

Piotr Kowalczyk
Institute of Oceanology
Polish Academy of Sciences
Ul. Powstańców Warszawy 55
PL – 81 - 712 Sopot

July 28, 2026

Editor
Earth System Science Data

Attn: Review of the manuscript by Jean-François Berthon and Giuseppe Zibordi “Coastal Atmosphere & Sea Time Series (CoASTS) and Bio-Optical mapping of Marine optical Properties (BiOMaP): the hyperspectral absorption coefficients by optically significant constituents” submitted to Earth System Science Data and coded essd-2026-463.

Dear Editor,

After reading the manuscript by Berthon and Zibordi submitted to Earth System Science Data and coded essd-2026-463 **I recommend to consider this paper for publication in this journal after minor revision.**

General opinion

Authors have presented data sets of absorption coefficients spectra of particles suspended in sea water, phytoplankton pigments, and non-pigmented particles in the spectral range between 400-750 nm measured with a 3 nm spectral resolution at 2 nm increment, in water samples collected in the surface layer of numerous marine water around Europe. The particulate absorption spectra are accompanied with absorption coefficient spectra by Chromophoric Dissolved Organic Matter – CDOM, measured in same water samples volume in the spectral range 350-680 with 1 nm resolution. Presented data set consist with two parts: Coastal Atmosphere & Sea Time Series program performed from 1998 to 2016 in the northern Adriatic Sea at the Acqua Alta Oceanographic Tower (AAOT) - CoASTS, and the Bio-Optical mapping of Marine optical Properties (BiOMaP) field program performed from 2000 to 2021 in the European Seas. The geographical extent of sampled marine basins included: Adriatic Sea, Ligurian Sea, Eastern and Western Mediterranean Sea, the Black Sea, the Baltic Sea, Iberian Shelf, English Channel and North Sea, and Greenland Sea. Author have measured particulate and CDOM absorption spectra with use bench top spectrophotometer using well established methodology. Authors have also assessed uncertainty budget for measuring particulate and CDOM absorption spectra. They have assessed measurements uncertainty with two ways – first, by repeating spectrophotometric scans of the same sample and second measuring replicated sample taken from the same water volume. In case particulate absorption measurement of repeating sample the uncertainty was lower (the mean absolute percent differences (MAPD) ranged 2.8% - 7.4%) compared to replicated samples (the MAPD ranged 8.9% - 10.7%) and uncertainty increased toward longer wavelengths. The measurement uncertainty of CDOM absorption was higher for both for repeating and replicated spectrophotometric scans, and have the same increasing tendency toward longer wavelengths.

Author have presented data in the form of visualized spectra phytoplankton pigments absorption coefficient, $a_{ph}(\lambda)$, depigmented particles absorption coefficient $a_{dt}(\lambda)$, and CDOM absorption coefficient $a_{ys}(\lambda)$ for a given geographic locations. Authors have also calculated averaged and standard deviation of absorption spectra for a given constituents and given geographic subsets. Authors have also showed a tertiary plots for three constituents relative percent contribution to sum of $a_{ph}(\lambda)$, $a_{dt}(\lambda)$, and $a_{ys}(\lambda)$. These plots illustrated which constituent controlled a total absorption in a given European sea, or its subregion.

The last figure presented a relationship between $a_{ph}(442)$ versus $a_{ph}(676)$ to illustrate the impact of regional phytoplankton pigments composition. Data showed decreasing values of the average $a_{ph}(442) / a_{ph}(676)$ ratio from oligotrophic waters of the Mediterranean Sea to more eutrophic Baltic Sea and the North Sea waters.

This is a very important contribution of Author, setting a benchmark for contemporary spectral values of absorption coefficient of three most important absorbing constituents. For these reason this manuscript deserves a prompt publication in Earth System Science Data journal. However I see one flaw of this presentation. Authors shall confront and compare their data with existing publications of same absorption coefficients measured with same methods. There exiting publication for many of considered regional European sea – especially in the Baltic Sea, the North Sea and the Greenland Sea. This way Authors could cross-validate quality of their contribution.

I found one minor error:

Page 2 Abstract Typo is Adriatic Sea at the Acqua Alta Oceanographic Tower
Should be Adriatic Sea at the Aqua Alta Oceanographic Tower

Page 8 line 120

The equation: is $a_{ph}(\lambda) = a_p(\lambda) - a_{ph}(\lambda)$,
should be: is $a_{ph}(\lambda) = a_p(\lambda) - a_{dt}(\lambda)$

Best regards

Piotr Kowalczyk