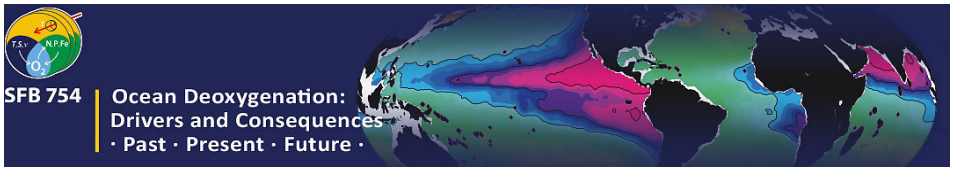

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Oxygen and nitrate variability in the shallow oxygen minimum zone off Mauritania

Upwelling systems play a key role in the global carbon and nitrogen cycles and are of local relevance due to their high productivity and fish resources. To capture and understand the high variability of physical and biogeochemical parameters found in these regions novel measurement technics have to be combined in an interdisciplinary manner. Here we use high-resolution glider-based physical-biogeochemical observations in combination with ship-based underwater vision profiler (UVP5), sensor and bottle data to investigate the drivers of oxygen and nitrate variability across the shelf break off Mauritania in June 2014. Distinct patches of oxygen anomalies were derived from the glider data, which strongly correlated with nitrate anomalies. High oxygen and low nitrate anomalies were clearly related to water mass variability and probably linked to ocean transport. Low oxygen and high nitrate patches co-occurred with enhanced turbidity signals close to the seabed, which suggests locally high microbial respiration of resuspended organic matter near the sea floor. This interpretation is supported by high particle abundance observed by the UVP5 and enhanced particle-based oxygen respiration rate estimates close to the seabed. Discrete in-situ measurements of nutrients, dissolved organic carbon and amino acids were used to further relate the observed oxygen and nitrate anomalies to local and large scale remineralization processes. Our observations highlight the complex interplay of remote and local physical-biogeochemical drivers of oxygen and nitrate variability off Mauritania, which cannot be captured by classical shipboard observations alone. By applying adaptive sampling strategies, combining high-resolution in-situ data with satellite data in near real-time, interdisciplinary data can be sampled in regions of interest. Such a data set allows decomposing physical, biogeochemical and biological drivers in highly variable upwelling systems.

Position

Postdoc

Affiliation

LOCEAN-IPSL, IRD/CNRS/Sorbonnes Universites (UPMC)/MNHN, UMR 7159, Paris, France

Email Address

soeren.thomsen@locean-ipsl.upmc.fr

Are you a SFB 754 / Future Ocean member?

No

Primary author(s) : Dr THOMSEN, Sören (LOCEAN-IPSL, IRD/CNRS/Sorbonnes Universites (UPMC)/MNHN, UMR 7159, Paris, France); KARSTENSEN, Johannes (GEOMAR Helmholtz Centre for Ocean Research Kiel); KIKO, Rainer (GEOMAR Helmholtz Centre for Ocean Research Kiel); Dr DENGLER, Marcus (GEOMAR Helmholtz Centre for Ocean Research Kiel); Dr KRAHMANN, Gerd (GEOMAR Helmholtz Centre for Ocean Research Kiel); ENGEL, Anja (GEOMAR Helmholtz Centre for Ocean Research Kiel)

Presenter(s) : Dr THOMSEN, Sören (LOCEAN-IPSL, IRD/CNRS/Sorbonnes Universites (UPMC)/MNHN, UMR 7159, Paris, France)

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