

We thank the referee for carefully reading the manuscript and providing valuable suggestions. Please see our responses to the reviewer's comments below.

P12, L13-15

This is a fair point. While we do think that transport uncertainty (transport model spread) is higher over land, which leads to higher transport-driven uncertainty from land samples over land than from ocean samples over oceans, that point has not yet been demonstrated at this point in the manuscript. So we have added a sentence here to say that CO₂ differences are larger over land due to both transport and flux variability being higher over land.

P20, L12-14

We respectfully disagree with the referee here. In these lines we are talking about the uncertainty in inverted fluxes, not differences in the simulated CO₂ fields. We are referring to the higher spread in IS and MBL inversions over land as evidence that transport variability, at least on land, is higher in the PBL than in the total column. We would also like to refer the reviewer to the new IS-LNLG and IS-OG experiments that we have included in the revised manuscript, which explicitly tries to address the impact of coverage versus the impact of total column sampling.

P12, from L16

The referee is correct, we have not defined “venting”, and it is an ambiguous term. Sometimes it means exchange between the PBL and the free troposphere, and sometimes it means inter-hemispheric exchange. We have removed all mention of “venting” and used more exact terms in the revised manuscript. Regarding the comparison between LMDZ and TM5 in NH winter, the referee is right. The surface signal is positive, so the model that has a faster (slower) PBL-FT exchange will have lower (higher) CO₂ near the surface. Since TM5 has lower CO₂ in the continental PBL in the NH winter, TM5's PBL-FT exchange must be higher than LMDZ's. We have corrected this in the revised manuscript.

In figure 3, the positions of PCTM and LMDZ have been exchanged to be consistent with figures B1 and B2, as per the referee's suggestion.

P12, L25

Reference to figure B1 added.

P18, L15-16

The 16-day nadir/glint mode lasted till early July 2015. This information has been added. However, there is no drastic change in the difference between fluxes from nadir and glint inversions after that date, so we only mention this as one of two possible reasons for why nadir and glint-derived fluxes may be different despite no relative coherent bias.

P7, L28

Added “set of”.

Figure 4 (and other similar figures)

The referee is right that our order of regions is not the standard TRANSCOM region order. However, in Figure 4 we are not just presenting the TRANSCOM regions, so we would respectfully suggest that having

the same region order is not crucial. In figures 5 and 6 we **are** presenting only TRANSCOM regions (and their totals), so in those figures we have switched the order to conform to the standard TRANSCOM order.

P20, L34

Change “uncertainty” to “uncertainties” since we are referring to multiple regions.

P21, L20-21

Changed “do” to “does”.

P22, L23-24

That sentence has been fixed, using the singular in all instances and a judicious application of “respectively”.