

## ***Interactive comment on “Biogeochemical characteristics of a long-lived anticyclonic eddy in the eastern South Pacific Ocean” by M. Cornejo et al.***

**M. Cornejo et al.**

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We thank the reviewer for his/her time and constructive comments. We carefully read each of the comments and will address them as stated below:

Major points 1 - The paper needs to be corrected by a native English speaker, by preference a scientific person. Sentences were sometimes really hard to understand, the meaning was unclear due to incorrect use of the past tense / passive voice, among other mistakes. Also, I think that the use of some words is surprising for a scientific paper.

C9173

The manuscript was reviewed and edited by a colleague who is a native English speaker prior to submission. Nevertheless, we will check use of tenses and grammar, and ask another English speaking colleague to edit the revised manuscript prior to submission to ensure proper use of English.

Here are some mistakes: Line 20 p 14483: Estimation instead of Estimates. Line 6 p 14484: “Transport water long distance”: something missing? Line 12 p 14484: to transporting: -ing? Line 14: at the eddy -> within the eddy?

All these mistakes have been already corrected in the text

Also, the term “unfortunately” (line 2 p 14486) does not really fit in a scientific paper. Moreover, for this specific sentence, it is not explained why not being able to calibrate the oxygen sensor is unfortunate. This is not obvious for people that are not used to go at sea.

We removed this term and revised the sentence

2–A quick summary of the findings and an interpretation of how planktonic ecosystem would behave are missing.

The last paragraph provides a summary of the significance of the results but we will expand it to include a summary of the results. How the planktonic ecosystem will behave is not part of the scope of this study and we tried to restrict interpretation to variables that we actually measured. However, if the editor finds it necessary, we will add a short discussion on that.

3 – The abstract is a little bit messy, and could be more synthetic and straightforward. Indeed, the link between the mesoscale activity in upwelling system and the introduction to the cruise and the low oxygen sampling is quite mysterious. Instead of introducing the low oxygen sampling I would suggest to directly announce that “such typical eddies” has been sampled, and then give properties of this sampled eddy.

The abstract has been revised

C9174

4-Dynamical processes between cyclonic and anticyclonic eddies are different: please state, when necessary, if the described property depends of their polarity (e.g., lines 23, 24 p 14484). Even at the end of the introduction, the reader does not know which eddy polarity was sampled: it only appears on the title.

Good point. Eddy polarity will be made explicit in the text (all sections)

Also, the final quick conclusion does not state again that the studied eddy is anticyclonic.

Already corrected

Finally, what would we expect for a cyclonic eddy?

We will add a sentence in the discussion saying that cyclonic eddies typically transport shallower waters with higher oxygen concentrations and lower salinity than the anticyclonic eddies, which transport low oxygen waters from the Equatorial subsurface waters from the coast, with a reference to Chaigneau 2011. Here we attached a figure from this paper (2011) showing this.

Minor points: 5–Figures/table comments: -

Table1: I guess that each “cruise” are actually “dataset”. For each of these dataset, I recommend to precise what kind of data (Coats, transect, satellite...) it is in a separate column.

The name of the stations will be changed from E03 to 094 in order to uniform the name as the Tara Oceans stations.

The table and table caption will be modified as suggested

Data sets = Name of program (or study)

Year – Year

Lat/lon and distance from 094 will be combined = location and distance from 094

C9175

Type of data

Legend: Hydrographic information from other studies used for comparison with hydrographic data obtained at Tara station 094 (this study). The name, location, and distance of the nearest station from the station 094 are also reported (this profile corresponds to a cast done near station 094, 32.52oS 80.64oW TARA\_094,labelTARA\_20110316T1152Z\_999)

Information on 094 will be deleted from the table as it is stated in the legend and methods of the paper

Moreover, I do not understand how you can provide one latitude and one longitude for a transect, or a cruise that sampled several points.

The locations shown in the table 1 do not represent all the stations of a cruise, but the station closest to our eddy station.

It would be easier to represent all the location dataset in the Figure 1a.

The representation of every station of the database considered results in a cloud of point near of station 094, which make difficult to see. We preferred do not show all of them in the figure 1a. However, if the editor finds it necessary we will add the locations of the other studies in the figure.

General for all Figures: Label a, b c ... are hard to see within Figures. Put them outside. –

Will do

Figure 1, caption: Remove “Right panel” which is useless if you refer to b c d...

Removed

“stisopycnales”?

It should say sigma-t isopicnals. It was corrected

C9176

-Figure 2, caption: "In the area of study" -> in the study area

Corrected

When referring to the color of the lines, be more synthetic, or just put references directly in the figure and refer to table 1: indeed, all details (CTD data, cruise, transect...) should be given in table 1, and should not be repeated here.

Will be modified according to suggestion: we will add a legend to color lines that include program name and refer to Table 1 as suggested.

You should add the climatological mean (average computed for the study region).

Good suggestion. This will be added

- Figure 5, caption: "Coastal eddy generation" (no 's) "isoline" instead of isocline

Both were corrected

- Figure 6, caption: The caption is not clear; I don't understand which line refers to which quantity. The caption need to be re-written.

The figure caption was revised as follow: Figure 6. a) Oxygen distribution as a function of sigma t at station 094 (within the eddy) in March 2011 (red line) and at the coast in June 2010 (black line). Estimated O2 depletion rates are shown as gray bars, where the vertical dotted line marks zero O2 consumption rate. b) N\* and Nitrous oxide saturation (black triangles and line) distribution according with st within the eddy at station 094.

In addition we will add a legend with line colors in the figure

Figure 7: Black lines in the upper panel are not the same than in the other two panels while it should be.

Will be corrected

6 - Line 24 p14483: ESP is not defined in the abstract

C9177

Corrected. It is now defined.

7 - line 1 p 14484: First sentence of the introduction would need some references. The mentioned point has been widely discussed and shown.

References added

8 – line 5 p 14484 "Alongshore current in the coastal region": this is redundant information.

The phrase was changed

9 - Line 4 p14487: AVISO website should be given in acknowledgement

Acknowledgement added

10 - Line 19 p14487: References to Fig1a and not Fig1

Revised

11 - Line 18-19 p14487: - names of stations are incomprehensive and not useful for the reader (same comment for Table 1 and Figure 1): use it only once in the text and/or rename them. If they are necessary, the exact name can be given in the acknowledgement.

Point taken

12 - Line 1 p 14488: what is the reference of "the grid"?

We used the available oxygen information of a 1° x 1° grid around station E03. We included this information in the text.

13 - Line 20 p 144488: reefer precisely to Fig 1b 1c 1d.

Corrected

14 - Line 5 p 14490: references needed for "transport of suboxic water from coastal OMZ".

C9178

References added

15 – Line 7 p14490: Why is it “speculative” since you cite several studies that show your statement in the following sentence.

The statement try to establish that the low oxygen concentrations detected in the middle of the ocean in a cruise conducted in 1967 and reported in Silva et al. (2009), was not associated with mesoscale eddies. Recently, when we re-analyzed the information of that work (Silva et al., 2009), we observed that this low oxygen and high salinity core was related to an ITE. The phrase was revised to better explain it.

16 - Line 10 p14491: what are you trying to emphasize. I do not get the subtleties between ‘although’ ‘to be taken with a grain of salt’ ‘it highlight’. Be simple and speciã. The phrase was re-written.

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