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Atmospheric Measurement Techniques Discussions

Interactive comment on "Semi-autonomous sounding selection for OCO-2" *by* L. Mandrake et al.

Anonymous Referee #1

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<General Comments>

The sounding selection is important topic to handle big satellite data. The contents in this paper such as relations between XCO2 deviation, transparency and complexity are important results. However, the description is abstract with only one equation and it is difficult for readers, who are not familiar with data processing. As the paper was submitted to Atmospheric Measurement Technique, additional discussion from atmospheric science point of view is required. Sections 1-3 are redundant or general. Instead, the contents such as section 4.4 and 4.5 should be described in more detail as the global coverage by the satellite remote sensing is the biggest advantage. Major revision is recommended before accepting for AMT.

Brief description of the following description will help atmospheric scientists understand.

(1) OCO-2 processing flow, the reason why OCO-2 processing is time consuming, brief description of the OCO-2 data screening method (very brief summary of O'Dell et al. and Crisp et al.) and what is special for OCO-2 and GOSAT observation compared with other remote sensing are helpful for readers

(2) List of geophysical parameter to retrieve in OCO-2 is helpful. In abstract, authors use "informative". Please clarify the information contents.

(3) After filtering, the retrieved XCO2 value might have bias. Discussion on how to avoid or detect bias is needed. Only clear sky condition, flat surface (no complex surfaces of mountains) and high surface albedo data are retrieved.

Question:

(1) Does transparency of 100% include thick or high cloud cases or pre-screed cases only?

(2) Is there the relationship between CPU time and complexity?

<Specific Comments>

(1) Page 5882, Line 21: What do authors mean "fast"? Is it data processing? Optics F number?

(2) Page 5884 line 25: Brief specify CPU. Is it the same one as described in Page 5894 line 7?

(3) Page 5896, Line 2: Brief explanation why CO2 radio and Delta cloud pressure could be good filter is helpful.

(4) Page 5899, line 4 and Fig. 15: The unfilled region of the Arabian Desert is also due to M gain

(5) Page 5899, Line 6: Are there regions where warn level is 18 or 19?

(6) Page 5899, Line 10: Brief description of the retrieval difficulty of ice regions is helpful.

(7) Page 5899, Line 16: The difference between OCO-2 and GOSAT is not only number of data. The spatial resolution of OCO-2 is much higher and the repeat cycle is much long. The discussion on these differences are scientifically interesting.

(8) Page 5899, Line 24: Definition of agreement will help readers understand.

(9) Page 5900, Line 11: Analytical results of land and sea characteristics should be summarized briefly here.

(10) Tables 2 and 3: “Utility” appears in the first row. “Name” should be in the first row. Or brief definition of “Utility in %” in the caption or footnote without referring to the text is helpful.

(11) Fig. 2: It looks that Fig. 2 was made by using the real GOSAT data. What are the features 1 and 2? Are they CO2 ratio and delta cloud pressure?

(12) Fig. 3: The figure is busy. Upper right table: there are two “low” and two “high” rows. Description of difference between the two is needed. What is the color scale of the lower left side figure?

(13) Fig. 6: The GOSAT day side track is going down toward south-southwest from the North Pole. The authors are discussing day paths only. Is it a nigh path?

(14) Figures 7 and 8: Description of geophysical meaning of complexity of four (Fig.7) and three (Fig. 3) is helpful for readers. Is the MMS value of about 3ppm at 100% transparency the same or larger in other area (land in the northern hemisphere)?

(15) Fig. 15: Brief description how to make Fig. 15 is helpful. Is it made from GOSAT data or simulated samples?

(16) Fig. 16: The definition of the error bars has to be described.

<Technical Corrections>

(1) Figure 5886, line 18: Yokota, 2004 > Yokota et. al., 2004

(2) Fig. 5: The blue bars are difficult to see.

(3) Figures 11 and 12: upper left: hPa > Pa ?

(4) Fig. 14: hPa> Pa?

Interactive comment on Atmos. Meas. Tech. Discuss., 6, 5881, 2013.