**AC: We thank the Reviewer#1 for taking time to review this manuscript. Your 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.**

Reviewer#1

**General Comments**

This manuscript presents a significant and timely contribution to the field of satellite gravimetry by introducing HUST-Grace2026s, a new static gravity field model that consistently integrates over 20 years of data from both the GRACE and GRACE-FO missions, thereby bridging the gap between these two satellite gravimetry eras. The authors apply advanced processing strategies—including stochastic modeling based on postfit residuals and rate-term estimation—to derive the model, and provide a thorough validation against independent data sources. The work is well-structured, technically sound, and offers valuable insights into the challenges and opportunities of extending static gravity field solutions into the GRACE-FO era. However, several aspects of the manuscript would benefit from clarification and revision to enhance its clarity, consistency, and impact. The following comments are intended to help the authors strengthen the presentation and address a few issues that may affect the interpretation of their results.

**AC: We thank you for your valuable comments. Your comments help us improve our manuscript quality a lot.**

**1. Comment on key outcome 1 (P26;)**

The first conclusion states that "processing chain refinements can play a more critical role than the simple addition of GRACE-FO data." While this finding is supported by

the analysis of the current dataset (GRACE-FO data up to March 2025 at ~500 km altitude), the statement as written lacks the temporal qualifiers that the authors themselves include in the main text (e.g., in Section 3.1.2, they note that GRACE-FO "currently operates at a higher orbital altitude of about 500 km"). To maintain consistency and avoid overgeneralization, it is recommended that the authors explicitly qualify this conclusion in the same manner, noting that it applies to the current orbital phase of GRACE-FO and that this assessment may change as the orbit decays in later mission phases.

**AC: Thank you for your insightful comments. We have modified the sentence in the conclusion section in our manuscript.**

**Modified Sentence**

**P27 L14-L18**

**"(1) Impact of GRACE Orbital Altitude: The sensitivity of geopotential coefficients to orbital altitude decay increases with both decreasing altitude and increasing coefficient degree, however, because of the current orbital altitude of GRACE-FO satellite, the contribution of GRACE-FO observation data is still limited for static gravity field determination comparing with that of GRACE. It also confirms the processing chains refinements itself can play a more critical role than the simple addition of current GRACE-FO data."**

**2. Comment on Contribution Matrices (Figures 10 and 11)**

The contribution matrices in Figures 10 and 11 are presented as revealing the "relative importance" of each data source. However, these matrices are derived from normal equations that are themselves influenced by the chosen parameterization (e.g., rate-term truncation at degree 60), and VCE weighting. They reflect the modeler's decisions as much as the data's inherent information content. The claim that GRACE-FO LRI data

"provides the principal constraint on zonal coefficients" may be an artifact of the specific processing choices rather than a fundamental property of the data. A more cautious interpretation would strengthen the manuscript by acknowledging that these contributions are conditional on the processing framework.

**AC: Thank you for your insightful comments. We have modified the sentence according to your comments.**

**Modified Sentence**

**P21 L1-L7**

**"Our findings confirm that adding trend/oscillation terms markedly improve the accuracy of models previously limited to static terms. However, they also reveal two important facts: (1) if the maximum degree for trend/oscillation parameter estimation is set too low, the GRACE-FO LRI data may not confer its maximum possible benefit to the static field determination. (2) the contribution of static parameters has a strong connection with that of trend/oscillation parameters and it should be introduced some prior information to decorrelate them during the static gravity field determination. In other words, it should keep in mind that our result presented in this section is conditional and dependent on the parameter strategies framework."**

**3. Minor Comment on Section 3.1.2**

In the second paragraph of Section 3.1.2 (Page 16), the authors state that they attribute the limited improvement from GRACE-FO data to "two main factors," but then proceed to list three factors (numbered 1, 2, and 3). This inconsistency should be corrected. Please revise either the introductory phrasing to read "three main factors" or adjust the numbering to match the stated count.

**AC: Thank you for your comments on our manuscript. We have adjusted the numbering to match the stated count.**

**Modified Sentence**

**P17 L6-L15**

**"We attribute this to three main factors: (1) Truncation of trend/oscillation terms … (2) Orbital altitude limitation … (3) Accelerometer data transplantation …"**

**4. Minor Comment on Section Numbering**

In Section 3.1, the subsection titled "Combination with KBR1B data" is numbered as 3.2.2. This appears to be a numbering error, as it should be 3.1.2 to be consistent with the hierarchical structure. Please correct this numbering.

