

Interactive comment on “Retrieval of carbon dioxide vertical profiles from solar occultation observations and associated error budgets for ACE-FTS and CASS-FTS” by C. E. Sioris et al.

Anonymous Referee #1

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This paper discusses alternate method for calculating tangent height (THs), instead of using traditional CO₂ absorption spectra. The subject is important and provides great opportunity of retrieving CO₂ concentrations from the ACE-FTS measurements. However, I am not convinced the presentation method - at the moment the Methods section is too long and the Results section still reads like methods/technical details. I understand the main aim of this journal is measurement technique, but still expect to discuss the results in a tangible way.

I also would like to state that the paper is more technical than I expected while accepting for reviewing, and at times felt my reviews may not the best to evaluate the

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quality of this manuscript. For this I trust the editors will judge my reviews a bit more carefully and the authors will make additional efforts to present their results with better readability, e.g., try to reduce the Method section as much as possible keeping only the essential details for this paper.

Here are some of my comments on the Results section:

First few paragraphs in Page 1716 do not sound like results.

page 1716, line #26-27 : Need to mention what is the actual source of this data? May be even discuss of their salient features supporting your idea of choosing G. C. Toon's data over others.

page 1717, line #18ff : Bit of an odd formulation, first say reliable and then implausible!

page 1719, line #1-4 : cannot understand the link here.

page 1719, line #5 : basically 5 out of 12 month, if you count by number of days each of the 5 campaigns cover about 30 days each

page 1719, para 2 and para 3 : these are not results. more inappropriate when the Methods section is long

page 1719, line #18ff : Why? Is there much difference between the 3 instruments? It could be actually interesting to discuss how different are the 3 data are - e.g., are the differences smaller/greater than uncertainties of your retrievals?

page 1720 (whenever uncertainties are discussed) : isn't 1% bias is significant for CO₂ for improving our understanding of the carbon cycle? It is all the more worrisome because the biases are latitude and height dependent. Please provide justifications what uncertainties are acceptable for the usage of your CO₂ data product.

page 1721, item#4 in Section 4: I think, it is more important if you could tell the readers how important is the choice of a priori was - not interesting to state that a priori did not come from a CTM. I see no scientific merit.

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