

27.01.2019 22°35.7'S 074°01.5'W on the way to Valparaíso

MSM80 CUSCO

Sixth weekly report covering the period from 21.01. till 27.01.2019

At the beginning of last week on 21<sup>st</sup> January, we completed the sampling campaign for small- to mesoscale processes and gradients in water mass distribution and upwelling intensity. In particular the phytoplankton (= microalgae) scientists on board were happy, as one of the stations was right in the middle of a patch of murky brown surface water with an extremely high chlorophyll content. From the monkey island of the ship, we could clearly see the discolouring of the sea and the extent of the patch in every direction. The diameter was only two or three nautical miles. Water samples quickly proved that we encountered an intensive dinoflagellate bloom close to the sea surface. These microorganisms are mobile and propel themselves through the water by means of flagella at a surprisingly high speed, taking into account their minute size.

During the remaining days in the study area from 22. till 26.01., sampling concentrated on the southernmost section at 16°S. In the meantime, the procedures have become a routine. At first, we steam to a position about one third of the total section length away from the coast and deploy the drifter as the first procedure in order to allow the drifter the maximum time in the water and the longest measurement period. Thereafter, we move to the easternmost station, closest to the coast, and continue our standardized sampling scheme. As the final action at the easternmost station, we deploy the ScanFish. With the ScanFish in tow, we steam about 120 nm westwards along the entire section from the station closest to the coast to the one most distant from the coastline. Along that track, water depth increases from 120 m to more than 5.000 m. On our way back to the coast, we take water samples in regular intervals, conduct hydrographic measurements and sample zooplankton with different nets. The entire scientific programme for one section requires about three days. At the end, we still have to recover the drifter without knowing beforehand, where exactly that will be. The drifter sends messages with its position data every 20 min via satellite phone. Nevertheless, the direction and speed of the drift are hardly predictable.

During its four deployments, the drifter always headed in a different direction. At the last deployment, it moved westwards relatively fast with almost one nautical mile per hour. Therefore, we had to steam again for ca. 100 nm at the end of the cruise to pick up the drifter. We completed the final station work of the expedition MSM80 at the drifter's position on 26.01.2019 at 02:00 a.m.

The research cruise MSM80 was very successful. We sampled 106 stations, far more than originally planned, and achieved plenty of new insights. We are now a big step closer to solving the research question of the CUSCO project, why the coastal upwelling system of the Humboldt Current off Peru is so productive and rich in fish. The analysis of the many samples and data will keep us busy in the home labs of the different institutions involved and it will deliver exciting results.

On behalf of all scientists on board, I would like to thank captain Maaß and the entire crew of R/V Maria S. Merian for their extremely skilful, proactive support and commitment during the expedition MSM80. Their excellent efforts were essential for the scientific success of the expedition.

Yesterday we started packing of our expedition equipment. Today, most of the devices and boxes are already stored in the freight containers. This leaves us a few days for preliminary analyses of data right here on board and for the preparation of the cruise report.

On 30<sup>th</sup> January, we will reach Valparaíso in Chile, from where most of the cruise participants will be flying back to Germany. After six weeks at almost constantly warm temperatures of 20 to 24°C, at

least some of us are looking forward to a change in weather conditions and maybe the last days of winter in Germany.

Best regards from all cruise participants,

Holger Auel

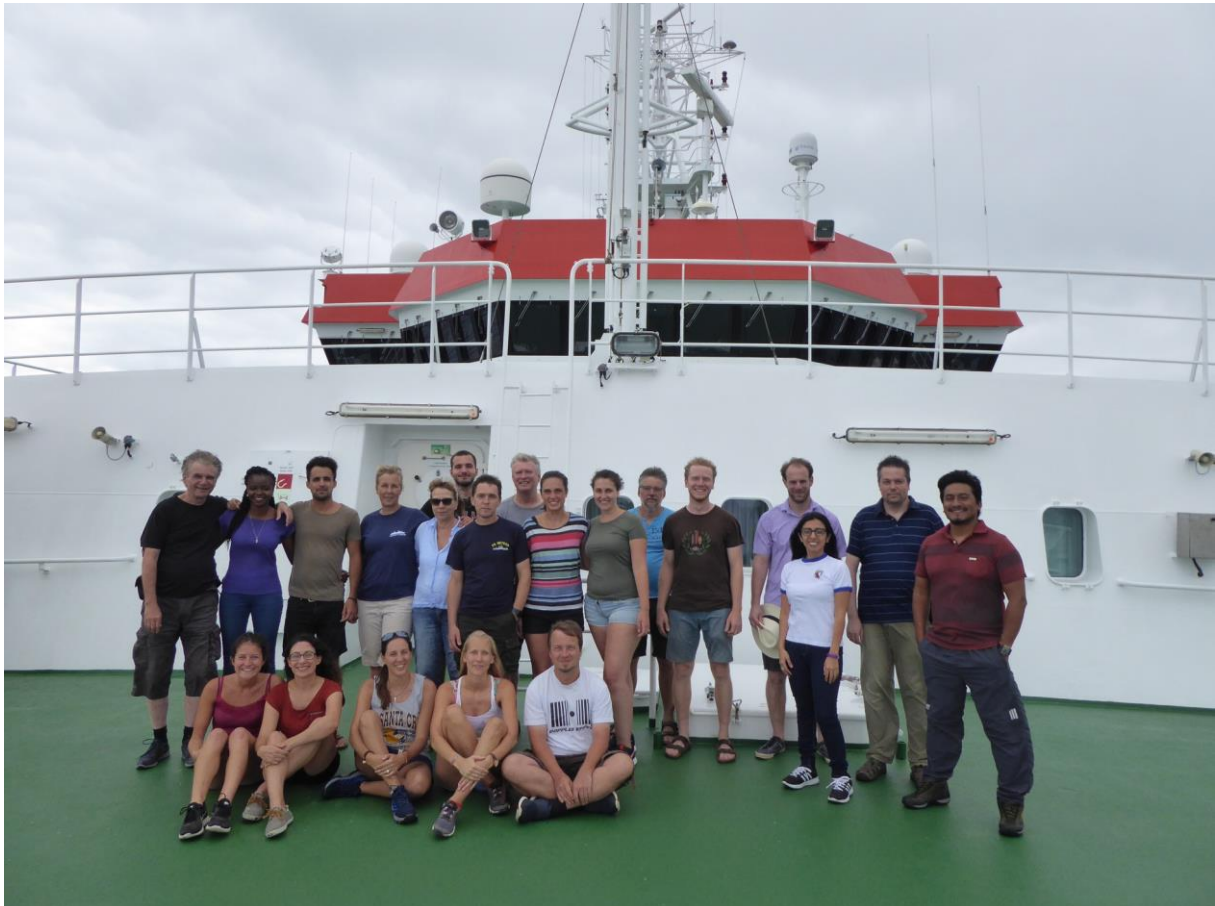


Fig. 1: Scientists on board R/V Maria S. Merian during MSM 80 (Foto: E. Reize and S. Janßen)



Fig. 2: R/V Maria S. Merian at sea (Foto: D. Auch)