

## ***Interactive comment on “How bias correction goes wrong: Measurement of $X_{\text{CO}_2}$ affected by erroneous surface pressure estimates” by Matthäus Kiel et al.***

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Review of “How bias correction goes wrong: Measurement of  $X_{\text{CO}_2}$  affected by erroneous surface pressure estimates” submitted for possible publication in AMT by M. Kiel et al.

This paper describes some recent refinements in the OCO-2 data processing that led to the generation of version 9 based on version 8 product. It is a must-read for those who use OCO-2 level 2 ( $X_{\text{CO}_2}$ ) products and must understand the data processing and bias correction that has been applied to the data.

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The paper is very clear, straightforward and well presented. It must be published with minor changes at the author discretion.

Minor suggestions : In the abstract (line 4), it is said that the pressure estimate error propagates 1:1 into XCO<sub>2</sub>. As XCO<sub>2</sub> and P<sub>surf</sub> do not share the same unit, it is not clear what that means. Adding the word “relative” may help (ie relative errors in P<sub>surf</sub> translate nearly 1:1 into relative error in XCO<sub>2</sub>)

On a similar subject, in the introduction; line 10, a sentence could be added to state that the error transfer is somewhat expected as the CO<sub>2</sub> measurement is sensitive to a number of molecule that is normalized by P<sub>surf</sub> to deduce XCO<sub>2</sub>

At the end of section 3.1, one could add a sentence to state that, over vegetated areas, one could fear a different CO<sub>2</sub> concentration in the low levels of the atmosphere with an impact on XCO<sub>2</sub> over variable terrain. Thus, an analysis over desert area is preferable as is done in 3.2

P6 line 20. I could not understand the use of an “orbital mean”. What is that exactly, and why this choice rather than some information that is specific to the location and time of the observation?

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