

Earth Syst. Sci. Data Discuss., referee comment RC2
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Comment on **essd-2022-277**

Anonymous Referee #2

Referee comment on "The global leaf chlorophyll content dataset over 2003–2012 and 2018–2020 derived from MERIS/OLCI satellite data (GLCC): algorithm and validation" by Xiaojin Qian et al., Earth Syst. Sci. Data Discuss., <https://doi.org/10.5194/essd-2022-277-RC2>, 2022

The authors focused on mapping global weekly leaf chlorophyll across nearly 20 years based on radiative transfer models and improved LUT methods, which considered different kinds of canopy structure, PFTs, and soil backgrounds. This is an interesting and meaningful research, which has a profound impact on modulating ecosystem biophysical and biochemical dynamics. However, at present, there is no great breakthrough in either dataset or methodological innovation compared to previous studies. Besides that, the validation method results have not been greatly improved. I am sorry that I cannot support this manuscript for publication here. The main comments are as follows:

- Detailed description of how to use 4SAIL and 4-Scale model need to be added in manuscript. Now it is not clear for readers to figure out how you applied these models and what are the differences between other studies.
- This study didn't consider the covariance between different functional traits and just set a fixed value for N , C_w , C_m , C_{anth} and C_{brw} at a global scale. Moreover, only a simple linear relationship between LCC and C_{xc} was set instead of considering the nonlinear change of the relationship between them with time. Above all can definitely improve the computational efficiency, but will cause large uncertainties when using the ill-posed radiative transfer models.
- Detailed description of validation method should be added. For the validation datasets: Firstly, I think such a limited validation dataset is insufficient to validate global LCC inversion results. Second, the validation dataset didn't consider the seasonal variations of LCC.