

Reviewer #2

**Major Comments:**

Q - Line 124: Can you clarify why you chose to average 2015 -2017 and use those values where you had missing data? Why did you opt not to interpolate or fill with the long term average or another metric?

*A – The 2015-2017 average was used to define the ratio between seasonal and permanent extent as it represents the GSW dataset years without missing datapoints thereby providing a complete global dataset of the ratio. While a long-term average of each pixel location may provide another solution, our approach provided a simple and efficient estimate to establish a complete dataset. Given that this was done for catchments with less than 5% of its pixels missing, we do not believe that this will significantly alter our findings. We have added additional text regarding this limitation in the updated manuscript. See also comments to reviewer #1.*

Results: It would be nice to include a general comment about regional differences or perhaps even climatic differences. Most importantly, are there regions that stick out or areas that are notably with respect to your results? I know this gets brought up in the discussion, but it might increase the clarity of your results.

*A – While it is beyond the scope of this paper to explore the climatic influences on the results, we have included a few mentions in the results to give more context. This section now ties better with the discussion later.*

Section 4.3: I would suggest changing this section title to something more specific. This section dives into the trends in and potential reasons for why the trends are occurring, but I don't directly see the link to water management strategies. I also think this would be a better first discussion paragraph as it goes into the reasons behind your results and would prepare the reader for the other two sections on ecosystem health and biogeochemical cycles.

*A – This is a valid point and we have now changed the paragraph order by moving section 4.3 to the start of the discussion. We have also changed the section title to “Global Surface Water Trends” which better describes the content of this section.*

Line 336: You discuss regional differences, but I don't feel like you dove into the regional differences as much. I would expand this in section 4.3. I would also elaborate on the regional differences you see in the conclusion.

*A – We have now expanded section 4.3 to include more discussion on the regional difference as well as including a summary of those regional differences in the conclusions.*

Conclusion: I would include one or two key points from section 4.1 and 4.2. This would make the conclusion a bit stronger and prove why this dataset is so unique and what it can be used for.

*A – This is a good suggestion and we have implemented the reviewers feedback in the conclusion by adding one sentence each on the biogeochemical implications and ecosystem health.*

**Minor comments:**

Line 31: The authors cite GRanD (Lehner et al., 2016), but it also might be useful to cite GeoDAR (Wang et al., 2023) as that is a more representative of the total storage that exists globally inside reservoirs.

*A - Added*

Figure 2: I would suggest breaking this up into two figures either by rivers and lakes or by plot type since the figure is quite tiny and it's hard to see the changes in the maps. I would also suggest making the lines on the line plots thicker and changing the colors to be more divergent, especially for the surface area of lakes (Panel B line plot). For the maps, I would include a color bar that shows that white denotes either no data or not enough data (I'm personally not sure which it is). Lastly, it could be beneficial to switch the color bar from rainbow to another one that is more color blind friendly.

*A – We have added a colorbar for the nodata symbol (not enough data is shown in Figure 3), increased the line thickness, and split the figure into two as the reviewer suggested. We have at this time decided not to switch the colorbar but can implement those suggestions as well if desired by the editorial team.*

Figure 3: I also suggest splitting this figure into two. Perhaps either by the type or by seasonal and permanent as I think it will increase the clarity of your results section. I also don't know if you need the color legend for each panel, but perhaps that is necessary?

*A – We have decided not to split the figure into two here considering section 3.2 contains only one paragraph that explains the figure. However, we can accommodate those suggestions if needed.*

Figure 4: I like this figure; however, I would change the colors to a different set (perhaps one color for each water body type and different shapes for seasonal and permanent). Seasonal Lake gets lost in this figure and my eyes are drawn to permanent lake and seasonal river.

*A – We have now changed the color scheme and included different shapes for seasonal and permanent waterbody accuracy for additional clarity.*