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Discussions

Interactive comment on "Measuring and modelling water related soil–vegetation feedbacks in a fallow plot" by N. Ursino et al.

Anonymous Referee #1

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1 General comments

The paper revisits ERT data published in Cassiani et al. 2012 (VZJ) and tries to interpret the data better with a new bucket model. The authors show that the formation of a soil crust and the vegetation influence the hydraulic functioning of a fallow plot as compared to a vegetated plot. However, lack of further data made it difficult to validate the interpretation and conclusions drawn from the ERT survey and the modeling. To my opinion, the authors make an valuable effort to understand the outcome of the previously published non-invasive measurements using a modified model. However, only a few of the conclusions really add information to the previously published paper (Cassiani et al. , 2012), since that paper already comprised a model-assisted data

analysis. I regret that the authors did not include the current model in the earlier paper or separate the modeling part from the experimental part altogether from the beginning, which would have been much more coherent. However, if the authors clearly separate new from old data/interpretations/analyses, I believe the current paper can add extra information on the experiment and may be published in HESS.

2 Specific comments

- The introduction: I think the introduction contains too much repetition of the previous paper and also to many things that refer the methods used in the paper. At the end of the introduction I would like a clear objective statement of the current paper that is different than the Cassiani 2012 paper.

- L75-78: to material and methods

- L 96-99: to material and methods

- L104-108: I find the references on the use of ERT for solute transport imaging and soil moisture dynamics very limited. If the authors wish to give a reference, which contains a good overview, then they may restrict themselves to one or two. Otherwise, some other authors need to be included. (eg Greve, amidu, al Hagrey, Jayawickreme, Looms, Ackworth, Schwartz, Werban, Srayeddin,... and probably even more) Furthermore, Binly et al 1996 is a reference for solute transport and not for soil moisture monitoring with ERT, if I recall well. Also Roth et al., 1990 is not the first paper on the use of TDR...

- L125-139 to material and methods

- L165: please also give the classification according to the World Reference Base (FAO)

- L185: here you speak of 3 ERT transects, whereas in cassiani et al201 there are only 2. Please give a clear scheme of the transect locations as well as TDR and trace on the field. Please also include the location of the irrigation points.

- L 196: Is Monego et al the first reference here? Was the procedure the same as Labreque et al or Koestel et al? Please give more detailed information on the error analysis and the applied regularization and error levels during inversion.

- L204 where tdr probes installed vertically or horizontally?

- Section 2.4: I found it very difficult to entirely understand this and had to read it several times. Would it be possible to illustrate the procedure with a scheme or something similar?

- L286-295 Sometimes you interpret things in the text before showing the data themselves. This should be avoided.

- L295: no cracks?

- L334: I don't understand how you came to these p values.

- L370 didn't you have problems with electrode contact in this dry crust?

- Section 3.2: I miss a discussion of how you dealt with the influence on EC and thus WC of simultaneous changes of soil temperature, salinity changes, soil moisture changes, ... Did you look into this?

- L450-455 This is a probable explanation, but it would be better to find some data to validate this interpretation. E.g. suction cups. Do you have supporting independent data? Does the ERT sensitivity decreases with depth influence this kind of observations?

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- L475 How exactly did you choose the measurement volume to compare TDR/TRASE and ERT. Please describe this clearly in MM so that the results are reproducible.

- L495 I am confused here. Didn't you say that it was all runoff?

- L543 what type of weeds were present?

- L568 How can you model this? If I remember well, you have no root data?

- L587 Why is the fallow plot without irrigation? In the real experiment there is irrigation, isn't there? (see l495)

- fig 5 why do you use this strange color scale with multiple white bars? It is difficult to read the axis numbers and labels. Why do you show only 2 out of 3 transects? Please clip the area with very low sensitivity.

- fig 6 is this average S? Which plot?