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Hydrology and Earth System Sciences Discussions

Interactive comment on "Observing soil moisture temporal variability under fluctuating climatic conditions" *by* A. Longobardi

Anonymous Referee #2

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Review of "Observing soil moisture temporal variability under fluctuating climatic conditions"; by A. Longobardi

This study analyzes 3 years of soil moisture observations on a site with 6 probes in the humid Mediterranean climate of Southern Italy. The author finds a bimodal behavior of soil moisture dynamics, mimicking climate in the region, with a wet state trough the rainy season and a dry state in the typically dry summer, with transition periods in between. These issues are known from other sites and have been discussed in other studies, but I think the analysis of data from this new site merits publication, since it adds new observational evidences and discussion of particular features of the response of soil moisture dynamics to the climate variations of the region of the study.

General comments:

There is only a brief mention to lateral redistribution of soil moisture, even though the author does mention that soil moisture spatial variability is not the focus of the paper. To be more precise, redistribution through the saturated zone. A relatively shallow water table due to groundwater convergence, for example in a valley floor, can substantially increase soil moisture persistence and modify the author's whole discussion about bimodality, especially for the deepest 80 cm layers. Therefore, soil moisture dynamics can be quite different given the same soil textures and climate conditions, depending on the location of the site. There are also other terms in the equation of balance for soil water, not just infiltration and evapotranspiration, one being the aforementioned lateral flow and the other drainage, which can also modify substantially soil moisture conditions and dynamics. Even at the study's site, if there was no parking lot above (I assume with an impermeable surface), one could expect a somewhat more persistent wetter soil in the lower part of the slope, close to the retaining wall. I think some of these issues should be discussed, at least in the introduction section.

There is neither in the study a quantitative reference to temperature, and the interannual variability in soil moisture is implicitly attributed entirely to precipitation. How large are variations of temperature among the different years and what are the potential effects on the observed soil moisture dynamics? Is a wetter than normal also a colder than normal summer? Or is it the opposite?

Specific comments:

1) Why is probe 1 selected for the plots in figures 5, 6, 7. Are Fig. 9 and 10 also for probe 1? Why not showing average conditions for all probes?

2) How dependant does the author think the results are on soil textures? For example, on Fig. 8 one of the probes (6) shows a significantly larger drying than the others. Around October, however, probes 2 and 5 seem to dry much faster than the others.

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Interactive Comment

3) There are some grammatical mistakes, please recheck the text. Listing some of them, just in a couple of pages:

On page 938, line 4: "the impact of climate fluctuation on vegetation patterns which are related to the soil water availability and thus, in turn, to soil moisture dynamic". Do you mean "the impact of climate fluctuations on vegetation patterns, which are related to soil water availability and thus to soil moisture dynamics" or "the impact of climate fluctuations on vegetation patterns that are related to soil water availability and thus to soil moisture dynamics"?

On page 938, line 16: "the measurements temporal horizon" should be "the temporal horizon of the measurements" or "the measurements' temporal horizon".

On page 939, line 2: "a wood stairs was realized" doesn't make sense, it should be something like "wood stairs were built" or "placed".

On page 939, line 20 and also on page 940 line 1, "at-site" should be "on-site".

On page 939, line 5: "we will intend the measurements period as split" sounds better as "we intend to split the measurement period" or simply "we will split the measurement period".

Etc...

Please check carefully.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 5, 935, 2008.

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