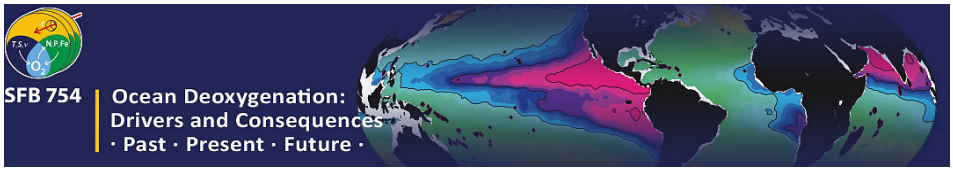

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Untangling the key drivers in oxygen minimum zone (OMZ)-influenced waters that shape natural plankton assemblages

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The eastern tropical South Pacific Ocean (ETSP) contains one of the largest oxygen minimum zones (OMZ) in the world, with a pronounced impact on nutrient cycling and stoichiometry in the region. Low oxygen concentrations support nitrogen loss and release of sedimentary phosphorus, leading to inorganic macronutrient nitrogen to phosphorus ratios (N:P) in upwelled waters well below the Redfield ratio (16:1). Field studies and bioassays indicate that inorganic macronutrient N:P influences phytoplankton community composition, which will likely influence trophic transfer and organic matter partitioning. However N:P in inorganic nutrients is not the only defining characteristic of upwelled waters from subsurface layers. In addition, dissolved organic matter (DOM) concentration and composition, trace metal concentration and bioavailability, and the seed microbial community will also depend on the origin of a water parcel and its history of oxygenation. In this study, our aim was to distinguish key drivers (inorganic nutrient N:P, seed microbial community, DOM/trace metal availability) of the lower food web response to water influenced by the OMZ in the ETSP. We collected water with two distinct nutrient signatures (N:P~4 and 1 for moderate and strong OMZ, respectively) from different locations in the coastal Peruvian upwelling region. These waters were then added to a surface phytoplankton community resulting in 3 treatments for each N:P ratio (filtered, unfiltered, inorganic nutrient addition). Here, we report on the key drivers of particulate and dissolved matter dynamics and the response of the phytoplankton community biomass and composition during this short-term incubation study.

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