Hydrol. Earth Syst. Sci. Discuss.,
https://doi.org/10.5194/hess-2018-480-RC1, 2018

Hydrology and Earth System Sciences
Discussions

Interactive comment on "The Kerala flood of 2018: combined impact of extreme rainfall and reservoir storage" *by* Vimal Mishra et al.

S. Padikkal (Referee)

sudheerpadikkal@yahoo.com

Received and published: 27 September 2018

This paper and its findings are very relevant in the context of extreme climatic events recurring at an alarming rate all over the world. A critical analysis of Kerala flood of 2018 presented here must be of great interest to the researchers, water resources managers as well as the development practitioners. Authors have done a good job and the presentation of its results are appealing to the scientific community.

The estimation of return period of extreme rainfall using GEV distribution and its analysis are well presented. In that aspect, this paper is an outstanding work. However, there are certain important aspects missed out in the analysis of reservoirs' storage and that makes the conclusions drawn a bit unscientific. I would request the authors to

consider the following aspects and rework on it to make the paper more applicable to a wider section of readers among researchers and practitioners.

(a) Unlike the impact of extreme rainfall analysed and presented, the impact of reservoir storage in worsening the flood situation appears to be only a general statement and it is not supported with a clear and logical analysis. (b) Assessing the impact of reservoir storage by just looking at the percentage of FRL storage is a premature analysis.

This has to be analysed in a more logical manner by checking the rise in water level caused at a downstream point due to reservoir releases. To be very specific, you need to do this analysis for at least 5 major reservoirs you are considering. Idukki, Idamalayar and Periyar in the Periyar basin, Malampuzha in the Bharathapuzha basin and Parambikulam in the Chalakkudipuzha basin. CWC gauging stations are available on the downstream side of these reservoirs in Periyar, Chalakkudipuzha and Bharathapuzha. So the flow data at these points are already there in the public domain.

Simulate the depth of flow at these points without the reservoir releases and with reservoir releases and see whether the impact is significant (reservoir release data is also in the public domain, or you can get it from the respective dam managers). If you are getting the impact significant, simulate again the reservoir storage to safer position and see the volume that should have been left unfilled in the reservoir to make the impact of its releases insignificant. This finding is also important. I would expect such an analysis before jumping into a conclusion that reservoirs storage also contributed to the flood.

Another important point to be considered in this analysis is that the main objective of major reservoirs you have taken is water conservation and not flood control. When you optimize the storage based on the major objective of water conservation, what is the limitation on unfilled volume should also be clearly investigated before making a conclusion.

Hope the authors would consider these points and revise the MS with these results to

make it more convincing. This paper would be of interest to the broader public if the authors take up the additional analysis I have suggested and revise the MS accordingly.

Interactive comment on Hydrol. Earth Syst. Sci. Discuss., https://doi.org/10.5194/hess-2018-480, 2018.