

Reply on AC2

Mengqi Zhang

Community comment on "Carbon dioxide cover: carbon dioxide column concentration seamlessly distributed globally during 2009–2020" by Haowei Zhang et al., Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2022-215-CC2>, 2022

The authors put a lot of effort into addressing most of my concerns and suggestions. The authors address most of the errors and concerns, especially fixing Equation 1. The author added more validation and analysis content, which greatly improved the quality of the article.

As a community comment, overall, the quality of the article has been greatly improved. I think it meets the basic criteria for publishing on ESSD at least for now.

But some content still needs polishing. I have some suggestions as follows.

On the response of "P4, L105. However, the OCO-2_L2_Lite_FP9r provides data locations that are gradually shifted over time by satellite observations", I already understand what the author wants to convey. But in fact, "the satellite orbit is gradually offset in order to collect more data." is the **Inherent Properties of Sun-Synchronous Orbits(SSO)**. Most polar-orbiting remote sensing satellites, such as Terra and Aqua, opt for SSO orbits, which allow them to image the globe in a single day. For OCO-2, it is also an SSO orbit, but its width is so narrow that it can only detect sub-satellite points (there are also SAM mode and glint mode). **Here I just want to remind, not deny anything.**

If "Fig. 13-1 The distribution of seasonal mean XCO₂ in 2010" is added to the revised manuscript, it is better to replace abcd with the name of the season, or the abbreviation of the month (eg JFM).

If "Figure 16-1 Monthly-averaged XCO₂ validation results for TCCON data and CDC dataset at global mid- and low-latitude TCCON sites from 200906 to 202012." is added to the revised manuscript, it is recommended to check the color fill of the standard deviation. Although readers can understand its meaning, 1x std and 2x std seem to be reversed, maybe it may be a color overlay problem, it is recommended to check, including others.

According to ESSD's publication policy (<https://essd.copernicus.org/articles/10/2275/2018/>,), Acknowledgements should mention the OCO-2 and GOSAT data used in this article, as well as the TCCON data, and other publicly available data used. This is also a general requirement.

Overall, the author has solved most of the problems, and I believe the above comments can better improve the quality of the article. As a community comment, I have no further comments.