Author's Response to Editors Comments

Dear editor,

Thank you for your careful review of our manuscript and your remarks that helped to improve the manuscript. We have addressed them in the new version and we are pleased that you consider that this study suits the standards of Ocean Science.

Best regards,

Xabier Davila

Throughout the text, there is no such thing as "multi-spectral chl-a", please include word "fluorescence"

AC: This was modified throughout the entire manuscript.

L2, Consider not repeating word "processes" and rephrasing "processes play…role … in … processes." Can you simplify e.g. saying " Submesoscale processes have a determinant role in the dynamics of oceans by transporting momentum …"

AC: We followed the editor's suggestion and the sentence was chenged to: "Submesoscale processes have a determinant role in the dynamics of oceans by transporting momentum, heat, mass and particles.".

L5, It is not clear what is the "variability" you refer to, and now the sentence is a bit complicated (by copying directly the words from reviewer). Think what your main message is here and write it direct. E.g. "In coastal areas submesoscale oceanic processes act together with coastal ones, and their effect on phytoplankton distribution is not straightforward." (just an example)

AC: We followed the editor's recommendation and the sentence was modified to: "In coastal areas, however, submesoscale oceanic processes act together with coastal ones, and their effect on phytoplankton distribution is not straightforward.".

L 12, add term "fluorescence" i.e. "multi-spectral chlorophyll-a (chl-a) fluorescence profiles"

AC: Done.

L13, as above, add fluorescence. "in-vivo chl-a fluorescence"

AC: Done. This was also modified throughout the entire manuscript.

L19, I suggest saying "Brown and Green algae groups" to be more precise

AR: Authors agree.

AC: This was modified accordingly.

L23, instead of "multi-spectral chl-a" use "spectral groups"
AC: Done.

L30, Not necessarily only increasing? Change to "affecting"?
AC: "increasing" was changed to affecting.

L33, should read "…absorption of atmospheric…"
AC: Done.

L36, Why to state "plankton studies" here in the list? Do you mean it affects how we (should) observe plankton i.e. "monitoring strategies" or something else.
AR: The authors refer indeed to monitoring strategies.
AC: The sentence was changed accordingly.

L44, is the use of word "bathymetry" really appropriate here, do you mean "sea floor" or something alike.
AC: "bathymetry" was changed to "sea floor".

L75, "chl-a" instead of "chlorophyll"
AC: Done.

L90, in the response to reviewers versus modified MS, there is some inconsistency, as word "spectral" is taken out (it is included in your response to reviewer 1. I'm sorry to be picky, but the meaning is very different with or without "spectral" and spectral groups are what you studied. I recommend e.g. saying " … distribution of the two dominant spectral groups of phytoplankton, estimated with multispectral chl-a fluorescence technique, …" Alternatively, as the sentence will become quite long, you may introduce the technique very briefly in the beginning of this paragraph.
AC: We follow the editor's recommendation and the sentence was modified to: "Secondly, we investigate the link between the observed submesoscale structures and the distribution of the two dominant spectral groups of phytoplankton, estimated with multispectral chl-a fluorescence technique, above and below the pycnocline, and at the DCM, by performing a set of General Additive Models.".

L117, please note if this second fluorometer is also a Fluoroprobe
AC: Done.

L135, the list of references is exhaustive. Typically three-four key references will do: original study, a recent/major modification of it, and a key review. Please reduce the amount.
AC: Done.

L149, now you introduce another source of chl-a data. It is thereafter not straightforward to understand which data is used where .It may help if you differentiate fluorescence and satellite based chl-a somehow (e.g. by adding some subscript)

AC: Done. Satellite data now is mentioned as chl-a^{sat}.

L189 vs. L112, Total chl-a vs. total chl-a, thus need to define "Total chl-a" which is used throughout the text.

AC: "total chl-a" in L112 was changed to "Total chl-a", since they refer to the same variable.

L192, should read "Generalized"

AC: Done.

L211, strictly speaking, "Green chl-a" and " Brown chl-a" are not defined. And why not state "Brown chl-a to Green chl-a ratio (B:G)"

AR: The authors agree.

AC: The sentence was modified to "In total, 12 GAMs were carried out from the combination of Total chl-a, Green algae chl-a (Green chl-a), Brown algae chl-a (Brown chl-a) and Brown chl-a to Green chl-a ratio (B:G) among the three vertical subsets (Table 1). "

L212, "total" or "Total"

AC: "total" was changed to "Total".

L213, "Green chl-a" instead of green algae chl-a, or at least be consistent

AC: Done.

L243 should read "isopycnal 35.1 as in Puillat et al. (2006)."

AC: Done.

L277, should read "assess" (!)

AC: Done.

L278-9, Brown and Green should be with capital B and G, following your terminology in Mat&Meth.

AC: Done, this modifications were also applied to the rest of the manuscript.

L293-4, In Mat&Meth you have chosen terminology "Brown chl-a", not "Brown algae chl-a", be concise, also found in other parts of text, please check

AC: Done. The changes were applied throughout the manuscript.

L409 should read "between chl-a and salinity"

AC: Done.

L413-6, remove parenthesis "(negative)" and "(positive or cyclonic)" as they decrease readability, while not bringing any added information

AR: Agree.

AC: Done.

L431, "While,", remove comma
AC: Done.

L432, "chl-a", not "Chl-a"
AC: Done.

L614, Indicate that the following parts (1&2) are for Appendix A: Supplementary Material
AC: Done.

Figure 1. Please include word "fluorescence", there is no such thing as "multi-spectral chl-a"
Should read "Seasonal to mesoscale"
AC: Done.

Figure 2. Somehow you need to indicate that this figure illustrates the satellite data. Figure (including the text) should be understandable alone, thus spell out LRC.
AR: The authors understand that this comment is for Figure 3 rather than for Figure 2.
AC: The first sentence was changed to" Satellite observations for SST (A,B), turbidity (C,D) and chl-a^{sat} (E,F) corresponding to...". LRC is now spelled out in the corrected version.

Figure 3. Replace the word "context" by "situation","characteristics", or similar
AC: "context" was replaced by "conditions" in Figure 4.

Figure 4. replace "Negative (positive) vorticity values represent anticyclonic (cyclonic) circulation" by "Negative vorticity values represent anticyclonic circulation"
If you really need to include further information, add " …while positive values represent cyclonic circulation". Correct also in other figures.
AC: Done.

Figure 6. Again, it is not immediate if the chl-a is from satellite, or fluorescence. Please include his information (ok, one gets a hint from colorbar title).
AR: This figure is derived from the surface Fluoroprobe. \
AC: This was indicated in the figure.

Figure 7. Last sentence should read " The red and blue horizontal lines represent the horizontal extension of A17 and C17E, respectively, that the section crosses." A similar correction needs to be done in several other sentences in figures.
AC: Done.

Figure 7 & 8. Should read "logarithmically transformed" not "normalized"
AC: Done.