. The study areas were three catchments in Sweden.
A joint probabilistic distribution of future climate projections of temperature and precipitation from the perturbed physics experiment, together with output from RCMs from the ENSEMBLES project, were then overlaid on the response surfaces. Site-specific thresholds were set where they were available, otherwise a general threshold, such as the probability of exceeding a 100 year return period were selected. The approach gives the opportunity to analyse climate model projections from many sources in a probabilistic framework and can be used as decision support system to adapt to future changes in the local hydrology.