

Interactive comment on “Geophysically-based analysis of BTCs and ion exchange processes in soil” by Shany Ben Moshe et al.

Anonymous Referee #1

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The manuscript presents analysis of solute transport in saturated small dimension soil columns. The paper compares breakthrough (BT) analysis that is based on standard measurement of the solution electric and chemical properties, as commonly measured on the column boundaries, with that obtained by spectral induced polarization (SIP) which is based on measurement of the variations in the bulk electrical properties of the soil column during solute transport process. The similarity between the BT obtained by both methods is not surprising and expected. Yet it revealed another possibility which is related to characterization of cation exchange processes taking place in the porous domain during the transport. Obviously, cation exchange between the solution and solid phases result in changes in bulk electrical conductivity of the domain. The analysis presented in this manuscript is very elegant and promising. Yet is hard to anticipate

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broadening of methodology to applicable studies as the sensitivity of the methodology will be reduced dramatically in cases where the chemical composition of the solution is more complex and the differences in the ion concentration and transported solution is not as dramatic as in the case presented here. This subject is discussed shortly at summary. However, the paper will benefit if a broader discussion on where and how this method can be implemented and give few examples to how it can be used. There are many research areas that could benefit from better understanding flow and transport process, from remediation of contaminated sites to fertilizers distribution in the soil. Where the world is going to benefit this development with respect the of the technological limitation? Nevertheless, I recommend publication. I do not have specific comments.

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