

## ***Interactive comment on “Comment on: “Spatial characterization of long-term hydrological change in the Arkavathy watershed adjacent to Bangalore, India” by Penny et al. (2018)” by Nitin Bassi et al.***

### **Anonymous Referee #1**

Received and published: 17 October 2018

Review of “Comment on: “Spatial characterization of long-term hydrological change in the Arkavathy watershed adjacent to Bangalore, India” by Penny et al. (2018)”

This manuscript presents some interesting comments on a “Spatial characterization of long-term hydrological change in the Arkavathy watershed adjacent to Bangalore, India” by Penny et al. (2018), previously published in HESS. The manuscript critiques the Penny paper on a number of points.

I am aware that a previous submission of this commentary has caused a large number of comments on the HESSD forum. However, I (on purpose) have not read the details of this conversation to remain as objective as possible in my current review.

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The presented critiques on the Penny et al can be summarized as follows:

- 1) Various sources of ground data (streamflow, groundwater, precipitation, reservoir levels) exist, which are not acknowledged (or used) in the Penny et al. paper.
- 2) Past literature has discussed hydrological changes in this region, which, again, is not acknowledged in the Penny et al. paper.
- 3) Several assumptions in the Penny et al analyses are argued to be misleading.

These are interesting points that are may be relevant for HESS; especially highlighting the data availability of in this region helps to support future hydrological inferences of this region.

However, at present, the manuscript does not provide a structured scientific critique of the Penny et al paper that would lead to me recommending publishing this in HESS. Before I can recommend publication, the authors should address the following points:

[1] A critique of the Penny paper (in my opinion) requires tackling the main claims of their work. At present this critique does not clearly list the main claims of Penny et al., and therefore it also does not use the main findings of Penny et al. as the core of what needs to be “critiqued”. In the context of the main current critiques, I expect that the authors show (or logically argue) how:

i) the data which is available leads to substantially different conclusions on the key findings of Penny, (ii) how past literature relates to the main findings of Penny et al, (iii) how a more realistic representation of reservoirs (i.e. section 4) affects the main findings of Penny et al, and (iv) how a better representation of the main assumptions and inferences of Penny et al that are listed in section 5, affect their main findings:

Properly addressing this point requires: (i) a better list of the main findings of Penny et al., (ii) a quantitative analysis (or very structured reasoning) that uses “better assumptions” and the available data to yield different conclusions than Penny et al.

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Once such changes are made (if feasible), this critique could be changed into something that opens by an abstract that looks something like:

"Recent work by Penny et al. (2018) quantifies hydrological changes in the Arkavathy watershed, India, and finds that [LIST MAIN CLAIMS OF PENNY]. Here, we show how using local data and more realistic assumptions reveals that [LIST REVISED CLAIMS]."

[2] In many instances, the critique discusses the analysis of the Penny et al. paper without providing context for someone that is not familiar with all details of the Penny et al. work. For this critique to be more suitable for publication, I recommend that you always assume that the reader is not familiar with the details of this work, and you write the critique as a work that can be read as a stand-alone piece. In the list of detailed suggestions provided below, I have highlighted cases where sufficient background was lacking. However, I am unsure if this list is comprehensive, so please consider the entire text on this aspect in revising the paper.

[3] the overall quality of writing leads to many cases of inaccurate or unclear statements. In the detailed comments, I have highlighted where this is the case. However, I am unsure if this list is comprehensive, so please consider the entire text on this aspect in revising the paper.

#### Detailed comments

#### PAGE 1

L9-14: see suggestion for reframing the work according to the major comment provided above, and the suggestion that the abstract will be much more useful if you state it something like: ""Recent work by Penny et al. (2018) quantifies hydrological changes in the Arkavathy watershed, India, and finds that [LIST MAIN CLAIMS OF PENNY]. Here, we show how using local data and more realistic assumptions reveals that [LIST REVISED CLAIMS]."

