Hydrol. Earth Syst. Sci. Discuss.,
https://doi.org/10.5194/hess-2018-24-RC3, 2018

Hydrology and Earth System Sciences
Discussions

Interactive comment on "Improving soil moisture and runoff simulations over Europe using a high-resolution data-assimilation modeling framework" *by* Bibi S. Naz et al.

Anonymous Referee #3

Received and published: 17 May 2018

General comments:

The objective of this work is to assimilate ESA-CCI satellite-derived soil moisture estimates in CLM over Europe, from 2000 to 2006. The content of the paper is disappointing. The data assimilation experiment boils down to a sensitivity study illustrating possible model biases. Independent validation is missing. No justification is given for the choice of the 2000-2006 time period. Most recent satellites are missing in this period. It is not clear whether or not interannual variability of the vegetation is accounted for in the model. The authors do not use the scores usually used in hydrology. The improvement of the assimilation on water discharge is not convincing at all. The pa-

per is poorly organized (no Discussion section). This work cannot be published in the present form.

Recommendation: reject.

Specific comments:

- P. 1, L. 21 (independent CCI-SSM observations): do you mean observations independent from CCI-SM? They should be!

- P. 3, L. 3: 10**0km?

- P. 4, L. 3 (CLM): how is vegetation represented in this version of the model?

- P. 5, L. 5 (LAI): does this mean that LAI for a given month is the same from one year to another? Given the marked impact of LAI on evapotranspiration, this might introduce marked soil moisture biases.

- P. 5, L. 20 (6 km): it is written in the Abstract and in Section 2.3.2 that the assimilation was made at a spatial resolution of 3 km. Why such a mismatch with the spatial resolution of atmospheric forcing?

- P. 7, L. 4: E-OBS was not defined before.

- P. 11, L. 13 (this study demonstrates): I am not convinced, there is no demonstration.

- P. 11, L. 32 (soil texture): Absolute CCI-SM values depend on pedotransfer functions and texture of the NOAH model. They are not "observed" and they should not be taken for granted. This is not a good way of doing data assimilation.

- P. 22, Table 1: what about other key hydrological scores such as KGE or NSC? Given what can be seen in Fig. 10, I doubt these scores are improved by the assimilation.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., https://doi.org/10.5194/hess-2018-24, 2018.