

Interactive comment on “On the role of circulation and mixing in the ventilation of oxygen minimum zones with a focus on the eastern tropical North Atlantic” by P. Brandt et al.

Anonymous Referee #2

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This overview is an important contribution to the regional and global communities working on the ETNA and especially towards improving the way models reflect the climate sensitivities of the ETNA OMZ. It reflects a very significant and well coordinated effort by the community represented by the authors.

The manuscript succeeds in assembling a description and steady state quantification of the oxygen ventilation and consumption processes but it does so in a manner which is dense and hard to read and make the connections. While there is an attempt to "integrate" the processes in Fig 21 the text has the sense of a number of almost standalone parts of study.

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One easy gain to simplify the text would be to remove the section on the ETSP which interrupts the coherence of the ETNA focus. It is also not clear how and where this study adds to what was already known. In this respect a focus in the introduction not just on the gaps in the ETNA that this study set out to investigate but also a brief comparison of the Atlantic and Pacific OMZs to put some context to the relatively well ventilated ETNA.

Much modelling and observational work has been undertaken on the role of planetary wave systems and dynamics to explain O₂ variability and trends in the tropical OMZs but this is not really reflected in this study. Given that these dynamics appear to explain a significant part of the variability in the ETSP and the ETSA it seem that the study should explain why these are under-represented in the ETNA. The time series data in Figs 8 and 9 indicate that there are seasonal and intra-seasonal modes which warrant consideration in this context.

Given that one of the major scientific benefits of such a synthesis is a better understanding of the climate sensitivities of the ETNA, it would have been useful to see some discussion on where models may look to improve the way they reflect the climate sensitivity of the OMZ. The meridional negative anomaly of the oxygen trend (Fig. 18) between 10 - 30N and 100 - 500m would seem a good basis to examine where the imbalance may be emerging in the proposed budgets Fig. 13 and 14.

Finally, the summary is again too long and much of the discussion points are repeating the text. Overall, an effort to clarify the objectives and context of the study as well as removal of non critical parts will help further highlight the strengths of this otherwise comprehensive excellent study.

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