

## ***Interactive comment on “Multi-decadal Hydrologic Change and Variability in the Amazon River Basin: Understanding Terrestrial Water Storage Variations and Drought Characteristics” by Suyog Chaudhari et al.***

**Anonymous Referee #2**

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This study applied a physics-based hydrological model and GRACE product to investigate the hydrological changes in the Amazon basin, especially the water storage and how it related to droughts, during 36 years period. The results of this study are comprehensive and the findings are significant, which improve the understanding of hydrology in Amazon. But there are still some concerns in the manuscript need to be addressed. The first two questions regard the modeling approaches. Firstly, it was mentioned that the atmospheric forcing data are spatially interpolated using a bilinear interpolation method to the model grid. The issue is, for example, rainfall events are usually local

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and spatially discontinuous, whether the bilinear interpolation is appropriate for some of the climatology data. Secondly, regarding the LULC change applied to the model, LAI higher than 5 are considered as forest canopy. Then the question is, how does this approach deal with the seasonal variation of LAI as for LULC change? The manuscript consists of 5 parts, but the model descriptions in Section 2 should belong to Section 3, methods. Thus, it would be better to re-organize the contents and the structure of the manuscript. In addition, Figures S3, S6, and S8 are not referred nor discussed in the manuscript. Moreover, there are also some specific comments as below.

1. P3L13~15, some of these ‘more recent’ literature are still more than 10 years old. The author should cite some real more recent papers.
2. P8L27~29, the description of the symbols in the figure should also be presented in the figure caption.
3. P9L7, this conclusion is not easy to clarify from the figures. Please describe more clearly and specifically.
4. P9L14, the discrepancies in some basins cannot be seen from Figure S2, for example, by which metrics?
5. P12L13, the method of t-test should be described in the methodology section unless it is an ordinary t-test.
6. P14L14, it should be ‘Figure 10’.
7. Figure 5, the color change of the rivers is not clear. The line widths of the rivers should be increased.
8. Figure S1 lacks the north arrow and the scale. Moreover, the author should mark all sub-basins and major rivers in this figure.
9. Figure 7, y-axis label is missing.
10. It would be better to include geo-coordinates for all spatial plots, e.g., Figure 3, 4, 5, 6, 8, 9, S4, S5, S7, and S9.

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