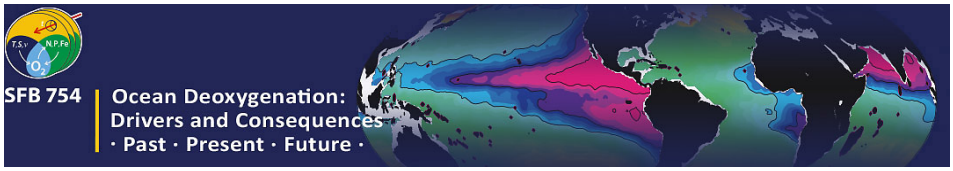

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AN EXPERIMENTAL AND MODELING INVESTIGATION OF SEDIMENT NUTRIENT CYCLING DURING FURTHER DEOXYGENATION ON THE PERUVIAN MARGIN

Thursday, 6 September 2018 17:45 (15)

In this study, we present the results from an ex situ incubation experiment of sediment cores from the Peruvian oxygen minimum zone (750 m water depth). The motivation is to understand how the efficiency, timing and magnitude of nutrient recycling responds to lower levels of oxygen and nitrate in the water column. Three sediment cores (one control, two replicates) were incubated for 17 days on board RV Meteor during cruises M136 and M137 in austral summer 2017. The overlying waters were subject to anoxic conditions where nitrate was allowed to become depleted. When nitrate was exhausted, ammonium, phosphate and iron began to accumulate in the water at different rates and at different times. Hydrogen sulphide was released from the sediment around one week after nitrate disappeared. Re-addition of nitrate led to a dramatic reduction in sulphide levels, but had no noticeable effect on dissolved iron. At the end of the experiment all cores were sliced and porewaters were analysed. Further samples were taken for genetic sequencing to relate the geochemical observations with the microbiological community composition. A simulation of the experimental set-up using a 1-D diagenetic model was undertaken to identify key processes and kinetic parameters that explain the observations. The results will improve our predictions of benthic-pelagic coupling across the wider region.

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