Comparison between regional and catchment specific calibration of a distributed hydrological model

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In calibrating area distributed hydrological models, a regional approach will be more rational than the more traditional basin specific approach. Regional calibration can result in a seemingly poorer calibration for some catchments with good data, however this is compensated for by getting a more robust calibration which also performs good results for catchments where data are scarce or absent.

A distributed hydrological model (DEMLab) is used to simulate three regions which together cover most of southern Norway. The model has daily time resolution and $1*1$ km^2 grids. The input data are pre-processed and not a part of the calibration. The model is calibrated by using the local, gradient-based Gauss-Marquardt-Levenberg search algorithm, which is very effectiv in finding a local optimum at a not linear surface. The results from regional and basin spesific calibration are compared for all three regions, in order to see how much the goodness of fit is reduced for single catchments when a regional parameter set which satisfies the whole region is used instead. Deviations between the simulation results from regional and catchment specific calibration, is tried to explain by catchment characteristica.