Review of

A Database of Aircraft Measurements of Carbon Monoxide (CO) with High Temporal and Spatial Resolution during 2011 – 2021

by Xue et al.

The manuscript presents a dataset of high-quality, airborne carbon monoxide measurements. The dataset is based on seven aircraft campaigns and two intercontinental flights with five campaigns over Europe and two campaigns over Asia and Africa, respectively. While the data set is relatively small and limited in terms of temporal and spatial coverage, it is of interest for studies of atmospheric transport and chemistry that require high-resolution and precise measurements. I recommend publication after the following comments have been addressed.

Major comments:

The presentation of the data needs to be improved. At the moment the manuscript includes a large number of figures of different quality and resolution. Presentation of all flight tracks in individual figures and in one figure combined seems not necessary. In addition, the presentation of the flight tracks on top of the Google maps shows poor quality for some of the campaigns with low resolution and strangely enlarged or stretched fonts. My suggestion would be to remove the individual campaign flight plots and to either have one very much improved version of Figure 22 or to replace Figure 22 with a scientific style map plot that shows the individual campaigns.

The 3D flight track plots (color-coded by the CO measurements) are interesting but need to be improved and made consistent. Some are missing the vertical axis. Some have black surface lines for the flight tracks, while others don't.

Please make it clearer (one to two sentences in each case is fine) why a particular flight is shown for a campaign by explaining the motivation to present this example.

The manuscript needs an improved conclusion and summary section. It would be valuable to highlight which campaign is typical for particular conditions discussed in the manuscript (anthropogenic emissions, clean background air, ship emissions, convection, wildfires etc.). Please also explain here which campaigns have already been used for either model evaluations or comparisons to satellite measurements.

It would be helpful for interested readers to also point out sources of other airborne, high quality CO measurements (e.g., US campaigns, balloon-borne measurements etc.).

Minor comments

Line 37-39: Please rewrite sentence, as it is hard to understand.

Line 54: Not sure what 'atmospheric dynamics … could be achieved' is supposed to mean.

Line 63: What target regions are meant here? Is this supposed to be the upper troposphere in general or some very specific regions?