

Expedition SO287 – CONNECT

11.12.2021 - 11.01.2022

Las Palmas -Guayaquil

Weekly report No. 5

03. - 10.01.2022



In Guayaquil

Its one o'clock board time, 7 pm in Germany and we are transiting through the Rio Guayas, a broad river with jungle on both banks and SONNE will arrive in the port of Guayaquil in Ecuador around 2 pm.

Two days ago we finished our last station in the fourth ocean area we passed, starting in the western subtropical Atlantic, travelling along the North Equatorial counter current to the northern most point of the cruise in the Sargasso sea and then to the stormy Caribbean, experienced a great transit through the Panama Canal and could enjoy a boat ride in the Tropical Pacific after our last four stations.

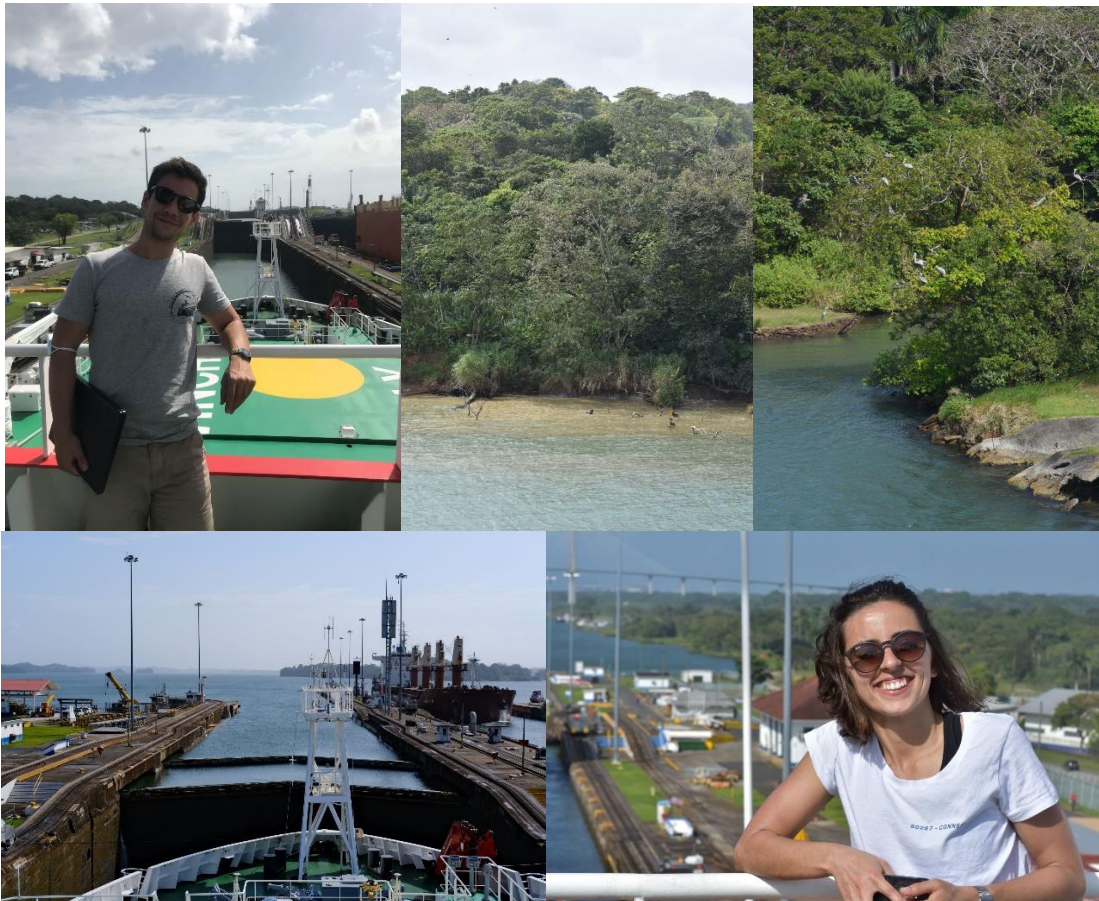


Fig 1: Impressions from the Panama Canal. Claudio and Alex enjoyed this experience (Photos: Wanja Böhme).

From Claudio Cardoso and Alexandra Rosa about the Panama Canal: After a 23-day transit between the Northwestern African coast and the Central American coast, with few signs of civilization (only a few cargo-ships at a distance) and a lot of station work in between, the arrival to the Panamá Canal was such a beautiful sight to see! This marked the end of the first part of the campaign - in the Atlantic Ocean, and the start of the second part of the campaign, in the biggest and oldest Ocean of our beautiful world – the Pacific Ocean. This transition will definitely be remembered by everyone on board by the crossing of the Panama Canal. The contrast between the deep blue of the Atlantic ocean and the Caribbean and the green from the forest surrounding the Canal was overwhelming. A [time-lapse video of the Panama Canal passage](#) shows our impressions of the Canal. And to think about all the

effort taken to make such piece of engineering possible reminds us that our society is capable of reaching grandiose achievements. As scientists, we only hope that such ingenuity can be applied to overcome the pressing issues related to our impact in the environment, such as global warming, the extinction of species and the increase of marine litter.

SO287-CONNECT aims to understand some of these issues. Cláudio Cardoso and Alexandra Rosa (Fig.1), who were involved in operation and processing of the CTD casts, in the deployment of atmospheric radiosondes and in the processing and interpretation of remote sensing products such as satellite-derived Chlorophyll-a observations and eddies tracked with altimetry products experienced it as their oceanographer's dream and true honor to be on board this ship.

