

Worden et al. OCO-2

In addition to the reviewers comments I have some points I would like the authors to address :

I think the paper is interesting and presents a new analysis to look at this type of satellite data. But i think the paper is sometimes hard to follow and could be improved by explaining more precisely/carefully what is done.

- It seems that sometimes slightly different terminology is used for the same thing. This unnecessarily complicates the reading and understanding of the paper. It would be very helpful to stick to the same terminology throughout the paper. (an example : p.8-9 calculated measurement noise, calculated measurement error, measurement uncertainty due to noise, are these all different things or are they indicating the same thing ? If they mean the same thing please use one term)

INTRODUCTION

- The analysis with Ctracker is limited to the US, which means roughly speaking latitudes higher than 30 N. Whereas the OCO-2 data analyses that follows focuses mostly on neighborhoods between 30S-30N. To what extent are the variabilities as obtained for N-America then useful to compare with ?
- p.3,l.16 'while in-situ ...', are these column integrated variabilities or are these in-situ measurements at a certain height or ?
- p.3, l.16 'while in situ and model data ..' what model data do you refer to here ?

OVERVIEW OF THE OCO-2 DATA

- p. 5 I am bit lost now. In the refered document a description is given on the Bias correction for OCO data. Here also corrections are based on the small areas and variability seen within these small areas, and a correction based on main parameters influencing that. Has such a correction already been applied to the data here ? If so, how does that affect the neighborhood analyses here ?

- for which period OCO-2 data is analysed ? I don't think it is mentioned anywhere. I think it should be mentioned quite early in the paper.

EVALUATION OF UNCERTAINTIES

- L17-19, p.5 the data that is used in a neighborhood is presumably taken from one orbit and are thus very close in time ? So never data from different moments in time that happen to fall in the same 100 x10.5 km area are compared as part of one neighborhood ?

- L19-22 p. 5 please provide map to show the locations of these neighborhoods. If not in the paper than at least in the response such that it is visible to interested readers.
- P. 5, l 17-18 I think the basic info to verify the average 190 observations are not in the manuscript. Please provide, and briefly explain why indeed you have ~190 observations per neighborhood on average to work with. Is there also a way that we can understand why you get roughly 39000 neighborhoods to work with ?
- L. 27 mean CO2 column → mean CO2 column in a neighborhood ?
- P. 7 is 'small area' the same as 'small neighborhood' ? if so please use one term throughout the paper.

Minor textual :

- p. 1, l.28, that not well → that are not well
- p. 2, l.16 much much → much
- please change numbering of sections 1.0, 2.0. 3.0, ... to 1, 2, 3.
- p.4, l.3-5, sentence incorrect, please correct.
- p.5, l.1, sentence incorrect, please correct.
- p.5, l. 5-6, include the weblink as a reference : well characterized (ref.).
- p. 10, l. 1, l. 5 Figure 1 → Figure 2
- fig. 5 caption, XCO2 → delta XCO2
- p.15, l. 24 of this of → of this