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Hydrology and Earth System Sciences Discussions

Interactive comment on "Centrifuge modeling of one-step outflow tests for unsaturated parameter estimations" *by* H. Nakajima and A. T. Stadler

J. van Dam (Referee)

JOS.VANDAM@WUR.NL

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General comments:

Laboratory outflow experiments in combination with centrifugal forces and inverse modeling are an attractive option to determine the soil hydraulic function over a large range of soil water pressure heads in a relatively short time. The authors provide a clear overview of experiences with outflow experiments, including those using centrifuge forces and inverse modeling, as reported in literature. The performed experiments and analysis are a novel extension of official scientific research so far. The authors clearly show the limitations of the proposed methodology with respect to acceleration range and the quality (amount + accuracy) of measured data. The paper is very well written.

Specific comments:

Include in the paper the accuracy of the outflow and soil water pressure head measurements.

Include in the paper the initial parameter values which were used in the inverse modeling.

The experiments were performed with Ottawa sand. This sand is very rigid, and shows a retention function which is very well defined (large n value in the van Genuchten analytical soil hydraulic functions). Do the authors think the proposed methodology can be used for loamy and clayey textures?

The authors propose one-step experiments in combination with soil water pressure head measurements. From the paper it is not clear whether they envisage multi-step experiments in combination with soil water pressure head measurements. Such type of experiments may increase the reliability and versatility of the method.

Unlike Simunek and Nimmo (2005), the authors use a relatively large centrifuge apparatus. Can the authors provide an indication of the extra financial investment required compared to the small centrifuge apparatus?

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 3, 731, 2006.