



POSTRE-II

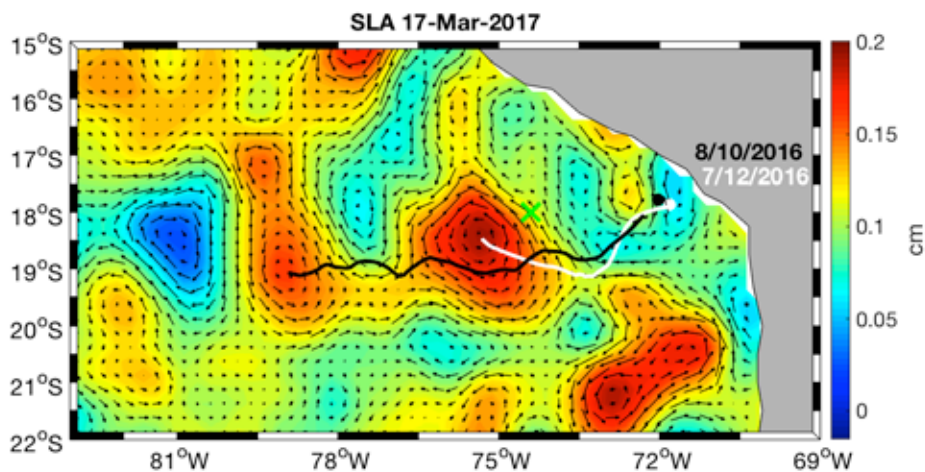
M135

(01.03. – 08.04.2017)

3rd weekly report 19. Mar. 2017



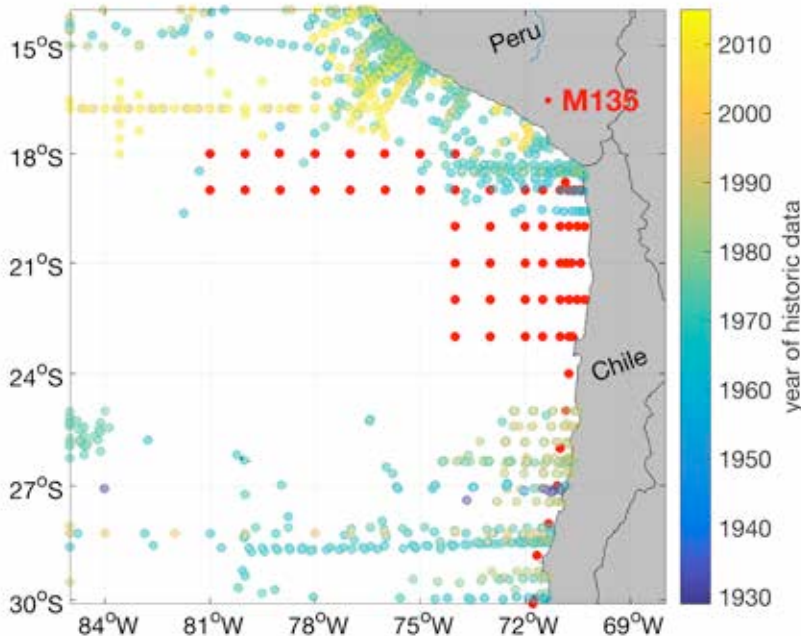
Week three of the Humboldt Current survey continued to be successful. We sampled along two long zonal sections between the coast of Chile and Peru and the 81°W along 19°S and 18°S. The station spacing was one CTD profile every 100km. We find a strong tracer signal in many stations and have noticed, that the amount of tracer detected seems to depend on the presence of eddies with large amounts of tracer in anticyclonic eddies and less tracer inbetween. These eddy form in the Humboldt Current near 18°S at the coast of Peru and Chile. The graphic displays the current



Map of altimeter based sea level height anomalies. Red regions denote high stands with a surface circulation against the clock with speeds of a few tens cm/s. These are anti-cyclonic eddies. The blue areas denote low stands and cyclonic eddies. The track of the eddy propagation was also calculated from satellite data and are marked by the black and white lines. Those analyses were performed by Florian Schütte from GEOMAR in Kiel. He had done similar analyses for the Atlantic region.

situation with red areas denoting high sea level anomaly and a maximum of 20 cm/s surface current of anticyclonic spin from the surface to greater depths. Our analysis shows that the westernmost eddy formed during October 2016 and the more eastern one two months later in December. The tracer rich water gets 'trapped' in the eddy center, transported westward and only slowly dispersed into the interior.

