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Interactive comment on "Quantifying the impacts of human water use and climate variations on recent drying of Lake Urmia basin: the value of different sets of spaceborne and in-situ data for calibrating a hydrological model" *by* Seyed-Mohammad Hosseini-Moghari et al.

Seyed-Mohammad Hosseini-Moghari et al.

hosseini_sm@ut.ac.ir

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Dear S. Chaudhari,

We would like to thank you for your interest on our manuscript. We will try to do our best to consider all your recommendations in the revised version. Below, we have provided a point-by-point response to your comments.

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Comment#1: The results from natural simulation in the manuscript shows a negative TWSA trend (Page 21, Lines 11-13), especially in 2009-2013; to what do the authors attribute this declining trend? Does any of the climate variables, such as precipitation and temperature, over the region show a similar declining trend? How much of the negative TWSA trend can be explained by the changes in climate variables? Even though the manuscript title says “climate variations”, discussion regarding this part is currently too brief.

Response: In the text, whenever we refer to “natural simulation” (naturalized conditions, WGHM-NAT), the simulation results are driven by climate only (in the form of daily time series of precipitation, temperature as well as shortwave and longwave down radiation) and not be human water use. So, the negative TWSA trend which you mentioned is explained totally by climate variables. The average of precipitation values in 2009-2013 was about 7.5% less than the average of precipitation values 2003-2007. About the temperature, the average of temperature in 2003-2007 and 2009-2013 were almost the same. Actually, the strong negative trend occurred in 2008 and 2009 (comp. Fig. 9) and average of precipitation during 2008-2009 was 19% less than during 2003-2007. In the revised version, we will add more information on the climate variations and also refer to the study of Bavil et al. (2018) over the Lake Urmia basin.

Reference: Bavil, S. S., Zeinalzadeh, K., and Hessari, B.: The changes in the frequency of daily precipitation in Urmia Lake basin, Iran, Theoretical and Applied Climatology, 133(1-2), 205-214, doi: 10.1007/s00704-017-2177-7, 2018.

Comment#2: Figure 5 in the manuscript shows the WGHM grids. Significant area of the lake basin is excluded from the model domain. As the authors are estimating the total basin water storage change it is essential to encompass the entire basin.

Response: We believe our procedure works well. One should not encompass much more than the entire basin area, to avoid, for example, that the precipitation input into the basin and Lake Urmia is overestimated. Given the 0.5° resolution of hydrological

model and the climate input data, the fit is quite good. We quantified the area outside the basin that is covered by the 0.5° grid cells and compared to the area of the basin that is not covered by the included grid cells; the basin area in WGHM model is only 4% larger than the actual area of the basin.

Comment#3: The authors should use contrasting colors in figures. It is difficult to distinguish the WGHM-ANT and WGHM-NAT lines in Fig 9 due to similar colors.

Response: We will change the color of WGHM-NAT in the revised version.

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Thank you very much again for your time and for providing valuable comments.

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