L16: replace "more so" by "especially".

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## Interactive comment

L16: The increase in water demand is independent of how arid a place is (i.e. the Moon is an arid place, but water DEMAND is very low, and not changing). Maybe you want to state something about water "stress" or a statement about "scarcity"? However, at present this argument is inaccurate. Please rephrase.

L17-18: "closure" is unclear wording in "are on the verge of closure or are already closed, with". (I understand what you mean, but why not simply replace it by "have". Also, do you have any references supporting this statement?

L20: Maybe "rivers and aquifers" is better since "aquifers" are parts of catchments"?

L20-24: this explanation seems redundant. In case you'd like to keep it, please rephrase the text as you only cover part of the potential causes of hydrological changes.

L24: "In addition to" or "apart from"?

L25-26: "as most of the time it is the people in the latter that get affected by the hydrological changes occurring upstream." seems like a statement that can be supported by a reference?

## PAGE 2

L1: "thus" is not warranted here. "Which suggests" or "which may lead to" seems more appropriate.

L5: "A few recent" or "Several"?

L5-7: Your wording suggests that this is an issue that is more wide-spread than the two citations that are listed here. Providing a more comprehensive reference list would be useful.

L7: "the official agencies" suggests you refer to specific agencies. Do you mean "official agencies" in a broader sense? If that is the case, remove "the".

L8: "are debated among the researchers." do you mean "discussed in person" or "dis-

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cussed on published works". If the latter is the case, please cite some examples.

L8: Please cite the studies which refer to "In some cases"

L18-29: So if these data are available, show the reader how if they lead to the same or differences inferences than the main points of the Penny et al paper.

Entire section 3: state HOW previous literature relates to their work, rather than just stating they did mention past works in this regions

PAGE 3

L31: "somewhat hard to comprehend" is vague. Can you be more specific?

Section 4: "surface water extent" seems clearer than "water spread area".

PAGE 4

L3-9: Assuming zero outflow sounds naïve, but does it really matter given Penny et al state that when overflows occur "S is equal to its maximum Smax, so that variations in overflow cannot contribute to changes in observed S"? Thus, are these overflows not (implicitly) accounted for by having defined a maximum storage?

L10: I would change section heading because "unit" implies that the authors made some errors in the dimensions of the analysis (which is not the case).

L10-20: It is fine to show precipitation time-series, but it would be much more useful to actually calculate how these precipitation time-series affect reservoir behavior. Reservoirs buffer variations in rainfall and therefore do not necessarily show the same place-to-place variations as observed in the rainfall time series.

L22-24: Since these data exist, show us what these data look like and state if they are consistent, or contradicting, the findings of Penny et al.

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water behaviour at the local or regional scale." It may be more fruitful to say "We explain how" rather than "Our contention is"...

L30: "very sweeping inference" why "sweeping" in this context?

PAGE 5

L4-6: "Contrary to the findings of Penny et al. (2018), the data of observation wells installed by CGWB that monitor groundwater 5 level in the basin indicate that the groundwater fluctuation due to draft is positive in a major part of Cauvery middle subbasin where Arkavathy lies." If this is the case please SHOW these data, rather than just state it.

L9: "because of the negative gradient with respect to surface water bodies" do you mean something like "because they are located at lower elevations than surrounding surface water bodies"?

L9-10: "inflows received by stream passing through Indian cities are wastewater." If this is the case, do you have any supporting this statement, or is this statement based on your local expert knowledge?

L10: what do you mean by "the quantum of the flow"?

L9-13: This is an interesting statement, but, at present, it seems to rely purely on speculation, rather than any data supporting that this is happening...

L15: "quite" seems redundant

L19: "will only yield misleading results" is a purely speculative (and very likely to be wrong) statement.

L15-22: Similar to the changes that are needed for the abstract. Rather than stating that Penny et al are wrong, SHOW how they are wrong

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