Greetings from the equatorial Atlantic! The Ronald H. Brown set sail from Port Saupe, Brazil at 09:30 LT on March 6th, heading for the start of the A16N line. Our set up period in port was brief, with many arriving the day before departure. This was likely good, because security in port was very strict and it was tough to get both to and from the ship. However, we persevered, helped in part by port gate guards who were willing to call taxis for us. Sadly, our chief scientist, Denis Pierrot (AOML), had a medical emergency in Brazil and was unable to sail. Zach Erickson (PMEL, previously co-chief) took over as chief scientist and Katelyn Schockman (AOML) became co-chief scientist for Leg 1 of A16N.

The Ronald H. Brown leaving Port Saupe. Photo credit: Dennis McGillicuddy Jr.

We reached the edge of the Brazilian Exclusive Economic Zone (EEZ) just after 08:00 GMT on March 7th and began taking discrete underway samples every 4 hours. We deployed a core Argo float at 22:15 GMT March 7th (7˚S, 30˚W) and a surface drifter at 12:00 GMT March 8th (6.5˚S, 27˚W). Three underway pCO_2 systems were brought online, with some minor troubleshooting, to begin recording continuous underway measurements. On our CTD test cast we had no major problems, except that the two oxygen sensors on the CTD did not agree with each other, and neither agreed well with the Winkler titrations for oxygen from the bottles. We still have not resolved this, although after Station 3 we put on a new secondary sensor and they now agree more closely with each other. Likely there will need to be a significant correction to the CTD oxygen sensor values post-cruise.

Sampling the test cast. Anticyclonic (in the Southern hemisphere remember!) from the top left is David Cooper (UW) and Rachel Bramblett (UGeorgia) sampling CFCs, Jess Leonard (RSMAS) sampling for pH and alkalinity, Taydra Low (U Wisconsin) as "water cop", Star Dressler (U Guam) sampling for pigments, and Tyler Christian (AOML) and Ellen Park (WHOI) sampling for particulate organic carbon. Photo credit: Zach Erickson.

We started the A16N line at 6˚S, 25˚W at 22:30 GMT, March 8th. On our first cast, the winch wire shorted at approximately 5,000 m, rendering the CTD controls useless. The cast was terminated, and the CTD was brought directly back to the surface. After re-terminating the wire, a second cast was deployed. However, we had unknown altimeter problems, which resulted in this second cast hitting the bottom, albeit at a reduced speed, with the altimeter still reading 100 m

above the seafloor (its maximum value). Data on the upcast was off (salinities of ~26, oxygen also much too low) and we were worried that the sensors had been damaged, but upon recovery of the CTD package at the surface we found that they were simply filled with sediment that could be washed out. Phew! We replaced altimeters and tried again at Station 2, but still the altimeter did not kick in close to the expected bottom. We stopped this cast at 5718 db, about 50-100 db short of the bottom depth, to avoid hitting again. It is suspected that the altimeter cables were fried when the winch wire shorted. We again replaced the altimeters, the corresponding cables, and also added a Benthos supplied by the ship. At Station 3, the altimeter worked (although the Benthos didn't register until 20 m from bottom). Since then we have had no further problems. The conductivity sensors took a few casts to recover fully from their mud encounter. They were thoroughly rinsed after Station 1 and again at Station 4, and then we found a soft brush and cleaned them more rigorously prior to Station 8. Since then they are working as expected, but prior stations may require their own salinity correction using the bottle measurements.

Bottle measurements are in general going well. The CFC team worked heroically to resurrect instruments that have sat in the CFC van for years (and endured multiple shipments) and is now in good shape with no missing casts. Some of the dye used to measure pH spilled so we are conserving it as best we can (while not missing samples) to try and avoid having to make more before the end of Leg 1. However, we are able to make more if needed.

We are hosting several side projects on this cruise! The Bio-GO-SHIP team is here in force, with a dedicated inline system and a special pump to ensure particles are not broken up before they can be imaged. This pump has had a few issues, including briefly starting a flood in the pump room, but that was quickly dealt with and all is working fine now. We are also conducting dedicated Bio casts to 1000 m every day near noon, and are working to conduct these as efficiently as possible. Four Biogeochemical-Argo float deployments are expected for this cruise, with one successfully released at 4.5˚S, 25˚W on March 10th. Finally, we are testing new underway systems for pCO_2 and pH, as well as a new instrument package combining pH, oxygen, and CTD (right). These are currently set up throughout the ship in the hydro lab, bio lab, and on the back deck. We are, however, missing a few non-crucial instruments that we had hoped to have on the cruise, and are hoping that once the ship docks in Rota, Spain on April 6th it can pick up (1) correct brackets to install chipods to measure small-scale turbulence, (2) a fluorometer to measure chlorophyll, and (3) a cable for our transmissometer to measure water turbidity so that these measurements can be a part of Leg 2!

Makeshift ambient seawater bath for a prototype sensor. Seawater runs from an inline system in the main lab to the instrument sitting on the back deck, from the instrument into the container, and then drains from the hose near the top into the ocean. Photo credit: Zach Erickson.

Zach Erickson and Katelyn Schockman, Chief Scientists