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Atmospheric Measurement Techniques Discussions

Interactive comment on "Mobile MAX-DOAS observations of tropospheric trace gases" *by* T. Wagner et al.

T. Wagner et al.

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Reply to the comments of anonymous Referee #2

First of all we want to thank this referee for the positive assessment of our manuscript and the helpful comments. We followed them as outlined in detail below.

'Mobile MAX-DOAS observations of tropospheric trace gases' by Wagner et al. describes a new analysis technique for MAX-DOAS measurements made from mobile platforms. The technique is discussed in detail and then applied to measurements made from a car driven from Brussels to Heidelberg. The standard MAX-DOAS technique usually applied cannot be used here since the airmass can change rapidly during

a typical MAX-DOAS scan (elevation angle sequence) and therefore using e.g. the 90 SZA measurement of each scan as a reference becomes very problematic. Instead the authors propose to use a single reference spectrum for the whole measurement period and to correct for the reference and stratospheric contribution by deriving the necessary correction from the measurements themselves. As far as I am aware, this is a new and innovative approach for the analysis of MAX-DOAS observations. The paper is well written and the material clearly suitable for AMT.

Specific comments: Abstract, 1 sentence: either needs a comma after ': : : DOAS observations' or should start with 'Information on : : : can be obtained from Multi-Axis (MAX-) DOAS observations'.

Author reply: We added a comma as suggested.

Page 2853, line 22: Suggest to replace 'Besides : : :' with 'Apart from : : :'

Author reply: Changed.

Page 2859, Eq 10: should be DSCD_trop and not DSCD_trops

Author reply: Changed.

Page 2865, line 24: I assume LT stands for local time, should be mentioned somewhere

Author reply: We removed 'LT'.

Page 2865: The tropospheric NO2 VCD time series measured at 22 deg elevation angle: what altitude range is the VCD calculated for? This would be helpful to know to be able to convert to mixing ratios.

Author reply: Unfortunately, from the high elevation angles, no information on the height of the NO2 layer can be obtained. Thus we can not give any value for the altitude range. We made this point more clear in section 2, where we added the following sentence after the introduction of the tropospheric VCD: 'The tropospheric VCD contains information on the integrated trace gas concentration for atmospheric layers close to the

surface. Above about 2km, the measurement sensitivity gradually decreases, depending mainly on wavelength, elevation angle and the atmospheric aerosol load (see e.g. Wagner et al. [2007a]).'

Caption of Fig 2: 'driving route': either delete 'driving' or change to 'road route'.

We removed 'driving'

Caption of Fig 4: words after Eq. (11) should not be capitalized. Author reply: Changed.

Interactive comment on Atmos. Meas. Tech. Discuss., 2, 2851, 2009.