

## ***Interactive comment on “Quality controls, bias, and seasonality of CO<sub>2</sub> columns in the Boreal Forest with OCO-2, TCCON, and EM27/SUN measurements” by Nicole Jacobs et al.***

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We are grateful to referee #2 for constructive suggestions for improvement. The referee's favorable account of the implications of these results for improving satellite data throughput in under-sampled regions and validating EM27 measurements against TCCON are also appreciated and reflect what we had hoped to communicate in this manuscript. In addition, the referee makes a good suggestion to provide a publicly available dataset with Boreal QC filtered OCO-2 data. Major efforts have been put into developing and validating the globally appropriate B9 QC scheme (and subsequent QC releases) for OCO-2 and the Boreal application is a more specific one, so we do not

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think it appropriate to release OCO-2 data with the Boreal QC filtering already applied. However, all of the filtering parameters are defined in Table 1 with names that match their corresponding variables in the OCO-2 Lite files, so an interested group could follow the methods described in this manuscript and code a script to apply the filters to data in the OCO-2 Lite files, either independently or by contacting us to collaborate and share code. All of the referee's recommendations for organizational revisions were implemented with the following details. Page and line numbers refer to the originally submitted discussion paper.

referee comment: "Pages 20/22: combine Figures 11 and 12 into a single figure, to emphasize how the seasonality is introduced by the OCO-2 bias correction."

Figures 11 and 12 were combined into side-by-side boxplots of a similar style to previously numbered Fig. 19 and Fig. 20. As an extension of this change, the color-scheme and formatting of all boxplots, including previously numbered Fig. 15, 19, 20, 22, and 28, were changed to improve clarity and aesthetics.

referee comment: "Pages 23/24/25: in Figures 15/16/17, for consistency with the text, I suggest using the label 'abc' instead of 'bc' when showing the 'with T700' results."

Figures 15, 16, and 17 were relabeled for consistency with the text as suggested.

referee comment: "Sections 4.2 and 4.3: I suggest moving these (and their associated figures) to an appendix, so that the discussion section is more focused on the QC parameters which have a greater impact on the seasonal variability in the XCO<sub>2</sub> biases."

Sections 4.2 and 4.3 were added as appendices and text in the discussion and conclusions was altered in accordance with this change.

referee comment: "Appendix A: a paragraph here which briefly describes how the quality control histograms are used to obtain the QC thresholds would be helpful (the authors may still refer to the O'Dell paper here for further detail)."

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A descriptive paragraph was added to Appendix A describing the QC histograms and giving some brief explanation of how they are used to determine quality control filters.

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