

Hydrol. Earth Syst. Sci. Discuss., referee comment RC2  
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## Comment on hess-2021-350

Anonymous Referee #2

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Referee comment on "Remotely sensed reservoir water storage dynamics (1984–2015) and the influence of climate variability and management at a global scale" by Jiawei Hou et al., Hydrol. Earth Syst. Sci. Discuss., <https://doi.org/10.5194/hess-2021-350-RC2>, 2021

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### General Comments

This study demonstrates an integrated remote sensing framework for improving the understanding of long-term reservoir storage dynamics at the global scale. The methods of this study highlight a combination of well-established quantitative approaches and publicly available data sets and have the potential to benefit studies across water resources management and satellite remote sensing. The manuscript is well written and organized, but further explanation or clarification might be needed on the hydrology part, particularly for some components of trend analysis and associated conclusions.

### Specific Comments

- My major concern is that the trend analysis didn't include reservoir outflow and water use at the reservoir or basin level. The authors did attempt to explain the lack of data behind their decision, but this may not be sufficient to justify an incomplete analysis of the reservoir water balance. Without a reasonable estimation of the dynamics of outflow and water use, it is not convincing that the trend in precipitation/streamflows alone can effectively explain the trend in reservoir storage, particularly for those reservoirs where the trends in precipitation/streamflow and storage are not consistent. Therefore, some of the conclusions on the influence of water use are not robust, e.g., lines 17-18, 221-223, 248-249, 267-268, 362-365, and 376-377.
- The analysis of reservoir reliability, resilience, and vulnerability (lines 172-189) is a good extension to the estimated reservoir storage dynamics. The concepts and calculations in this part could be better introduced by using a real reservoir as an

example, perhaps a well-known reservoir with good data availability. Also, how did the authors determine the time length of failure events (line 178) determined? How does the value of this factor vary among different reservoirs or basins? What is the unit of resilience (line 185)?

- Field observations and modeling studies have shown that evaporative loss from reservoir surface can be quite significant, especially for reservoirs in arid and semi-arid regions. This seems to be contradictory to some conclusions from this study (lines 265-266, 307-308 and 311).

### **Technical Corrections**

Figures 2-3. No need to use the second y-axis.

Line 171. Remove the comma.