Atmos. Meas. Tech. Discuss., 8, C230–C232, 2015
www.atmos-meas-tech-discuss.net/8/C230/2015/

Atmospheric Measurement Techniques Discussions

Interactive comment on "Tropospheric nitrogen dioxide column retrieval from ground-based zenith-sky DOAS observations" *by* F. Tack et al.

Anonymous Referee #2

Received and published: 2 March 2015

Review of Tropospheric nitrogen dioxide column retrieval from ground-based zenith-sky DOAS observations Tack et al.

This paper is describing a new algorithm for measuring tropospheric NO2. The paper contains strong emphasis on the error analysis. This emphasis is negated by the use of a scalar radiative transfer program instead of a vector program for sky radiances. The authors need to demonstrate that the scalr errors are much smaller (doubtful) than the measurement errors described.

Below is a partial review pending a discussion of the use of a scalar radiative transfer calculation. In my opinion, the measurement portion of this paper is good, but the analysis using LIDORT should be justified.

Minor errors P938 L4 In the case of GB ZS-DOAS <change to> In the case of the GB ZS-DOAS

P938 L14 Since more than three decades -? For more than three decades

P938 L23 increasing therefore the <change to> increasing, therefore, the

P940 L5 10 June to the 21 July 2009 <change to> 10 June to 21 July 2009

P940 L23 Gaussian? Did you measure this or assume the shape?

P941 L4 The con?guration of the instrument allows to <change to> The con?guration of the instrument permits measurement of

P942 L11 is given here while the <change to> is given here, while the

P942 L9 Is the use of QDOAS the source of the Gaussian slit function?

P942 L16 They account for respectively the <change to> They account for, respectively, the

P942 L25 expressed as SD <change to> expressed as standard deviation SD

P943 L19 What is the effect of using a scalar RT that neglects polarization? The slant optical depth should be in error.

P946 L5 LIDORT is a scalar radiative transfer program, so it has the same problem

P948 L7 the opposite of the y-intercept <change to> the negative of the y-intercept

P949 L1 The photochemical model has its own unquantified uncertainties. For polluted areas, the difference between 6.2 $\times$ 1015 and the diurnal variation is small compared to the tropospheric values. The value 6.2 $\times$ 1015 seem high for extrapolation to zero AMF. The authors need to comment on this.

P952 L22 troposphere is decreasing fast <replace with> troposphere is decreasing rapidly