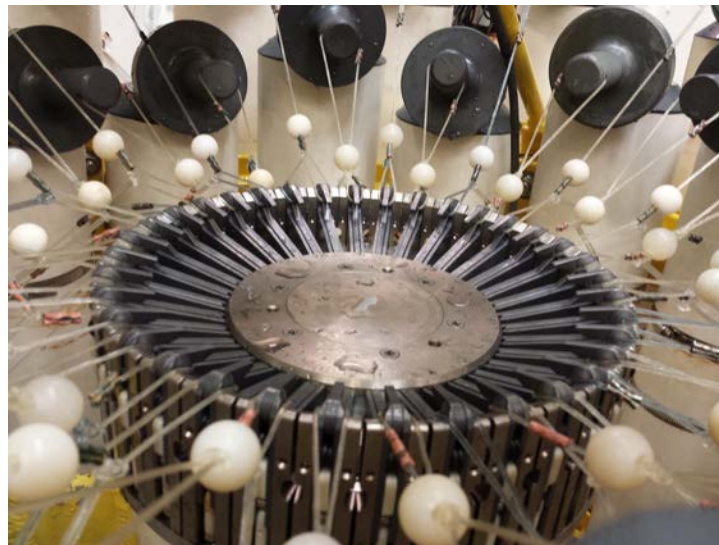


## **2016 I09N Cruise report, week 3**

Ahoy land-dwellers!

This week started off with an issue around the carousel of the rosette. The carousel is the mechanism that triggers the closing of bottles (bottle tripping) in the rosette (see pic below). On a couple of stations, problems with communication in the rosette prevented the surface bottle from tripping. It was determined that there was damage to the bulk connector of the carousel, which could have forced us to switch to our spare 24-bottle carousel (thus losing some of our vertical resolution). Eventually the connector was repaired and we now have reliable communication with the rosette during the casts. We were also able to keep using the Y-cable that allows communication between the carousel and the SBE35 reference temperature sensor. Special kudos to the ODF team, especially Sergey, Matt, Ted and Courtney, for committing to diagnosing the problem and fixing the connection with minimal loss of time.

On the same note, we have been forced to take Niskin 12 out of the rosette because the magnet operating the trigger mechanism is damaged and the bottle was not tripping. Given that we are now moving towards shallower depths (all the stations deeper than 4500m are now behind us), we think that the science objectives will not be significantly impacted.

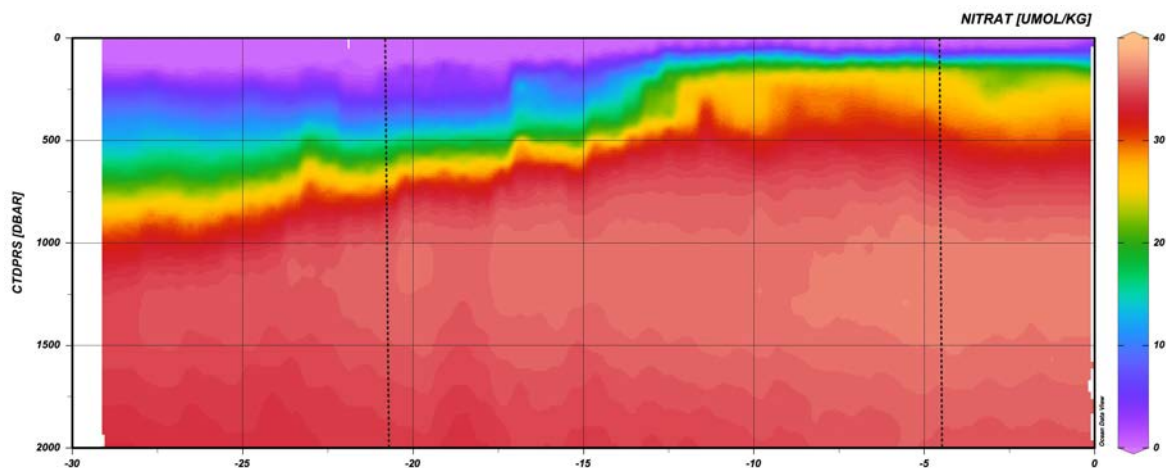


Carousel with 36 bottles cocked and ready to be tripped.  
Picture courtesy of Patrick Mears and Leticia Barbero

On this week's report we want to highlight some of the work being done as an ancillary project of our regular GO-SHIP work. Scientists from UC Irvine and the Bigelow Laboratory for Ocean Sciences are conducting biological experiments using the ship's underway water line as well as CTD samples. The samples will be analyzed back on land to determine Particulate Organic Carbon, Nitrogen and

