

An evaluation of multi-basin hydrological modelling for predictions in ungauged basins

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Abstract Availability of data is the limiting condition for reliable hydrological predictions in many regions of the world. One possible solution is to increase the scale of hydrological models so as to encompass data sparse regions within larger regions where data are available. A growing number of hydrological model studies use the spatial distribution of soils and vegetation to predict spatially-varying catchment behaviour. This introduces the potential to setup and use hydrological models over larger scales and simultaneously over several river basins. Such models can be set up easily, over very large regions, using freely available global data sets. However, the questions remain: (a) can a multi-basin hydrological model be calibrated using a uniform parameter set? and (b) can the uniformly calibrated, multi-basin hydrological model be used to make reasonable predictions in ungauged basins? Two different multi-basin regions were set up and calibrated using uniform land-use and soil-type dependent parameters in the HYPE hydrological model. Results indicate that a reasonable calibration can be achieved for a large multi-basin model set using readily available global input databases and using a homogenous parameter set.

Key words distributed hydrological modelling; predictions in ungauged basins