Thank you for your comments and suggestions. Please find below our points-by-points answers.

Reviewer CC1

Comment C1

A few citations not available, such as line 30, "Sat, 2000".

Answer A1

Thank you for pointing it out. We have fixed it and made sure all citations were correctly cited within the manuscript.

Comment C2

Font size of many figures (e.g., Fig. 2) should be larger.

Answer A2

Text font size has been increased from 10 pt to 12 pt in all figures.

Comment C3

Incomplete sentences (e.g., line 54, "… boat (some samples were collected in waters 55 as shallow as 1 m, Babin 2003").

Answer A3

The sentence has been fixed.

Comment C4

Line 119, R(0+), a typo. Also, please check the grammar of this sentence and the entire manuscript.

Answer A4

The sentence has been fixed.

Comment C5

Line 121, "using a sum of two exponential functions to account for Raman scattering". Need more information on why "two exponential functions". On the other hand, from the figures in A1, it appears after ~1 m, the Eu(779) is no longer valid.

Answer A5

The whole paragraph has been rewritten as follows:

Vertical irradiance profiles in the red and near-infrared channels at wavelengths beyond 600 nm were fitted using a sum of two exponential functions of which one represents the diffuse attenuation due to absorption and elastic scattering for the channel under consideration, while the other accounts for Raman scattering from the corresponding (shorter) excitation wavelengths significantly contributing to the upward light field (e.g., Sugihara et al. 1984). Not doing so, i.e., using just a single exponential function, leads to substantial underestimation of the extrapolated subsurface values due to significant Raman contribution from excitation wavelengths with significantly lower K values (see Appendix 1).

Remark; "... from the figures in A1, it appears after ~1 m, the Eu(779) is no longer valid."

Figure A1 showing the near-surface depth dependence of EU at 779 nm demonstrates why the two-function approach is required. Below a depth of ca. 1.5 m, the signal is strongly dominated by Raman scattering and is therefore characterized by a diffuse attenuation coefficient very close to that of the corresponding excitation wavelengths.

Comment C6

Further, for Eu data, did you carry out correction of instrument self shading?

Answer A6

The following text has been added:

Note that a correction to account for instrument self-shading of the upwelling irradiance was not applied. We assume the impact of this omission is relatively small except for highly absorbing waters (depending on constituent concentration and/or observation wavelength), where it may lead to an underestimation of near-surface upwelling irradiances.

Comment C7

The increase of Eu(683,706) with depth showing in Fig. 3 suggests this measurement is quite questionable.

Answer A7

As now described in the text, the observed increase of EU with depth at 683 nm and, to a lesser degree, at 664 and 706 nm is due to chlorophyll fluorescence associated with a deep chlorophyll maximum in the clear North-East Atlantic waters. This case has actually been chosen to demonstrate that the sensitivity of the radiometric measurements is sufficient to resolve such phenomena.

Comment C8

Suggest to include a section to specifically to talk about uncertainties associated with the measured parameters.

Answer A8

While uncertainties have not been assigned to individual values, statistical approaches may be applied by users to assign uncertainties on an aggregated level. In case a reprocessing of selected parameters is carried out, uncertainty related issues will receive a more thorough coverage (as far as the still information allows).

Comment C9

Fig. 7, for Y axis, suggest to use dynamic range, so the R spectra can be presented more clearly.

Answer A9

This was done according to the reviewer's suggestions. Each panel in Fig. 7 has a free y-axis adjusted for its content. However, we have added a sentence to the caption to make sure that the reader is aware of the dynamic y-axis.

The following text has been added to the caption of Fig. 07:

Please also note the y-axes are adjusted to the data presented within each subplot.

