

Reply to Referee #3

January 31, 2025

We thank the reviewer for his insightful and useful comments. We will address them to improve the manuscript. Below, you will find the reviewers comments in red and our reply in black.

1 Referee #3: Minor Comments

1. Line 6: Citation(s) for the statement that CloudSat is considered the reference?

We will add citations to Palerme et al., 2014, and Stephens et al., 2018 in the introduction.

2. Line 7: inability to see shallow or retrieve heavy precipitation.

We will modify it.

3. Line 13: Reword "This radar measurements" - suggest "The proposed radar measurements"

We will reword as suggested.

4. Line 29: Reword to "snowfall not only removes moisture..."

We will reword as suggested.

5. Line 76: Please give some background to ERA5 snowfall. Validation, assimilated data, etc.

We chose ERA5 snowfall dataset as a reference because it is considered to be one of the most accurate and precise reanalysis product. What is important for our study is that it provides realistic spatio-temporal variability of the snow fields. We can add some references to similar studies that uses the same dataset.

6. Figure 4: These plots are a bit dense and need more explanation or possibly simplification

We will better explain the plots and will remove the histogram on the ERA5 occurrences to simplify the plots.

7. Line 215: Why not shown?

We didn't include in the plots the zonal mean of the snowfall captured by CloudSat and Wivern to simplify the plots. We can include those in the revised version.

8. Line 220: Why not shown? Maybe not worth mentioning the 10-day time scale given CloudSat's sampling

We didn't include in the zonal plot referred to the 10-day timescale because we thought it was not important since the repeat cycle of the CloudSat orbit is largerer than 10 days. We will substitute the 10-day timescale with the seasonal timescale in the revised version and will include the related plots.

9. Line 250: Please add more explanation/narrative here regarding the local variability plots

We will change the colorbar limits of the plots to improve readability and will add some explanation to it. In the Antarctic Peninsula and Western Greenland there are some spots where snowfall is significantly larger than in the whole area. WIVERN can capture this at monthly and annual scales. Instead, as the figures show, CloudSat sampling do not provide sensible information on those hotspots.

10. Figures 8 and 9 would benefit from a legend

We will add the legend,