

## ***Interactive comment on “Spatial characterization of long-term hydrological change in the Arkavathy watershed adjacent to Bangalore, India” by Gopal Penny et al.***

**Anonymous Referee #2**

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Overall this is a well written manuscript that attempted to describe trends and spatial differences in changes in hydrology in the Arkavathy watershed on the basis of changes in extracted tank water surface area from satellite images along with other attributes.

Although the methods were well described, the broader perspective of the analysis is not well presented. After all the study analyzed the tank's surface water dynamics for a very small area (the total area of the Arkavathy is not provided), so, what new information does the findings bring to the community compared to the known facts at regional to national scale for India?

Given the size of the tanks studied, I would imagine the seasonal water area dynamics will have greater implications than the inter-annual dynamics. The manuscript did not

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discuss anything on the seasonality for these tanks, or how does that influence the trend?

The manuscript mentioned about differences in water quality, turbidity, vegetation in the water which are influential factors for changes in the reflectance. Even though the DN values were converted to reflectance, the manuscript used only one index (NDWI) to classify water surface area, while there were potentially many other methods or index (Senay et al., 2013) could be used to map water surface correctly, as no one index can cover it all.

While the analysis was performed for the time period between 1972 and 2010 the validation was done for 2014 results. To me validation needs to be done for the time for which the trend analysis is performed (few sample years both wet and dry between 1972 and 2010).

As the study area is so small Google earth might provide good data for validation. Have the authors looked into google earth images as a potential source of validation data?

Page 10 line 5: claims that MK analysis confirms an increase in agricultural land use fraction is related to decrease in tank water storage. How? There is no evidence shown in the manuscript that suggests agricultural land use is increasing. This is vague to me.

Page 10 line 11-12: statement connects with changes in land use and management practice with depleted subsurface stores without providing evidence.

Page 11 line 6-7: Target for classification is to identify water and not water cells, in that case how does incorporation of additional land cover will reduce the classification error?

I think the method used in the manuscript is too simplistic, although producing time-series information of tank water surface area is valuable. I am not sure how much new information has been brought to the community by this study; therefore I am not convinced that HESS is the right journal for this article.

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Senay, G.B., Velpuri, N.M., Henok, A., Pervez, M.S., Asante, K.O., Gatarwa, K., Asefa, T., & Jay, A. (2013). Establishing an operational waterhole monitoring system using satellite data and hydrologic modelling: Application in the pastoral regions of East Africa. *Pastoralism: Research, Policy and Practice*, 3, 20.

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