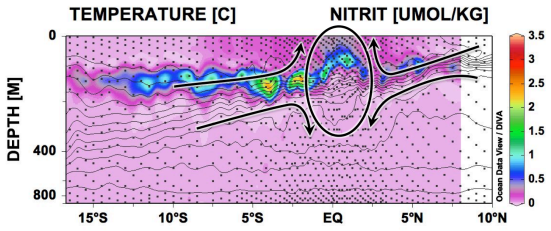
NOAA Ship Ronald H. Brown P16N Leg 1
Weekly Scientific Report 03
From Jessica Cross, Chief Scientist, and Samantha Siedlecki, Co-chief Scientist

5.6°N, 151°W
5 pm, Friday, 01 May 2015 (local time and day)
Air: 25.75 °C
Water: 28.69 °C
Winds: 5.45 kts
en route to station 78

Hello everyone,

I am happy to report that we have officially completed our high-resolution transect across the equator, and should shortly pass 6 °N. Our science party and crew both seem to be glad to have a few minutes between CTD casts during our transits. Now we are getting down to the work of processing data we have been collecting and analyzing, especially as there are a little less than two weeks left in our cruise. We have started working on the cruise data report with each of the groups on board. The initial quality control and figures have been greatly facilitated by Mary Johnson's local website for the ship. Each group has been keeping up with their data processing such that Sam and I can look at the data coming in every day. We will definitely be disappointed to see Mary retire after Leg 2—her skills have been much appreciated.

So far, we've seen some interesting changes as we've crossed further north; the equatorial undercurrent is visible in almost all of the chemistry because of the way it impacts water column structure. My personal favorite is the uplift of the primary nitrite maximum with the upper thermocline (below). While this same structure and feature was observed in 2006, the maximum nitrite concentration we have observed is higher this year.



Nitrite concentrations (color shading) with temperature contours (overlaid). The Pacific Equatorial Undercurrent can be seen positioned over the equator (oval), where convergence forces thermocline waters both shallower and deeper (arrows).

The surface water was so warm near 4 °N that our rosette recovery team could feel the heat in the frame when bringing the package on deck. It is certainly warmer than the last occupation of P16N during 2006; while the surface waters are on average warmer just by a couple of degrees, preliminary estimates of change across the thermocline are warmer by about 5 °C. These changes also correspond to the positive PDO/ENSO phase that is currently being reported in the news. The warm anomaly is clearly visible when our shipboard TSG is referenced to several climatologies—an analysis that Sam Siedlecki and our Annie Foppert have been diligently working on. You can read all about it in our latest blog post.

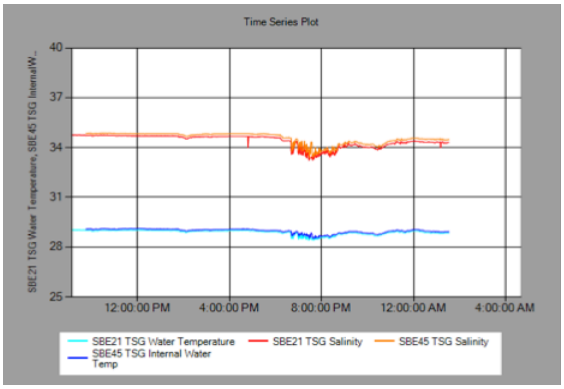
As an update to last week, we continue to monitor the loss of gear oil from our port z-drive. While the leak itself does not appear to be changing over time, there is a clear increase in oil loss

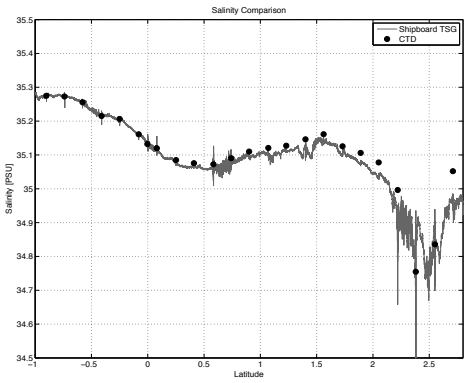
while the drive is running. As a precautionary measure, we are trying to avoid using the port z-drive while we are on station. So far, this has not affected our ability to minimize drift and we are staying closely on station. The Brown continues to work with MOC on dry dock repair options. For right now we will not be initiating repairs between Legs 1 and 2, and we do not expect a delay in starting Leg 2.

Our other main mechanical challenge this week was that the main scientific refrigerator was down for several hours due to a buildup of ice on the motor. Because of the Brown's quick response and the rapid pace of repair, we do not think that the integrity of the samples or reagents stored in this area was impacted. Engineering isolated the source of the problem to the door being left open while the refrigerator was in use. A handle has now been installed on the inside of the door so that we will be able to more closely control the interior temperature by closing the door and prevent humidity from freezing up the motor.

One of our scientific challenges this week was the presence of quite a few long-line tuna fishing vessels along our cruise track. Their presence caused us to have to move a station from our high resolution equatorial transect to just north of 3 degrees North. They were fishing fairly deep – about 250 meters. We were able to communicate with some of the fisherman due to the Chinese-English translation by Xing Lu, a student working with the CFC group. She was kind enough to help the CO communicate about how many long lines they had in the water and where they were positioned. We safely navigated those waters as a result.

As we have crossed the equator and entered the Inter-tropical Convergence Zone (ITCZ), we have had several straight days of cloudier skies, rain, and higher winds and seas. We are changing our deployment and recovery process early to be sure that we are ready to encounter the 20-knot winds and 10-foot seas that are projected to for 10 °N. In one of my favorite moments this week, CO Kamphaus pointed out that as the Brown is one of the only observation points reporting from this area of the Pacific, the position of the ITCZ 'followed' us north for a few days. You can certainly see the rain in our TSG data as well, both as singular rainsqualls (below, left) and net freshening of surface water through the ITCZ (below, right). However, it looks like a high-pressure system has set up centered near Hawaii, so there should be sun waiting for us soon.





Until next week;

--Jessica and Sam