Reviewer 1, specific comments:

My major concern is that the study treats the pan-Arctic as a single, uniform ice body, without distinguishing between multi-year and first-year ice. It would be more informative if the authors separated the blowing-snow effects across these ice types. I raise this point because a recent study by Li et al. (2025; https://egusphere.copernicus.org/preprints/2025/egusphere-2025-4601/#discussion) suggests that multi-year sea ice may be an important source of sea salt (via blowing snow as proposed) for Svalbard halogen chemistry. From the derived blowing-snow occurrences shown in your Figures 2 and 3, areas of higher blowing-snow frequency appear to coincide largely with regions dominated by multi-year ice (see Fig. 1 of Li et al. or other sea-ice type maps). This overlap is an interesting feature that merits further discussion. With access to ice-type data, the authors could also assess the impact of blowing-snow sublimation on the surface snow mass budget separately for different ice types, similar to the analysis already conducted for the entire Arctic.

The authors greatly appreciate the suggestions made by the reviewer and for bringing the Li et al. (2025) and Huang et al. (2025) references to our attention. We agree that discussion comparing the occurrence and sublimation of blowing snow over first- versus multi-year sea ice is warranted. We have added a contour which delineates multi-year ice (defined as multi-year ice constituting more than half of the total sea ice concentration) to the original Figure 2 (blowing snow occurrence and properties), Figure 8 (blowing snow sublimation), and Figure S9 (all-conditions blowing snow sublimation).

The separation between multi- and first-year sea ice occurs just to the north of Svalbard and bifurcates the high occurrence region shown in the original Figure 2a. We also find that while multi-year ice constitutes only 25% of our study area, it accounts for 30-35% of the seasonal blowing snow sublimation. The fraction of snowfall removed by blowing snow sublimation, as inferred from ICESat-2, also varies by ice type. On average, values over multi-year ice (15-22%) are 1.6 times larger than over first-year ice (9-14%). The enhanced offsets reflects both stronger sublimation and overall lower snowfall over multi-year ice (11.43 cm SWE) compared to first-year ice (12.64 cm SWE).

The strong influence of multi-year sea ice noted by Li et al. (2025) is likely more a consequence of the prevailing meteorology than of ice type alone. As storms transit the North Atlantic and enter the Arctic, they generate strong north-northwesterly winds in their lee. At Svalbard, these winds transport air from multi-year ice regions toward the archipelago.

Discussion of our results in the context of first- and multi-year ice, with reference to Li et al. (2025), have been added surrounding the updated figures.

Regarding blowing-snow sublimation modelling (lines 103-105), a recent study by Huang et al. (2025) suggests that snow particle fragmentation within the saltation layer may significantly influence the sublimation flux. Huang, N., Bao, J., Yu, H., and Li, G.: Snow particle

fragmentation enhances snow sublimation, Atmos. Chem. Phys., 25, 12535–12548, https://doi.org/10.5194/acp-25-12535-2025, 2025.

We have also added additional wording to the Introduction describing the fragmentation pathway and its influence on suspension and sublimation, with reference to Huang et al. (2025).

Re Fig. 1. It would be helpful to include the blowing-snow sublimation flux along the track (together with air temperature and RH_ice curves), along with some discussion.

The suggestion of the reviewer to add additional along-track meteorology and sublimation to the Figure 1 case is also a good one. We have added two new panels: one showing the air temperature and RH ice curves and the second showing the sublimation inferred from ICESat-2 and predicted by SnowModel-LG. To keep the size of the case study figure manageable for the reader, we have split it into two figures: Figure 1 which shows the ICESat-2 backscatter curtain and along-track meteorology and sublimation and Figure 2 which shows the Arctic-wide spatial structure. We have also added discussion of the new along-track panels.

Reviewer 1 technical items:

Line 470: Fig. 5e must be Fig. 5f.

This has been corrected in the revised text and updated to reflect the new order of figures.

Line 491: Fig. 5c must be Fig. 5c.

This has been corrected in the revised text and updated to reflect the new order of figures.

Line 519: Fig. 1b should be 1a?

This has been fixed in the revised text.

Line 540: Fig. 7e should be fig. 7c?

This has been corrected in the revised text and updated to reflect the new order of figures.