Author's reply to François-Marie Bréon

We would like to thank François-Marie Bréon for helpful comments and suggestions. We will adapt all suggestions in the final version of the manuscript (amt-2018-353).

Point-to-point response to specific comments and suggestions:

Referee: In the abstract (line 4), it is said that the pressure estimate error propagates 1:1 into XCO2. As XCO2 and Psurf do not share the same unit, it is not clear what that means. Adding the word "relative" may help (ie relative errors in Psurf translate nearly 1:1 into relative error in XCO2).

Authors: We will rephrase the sentence in the following way:

"Relative errors in the surface pressure estimates, however, propagate nearly 1:1 into relative error in bias-corrected XCO_2."

Referee: 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 CO2 measurement is sensitive to a number of molecule that is normalized by Psurf to deduce XCO2.

Authors: We will add the following sentence to emphasize the normalization using P_{surf}:

"XCO_2 is the ratio of CO_2 to the dry surface pressure. Any error that does not affect both, the CO_2 measurement and dry surface pressure, in the same way, is expected to propagate into XCO_2."

Referee: At the end of section 3.1, one could add a sentence to state that, over vegetated areas, one could fear a different CO2 concentration in the low levels of the atmosphere with an impact on XCO2 over variable terrain. Thus, an analysis over desert area is preferable as is done in 3.2.

Authors: We modified the sentence in the following way:

"The assumption here is that there are no significant variations in XCO_2 over the field of analysis. This may not be true in regions with large heterogeneous sources (e.g. urban areas) or sinks (vegetated areas) of CO_2."

Referee: 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?

Authors: We added the following sentence:

"The orbital mean is calculated by taking into account all soundings of a particular orbit that are within the latitude and longitude limits of the analyzed scene."