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Hydrology and Earth System Sciences Discussions

Interactive comment on "Quantification of pore-size spectrums by solute breakthrough curves" *by* S. Erşahin

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The author appreciates referee1 for her/his evaluation of this manuscript. His/her suggestions were highly esteemed as they increased the scientific merit of the paper. The author's responses to the referee's concerns/suggestions are listed below. 1. A one-way ANOVA test and then an LSD test was conducted to test differences among means of mobile water content (b) and pore water velocity (v) values for four different particle size classes. The tests showed that means for the b values were not different significantly (P>0.45). Statement regarding this has been inserted into the manuscript. Please see the Lines 9-11 on Page 10 of revised version (for b) and L17- 19 on Page 9 (for v). 2. The wall of columns were sealed with a silicon to have good contact between

sand and column wall. The ANOVA test conducted, accordingly. The results showed that pore water velocity was significantly different (P<0.05) for different particle size treatments. Inspecting the Figs. 1-4 (right figures) show that the location of pore size spectra on the x-axis gradually shifted to left against decreased particle size, justifying that the model described well the relation between particle size and effective pore size. However, it was stated in the manuscripts that pore size spectra of replicates were dissimilar and it was attributed differences in geometry of effective pores and lenses of more homogenous particle domains formed at packing. It is unlikely that stratifying layers of preferential pathways formed at packing would be suspect in some columns. Preferential flow effect in transport of a non-reactive chemical is characterized by early appearance and slow approach to relative concentration of unity. Inspection of BTCs reveals that neither of these conditions existed in the columns. This suggests that it's hard to consider a preferential flow effect in these columns. In sand, preferential flow occurs as fingering. Fingering occurs when instability develops in the wetting as through coarse unsaturated sand. It has been demonstrated that the fingers doesn't form in very dry and saturated sand (Lewis and Sjöstrom, 2010). Since this study was conducted in completely saturated conditions, preferential flow was not likely to occur. 3. Figures 1-4 were redrawn, accordingly. The Figures' captions were revised to read "top, middle, and lower graphs are replicates". 4. The manuscript was gone over for errors of grammar, sentence structure, typography, and so on. The mistakes were corrected. Please see the revised version. 5. Values of b and Ks were inserted into Table 1. 6. The changes made in accordance with referee's suggestions are applied to revised manuscript. Moreover, differences in pore spectra for replicates was interpreted further (please see revised manuscript).

Lewis, J., and Sjöstrom, J. 2010. Optimizing the experimental design of columns in saturatedand unsaturated transport experiments. J. Contam. Hydrol., 115:1-13.

Please also note the supplement to this comment:
http://www.hydrol-earth-syst-sci-discuss.net/8/C5333/2011/hessd-8-C5333-2011-

supplement.pdf

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 8, 8373, 2011.