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Comment

Interactive comment on “SO₂ Retrieval from SCIAMACHY using the Weighting Function DOAS (WFDOAS) Technique: comparison with Standard DOAS retrieval” by C. Lee et al.

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In the paper, we have focused on removing constant and latitudinal offsets in the retrieved SO₂ slant columns, which could be due to imperfect correction for the varying ozone dependence of the Ring effect. To account for the temperature dependence of the ozone absorption cross sections in the retrieval, we have used ozone climatology of ozone and temperature profiles. We have not created the global climatology of SO₂ profiles for the SO₂ weighting function, which could produce the vertical columns of SO₂ through the fit.

The offset in the slant column of SO₂ is dependent on the Ring spectrum which is used in the fit. For Figure 2 and 3, we used the same Ring spectrum in the WFDOAS as

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that of the SDOAS when adopting a single Ring spectrum. Ring spectrum in online Ring spectrum calculation (ORSC) is calculated as a function of total ozone column including ozone profile shape, solar zenith angle, surface albedo, altitude, and satellite viewing geometries, as described in section

Slant column fitting errors in WFDOAS retrieval are at level similar to those in SDOAS retrievals. The fitting error is associated with low radiances measured by SCIAMACHY at shorter wavelengths and/or high ozone (or high solar zenith angle). The measurement of low radiances leads to the uncertainties in SO₂ retrievals. The error due to low radiance measurement is at level higher than the typical signals from anthropogenic SO₂ pollutions, and is higher at higher ozone amounts and solar zenith angles, which are typical at the high latitude regions.

In the revised manuscript, "Slant column fitting errors (about 100 - 200% relative errors) in WFDOAS retrieval are at level similar to those in SDOAS retrievals and could be associated with the intrinsic measurement noise of SCIAMACHY. The fitting errors are related with low radiances measured by SCIAMACHY at shorter wavelengths and high solar zenith angle (or high ozone). The measurement of low radiances leads to the uncertainties in SO₂ retrievals." has been added in section of Conclusions.

Interactive comment on Atmos. Chem. Phys. Discuss., 8, 10817, 2008.

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