**AC: Thank you for your insightful comments. We have modified the numbering in our manuscript.**

**5. Comment on Figures with Multiple Curves (e.g., Figures 4, 5, 6, 8, 9, 12, 15)**

The authors present multiple curves in these figures to compare different models or processing strategies. However, the current color scheme, particularly the use of similar shades of blue and green, makes it difficult to distinguish between curves. This issue is compounded by the fact that many of these curves exhibit only small differences, which are already challenging to visualize. To improve readability and allow readers to better appreciate both the similarities and subtle distinctions among the compared solutions, it is recommended to use a more distinguishable color palette (e.g., colorblind-friendly options from ColorBrewer) and/or incorporate distinct line styles (solid, dashed, dotted). These adjustments will not only enhance clarity but also help convey that certain models are nearly identical in performance.

**AC: Thank you for your insightful comments. We have replotted the Figure according to your comments.**

## Modified Figure

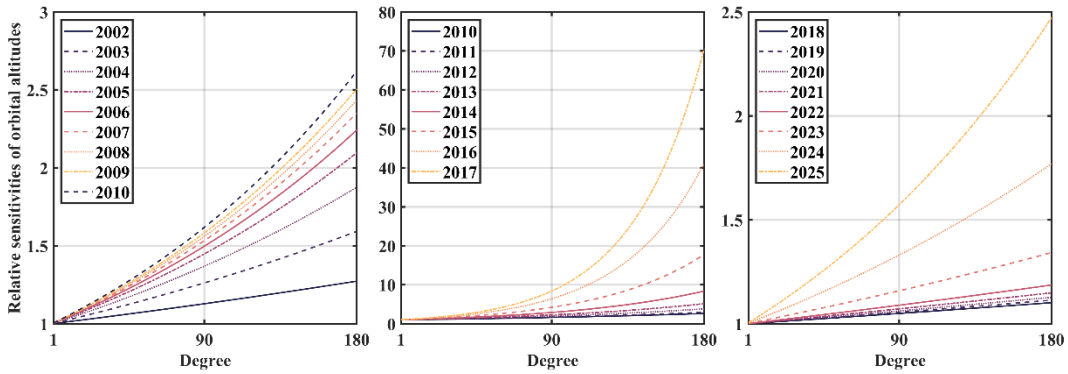


Figure 2

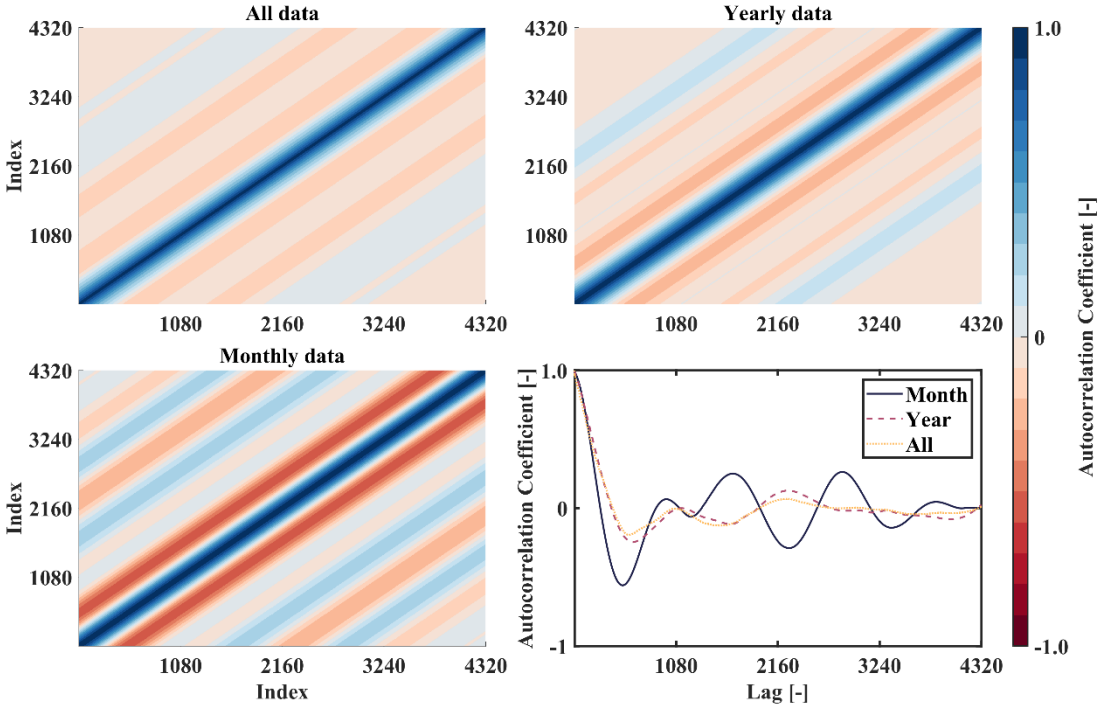


Figure 3

