

Editor (Dr. Piers Chapman):

I have gone through the revised manuscript and feel that the authors have answered all the questions posed by the reviewers. The paper can now be published, but there are a number of minor points that need to be addressed first. Additionally, I believe the copy editors will have some changes to the English.

We appreciate the positive evaluation and the helpful comments from the editor.

1. Line 53: I think this should read “We then present seasonal and interannual...”

We have deleted “clarify” in the revised manuscript (line 54).

2. Line 87: By “sampling depth interval” do you mean “thickness of the chl-a maximum”?

We have changed the description to “sampling depth interval around the Chl-a maximum” in the revised manuscript (line 87).

3. Line 104: I think this would read better as “(the depth at which sigma-theta changes by 0.125 compared to that at the surface)”

Done (line 104).

4. Line 112: “Here, El Niño or La Niña are taken to refer to all positive or negative...”

We have changed the description to “Here, El Niño or La Niña is taken to refer to all positive or negative ... (line 112).

5. Lines 154-156: I still have no idea what this means, nor what Fig. 9 actually shows. Is it important or relevant?

We apologize that we did not notice the comment from the editor in the previous round of review. We have changed the description to “The percentage of months with a deeper photosynthetically active layer than the mixed layer has a similar pattern to the percentage of months deeper the subsurface Chl-a maximum than the mixed layer” (lines 154-156). We also have changed Figure 9 from “ratio” to “percentage”, and the titles of Figure 9 to “Z_Cm>MLD” and “Z_PAR0415>MLD”.

6. Line 208: I think there is something missing here. It looks as though a sentence

should end after “and from profiling floats”, but then what comes before “potentially suffered from...”?

We have added the sentence “Especially data from profiling floats are potentially suffered from fluorescence quenching at surface (Xing et al., 2012).” in line 206.

References

Kang et al is given as 2017 in the reference list, but as 2018 (line 40) and 2019 (line 251).

Which is it, or are there more than one references to this author?

Both of them are 2017. We have corrected them in the revised manuscript (lines 40 and 252).

Hosoda et al (line 105) not in reference list

Nishioka et al 2020 (line 201) not in reference list

Chiswell et al (line 214) not in reference list

We have added them in the reference list.