

Associate Editor Decision: Publish subject to minor revisions (review by editor) (05 Dec 2019) by Marilaure Grégoire

Comments to the Author:

Dear Lothar,

I have read the reviews provided by two reviewers of the revised version of your manuscript. One of the reviewers who assessed the first version of your work is satisfied by the answers to his/her comments and provides a few additional comments while another one is asking more justifications on the significance of the trend in O2 and nutrient data. I recommend that you address these last comments in a revised version.

Thank you so much for your efforts,

Kind regards,

Marilaure

Suggestions for revision or reasons for rejection (will be published if the paper is accepted for final publication)

It is difficult to have any confidence in the trend results. I would suggest writing a paragraph on the confidence in the trend results and their significance. Beyond purely statistical analysis, why are these trends significant?

We added a paragraph dealing with the uncertainties of the mathematically significant trends. We argue that the observed trends indicate a relationship that needs to be monitored and revisited with future monitoring data, to understand better the causes of this relationship and the extent to which this is a related process to analyze in more detail in biogeochemical models and observational process analysis.

In the concluding remarks we now write concerning the PDO:

„Statistically significant trends and correlations hold true for the period and data analysis, though in data sparse regions, these findings should be subject of future scrutiny. Regional and small scale processes, related or independent of large scale PDO forcing may alter the signals seen so far.“

And further below addressing the other indices:

„With respect to other climate indices, the results are more mixed, and statistical significance should be treated with caution. “

Suggestions for revision or reasons for rejection (will be published if the paper is accepted for final publication)

The definition of the Pacific Decadal Oscillation (PDO) is not correct. I have listed below the correct definition, as provided by Deser et al. (2010) on page 143, as well as the incorrect definition provided by Stramma et al. (this revised manuscript) on page 4 lines 21-23. I believe that Stramma et al. have missed the significance of the parentheses in Deser (2010).

Here is the description of the Pacific Decadal Oscillation as provided by Deser et al. (2010):

“The leading EOF of monthly SST anomalies over the North Pacific (after removing the global mean SST anomaly) and its associated PC time series are termed the Pacific Decadal Oscillation (PDO) after Mantua et al. (1997).”

Here is the description as provided by the authors of this manuscript:

“The PDO is the leading empirical orthogonal function (EOF) of monthly SST anomalies over the North Pacific between 20°N and 70°N, after removing the global mean SST anomaly and its associated principal component (PC) time series (Mantua et al., 1997; Deser et al., 2010; Newman et al., 2016).”

Thank you for pointing this out. We used in all our computations the Deser et al. 2010 definition, though our description was formally not completely clear about the order of steps undertaken. We now use the identical sentence to Deser et al. as recommended by this reviewer but explain the abbreviations EOF and PC and reference this as citation.

