# Spatial variability of $^{234}$Th-derived organic carbon and nitrogen export in the Peruvian OMZ

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Variabilities in the intensities of oxygen minimum zones (OMZs) have direct impacts on remineralization processes and benthic release of macro- ($PO_4$) and micro-nutrients (Fe) from anoxic sediments [1-2]. The latter has the potential to fuel surface primary productivity (PP) upon reaching the surface ocean, thus acting as a negative feedback to ocean deoxygenation. How organic carbon and nitrogen export response to future changes in PP is unclear. Organic matter export in the Peruvian OMZ has been tightly linked to nitrogen loss via annamox and denitrification [3]. Nevertheless, coupled climate carbon cycle models have shown conflicting results regarding POC export variability with changing PP [4].

Here, we present $^{234}$Th-derived fluxes of particulate organic carbon (POC) and nitrogen (PON) along 4 coastal-offshore transects from 11°S to 16°S across the Peruvian OMZ. Seawater and particulate (> 50 μm) samples were collected during two cruises (M136 and M138) using NISKIN bottles and the Challenger stand alone in-situ pumps, respectively, on board the R/V Meteor in April-May 2017. Monthly satellite wind stress and in-situ microstructure measurements were respectively used to correct for the depth integrated $^{234}$Th fluxes due to upwelling and diffusion. Both $^{234}$Th-derived POC and PON fluxes below the mixed layer decrease toward offshore stations, but fluxes at 100 m show little spatial variation. At both depths, we observe no significant correlation between $^{234}$Th-derived POC fluxes and net PP (NPP), chlorophyll *a* maximum, or oxycline depth. $^{234}$Th-derived POC fluxes at 100 m are largely invariant across a wide range of NPP, implying that future changes in NPP as a consequence of climate change and ocean deoxygenation has limited implication on the variability of the biological carbon pump strength.

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