Atmos. Meas. Tech. Discuss., 2, C847–C849, 2009
www.atmos-meas-tech-discuss.net/2/C847/2009/

Atmospheric Measurement Techniques Discussions

Interactive comment on "Four Fourier transform spectrometers and the Arctic polar vortex: instrument intercomparison and ACE-FTS validation at Eureka during the IPY springs of 2007 and 2008" *by* R. L. Batchelor et al.

Anonymous Referee #2

Received and published: 30 November 2009

General:

The authors present an intercomparison study of three groundbased and one spaceborne IR sun occultation interferometer regarding the stratospheric trace gases O3, HCl, ClONO2, HNO3, and HF at high northern latitudes.

Since this work shows new results together with an investigation of the relevant coincidence criteria to be applied for situations near the vortex boundary, it is suited for publication in AMT – after the following comments have been addressed sufficiently.

Specific:

p. 2887, l. 16:

The definition of the resolution of ACE-FTS and PARIS-IR (0.5/MOPD) is not compatible with those for the other two instruments (1/MOPD). This should be corrected.

p. 2888, l. 10: 'the satellite borne spectrometer has considerably more vertical resolution'

Perhaps better 'due to the limb-sounding geometry, the satellite borne spectrometer has considerably better vertical resolution'.

p. 2889, l. 3:

Could you add the information, which pressure/temperature profiles have been chosen for each instrument?

p. 2892, l. 24: 'show excellent agreement'

'excellent' should be substituted by a more quantitative measure (e.g. give % difference)

p. 2894, l. 12-24:

The explanation of the fact that after smoothing, the ozone column densities of the high-resolution instruments fit much worse to the PARIS-IR is very vague and, thus, needs more investigation. I would suggest to use the higher-resolution result profiles for ozone of the DA8 and the 125HR as a-priori for PARIS-IR retrievals. These retrievals should be done with a scaling factor, not to change the shape of the profiles with altitude. This scaling factor should stay close to one in case the profile shape is responsible for the deviation between the instruments. This would also help to overcome possible effects of saturation within the spectral window used for ozone retrieval, since the smoothing approach is strictly only valid for linear cases.

p. 2895, l. 7: 'Following standard conventions'

Could you explain more clearly what 'standard conventions' mean. Could you e.g. cite a publication which show that these conventions are valid for some situation/geographical region.

p. 2895, l. 13: 'was interpolated to the 38-layer altitude grid'

How has the interpolation been performed?

p. 2899, l. 8:

However, the standard deviation of ClONO2 is worse. Can you try to explain why?

p. 2899, l. 8:

A figure like Fig. 5 should be given for the stricter match criteria.

p. 2899, l. 11: 'the difference between the measurements is zero to within one standard deviation', and p. 2899, l. 13: 'within one standard deviation'

This would be valid, if the standard deviation given in the table is really the standard deviation of the mean of the differences (i.e. the standard deviation of the ensemble of differences divided by sqrt(n)). Could the authors confirm this and state it clearly in the text?

Interactive comment on Atmos. Meas. Tech. Discuss., 2, 2881, 2009.