Hydrology and Earth System Sciences Discussions

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Interactive comment on "Novel evaporation experiment to determine soil hydraulic properties" *by* K. Schneider et al.

Anonymous Referee #2

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General comments This paper presents an interesting method for measuring soil hydraulic properties using the evaporation technique. It used a combination of multistep outflow for measurement at potentials $>$ -100 kPa, and the evaporation method when potentials $<$ -100 kPa. The technqiue is sound and well described. To overcome the limitation of using tensiometer at potentials $<$ -100 kPa, the authors proposed to measure the water vapour flux. I think this point is not emphasized by the authors, the abstract and title of the paper seems to indicate that the paper is presenting a new evaporation method. As I understood the "novel evaporation" method is a complement to the existing multistep outflow (MSO) and conventional evaporation method for potentials $<$ -100 kPa.

What I am not sure is why the authors use MSO for potentials $>$ -100 kpa, the MSO is

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known to have some problems (Hollenbeck & jensen, 1998). It will be better if they use the conventional evaporation method until the tensiometer fails (about -80 kPa), then the method switches over to the "novel" method which detects the changes in potential using vapour pressure.

Specific comments - what is the limit of the vapour pressure changes can be detected so that the equivalent matric potential can be measured? - the authors used the model by Jin & Jury for tortuosity factor. Recent articles by Moldrup et al shows the relatioship beween Diffusivity constant in soil and free air is dependent on the water retention curve. I'd like to know if this has implication on the assumed model $D_g/D_0 = \theta_s^{(4/3)}$ used by the authors.

References

Hollenbeck, K.J., and K.H. Jensen. 1998. Experimental evidence of randomness and non-uniqueness in unsaturated outflow experiments designed for hydraulic parameter estimation. Water Resour. Res. 34:595-602.

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