

Responses to Comments

We have listed the comments in black font and our responses in blue font.

Anonymous Referee #2

Thank you very much for your informative, valuable and useful comments, and also for your time and effort in improving our manuscript.

The authors have studied the impact of land use type (crop, shrub, orchard, forest) and growth stage (age of vegetation) on soil water conditions. The study was conducted in the Loess Plateau (NW China). At three catchments, soil samples up to a depth of 18 m were taken for gravimetric estimation of the soil water content. Each treatment was sampled without replicates. Based on their once-off soil moisture profiles, the authors conclude that the formation of deep soil desiccation depends on the growth stage of the vegetation.

The paper lacks of novelty and scientific innovation. It deals with a local problem using standard methods. In its present form, the paper is not suited for publication.

Reply: Thanks your comprehensive and reasonable evaluation. As suggested by you and the other two reviewers, we have revised our manuscript thoroughly. The aims and objectives of the manuscript were also refined.

My concerns are:

1. The introduction is tedious. It is not really shown why there is a need for further studies on this topic.

Reply: We have revised this part and presented the research gaps clearly.

2. The study area is not well described. No information about the vegetation characteristics, land use history, and soils are given.

Reply: Some information such as characteristics, land use history, and soils was added to the section of study area.

3. A definition of field capacity (FC) is not given. Is it related to a certain hydraulic conductivity (as in Australia) or to a certain pressure head (as in the U.S.)? I do not understand the difference between FC and stable FC (SFC). What is the physical meaning of FC and SFC?

Reply: We used the pedotransfer function, which was selected from five established PTFs, to generate the profile values of field capacity. The definition of FC and stable FC were presented in revised manuscript.

4. The effect of small scale variability in soil water content and in soil properties

(texture, carbon content, bulk density) is not addressed.

Reply: This small scale variability in soil water content and in soil properties was considered by using the pedotransfer function, which taking the heterogeneous of soil properties into account.

5. Did you consider the impact of land use on FC and PWP?

Reply: We evaluated the impact of land use on FC and PWP in revised manuscript.

6. The conclusions are not really supported by the data.

The paper relies on a reliable estimate of field capacity (FC) and permanent wilting point (PWP). However, the authors used published FC and PWP data for deriving all these other soil water characteristics (e.g. DSL). FC and PWP may significantly differ depending on texture, carbon content, bulk density, and also on the type of land use. To my experience, the small scale variability of FC and PWP is relatively high. Thus, the calculated soil water characteristics as DSLT (Eq. 4) or DSL-QWD (Eq. 6) are highly uncertain. For this reason, I am in doubt about the conclusions. The observed differences in the soil moisture profiles between the treatments might be also due to small scale variability in soil properties. To overcome these shortcomings, the authors should use the site and depth specific FC and PWP for the estimation of DSLT etc.. In addition, more replicates per treatment are needed for reliable conclusions.

Reply: We used the pedotransfer function, which was selected from five established PTFs, to generate the profile values of bulk density, field capacity, and permanent wilting point at each sampling soil layer, by taking the heterogeneous of soil properties into account. This would be a way to overcome the variation of soil textures in the profile and also would improve the reliability of the research results.