

## ***Interactive comment on “Spatial variations of deep soil moisture and the influencing factors in the Loess Plateau, China” by X. N. Fang et al.***

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We thank reviewer for the constructive comments. We have gone through all the comments and will amend the original manuscript base on the suggestions and comments. In the following pages we provide brief answers to the reviews comments and we will make corresponding changes when we receive the editor decision.

Reviewer: The Fang et al. paper on the spatial variation of deep soil moisture in the Loess Plateau is in general well-written and it presented a very comprehensive dataset that was rarely available anywhere else.

Authors: Discussion of the deep soil moisture condition under different vegetation types and its control mechanism at watershed scale is indeed a valuable and challenging task. Thank you very much for your encouragement. We will carefully amend the

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manuscript based on the comments that the reviewers provided.

Reviewer: The authors should clarify what they meant by "deep soil moisture" early in the introduction. How deep they investigated, and the temporal and spatial scale of their experiment.

Authors: As suggested by the reviewer, we will define "deep soil layer" clearly in the introduction section of revised manuscript, and describe the investigation depth, temporal and spatial scale of our experiment in detail.

Reviewer: There are many very long paragraphs, please break them into two or more short sections. (page4,paragraph 2)

Authors: As suggested by the reviewer, we will break down the long paragraphs into short sections.

Reviewer: I was wondering how the soil moisture was measured, did they dig a 5-m hole for each profile, or use any technology that is able to reach up to 5 m without digging a hole? If they indeed dug hole for each site, how they did it? The paper did not make it clear in all these details. It would be very impressive to dig 151, 5-m soil profile holes for any study.â

Authors: Actually, the soil samples in depth of 0–5m were taken by a soil drill (5 cm in diameter) with 20-cm increment. It is indeed a challenging task in logistics and therefore the data are quite valuable. We will clearly describe the sampling details in the revised manuscript.

Reviewer: In page 3, line 7-9 only include a few representative references, this is too many.

Authors: As suggested by the reviewer, we will further exam the references, and only retain a few representative ones.

Reviewer: In page4, line22. Should you simply use deep soil moisture (DSM) only?

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This is the term you used in your title.

Authors: Yes, “deep soil moisture (DSM)” is more accurate than “deep soil moisture content (SMC)”, thus we will replace it in the revised manuscript.

Reviewer: “whole” in page 5, line 4, “According to previous studies, factors that control deep SMC variations are different under three land management types: native vegetation with a shallow root system, introduced vegetation with a deep root system, and vegetation with agricultural management measures (Jia et al., 2013; Jia and Shao, 2014; Yang et al., 2012b; Yang et al., 2014a).” in page 5, line27-29, and “The Ansai watershed is located on a warm forest steppe” in page 6, line 23 should be deleted.

Authors: Following the reviewer’s suggestion, we will delete these less relevant sentences in the revised manuscript.

Reviewer: In page 7,line 4.You should include the boundary of Shanxi province since you mentioned it in your description.

Authors: Following the reviewer’s suggestion, we will add the boundary of Shanxi province in Figure 1 in the revised manuscript.

Reviewer: In page 13, line 1. You don’t need to include the legends in the graphs since there is only one category.

Authors: As suggested by the reviewer, we will delete the unnecessary legend in the graphs in the revised manuscript.

Reviewer: In page 24, line 8. I don’t think you need to count to two digits, simply 80%, 68% etc...

Authors: As suggested by the reviewer, we will only reserve integer digits in the revised manuscript.

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