

Interactive comment on “Estimation of phytoplankton pigments from ocean-color satellite observations in the Sénégal-Mauritanian region by using an advanced neural classifier” by Khalil Yala et al.

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General comments:

Measurement of oceanic phytoplankton pigments plays a crucial role in understanding biological response to global climate change. This study proposed a Self Organized Map (2S-SOM) to estimate the pigment concentrations from satellite ocean colour products in the Senegal-Mauritanian region. It is an interesting and important study to improve our understanding on the existing remote sensing methods.

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Specific comments: 1. The introduction can be written in a much more accurate way. I would check it phrase by phrase and sentence by sentence. Take phytoplankton identification method as an example: 1) Line 50-52: For example, one limitation of microscopy is the difficulty in identifying picoplankton. 2) The optical microscopy method is developing, for example the imaging flow cytometry (IFC). 3) Line 54-55: Mind the use of the terms PSC and PFT. PFT depends on how you define it. PSC is also a type of PFT definitions. 4) Line 57-60: the conversion formula method is the so called "Diagnostic Pigment Analysis". CHEMTAX uses matrix factorization to estimate PFT from pigments. 5) Line 60: I am not sure with just marker pigments themselves the identification of phytoplankton can be achieved in species level. 6) In summary, please check IOCCG report 15 and related literature carefully. 2. Line 139-140. Match-up procedure can be more detailed, for example, by adding the criteria of refusing data points and the reason why you choose 20km. 3. Line 150-160 and Figure 3. Please use more statistical metrics in addition to R-square and RMSE according to Brewin et al 2015. Please specify whether they are calculated in log scale or not. Brewin, Robert JW, et al. "The Ocean Colour Climate Change Initiative: III. A round-robin comparison on in-water bio-optical algorithms." Remote Sensing of Environment 162 (2015): 271-294. 4. Line 288-289: you have said the same as Line 264-265. 4. Table 2: often these statistics are done on log(pigments) - given their distribution and expected errors. 5. Line 402: Unfortunately it cannot be concluded that diatoms dominated because of high Fuco ratio and chl-a, without additional information on phytoplankton groups using e.g. microscopy. 6. Please spell MLP out in the Discussion section. 7. Line 649-654: Can you summarize why SOM needs fewer data points than MLPs and other supervised learning? Why MLP cannot be trained with total ~500 data points? 8. Is it possible to clarify the minimum threshold of pigment concentration of the applicability of 2S-SOM?

Technical corrections: 1. The country Senegal has three versions of names in the manuscript, i.e. Senegal (title), Senegalo (context) and Senegal (Figure 1). Please keep the consistency. 2. Line 41: The word "phytoplankton" is more often

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used as plural. 3. Line 42-44: mind the subscript of CO₂. 4. Line 43-44: I have not found the information of 30% in Behrenfield et al, 2005. 5. Line 48: The description "fish grazing on phytoplankton" is not accurate. The effect of phytoplankton on fisheries is via marine food chain, i.e. zooplankton grazing on phytoplankton provide food source for some fish. 6. Line 56: Please add the citation: Sosik, H.M.; Sathyendranath, S.; Uitz, J.; Bouman, H.; Nair, A. In situ methods of measuring phytoplankton functional types. In *Phytoplankton Functional Types from Space*. Reports of the International Ocean-Colour Coordinating Group (IOCCG), No. 15; Sathyendranath, S., Ed.; IOCCG: Dartmouth, NS, Canada, 2014; pp. 21–38. 7. Line 84: use the abbreviation of "PSC". Full name is not needed. 8. Line 86: the term "PSC percentage" is inaccurate. It is the contributions of Chl_a from different phytoplankton size classes to total Chl_a concentration. 9. Line 105: the colour of the land is not red. 10. Line 111: delete "a". 11. Line 112: "systems". 12. Line 161: "wavelengths". 13. Please define the abbreviation of a variable before using it (e.g. Table 1 and a lot of places). 14. Line 181-182: this is not a sentence. 15. Line 182: typo: divinyl chl-a. Did you consider chlorophyllide-a as part of Tch_l-a? 16. Line 186-190: you have mentioned these in Line 113-117. 17. Figure 4&5: R_{rs} is not defined. From my perspective, extensive editing of English language and style required.

I hope you find my comments helpful for your revision. Best regards, Yangyang Liu
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