

***Interactive comment on* “Evidence for greater oxygen decline rates in the coastal ocean than in the open ocean” by D. Gilbert et al.**

D. Gilbert et al.

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We thank referee 2 for making constructive suggestions that helped improve the paper and strengthen some of its conclusions.

Major concerns

1. The data used to establish the first conclusion (published oxygen trends more negative than those computed from raw oxygen data) are not comparable. The published time series are from various length records and from different absolute times than the raw oxygen data (Tables 4-6 are all for 1976-2000). The authors need to use comparable time series lengths and absolute times so that they can compare “apples to apples.”

Response: We understand the referee's concern about the necessity to compare "apples to apples". In order to investigate this problem, we computed new trend estimates from the published timeseries by focussing exclusively on the 1976-2000 reference period, as was done in Tables 4 to 6. The results from this analysis are presented in the revised paper.

2. The data to support conclusion two (trends more negative earlier in 20th century) are not presented quantitatively in the paper. None of the tables have information from 1951-1975. The only indication of the differences is shown qualitatively in Figs. 7 and 8. In addition, and this is important, the trends aren't more negative, that is the numerical trend values are not more negative, but, rather, the "odds of having negative trends increased by a factor of 2."

Response: Thanks for pointing this out. We rewrote conclusion two, which now states that the "odds of having negative trends increased by a factor of 2 from the 1951-1975 period to the 1976-2000 period."

Suggestions intended to improve the manuscript

a. Fig. 1: make dots bigger.

Response: A revised figure with bigger dots was produced.

b. Fig. 5: Is there a way to indicate the time series length for the trends? Maybe another histogram? Should the present trend histogram be subdivided by the time series length? That is, is there something systematic about the trend value based on the length of the time series? For example, a short time series could certainly have a larger trend value than one that spans many decades of ups and downs.

Response: We adopted this suggestion by splitting the published oxygen timeseries into two groups of similar size. The first group contains timeseries with durations of 33 years and shorter (N=51), whereas the second group contains timeseries longer than 33 years (N=49). We find that the standard deviation of the estimated trends is

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larger for the group with shorter timeseries ($3.16 \mu\text{mol L}^{-1} \text{yr}^{-1}$) than for the group with longer timeseries ($1.84 \mu\text{mol L}^{-1} \text{yr}^{-1}$), as referee 2 had intuitively guessed. We inserted these new results in the revised manuscript and changed Fig. 5 accordingly.

c. Fig. 6: This figure is not very helpful given the tiny size of the colored dots. Either make the dots much bigger (and use insets if necessary for regions with lots of samples) or delete the figure.

Response: A revised figure with bigger dots was produced.

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