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Atmospheric Chemistry and Physics Discussions

Interactive comment on "Validation of OMI tropospheric NO_2 column data usingMAX-DOAS measurements deep inside the North China Plain in June 2006" *by* H. Irie et al.

Anonymous Referee #2

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The focus of this paper is the validation of tropospheric NO2 columns retrieved by OMI over the NCP by two ground based MAX-DOAS systems located at Tai'an and Mt. Tai. The authors have developed their own aerosol retrieval algorithm to determine NO2 AMFs for MAX-DOAS. The retrieved AODs are validated with coincident MODIS measurements with reasonable agreement. To support the MAX-DOAS NO2 measurements a comparison is performed with an in situ chemiluminescence detector equipped with a molybdenum converter. From the OMI validation results the authors suggest that OMI may have a positive bias in the tropospheric NO2 columns over the NCP of 20%, although the data to support the conclusions of the paper are limited to one month which quantitatively reduces the strength of the results. This paper however,

is a valuable and important addition to the validation of NO2 from satellite instruments and should be published with the following revisions.

General comments:

Like reviewer 1, I also feel that the question of often referring to other papers without including the key information in the manuscript needs to be addressed. An explanation of the methods used will improve the manuscript.

The authors use measurements of NO2 from a chemiluminescence detector with a molybdenum converter to validate their MAX-DOAS NO2 VMRs, however, these types of instrument are also sensitive to interferences from NOy species which may result in an overestimation of the in situ concentrations. This needs to be addressed in the manuscript.

Specific comments

P8247, L3-4: This sentence is unclear. It reads as though only one 6-min zenith-sky measurement is made every 30 minutes, however, as a mirror was periodically inserted into the FOV of each telescope there should be five zenith spectrums, one for each viewing angle. The authors should clarify this.

P8250-8251, Section 2.3: Please include a discussion of errors in the OMI retrieval of tropospheric NO2 columns.

P8253, L14: The authors state that the mean MAX-DOAS VMRs at an altitude of 1626ś500m a.s.l. have been used to compare against the in situ measurements, but it is not clear how they obtain this value. This should be clarified here.

P8253, L22-26: This sentence should be re-phrased and the interference from other nitrogen species to the in situ measurements should be addressed.

P8255, L5-7: The authors state that they use a daily mean OMI tropospheric NO2 column to compare to the MAX-DOAS measurements. Previously, in the manuscript,

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OMI is said to only overpass once per day, therefore, the measurement cannot be representative as a daily mean. This sentence should be re-phrased.

In the comparison, are the MAX-DOAS NO2 columns daily means, or the closest coincidence in time? The authors should also state what altitude range they are using here for the comparison. Is it the total MAX-DOAS NO2 column?

P8255, L12-13: I suggest that the authors include the correlation coefficient here.

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 8243, 2008.