

***Interactive comment on “The benefits of
gravimeter observations for modelling water
storage changes at the field scale” by
B. Creutzfeldt et al.***

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I continue to be impressed by the authors' work and the clarity of their presentation. This paper falls neatly in the framework of coupled hydrogeophysical analysis, which we have discussed in some recent papers (Hinnell et al., 2010; Ferré et al., 2009). In this case, the authors present compelling evidence of the advantage of eliminating independent geophysical inversion in favor of incorporating a gravity forward model into hydrologic investigations. My only question regards their comparison with a lysimeter. While I agree that this represents the best available method to measure water exchange under spatially uniform conditions, there is the question of whether the lysime-

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ter's measurement scale is representative at the field scale. The authors mention this in the final two paragraphs of the conclusions, but I think that a more developed discussion of the advantages and challenges of using gravity under spatially heterogeneous conditions would round out the paper nicely. For example, could they describe how they could test for the impacts of heterogeneity using their current modeling framework?

Hinnell, A.C., T.P.A. Ferré, J.A. Vrugt, S. Moysey, S.A. Huisman, and M.B. Kowalsky. Improved extraction of hydrologic information from geophysical data through coupled hydrogeophysical inversion. *Water Resources Research*, 46, DOI 10.1029/2008WR007060

Ferré, T.P.A., L. Bentley, A. Binley, N. Linde, A. Kemna, K. Singha, K. Holliger, S. Huisman, and B. Minsley. 2009. Critical steps for the continuing advancement of hydrogeophysics. *EOS Trans. AGU*, v. 90, no. 23, 200.

Interactive comment on *Hydrol. Earth Syst. Sci. Discuss.*, 7, 2221, 2010.

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