Hydrol. Earth Syst. Sci. Discuss.,
doi:10.5194/hess-2016-22-RC1, 2016

Hydrology and Earth System Sciences
Discussions
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Interactive comment on "Spatial variations of deep soil moisture and the influencing factors in the Loess Plateau, China" *by* X. N. Fang et al.

Anonymous Referee #1

Received and published: 14 February 2016

The goal of the study was to characterize the soil moisture under different land use and land cover for a large watershed (Ansai, Shannxi Province) in an arid region (annual precip= 500 mm) on the Loess Plateau in northern China. Field soil samplings were made at 151 spots during a 2-month period in 2014. Soil moisture content as deep as 500 cm and associated soil, vegetation and other environmental factors were measured. The authors conducted a rather thorough analysis of on the controlling factor to soil moisture by soil layer and land use types using several standard statistical methods. 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

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Discussion paper

in practices given the large scale ecological restoration efforts in the study region. 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. Here are a few suggestions to improve the manuscript: 1. 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. Would a map be useful to show the dominant factor controlling the overall SMC 'spatial' distribution of SMC. The authors have identified Precip and Soil Particle size (soil texture) is the major driver. But, how different is the Preci 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! 2. Which layer is considered deep soil layer? This basic concept needs to be defined clearly. 3. The ms 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 landuse 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.

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