General comments:

In summary, this article tries to reconstruct Total Water Storage Change (TWSC) using satellite-based integrated water cycle components of P and E, and observation-based D in five larger basins in South Asia. Then, TWSC obtained from GRACE, ISBA, and GLDAS were used to evaluate the performance of the reconstructed TWSC here. The topic is interesting, but many attempts have already been made by previous studies (Tang et al., 2017; Humphrey et al., 2017). Major revision is needed before publication, here, a few suggestions that authors should consider while revising are listed below:

First, as shown in Fig. 2 and Fig. 4, SAtellite Water Cycle (SAWC) estimates generally has higher correlation with that from GRACE，ISBA，and GLDAS except for the Irrawaddy Basin. As for the correlation of anomalies, relative higher correlation between SAWC estimates and the other three were found in Mekong and Ganges basins, while much lower correlation was found in the left basins especially in Brahmaputra basin. This highlighted the spatial and temporal variation of the performance of SAWC estimates, therefore, more discussions on such uncertainties are needed.

Second, ISBA was used to evaluate the SAWC estimates due to the long series historical data. However, ISBA model does not represent anthropogenic factors such as groundwater extraction, river regulation or irrigation, which may significantly impact D and TWSC. This is much different from SAWC estimates which might already considered the anthropogenic disturbances. This difference can lead to some big discrepancy as shown in Fig.5 and Fig. 6 for the terms of D and delta S. Therefore, the authors are encouraged to clarify which anthropogenic disturbances have been considered in SAWC estimates and how they affect the discrepancy among different basins in corresponding years. Also, if possible, adding the results from other hydrological models that considers the human activity is highly encouraged.

Third, compared with previous studies of TWSC derive, an integrated utilization of satellite products to retrieve TWSC seems an advantage of this study, but similar idea has been reported in Pan et al. (2012) and Zhang et al. (2016), therefore, clear illustration of the novelty of this study is needed.

Fourth, as shown in B of Eq.4, a priori specification of the uncertainties seems important in obtaining optimized solution through “Post-Filtering", so more explanations of the advanatge for current specification scheme is needed.

Specific comments:

Page 5, Line 60-65, this study used one gravity solution based on MASCON-JPL. Other solutions from Center for Space Research (CSR) at the University of Texas at Austin, and GeoForschungsZentrum (GFZ) are available. The comparison of different solutions among different basins are needed to be clarified to support the choice of the solution or using the resembled solution.

Page5, Line 70, “with respect to averaged season”, the time period should be specified.
Caption of fig. 3, for the original X_{SW} (blue), it should be green as shown in the figure.

Reference:

Humphrey, Vincent, Lukas Gudmundsson, and Sonia I. Seneviratne. "A global reconstruction of climate-driven subdecadal water storage variability." Geophysical Research Letters 44.5 (2017): 2300-2309.

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Tang, Yin, et al. "Reconstructing annual groundwater storage changes in a large-scale irrigation region using GRACE data and Budyko model." Journal of hydrology 551 (2017): 397-406.

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