

Interactive comment on “Why is the Arkavathy River drying? A multiple hypothesis approach in a data scarce region” by V. Srinivasan et al.

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General comments

This is an interesting and well-presented paper of which I will be happy to suggest minor revisions. My main comment, which I realise is subjective, has to do with the style in which the argumentation is set up. I am fully sympathetic to the fact that the authors advocate a "best practices" approach to attributing recent hydrological change in a complex regions such as the Arkavathy river basin, and that they try to generate information that is useful for policy making. I am also inclined to agree that there exist many documented attempts that focus too strongly on modelling, and that those attempts are very prone to neglect processes that are not represented in the model,

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thus leading to some form of "modeller myopia".

But I think that the authors pose the issue too black and white, contrasting "developed world models" to "developing world data scarcity", or, as I interpret it, an approach based on a-hydrological-model-that-happens-to-be-available, versus a conscious identification of the issues at hand and the appropriate complexity of analysis as a function of available data. Reality is of course much more of a continuum. As such, I see the paper not so much as a first step towards a new scientific approach, but rather an excellent example of "best practice" of bottom-up hydrological problem solving. This may not sound as novel, but is still highly relevant as unfortunately too many examples of not-so-good practice exist.

Another reason that I am a bit uncomfortable with the "us v. them" tendency of the problem statement, is that rejecting the use of complex models also has implications for the analysis. In particular, it makes it impossible to look at interactions between each of the hypotheses. For instance it is not unlikely that an increase of evapotranspiration from Eucalyptus may have reduced groundwater recharge, thus further aggravating the impact of extraction. The authors discuss this to some extent in section 5 and emphasize the need for further research, but give little explanation about how this can be done without the use of the models against which they argue in the introduction of the paper.

Specific comments:

p27/10: According to most rankings, India is not a developing country any more. Perhaps the entire concept of a developing country is getting a bit outdated, or at least a vague denominator given the enormous diversity it encompasses. Especially from a water resources perspective I would prefer to be more specific on why regions such as the study region are challenging: they combine data scarcity with strong pressure on water resources, fast environmental and socio-economic change, and an urgent need to improve local livelihoods.

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p27/19: traditional, developed world models: also here, I think that this is a bit too contentious to be appropriate. I don't think that such as thing as a developed world model exists. Yes, a lot of models have been developed for temperate regions and require a lot of data, but there is such a wide spectrum of data models, and catchments that it is not a matter of developed v. developing regions. Many developed regions are problematic in modelling their hydrology while many developing regions are starting to get better and better data. What makes a study region like Arkavathy challenging is the big discrepancy between the urgency of decision making v. the low data availability and complexity of the hydrology. This is of course a situation more likely to occur in developing regions, but surely not their monopoly.

p32/10: "TG Halli TG Halli": remove duplication

p36/24: evaporaion: correct

p53/22: this sentence would seem to throw away the baby with the bath water. Hydrology is an applied science and I think that traditionally it has been dealing pretty well with human interactions, but of course bad examples exist (as in any scientific discipline). Indeed, non of the methods presented in the paper is all too novel and again I think it is mostly an issue of stimulating good practice than preaching a revolution.

Table 1: Meterological -> Meteorological?

Table 1: ideally be more specific. periods of data availability, spatial resolution of maps, number of wells, ...

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