Hydrology and Earth System Sciences Discussions

Interactive comment on "Estimation of antecedent wetness conditions for flood modelling in Northern Morocco" *by* Y. Tramblay et al.

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Dear Philipp Meier, first we would like to thank you for the review of our manuscript. Please find below the answers to your comments. General comments:

#1: We have better detailed the calibration process for the model parameters; the sections 4.1 and 4.2 have been updated. The idea behind is that model parameters should not be calibrated blindly all together in an optimization procedure, since there might be dependences between the different parameters. It is a common practice to calibrate separately the production and transfer parameters of a hydrological model. We first calibrated the St (now R) and Tc parameters, using fixed S values for all events. Then, once the optimal St (R) and Tc parameters have been obtained for each event,

we calibrated S, with all the other parameters fixed. As the result, for each event i, we have calibrated values of the S, St (R) and Tc parameters.

#2: We also addressed this concern in the revised manuscript, by adding a standard split-sample validation procedure, using the first 2/3 of events for calibration and the remaining 1/3 events for validation. Indeed the number of events available is low, reducing the ability to check various split-sample validation schemes with sufficient sample sizes. The leave-one-out procedure ensures a systematic validation of the model ability to reproduce all the events. The validation results are very similar using the leave-one-out and split-sample approaches; this shows the robustness of the results.

#3: We fully agree with the reviewer that if remotely-sensed soil moisture data have to be used for completely ungauged basins we still need further analysis. Anyhow, as regards the T-value, its calibration does not significantly influence the results (see also Brocca et al. 2010, 2001 on Remote Sensing of Environment). For instance, by setting T=20 days, the R and RMSE values for ASCAT (AMSR-E) are equal to 0.969 and 0.077 (0.911 and 0.126), respectively. Comparing these results with those reported in Table 3 it is clear that the losses in the performance are nearly negligible.

Specific comments:

Page 9369, line 7: Yes, the linear regression approach was used as in Brocca et al. (2011).

Page 9369, line 21: The meaning of the parameter Td is already explained in the manuscript at Page 9369, line 22 = "the threshold, Td ([0–1]), being the point in the hydrograph where base flow replaces direct runoff"

Page 9370, line 19 – 20 & Page 9370, line 22: We modified the equations 2, 3 and 4 to be the exact same equations given in the HEC-HMS technical reference manual. Now the St parameter is named R, to be consistent with the reference manual (http://www.hec.usace.army.mil/software/hec-hms/documentation/HEC-

HMS_Technical%20Reference%20Manual_%28CPD-74B%29.pdf).

Page 9371, line 22: Please see the modified 4.1 and 4.2 sections. In the calibration phase, the S, K and Tc parameters are calibrated for each event (see general comment 1). Then the S parameters obtained are related to different estimators of the antecedent wetness conditions.

Page 9374, line 13: We modified the text accordingly

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