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Hydrology and Earth System Sciences
Discussions

Interactive comment on "Use of field and laboratory methods for estimating unsaturated hydraulic properties under different land-use" *by* S. Siltecho et al.

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Use of field and laboratory methods for estimating unsaturated hydraulic properties under different land-use

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The authors compared different measurement to determine unsaturated soil hydraulic properties such as soil moisture characteristic (SMC) and hydraulic conductivity under different land-uses with same parent material (rubber tree plantation in different posi-

tions along a slope, ruzi grass pasture and an original forest). They used the Breekan method, an evaporation method and Arya et al. model. Then, the estimated parameters by different methods were used with Hydrus1D for a one year simulation and computed pressure head. But, they stated only the results of comparison the methods without any interpretation. The manuscript did not have a good discussion.

Major comments:

In the abstract, one-third of the text is to explain the importance of the study (page:6101 , line 2-7). It is too long. Please remove additional sections of the text.

Introduction and method and material are somewhat confusing. It seems better to change the order of subtitles in method and material in 2.2 Estimation of soil unsaturated hydraulic properties as following: 2.2.1: disc infiltrometer, 2.2.2. Pedo-transfer function, 2.2.3. Breekan method, 2.2.4. Evaporation method, 2.2.5. The inverse method. Moreover, I think it is not necessary to separate the subtitles of Evaluation of the methods and statistics from each other.

The authors used Arya and Paris (1981) method (AP model) as a PTF model to estimate soil moisture characteristic curve (SMC) from soil particle size distribution (PSD). Why is this method selected? In the many literatures, the performance of this model has been validated again and again (Haverkamp and Parlange, 1982; Tyler and Wheatcraft, 1989; Arya et al., 2008; Vaz et al., 2005; Wang et al., 2002). Why don't the authors consider another physical base model to estimate SMC from PSD such as Mohammadi and Vanclooster (2011) (MV model). Not only the performance of MV model is pretty much the same as that of AP model, but also MV model doesn't have any empirical parameter.

Page 6115, line (11-14): the authors concluded that "when data were considered globally regrouping all the measurement methods the variability of the results was higher considering the measurement method rather than the measurement location". Since the physical and chemical properties of five studied land uses nearly were the same.

Thus, this conclusion can not be extended to a global scale.

In result and discussion: The authors stated only the results without any interpretation. Even they did not compare their outcomes with the results of other researchers. The discussion of this paper is very weak! Please discuss more about the results.

At the first of the method and material, the authors expressed unsaturated hydraulic conductivity models. But, in the results, they compared only the SMC model parameters and saturated hydraulic conductivity values under different land use measured by different methods. I think that the addition a comparison between hydraulic conductivity curves obtained by different methods for each land use can be helpful.

Figure 3a showed that scaled retention curves by Breekan method are too different from other methods. Why?! Please interpret this observation.

Minor comments:

Page 6111, line 18: They used the coefficient of determination as CD. But the abbreviation of R2 is usually applied to this evaluation criterion. Please change it

Page 6115, line 24-25: these sentences are related to introduction part not result. Please delete

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