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## Dispersion of a tracer in the Eastern Tropical South Pacific

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Anoxic marine sediments release significant amount of ammonium, phosphorus, reduced iron and silicate (e.g. Bohlen et al. 2011 & Noffke et al. 2012). Therefore the water layer directly influenced by the sediments, the bottom boundary layer (BBL), contains high concentrations of nutrients and is particular dynamic in terms of N-cycling (e.g. Kalvelage et al. 2013). The nutrient flux from the BBL to the interior ocean is potential important for the development of Oxygen Minimum Zones (OMZ).

There is a lack of understanding about the complex dynamic processes responsible for dispersion of nutrients from the BBL to the interior ocean. To investigate integral aspects of these processes, a deliberated Tracer Release Experiment (TRE) was conducted. In October 2015 the Peruvian Oxygen-minimum-zone System TRE (POSTRE) was initiated to detect the pathways connecting the BBL with the OMZ and to investigate the biogeochemically important BBL - ocean interface processes.

The tracer was released in 250 m on the Peruvian shelf, which is in a potential density range from 1026.24-1026.38 kg m<sup>-3</sup>. It is the first TRE, where the tracer is injected directly in the BBL, i.e. onto a fixed depth rather than a target density layer.

The tracer survey took place in March 2017, about 17 months after injection.

From the lateral distribution a tracer advection of at least 2000 km southeastward along the coast was observed. This is related to the Peru Chile Undercurrent, into which the tracer was partly injected. Due to the zonal eddy transport the tracer is also found more than 1400 km offshore.

In the vertical distribution Gaussian shaped profiles are found for off-shore stations. An open ocean diapycnal mixing estimate from the advection-diffusion equation over the entire period has an order of 10<sup>-5</sup> m<sup>2</sup> s<sup>-1</sup>, which is consistent with the results from several open ocean TREs.

In the coastal area the profiles have equally high tracer concentration throughout the water column. This shape indicates enlarged mixing due to boundary influence. Moreover the overall center of the tracer was found on lighter isopycnals than the injection densities. There had to be high upward diffusivity on the shelf, when the experiment was started. This indicates that the represented nutrients can reach euphotic zones.

### Position

PhD Candidate

### Affiliation

Geomar

### Email Address

mfreund@geomar.de

### Are you a SFB 754 / Future Ocean member?

Yes

**Primary author(s)** : FREUND, Madeleine (Geomar)

**Co-author(s)** : Prof. VISBECK, Martin (Geomar); Dr TANHUA, Toste (Geomar)

**Presenter(s)** : FREUND, Madeleine (Geomar)

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