

## ***Interactive comment on “Analysis of the linearised observation operator in a soil moisture and temperature analysis scheme” by I. Dharssi et al.***

### **Anonymous Referee #2**

Received and published: 14 July 2015

#### General evaluation:

This paper could fit in the journal SOIL, but would fit probably better in a hydrometeorological journal. Nevertheless, I think the paper should not be rejected because it is out of scope as the paper deals with soil.

The paper presents a sensitivity analysis of meteorological variables with respect to soil variables. The conclusions are not very surprising, and will also be model specific, given different parameterizations in the land surface model. Therefore I think that a much better motivation for this work and the novelty of this work should be given. What do we learn from this work which is helpful for the construction of our data assimilation experiments?

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As it is unclear to me whether the paper contains enough novel material I suggest major revision.

#### Main points:

Section 1. The literature review is not adequate. What has already been done in terms of data assimilation experiments with land surface models (e.g., soil moisture assimilation, other papers with T2M assimilation)? What is novel?

Section 3.1, Line 1-11. This is a highly parameterized relation in models and it is unclear to what degree the sensitivity of T2M with respect to soil moisture is realistic. I wonder therefore what is the purpose of a detailed interpretation of Figures like Figure 2?

#### Further comments:

P515, L7: Please refer also to soil literature here. There is a large body of evidence in the soil literature, much earlier than these references in the land surface literature.

P515, L10-L12: Cite standard soil physics textbooks. The variations can be much larger. Please rewrite also this sentence indicating that variations can be on the order of many orders of magnitude.

Figures. The color scales in all figures are not very ideal. I would prefer gradual changes in the maps ranging between blue and red. Now we have nearly identical colors for very low values and medium high values. Please modify everywhere.

#### Editorial:

P508, L21: has been developed?

P509, L1: found instead of find?

P513, L17: (...) come independent.

P516, L5-L9: Rewrite sentence.

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Caption Figure 10. "increased" instead of "increases".

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Interactive comment on SOIL Discuss., 2, 505, 2015.