

Interactive comment on “The ACOS X_{CO_2} retrieval algorithm, Part 2: Global X_{CO_2} data characterization” by D. Crisp et al.

Anonymous Referee #1

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The paper by Crisp et al. reports on the process of retrieving column averaged carbon dioxide concentrations from measurements of the Greenhouse Gases Observing Satellite (GOSAT). Crisp et al. carefully list all the steps that need to be considered when going from a retrieval algorithm that is well-behaved on synthetic data to real measurements. The manuscript makes substantial use of results published previously by Wunch et al., 2011, and O’Dell et al., 2011, who quantitatively evaluate retrieval performance of the ‘ACOS’ algorithm for real GOSAT observations and simulations, respectively. The study acknowledges contributions from other research groups and summarizes many findings ranging from radiometric calibration issues to spectroscopic modeling and post-processing quality filters. Thus, the present paper reads as a review of how to treat GOSAT measurements.

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Although the paper mostly collects previous findings, I rate the study useful for the atmospheric science community. Researchers aiming at retrieving atmospheric parameters from GOSAT find a well written review here. Therefore, I recommend publication in AMT after correction of some minor technical details listed below. The open-access reviews for the Wunch et al. and O'Dell et al papers cover some more substantial criticism on the methodology and the performance evaluation of the 'ACOS' algorithm.

Minor comments:

p.12, l.9: steps steps -> steps

section 5: Fig. 2b is not discussed in the manuscript.

p.15, l.21: in the in -> in the

p.26, l.11: O2 A-band band -> O2 A-band

p.27, l.13: It is not entirely clear what "B2.8corrected" and "B2.8offset" refer to.

Table 4: What is "outcome"?

Figures: I am afraid that the resolution of most figures is still not sufficient for quality printing. Some figures (eg. Fig. 1, 3, ...) have spurious frames and lines.

Fig. 8, caption: Is Delta-XCO2 really calculated with respect to TCCON? Isn't it with respect to the assumption that the southern hemisphere shows uniform XCO2?

Fig. 10: Some quantities such as "Perr" in the legend lack units. "Blended albedo" is only explained later in the manuscript.

Fig. 12: Panels a) and b) swapped.

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