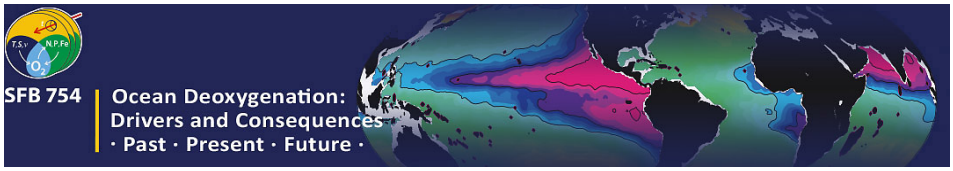

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Vertical carbon flux along a transect at 12°S within the Oxygen Minimum Zone off the Peruvian coast

The vertical flux of organic carbon out of the euphotic layer in the Peruvian Oxygen Minimum Zone (OMZ) was estimated indirectly by measuring the pair of natural radionuclides thorium-234 (^{234}Th) and uranium-238 (^{238}U). The "scavenging" of ^{234}Th onto particles produced in the euphotic zone and exported through sedimentation causes a separation between daughter and parent nuclide. The resulting disequilibrium between the two nuclides is used to calculate the flux of particulate organic carbon (POC). Samples were obtained during two expeditions (M92, M137) taking place in the framework of the SFB754 (Collaborative Research Center 754). The sampling stations were all situated along a transect perpendicular to the coastline just south of 12° S and covering a water depth range from 80 m to 1000 m. The first sampling method consisted in the deployment of 4-6 in situ pumps at a time to collect the particulate and dissolved fraction of ^{234}Th, and the second so called "small volume" method consisted in sampling 4 L of seawater from NISKIN bottles and precipitating the total ^{234}Th. All ^{238}U samples were taken from the NISKIN bottles and measured by ICP-MS.

A very pronounced OMZ was observed, the water column being depleted of oxygen (< 5 µM) down to some 500 m depth with an oxycline situated between 20-50 m during the first expedition in the austral summer, and between 80-120 m during the second expedition in the austral autumn. POC fluxes out of the photic layer during the first expedition were highest (10 mmol C m^{-2} d^{-1}) at the shallowest site (80 m bottom depth). At three other sites with bottom depths within oxygen depleted waters (< 500 m), POC fluxes were around 5 mmol C m^{-2} d^{-1} and < 1 mmol C m^{-2} d^{-1} at the two sites farthest from the coast (750 m and 1000 m bottom depth).

The carbon fluxes measured during the austral summer expedition will be compared to those from the autumn season, during which flux measurements were done using also the "small volume" method. They will be discussed within a broader framework of POC flux measurements in the OMZ of the tropical south Pacific. The presented flux data set is one of the most comprehensive ones presented from the Peruvian OMZ, where flux data are generally rare.

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