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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Comparing the Ensemble and Extended Kalman Filters for in situ soil moisture assimilation with contrasting soil conditions" *by* D. Fairbairn et. al.

Anonymous Referee #2

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The paper presents a potentially interesting analysis and comparison of different data assimilation types based on their ability to produce a deterministic soil moisture analysis on the Meteo-France land-surface model. The contribution needs to be more concise and at the same point some of the underlying assumptions needs to be better explained. The authors have explored a large spectrum of experiments and I have some suggestions on how to improve the First, I would definitely include a map of the 12 SMOMANIA sites with a table listing the main characteristic of each site: without a map and some information about for example the climate variability it is difficult to draw conclusion for example on the critical importance of the soil type (clay soils versus

sandy soils for example). Are there other factors that should be considered? I wonder if there is too much emphasis on the soil type characterization and if its importance is really demonstrated in the paper. At a first glance, I would say not really because there are so many other factors that can be considered. I would suggest a better description of the real and synthetic experiment and which observations have been used in each case and how. A summary on a table would be very helpful. I have some comments about the structure of the paper: I found the chapter with the methods very confused and some of the equations need to be checked. I wonder if having chapter 2.7 before 2.6 would be beneficial to the reader to understand the whole experimental setup. Finally, a summary of pro and cons of each method with the correspondent computational burden can provide the reader with ideas on the feasibility of these methods. Minor suggestions: p. 7361 around line 28: it would be interesting to know what was the RMSE value before calibration. p. 7362, line 1: representivity? p. 7382, line 7: sources of errors, such as?

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 12, 7353, 2015.