

Interactive comment on “Source attribution and interannual variability of Arctic pollution in spring constrained by aircraft (ARCTAS, ARCPAC) and satellite (AIRS) observations of carbon monoxide” by J. A. Fisher et al.

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Received and published: 15 January 2010

We thank Dr. Deeter for his interest and comments. We have expanded our discussion of AIRS CO to include more information on use in the Arctic. We now state in Section 5:

“AIRS version 5 total column retrievals for 2003-2007 have been validated against FTIR data at three high latitude sites and show excellent agreement (Yurganov et al., 2009). At Ny Alesund (80°N), the mean annual bias is near zero. Mean bias is also near zero at Kiruna (68°N) and Harestua (60°N) for DOF for signal greater than 0.7, but negative

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biases are observed at lower DOF. Overall, northern hemispheric AIRS total column observations in April show an 8% negative bias relative to FTIR data. Validation of AIRS CO retrievals in the northern hemisphere with aircraft in situ profiles indicates AIRS is biased approximately 10% high from 300-900 mb with little quantitative sensitivity to the boundary layer, like all thermal IR sounders (McMillan et al., 2009). In the Arctic, this lack of sensitivity may be compounded by the cold surface. We therefore expect AIRS to be capable of identifying transport to the Arctic in the mid-troposphere but not at low altitude, and test this below with two case studies of pollution plumes observed by ARCTAS.”

With regards to the averaging kernels, we specify “The column sensitivity as indicated by the averaging kernels is low in the boundary layer and has a broad maximum at 300-600 hPa.”

With regards to our data thresholds, we have added the following: “These thresholds eliminate on average 20% of the available daytime observations globally and 25% in the Arctic in April.”

Interactive comment on Atmos. Chem. Phys. Discuss., 9, 19035, 2009.