



Physical controls on oxygen distribution and denitrification potential in the north west Arabian Sea

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At suboxic oxygen concentrations, key biogeochemical cycles change and denitrification becomes the dominant remineralization pathway. Earth system models predict oxygen loss across most ocean basins in the next century; oxygen minimum zones near suboxia may become suboxic and therefore denitrifying. Using an ocean glider survey and historical data, we show oxygen loss in the Gulf of Oman (from 6-12 to $< 2 \mu\text{mol kg}^{-1}$) not represented in climatologies. Because of the non-linearity between denitrification and oxygen concentration, resolutions of current Earth system models are too coarse to accurately estimate denitrification. We develop a novel physical proxy for oxygen from the glider data and use a high resolution physical model to show eddy stirring of oxygen across the Gulf of Oman. We use the model to investigate spatial and seasonal differences in the ratio of oxic and suboxic water across the Gulf of Oman and waters exported to the wider Arabian Sea.