

Earth Syst. Sci. Data Discuss., referee comment RC2
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Comment on **essd-2022-138**

Anonymous Referee #2

Referee comment on "GLOBMAP SWF: a global annual surface water cover frequency dataset during 2000–2020" by Yang Liu et al., Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2022-138-RC2>, 2022

The dataset provides a MODIS-derived annual surface water frequency dataset, which can help analyze the dynamics of surface water. The manuscript is well structured and written! My major comments are:

I agree with the authors that the daily MODIS observations have value in capturing the variations of surface water; however, its limitation is also obvious. The 500-m resolution is too coarse for capturing the abundant small water bodies as well as the subtle changes of surface water. Moreover, the Sinusoidal projection of MODIS caused a considerable distortion in high latitudes, worsening this omission, particularly in North America and Eastern Russia, where a large portion of the global small water bodies are located. It seems that the authors have been mainly focused on China and a few low-mid latitudes, but did not assess the performance in high latitudes, which seems to require more attention during validation.

The authors reported the areas of global inland surface water, including permanent and maximum areas; however, I think the numbers could be biased by failing to capture the small water bodies as commented in the above paragraph. As many much finer surface water datasets have already been produced, I would suggest the authors clarify the conditions of these reported areas, such as water bodies larger than a certain size; otherwise, the areas would not be valid.

I am not convinced why the authors did not compare the results to the global water dataset produced by Pekel et al. and the GLAD (Pickens et al., 2020), which all provide permanent and seasonable water cover that can be comparable to this dataset.

Specific comments:

I would suggest removing “for change analysis of inland water bodies” in the title.

Line 172, why six observations?

Line 179, does the slope criteria also remove water in a sloppy area that is outside of shadow? Also, did the variation of solar angles along latitudes and seasons considered in estimating shadows?

Line 200, please clarify what resample method was adopted.

Line 427-448, I am not fully agreeing with the novelty of the method as mentioned here. The method still identifies water cover as explained in the methodology, so the statement of the advancement here does not seem to be a valid point. Also, the method seems to be a very simple one without considering calculating water index or machine learning-based models. I am honestly surprised that it was robust enough for producing a reasonable global result.

Figure 8 is hard to interpret because most of the pixels showing positive trends also show negative trends. I think that the authors need to come up with a better way of presenting the results.