Comment on essd-2021-199
Anonymous Referee #1

Referee comment on "The TROPOSIF global sun-induced fluorescence dataset from the Sentinel-5P TROPOMI mission" by Luis Guanter et al., Earth Syst. Sci. Data Discuss., https://doi.org/10.5194/essd-2021-199-RC1, 2021

General comments:

The researchers accomplished SIF retrieval from the Sentinel-5P TROPOMI mission and provided data with high quality, which expands the application of TROPOMI data in vegetation monitoring. The methods and materials used in the manuscript are reasonable and described in detail, which can support the publication of the dataset. The dataset is accessible and complete, the quality value and retrieval error of the data were fully evaluated. The TROPOSIF product has a high consistency compared with previous SIF products, and the results are reliable. There are only a few questions to be discussed.

Specific comments:

- Line 37 to 42: Since Caltech's TROPOMI SIF product has been proven to be effective, the gaps in previous research and the purpose of this research should be more clearly stated.
- Line 88 to 90: To what extent can the influence of the atmosphere be considered negligible? Can you add a comparison to compare the retrievals using calculated effective atmospheric transmittance and transmittance set as 1?
- Figure 8: Previous SIF products have shown a tendency that SIF magnitudes decrease with narrower fitting windows toward longer wavelengths near the far-red fluorescence peak and in fitting windows with less water vapor absorption (Parazoo, 2019), which is inconsistent with the results shown in Figure 8, how do you account for this?

Line 393 to 398: The use of the 735-758nm fitting window is a feature of this research, but the limitations of this window were also stated. Is it possible to select one of the retrievals from the two fitting windows for each observation according to several indicators (e.g. cloud fraction threshold) to merge the retrievals from the two fitting windows and maintain the advantages of both, rather than providing two separate datasets?

Technical corrections:

- Figure 1: The “FT” in the figure note is inconsistent with the abbreviation “FW” in the figure.
- Figure 2: Only the weights of the first 8 singular vectors are shown in the figure, which is inconsistent with the figure note.