

## **2<sup>nd</sup> Review of “Exploring commercial GNSS RO products for PBL studies in the Arctic Region” by Ganeshan et al.**

I appreciate the authors' efforts in addressing the reviewers' comments and suggestions, including adding a section on the sensitivity tests of cut-off thresholds for deriving PBLH. However, several key concerns remain inadequately addressed in the responses and/or revised manuscript:

1. Since this study incorporates multiple datasets, and given that the authors acknowledge the impact of processing algorithms on the RO penetration depth, it is essential to provide clear details in Section 2. Please specify which data centers processed the data, the data availability period, the average daily RO counts over the Arctic Ocean, data version, processing modes (e.g., real-time, postprocessed, or reprocessed), and other relevant information. A summary table could be helpful here to enhance clarity.
2. Consider modifying the title from “Arctic region” to “Arctic Ocean” to more accurately reflect the study's geographic focus.
3. In Fig. 1, the authors compared the commercial dataset purchased by NASA and NOAA for the same month but not for a common dataset, which could result in sampling differences. It may be premature to attribute the observed differences in the penetration probability solely to the difference of the processing algorithms (Line 170-171). A similar concern applies to Fig. 2b, where the Spire and COSMIC-2 datasets over 30S-30N are compared. The sampling difference between these two missions may be significant due to their distinct RO count distributions with latitudes. The authors may consider using a collocated Spire-COSMIC-2 dataset to replot this figure. It could minimize the impact of sampling difference and provide more robust results. Additionally, if these statistics include the regions beyond the tropical ocean, terrain effects should be accounted for when generating this figure.
4. Fig. 4 shows that the daily RO counts reaching below 500 m for GeoOptics over the whole Arctic Ocean range from a few to 25. Such amount and variability raise concerns about whether GeoOptics data are sufficient to reliably capture the spatial variability of PBLH month by month. Could the authors comment on the reliability of GeoOptics data for deriving monthly PBL structure and variability?
5. The NASA Spire-derived PBLH exhibits lesser spatial and seasonal variability compared to the other two datasets, which the authors attribute to highly smoothed vertical RO retrievals. However, NOAA Spire RO data are not similarly smoothed. Why not present the PBLH derived NOAA Spire data to substantiate this explanation?

6. The last paragraph of the summary lacks scientific accuracy. The discussion is rather weak without reliable justification. For instance, could the author define what constitutes a “smooth” versus a “dramatic” change in the decline rate of RO penetration?