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Interactive comment on “Tracer study to estimate the transport of cruise altitude aviation emissions in Northern Hemisphere” by Lakshmi Pradeepa Vennam et al.

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Comment: The authors may be interested in an earlier tracer study of aircraft emissions that seems relevant for the current study:

Forster, C., A. Stohl, P. James, and V. Thouret (2003): The residence times of aircraft emissions in the stratosphere using a mean emissions inventory and emissions along actual flight tracks. STACCATO special section of J. Geophys. Res. 108, 8524, doi:10.1029/2002JD002515.

Response: We thank the reviewer for pointing us to this tracer study of aircraft emissions. Forster et al., studied the residence times of aircraft emissions in the stratosphere using a mean emissions inventory in the North Atlantic Flight Corridor (NAFC). The authors comprehensively described the residence time using the NO_x passive tracer age and also showed the difference between using mean emissions inventory and inventory along actual flight tracks. While Forster et al., studied a very important topic it is slightly different from our study in some aspects:

- 1) Our study focused on the tracer mass that reached the surface from the cruise altitudes due to transport
- 2) We used highly resolved aircraft emissions and looked at the entire northern hemisphere rather than just the Atlantic corridor.
- 3) We discussed the overall vertical profile of the tracer in the 3-month model simulation time and how it is varying seasonally
- 4) We also showed how the tracer contributions are varying at three sub-regions (Tropics, sub-tropics and arctic)
- 5) Finally we discussed the CAAE tracer source-receptor relationships at North America (NA), Europe (EU) and East Asia (EA) regions near the surface.

Based on our reading we agree that it is a relevant reference for our present study, so included it in the revised manuscript and added the following lines “*Another study (Forster et al., 2003) investigated the residence times of the North Atlantic Flight Corridor (NAFC) using a Lagrangian dispersion model and showed that the stratospheric emissions are transported in northeasterly directions with maximum flux occurring near Europe and North Africa, however this study focused only on the NAFC and used a mean emission inventory*”.