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Dr Annick Bricaud
Earth System Science Data
Editorial Support Team

Attn: Review of the manuscript by Thomas M. Jordan, Giorgio Dall'Olmo, Gavin Tilstone, Robert J. W. Brewin, Francesco Nencioli, Ruth Airs, Crystal S. Thomas, and Louise Schlüter entitled "A compilation of surface inherent optical properties and phytoplankton pigment concentrations from the Atlantic Meridional Transect" submitted to Earth System Science Data and coded essd-2024-267.

Dear Dr Bricaud,

After reading the manuscript by Jordan et al., submitted to Earth System Science Data and coded essd-2024-267 **I recommend to consider this paper for publication in this journal almost as is.**

General opinion

Authors have presented and described in thorough details an impressive data set consisting with more than 300 000 measurements points of spectral values of particulate absorption $a_p(\lambda)$, scattering $b_p(\lambda)$ and beam attenuation $c_p(\lambda)$ coefficient, measured along track of nine Atlantic Meridional Transect cruises between 2009-2019. Measurements were conducted with use spectral absorption and attenuation meter ac-9 at nine spectral channels (SeaBird Inc. USA) or its hyperspectral version asc, in the spectral range ~ 400–750 nm at ~ 4 nm spectral resolution. Presented data set includes ca. 700 coincident measurements of phytoplankton pigments concentrations with use of the high performance liquid chromatography methods (HPLC). Phytoplankton pigments concentrations measured in collected water sample were used to derive continues transect of the total chlorophyll-a concentration in the surface water based on regression between HPLC total chlorophyll-a concentration and absorption line height at 676 nm parameter calculated from red part of particulate absorption spectrum. This study covered very detailed spectral uncertainty budget of optical measurements and thorough discussion of uncertainty associated with inter laboratory results of the HPLC analysis. Author also included the correlation matrix between total chlorophyll-a concentration and identified accessory pigments and identified spectral characteristics of end-member $a_p(\lambda)$ spectra where accessory pigment groupings were present in higher concentrations relative to Tot_Chl_a. Authors have also presented distribution of selected values of bio-optical parameters in sampled biogeographic provinces of the Atlantic Ocean which make this study not only presentation of data collection but additionally very detailed research paper presenting very valuable bio-optical characterization of the Atlantic Ocean between 50 deg. N and 50 deg. S.

I am impressed by the quality of the data set, and how authors have presented it. I am truly confident that this study shall be published as is. There are very few minor mistakes that I have spotted, by those can be corrected during proof edition. Manuscript does not need any further review.

Congratulations to Authors. Very well done.

Detailed comments

I have spotted just two minor mistake:

Page 4, line 114

Is: “ACS systems (spectral range ~ 400–750 nm at ~ 15 nm spectral resolution)…”

Actually the spectral resolution of the acs instrument is ca. 4.3 nm. According to technical specification provided by manufacturer acs measures absorption and attenuation in the spectral range 400–750 nm at 80 spectral channels which makes 4.3 nm spectral spacing between channels. Please correct.

Page 7, Equation 4

Is: $b'_{p}(\lambda) = a_{p,m}(\lambda) - c_{p,m}(\lambda)$,

Shall be

$b'_{p}(\lambda) = c_{p,m}(\lambda) - a_{p,m}(\lambda)$

Use of Equation 4 as written in the original manuscript would results in negative values of spectral scattering coefficient, as spectral attenuation coefficient values are greater than spectral absorption coefficient values. Please correct.

Best regards

Piotr Kowalczuk