Observed global oxygen: deoxygenation trends and variability

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Oxygen measurements are generally sparse in most ocean basins, nonetheless some key locations with longer-term oxygen time series exist and trends for the global ocean can be estimated. In many regions especially the tropical oceans oxygen has decreased over the past 50 years, however in subtropical ocean regions of increasing oxygen values exist. Typical oxygen trends range from -0.5 to +0.4 micromol/kg/yr in the upper ocean over the last few decades, with a global mean oxygen trend of -0.066 micromol/kg/yr between 50°S and 50°N at 300 dbar for the period 1960 to 2010 [Stramma et al., 2012]. An estimate for the total surface to bottom world ocean oxygen loss over the last 50 years is presently computed and will be presented at the conference. Further expansion of low oxygen regions in conjunction with overfishing may threaten the sustainability of pelagic fisheries and accelerate shifts in animal distributions and changes in ecosystem structure.
In the Pacific Ocean multidecadal variability (Pacific Decadal Oscillation) and also El Nino phases are superimposed on long-term oxygen trends [e.g. Czeschel et al., 2012]. Local variability from mesoscale hydrographic features contribute to the redistribution of oxygen and nutrients in low oxygen environments.

REFERENCES

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