

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

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Dear Dr. Quintana,

Hope you are doing well. I recently checked your revised manuscript. I am pleased to see that you thoroughly addressed reviewer comments in your responses and in your revised manuscript. It is currently under re review.

Maybe you can in between comment on a few points listed below.

Best regards

Erwin Zehe

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- What is meant with diffusion between different layers, diffusive water flow? Normally this is driven by potential gradients not by gradients in water content. Capillary rise will e.g. have the same velocity in sandy and loamy soils, as long as the water content difference is the same (Eq. 4-7)?

- Beta is named slope of the soil retention curve. However, Eq. 8 is no retention curve, it describes how hydraulic conductivity depends on water content?

-I am not convinced that the topmodel like exponential decrease of k_s is necessary for improving your model. Originally this is an elegant work around to avoid a vertically resolved soil zone but to account for the presence of an impermeable layer. Your model is vertically resolved, which not including an impermeable layer by reducing k_s of the lower soil store.

- By making k_{sat} dependent on z , C_3 becomes also dependent on z (exponentially). To me it is not clear how you calculate diffusive water flows. Do you use an average of k and C_3 , which one? Topmodel avoids this problem by assuming that u -zone processes can be regarded as quasi steady. This is for sure not the case in entire France?

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