Atmos. Meas. Tech. Discuss., 4, C1548–C1550, 2011
www.atmos-meas-tech-discuss.net/4/C1548/2011/

Atmospheric Measurement Techniques Discussions

Interactive comment on "Global and long-term comparison of SCIAMACHY limb ozone profiles with correlative satellite data (2002–2008)" *by* S. Mieruch et al.

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Received and published: 8 September 2011

1 General Comments

This paper presents a comprehensive validation study based on ozone profile data from different satellite instruments and a trend estimation for the period (2002-2008). The first issue is essential to get knowledge on the quality of longer (few years) data series from these instruments. The second issue shows the limitations of trend analysis for ozone if time series are too short. Limb scatter ozone profiles from SCIAMACHY on Envisat are compared with measurements from MLS on Aura (since 2004), SABER on TIMED (since 2002), SAGE II on ERBS (1984–2005), HALOE on UARS (1991–2005),

and ACE-FTS aboard SCISAT-1 (since 2004). The satellite instruments and their measurement techniques are briefly introduced in an overview. Valuable ball-park numbers from previous comparisons are given for each instrument. Previous work generally is well represented and the new results are well put into the context of existing research. Section 3 investigates the pre-processing of the different data sets, followed by comparisons of SCIAMACHY with other measurements. Finally a statistical hypothesis testing is used to judge upon the significance of differences. The statistical methods and assumptions are valid and clearly presented. The trend estimation is summarized in Section 4, which includes significance tests of the trends and the comparison of trends between independent space-borne observations. The outline of the paper is generally good. For the most part, presented facts support the conclusions. It rapidly gives a good overview over most ozone measuring satellite instruments, their data series and their consistency. Overall this is a good paper with important results. With minor revisions, I think the paper is suitable for publication in AMT.

2 Specific Comments:

The section on data processing describes that in some cases original data from other instruments are not available in the needed number densities as retrieved by the SCIAMACHY-instrument. For this conversion auxiliary data (temperature, pressure, height) have to be included. Since these data also include errors, additional errors are introduced into the transformed ozone data. How large are these errors?

Figures 2 and 3 reveal larger discrepancies of the SCIAMACHY data below 20 km, with a core area in the tropics. However, this is extended to 30-40degrees outside the tropics, especially into the N.H. Since the lower stratosphere and these latitudinal belts are very important for the ozone budget, the text and the quotation on page 4880 (repeated in the second para of the summary) is very poor.

3 Technical Comments

page 4874, line 14: replace "satellite" by "satellite instrument"

page 4877, line 14: replace “right” by “bottom”

Interactive comment on Atmos. Meas. Tech. Discuss., 4, 4867, 2011.