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Interactive Comment

Interactive comment on "Reviving the Ganges Water Machine: why?" *by* U. A. Amarasinghe et al.

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I have read the manuscript with interest, as well as the two reviews, that are both quite thorough and critical, identifying key weaknesses and also providing constructive suggestions for improvements.

As editor, I would like to raise four points, some of which may also have been raised in some way or other by the reviewers, but need to be emphasized:

1. The authors have to be extremely clear about defining their subject matter: what precisely is meant when they refer to the "Ganges Water Machine". How is it defined?

Authors response: We have clarified this by revising the sentence in L12-13 in the abstract.

The approach of the GWM for providing such SSS is through additional pumping and depleti
prior to the onset of the monsoon season and recharging the SSS through monsoon surface

In relation to this, I find it difficult to combine the general knowledge I have of water

management in India, which is characterised, among others, by the systematic over-exploitation of groundwater, on one hand, with the tenet of this paper, namely that theremust in fact be greater abstractions of groundwater prior to the monsoon, to ensure that sufficient storage space is avaiable to store the monsoon rains. Surely, in case groundwater is over-abstracted, which I thought was the case already in India, one would think that there would be sufficient storage space left for the monsoon recharge to be stored? So is the Ganges Water Machine a real proposition, or rather a myth?

Author's response: It is true that groundwater over exploitation is a major problem in some areas, especially in the northwestern, western and southeastern parts of India. Even there, there are still pockets with substantial GW resources. However, much of the groundwater resources in the east is underexploited. Because surface storage potential is limited, and Eflow is not a parameter in the Basin water management at present, we believe that GWM is indeed becoming a real proposition than a myth. Wherever the GW is overexploited, natural surface water –groundwater interactions are not sufficient to recharge the depleted aquifer. There MAR (managed aquifer recharge) is a must. In other areas, there is huge potential for reviving the GWM.

2. Are the data provided in Figures 2, 4, 5 and 7 referring to the entire Ganges basin (i.e. including Nepal and Bangladesh)? Figure 6 provides data on ET and EF for different EMCs at what site/location?

Authors response: The estimates of Fig 2, 4, 5 and 7 are for the Indian part of the Ganges. ET of Figure 6 is for the Indian part of the Ganges. EF is based on the flow at the Farakka Barrage as estimated by Smakhtin and Anputhas . We have clarified them in the text.

3. Throughout the paper, the authors are not meticulous in using correct units. Stocks should be reported as volumes, flows as volumes per time unit. The main text, Tables 1 and 3, as well as the Y-axis of Figures 2, 3, 4, 5 and 6 need to be amended. The unit of the values presented in Figure 8 are not declared. When formulae are given (equations 1, 2, 3), no units are reported. This is important given the subject matter of the paper, where there are chances of confusing stocks with flows.

Authors response: The Y axis of Fid 2, 3, 4,5 and 6 are flows (volumes per a time

HESSD
12, C4821–C4822, 2015

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unit). We have revised the manuscript and figures and included time units for the equation in the text and y-axis of revised figures

4. The authors should indicate how the present manuscript relates to another manuscript submitted to HESSD by the first two authors of the present paper, together with some other authors, with nearly the same title, namely "Reviving the "Ganges Water Machine": where and how much?" (http://www.hydrol-earth-syst-sci-discuss.net/12/9741/2015/hessd-12-9741-2015.html)

Authors response: The present paper is the first paper in a series of publications under the "Reviving Ganges Water Machine". Mutuwatte et al paper is the second one in the series, assessing the surface runoff potential of the sub-basins.

I consider the criticisms of both reviewers quite severe and fundamental. It is clear that the submitted manuscript is of insufficient quality to be considered for publication in HESS. I invite the authors to take the critique and suggestions made at heart and to thoroughly revise and significantly improve the manuscript.

Principal author's response: We thank the two anonymous reviewers and Prof P. Van de Zaag for their thorough and useful comments. We have tried to address their comments as best as and to the extent possible for this manuscript; and hope the revisions are sufficient enough to make this manuscript of sufficient quality to be published in HESS.

This is only the first paper of a series of papers on Reviving Ganges Water Machine. The second paper is already being reviewed in HESSD. Other papers in this series, technical feasibility of recharge, power for GWM, EFlows, water quality, and finally a synthesis paper on techno-socio-economic feasibility will be published as and when they are complete. Thank you.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., 12, 8727, 2015.