

AC: We thank the reviewers for taking time to review this manuscript. Their insightful remarks have helped us to identify parts in the manuscript which needed clarification and certainly allowed us to improve the quality of this paper.

Anonymous Referee #3

Review about the paper

HUST-Grace2024: a new GRACE-only gravity field time series based on more than 20 years satellite geodesy data and a hybrid processing chain

submitted to Earth System Science Data (<https://doi.org/10.5194/essd-2024-39>)

Authors: Hao Zhou, Lijun Zheng, Yaozong Li, Xiang Guo, Zebing Zhou, and Zhicai Luo

General Remarks:

The manuscript provides detailed information about their new version of the time-variable gravity field series using a new data processing strategy and new input data. However, the following are my primary comments and suggestions for major comments to the study.

AC: We thank the reviewer for their insightful comments, which helped us to identify parts in need of clarification and undoubtedly allowed us to improve the quality of the manuscript. Below is the point-by-point response to the specific remarks.

1. The GRACE result section should incorporate also comparisons with previous versions of HUST-Grace to assess how they correspond with the official GRACE solutions.

AC: Thank you for insightful comments, Reviewer #2 has the same comments with you, we have added some comparison results in the new section. The new section is about comparing with our solution with previous versions of HUST-Grace such as HUST-Grace2020 to assess our newest solution performance.

2 During the GRACE mission, particularly after 2010, more factors emerged, including maneuvers and the GRACE-B battery issue. Hence, it is imperative to incorporate the GRACE time period post-2010 within the results section, as it will serve as a comprehensive testing phase for the new step procedures provided in the study.

AC: Thank you for insightful comments, it really helps us to improve our research work furtherly. We have added some GRACE results for the time period post-2010 according to your valuable comments. Please refer to the modified result section in the revised paper.

3.The study's proposed improvement steps should clearly and prominently show the impact of either the new accelerometer calibration or the new AOD1B product. This can be done in the result section, comparing it with the prior version of HUST solutions.

AC: Thank you for your valuable comments, we have added some comparison results in the section 3.1.3. Please refer to the revised paper.

4.The metrics used to examine the models in the comparison section were used in a very subset of the significance of the magnitudes. Although the comparison is intended to emphasize that the HUST-

Grace2024 model is better in a meaningful way, it may not be meaningful if the cm or mm orders are 3 digits finer after the comma. For example, Page 19, Line 17, RMSs over ocean is in cm, but the notations are well below mm.

AC: Thank you for this careful observation, Reviewer #2 has some similar comments with you. We have modified this error in our revised paper.