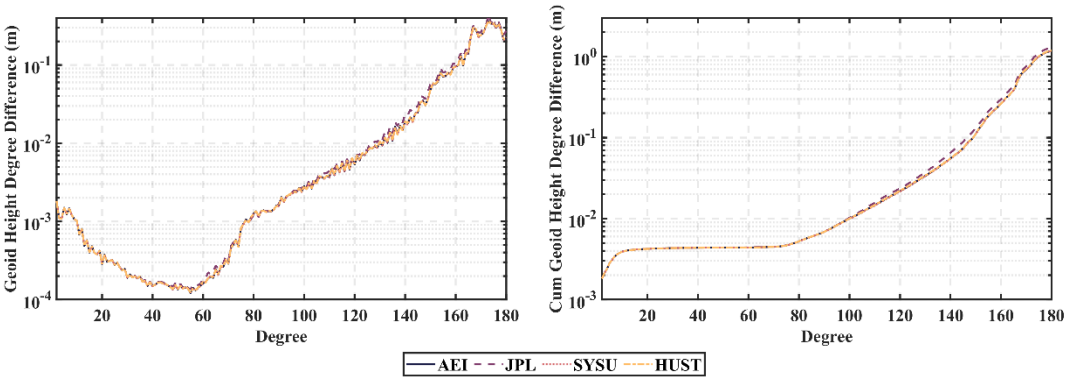


**Figure 4**

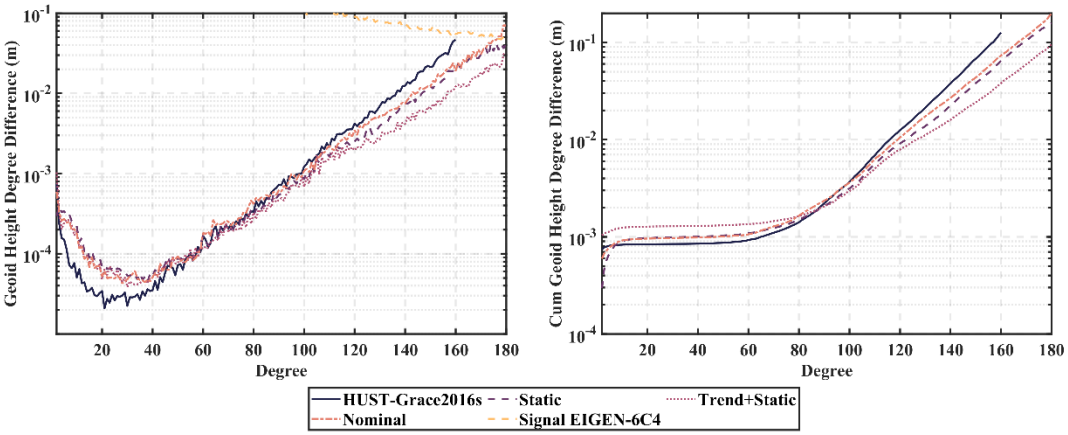


**Figure 5**

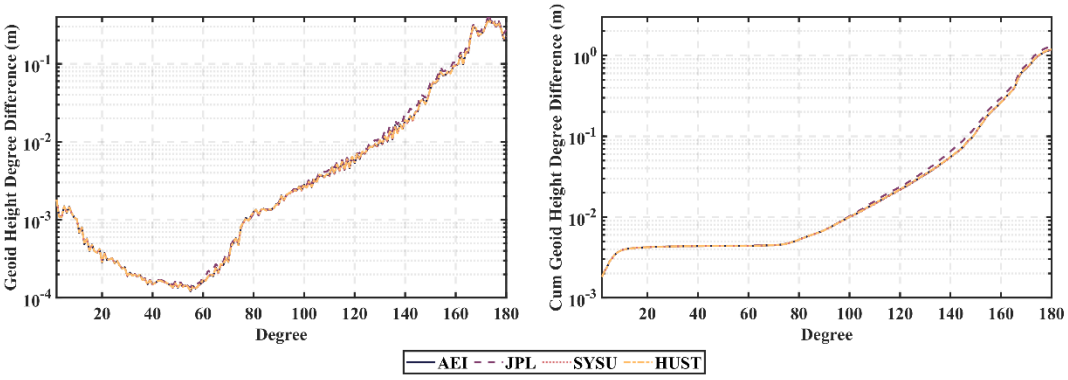


**Figure 6**

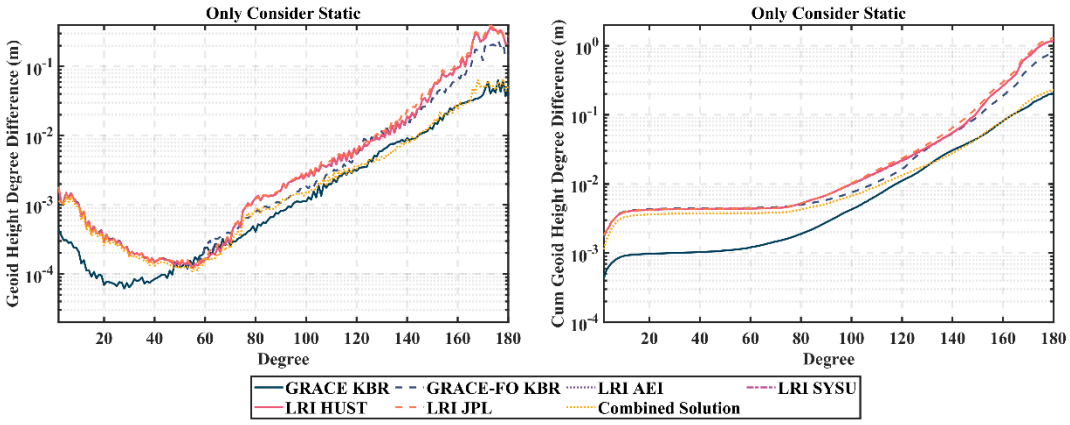


Figure 8

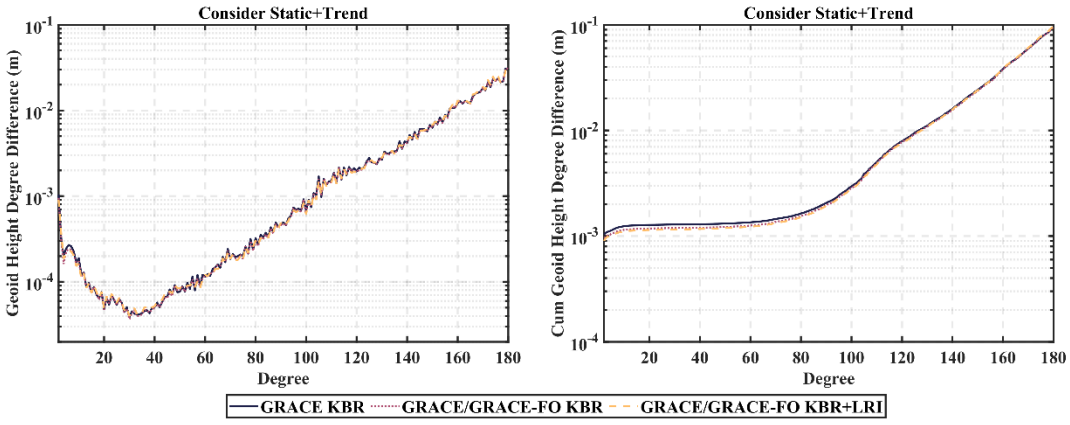


Figure 9

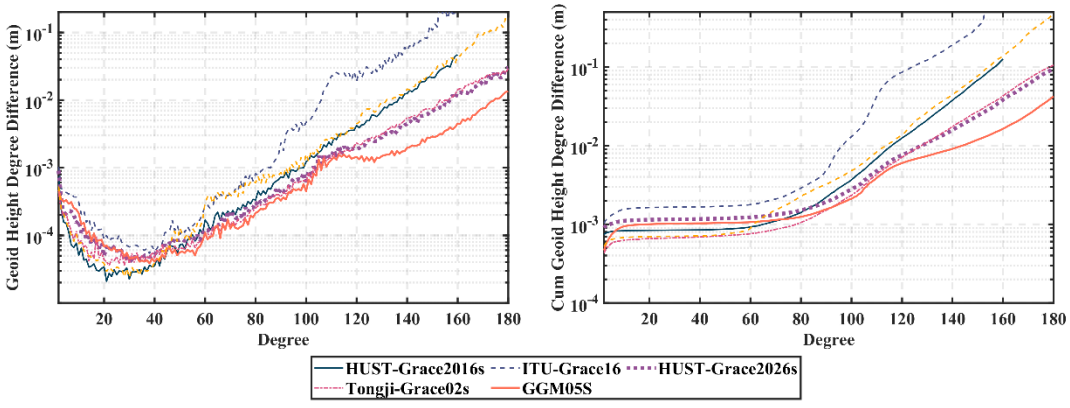


Figure 13

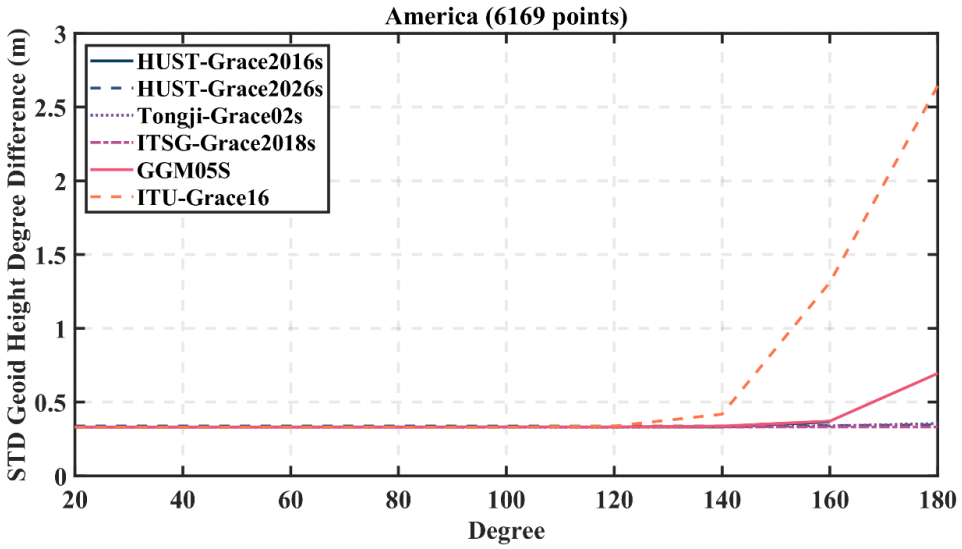


Figure 16

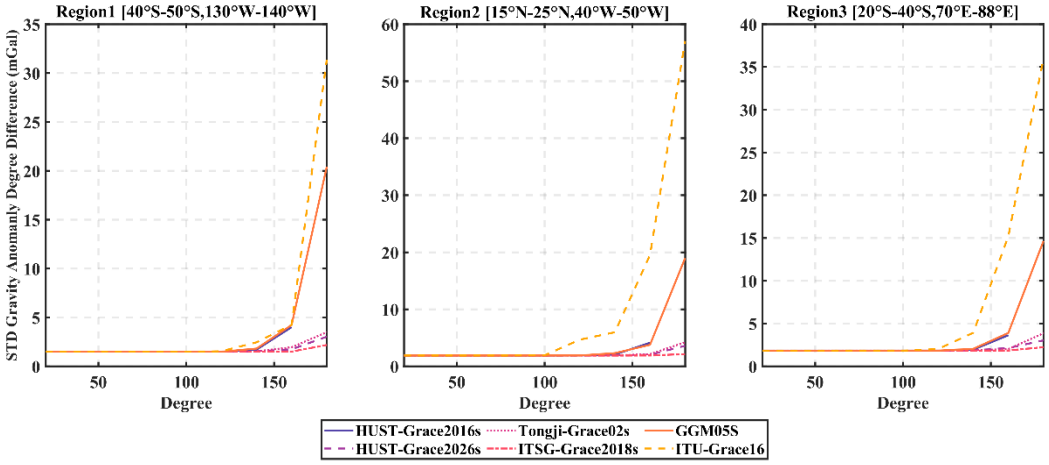


Figure 17