A second objective of the cruise is to map the distribution and strength of the oxygen minimum zone in the Chile-Peru system. Up to now we have obtained more than 70 dissolved oxygen profiles. For that we use an electrical sensor on the CTD system that we need to calibrate frequently with water samples that get chemically titrated for their dissolved oxygen concentration following a method after Winkler. We are



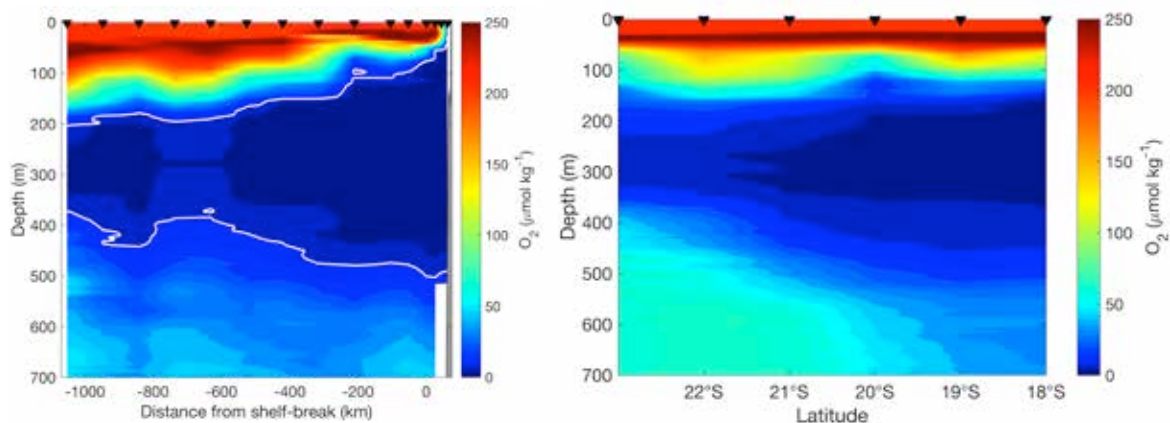
Map of freely available oxygen data. The color denotes the year of measurement. The red dots of the M135 cruise fill a glaring hole in the data distribution. (Sunke Schmidko)

interested in both the spatial extend of the low oxygen zone and at the same time their evolution over time.

Already we can claim, that we have significantly extended the available ocean oxygen data base.

Since up to now there were no single freely available oxygen measurements between 25°S and

20°S. In addition we are interested in the vertical distribution of the dissolved oxygen. Overall we find that the vertical extend grows towards the north and the coasts. Moreover, we have some indications, that the vertical extend of the OMZ has increased with time, limiting the habitat for fish that need oxygen to live. This decline seems in line with our work, recently published in Nature, of a global decline of oxygen in the ocean.



Left West-East section along 19°S and right South-North section along 74°W of dissolved oxygen content. One can see the extend of the (blue) oxygen minimum zone.



Fishernet entangled in the CTD and bow thruster of METEOR. (Foto: Sunke Schmidtko)

Midweek we 'fished' a drifting fishing net with the CTD which was significantly entangled in the CTD but also on the hull of the ship. This led to an unplanned stop near the coast of Peru. We had to order a diver to cut the net of the bow thruster. Thankfully good cooperation between the agency and the authorities meant that we only lost a few hours of the allocated cruise time.

Meanwhile we have reached halftime and celebrated this event accordingly with a barbeque party on deck while the sun was setting near the Peruvian port town Ila.

The mood on board remains excellent, we love the food and the cooperation between the scientific cruise and the captain and crew works flawless.

With the best greetings from 17° South und 71° West,

Martin Visbeck and the science team of M135.



Celebrating the half-way-point by a barbeque on deck.