This paper gives a very nice overview of the impact of assimilating additional GNSS-RO data and shows logically and systematically the improvements ROMEX data has on the forecast scores using the JEDI-GFS system. First, the impact on short range forecasts are shown by comparing short range forecasts to observations. Secondly, the impact of short and medium range forecast scores are shown with using the IFS as a reference. It is impressive to see that 20 K and full ROMEX show systematically an improvement to e.g. humidity and wind in the short-range; which is consistent to what observations are seeing. Also, for longer lead times the impact is quite substantial by the additional assimilation of GNSS-RO data. However, also some detrimental impacts are illustrated and well documented in this paper. In general, the paper reads nicely and is well structured. I recommend to accept this publications with some minor revisions; stated below:

Thank you very much for your valuable feedback. We greatly appreciate your positive comments on our work. In response to the general and specific comments, we have carefully reviewed and revised the manuscript accordingly. A point-by-point response is provided below in blue for clarity.

General comments

General question: "Which version of processing was used for Yunyao or other RO data in your study?" Maybe mention that somewhere.

We have added the processing description in Section 2 with a reference to Marquardt (2024), as shown below.

"All these data are distributed through the EUMETSAT Radio Occultation Meteorology Satellite Application Facility (ROM SAF; Marquardt 2024). This study uses version 1.1 of the dataset."

Specific Comments

p2, l53: I understand you mention only the commercial data operationally assimilated but maybe also mention the Chinese companies (also used in the ROMEX studies). I am not sure if they are assimilated by CMA nowadays?!

Thank you for the comment. Chinese companies, Yunyao and Tianmu, have been added.

P7, Fig.1: I was wondering what is shown here. The total number of RO profiles over the month of September for every 5x5 box? Or the number of average daily profiles over that month?

It is the total number of RO profiles over the month of September 2022 for each 5x5 box. We have revised the figure caption.

Also, I think it would be better to use a radially symmetric kernel to estimate the number density for the following reason. If one compares the number for 5x5 lat/lon boxes the area covered over the Tropics is much bigger (and more chances to have RO data) than over the Poles. This would give a wrong impression of where the most data is located.

We agree that the areas covered by 5×5° lat/lon boxes vary significantly across latitudes. To avoid the misleading impression, we have replotted Figure 1 using an equal-area projection. This approach allows us to visualize the variation in box areas while still preserving the total number of profiles over the one-month period. Figure 1 has also been refined with a different color bar and an updated caption, incorporating the suggestions from the other two reviewers.

P9, l221-223: This is true but one has to admit that the horizontal location of that observation point can be different to the tangent point horizontal location- hence, we have ROPP 2D. Maybe mention that.

If we understand correctly, the reviewer is pointing out that a RO observation assigned to the tangent point actually reflects the integrated effect of atmospheric refraction along the entire ray path. This is correct, and we appreciate the opportunity to clarify. In the revision, we have noted the limitations of the 1D approach and mentioned the ROPP 2D method as shown below.

"However, ROPP1D does not consider the integrated effect of atmospheric bending along the ray path, as is done in ROPP 2D. The comparison between these two operators will be a separate work."

P11, l252: Mention that September 2022 this is not the full ROMEX period

Thank you for your comment. It is mentioned in the revision.

P13, l323: Maybe indicate the magnitude of this cooling/drying for ROMEX.

The cooling/drying effects are mentioned now as shown below.

"Experiments with additional RO data assimilation tend to cool nearly the entire troposphere, up to 0.17 K (ROMEX vs. NoRO), as indicated by the RO experiment curves lying to the right side of the NoRO curve."

"The dry effect of ROMEX reaches a maximum of approximately 0.1 g kg^{-1} at 700 hPa, relative to NoRO."

Technical comments

Throughout the manuscript correct the spelling of "centre" in ECMWF.

Thank you for catching it! All are corrected in the revised manuscript.

p1, l12: add "daily" after "35,000" and before "RO profiles"

Thank you for pointing this out. We have corrected all occurrences.

p2, l30: Replace "RO" with "GNSS-RO". RO is just the way it is measured - it doesn't fit the remainder of this sentence, as it describes GNSS-RO.

p2, l42: Again I would use GNSS-RO to be really accurate but of course you could mention in the text that with RO data you mean GNSS-RO data. (also l.53)

Thank you for the comment. In the revised version, we use "GNSS-RO" at its first appearance and introduce 'RO' as a shorthand thereafter.

P4, l94: Change "improvement" to "impact" or "change"

We have revised it.

P5, l141: add "daily" after "35,000" and before "profiles". This keeps coming up at more occasions throughout the manuscript when 35000 profiles are mentioned. Please check.

All occasions are checked and revised.