

## ***Interactive comment on “Characterizing hillslope-stream connectivity with a joint event analysis of stream and groundwater levels” by Daniel Beiter et al.***

### **Anonymous Referee #3**

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The authors studied the connectivity of hillslope to stream water using an impressive amount of data from 5 different catchments. The catchments studied were divided in two different geologies. The methodology they chose to use was focused in groundwater levels in piezometers near the streams and stream levels to try simplifying the hillslope approach that is often used when searching for connectivity with the stream. The study is interesting and I only have a few comments and questions to the authors adding to reviewers 1 and 2. I will now follow with some general comments and later into more specific comments:

- One of the goals of the study was to test if assessing the connectivity between hill-

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slope and stream could be done with a single shallow near stream piezometer. I see your results show the answer is yes, but you miss to discuss or analyze why it worked in some piezometers and why not in others. What could you do different? In the discussions you mention that it works if you use a single well-chosen piezometer, how did you manage to have badly chosen piezometers in your network?

- Related to the previous comment, is there any information about the soil profiles of the piezometers? Or were they installed blindly with the cobra? What do you mean with refusal? Is that refusal as when you reach rocks/bedrock? Or would refusal count as well as when you reach a clayey layer that could divide two aquifers (valid for the sandy soils)? Is there information on the elevation of the piezometers related to the stream/streambed?

Following come some specific comments:

- Page 1 Line 7: I suggest modifying the text here or earlier, “Step two” comes as a surprise since there was never a step one.
- P 4 L 3-12: This paragraph could be friendlier and provide more information if it was shown as well in a set of tables for the piezometers in each catchment. Stating elevation over stream bed, well depth and distance from the stream among other things. Maybe just as supplementary data, but it would help the reader visualize the piezometers better.
- P 4 L 15: I mentioned it before, but does this mean that there is no information on the soil profiles?
- P 5 Figure 2: I like this Figure and the information it provides. But I do agree with reviewer 2, either add data here or on the tables I mentioned two comments ago.
- P 7 Figure 3: I suggest you improve the horizontal lines that come from ‘hfallThreshold’ and ‘hpostAmplitude’ because they are hard to see in the current version.
- P 8 L 9: “...are presumed to be rather short,”. Is there any data on hydraulic conduc-

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tivity?

- P 8 L 34: I suggest changing All NA to allNA, as you used the term allNA in all other instances.
- P 10 L 9-10: I would suggest to rephrase this sentence and say directly what you did instead of saying first what you did not do. It would make it easier to read.
- P 11 L 7: why did you consider it sufficiently representative? Could you provide more information to the reader? How far is it located? Similar elevation?
- P 12 L 2: Here you refer to Figure 9 before referring to Figure 8, maybe move Figure 9 to position 8 or change the text.
- P 12 L 3-4: "...low in summer and autumn." I don't see this generalization when I see Figure 7. There are several piezometers were autumn covers the whole spectrum. Or is there median values that we have no knowledge of?
- P 19 L 1-3: Any insights on why you had some exceptions? Because if those were your only wells this study would have completely different conclusions. If you have no insights, then that is valid as well, but it should be stated.
- P 22 Table 2: Use capital letters in each of the boxes, you used in some boxes but not all.
- P 22 L 1: "...single well chosen well.". I agree, but how did you choose well or bad? Assuming you had installed your piezometers.
- P 23 L 1: The closing ) is missing after Figure 10.

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