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Diel Vertical migration of mesozooplankton associated with presence of an Oxygen Minimum Zone off northern Chile

The Oxygen Minimum Zone (OMZ) in the eastern South Pacific Ocean is an intrinsic characteristic of the water column and a permanent feature that covers the coastal zone of Ecuador, Peru and Chile. During the last two decades studies in this region have shown that waters with low oxygen content become a physiological constraint for pelagic and benthic organisms, and so impacting biomass, productivity and species diversity, as well as limiting the diel vertical migration of zooplankton organisms.

The diel vertical migration of zooplankton in relation to the OMZ was investigated across a zonal section off Iquique (20°S), in the coastal zone off northern region of Chile which is subjected to important coastal upwelling throughout the year. The oceanographic information and zooplankton samples were collected during the LowPhox cruise performed in October 2015 onboard the R/V Cabo de Hornos. The Zooplankton hauls were done in five depth strata from 800 m depth to the surface, during day and night condition using a HydroBios Multinet, with a 0.25 m² opening area and equipped with 200 µm mesh-size nets. The samples were digitized with a ZooScan digital imaging system and then identified and automatically classified in taxonomic categories.

Results are presented for the major taxonomic groups of mesozooplankton. The dominant taxa were Appendicularia, Copepoda, Eggs, Euphausiacea, Nauplius, Ostracoda, Salpidae and Siphonophora. A high percentage of these taxa performed nictimeral displacements.

The vertical distribution of zooplankton was modal and it was characterized by: 1) non-migrant groups, such as Salpidae and Siphonophora which showed limited nictimeral movements, probably because of the chemical barrier imposed by the OMZ; and 2) migrant groups with a greater range of vertical distribution such as the case of the copepod *Rhincalanus spp*, Annelids, Briozoa, other copepods, Euphausiids, Gastropods and Foraminifera, which even showed intrusions into the OMZ during the night.

The differential vertical displacement of taxa indicates that a significant fraction of the zooplankton can interact with the OMZ with biogeochemical consequences associated with the active transport of Carbon and nitrogen into this hypoxic water, although the migration seems to be attenuated by the ecological barrier imposed by the OMZ.

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