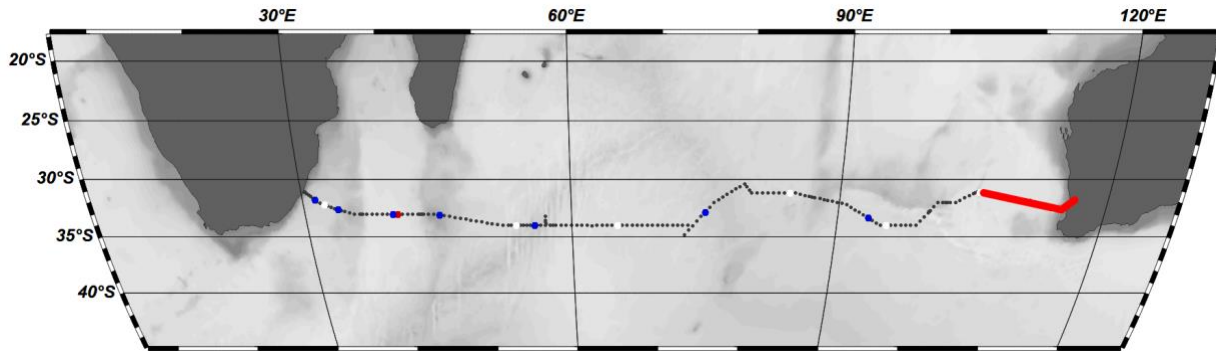


I05_2023 Weekly update 7/28/2023

Update 1 of 7



A map of our planned cruise track with the completed stations covered with a red line. Upcoming planned and potential float deployment locations have larger dots.

Highlights (as of writing this 7/28)

- Mobilization
- 23 CTD stations (22 to full depth) and 6 bio stations completed
- 2 floats deployed: 1 SQUID float and one BGC Argo float (*The Excelsior*)
- Some weather time, some tech time
- Transient tracer team moved to hydro lab after a wave damaged and flooded the lab container

Greetings from GO-SHIP cruise I05_2023 (a.k.a, RR2308) aboard the Scripps Institution of Oceanography research vessel Roger Revelle! We are well underway and things are starting to come together. We are currently busy doing station work, and everyone is becoming more comfortable and efficient in their parts of the overall effort.

Mobilization went well, though we have few pictures to show from that time because we were moved to a port facility that forbids such. The move was to accommodate the shore crane we needed to load our largest items aboard. This facility was a bit out of the way and had some access challenges, but these challenges were overcome with rental cars, rideshare apps, and a great deal of patience from the subset of our team that was visiting us in port to help us stage for the cruise. In the end we sailed with most of our planned complement of oceanographers. We did have two team members withdraw due to emergent issues, but Aurélie Moulin was able to join as a “floats” watch-stander on short notice, and Eva Capilla Garcia, one of our planned CTD watch-standers, bravely took on an empty spot on the pH/TA team. My gratitude goes out to all for their patience and flexibility in making this cruise happen.

I05_2023 Science Party



The science party on I05

Station work started in earnest and we've already started matching projected times for many of our stations, which is a bit of a feat in week 1 when people are still leaning their roles. However, we have 196 stations planned in 55 days, so we will need every bit of efficiency that we can muster—as well as a lot of stamina and a whole lot of luck—to complete our ambitious plan. Like most marathons, this one began with a bit of a faster pace than would be sustainable, as the closely-spaced continental slope stations brought aboard samples more quickly than they could be measured. Mercifully, we were quickly in deeper waters (as I type this our CTD is below 5000 m depth), and the greater wire times and longer transits have helped all our teams catch up and catch their breath.

The bio GO-SHIP stations have also started, with separate casts at a subset of the stations where we are doing CTD casts down to 1000 m depth. These casts are intended to measure metagenomic information in seawater, as well as particulate organic matter and pigments. Each of these analyses benefits from a full Niskin's worth of seawater (i.e., ~11 L, or how much we can trap in each of the 36 bottles we trigger

at different depths), so in most instances it makes sense to do this as a separate cast each day at noon. In shallower waters we will combine the two into a single cast of the rosette, since we won't need all 36 bottles to fully sample the shallower water column.

