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Ocean Science Discussions

Interactive comment on "Technical Note: Algal Pigment Index 2 in the Atlantic off the Southwest Iberian Peninsula: standard and regional algorithms" *by* Priscila Costa Goela et al.

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"Technical Note: Algal Pigment Index 2 in the Atlantic off the Southwest Iberian Peninsula: standard and regional algorithms"

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Replies to Comments of Reviewer #2 (Anonymous Referee)

Note from the authors: Please see the Supplement pdf file of the reply for the correct formatting of the characters.

GENERAL COMMENTS

As a technical note, this manuscript provides details the match up analysis between satellite retrieved estimates of chl-a and in situ measurements from different sources for a small region off the Iberian Peninsula. The results would be interesting to a limited readership who are interested in the same region. However I do think the paper has a major flaw; the authors find that the comparison of in situ chl-a parameters from different sources (absorption vs HPLC) yields better results than the comparison of retrieved parameters with either absorption or HPLC in situ results. These results are affected by the comparison of only 54 pairs of data for the retrieved vs in situ compared to 297 for the in situ abs vs HPLC. The potentially better metrics for the comparison of in situ parameters could be totally or in part due to the sample size being approximately 6x that of the retrieved vs in situ comparisons. I presume that the smaller data set is due to cloud cover etc so that you could only retrieve 54 data points that matched to an in situ measurement. If this is the case then the comparison between in situ abs vs HPLC should also only be for these same 54 data sets, so that all comparisons are being made on the same data sets. Overall I think the idea of the paper is suitable as a technical note in OSD, but I would like to see the data and conclusions drawn after the authors re-analysed the data using the same 54 data sets for all comparisons, before I commented on the worth of the final paper.

Authors' response: The authors thank the referee for noting this issue. In fact, there was an important detail requiring explanation in the manuscript. Regarding Fig.1, two different analyses are shown: a validation exercise (in left and middle panel) of MERIS products data against in situ reference data, and the other analysis (right panel) is the assessment of the performance of the regional NN algorithm for the retrieval of TChla. The different numbers of data points arise from the differences between the two analyses, the greater number of data points is used to evaluate the algorithm on the basis of its best performance (e.g. Cristina et al., 2016, Sá et al., 2015; Kajiyama et al., 2013). The x and y axes of the figures in the left and middle panels (Figs. 1a-d) represent the values of API2 product as retrieved by both MERIS and by the regional algorithm using MERIS reflectances, respectively. In these cases, the total number of

points compared were 54. In contrast, Figs. 1c and 1f represent the regional algorithm trained using in situ reflectances collected from the in situ deployment of a Satlantic® radiometer. In this case, 4 to 8 reflectance casts were collected with the radiometer for each location corresponding to one in situ TChla measurement. As the objective was the regional algorithm performance assessment, all those points were used for this comparison, showing the best case scenario for the use of the regional algorithm. However, we can still show that comparison results remain consistent with the reported statistical values (Figure A1 in attachment) even when using only one radiometric cast per location (i.e., N=54 as in right panels of Fig. A1) to compare MLP(RrsSITU) with in situ references (TChla (ABS, HPLC)).

Figure A1 – Comparison of the performance of the regional NN algorithm results using only N=54 points (right panels), or with N=297 points (left panels, as originally Figs. 1c and 1f in the manuscript), both against TChla references (retrieved through aph(442) and with HPLC).

Authors' changes in manuscript: A more detailed explanation has now been included in the manuscript to explain better the difference between number of data points, in Page 5, line 2, quoting: "The total number of samples used to validate MERAPI2 and MLP(RrsMER) algorithms results with respect to the in situ reference measurements was N=54. In contrast, the total number of samples for assessing the performance of regional MLP algorithm with in situ reference measurements (MLP(RrsSITU), was N=297. This larger number of samples is based on the data from 4-8 radiometric casts for each in situ TChla sample at each location."

Specific comments

Comments from Referees: A general comment is that there was a lot of acronyms and I think it would be useful to have a table which defined all the acronyms.

Authors' response: The Referee's suggestion to create a table with all the acronyms was appreciated and included in the revised manuscript (Table 3).

Authors' changes in manuscript: Page 12 includes Table 3, with the list of the acronyms used in the manuscript.

Comments from Referees: Pg 2, line 21: "of the Southwestern Iberian. . ." should be "off the Southwestern Iberian..."

Authors' response: Thank you for noticing. The sentence has been modified in the revised manuscript.

