



Comment on **essd-2021-247**

Anonymous Referee #2

Referee comment on "An eleven year record of XCO₂ estimates derived from GOSAT measurements using the NASA ACOS version 9 retrieval algorithm" by Thomas E. Taylor et al., Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2021-247-RC2>, 2021

The authors present estimates of carbon dioxide dry air mole fraction, i.e., XCO₂ from GOSAT observations using ACOSv9 retrieval algorithm. The satellite-based XCO₂ product has been validated against TCCON measurements and compared with OCO-2 measurement as well as to the values simulated from a suite of global atmospheric inverse models. Moreover, the evolution of the ACOS L2FP retrieval algorithm has also been summarized along with the comparative results generated using various versions of the algorithm. The GOSAT XCO₂ dataset is important in terms of quality and quantity and a very useful contribution to the carbon cycle community. Overall, the article is well organized, and the writing is clear, albeit with a few instances of wording/grammar issues mostly mentioned by the first referee. I recommend the manuscript for publication in ESSD with a few minor changes in the manuscript.

L28: "TANSO-FTS", the abbreviation is not introduced.

L30-31: Focus of the manuscript is ACOSv9 algorithm that does not deal with CH₄. Is it necessary to mention XCH₄?

L55: "the L2FP retrieval", do you mean L2FP retrieval algorithm?

L71: Add a comma after "In Section 3".

L191: "IDP", the abbreviation is not introduced.

L215: Why were these specific collocation criteria of +/- 2.5 ° Lat and +/-5 Lon selected? Also mentioned by the first referee.

L453: "ACOS GOSAT v9 XCO₂ versus OCO-2", the comparative results can be summarized into a table for the convenience of the reader.