

Interactive comment on “Is Annual Recharge Coefficient a Valid Concept in Arid and Semi-Arid Region?” by Yiben Cheng et al.

Anonymous Referee #2

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I generally like this article as it is based on three years of observations and in ground-water hydrology, specifically recharge, there is no substitute for observations are these are far and few.

I however have a number of philosophical issues that should be addressed before this paper is deemed publishable

(1) The authors seem to knock on annual recharge coefficient as well as models and state neither would work. I concur with the first one (annual recharge coefficient) but I am not so sure that you can make the same statement on models. Most models are complete depictions of hydrological cycle and if done correctly (implying that all the components of the water balance are correct), then recharge should be accurate (2) I find the figures 3, 4 and 5 very interesting. However, there is a large component of the

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infiltrating water that evaporates and if that is not subtracted from the rainfall you cannot estimate the recharge. In fact you cannot just compare 2013 to 2014 to 2015 without accounting for evaporation of the infiltrating water in the inter-storm periods. I think your observation that recharge is dictated by high intensity rainfall is correct; during high intensity (and long duration rainfall) the saturation of the soil profile hastens recharge and decreases evaporation (due to lesser atmospheric demand especially if it is raining!). (3) A better analysis of length of the storm, atmospheric evaporation demand (should be very easy to calculate) should help in estimating recharge (with a simple model as compared to SWAT or HYDRUS). This will in fact justify your hypothesis that recharge is dependent on a few high intensity events

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