This manuscript gives an introduction to the quasi-Lagrangian sampling strategy performed during the HALO-(AC)3 campaign in order to study air mass transformations. Some example applications/first results are described, covering the observations during air mass transformation in warm-air intrusion (WAI) and cold-air outbreak (CAO) cases, Arctic cloud and aerosol properties, and measurements of mesoscale divergence and subsidence.
In general, it is a very well written manuscript, providing a good overview of the quasi-Lagrangian sampling strategy and its application. I do have a few specific/minor comments for improving the clarity in some places, apart from these, I believe that the manuscript will be publishable.

Comments:

line 60/footnote: Why do you restrict yourself to marine CAOs? Please explain and mention here.

ll 96-104: As you list previous attempts of Lagrangian measurements: What do these studies tell us here? Was their approach successful, did you copy their approach? Where there issues which you now tried to solve with your approach? What can we learn from these studies which is valuable here?
Listing these is good, but what do they tell us for this study? Is there an added value we can gain from these studies?

line 133: Ehrlich et al., 2024 – as this paper is not yet published, not even submitted, I would strongly recommend to make an according statement here: Ehrlich et al. (2024, to be submitted).

line 134: AWIPEV – abbreviation?

Table 1: Dropsondes used in GTS: Are these taken from the HALO dropsondes only, or is it a mix of HALO and P5 dropsondes?

Section 3.1: Calculation of trajectories: Were these trajectories calculated a) before the flight – used for detailed flight planning, b) during flight, using ‘real’ starting position of the planes – for real-time steering of the planes, or c) after flight – to check whether quasi-Lagrangian sampling has been achieved?
The question is partly answered in the following subsections, but I think it would be good to state this clearly here.

Figure 2: Is HALO’s remote sensing view on the air mass parcels (blue cubes) partly blocked by the P5, as it is flying stacked in between HALO and the air parcel? Or has this been taken into account for the collocated flight planning (e.g. adding a small spatial offset)?

Figure 3: I would recommend to let the aircraft nose point into the direction of flight. E.g. in Fig. 3b it looks as if the aircraft is flying outbound of Kiruna, but I believe, it is on its way back, so the nose should better be pointing towards the right (or downwards right).

ll 266-268: Why treat open ocean and sea ice differently in CAO and WAI cases? Why disregard the cases above sea ice in the former?

Figure 7: There seem to be some white boxes overlaying some of the subfigures: “(a)” and “(b)” is only displayed partly, some of the y-axis annotation of subfigure (b) are partly gone, the indication of cases (e) in subfigure (a) and case (c) in subfigure (b) are only partial.

line 409: “thin ice of nilas” ? What is nilas?

Figure 13: I would prefer if the colour scales also mention what property/variable they are showing. Secondly, the colour scale between subfigure a/b and c looks like it would belong to subfigures a and b, but I believe it does belong to subfigure c? If so, please reorder the figure to make this more clear, maybe place the colour scale on the right hand side of subfigure c? Also, in the figure, I can only spot instances where the occurrences (?) reach about or a bit more than 1000, while the scale goes up to 10000. Is that necessary? Otherwise, I would recommend to not extend so far, then also differences in the 30 – 100 value range (green to yellow transition) would become more visible.
For all three subfigures: please consider changing the colour table ("end the rainbow"): Generally, it is advised to choose colourblind-friendly colour schemes, and the rainbow scheme is unfortunately not one of those (among other shortcomings of this colour table, see e.g. the open letter to the scientific community here: https://www.climate-lab-book.ac.uk/2014/end-of-the-rainbow/).

lines 450-452: How can you be sure that the aerosol particles that were observed below and above the cloud are cloud droplet residuals (CDR)? Or do you mean that you compared the CDR properties (from within clouds) to aerosol properties above and below cloud? Please clarify/rephrase.

Figure 15: How were the size distributions normalised, in what respect?

Figure 17 b-e: While you indicate times for ERA5 in the figure labels, could you also do so for the HALO/P5 lines?
subfigure d) – The label indicates a green colour for the P5, in the plot, I can only find a red line, please check (maybe worth checking all figures again for colourblind-friendliness).

Appendices:
While I understand that these results might be very interesting, the link to the main paper is not clear to me. They get barely mentioned (just in the introduction of Section 4 (" In the three appendices, we add partly preliminary, but nonetheless very interesting supplementary discussion and results from the HALO–(AC)3 campaign"), but seem otherwise disconnected. As the manuscript is already very long, I am not convinced that these appendices are necessary. So, maybe consider removing these. What is their link to the main aim of the paper (quasi-lagrangian observations), and what value do they add in that regard?

Figure 20: A legend would be nice.