**Hydrology and
Earth System
Sciences**
Discussions

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 detailed 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 researchers conclude that natural vegetation and croplands had the highest soil moisture content while introduced vegetation types have caused soil desiccation. The authors suggest that vegetation restoration in the study watershed has resulted in concerns of soil water resources depletion and this issue can explain the low productivity in planted forests. The data are valuable and findings have important implication in practices given the large-scale ecological restoration efforts in the study

region.

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 manuscript based on the comments that you provided.

Reviewer: The manuscript is well written. However, a thorough read by an English native speaker will increase the readability and presentation. There are too many grammar errors and clarifications are to be addressed.

Authors: In order to increase the readability of the manuscript, we will invite a native English speaker to revise the language of our manuscript.

Reviewer: The title is misleading. The work does not address spatial variations of SMC. No maps are presented to show the differences in space across the watershed although work does examine how slope gradient, slope positions and climate (Precip) distribution result in difference in SMC.

Authors: Based on the collective suggestions from all the reviewers, we will adjust the title in the revised manuscript, and remove the "spatial variations" from the title.

Reviewer: The authors have identified Precipitation and Soil Particle size (soil texture) is the major driver. But, how different is the Precipitation and soil across the watershed is not clear. Also, I suggest a word of watershed should be added since the paper does not address SMC for the entire Loess Plateau!

Authors: We agree it is necessary to clarity the differences of precipitation and soil particle size across the watershed. Thus, we will add relevant contents in the revised manuscript. Besides, following the reviewer's suggestion, we will add a word of "watershed" in the title as well.

Reviewer: Which layer is considered deep soil layer? This basic concept needs to be defined clearly.

Authors: In this study, deep soil layer refers to the layer whose soil moisture can seldom be influenced by rainfall infiltration and evaporation during a certain time period. We will define "deep soil layer" clearly in the Introduction section of revised manuscript.

Reviewer: The manuscript is overly long. I suggest the authors just present key findings that are useful for illustrate the 1) overall patterns of SMC on space by soil depth, 2) contrast SMC by land use 3) Illustrate key factors that justify the fact that the introduced vegetation had lower SMC than native grassland and crops was due to higher biomass and evapotranspiration loss NOT by other factor such as slope, aspects, soil etc. Several figs are not essential example, Fig 2 and Fig 9. Similarly reduce the number of Tables, such as Fig 7. In Table 4, only the significant correlations are needed to be reported.

Authors: Following the reviewer's suggestion, we will exam the manuscript carefully and remove/condense some sections, especially for figures, and tables that are of less relevance with key findings.

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