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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Validation of HNO_3, $ClONO_2$, and N_2O_5 from the Atmospheric Chemistry Experiment Fourier Transform Spectrometer (ACE-FTS)" *by* M. A. Wolff et al.

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“Validation of HNO3,CLONO2, and N2O5 from the Atmospheric Chemistry Experiment Fourier Transform Spectrometer (ACE-FTS) ” by M. A. Wolff et al.

This paper presents comparisons between ACE-FTS measurements of HNO3,CLONO2, and N2O5, and measurements from a variety of other instruments, having as much temporal and geo-graphical overlap as possible. The various observation techniques, the criteria for ‘coincidence”, and the comparison methods are clearly described. In general, the comparisons show good agreement. Overall, this careful and detailed work in a well-written paper should be

published after minor revision. Details will be found below.

Recommendations:

1). In the comparisons with satellite data, I believe the authors need to show the combined instrument errors, e.g. the mean of quadratically combined ACE-FTS and SMR total (systematic plus random) errors.

2). MIPAS ESA and MLS/Aura data are retrieved at pressure coordinates. Their comparisons with ACE-FTS in Figs 4 and 6 are in altitude coordinates. How did you complete the transformation? In some cases, it is not a straightforward matter. For example, the ESA MIPAS altitude registration uses the so-called engineering data and has known errors (e.g. Wang et al.: Validation of stratospheric temperatures measured by MIPAS on ENVISAT, J. Geophys. Res., 110, D08301, doi:10.1029/2004JD5342, 2005). To avoid the influence of the error in the ESA MIPAS altitude registration, it is strongly suggested that the comparisons should be conducted in pressure coordinates. This can be easily done for ACE-FTS since it retrieves altitude and pressure simultaneously. This issue should be addressed properly.

3). The comparison with FIRS-2 (section 5.3, Fig. 14) has only a single profile, and shows large differences, in particular for CLONO2, and N2O5 with the unknown reason. Is it necessary to present it here, at least for CLONO2, and N2O5?

Minor Changes in Fig. 2:

Figure Caption: “ACE-FTS and SMR and”, delete the second “and”. Also, “using Eq. (2)”, should be (3) or (4).

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