

This manuscript evaluates terrestrial water storage (TWS) changes before and after the GRACE/GRACE-FO period, with particular attention to the reliability of ERA5-Land TWS trends. The authors use process-based hydrological simulations and statistical/machine-learning TWS reconstructions to assess whether the pre-2002 ERA5-Land TWS behavior is reasonable. The manuscript further suggests that the relatively high pre-2002 ERA5-Land hydrological state and the subsequent strong apparent TWS decline are mainly related to ERA5 precipitation forcing, which may be affected by shifting biases caused by changes in the assimilated observing system.

The work is interesting and the main conclusion appears reasonable. However, the current version is difficult to follow. The writing is not sufficiently clear, the figures and tables are not well organized, and the presentation and formatting are not sufficiently polished. These issues should be addressed before the manuscript can be considered further. The detailed comments are:

1. The manuscript should be carefully reformatted according to the HESS/Copernicus guidelines. There are frequent formatting problems throughout the manuscript, including missing spaces, inconsistent punctuation, which noticeably affect readability and presentation. The authors should carefully check the entire manuscript. In addition, the tables should be reformatted using the standard HESS/Copernicus style, e.g., “Table 1.” rather than “Table 1:”, “Figure 1.” rather than “Figure 1:”, and preferably follow a clean three-line format without vertical or full grid lines.
2. The title should be revised to better reflect the main focus of the manuscript. The current title, “Assessing Terrestrial Water Storage Change Since the 1980s,” is too broad and somewhat misleading. The manuscript does not provide a comprehensive assessment of TWS changes since the 1980s. Instead, it mainly investigates why ERA5-Land shows an apparent shift or strong decline in TWS around the early 2000s. The analysis focuses on whether this ERA5-Land TWS behavior is caused by changes in ERA5 precipitation forcing and assimilation-related shifting biases. Therefore, the title should be revised to more specifically reflect the actual focus of the study, such as the causes of ERA5-Land TWS inhomogeneity or precipitation-forcing-induced biases.
3. The use of SLR data is inconsistent across figures and tables. SLR is included in Figure 1 and Figure 3, and its global TWS trend appears to be relatively strong and comparable to ERA5-Land in some periods. However, SLR is not included in Table 3 or Figure 2. This inconsistent treatment is confusing.
4. Line 102: “Benchmark” may be overstated. The manuscript mainly provides a multi-product comparison of TWS estimates rather than a formal benchmark framework. Unless the authors define clear benchmark criteria and evaluation standards, I suggest replacing “benchmark” with “assessment” or “comparison”.
5. Abbreviations should be defined more clearly. The manuscript contains many abbreviations, which reduces readability. All abbreviations should be defined at their first occurrence, e.g., “precipitation (P)” at Line 128. Similarly, abbreviations such as “P”, “ET”, and “RO” at Line 334 should be clearly defined or briefly reintroduced. Key abbreviations such as HWM should also be briefly reintroduced when used extensively in later sections. An abbreviation list would be helpful.
6. The order of input datasets should be consistent. In Lines 229-232, the HG19 input datasets are introduced in the order of ERA5, MSWEP v2.2, and GSWP3, whereas Table 2 lists them in the order of ERA5, GSWP3,

and MSWEP v2.2. The authors should use a consistent order in the text and table to avoid confusion.

7. Dataset names should be standardized throughout the manuscript. There are many inconsistencies in dataset names, which seriously affect readability. For example, GSWP3 and GSWPv3 appear to be used inconsistently, and MSWEP2.2 and MSWEP v2.2 are also written in different forms. The authors should carefully check the entire manuscript and use one standard name for each dataset throughout.

8. Terminology in Table 2 should be standardized. Several variables in Table 2 are written inconsistently, such as “2m temperature” and “2m T” , “precipitation” and “Precip”, and “indices” and “variables”. In Line 263, additional abbreviated forms such as “ T_{2m} ”, “ q_{2m} ”, “SWd”, and “P” are also used. Please use consistent and academically standard names throughout the manuscript, and define all abbreviations clearly when they first appear.