Response to Referee 1:

First of all, we thank the referee for the effort to carefully reading the manuscript and for all comments.

General comments:

This paper describes the first result of GLORIA-B flight from Kiruna in 2021. The paper is generally well written and the contents which are described in the paper is clear. I felt the paper is almost worth published in Atmospheric Measurement Techniques. I have only a few minor points which would be nice to be modified before publication, which is pointed out below.

Minor comments:

1) P.1, L.31: What is "HEMERA"? Please provide what it means for.

HEMERA is not an acronym and stands for: "Integrated access to balloon-borne platforms for innovative research and technology." HEMERA is a Research Infrastructure funded by the Horizon 2020 framework Programme of the European Union which integrates a large starting community in the field of tropospheric and stratospheric balloon-borne research, to make existing balloon facilities available to all scientific teams in the European Union, Canada and associated countries. That means that although the name HEMERA is not an official abbreviation, it was chosen as the project name, inspired by the Greek goddess Hemera, the personification of day. We integrated the meaning of HEMERA into the text of the manuscript.

2) P.22, L.510: "a clear negative bias is evident in the cryosampler VMR." What is the cause of this negative bias? Please give some idea for this bias.

A similar negative bias has already been observed in cryosampler data comparisons with ACE-FTS (Atmospheric Chemistry Experiment - Fourier Transform Spectrometer) satellite measurements (see Fig. 4 in Kolonjari et al., Atmos. Meas. Tech., 17, 2429–2449, https://doi.org/10.5194/amt-17-2429-2024, 2024). However, the reason for this bias is still unclear although there is an indication that the O_3 present in the cryosamples might affect some species (like HCFC-22) chemically during the sampling or storage process (see Fig. 4 in Laube et al., Atmospheric Meas. Tech., 18, 4087–4102, https://doi.org/10.5194/amt-18-4087-2025, 2025). We added this information to the manuscript text.

3) P.23, L.539-540: What is the meaning of the sentence? "The vertical shape of the observed profiles is largely as expected." I guess some word(s) are missing.

In fact, this sentence is not very specific. Therefore, we rewrote it to: "The decreasing SF_6 values from 10 to about 25 km reflect the increasing age of air in the upper altitude range compared to the lowermost stratosphere (near 10 km)."