

## ***Interactive comment on “On-orbit radiometric calibration of SWIR bands of TANSO-FTS onboard GOSAT” by Y. Yoshida et al.***

**Anonymous Referee #2**

Received and published: 29 August 2012

This manuscript describes a method to derive the radiometric degradation of GOSAT short-wave-infrared spectra from solar calibration measurements. The strength of the method is that it takes into account wavelength and polarization dependence of the degradation and it is shown that this new degradation model eliminates an increase in  $\chi^2$  of the fit to the O<sub>2</sub> A Band spectra and radiance adjustment factors with time.

This manuscript is well presented and well written. It deals with a relatively specific, but still very important issue. From my point of view, the manuscript would have been benefited from a more in-depth discussion in the conclusion section (e.g. are there lessons learned for other satellite missions) and from a more detailed discussion on the impact on the XCO<sub>2</sub> or XCH<sub>4</sub> retrievals (as this is what most readers will be interested

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in). I would like to suggest to the authors to consider this but if the authors do not want to make these changes then I would also be fine if the manuscript is published in AMT after addressing my comments below.

Comments:

p.4712, L5: spectrum -> spectra

p.4713, L17: precise -> accurate

p.4713, L22: Further -> Furthermore,

p.4713, L28: clarified -> evaluated

p.4714, L5: Residual spectrum in Figure 2b shows large structures. It might be worthwhile to mention that these systematic structures are mostly related to shortcoming in the spectroscopy of O<sub>2</sub>.

p.4714, L10: Rough spectra -> what is that?

p. 4715, L.13: atmospheric oxygen -> atmospheric molecular oxygen

p. 4715, Eq. 1: Please discuss this equation in more detail, eg.  $R^2$  term is to take into account the variable solid angle of the Sun

p. 4715, L27: reflectance  $r$ . Please point out that you make the assumption that  $r$  is not time-dependent itself.

p.4716, Eq.2: The constant is only a constant wrt to  $\theta$ , but it is still a function of time and wavenumber

p.4718, Eq.6: say that  $d, e, f$  are constants that are fitted.

p.4718, Figure 8: Could you describe in more detail what the figure shows and what it tell us.

p.4719: section 4.3: Could at least give some indication by how much the retrieved

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XCO<sub>2</sub> will change due to the new degradation correction. Otherwise, readers will not be able to assess the importance of this new degradation correction.

p. 4723, table 1: Define the angle  $\theta$ (SES) in the caption

p. 4731: I find it confusing to give 4 angles at the top of the figure but to show only 3 curves. I would remove the reference angle  $\theta_0$  from the top of the figure and say in the figure caption that the figure gives values relative to a  $\theta_0$  of 33 degrees.

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Interactive comment on Atmos. Meas. Tech. Discuss., 5, 4711, 2012.