

## ***Interactive comment on “Controls on surface soil drying rates observed by SMAP and simulated by the Noah land surface model” by Peter J. Shellito and Eric E. Small***

### **Anonymous Referee #2**

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#### General Comments:

This article calculates drying rates over parts of North America and assesses the relative roles of other land surface characteristics such as vegetation and soil texture in soil dry down. This paper extends previous work by expressing soil dry down in multiple ways and by comparing to Noah land surface model simulations. A key finding is that SMAP dries down more quickly after precipitation than Noah and that evaporative efficiency is reduced when vegetation is increased.

The article is well-written and will certainly be of interest to the land community. The methods and the results presented here are useful from a soil science perspective

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but also seem likely to be helpful in better understanding and improving land surface models. I offer minor comments below to improve the readability of the manuscript.

#### Specific Comments:

Page 1, Line 10-11: “Data cover the domain of the NLDAS 2”. Please reword – just because the data cover this domain, doesn’t mean that the whole domain will be used (as is the case here).

Page 3 Line 6 – Although the nominal SMAP depth is 5 cm, the sensing depth also changes slightly with moisture content. Is it possible that this could affect the conclusions?

Page 6 Line 24: Was any information lost in the re-gridding? How do you know (comparison of statistics to the original, etc)?

Page 10, Section 2.2.5: This section is very short and doesn’t seem substantial enough to be its own section. Perhaps move the information to 2.1.5.

Page 14 line 14: I don’t see the wetting between successive overpasses in Figure 2. Is it possible to point out a time period as an example?

Figure 4: Is it possible to also include the points on this plot, rather than just the contours?

#### Technical Corrections:

Page 4, Line 6-7: Please write out the words first and have the abbreviations in parentheses.

Page 4, Line 13-14: (cm<sup>3</sup> cm<sup>-3</sup>) instead of “, in cm<sup>3</sup> cm<sup>-3</sup>”

Page 6 Line 7: “on it” not necessary and sounds a bit awkward.

Page 6, Line 9: The equations appear a bit fuzzy. Is it possible to make these clearer?

Page 6, Line 16: I believe the cities should be separated with semi-colons, rather than

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commas (e.g., Fort Cobb, OK; Little River, GA; ...etc).

Page 8, Line 13: covert to convert

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2017-338>, 2017.