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A similarity approach for the regionalization of hydrological model parameter sets

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Currently many hydrological studies are focusing on changing climate and landuse conditions. Often statements are requested about poorly gauged catchments, so that hydrographs for the calibration of conceptual hydrological models are not sufficiently available. As a result, methods have to be developed to predict model parameters for poorly gauged catchments.
In this study a similarity approach, based on Self-Organizing Maps (SOM), and its application to 41 catchments of the Aller-Leine River Basin in Northern Germany is presented. Out of these 41 catchments 13 were chosen as donor catchments and the remaining 28 as un-calibrated validation catchments. The main assumption of our approach is that similar catchments will have similar model parameters. In a first step a SOM was used to classify the catchments due to their characteristics (SOM_CC). In a second step the 13 donor catchments were calibrated under the condition that the trained SOM on the model parameters (SOM_MP) is reproducing the existing SOM_CC. For the calibration the well known Simulated Annealing algorithm was used. After the calibration, model parameters were transferred from the SOM_MP to the validation catchments and the model performances are evaluated.
First results indicate, that it is generally possible to estimate whole parameter sets for ungauged catchments with this method. However further development is needed to improve the performance.