Reviewer RC1

Comment C10

This paper is very important as it provides an introduction to a unique dataset to the community in its full glory. I strongly support publishing it. However I think the text can be significantly improved. In particular mentioning figures in sentences should be avoided and rather they should be cited in brackets while the text includes only what we learn from the data in those figures. Also, some figure captions (Fig. 3) include description of data characteristics that are never mentioned in the text. There are some 'Frenchisms' that could be made clearer (I made suggestions in the attached annotated PDF. Finally, the conclusion section does not do justice to the importance of the data set and the impact it had and likely will have in the future on the field of ocean optics in general and ocean color remote sensing in particular.

Answer A10

Thank you very much for this review. Accordingly, we have significantly improved the text by addressing all the comments provided. Finally, we have completely rewritten the conclusion to better reflect the impacts of this data set on future ocean color remote sensing studies (see also A21). Please see below the answers to all the specific points raised. The caption to Figure 3 has been simplified, explanatory descriptions have been moved to the main text. The final version of the article will be checked by a native English speaker to minimize the presence of "Frenchisms" potentially confusing readers.

Comment C11

Line 38: Text improvement.

Answer A11

- *homogenous* has been replaced by *consistent*
- *complete* has been replaced by comprehensive

Comment C12

Line 214: Citation typo.

Answer A12

Line 214: Reviewer is right, the year of the citation has been corrected and now reads Aiken et al., 2000.

Comment C13

Line 224: I don't think you can claim, given the number of samples measured, that you got the correct average IOP for each area.

Answer A13

To provide a better idea of the spectral variability of the measured IOPs across the sampled areas, individual absorption spectra have been plotted in light gray in Fig. 5A-D behind the averaged spectra.

Comment C14

Line 225: Text improvement.

Answer A11

- *Averaged* has been replaced by *measured*
- *by* has been replaced with *in each*

Comment C15

Line 228: This is the first time this concept is mentioned.

Answer A15

"*water color*" has been removed from the sentence.

Comment C16

Line 234: Text improvement.

