Contribution ID : **59** Type : **Oral**

Microbial degradation activity and organic matter lability in the oxygen minimum zone off Peru

Tuesday, 4 September 2018 15:00 (15)

Within oxygen minimum zones (OMZs) microbial biogeochemical cycling is adapted to limited availability of oxygen (O2). Earlier studies suggested higher efficiency of carbon export in those regions due to reduced microbial degradation activity. However, previous findings on the effect of O2 on microbial activity are ambiguous and compared to nitrogen cycling little is known about microbial degradation activity within OMZs. Here, we present first results on bacterial biomass production (estimated by 3H leucine incorporation) and rate measurements of the extracellular enzyme leucine aminopeptidase, for the OMZ off Peru. Additionally, we estimated the uptake of dissolved organic carbon (DOC) and lability of dissolved organic matter, defined by combined carbohydrates and amino acids.
We observed no significant reduction in bacterial biomass production (20 ± 26 µmol C m-3 d-1), or leucine aminopeptidase rates (49 ±22 nmol L-1 h-1) and no reduced cell abundance (8 ± 4 x105 ml-1), in core of the OMZ (<5µM O2) compared to more oxygenated waters (34 ± 44 µmol C m-3 d-1 and 34 ± 20 nmol L-1 h-1, 9 ± 2 x105 ml-1) at the upper and lower oxyclines (5-60 µM O2), suggesting that the microbial degradation rate does not slow down under low O2 conditions. Additionally, changes in dissolved organic matter composition between the OMZ core and the lower oxycline suggest active microbial organic matter degradation in the anoxic waters.
Our results suggest that microbial degradation of organic matter significantly contributes to the formation of the OMZ off Peru and can proceed at relatively high rates within anoxic waters. This indicates that carbon dioxide production by heterotrophic microbial degradation in the OMZ off Peru is not necessarily reduced under anoxia and driven by anaerobic heterotrophic respiration pathways like denitrification.

Position

PhD Candidate

Affiliation

GEOMAR Helmholtz Centre for Ocean Research Kiel; Düsternbrooker Weg 20; 24105 Kiel, Germany

Email Address

mmassmig@geomar.de

Are you a SFB 754 / Future Ocean member?

Yes

Primary author(s) : MAßMIG, Marie

Co-author(s) : Mr LÜDKE, Jan; Dr KRAHMANN, Gerd; ENGEL, Anja

Presenter(s) : MAßMIG, Marie

Session Classification : 04 Microbial Communities and their Impact on Biogeochemical Cycles in Oxygen Minimum Zones

Track Classification : 04 Microbial Communities and their Impact on Biogeochemical Cycles in Oxygen Minimum Zones