

## ***Interactive comment on “Satellite-based remote sensing data set of global surface water storage change from 1992 to 2018” by Riccardo Tortini et al.***

### **Anonymous Referee #1**

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In this study, the authors produced a global lake/reservoir volume change dataset. The water levels are derived from altimetry data between 1992 and 2018. The water areas are mapped from MODIS data between 2000 and 2018. Finally, the water storage gain or loss for 347 lakes/reservoirs are estimated. This study is suitable to be published in ESSD, but some improvements (see comments below) are necessary.

Major comments:

1. The WSA is estimated using 500-m MODIS data. It looks that 120 MODIS pixels are included, but the lake surface area change is used. This is not suitable for most of lakes with small area changes. It could be fine for reservoirs, as the reservoirs have large

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inundated area dynamics. Many studies have used lake mapping from 30-m Landsat images, which is better than MODIS data.

2. How many lakes in the Tibetan Plateau are included? The existed studies have reported that about 60 lakes with altimetry data and the corresponding estimates of lake volume variations.

3. The Equation (1) is correct? It is  $WSE_{t+1} - WSE_t$ ?

4. The linear regression between elevation (WSE) and surface area (WSA) was used. How about polynomial correlation? The authors test them?

5. More validations including lakes in different types and continents can be provided?

6. How water storage change in 1992-2000 without MODIS water mapping was estimated?

Specific comments:

1. “and to characterize how these conditions change through time over long periods (Lettenmaier et al., 2015; Crétaux et al., 2016)” A suggested study here for monitoring lake area, level and volume changes since 1970s: <http://dx.doi.org/10.1002/2017GL073773>

2. “and the Tibetan Plateau (Lee et al., 2011; Kleinherenbrink et al., 2015; Cai et al., 2016).” It looks some key studies of lake changes in the Tibetan Plateau from altimetry data are missed here. <https://doi.org/10.1029/2019GL085032>, <https://doi.org/10.1016/j.rse.2011.03.005>, <https://doi.org/10.1007/s10712-016-9362-6>

3. “a polygon was drawn by hand using high resolution imagery from various sources (e.g., Global Surface Water Explorer, Google Earth, ESRI World Map)” How to make sure the dates between them are matched.

4. The links below are not accessed. <https://doi.org/10.5067/UCLRS-GREV2>  
<https://doi.org/10.5067/UCLRS-AREV2> <https://doi.org/10.5067/UCLRS-STOV2>

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<https://podaac.jpl.nasa.gov/>

5. The correlation ( $r^2$ ) could be presented in Figures 6, 7, 8.

6. How about the mismatching in Figure 8a-b?

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Interactive comment on Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2019-219>, 2020.