

Interactive comment on “Identifying recharge under subtle ephemeral features in flat-lying semi-arid region using a combined geophysical approach” by Brady A. Flinchum et al.

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General comments

Thank you for the discussion paper. This is well-written with interesting data and presents a compelling case for geophysical imaging of the water table.

Specific comments

How do you justify selecting single values for the Archie's Law exponents? There is a lot of published evidence that these parameters vary widely and the only reliable way to establish them is empirically for a given formation. Does using a realistic range of

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values from the published literature alter your Figure 7? You also use this to state it is “possible” for the electrical conductivity to be lower; what about using the potential ranges in these parameters to work out a probability that this is the case? It seems there are other likely explanations which should have more discussion, such as a change in lithology. You state at line 466 that this is not the case, i.e. no lateral lithological variation; why? Is that supported by the wider set of borehole data collected as part of this work? Is it not possible that the topographic feature indicates lateral variation in subsurface material?

I think the conclusion is too firm – without monitoring of the surface water and time-lapse data, I don’t think you can demonstrate that it is a recharge feature, unless you can exclude the possibility that the Poisson’s ratio and conductivity data are not both related to a lithological feature.

Technical corrections

Line 31: “recharges” not “recharge”. Lines 80, 107: “East” should be “east”. Line 90: “sediments” not “rocks” (not lithified). Line 173: “S-wave” not “S-Wave”. Line 340: remove “gravitate”, use something like “prefer” instead? Line 393: “quaternary” should be “Quaternary”

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2019-576>, 2020.

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