Answer A16

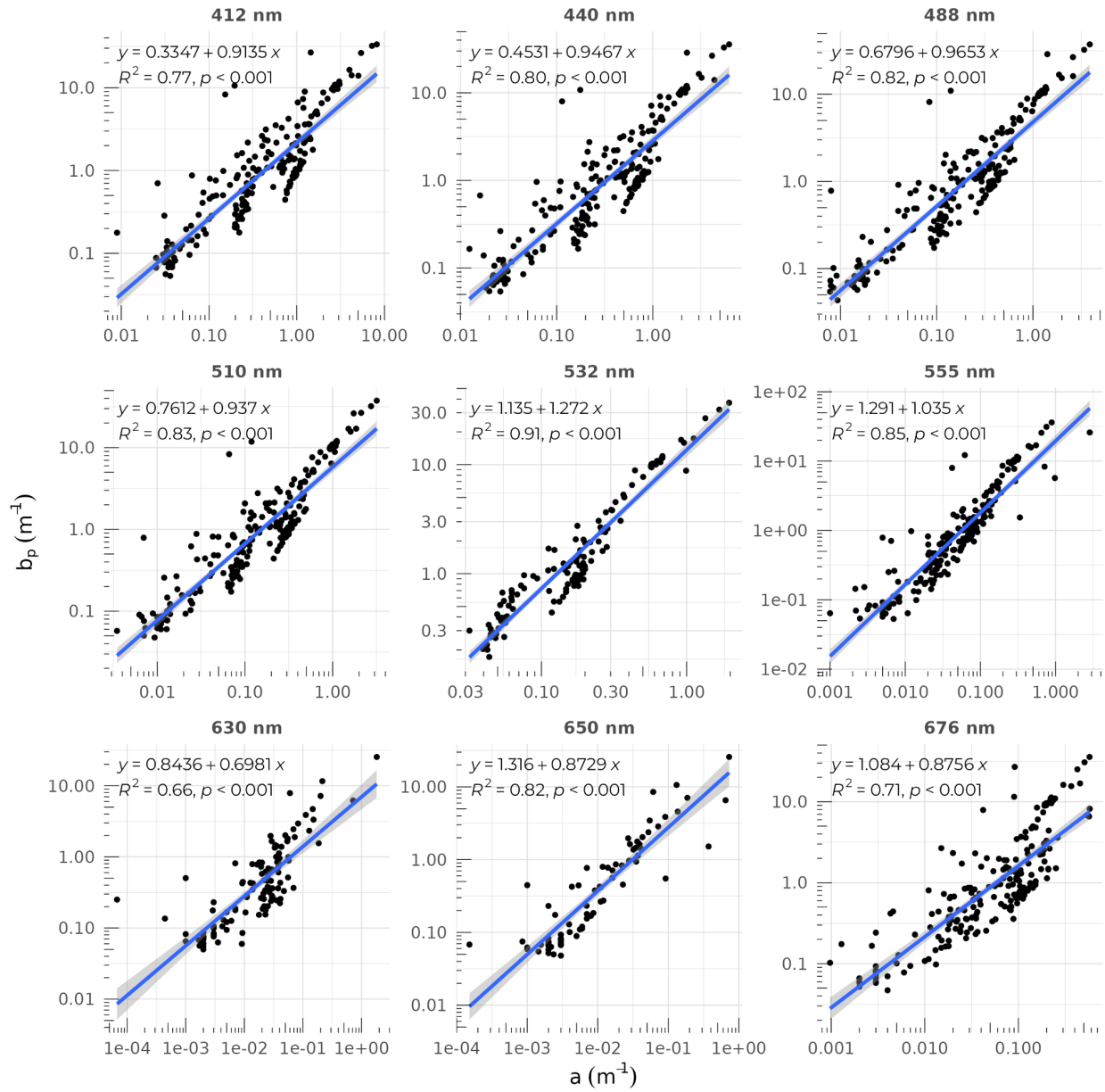
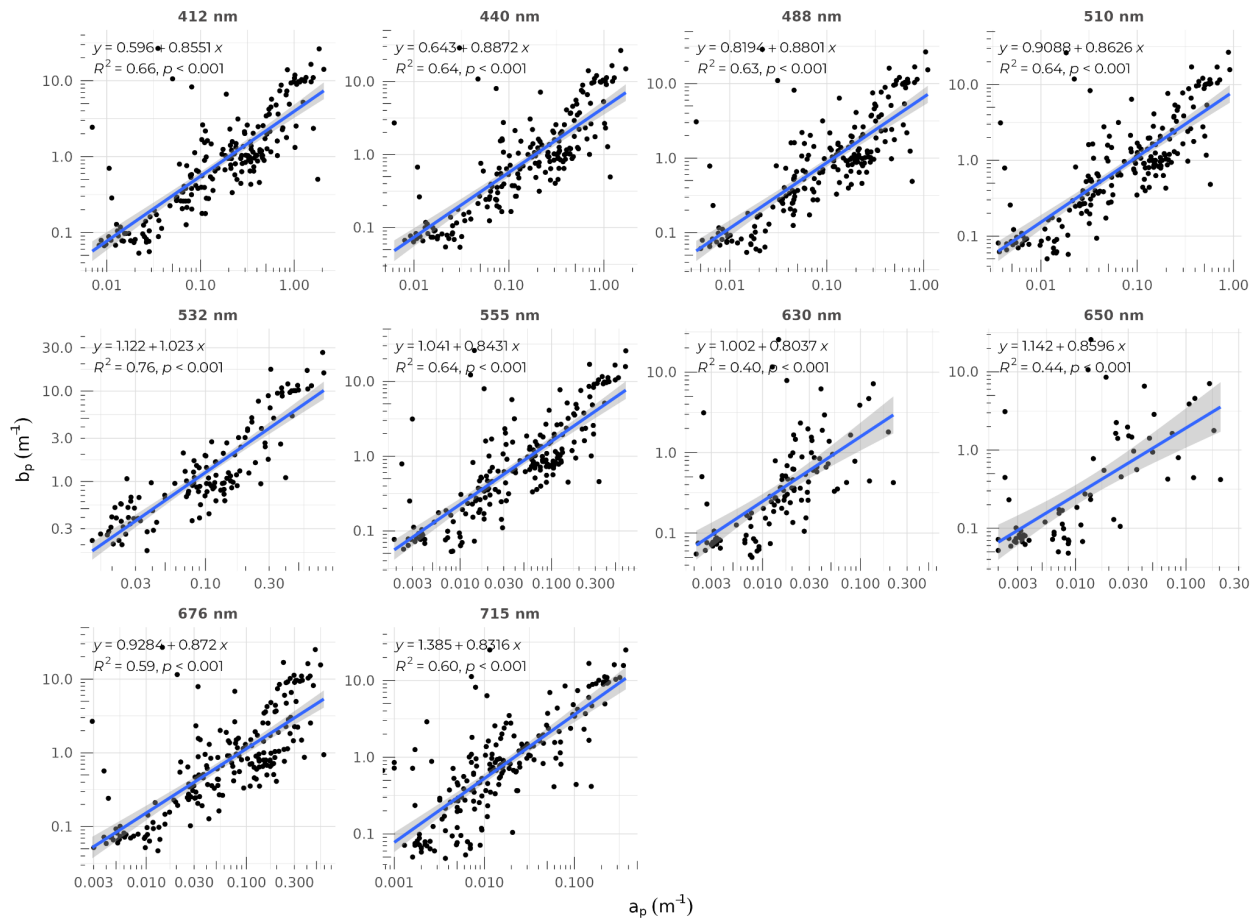
The word *strengthened* has been replaced with *emphasized*.