Authors' changes in manuscript: In page 2, line 21, where it was "of the Southwestern Iberian. . .", has been changed to ". . .off the Southwestern Iberian. . .".

Comments from Referees: Pg 3, line 8: delete neural nets and bottom-of-the-atmosphere as they have both already been defined.

Authors' response: Thanks for noticing. The manuscript has been revised acknowledging the Reviewer's recommendation.

Authors' changes in manuscript: The Referee's request has been addressed in page 3 in line 26 in the revised manuscript, where it was ". . .bottom of the atmosphere (BOA). . .", has been changed to ". . .computes BOA. . .".

Comments from Referees: Pg 3, line 16: could not access web address provided – "page not found" message

Authors' response: Thanks for noticing. The revised manuscript has the corrected link.

Authors' changes in manuscript: The correction of the link in the revised manuscript was made in page 4 line 4, where. . ."http://ocportugal.org/sites/default/files/api2Sgr.pdf". . . has been changed to "...http://ocportugal.org/sites/default/files/mlpSgrAPI2.pdf".

Comments from Referees: Pg3, line 21: "applicability should be application"

Authors' response: Although other terminology could be applied, like the Referee's sug-

gestion, the authors decided to maintain the same terminology, to assure the consistency with previously published studies (Cristina et al., 2016, Sá et al., 2015; Kajiyama et al., 2013) on similar topics.

Comments from Referees: Pg 3, line 23: “applicability should be application”

Authors’ response: Although other terminology could be applied, like the Referee’s suggestion, the authors decided to maintain the same terminology, to assure the consistency with previously published studies (Cristina et al., 2016, Sá et al., 2015; Kajiyama et al., 2013) on similar topics.

Comments from Referees: Pg 3, line 25: “PCA should be in brackets – (PCA)”

Authors’ response: Thanks for noticing. The manuscript has been revised acknowledging the Referee recommendation.

Authors’ changes in manuscript: Where it was “. . .Principal Component Analysis PCA ...” in the page 3, line 25, it has been changed in page 4 line 13 of the revised manuscript “. . .Principal Component Analysis (PCA)...”.

Comments from Referees: Pg 3, line 29: remove “novelty index” or “ÅN′ ” as this term has already been defined

Authors’ response: Thanks for noticing this. The manuscript has been revised acknowledging the Referee’s recommendation.

Authors’ changes in manuscript: Where it was “. . .is its novelty index η ...” in the page 3, line 29, has been changed in page 4 line 17 of the revised manuscript “. . .is its η ...”.

Comments from Referees: Pg 3, line 30: replace “when _ is below the threshold _=1.” With “when _ < 1.”

Authors’ response: The authors agree that this sentence was not easy to read, and have changed the statement to: “. . .when $\eta \leq 1$”.

Authors’ changes in manuscript: In page 4, line 17, where it was “when η is below the threshold η=1.”, it is now “. . .when $\eta \leq 1$.”.

Comments from Referees: Pg 4, line 3: replace “an hyperspectral” with “a hyperspectral”

Authors’ response: Thanks for noticing this. The revised manuscript has replaced the word.

Authors’ changes in manuscript: Where it was “. . .an hyperspectral...” in the page 4, line 3, has been changed to “. . .a hyperspectral ...”in page 3 line 10 of the revised manuscript.

Comments from Referees: Pg 4, line 3: delete “located below the surface” as it is implied by the preceding “subsurface”.

Authors’ response: Thanks for noticing this. The sentence was deleted following the Referee recommendation.

Authors’ changes in manuscript: The sentence from the page 4 line 3 “. . .a subsurface radiance sensor Lu(ïĄň) located below the surface...”, has been changed to “. . . a subsurface radiance sensor Lu(ïĄň)...” in page 3 line 8.

Comments from Referees: Pg 4, line 10: replace “in GF/F” with “on GF/F”

Authors’ response: Thanks for noticing this. The word was changed following the Referee recommendation.

Authors’ changes in manuscript: The word from the page 4 line 10 “. . .in GF/F...”, has been changed to “. . .on GF/F...” in page 3 line 18.

Comments from Referees: Pg 4, line 14: the sodium hypochlorite bleaching does not remove the detrital contribution; it removes the pigment contribution. The phytoplankton contribution is determined as the difference between the total particulate and detrital absorption which are recorded before and after the hypochlorite bleaching,

respectively.

