Ocean Sci. Discuss.,
https://doi.org/10.5194/os-2018-155-RC1, 2019

Ocean Science Discussions

Interactive comment on "The CMEMS GlobColour *Chlorophyll-a* Product Based on Satellite Observation" *by* Philippe Garnesson et al.

Anonymous Referee #1

Received and published: 24 January 2019

This article presents the new version of the GlobColour product delivered by ACRI-ST within the CMEMS. As this GlobColour Chlorophyll-a (Chl-a) product has a global coverage and provides retrievals in coastal waters this manuscript can be of interest for many current and future users of satellite-derived products.

Chl-a in this new GlobColour product is derived from two algorithms: the Color Index of NASA for clear waters (Chl-a < 0.15 mg m-3) and the OC5 algorithm of Ifremer for water where Chl-a is superior to 0.2 mg m-3, including the coastal turbid waters. This is very similar to the strategy chosen by the Plymouth Marine Laboratory for the OC-CCI product, also provided at global scale. However a distinction is clearly made by the authors: the GlobColour processing chain provides a Level 3 Chl-a multi-sensor product obtained from mono-sensor Chl-a whilst the Level-3 Chl-a of OC-CCI is obtained from

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a prior merging of the remote-sensing reflectance of the different sensors on a common reference of spectral bands (SeaWiFS). The OC-CCI approach is similar to that of the Mediterranean Product Unit of CMEMS described in Volpe et al. (Ocean science, accepted). Targeting directly Chl-a, the GlobColour processing can theoretically and practically be adapted more quickly to the modification of the products of any single sensor (following the reprocessing by the Agencies) whilst this task is more difficult to achieve through the complexity of the band switch and band correction operated in the OC-CCI approach. However as pointed out by Volpe et al., the band merging approach has the advantage of providing a homogeneous dataset of spectral reflectance from which can be derived, in full consistency for the long term, different environmental parameters, amongst them Chl-a but also light attenuation, Kd, Suspended Particulate Matter, ...

The authors discuss different issues encountered in the near real-time and long term processing of Ocean Colour data and some interesting illustrations are provided on the effect of the drift of Rrs in flight and the successive reprocessings by the Agencies onto the OC-CCI product (Fig. 2 & 3) or onto the GSM/Nasa (Fig. 5.) product. However these major operational constraints have also consequences on the GlobColour and these latters are not described Thorough descriptions of the quality and flaws of the GlobColour products over the period 1997-2018 are missing. This could be due to the fact that this GlobColour product is new. In that case, would it not be better to change the title for something as “The new GlobColour product and the challenge of Ocean Colour processing at global scale?” The choices of the author in the article should be easier to understand.

In conclusion of these general remarks, the paper should be re-organized. For instance, the first paragraph of the Result and Discussion, 3.1, deals only with the OC-CCI and GSM products! Finally, in this text, the GlobColour product is assessed through its difference (more flexibility as for ingesting OLCI data) with other products but not through comparisons to in situ data; which is a main issue in OC applica-

tions, particularly in the coastal waters that are now clearly addressed by OC-CCI and GlobColour. This issue should, at minimum, appear in the discussion. As CMEMS OC products aim at covering coastal waters, why not take advantage of the coastal monitoring networks for a better flexibility in modifying the processing chains after a reprocessing by the Agencies or the availability of a new sensor?

Despite these comments, the manuscript is worth publishing. The illustrations are very informative and the main issues in the operational processing of OC data are pointed out.

Specific remarks

Introduction

Line 11 the CCI/Sv3 is mentioned but not referenced. That will be done later in the text.

Line 19 The continuity between OCx (OC3 & OC4) and OC5 is guaranteed by the construction of the OC5 tables. What do you mean, OC3 and OC4 are used in the GlobColour product in complement to CI and OC5?

2.2 Flagging approach This chapter is not clear. How is the OC5 LUT doing its own flagging? Not sure there is a control of the errors coming from the atmospheric correction or clouds by the ratios used in OC5. The 412 Rrs processed in OC5 can take into account a possible effect of the overcorrection of the atmospheric content but it could only be marginal in case or clouds, ...

3.1 Results are those of OC-CCI (already mentioned). However this chapter deals with interesting issues in OC monitoring.

In Figure 6, it would be better to show the 2 deviations with a same reference: MODIS Rrs 667. OLCI-MODIS and VIIRS-MODIS would appear with similar colours, demonstrating the variability of the atmospheric corrections between OLCI and VIIRS on one side and MODIS on the other.

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Conclusion

It is not really a conclusion. The conclusion (or the last lines of the discussion) should open a window on a possible improvement of the processing chains; I would have appreciated a larger view, a strategy for improving the quality of the products, an opening to validation and flexibility after the launch of a new sensor or after a major reprocessing by the Agencies.

Technical corrections

Page 1:

Line 12: provides Line 24: the Ocean Colour Thematic Assembly Centre

Page 2:

Line 12; the CCI/S3v project is not defined Lines 16-19; the continuity of the 3 algorithms. CI , OC5 and ? Lines 20-21: the two sentences could be merged.

Page 3:

Lines 2 and 3. you already said (page 2 line 29) that VIIRS-NOAA20 and OLCIB data will be incorporated into the GlobColour chain. Line 5: meters Line 11: Do you mean "The redundancy can decrease the level of uncertainty"? Line 16: could you provide more information on the reference of the CCI product Line 27: use them

Page6:

Lines 1-2: “The RRS merging approach is a very attractive solution. However the issues linked to the instrument and difficulties of calibration shows that is challenging to be successful with this approach.” This assertion is not really proven. Line 7; requires

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