

Decomposition of Superoxide (O_2^-) across the Mauritanian Shelf

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Superoxide (O_2^-) is one of the short lived reactive oxygen species (ROS) formed in seawater by photochemical or biological sources. The photoproduction of O_2^- is now thought to involve reactions between Oxygen and reactive reducing (radical) intermediates formed from dissolved organic matter (DOM) via intramolecular reactions between excited single state donors and ground-state acceptors [1]. In seawater, the main pathways identified for the decomposition of O_2^- into H_2O_2 and O_2 , involve reactions with Cu, Mn and DOM. Interactions between ROS and DOM also play an important role in e.g. light availability for primary productivity, and are known to be critical for ROS generation/ destruction. Our earlier results in the surface waters impacted by Saharan aerosols in the Atlantic Ocean indicate that the main decay pathways for O_2^- in this area are via reactions with both Mn(II) and organic matter [2]. In the present work we examined the relationships between O_2^- decay rates and parameters associated with chromophoric/ fluorescent dissolved organic matter (CDOM/FDOM). We present data from samples collected along a transect across the Mauritanian continental shelf during a period of upwelling. In this region we also found that reactions with DOM, are a significant sink for O_2^- constituting on average $58 \pm 13\%$ of the O_2^- loss rates [3]. Analysis of FDOM parameters indicates that many of the markers previously used for terrestrial sources of DOM and FDOM are called into question as marine sources exist. In particular recent work [4] indicates that algal species may also produce syringic, vanillic and cinnamic acids, which had previously been ascribed solely to terrestrial vegetation.

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[4]Rico,M.,López,A.,Santana Casiano,J.M.,González,A.G., González-Dávila, M. 2013. *Limnology And Oceanography*,. 58, 144–152.