Authors' response: The authors agree that the sentence was not clear, and the manuscript will be changed accordingly.

Authors' changes in manuscript: In page 4, line 13/14, where the text "The phytoplankton absorption was determined from the total particle absorption, through the measurements before and after sodium hypochlorite bleaching of the filters to remove the contribution of detrital absorption" has been changed to "The phytoplankton absorption was determined as the difference between the total particulate and detrital absorption which were measured before and after sodium hypochlorite bleaching (Ferrari and Tassan, 1999; Goela et al., 2013), respectively.

Comments from Referees: Pg 7, line 4: "An additional explanation could be that TChlABSREF was determined using aph(442), which is likely better related to Rrs than TChlHPLCREF (both aph(442) and Rrs directly represent optical properties)." aph(442), might be better related to Rrs, but TChlHPLC is a direct measurement of the chl-a concentration whereas the aph(442) is an indirect measurement of the absorption due to phytoplankton. It is estimated as the difference between the total particulate and detrital absorption, both of which are measured, but would carry errors associated with the technique (extraction efficiency of the pigments, the dominance of a detrital signal etc) which would affect the accuracy of the estimation of aph(442).

Authors' response: The authors agree that this statement should be included in the manuscript.

Authors' changes in manuscript: This statement was added to the argument, in Page 7, line 10, quoting: "Some caveats would however apply to this argument, because ãĂŰTChlaãĂů_HPLCˆREF is a direct measurement of the TChla concentration whereas ãĂŰTChlaãĂů_ABSˆREF is an indirect measurement which has errors associated with the laboratorial determination of aph(442)".

Comments from Referees (Figures and captions): A general comment is that if the reader prints this publication, the font size used on the figures is quite small and can make reading difficult, especially both parts of Figure 2.

Authors' response: Thank you for noticing. The font size in the figure was expanded.

Authors' changes in manuscript: The figures in attachment have a larger font size.

Comments from Referees (Figures and captions): Figure 3: should have a description of each panel in the legend rather than referring to a section in the text. It is difficult to read both the section and the plot at the same time on a computer.

Authors' response: Thanks for the comment. The authors agree, and now a more detailed legend is presented.

Authors' changes in manuscript: The legend of Figure 3 was changed to: "Comparison between Sagres regional Multilayer Perceptron (MLP) algorithm map with MERIS pigment index product map Algal Pigment Index 2 for the 25th August 2010, showing a) the product map of the regional MLP, b) standard API2 MERIS product map, c) difference between MERAPI2 and MLP(RrsMER), d) region of applicability of MLP(RrsMER), f) results of the application of the regional MLP to the Portuguese coast in the three regions of interest (shown in e). Please see Sect. 3.2 for a more detailed description of the panels."

Please also note the supplement to this comment:
http://www.ocean-sci-discuss.net/os-2016-41/os-2016-41-AC2-supplement.pdf

Interactive comment on Ocean Sci. Discuss., doi:10.5194/os-2016-41, 2016.

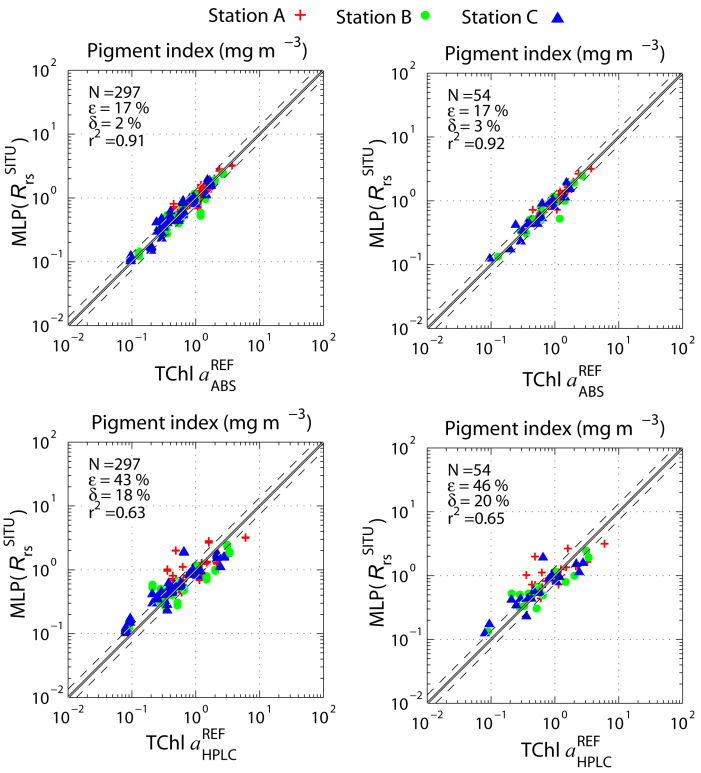

Fig. 1. Figure A1 Comparison between N=297 and N=54 (Full legend within the reply)

