

Interactive comment on “Improvement, calibration and validation of a distributed hydrological model over France” by P. Quintana Seguí et al.

Anonymous Referee #2

Received and published: 21 July 2008

General Comments: Basically, authors try to "improve" the overall performance of the hydrometeorological model (SIM) by introducing a new parameterization of subsurface hydrological processes, in particular by adding a TOPMODEL like depth dependency of saturated hydrological conductivity. They show the sensitivity of the model parameters in a 1D-mode to runoff, infiltration and evapotranspiration, introduce a spatial calibration procedure and demonstrate the performance of the new model (after calibration) against discharge measurements from selected 152 stations around France. My major problem with this paper is the following: On page 1329, line 20ff it is stated, that the original model has problems in representing discharge as presented in Fig. 1. This might be the case given the "default" parameterization as applied. When arguing for the need of calibration with the new model, why don't the authors first try to improve the

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model performance by calibrating the "old" one in a more rigorous way. Even though it not clear from the manuscript how the parameters C1, ..., C4 are calculated and how Ks has an impact on these values, it seems to me very obvious, that variations of the parameters might have important impacts on predicted river discharges. Perhaps the complexity of the model can be reduced - the dynamics of most discharge records can be reproduced by models having a number of parameters around 3-4 (Hornberger...). Why isn't this option analysed in detail before starting to increase descriptions again. Perhaps the structure is already sufficient and adding more complexity (to cite the authors, p1335, l11f) "... is not desirable, because it prevents the modeller to understand the behaviour of the system." What understanding is gained after the introduction of more complexity, except that higher parameterization is better able to fit the observed data? I feel this issue has to be addressed in very detail by the authors in a revised version of the manuscript.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 5, 1319, 2008.

HESSD

5, S739–S740, 2008

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