

# ***Interactive comment on “Evaluation of soil moisture in CMIP5 simulations over contiguous United States using in situ and satellite observations” by Shanshui Yuan and Steven M. Quiring***

**Anonymous Referee #1**

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General Comments: This paper evaluated soil moisture simulations in CMIP5 experiment using in situ and satellite observations. The evaluation focused on both surface and deep soil layers. This paper clearly stated the research question, used defensible methodology and datasets and presented solid results and conclusions. This paper is logically formatted and set a foundation for using in situ observation to evaluate soil moisture from GCMs. Though there are still some limitations in this study (as the authors described in the last section), this paper can still bring benefits to future research and applications, such as model development and validation, drought evaluations and data assimilations. Hence, I recommend this paper to be published in HESS with minor

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revision. Some detailed comments are attached as following.

Detailed Comments: 1. Section 2.1, page 4. The authors modified sub-regions from previous studies. Will this modification affect the results? For instance, do the land cover types in the new sub-regions differ from previous studies? 2. Page 5, line 2. The authors mentioned that soil moisture data were collected from 8 different networks. Do the 8 networks use same way to measure soil moisture? If no, then is there any significant biases among networks? 3. Comparison between point measurements and gridded value is a big challenge, especially in a big grid box. Can simple spatial average method solve the issue? 4. Page 6, line 14. Add a space between “<” and “0.25”. 5. Section 3.1, page 8. The content in this page is about the evaluation of individual models. Generate another section to present these results. 6. Page 27, Figure 9b. It is better to change 1 m to 100 cm at the top of figure, because it is important to keep expressions consistent throughout the paper.

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