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Atmospheric Measurement Techniques Discussions

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

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Question 1 Absolutely no data was processed that did not pass O'Dell's cloud filter. That being said, there are always diffuse or partial clouds that pass the pre-screen. Much of that population is precisely what the filter is working to identify and remove. I have added text to section 2 to make this clearer, thank you.

Question 2 Yes, it will take significantly longer to converge a new filter with a larger complexity N, as it must search for all possible N-tuples. However, once created, the evaluation of the Warn Levels requites no significant CPU time regardless of complexity.

Specific Comments 1 I have replaced the word fast with high data rate

Specific Comment 2 CPU specifications now included, thank you

Specific Comment 3 In the line referenced, additional text has been added refering to their high utility, acceptable interpretability, and low restriction.

Specific Comment 4 Arabian desert note regarding M-gain has been added, thank you.

Specific Comment 5 Warn Level 18 and 19 generally occurs over icy surfaces and especially the poles, where the retrieval algorithm typically fails, though they can occur with a low frequency anywhere on the planet. Text to this effect has been added, thank you.

Specific Comment 6 I would love to give an interpretation as to why icy regions are difficult. I am told by OCO2 personnel I work with daily that it's not fully understood at this time, an open question for the science community. However, it was reassuring that the algorithm detected the known issue.

Specific Comment 7 While the difference between OCO2 and ACOS is certainly much more than mere data volume, these differences will have minimal impact on the algorithm performance. There will still be partially cloudy / diffuse scenes, ice will remain challenging, and aerosols will still obscure sounding veracity. Even the data volume doesn't really affect the algorithm at all, save that section 4.5 is speaking to the mission requirement that 6% (of the total data flow) quality soundings are processed continuously, therefore requiring the use of something like this algorithm. I believe it would confound the issue to elucidate further differences between the missions here.

Specific Comment 8 The text has been altered to make agreement more clear. Thank you.

Specific Comment 9 Added text in the summary reflecting the relative reduction in MMS for land and sea. Thank you. 3 1.2 sea 3.25 1.4

Specific Comment 10 Text describing the column headings in Tables 2 & 3 have been added.

Specific Comment 11 Figure 2 was indeed made using real GOSAT data, but I do not want to confuse the issue by putting the real features on the axis. All that matters is that this is a generic set of two real features demonstrating the effect of a combined complexity two filter.

Specific Comment 12 The Warn Levels are computed using an ensemble (in this case, 2) of Fixed Filters. Thus, two sets of low and high thresholds per warn level. The color scheme in the Desired Spatial Coverage map must of course speak to the sounding density desired in each bin. I have added text to make this clearer to the Figure 3 caption, thank you.

Specific Comment 13 The GOSAT track was taken from the provided dataset by the ACOS team. However, as I am only given valid retrievals, it must be a day track. I cannot comment further.

Specific Comment 14 I have added text interpreting the meaning of complexity four in the graph, thank you.

Specific Comment 15 This is made using actual GOSAT data. I have modified the text to make this clear, thank you.

Specific Comment 16 Added description of error bars, thank you.

All technical corrections have been applied to the paper, thank you. Excellent catch on the hPa -> Pa units. Thank you.

General comment After careful consideration, we must respectfully disagree that more atmospheric science should be put into the paper. This is a technique-focused work describing a general process by which an adjustable filter may be constructed for any instrument possessing many dimensions of metadata for each output value. Although such discussion is of course relevant and interesting to the journal, it would take the form of a second (third, fourth) paper analyzing the atmospheric science meaning of the Warn Levels. However, this understanding is not required in order to obtain the

benefits of the Warn Levels nor implement them, precisely the utility of the method. We prefer to retain the paper's current focus on the technique itself with only suggestions of atmospheric interpretation of the warn levels themselves. This paper also serves to document the Warn Level generation process for ACOS and the coming OCO mission. The atmospheric interpretation mentioned is research not yet done. But the utility of the technique remains true now. It is also true that Referee #2 did not feel any additional atmospheric science was required for the paper.

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