Specific Comments:

1. *The main challenge the authors faced in comparing different measurement series was the difference in the footprint of the individual measurements and, therefore, the impact of surface roughness on the results. As a reader I would like to see this issue discussed further, ideally supported by some data. The authors could add a more rigorous analysis of uncertainties. At present it is more or less covered by two sentences (section 5. line 252-257).*

   The paragraph is thoroughly extended by adding all observation accuracies from literature and further interpretation.

2. *I would also like to know if outliers were filtered from the laser data? Lasers are subject to errors caused by blowing snow at the snow surface.*

   The laser observations are filtered by a moving median over 24 h to remove outliers and resampled to 15 min to match the temporal resolution of the GNSS derived. A sentence is added in section 2.2 (reference data).

3. *Why do the high-end and low cost receiver time series diverge after August 2022? I think a hypothesis is needed (section 4.2, line 194).*

   Indeed, a hypothesis is missing in the text. We checked all possible error sources which are related to the GNSS refractometry processing, such as the antenna height, base coordinates, antenna calibration parameters, reference ellipsoid (WGS84), satellite availability and signal strengths. As GNSS refractometry is a relative observation method between the base and rover antenna, the processing is consistent for all data epochs and receivers, and there was no change in satellite signatures, we could exclude all such error sources. Since the offset is sudden and affects the receiver height, we assume a change in the effective physical height of the low-cost antenna. The antenna is screwed on the submerged lateral boom via a small vertical balise bar. Due to the overlying pressure of the snowpack and the cold, it could be possible that the screw has become loose and the antenna sank a few centimeters into the underlying snow. This can only be verified once the buried antennas are dug out in future (scheduled for season 2023/24). This has not been done to this stage in order to not disturb the snowpack.

   The text is adapted to include this hypothesis.

4. *I note that according to figure 6 the low-cost data better tracks the manual density measurements after Aug. 2022 (section 4.3, line 228). This is not mentioned in the text and this omission should, in my option, be addressed.*

   A sentence is now added in section 4.3 to address the fit of the low-cost density results after August 2022. The order of the paragraph is rearranged for more clarification and context.

5. *I would also expect the high-end receiver to better correlated with the laser data as the former seems directly under the latter while the low-cost antenna is further from the laser footprint.*

The pictures seem to mislead the interpretation of the position of the buried antennas to the laser footprint. The laser is oriented approximately towards 90 degrees (East) compared to the buried antennas and thus the high-end sensor is not directly below the laser.

6. *Section 4.1: I would like to know if there are relationships between GNSS satellite zenith and aspect, and the errors. Is there are directional component, related to, for example, the effect of the mast and prevailing wind on surface roughness?*

   As mentioned in sections 3.1, azimuths where the GNSS-IR signals were bended around or reflected off the nearby air chemistry observatory were excluded from the GNSS-IR processing. Single azimuthal bins were not analyzed as it is intended to average all azimuthal observations to a) get the mean reference point around the mast to enable a comparison to the laser reference data, and b) filter all heterogeneities in surface roughness over the whole GNSS-IR footprint.

   Single elevation bins cannot be formed as the GNSS-IR method uses all satellite tracks from 5-30 degrees elevation to be able to calculate the multipath oscillation frequency, needed for accumulation estimation.

7. *Should tiltmeters and power monitoring be added to the setup?*

   If the system setup is prone to tilting and the relative height difference between the reference and rover antennas cannot be ensured, a tiltmeter would make sense to enable to monitor the physical baseline height component. Power monitoring could be added for remote self-sufficient locations.
   The discussion section is now extended to include this suggestion.

8. *Would a comparison of your results and accuracies from different measurements (manual density, SWE; surface height/accumulation from lasers and sonic rangers) be appropriate using the literature? Perhaps as a short paragraph at the end of the discussion to provide additional context.*

   Please see point 1. We have extended the first paragraph in the discussion section to include different measurement accuracies from literature to enable further discussion of the influence of the different footprints on the measurement uncertainties coupled to the heterogeneity of the snow pack around the antenna. We think that in that way your comment is addressed sufficiently.

Technical Corrections:

1. *In several places, especially in sections 2 and 3 you use the term "ground" to describe the ice shelf surface. Please use the term "surface" as it is not strictly speaking ground.*
   The term “ground” is replaced by the term “surface” for all relevant parts connected to the ice shelf surface.

2. *In section 2.1 it would be useful to know which reference ellipsoid was used: was it the same for all instruments? If not could there be an effect on data quality?*

   The same reference ellipsoid (WGS84) is used for all instruments. Thus, all results are consistent. This is now addressed in the manuscript by the extended text reffered to in comment 3.

3. *p4. l80: could the arm for the buried GNSS antennas bend? Was it rigid?*

   The buried lateral boom is rigid and initially placed on very dense, wind-packed snow. Bending of the arm is thus assumed to be neglibible. A sentence is added in this section for clarification.

4. *p5. l10; eq. 1: should h not be δh if it is a difference or change?*

   Eq. 1 refers to the relationship of the height (h) above the surface to the frequency of the multipath oscillations detected by GNSS reflectometry. The difference of this height (Δh) to the initial height over time then gives the change in accumulation. The respective sentence is adapted for clarification.

5. *p.6 fig. 3. For the sake of completeness please explain the difference between cyan and mauve ellipses or what they represent (which antennas they represent). How were they calculated?*

   The figure caption is extended to clarify the meaning of the colors. The colors represent the Fresnel reflections ellipses for the limits of the used elevation range for GNSS reflectometry: Red (30°) and blue (5°). They are calculated by the first Fresnel reflection ellipsoid.

6. *p7. eq. 3. Please remind the reader that m is SWE and b is accumulation. I have a short memory.*

   The reader is now reminded about the meaning of m and b in the respective section.

7. *p9. fig. 4. (also figures 5 and 6): would it not be better to have sub-figures a) and b) across the top and c) and d) along the bottom of these figures? This might be pedantry, I know.*

   We chose the order of the subfigures carefully with the intention to enable the reader to easily compare and interpret the differences between the individual measurement methods with the absolute values based on the same x-axes.