Dynamics of dissolved organic matter and inorganic nutrients in upwelling simulations

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Introduction and methodology

This study investigated the role of microbial communities in net dissolved organic matter production and associated inorganic nutrient uptake, and subsequent catabolism of DOM by heterotrophic bacteria. Using natural water and microbial populations, we simulated upwelling systems of different intensities by combining seawater from different water masses. We evaluated the resulting net community production and our findings suggest a decouple between DOC and DON remineralization, and at different rates depending on availability of inorganic nutrients.

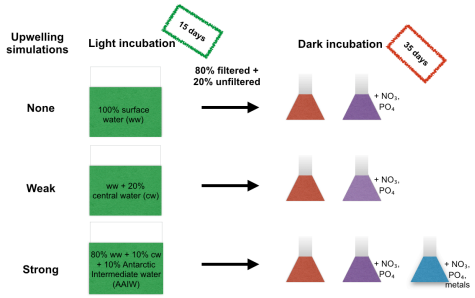

Figure 01: Incubation scheme for the upwelling simulations.

Main results

Light incubations: Fluorescence intensity showed a small peak in the weak upwelling and a larger peak in the strong upwelling treatment. Dissolved organic carbon and nitrogen (DOC and DON) were consumed at different levels in the "none" and "weak" upwelling scenarios, but underwent net production in the strong upwelling treatment. Inorganic nutrients (PO_4, NO_3^- and NH_4^+) were consumed in all treatments.

Dark incubations: DOC experienced remineralization in all treatments, while DON and inorganic nutrients were either consumed or produced at different rates, especially when comparing no-amendment *versus* nutrient addition *versus* trace metal amendments. These results highlight the importance of microbes in shaping nutrient concentrations and organic matter quality in the environment.