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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 #1

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

In this paper, the author presents an analysis of a number of TDR-based soil moisture profiles over a three-year study period. Although the topic is important, at this point I do not recommend the paper to be published.

Major remarks

- A first problem is the poor quality of the grammar and vocabulary. There are so many linguistic mistakes in the paper, it is impossible to list them.

- What I don't understand is why, if data from six profiles are available, only one profile is fully analyzed in Section 3 and Section 4.1. Looking at Figure 8 it is clear that the

observations from the different profiles are far from similar. So to what extent are the conclusions drawn in the paper also valid for the other profiles?

- The major problem with the paper is that it does not teach us anything that we don't already know. The paper demonstrates that soil moisture contents follow the precipitation, that there is a dry and wet period during the year with a transition in between, that soil moisture contents are distributed bimodally throughout the year, and that there is a difference in variability depending on the depth in the soil. These are all issues that have been shown in other papers.

Minor remarks

- Introduction, page 937, line 22-25. If during the warm season soil moisture is the result of the balance between precipitation and evapotranspiration, that means that drainage can be neglected. For a Mediterranean climate this may be true, but it is certainly not always so for temperate climates.

- The location of the rain gauge. If I understand Figure 1 correctly, the rain gauge is located right next to a number of trees. What impact is this location going to have on the quality of the precipitation observations?

- Page 940, line 9. "Compared to mean regional values". Does that mean the averages for a large region for those three years, or the long-time average for this specific location?

- Figure 4 is not necessary, it shows the same information as Figure 3. Further, In Figure 3 the maximum monthly precipitation does never exceed 200 mm, but in Figure 4 it reaches values of approximately 300. Unless I understand it wrong there is something not consistent here.

- I also don't understand Table 1 and Table 2. Table 2 states that for 2004/2005 the total amount of precipitation is 43 x 22 + 10 x 15.36, or 1099.6 mm. Table 1 states that for the same year the total precipitation is 1237 mm. For 2005/2006 these totals are

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1467.33 and 1622 mm, respectively. For 2006/2207 these are 645.64 and 841 mm, respectively. From Table 1 I conclude that the sum of the rainfall in the wet and dry periods has to be equal to the annual precipitation (this also follows from the definition of wet and dry period on page 944). Unless I made a mistake in my reasoning there is something very wrong here.

- On page 942, line 7 and following, it should be stated clearly that this section discusses the results from profile 1.

- The section on page 942 is not consistent with what is written above. At the end of page 941 it is stated that evapotranspiration decreases with increasing soil depth, and that this causes the soil moisture to be higher deeper in the profile. Here it is stated that the deep soil moisture is higher and that this perhaps is caused by a different soil type.

- In the same section it is stated that the soil moisture follows a sinusoidal pattern. Looking at Figure 6, this is not a sinusoidal pattern, it is just a temporal variability resulting, as the author states, from the balance between replenishing the soil and removal of water from the soil. Why would this be a sinusoidal pattern? Same remark for the beginning of page 943.

- I also have a problem with the way the variability in Figure 7 is calculated. A coefficient of variation is defined as the standard deviation divided by the mean. This is just a way to rescale the standard deviation. A dry soil and a wet soil with exactly the same temporal variability will show different coefficients of variation. To me, it would make more sense to analyze the standard deviations themselves.

- Again, at the beginning of Section 4.1., it should be stated that the results shown are for profile 1 (at least this is the way I understand it).

- At the beginning of Section 4.2., again it should be clearly stated to which profiles the section refers.

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Taking into account all these remarks, I do not recommend this paper to be published.

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