

Response to the Editor’s comments for manuscript egosphere-2025-3263

The authors would like to thank the editor for the time spent reviewing our work and for his valuable suggestions. We have attentively addressed all the raised issues and have produced a revised version of the manuscript. Please find below our answers (shown in blue color) to each of the comments. The line numbers indicated in our response refer to the ”track changes” version of the new version of our manuscript.

Editor’s reaction to the Authors’ response to the Editor’s comments:

The responses by the authors to the second-round reviews of the two reviewers are not fully satisfactory. What remains to be addressed by the authors is:

Associate Editor Comment — Regarding the Authors’ response to Reviewer Comment 1.4 on the last sentence of the abstract:

Authors: “However, we have decided to keep the last sentence of the abstract...”.

This response is going against a key comment of the reviewer, and a key result of the manuscript, namely that plane-parallel radiative transfer calculations are not sufficient. The current last sentence is namely:

“Based on these results, this study makes recommendations, that can be found in the Discussion section of this paper, on the development of methods to account for sphericity effects in the inversion of geostationary data so that one can keep using plane-parallel radiative transfer codes for near-real-time operational applications.”

This sentence is a contradiction in itself, or at least poorly formulated: why do you develop methods to account for sphericity if you keep using plane-parallel methods? The formulation in the Conclusions sections is much better. The suggestion by the Editor is to change the last sentence of the abstract into:

“Based on these results, this study makes recommendations, that can be found in the Discussion section of this paper, on the development of methods to account for sphericity effects in the inversion of geostationary data so that one can correct the outcome of plane-parallel radiative transfer codes for near-real-time operational applications.”

Reply: Thank you for rephrasing the Reviewer’s previous comment, which we partially misunderstood. We agree that our sentence featured a contradiction, and we have replaced it with your suggestion in the abstract (line 21).

Associate Editor Comment — Regarding the Authors’ response to Reviewer Comment 2.1, on the change of all numbers in Tables 3-10 and B1:

“Although the conditions of these new simulation were exactly the same as before, minor differences can be observed in comparison to the previous results due to the statistical variability of Monte Carlo methods such as SMART-G. These difference can be observed in the tables mentioned by the reviewer, as they were modified to correspond to the new simulations and figures.”

There were many numerical differences in the tables of the two manuscript versions, most very small, but some larger. This is a serious point. This fact calls for a statement in the manuscript

about the statistical error of the Monte Carlo simulations. The absolute accuracy of the Monte Carlo radiances should be specified, and the resulting percentage statistical error in the differences SSA-PPA should be given in the manuscript.

Reply:

We understand the need for clarification regarding the statistical errors induced by the Monte Carlo Markov Chain simulations. We modified Sect. 3.2 to specify that "the statistical error introduced by this process allows the solver to estimate the standard deviation of the radiance, which is provided as a simulation output, thereby enabling the calculation of an uncertainty" (lines 239-240).

Regarding the resulting statistical error, the reflectances plots a) in Figures 2, 4, 5, 6, 7, 8, 9, 10, 11, 12 and B1 all feature error bars (not really visible, because of how small they are) which correspond to the calculated 2σ uncertainties (see Appendix A for detail). Likewise, the relative error plots b), c) and d) feature error bars corresponding to the propagated 2σ uncertainties (see Appendix A for detail) on the relative error. This precision was added in lines 269-270 : "To clarify the statistical significance of each result, the plots of reflectance and relative error in reflectance consistently feature error bars corresponding to the calculated uncertainty, which corresponds to a 95 % trust interval (see Appendix A)."

After an additional verification on our end, Table 3, 4, 5, 6, 7, 8 and 9 present small variations from the previous version of the manuscript in the sense that these differences do not exceed the above-mentioned uncertainties resulting from the statistical errors. However, we have found that the lines corresponding to SZA between 80° and 90° for VIS06, VIS08, NIR1.6 and NIR2.2 showed MPE values very different from the previous version. This is simply because we made a mistake in the second version of our manuscript (filed on 26/08/2025) when writing the line corresponding to SZA between 80° and 90° in Table B1, resulting in a shift of each column to the right (one can see that there was no value for VIS05, and that the values corresponding to the larger spectral channels were all shifted). This mistake was corrected when editing Table B1 in the third version of our manuscript (filed on 15/01/2026). In essence, the results presented in all Tables are correct as of the third version of our manuscript submitted in January 2026. We thank you for your insightful comment and hope that our clarification regarding the statistical error induced by the Monte Carlo Markov Chain algorithm improves the comprehending of our results. We also deeply apologize for forgetting to mention our previously corrected mistake in Table B1.

Associate Editor Comment — Technical comment on Table 1: chemical symbols should not be printed in italics.

Reply: This has been modified in Table 1.

Additional Author comment : We found a small mistake in the label of Figure C1 : this result corresponds to the principal azimuthal plane, not to the cross-principal plane. This was corrected (see Appendix C).