

Biogeosciences Discuss., referee comment RC1 https://doi.org/10.5194/bg-2021-224-RC1, 2021 © Author(s) 2021. This work is distributed under the Creative Commons Attribution 4.0 License.

## Comment on bg-2021-224

Anna Denvil-Sommer (Referee)

Referee comment on "Reconstruction of global surface ocean  $pCO_2$  using region-specific predictors based on a stepwise FFNN regression algorithm" by Guorong Zhong et al., Biogeosciences Discuss., https://doi.org/10.5194/bg-2021-224-RC1, 2021

The authors developed a new ML approach to reconstruct global surface ocean pCO2 that considers an impact of different predictors in different ocean regions. Based on Self-Organizing Map method authors defined 11 biogeochemical provinces. A stepwise FFNN regression algorithm was applied to each of these provinces to establish a set of predictors that are highly responsible for pCO2 variability in considered province. Based on selected predictors and analysis of FFNN size (number of neurons) a monthly 1°x1° surface ocean pCO2 product from 1992 to 2019 was constructed. The results show a good agreement with validation data and independent observations.

I found this work well-organized and easy to read. It was interesting to see new predictors (phosphate, nitrate, silicate, dissolved oxygen) and their role in pCO2 variability. The authors presented important results for the Indian Ocean where due to the lack of observations different methods show their disagreements.

Please find in the attacment several points that need to be clarified before publication.

Please also note the supplement to this comment: <u>https://bg.copernicus.org/preprints/bg-2021-224/bg-2021-224-RC1-supplement.pdf</u>