1. *What is the reference antenna? It might be the same Leica AS10 as the high-end rover, but it should be mentioned. Same antennas usually give results matching better, thus some of the difference between high-end and low-cost rovers might stem from this. Also the antenna calibration might be a thing to check, if you want to improve the results, at least no calibration tables were mentioned in the text.*

   The reference antenna/receiver is similar to the rover antenna/receiver and oriented in the same direction to mitigate differences due to system setup and antenna phase center offset and variations. Antenna calibration files are also added in the processing to reduce these effects for the differential processing of the low-cost system. Thank you for pointing out that this information was missing in the text, which is now added in section 2.1.

2. *How is the mast attached to the moving ice, i.e. how is the stability of the monument ensured? I was also wondering, along with a colleague earlier, how you can ensure that the mast or the lever is not deforming inside the ice?*

   The triangular mast is considered highly stable as it is more than 15m deep in the firn/ice and tensed into the firn/ice with 3 steal ropes every 3m in height. Mast deformations or sinking within the shelf ice/firn are not relevant for the GNSS-RR method as it is a relative observation method between the reference and rover antennas. Deformation in the upper few meters is prevented by the three guy ropes every 3m. The buried lateral boom is rigid and initially placed on very dense, wind-packed snow. Bending of the arm is thus assumed to be negligible. A sentence is added in this section for clarification.

3. *One thing that could be added would be the number of satellites observed by the GNSS antennas. How many satellites are left when the elevation angle is limited for the reflectometry? And how many satellites there are generally available? This is one factor affecting the quality of the results as well and could maybe explain if there were problems with the data.*

   In general, there are 7-13 GPS satellites available and used for the refractometry processing. A sentence is added in the processing description in chapter 3. As the overall variation in satellite visibility is small, we chose to not include an extra figure with the number of available satellites.

   The number of satellites does not decrease for reflectometry as the experimental site is totally flat and all observations from the low elevation range are used, including the ascending and descending tracks.

4. *Some terminology is used abundantly, for example, line 129 “vertical Up (height) component U”. For a geodesist, one would be enough, up component, height, or vertical component.*

   As a geodesist I agree. Since the paper is interdisciplinary and also focused on non-geodesists, we think that it is helpful to be explicit on the terminology for the first occurrence of “U” to reduce misunderstandings. See also the minor comment 6 of reviewer 1 (“short memory”).

5. *Also the symbol* m *seems to mean both mass (in equations) and the slope (in tables).*

   Indeed, the symbol “m” is used abundantly. The symbol for the slope is now changed to “a”.

   I agree with colleague on the points regarding 1) the order of figures 4 and 5, a *and* b *on top row and* c *and* d *below is much easier to read, and 2) some explanation why the results seem to lie nicely on top of each other before August 2022 and diverge after that.*

   1) 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.

   2) We checked all possible error sources which are related to the GNSS refractometry processing, such as the antenna height, base coordinate, antenna calibration parameters, reference ellipsoid, 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.

   The text is adapted to include this hypothesis.