Referee Report:
Evaluating consistency between total column CO$_2$ retrievals from OCO-2 and the in-situ network over North America: Implications for carbon flux estimation

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1 Overview

In this study, Rastogi et al. reports comparisons of total column CO$_2$ retrieved from NASA’s OCO-2 satellite ($X_{CO_2}^{ret}$) and constructed using a high-resolution regional model ($X_{CO_2}^{sim}$) over North America. The manuscript is very clear and well presented. This manuscript is well within the scope of ACP. I recommend that the manuscript be published in ACP after minor revision.

2 Minor comments

(1) Page 5, Line 119: it is described in the text that $\Delta X_{CO_2,i}^{flux}$ is computed at discrete levels from the surface to 14 km, does this indicate that level $N - 3$ in equation (3), which is the top level used for $\Delta X_{CO_2,i}^{flux}$, corresponds to 14 km? Please clarify.

(2) Page 16: 3.4 Evaluating the OCO-2 bias correction: in examination of residual feature biases, the authors state that there is no significant correlations between $\Delta X_{ret,bc-sim}$ and the listed parameters. However, no data is provided. It would be more informative/quantitative to show at least some typical results of the linear regressions.

3 Technical corrections


(2) Page 5, Line 107: if possible, please provide the version of ACOS used in this study.

(3) Page 9, Line 223: “NOAA’s CarbonTracker-Lagrange”: please provide the version of this model which is used to carry out the simulations in this study.

(4) Page 11, Line 262: “systemic errors as well errors” → “systemic errors as well as errors”.

(5) Page 12, Line 279: “a.s.l.” → “a.s.l. (above sea level)”.

(6) Page 17, Line 333: “$\Delta \Delta X_{ret,bc-sim}$” → “$\Delta X_{ret,bc-sim}$”.
(7) Page 17, Table 4: the value of $C_0$ is missing for each season. If the value of $C_0$ is constant as stated in the text, please fill in this value for each season. Otherwise it may cause confusion to the readers.

(8) Page 19, Line 376: “upper $350 \text{ [h Pa]}$” → “upper 350 [hPa]”
References