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Atmospheric Chemistry and Physics Discussions

# *Interactive comment on* "Transport of anthropogenic emissions during ARCTAS-A: a climatology and regional case studies" *by* D. L. Harrigan et al.

**Anonymous Referee #2**

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General Comments:

The paper presented a sound study of the atmospheric transport of anthropogenic emissions during ARCTAS-A as a part of IPY. This study combines the derived climatology of atmospheric transport from Asia, North America, and Europe and regional case studies. The authors documented the uniqueness of the study, and reflected the important findings of previous investigations done by others. Thus, this study provides substantial contributions to a better understanding of transport of anthropogenic emissions to the Arctic atmosphere. Proceeding from that I strongly recommend to publish the paper with the following minor comments addressed by the authors.



Minor Comments:

P.5441 L.8-10: "Although . . . , trajectories were more appropriate for the applications . . . " Please briefly explain in text why trajectory analysis is more appropriate for this study than Lagrangian particle dispersion models.

P.5441 L.21-23: As I understand, trajectories were released daily at 2 pm from areas of interest. Why specifically 2 pm was chosen? Would it be a better way to derive a transport climatology using trajectories released, for example, 4 times a day?

P.5443 L.19-20: Please explain why ozone depletion episodes at low altitudes were excluded from this study and how it would affect the results and conclusions.

P.5444 L.20-21: ". . . , and one distinct pathway is evident." Based on my visual inspection on Fig. 4b, I could not clearly identify the mentioned pathway. And it's difficult for me to identify pathways from Fig. 9b for North America and Fig. 13b for Europe too. Would it be possible to improve these figures to make pathways more distinguishable? Although it's challenging to show pathways in one single plot, the authors may want to try reducing the dot size or providing individual plot for each pathway as supplementary material to this paper.

P.5447 L.1-6: Why C2Cl4 and HCFC-22 were excluded from the correlation analysis?

P.5453 L.28-P.5454. L.1: "Although a few . . . , the majority . . . " Please quantify the numbers of trajectories in the above two categories.

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Interactive comment on Atmos. Chem. Phys. Discuss., 11, 5435, 2011.