Each ocean area, we crossed during SO287 was unique and delivered a lot of samples and data and we look forward to discover what they contain, for master theses, PHD work, working group and cruise reports and many publications. We also shared the joy to celebrate Christmas and New Years eve on board with 11 nations. We toasted 5 times to the New Year, learned some of the rituals from other countries and in general I think we had a great time all together during this COVID-escape slot.

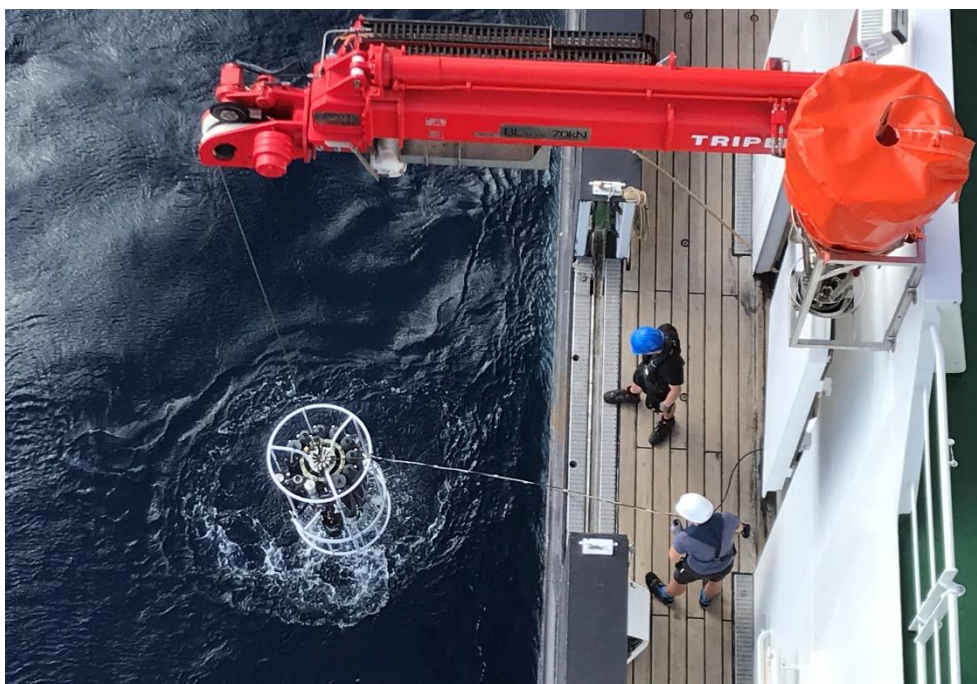


Fig. 2: Deploying the photo-optical CTD (Foto: Martin Hieronymi).

We again want to thank the friendly crew for their everlasting support, and I thank all participants for sharing their time and joy with us. Here I like to cite Professor Philippe Potin, who wrote to a colleague: The sun and the tropics are very nice to enjoy but the life on board free of Covid is a luxury that is maximized with the great ambiance with all the young people in the team working very hard and deploying an impressive energy during the social activities.

Despite the joy coming home some of us fear the reality of COVID again. But we will keep the memories of sun, ocean, and community and the great data set for great science we achieved on board.

SO287-CONNECT was set up to unravel the coupling of biogeochemical and ecological processes and their influence on atmospheric chemistry along the transport pathway of water from the upwelling zones off Africa into the Sargasso Sea and further to the Caribbean and also in the equatorial Pacific. With the acquired data fundamental questions about biogeochemical pathways under climate change and unknown processes, such as halogen release by Sargassum seaweed and its possible contribution to carbon cycling, the influence of ship emissions on trace gas production and the influence of plastic on biogeochemical cycles will be answered.

Continuous underway measurements of temperature, salinity, carbon cycle parameters, trace gases, chlorophyll concentrations in the surface water, as well as ocean currents (ADCP 38 and 75 kHz) and scientific echosounding EK60 (18, 38, 120, 200 kHz) of the water column were conducted. Samples were taken at regular intervals between few Hz and 12 hours. Atmospheric trace gases were sampled in canisters every 6 hours and aerosols were sampled for 24 hours. On 36 stations (6-8 hr station time per day for 2 stations in international waters), the ships CTD was deployed down to 1000 m at noon with an additional optical biological CTD down to 100 m and the ships CTD was deployed to the bottom at night, The rubber boat of RV SONNE to collect the sea surface microlayer with a Garret screen was deployed where possible, but on every noon station the sea surface microlayer was at least sampled from the ships deck. The Neuston Catamaran was also deployed at every noon station, and twice during transit in the exclusive economic zones of Puerto Rico, the Dominican Republic, Haiti, Jamaica, Columbia and Panama. We launched 40 Radiosondes and seven ozone sondes along the cruise track, to identify the structure of the atmosphere and the ozone column. The data acquisition was interrupted in the Panama Canal from 3.1.2022, 5 am to 4.1.2022, 9 pm.

Five incubators were placed on the stern to perform nitrogen, halogen, sulfur, and volatile organic compound cycling incubation experiments for turnover rate and trace gas production measurements and the influence of natural factors and anthropogenic stressors to investigate potential coupling and feedback mechanisms of these processes on the marine biogeochemical processes. Sargassum was sampled in the Sargasso Sea and the Caribbean and incubated to identify its contribution to halogen cycles and the marine carbon budget. The data specifically target carbon and nutrient cycling and the air-sea exchange processes of climate relevant gases and aerosols.

We just reached the harbor. The labs have been emptied and soon we will finish packing our equipment into the containers, which go off board on 12. January to return home.



Fig 2: The Panama Canal at night. (Photo: Wanja Böhme)

With best regards from the SO287-Connect team - all safe and sound on board - returning home in the next days.

Birgit Quack - Chief scientist SO287-CONNECT

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