

In this manuscript, the authors present a set of datasets providing back- and forward air mass trajectories linked to ARM ground site measurements. The increasing use of Lagrangian analyses for studies of aerosols, clouds and other atmospheric phenomena is highlighted as a growing area of research interest, but performing these studies requires knowledge of trajectory models and the data to run them. Providing pre-processed trajectory data connected to ARM products will greatly help expand the ability of researchers to perform these analyses, as well as help improve the reproducibility of these studies. Overall, the manuscript is clear and well written, and the datasets are easy to access.

The authors present a number of case studies which are clear and provide good examples of the intended use cases for each of the separate trajectory datasets. However, while the issues of uncertainty in Lagrangian trajectories are mentioned in the manuscript they are not discussed in detail. With the long time-span of some trajectories, I would expect that the uncertainty becomes large in many cases and so care needs to be taken. As these datasets are intended to be used by researchers who may not have personal expertise in Lagrangian trajectory modelling, I think it would be particularly important to include a discussion on uncertainty and under what conditions the trajectories are expected to be more or less reliable. An additional section explaining these issues, possibly along with some supplementary figures, would greatly enhance the manuscript.

Specific comments:

Table 1: The “Initialized at” column for the ARSCL trajectories is a little difficult to parse, I suggest changing to “11 equally distant heights between the hourly mean cloud base and top for the lowest (typically primary) cloud layer”.

Line 65: How does the vertical resolution of the ERA5 pressure level data affect the accuracy of the trajectories? Is it sufficient for more unstable conditions, particularly within the PBL? I am aware however that ERA5 model level data can't fit within the ARL files used by HYSPLIT, so it might not be possible to resolve this issue.

Line 110: This mentions tests performed to evaluate the uncertainty of longer back trajectories, but are not shown. It would be very nice to have these tests included as supplementary materials.

Line 219: For clarity: “we limit ourselves to exemplify 4 short analyses” -> we limit ourselves to four short examples

Line 229: Correction: “collimated” -> collocated

Figure 2: The shading along the trajectories in the middle and right figures is difficult to see. It may be clearer to present these as simple time series plots with the leftmost panel showing the spatial extent of the trajectory. More descriptive colorbar labels (e.g. “Hourly mean air temperature [°C]”).