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Air-sea fluxes of CO_2 and O_2 associated with the Mauritanian Upwelling

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During a research cruise to the Mauritanian upwelling region (R/V *Poseidon* Cruise 320/1, March 21 – April 7, 2005; Las Palmas/Gran Canaria – Mindelo/Cape Verde) precise underway measurement of the partial pressure of CO_2 and O_2 in surface seawater were carried out by using the following techniques: a) Continuous flow equilibration of seawater with air and subsequent detection of gas phase CO_2 with non-disperse infrared analyser (pCO_2), and b) Lifetime-based optode sensor in flow-through cell (p). The measured pCO_2 level of up to 750 μatm in upwelled surface waters document the strong source function of upwelling regions for atmospheric CO_2 that has been reported for other region (e.g. Körtzinger et al., 1997). This is accompanied by a similarly marked undersaturation of dissolved O_2 in surface waters which reach down to 50 % saturation. On transects into open-ocean oligotrophic waters, both gases quickly reached equilibration by a combination of air-sea exchange and net primary production. In this presentation the regional distribution of CO_2 and O_2 saturation anomalies as well as resulting air-sea fluxes will be shown. The CO_2/O_2 flux ratio will be used understand the relative importance of the two driving factors. Observed fluxes are likely to influence regional signatures of 'Atmospheric Potential Oxygen' (APO = O_2 + 1.1 CO_2) significantly.

References

Körtzinger, A., Duinker, J.C., Mintrop, L., 1997. Strong CO_2 emissions from the Arabian Sea during South-West Monsoon. Geophysical Research Letters 24, 1763-1766.