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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 #1

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The paper introduces a new method to retrieve the trop. NO2 column based on the ZS DOAS measurements. The performance of the method is validated by comparisons between the trop. NO2 VCDs obtained from the other techniques (e,g., MAX-DOAS, SAOZ, DS-DOAS) and those from this new method. The paper is well structured and carries informative contents to many scientists in the similar fields. However, some important revisions need to be conducted in the paper before being published in AMTD.

Comments: 1.Please address the merits of utilizing ZS-DOAS for measurements of NO2 VCD, compared to the other measurement and retrieval methods such as DS-DOAS, PANDORA, MAX-DOAS in INTRODUCTION.

2.Given that MAX-DOAS and ZS-DOAS are both ground based techniques and they

eventually aims to provide the true quantities (trop. NO2 VCD in this present study), I think the agreements are poor between the data obtained from MAX-DOAS and ZS-DOAS in Fig. 7 (b). If the comparisons were made between ZS-DOAS data and the satellite data, the agreements such as R=0.9 and slope=1.0 (slope is very good though) are good enough. I am aware of that MAX-DOAS, which is known to be one of the most sensitive ground based instruments to trop. NO2, also has errors. However, the agreements shown in Fig. 7 (b) are thought to be poor so that I doubt the necessity of the ZS-DOAS for retrieval of trop. NO2 VCDs. Authors need to provide the quantitative reasons that explains the agreements shown in Fig. 7.

3.The similar in-depth expainations need to be given to Fig 7 (a), as well.

Interactive comment on Atmos. Meas. Tech. Discuss., 8, 935, 2015.