

***Interactive comment on “Retrieval of tropospheric  
NO<sub>2</sub> columns from SCIAMACHY combining  
measurements from limb and nadir geometries”  
by A. Hilboll et al.***

**Anonymous Referee #1**

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This manuscript contains a thorough analysis to support the retrieval of tropospheric NO<sub>2</sub> columns by combining measurements from limb and nadir geometries. It makes a strong case for the value of limb/nadir matching over the reference sector method. I recommend publication after considering the suggestions below.

A paragraph should be added that summarizes the limb retrievals of NO<sub>2</sub>. The complexity of these retrievals needs to be conveyed to the reader.

It was surprising to see no mention of the Network for the Detection of Atmospheric Composition Change (NDACC) or solar occultation measurements as a means to un-

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derstand differences between the Oslo CTM2 and SCIAMACHY. Often differences between SCIAMACHY and the CTM were attributed to errors in the CTM because they disagreed with SCIAMACHY (for example in the discussion of the slope of F7). Errors in the SCIAMACHY retrieval could also be responsible. A validation dataset is needed to correctly attribute these differences. This is already a lengthy manuscript. It is understandable that there is insufficient space to introduce a third dataset for comparison. But then the attribution of differences to errors in the CTM should be softened. It would be more accurate to simply state that differences exist.

Many of the differences in F8 follow the pattern of surface reflectance. SCIAMACHY NO<sub>2</sub> tends to exceed that in the Oslo CTM2 over bright surfaces, e.g. snow covered regions in Feb, deserts in July. Could errors in the SCIAMACHY NO<sub>2</sub> retrieval be responsible?

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Interactive comment on Atmos. Meas. Tech. Discuss., 5, 5043, 2012.

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