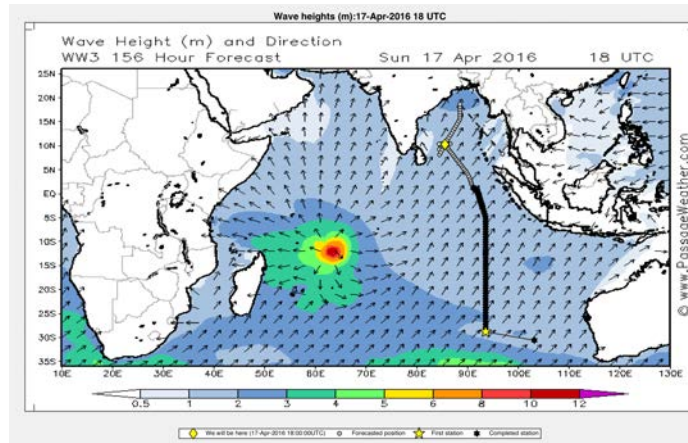
Phosphorous (POC, PON and POP, respectively). POP in particular had never been measured in these waters prior to our cruise. They are looking at differences in C:N:P ratios and anticipate that because the South Indian Ocean Subtropical Gyre is a nutrient poor region, the C:P ratio will be higher here than in regions such as the equatorial upwelling region, for example. Other samples are collected from the underway waterline to determine the surface phytoplankton community, and the presence of genes indicating key nutrient sources. The group is also conducting incubation experiments to determine nutrient uptake rates. This will allow them to know whether microbes are using different nutrient sources (nitrate, ammonia or phosphate, for example). These studies are carried out in combination with results from trace metal analyses (we are doing roughly one trace metals cast per day) and data from our CTD nutrient samples.

In the plot below, there is a representation of the preliminary nitrate concentration values measured so far on the cruise and the location of 2 “regional stations,” where more intense biological sampling has taken place. One more “regional station” is planned close to 5 degrees North.



Nitrate concentration ( $\mu\text{mol/kg}$ ) in the upper 2000 meters between stations 84 and 137 of I09N\_2016. The dotted lines represent the locations where regional stations were conducted, looking for different gene pools based on nutrient availability.

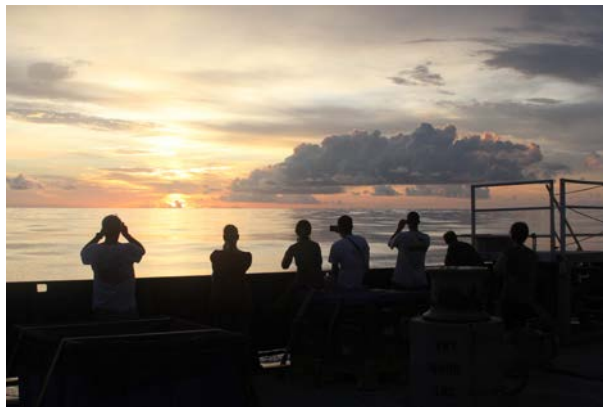
Amanda Fay, one of our CTD watch-standers modified a matlab program previously coded by Seth Travis and Natalie Freeman (CTD watch-standers on I08S), that allows us to have a look at the weather conditions predicted along our track. We continue to enjoy low waves and great weather, and from the privilege of our calm waters, we can appreciate the weather maps and watch as a huge storm with predicted wave heights of up to 10 meters forms off the coast of Madagascar.



Wave height prediction for April 17<sup>th</sup> at 18h UTC. The black stars on the track line indicate our current position, the yellow diamond shows where we will be on April 17<sup>th</sup>.

On April 10<sup>th</sup>, we crossed the geographical equator, as well as our mid-station and the half-way point of our days at sea, all within 24 hours. Talk about reaching milestones!

We have now deviated from a straight course north and are moving in a northwest direction, headed for the Bay of Bengal. Between 3S and 3N our stations are spaced closer together, so we are moving a little slower to give our scientists enough time to run their samples. We are having exceptionally good weather, so we also enjoy the occasional luxury of a 3-minute break in our sampling to watch the sunset (see pic below).



Picture courtesy of Karina Khazmutdinova.

If you want to read more about our cruise, remember to check out our cruise blog with posts from our scientists and Amanda's personal blog chronicling her experience on board:

<http://goship-i09n-2016.blogspot.com/>

<http://fayamanda.weebly.com/i09n-cruise-blog>

Onwards!

Carmen and Leticia, chief-scientists I09N