

Interactive comment on “Controls on redox-sensitive trace metals in the Mauritanian oxygen minimum zone” by Insa Rapp et al.

Insa Rapp et al.

irapp@geomar.de

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Response to Referee 2

Referee general comment: This is an important paper that illustrates the potential importance of benthic shelf sediments as a source of Fe to the oceans interior, and linking spatial and temporal variability to oxygen concentrations. While I think the authors make a good case for the role of oxygen, the paper is flawed by three serious omissions that must be corrected before publication.

Response: We thank the reviewer for the constructive comments and address each of them below.

Referee Comment 1. Iodide is reported as a critical parameter in the principal com-
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ponent analysis and there are detailed protocols for iodide analysis, yet no data are reported in the paper or in the supplement. These data are of great interest in their own right. While iodide has been reported in truly anaerobic, denitrifying water columns, it has not been well studied in these low oxygen regimes. One presumes that these data will appear in Pangea eventually, but why not here?

Response to Comment 1: Thanks for pointing out the importance of our iodide data. We have now added a plot showing the spatial distribution of iodide in the Supplementary Material (plot shown below). The data will also be uploaded in Pangea.

Referee Comment 2. Similarly, Ra-228 data are not reported, nor is there any quantitative assessment of Ra-228 correlations with Fe to support their conclusions about lateral transport.

Response to Comment 2: Unfortunately Ra-228 was not determined along our transect. Therefore, we can't provide such information. Due to the long half-life of 228Ra of 5.7 years, this isotope would show sediment-water interaction on longer time scales. In our study close to the source, shorter timescales are of larger interest. Additionally, there doesn't necessarily need to be a correlation between Fe and 228Ra when Fe is released from sediments, because 228Ra behaves conservative, whereas iron is removed by scavenging.

Referee Comment 3. The authors imply that the approach used to determine vertical eddy diffusivity will appear in the Supplementary materials, but it does not.

Response to Comment 3: The approach used to determine vertical eddy diffusivity is explained in detail in the method section of the main manuscript in the paragraph starting at Page 8, Line 9. For a more detailed description, we refer to Schafstall et al. (2010).

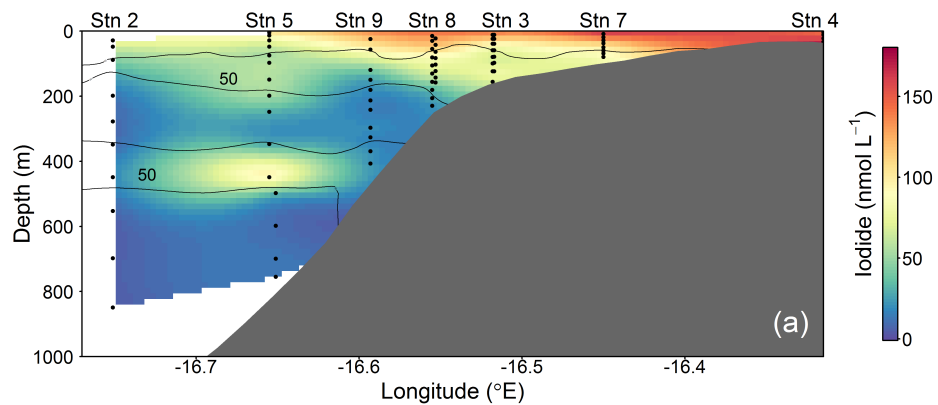


Fig. 1. Figure S1. Spatial distributions of Iodide across the Mauritanian shelf at 18°20'N in June 2014. Each sample location is indicated as black dot and oxygen contours at 50 $\mu\text{mol kg}^{-1}$ enclosing the upper