



Prediction bounds of a catchment model conditioned on distributed streamflow observations

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The Generalised Likelihood Uncertainty Estimation (GLUE) approach was applied to assess the performance of a catchment model and to estimate simulation prediction limits after conditioning based on distributed streamflow observations. The modelled physical system is a medium size catchment located in the centre of Belgium. The hydrological modelling was performed with MIKE SHE, which is a physically based, distributed, integrated hydrological (and water quality) modelling system. The GLUE analysis showed that the horizontal and vertical components of the hydraulic conductivity of one of the geological layers have the most influence on the streamflow model predictions in the application catchment. The study revealed a considerable uncertainty attached to the simulation of both high flows and low flows. Similarly, wide prediction intervals were obtained for the piezometric levels in relevant wells. Nevertheless, the results suggest that the model of the catchment predicts outputs within the limitations of the errors in the input and evaluation (measured) variables and the discrepancies between (i) the structure of the hydrologic model and the actual catchment processes; and (ii) the modelling scale and the scale to which the input and evaluation data were acquired.