

## FS Meteor Cruise M147 Las Palmas, Canary Islands – Belém, Brazil Weekly Report 30.04.2018-06.05.2018

On the 29th of April at about 5 p.m. we were able to start our journey from Belém towards the mouth of the Rio Pará. Because of the excellent preparation including test of equipment and setup of the laboratories under the guidance of Martin Frank during the transit from Las Palmas to Belém, it was possible, three hours later, to retrieve our first surface samples from the Rio Pará as one of the river endmembers of our mixing profiles using the towed fish. The new members onboard set up the laboratory equipment brought aboard and guickly found their places in the thematic teams from trace metal and isotope geochemistry to organic geochemistry to microbiology.



The dull and dank weather since our arrival in Belém, partly with heavy rainfall and thunderstorms, is a clear indication that we are here on time at the end of the rainy season, to investigate the material flux into the Atlantic during the phase of highest discharge of the Amazon River. The water masse of up to 80 liters per qm which poured down on us within a few hours (this is about the amount of rainfall in northern Germany during a full month at this time of the year) brushed off every attempt to protect ourselves against the rain instantaneously. However, at least the rain is warm at air and water temperatures of 28°C!

In the early morning of April 30<sup>th</sup>, as soon as we could leave the shipping canal of the Rio Pará, we started our program using the ship's own CTD-rosette sampler, trace metal clean rosette sampler and multicorer from GEOMAR. All deployments were successful and rendered formidable amounts of water and sediment samples for all laboratories, where the final challenges were waiting. For all of us, this extremely particle-rich water from the brown flows of the rivers is a rather unfamiliar material, which quickly pushed our diverse filtration methods to the edge of the envelope.



RV Meteor on its way upstream in the northern part of the Amazon mouth. The total estuary is about 300 km wide and because of the gigantic dimensions of the brown particle-rich water streams, the river banks never became visible at the horizon.

However, thanks to the significant engagement, creativity and close cooperation of all working groups, a certain routine found its way into the different laboratories. The short duration of the sampler deployments in the very shallow 10-20m water depths of the shelf region and the short transit times between the stations, which were much shorter than the time needed to process the samples between the stations, also required some dynamic station planning. Shallows and sandbanks as well as fishing activities required enormous attention also from the ship's leadership and partly necessitated an adaption of the sampling plan to what was possible for the navigation of the ship. However, the very cooperative and pleasant team work with the crew on the bridge, on the deck and everywhere else have enabled us to complete nearly 50 stations since we left Belém a week ago. In addition to the transect of the Rio Pará into the open Atlantic beyond the shelf edge, where we sampled the more familiar blue and particle-poor seawater endmember of the mixing line in up to 2000m depth, we have also carried out a similar salinity transect from the northern channel of the Amazon outflow into the open ocean. We were impressed by the immense dimensions of the Amazon estuary; although we were steaming upstream for a couple of hours, we were never able to view the coastline of the river banks on the horizon.

Instead, since yesterday, in the region south-east of the mouth of the Rio Pará, there is finally some land in sight, where there are extensive mangrove belts which are among the largest in the world, and they play an important role for the global carbon budget and for the input of dissolved organic matter (DOM) into the ocean. The high bioproductivity in this coastal region is reflected in the greenish color of the water from algae. We are investigating this input, which largely takes place via intense groundwater discharge along the coast, in a stretch of approximately 120 nautical miles along the coastline, using CTD and towed fish sampling as well as salinity and  $CO_2$  profiles. Further to the north-west, the northward directed surface current mixes these water masses with the streams of the large rivers.



The trace-metal rosette is back on deck after a deployment in deeper water; the bottles are taken off and brought to the clean-room container for sampling.

Although the work load for all station leaders and lab teams is intense due to the dense sampling sequence, all are in good mood; seasickness has calmed down, all are feeling well and the atmosphere is at its best. Even the weather is dry and sunny once in a while now.

With best wishes from the science and ship's teams of RV Meteor

Andrea Koschinsky

RV Meteor, 06 May, 2018

P.S.: For those who want to know more about our cruise M147, please visit our blogs: <u>https://www.planeterde.de/logbuecher/fs-meteor-amazonas/</u> (in German) <u>http://amazongeotraces-m147.com</u> (in English and Portuguese)