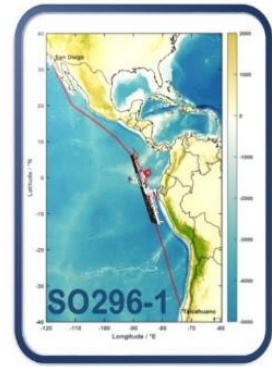


RV SONNE – SO296/1

27.12.2022 - 18.01.2023

Port Hueneme (USA) – Talcahuano (Chile)



2nd Weekly Report (02. - 08.01.2023)

After successfully starting our sampling stations off Mexico during the first week, we left Mexican waters at the beginning of the second week. Our route took us further along the Central American coast, through Ecuador, and past the Galapagos Islands to Peru. Unfortunately, we had to interrupt our sampling because we crossed the protected area, "Reserva Marina Hermandad," on our transit. In this area, which was established to preserve the Galapagos Islands, any intervention in the marine ecosystem is prohibited and, therefore, the sampling.

The changes in surface water properties from the beginning of our transect until the passage through the Equator were evident, among others properties, in the water temperature. The water temperature reached almost 30 °C off Mexico and, interrupted by small fluctuations, dropped to 27 °C at about 10°N (Fig. 1). Shortly before the Equator, the surface water temperature finally decreased to about 24 °C. The weather also changed: the view, characterized by individual cumulus clouds, turned into a dense cloud cover, which only cleared up again as we crossed the Equator.

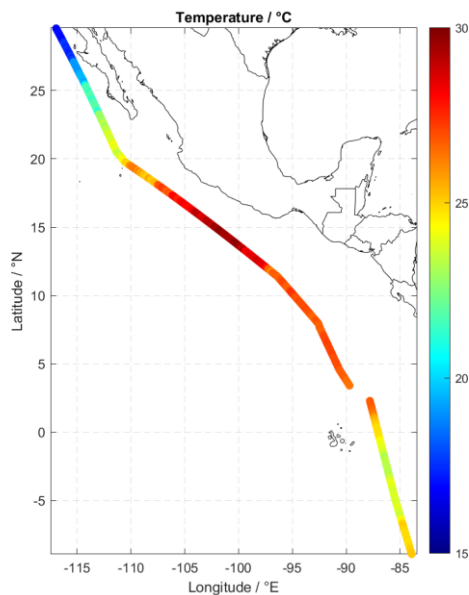


Figure 1: Water temperature in the surface water measured with the thermosalinograph. Unfortunately, the measurement is interrupted in the "Reserva Marina Hermandad" area.

Nevertheless, nutrient analysis can also describe the changes in water properties impressively. In our expedition, we measured nutrients using a nanomolar auto-analyzer due to the low nutrient concentrations in Mexican waters (Fig. 2). This device draws filtered water samples by an autosampler into a tubing system with continuously flowing samples separated by gas bubbles. The sample bubbles are mixed with a different dye depending on the target, which is determined photometrically in the instrument. We found low nutrient concentrations in the warm waters off Central America. In particular, nitrate concentrations were regularly below the detection limit of 25 nmol/L. However, shortly before the Equator, nutrient concentrations increased significantly.



Abbildung 2: Measuring with the nutrient autoanalyzer. (Courtesy of B. Klostermann)

The consequence of the increasing nutrient concentrations was also clearly noticeable qualitatively. For example, filters taken for chlorophyll a, suspended particulate matter (SPM), and particulate organic carbon (POC) began to show significant coloration. In addition, the number of fish, whales, and dolphins we could sight from the deck increased. At night, distinct bioluminescence of suspended phytoplankton could now be seen more often from the stern of the research vessel.

We also expect significant gradients for POC, SPM, Dissolved Organic Carbon, and Dissolved Organic Matter. Unfortunately, we can only determine these values in our home laboratory in Rostock. Additionally, the analysis of anthropogenic organic pollutants, hormones, and UV filters will also be carried out in Germany. Only then can the concentrations between the two subtropical regions be compared.

In addition to the ongoing scientific work, we also used the time on board for seminars. At the beginning of the second week, we met in the ship's conference room, where I introduced to all cruise participants the prevailing currents of our transect area. A few days later, our observers from Ecuador gave a presentation introducing their institute, the "Instituto Oceanografico y Antartico de la Armada" (INOCAR), and the oceanography and marine chemistry of the Ecuador region (Fig. 3). We have more presentations planned for the last week of our expedition - more will follow in the next weekly report.



Figure 3: Martha Barahona, oceanographer from INOCAR (left), explain the Monitoring program from Ecuador, and Alfredo Lynch (right), marine chemist at INOCAR, shows us the concentration of nutrients at the coastal region of Ecuador. (Courtesy of B. Klostermann)



Figure 4: Janika Reineccius shows to the observers how to collect the Microplastic samples. (Courtesy of A. Estelmann)

Greetings in the name of all participants,

Detlef Schulz-Bull

(Leibniz Institute for Baltic Sea Research Warnemuende)



Figure 5: Our faithful companion - during the last days the SONNE was accompanied not only by various gannets, but also by a frigate bird. (Courtesy of B. Klostermann)