Hydrology and Earth System Sciences
An Interactive Open Access Journal of the European Geosciences Union

Hydrol. Earth Syst. Sci., 4, 47-63, 2000
www.hydrol-earth-syst-sci.net/4/47/2000/

Application of a distributed physically-based hydrological model to a medium size catchment

L. Feyen[1], R. Vázquez[2], K. Christiaens[2], O. Sels[3], and J. Feyen[2]
[1]Laboratory of Hydrology, V.U.B., Pleinlaan 2, 1050 Brussel
[2]Institute for Land and Water Management, K.U. Leuven, Vital Decosterstraat 102, 3000 Leuven
[3]Laboratory of Hydrogeology, K.U. Leuven, Redingenstraat 16, 300 Leuven
e-mail for corresponding author: raul.vazquez@agr.kuleuven.ac.be

Abstract. Physically based distributed models are rarely calibrated and validated thoroughly because of lack of data. In practice, validation is limited to comparison of simulated and predicted discharges in a catchment, or of simulated and observed piezometric levels in some calibrated wells. Rarely, internal noncalibrated wells or discharge stations are included in model evaluation. In this study, the fully distributed physically based MIKE SHE model was applied to the 600-km^2 catchment of the Grote and the Kleine Gete, Belgium. Firstly, the MIKE SHE model was calibrated against both daily discharge measurements and observed water levels and then validated using a simple split-sample test. The observed discharges were simulated successfully in both the calibration and the validation period, while results for the piezometric levels differed considerably among the wells. In addition, a multi-site validation test for 2 internal discharge stations and 6 observation wells showed inferior results for the discharge stations and comparable results for the water table wells. As in the calibration and the split-sample test validation, water table fluctuations were predicted well in some wells, but with little agreement in others. This may be due to scale effects and to the poor quality of the data in certain areas of the catchment. Mainly, the lack of data made it difficult to simulate time series of internal catchment variables with acceptable accuracy so that even the calibrated and validated model could not provide reliable predictions of the water table over the entire catchment.

Keywords: integral hydrological modelling; distributed code; MIKE-SHE; model performance; model calibration; model validation

Final Revised Paper (PDF, 2335 KB)

Citation: Feyen, L., Vázquez, R., Christiaens, K., Sels, O., and Feyen, J.: Application of a distributed physically-based hydrological model to a medium size catchment, Hydrol. Earth Syst. Sci., 4, 47-63, 2000. Bibtex EndNote Reference Manager