Comment C17

Line 241: This is interesting as it Kd is driven mostly by absorption. Does it means that the same particles that absorb at 443 are also responsible to scattering (e.g. chlorophyll containing ones?)

Answer A17

This is indeed interesting. The regressions between bp and a - aw, and between ap and bp shown at different wavelengths in the two figures below, confirm the strong correlation between these two IOPs. This is due to both the fact that Chl, Spm and CDOM all covary in this dataset (see Babin et al. 2003, JGR), and the fact that the particles that scatter light also absorb because of phytoplankton pigments (in the blue and red), and/or because of non-algal particles (at all wavelengths in the

visible).

Comment C18

Line 265: Your style of writing could be significantly improved. This sentence should read: *"Total chlorophyll a co-varied with POC (Fig. 4) and their relationship was highly variable (Fig. 9a)."*

Answer A18

The sentence has been replaced with the suggested sentence.

Comment C19

Line 280: Are POC molecule more colorful than phytoplankton?

Answer A19

The sentence has been removed because we have no appropriate normalization at our disposal to figure this out. POC includes both NAP and phytoplankton, but we have no way to determine their respective contribution to POC.

Comment C20

Line 282: Text improvement.

Answer A20

"associated with a particular type of measure" as been replaced with *"associated with each measurement"*

Comment C21

Line 293: You should add something about the number of papers that have cited this dataset and why it is important for the community for this dataset to be released publically and consistently.

Answer A21

In the conclusion, we now refer to Table A1, which shows that nearly 40 studies have already been used in peer-reviewed journals, despite the COASTlOOC data not being easily accessible on a public and open repository. We also highlight the uniqueness of this dataset, which opens the door for future development and evaluation of new bio-optical models adapted for optically-complex waters.

Comment C22

Figure 3A: This issue is not mentioned once in the text. Why raise it only in the caption if at all?

Answer A22

Text has been added to the manuscript (see section 2.4.3 Irradiance depth merging). We also modified the caption and the figure accordingly. There were also requests to change some aspects of the figures which have been done.

Reviewer RC2

Comment C23

The Coastlooc project was a trailblazer for the marine optics community, providing an unusually rich and complete data set which remains relatively rare to this date. THe list of publictions that have previously used the data set is testament to its importance and this submission of a fully quality controlled version is a welcome step to ensure that it is available to the community for the future. I am certain that it will continue to be very highly valued and exploited as a result.

