

## ***Interactive comment on “Temporal stability of soil moisture under different land uses/cover in the Loess Plateau based on a finer spatiotemporal scale” by J. Zhou et al.***

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Review on Zhou et al. Temporal stability of soil moisture under different land uses/cover in the Loess Plateau based on a finer spatiotemporal scale

Spatial and temporal characterizations of soil moisture are essential in precision agriculture and hydrological modelling. This study analyzed the spatio-temporal dynamics of soil water under different land uses/cover during wetting-drying cycles at a very small spatial scale (60 cm × 60 cm), which is quite attractive. However, some improvements and clarifications are needed before publication.

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The main problem of this study lies in the description of “Materials and Methods”.

1. The 16 microplots were randomly arranged over the hillslope with the slope gradient ranging from 17.6

2. In each microplot, a central point (CP) and four ambient points (APs) were selected; however, their distributions in each plot varied. Were they arranged relative to the main plant in each plot? And how long have those plants been in each plot, are they natural plants or grown by researchers?

3. The authors didn't clearly state the measuring interval during these 43 days of experiment (Aug. 8, 2012 - Sep. 20, 2012). By the way, the experimental period shown on Fig. 4 was from Jul. 8 to Aug. 20. It also needs the correction.

4. The holes on the ground as a result of every TDR measurement was mended right after. How did you do that?

5. I don't understand Eq (13). It seems like  $\theta_{CP(i)}$  refers to the average of all the microplots for all the measurements? The “i” is quite confusing. And according to Eq(14), the probabilities of some micropolots should be more than 1. In addition, in Eq(15), k cannot range from 1 to k. You would be better to use another symbol. Please double check all the symbols you used in all the equations and make sure they are clear.

6. The three standards you listed here were quite confusing. For example, “the CumuP should be closer to 0.5 representing the mean soil water content of all land uses/cover for both the wet to dry (WTD) and dry to wet (DTW) processes.” Representing what? Also, how low can be called “as low as possible”?

7. According to your statement,  $t_s(n)$  referred to the time when temporal stability condition was reached. But the problem is how did you define the temporal stability? What's the “threshold” you mentioned? Temporal stability in Vachaud et al. (1985) meant no matter at what time, the rank distribution of soil moisture at each spatial location was

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almost the same. Then, the soil water content at one or two location can always represent the average moisture in the research area. You may need more explanation in this section.

In “Results”, I would suggest to use lines with scatters to better show the change in soil moisture with time in Fig. 3. If possible, different colors can be used, as well. Also, only one WTD and one DTW periods may not be enough.

At last, there are many grammatical flaws and unclear sentences in this manuscript which need to be significantly revised.

Above all, I would suggest major revision.

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 10, 10083, 2013.

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