

Interactive comment on “Remote and local drivers of oxygen and nitrate variability in the shallow oxygen minimum zone off Mauritania in June 2014” by Soeren Thomsen et al.

Anonymous Referee #2

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“Remote and local drivers of oxygen and nitrate variability in the shallow oxygen minimum zone off Mauritania in June 2014” by Soren Thomsen et al.

The authors present an analysis of the variability of dissolved oxygen (DO) and nitrate (NO_x) in an upwelling region off Mauritania (18°S) using a series of glider and ship-based observations including a novel underwater vision-profiler mounted on the rosette to obtain particle size spectra in the water column. In addition to the CTD, the glider was equipped with oxygen and nitrate (Satlantic Deep SUNA) sensors. Based on water-mass analysis and AOU changes (along with a sequence of reasonable hypothesis) the authors separate DO and NO_x local variability from a remote signal. The remote

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signal is mainly associated to changes in ocean transport, while local processes are related to local respiration and remineralization. Particularly, the results based on glider observations showed that an increasing of turbidity is related to negative DO anomalies close to the bottom and the authors hypothesize that resuspended particles increase local respiration. This hypothesis is supported by observations from the vision-profiler and, DOC and DHAA data obtained from the ship.

In general, the paper is well structured and the data processing is well done and adequately explained (references are appropriate when additional information is required). Figures and figure texts are clear and main features are well emphasized. I have only few comments:

1.- I'm not sure if I missed anything, but it's not clear to me how the particle-based oxygen respiration rates were calculated. In the Page 17 lines 8 and 9, the sentence: "the mean particle associated respiration rate estimate along 18 ° N during June 2014 reveal a similar pattern". On what is this claim based? The spatial distribution of the particles has been described in the previous lines, but the respiration rates are not mentioned. How the values of respiration rate given below (values in lines 10 to 12) are then obtained. Are these values given by OMP / AOU methods (like in Figure 6)?

From the sentence indicated above (lines 8 and 9) should it be understood that both sets of particles (small and large) are associated with a same respiration rate?

2.- Regarding the above comment, I understand that values for respiration (and nutrient remineralization) rate are crude estimations, nevertheless it would be valuable if the authors can provide an estimation of the error (or the variability, based on how they were estimated) associated to the given numbers.

3.- I wonder why there is no mention to the third type of oxygen anomalies described in section 4.2.1 in the discussion. I mean the negative (positive) DO (nitrate) anomaly “lens about 110 km from the coast and in 80 to 100 m depth” showed in 4n, m (and also in figure 5, last row).

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Minor specific comments

Some extra information about the glider data would contribute to improve the paper. Did the glider sample only until 250 m depth? What is the accuracy and precision of the nitrate data? Does the G2 glider have a pumped CTD? Was the sensor a fast-response Aanderaa optode?

Page 7. L 27: AOU was already defined (in P4 L31)

P 8. L 20-21: Check redaction.

P 13. L 11: OPM should be OMP

P 13. L 25: delete "by"

P 17. L 23: "Of cause" should be "Of course"

P18. L16: "waver" should be "water"

P 23. L 9: Define OM or you mean DOM

Table 1: include units

Figure 3: Indicate what the white vertical line represents.

Figure 7. Delete one "following".

Figure 9. A depth scale for the study region would help (because the shallow OMZ was studied).

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