The authors have done a good job of describing the data set and I only have relatively minor comments in the attached marked up version. I would highlight the request to include uncorrected AC9 data so that users may select their own scattering correction.

Great job and delighted to see this data set being made available to the community.

Answer A23

Thank you very much for the review. See below point by point all the corrections we have made based on your constructive comments.

Comment C24

Line: 97: The SPMR was intended to be used as a freefall profiler. Was it used in that mode from the helicopter? Looks like it was attached to the IOP package? Might be worth making this clear here too.

Answer A24

Good point. The first and second paragraphs of this section have been rewritten as follows to provide more details:

The SeaWiFS Profiling Multichannel Radiometer (SPMR, Satlantic Inc, Canada) was used to measure downward (Ed, W m-2 µm-1) and upward (Eu, W m-2 µm-1) irradiance in the water column. Irradiance was measured at 13 wavelengths matching the MERIS channels of direct relevance for ocean observations (411, 443, 456, 490, 509, 531, 559, 619, 664, 683, 706, 779, 866 nm,

except for COASTlOOC 1 operating at 590 nm instead of 619 nm) ranging from the blue part of the spectrum to the near-infrared at an acquisition rate of 6 Hz. The actual wavelengths differ slightly between upward and downward observations.

Comment C25

Line 97: Would be good to list the wavelength here.

Answer A25

See C24.

Comment C26

Line 106: This is a sensible decision, but you might want to note that this means there is potential for a degree of variability due to varying cloud cover to remain unresolved in those measurements.

Answer A26

The following text has been added to provide more information:

Under stable atmospheric conditions, no significant error is expected to result from this approach, while it will contribute to increased variability in the retrieved parameters when sampling under varying cloud cover. The practical impact of this, however, is limited due to the short duration of helicopter-based sampling typically lasting between one and three minutes per profile.

Comment C27

Line 118: This is unclear. Can you provide more detail?

Answer A27

We looked into the old code again to clarify. Actually, a constant, channel-independent air-sea transmission factor has been used to account for losses of the downwelling irradiance (direct + diffuse) due to Fresnel reflection at the rough sea surface.

The following text has been added to the sentence.

"… by applying a constant factor of 0.943 to account for losses of the downwelling irradiance (direct + diffuse) due to Fresnel reflection at the rough sea surface."

Comment C28

Line 170: What optical pathlength was used?

Answer A28

The optical path length was 10 cm. The precision has been added to the text.

Comment C29

Line 199: Other AC9 scattering correction approaches are available and are often preferred. Do you provide the uncorrected data? Would allow other scattering corrections to be applied.

Answer A29

The reviewer is right, there are other methods for scattering correction. As mentioned in the text, to correct absorption measurements for incomplete recovery of scattered light, a(715) was subtracted from a(<715). At this time, the raw data is not available. We will attempt to recover the complete AC9 data set and make it available on the SEANOE web page. We have added a precision about this in section 5.

Comment C30

Line 230: Typo

Answer A30

"e*stuaries"* has been replaced with "*estuarine*".

Comment C31

Line 234: Text suggestion.

Answer A31

See comment C16 where we replaced "*strengthened*" with "*emphasized*" given the comment of another reviewer.

Comment C32

Line 235: Text suggestion.

Answer A32

"*distanced*" has been replaced with "*distant*".

Comment C33

Line 241: Text suggestion

Answer A33

The text now reads "*with median bp(440) values varying*" instead of "*which median values varied*".

Comment C34

Line 248: Typo.

Answer A34

"*or*" has been replaced with "*and*".

Reviewer RC3

Comment C35

The COASTlOOC project dataset is a comprehensive and useful collection and clearly has been widely used. To standardize the QC, version control and documentation is an important task and serves to improve the standing and usability of the dataset. This paper has sufficient detail to describe the data and collection methods, and directs the reader to original sources for more detailed information. The paper includes useful plots for a user to decide whether the data is suitable for them as well as the full description of variables in Table 1.