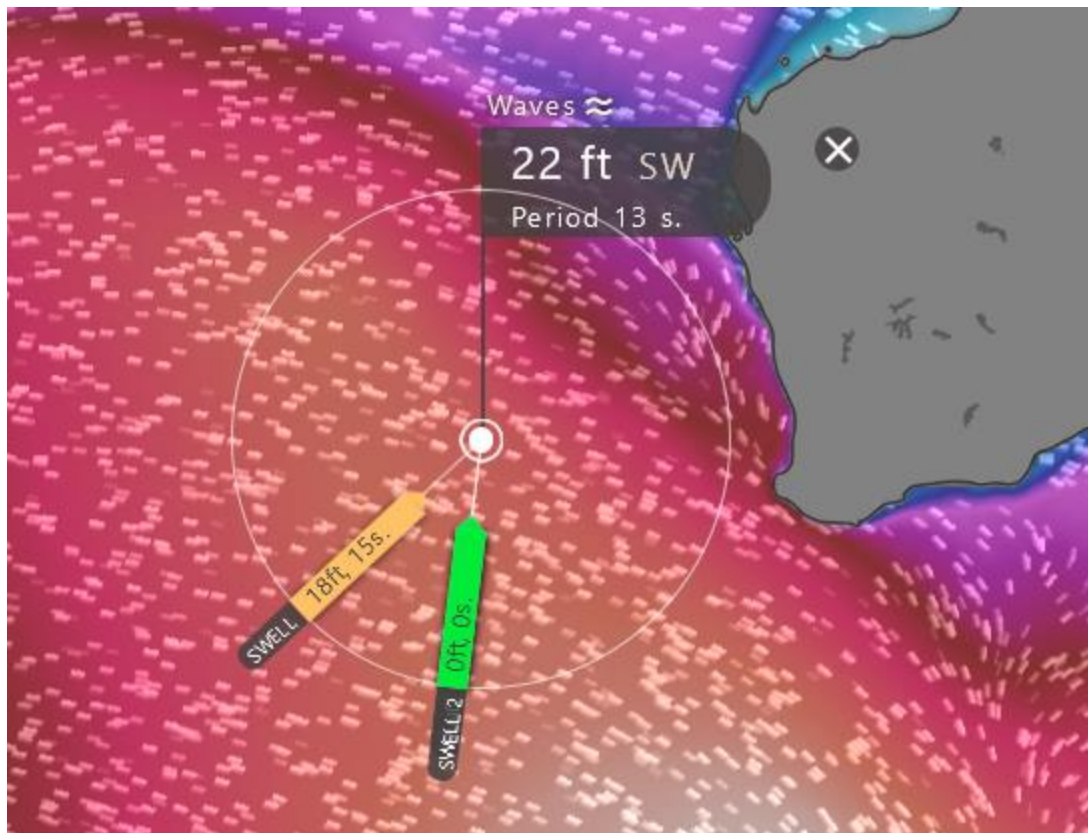
While the CTD and rosette package worked flawlessly at the start of the cruise, some modulo errors appeared on station 7. More crept in in small quantities over the next several stations and trouble shooting commenced. Ultimately, at station 12 the CTD pumps began to cycle while at depth, so the package had to be recovered for intensive troubleshooting. The issue was identified and fixed after ~12 hours and several test casts, part swaps, and re-terminations. The CTD has been working brilliantly since.

Deployments of floats and drifters have started with two floats already deployed, one planned for this current station, and two drifters planned over the next degree of longitude. We heard the 'happy' news that our first float deployment broke the "Adopt-a-float" website because the earliest organizers of the outreach effort hadn't imagined (or coded for the eventuality) that the program would someday exceed 500 adopted floats. However, our deployment of *The Excelsator* pushed them over that threshold and they had to briefly scramble to fix the site before celebrating the amazing milestone.

Weather has also been a factor, and this could be a recurring challenge for this cruise. The previous occupation was in the Southern Hemisphere's autumn, and we are attempting this line during the Austral winter. While this isn't a Southern Ocean cruise, the behemoth storms that perpetually churn through the gelid and wind-whipped wintertime ocean just south of us lash out at the subtropical latitudes every few days. At 32°S, we have little recourse when this happens but to turn the vessel to minimize the rocking and the pounding and wait until things calm down enough to do work again. A particularly problematic combination occurred on station 13, where a 3.1 knot current (comparable to the Gulf Stream) was trying to push the CTD package under the Reville relative to the heading dictated by the heavy winds, which is a dangerous situation for the CTD-sensor package. As such work had to be paused on that station with only a small portion of the CTD cast completed. With more than a day of this weather forecast to continue, we opted to proceed toward the next station where the current was expected to be more manageable (if not the winds), thinking we could return when the winds let up.

Unfortunately, en route, an unusually large wave swept over the port side and damaged and **flooded the transient tracer (a.k.a., CFC) van**. Thankfully, both people within emerged unhurt, though some of their equipment was damaged. We hove to (i.e., stopped the boat and oriented ourselves to minimize the rocking), and helped them dig out for several hours. The team and their equipment have since been relocated to the hydro lab, where the system is once again running standards to recalibrate. This remarkable recovery, from standing in 6" of water a few days prior, is due to heroic efforts from PI Warner and the team, with help from the ship's and scientific crew relocating and re-securing gear.

Having seen the currents diminish and change direction as we moved along the transit just before the wave, we opted to return to the line at the midpoint of the originally planned locations for stations 13 and 14, declaring this to be the new station 14. Thus we have only a partial CTD cast for station 13 at the original location, and ~45 nautical mile spacing for bottle samples between stations 12 and 15. However, this allowed us to continue to make progress despite the lingering strong current at station 13.



Wave forecast for 8/2/2023

Soon the winds let up and we've since been making good progress into the open ocean. However, our forecasts show that we could be due for more wind and waves within a couple of days. We'll continue to work as we are able and try to rest through the rocking the remainder of the time. I'll look forward to providing future updates!