

Interactive comment on “Coastal hypoxia/anoxia as a source of CH₄ and N₂O” by S. W. A. Naqvi et al.

Anonymous Referee #1

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General Comments:

This paper reviews the current and historical literature on CH₄ and N₂O production in low-oxygen marine environments. The review is very thorough in terms of covering the available information. The explanations are clear and well-written. I found the organization and layout of the paper logical and easy to follow. The arrangement of the examples by geographic region is helpful to the reader who is searching for specific information, but I see some overlap between Section 4.5 and Section 5 which both discuss the Black and Baltic seas. Perhaps these sections could be combined. If the purpose of Section 5 is to highlight the conditions in enclosed basins, then that could be more specifically indicated in the section title.

Overall I found the paper a very helpful synthesis of the available literature. The field
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has advanced rapidly in recent years is thus due for an updated review. This paper is timely in that respect. As an introduction to the field or a starting-point for further reading, it is a valuable contribution. The specific comments I have listed below are generally minor and should not be difficult to address.

Specific Comments:

Page 9458 line 10: I'm not sure about the term “back radiation”. Here the authors use it to refer to radiation from the earth's surface which is subsequently absorbed by the atmosphere, but I see it used more often to describe thermal radiation from the atmosphere toward the earth. If the term is ambiguous, perhaps a more precise phrase could be used.

Page 9461 line 11: What is meant by “in the shadow of the subtropical gyres” Page 9461 line 19: The abbreviation “EBUSs” is apparently used several times later in the paper as “EBUEs” - it should be consistent throughout

Page 9465 line 17: The authors state that there are no published data from the NW African (Mauritanian) region, but Walter et al. (2004) *Geophys. Res. Lett.* 31:L23S07 provide data from only slightly farther south in what they describe as an upwelling regime.

Page 9466 lines 7-8: Fisheries in the Benguela Current system were formerly rich but have been greatly over-fished, so to say that the conditions are “apparently not suitable” is not really true.

Page 9471 line 13: “While in THE case. . .”

Page 9674 : The description of Figures 5 and 6 is not clear. In the main paragraph on this page, the authors seem to discuss both sets of figures at the same time and it is not always stated which panel is being referred to. They mention Figures 6a and 6b, but the Figure 6 has no labels to identify the individual panels. I infer from the caption that the left column is “a” and the right column is “b”, but it should be clearly stated.

Also, is it appropriate to compare summer and winter monsoon periods from widely spaced years (1987 and 1998!)? How much interannual variability is there and can the summer conditions influence the following winter (or vice versa)? Lines 12 – 21: In the discussion of Fig. 5, it is stated that N₂O begins accumulating with the onset of upwelling in May, but when I look at the figure, N₂O appears not to increase until July.

Section 4.3 (pages 9476-9479): this is the only major section of the paper which is not illustrated. Several references are discussed and it would be useful to include a figure or two as examples.

Page 9486 line 27: (spelling) . . .RELATIVELY low O₂. . .

Page 9490 line 7: There is a brief mention of N₂O in the Mississippi estuary in Fox et al. (1987) *Estuaries* 10:1-12

Page 9495 line 1: Check spelling for Farraington (Farrington?) here and in reference list

Figures:

Fig. 5: The contour scale in panel h (hydrogen sulphide) is extremely difficult to read.

Fig. 6: As mentioned above, the parts “a and b” mentioned in the text are not identified on the figure. Also, the caption mentions that H₂S was not measured on cruise SK137, but it does not appear to be shown for the other cruise either.

Fig. 8: The contour labels are too small, unless I magnify the view to 200x. In a laser print they are almost impossible to read.

Fig. 10: It would be helpful to include a distance scale on the x-axis if possible, rather than just station numbers.

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