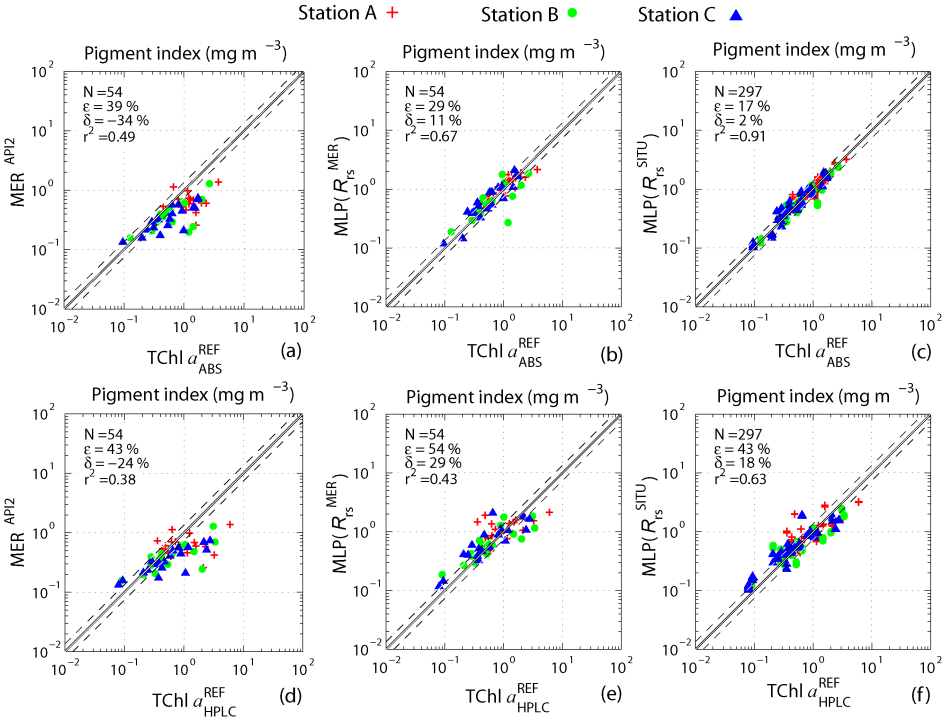

Fig. 2. Figure 1 - Correction to Fig.1 in the manuscript

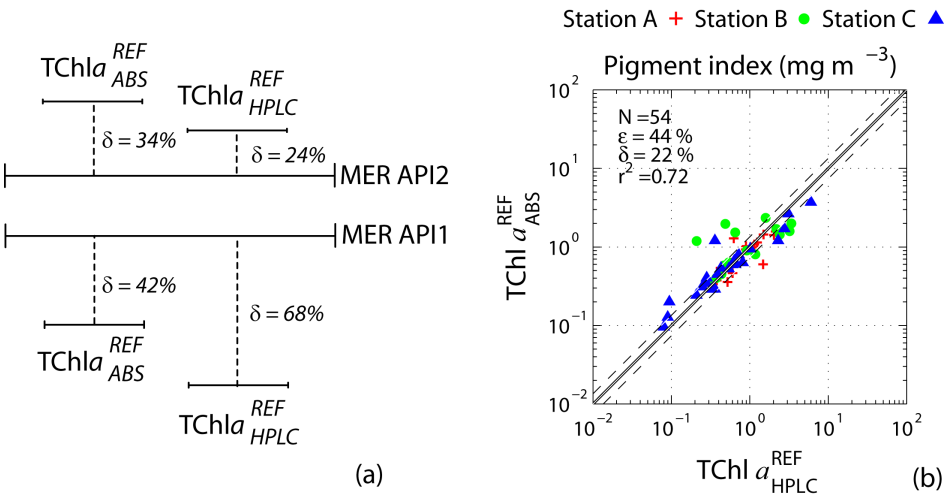

Fig. 3. Figure 2 - Correction to Fig. 2 in the manuscript