

Interactive comment on “Coastal versus open-ocean denitrification in the Arabian Sea” by S. W. A. Naqvi et al.

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The manuscript describes differences in nitrogen cycling and turnover between shallow coastal and open sea sites in the Arabian Sea. A very wide range of variables is presented for that purpose based on published and new data. The wealth of information is used to draw a detailed picture of the ecological differences including the different hydrographic constraints, concentrations of N₂O and in isotope ratios. Some questions cannot yet unambiguously be resolved like the role of Anammox and the extent of fractionation of nitrate on the shelf. However, evidence is shown that processes of nitrogen turnover work differently in both regions resulting in high N₂O emissions at the coast and lower ones offshore. This may have strong implications for climate scenarios esp. if humans alter the N-cycle and the microbial activity along the coast. Furthermore this

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differentiation into biogeochemical provinces within this ocean basin may have major implications for other oceanic regions where the same feature may exist. For the comparatively small Baltic Sea it was possible to show differences in coastal vs. open sea N-cycling solely based on isotopic signatures of nitrogen in sediments and nitrate (Voss et al. 2005, GBC19: 1-16, doi:10.1029/2004GB002338). The paper is relatively long and combines published with new data which is reasonable approach for such a complex story. However, I had major difficulties to judge which data belong to what category. To indicate which material has been published and which not would be helpful with a clear citation. The same is true for some figures which refer to past cruises but it stays unclear whether the material was published elsewhere or not. Detailed comments: Please show a map with all stations presented offshore and at the coast. Page 673 line 20. The loss of $20 \mu\text{mol NO}_3^-$ within a month would demand a loss rate of app. $0.7 \mu\text{mol/L/d}$ which is similar to $0.83 \mu\text{mol}$ (line 24). Page 674 line 10. There is a 25 years gap between the UNDP/FAO cruises and the years 97-04. Can one really talk about in trend over time in this case? I think it is more a two point observation. Line 19. I cannot agree to a regime shift on the Indian shelf. There may have been drastic changes, but a regime shift needs more features than suggested here. Page 674 line 14, It is the presence of a zero Winker oxygen, not the absence. Figures 3 and 6 are very small and numbers difficult to read. Figure 2 shows isolines of temperature, salinity, O₂ and nitrite, esp for the latter the data points may be shown.

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