Hydrol. Earth Syst. Sci. Discuss., 10, C5625–C5627, 2013
www.hydrol-earth-syst-sci-discuss.net/10/C5625/2013/

Hydrology and Earth System Sciences
Discussions

Interactive comment on "Assimilation of surface soil moisture into a multilayer soil model: design and evaluation at local scale" *by* M. Parrens et al.

M. Parrens et al.

jean-christophe.calvet@meteo.fr

Received and published: 14 October 2013

The authors thank the anonymous reviewer #2 for his/her review of the manuscript and for the fruitful comments.

1. [I was under the impression that CDF correction was included already in the reference tests, I only found later in the text that "CDF matching year per year is computed in the experiment DF-CDF but not in the DF-REF". In general and to my knowledge CDF matching should be considered a priori assimilation in order to improve the overall analysis results, e.g. it seems that CDF should be considered already as part of the references cases. Can the authors explicitly state what is the main rationale for not including it in their reference tests?]

RESPONSE 1

CDF-matching is performed for all the experiments (DF-REF, DF-H2, DF-B and DF-CDF) in order to reduce systematic biases between the observations and the model, except for the DF-NP experiment. In the DF-NP experiment, CDF-matching cannot be performed because the open-loop is too distant to the observations. For the other experiments, a CDF-matching over the whole three-year period is performed. Additionally, the influence of the CDF-matching on the analysis is studied with the DF-CDF experiment. In this experiment, the CDF-matching is performed year per year and not over the whole three-year period.

2. [Are the parameters/initial conditions of the 2L and DF models consistent among each other? Is it possible to add a table including the main parameters/initial conditions or state any other possible differences between the two models beside the layer structure?]

RESPONSE 2

The models were not calibrated, except for the field capacity value in ISBA-2L. In the case of ISBA-2L, the average of the observed soil texture profile is used (i.e. 20.0 % of clay and 45.3 % of sand). The field capacity parameter is set to 0.30 m3m-3 in accordance with the measurements. In the case of ISBA-DF, the measured profiles of soil texture (Fig. 1) and soil density are prescribed to the model. The value of the field capacity parameter is not prescribed in ISBA-DF.

3. [Technical corrections: It may be easier to include the terms “w_1” and “w_tot” (as per result section 3.2.1) in the caption of Figure 4 to be more consistent between text and figures.]

RESPONSE 3

Yes. This will be done in the revised version of the manuscript in Figures 4 and 7.

4. [In Figure 5 there is a reference to “OL-FR” and “EXP-FR” does “FR” refers to “Force-

HESSD

10, C5625–C5627, 2013

Restore”? I could not find this defined in the text, maybe consistently use either “2L” or “FR”?]

RESPONSE 4

Yes, "FR" refers to "force-restore". The legends of Figure 5 will be changed to be consistent with the text.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 10, 9645, 2013.