Atmos. Chem. Phys. Discuss., 11, C15167–C15168, 2012
www.atmos-chem-phys-discuss.net/11/C15167/2012/

Atmospheric Chemistry and Physics Discussions

Interactive comment on "Total depletion of ozone reached in the 2010–2011 Arctic winter as observed by MIPAS/ENVISAT using a 2-D tomographic approach" *by* E. Arnone et al.

T. von Clarmann

thomas.clarmann@kit.edu

Received and published: 7 February 2012

1. On page 33194, line 23 the authors state that GMTR retrievals are more suitable under vortex conditions than other codes. GMTR, however, assumes that all measurements are taken in the orbit plane, while close to the poles the azimuth angle of the line of sight causes measurements being taken significantly outside of the orbit plane. Doesn't that mean that GMTR is particularly suitable for measurements near the equator where the underlying assumption is fulfilled but less suitable for polar regions where this assumption does no longer hold?

2. Same place: I find the way how the Kiefer et al. paper is referenced a bit mis-

leading: One of the main conclusions of the Kiefer et al. paper is that the problem of horizontal structure is largely remedied by considering horizontal temperature gradients in the otherwise 1-dimensional radiative transfer calculations.

3. Same place and page 33196 line 27: Polar vortex conditions are characterized by small-scale structure. The horizontal information smearing of one-dimensional reduced spectral resolution MIPAS retrievals, evaluated by means of horizontal averaging kernels (von Clarmann et al., 2009a) is for most species and altitudes, according to Table 2 of von Clarmann et al. (2009b), less than the horizontal spacing of the limb scans which is 410 km. This implies that the horizontal resolution is limited by the horizontal sampling. In GMTR, the horizontal grid has a spacing of 5°, corresponding to far more than 500 km. This means that the horizontal resolution of GMTR is actually inferior to that of 1D-retrievals. Isn't this in conflict with the statement (which is repeated on page 33196, lines 10-14) that GMTR is particularly suitable for polar vortex obervation?

References:

von Clarmann et al., The horizontal resolution of MIPAS, AMT, 2, 47-54, 2009a.

von Clarmann et al., Retrieval of temperature H_2O, O_3, HNO_3, CH_4, N_2O, $ClONO_2$ and ClO fom MIPAS reduced resolution numinal mode limb emission measurements, AMT, 2, 1-17, 2009b.

Interactive comment on Atmos. Chem. Phys. Discuss., 11, 33191, 2011.