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Atmospheric Chemistry and Physics Discussions

Interactive comment on "High spatial resolution measurements of NO_2 applying Topographic Target Light scattering-Differential Optical Absorption Spectroscopy (ToTaL-DOAS)" *by* E. Frins et al.

Anonymous Referee #1

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The manuscript by Frins et al. presents a new setup of Total-DOAS for NO_2 measurements. The ideas of Total-DOAS are based on the findings in a previous paper by the same authors (Frins et al., 2006). The new aspect of the manuscript at hand is the use of Total-DOAS at short light paths in a polluted environment. The current study contains 8 measured data points only. These are not compared to any other NO_2 measurement technique. In addition, there is no information about meteorology or trace gas concentrations available which allows the reader to assess the presented data. It is not clear to me what causes the variation of the 8 values recorded during a 1-h time

interval.

The term *"High spatial resolution"* in the title refers to the possible measurements of small absorbances. The error in the slant column (Table 1) is $3.6 \times 10^{14} \mathrm{cm}^{-2}$ only, corresponding to an absorbance of about 10^{-4}. This value should be justified (e.g. by a plot of the residual) and discussed on the basis of the findings of Stutz and Platt (1996). The discussion on the influence of the extension of the NO_2 cloud (Figure 3a-d) is vague and not supported by any measurement like meteorology or trace gas concentrations at the instrument S or at the target T.

I do not recommend to publish the current manuscript in ACP. However, the Total-DOAS technique can become a valuable tool for measurements of NO_2 and other trace gases when the pros and cons of the technique are discussed on the basis of a more conclusive dataset.

References

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Stutz J. and Platt, U.: Numerical analysis and estimation of the statistical error of differential optical absorption spectroscopy measurements with least-squares methods, Appl. Opt. 35, 6041–6053, 1996.

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 10257, 2008.