Answer A35

Thank you very much for the useful comments. Please find, below, detailed responses for each comment.

Comment C36

I would suggest that a text version of Table 1 would be useful to include with the dataset as a self-descriptor.

Answer A36

We do not understand the question. The table is already present in the manuscript. We are willing to reconsider if the editor judges it so.

Comment C37

I followed the link in the paper and was able to access the data archive successfully. The default file-names of the downloaded files are not useful and would be better if they were descriptive and with some indication of version (in case of any future updates or errata).

Answer A37

The COASTlOOC data has been uploaded to SEANOE (Sea Open Scientific Data Publication) funded and operated by Ifremer (France) under DOI [10.17882/93570.](10.17882/93570.) If the data is to be updated, the DOI will also be updated, so that users have the full history of the data set.

The names of the individual COASTlOOC data files were assigned by SEANOE. We agree that they are not very helpful to the users, and will therefore try to convince the SEANOE custodian to rename the files. If this is not possible, we will make sure that file names mentioned in the article are consistent with those in the repository.

Comment C38

The quality of the figures is generally good, but font sizes are too small.

Answer A38

This has been resolved in C2, the font size has been increased from 10 pt to 12 pt in all figures.

Comment C39

Line 10: Text suggestion.

Answer A39

still today has been deleted.

Comment C40

Line 5: Text suggestion.

Answer A40

has been was replaced with *was*.

Comment C41

Line 54: Text suggestion.

Answer A41

efficient sampling stations replace *to efficiently sample stations*.

Comment C42

Line 54: Typo.

Answer A42

The parenthesis has been closed.

Comment C43

Line 61: Text suggestion.

Answer A43

immediately processed has been replaced with *processed immediately*.

Comment C44

Line 64: Typo.

Answer A44

"s" from *litters* has been deleted.

Comment C45

Line 65: Text suggestion.

Answer A45

no longer now reads *for no longer*.

Comment C46

Line 75: Text correction.

Answer A46

onto now read *on*.

Comment C47

Line 106: perhaps comment on the typical time in-water so that the reader has an idea of the lag between in-air and in-water Ed.

Answer A47

Good point, see C26 where this comment was answered.

Comment C48

Line 154: Text suggestion.

Answer A48

It was suggested to replace *downcast* with *down-cast*. It appears that *downcast* is a valid English word. We are happy to reconsider if the editor judges it so.

Comment C49

Line 156: Text suggestion.

Answer A49

larger has been replaced with *greater*.

Comment C50

Line 157: Text suggestion.

Answer A50

do therefore has been replaced with *therefore do*.

Comment C51

Line 163: Text suggestion.

Answer A51

resolving has been replaced with *resolution of*.

Comment C52

Line 163: Text suggestion.

Answer A52

for example has been deleted.

Comment C53

Figure 12 and other font size comments.

Answer A53

Font size in all figures has been increased from 10 pt to 12 pt.

Comment C54

Table 1: it would make more sense to me if the Variable was the first column in the table. The source file name could be after the units, or the final column.

Answer A54

As suggested, columns have been swapped.

Comment C55

Table 1: for what? I assume this informatin is in meta-data associated with the dataset ?

Answer A55

We have provided a better description of this variable in Table 1. It now reads as:

"*Non-algal absorption adjusted so that baseline background is equal to that of ap*"

Comment C56

Table 1: Typo.

Answer A56

organig has been replaced with *organic*.

Comment C57

Table 1: Date format? Just date or date-time? If including time, is it UTC?

Answer A57

It is just the date.

Comment C58

Table 1: Typo.

Answer A58

celsius now spells correctly.

Comment C59

Table 1: Is this correct? - density units would normally be kg/m^3 or kg/L

Answer A59

Sigma-t represents the density of a sea-water at atmospheric pressure, i.e., at the sea surface. It is defined as density minus 1000, where the density is measured in kg/m^3 and is typically expressed as a unitless number.