

## ***Interactive comment on “The Hydropedograph Toolbox and its application” by C. B. Graham and H. S. Lin***

### **Anonymous Referee #4**

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The paper presents a new "Hydropedograph Toolbox" which is intended to facilitate the interpretation of soil moisture data, matric potential and soil temperature. The toolbox provides facilities to plot soil moisture data against time, depth and soil temperature, to fit parametrisations of the soil water characteristic to the measured data, to fit a simple model for the annual soil temperature, and it provides tools to indicate potential events of preferential flow and diurnal cycles. The usage of the toolbox is demonstrated with data from the Shale Hills Critical Zone Observatory.

The language of the paper is in general fluent but not always precise. There are also some redundancies in the text making the paper longer than necessary. The figures are necessary but not of sufficient quality. The figure captions, the legends and the

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marked events are often too small to identify them definitely.

I have some concerns with the paper:

- Is the limited number of functions for plotting and analysis provided by this toolbox really worth to be published in a scientific journal?
- Do the plots without any reference to measurement errors not lead to an over-interpretation of the data?
- As the authors pointed out, more and more spatially distributed data is available. However, the toolbox does not - at least as far as I understand it - facilitate the comparison of different locations. It just generates time series plots at different positions.
- It might be helpful to have an open-source solution for data analysis which can be expanded over time. Unfortunately the authors choose to base their solution on MATLAB which is a rather expensive commercial programming language. This will exclude a substantial fraction of future users not only in developing countries.
- Finally I would expect from a publication in HESS that it demonstrates some non-trivial results which can be obtained with the toolbox. However, the conclusions which are presented are not much beyond what an educated scientist could have guessed without data.

Specific comments:

The other reviewers have already made a lot of valuable suggestions. I only want to add some points:

- It would be enough to mention the capability of Excel export of results once.

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- page 14233, line 12: "This increase ... will only result in a greater increase in the data flood". I would hope that it will not only increase the data flood, but also provide valuable information.
- page 14234, line 4-9 and page 14235, line 6-11: This text is completely identical and thus one is redundant.
- page 14236, line 2: "Interpretation of soil moisture hydrological processes": I think the toolbox addresses the interpretation of soil moisture data not processes.
- page 14236, line 17-25: It is very confusing that you discuss a lot of plotting styles which are not shown and do not state that.
- section 2.3: I personally would not agree to call everything preferential flow where an out of sequence event in soil moisture happens. So this could only be an indicator of potential preferential flow. Then it would be necessary to investigate if this is really the case or if there are other reasons.
- page 14243, line 4-6: "the 10 min data were interpolated into hourly averages". How do you interpolate in an average? And why do you not just average them by adding them and dividing by the number of measurements?
- page 1425, line 25: "The van Genuchten and Brooks and Corey model fits were all good" How can you talk about a reasonable (not to mention a good) fit with this quality of the data?
- page 14246, line 9-10: "Model parameters were well defined..." No they are not well defined. The scatter plot shows nicely that there is a vast range of possible values for alpha and n which produce nearly the same RMSE. Which is clear given the spread of the original data.
- page 14246, line 20-21: "Precipitation events were delineated as 24 h of no precipitation" This sentence contradicts itself.

- page 14247, line 1-2: "as soil moisture response data was used as an indicator of an event" How did you do that?
- page 14248, line 4-6: There are two minima of soil moisture...

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Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 9, 14231, 2012.

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