Referee comment #1

Thank you very much for your careful review, valuable comments, and suggestions for improvement!

Our response is displayed in regular blue font, while the revised text is displayed in italic font and highlighted in the revised draft manuscript.

Major points:

1. Figure 1: The label "Hobart" is difficult to read on the map, particularly the letter "t". Please move the label of Hobart.

   Response: The position of the "Hobart" label has been adjusted to improve its readability.

2. Figure 3: Please make the analysis period in Figure 3(c) consistent with that in Figures 2(e) and 2(f).

   Response: The analysis period in Figure A1(c) has been revised to match that shown in Figures 2(e) and 2(f).

3. Figure 3: The relationship between cloud phase and temperature in Figure 3 is not sufficiently clear. Adding time–height cross sections of air temperature from the four daily radiosonde observations would be helpful interpretation for reader.

   Response: Radiosonde observations were unavailable during parts of the study period (e.g., 16–17 November 2017 in Figure 2(a)), making it impossible to construct continuous time–height temperature cross sections from the observations. The cloud-phase classification shown in Figure A1 already incorporates ERA5 air temperature as part of the classification procedure, with the −38 °C threshold used to distinguish ice or mixed-phase cloud conditions. We have clarified this in the manuscript.

   Lines 155-157: *The cloud-phase classification incorporates ERA5 air temperature as part of the classification procedure, with the −38 °C threshold used to distinguish ice or mixed phase cloud conditions.*

   Lines 219-220: *The cloud phase is predominantly ice in all three cases (Fig. A1). At temperatures below –38 °C, the homogeneous freezing level, clouds are composed of ice.*

4. Figure 3: It is difficult to distinguish the different categories because several of them are represented by similar shades of blue. Please remove the categories that were not observed and use a more distinct color scheme to improve readability.

   Response: We have removed the cloud-phase categories that were not observed during the study period and adopted a more distinct color scheme to improve the readability of Figure A1.

5. Figure 4: Consider including Casey and Mawson cases for comparison. Because authors focused on Mawson case.

   Response: We agree that a TSI comparison between Casey and Mawson would be of interest. However, the present study is designed as a detailed case study focusing on the Mawson event. In addition, TSI observations for the Casey case are not available for the period considered.

6. Figures 9: Please add a vector scale to Figure 9(a).

   Response: A vector scale has been added to Figure 8(a).

7. Figure 10: Please add satellite time.

   Response: The satellite observation time has been added to Figure 9.

8. Figure 13: For easier comparison, please use the same x-axis spacing in Figures (a) and (b).

   Response: The x-axis spacing in Figures 13 (a) and (b) has been standardized to facilitate comparison.

9. Figures B1 and B2: Please add satellite time.

   Response: The satellite observation times have been added to Figures C1 and C2.

10. Lines 213-215: It would also be helpful to show the full-period results for HFGW at Mawson, similar to Figure A1. Because authors focused on Mawson case.

    Response: The HFGW event at Mawson analyzed in this study lasted only approximately 15 hours, which is considerably shorter than the period presented in Figure B1. Figure B1 was primarily included to demonstrate that HFGWs can be continuously detected by cloud radar when suitable thin ice cloud layers are present. Since the detectability of HFGW signatures depends on the presence and persistence of such cloud targets, a longer full-period analysis is not applicable for the Mawson case.

    Lines 239-240: *The detectable HFGW event at Mawson lasted only approximately 15 hours, and therefore a full-period analysis similar to Fig. B1 is not presented.*

11. Lines 264-274: Previous studies have reported that the ice clouds formation over the Antarctic coastal region can be influenced by the origin and transport pathways of air masses, as revealed by back-trajectory analyses. For example, Sato and Inoue (2023) suggested that the transported midlatitude air masses may contribute to middle tropospheric ice cloud formation at relatively warm temperatures. In contrast, when air masses originate from higher latitudes, supercooled liquid droplets tend to dominate even under relatively cold conditions (Inoue et al., 2025). Please discuss these previous findings for the present results.

Response: We have incorporated a discussion of the influence of air-mass origin on Antarctic coastal cloud phase by citing the studies of Sato and Inoue (2023) and Inoue et al. (2025).

Lines 289-293: *Previous studies have shown that ice cloud formation over the Antarctic coastal region is influenced by the origin and transport pathways of air masses, as revealed by back-trajectory analyses. For example, Sato and Inoue (2023) found that air masses transported from midlatitudes were associated with the formation of mid-tropospheric ice clouds at relatively warm temperatures. In contrast, air masses originating from higher latitudes favored the persistence of supercooled liquid droplets even under relatively cold conditions (Inoue et al., 2025).*

Minor points:

Response: Thank you for these careful editorial comments. We have made all the suggested corrections.

1. Lines 30: 2017, 2016 > 2016, 2017
2. Line 61: RSV is Research Vessel? The term 'RSV' should be written out in full at first use.
3. Line 205: In Fig. 3 (a) and (b) > In Figs. 3 (a) and (b)
4. Lines 210-211: Figs. 2 (e) and (f) > Figures 2 (e) and (f)
5. Line 212: UT > UTC
6. Line 224: Figs. 5(a) and (b) > Figures 5(a) and (b)
7. Line 228: Figs. 5(b) > Figure 5(b)
8. Line 230: Figs. 5(e) and (h) > in Figs. 5(e) and (h)
9. Line 231: Figs. 5(f) > Fig. 5(f)
10. Line 298: Figure 11(a) and (d) illustrates > Figures 11(a) and (d) illustrate
11. Caption of Figure 2: from 05:00 UTC to 15:00 UTC > from 04:00 UTC to 18:00 UTC
12. Caption of Figure 4: 2027 > 2017
13. Caption of Figure 13: from 16:00 to 00:00 UTC on 29 December > from 16:00 UTC on 29 December 2017 to 00:00 UTC on 30 December 2017