

GOSHIP I08S 2024 cruise: Weekly update #1, “ The Trudging Forties”.

Mobilization for I08S cruise occurred from Feb 17 to 21 at the Australian Marine Complex where R/V Thompson was berthed, about 15 km to the south of Fremantle. On Feb 17, most of the science lab leads arrived at the ship at 08:00 where equipment for ODF, CFC, pH/Talk, Bio and BGC floats was being delivered at the dock by the ship agent Gulf Agency Company (GAC). Loading started promptly and Jim Happell proceeded with SWAB testing (UNOLS program that checks the fleet for low level ³H and ¹⁴C contamination) inside the Main lab. In the high bay, a local contractor installed new roll up doors and the ship’s engineers tested the accordion system that will move the Rosette to and from the starboard deck during the cruise. Lab setup continued indoors as much as possible as outdoor air temperature was routinely around 45 °C during the day. According to temperature maps from Windy.com, Western Australia and the Perth area were the hottest spots in the world during our mobilization.

A few shipments arrived in the later part of the mobilization, most notably the five different backup shipments coming from PMEL, AOML and UCSD for the DIC group. These were backup air shipments to the PMEL van lab which had been delayed in Singapore and would not make it on time in Fremantle for I08S. Finally, twelve Nitrogen and pure air gas tanks intended for the DIC analytical lab were delivered to the ship in the morning of Wednesday Feb 21, and the R/V Thompson set sail at 14:50 local (UTC +8), marking the start of the I08S 2024 cruise.

As we crossed the western Australian shelf, the ship’s ADCP mounted on the hull and thermosalinograph measured southward velocity and warm water temperatures inshore, consistent with the Leeuwin current with its warm tropical waters. Inside the EEZ, the Bio group started taking samples from the underway system as permitted by research clearance from the Australian government. Since then, the bio. group has been busy continuing to collect underway samples for a suite of biological parameters at solar sunrise, noon, and sunset.

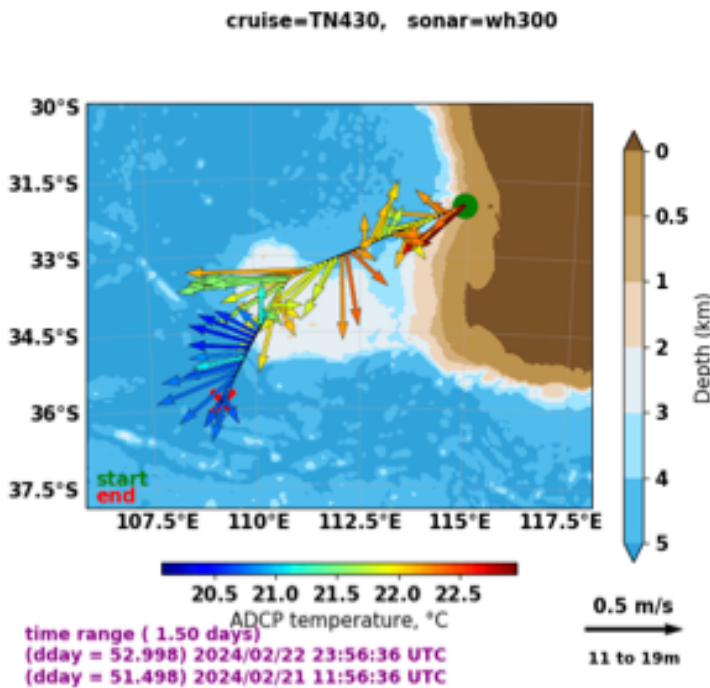


Fig. 1. ADCP and thermosalinograph data collected underway as we departed from Fremantle.

On the second day of the cruise fire drills were conducted in the morning and everyone in the science party donned their immersion or “Gumby” suits. In the afternoon a CTD test cast was done 10 nm outside the Australian EEZ. This test cast was successful, and every group practiced their sampling skills. The six CTD watchstanders learned to cock the 10.2-Liter Bullister bottles, draw water from them for salt samples, and practiced the CTD operation from the control room. This cast also allowed us to test the CTD and LADCP instruments, as well as the accordion system and gauge the sensitivity of the wire tension to the ship’s motion and sea state. After the test cast, the R/V Thompson continued its transit to the southwest at 12 knots for the next couple of days. On Saturday Feb 24, a couple of BGC floats were decorated and Katelyn organized a science meeting in the ship’s library where we learned a bit more about the GOSHIP program, the circulation of the I08S cruise, an interesting CTD dataset from sensors mounted on seals, the principles of CFCs, details of the Argo float program, and proper etiquette for dog dating from two of our participants.

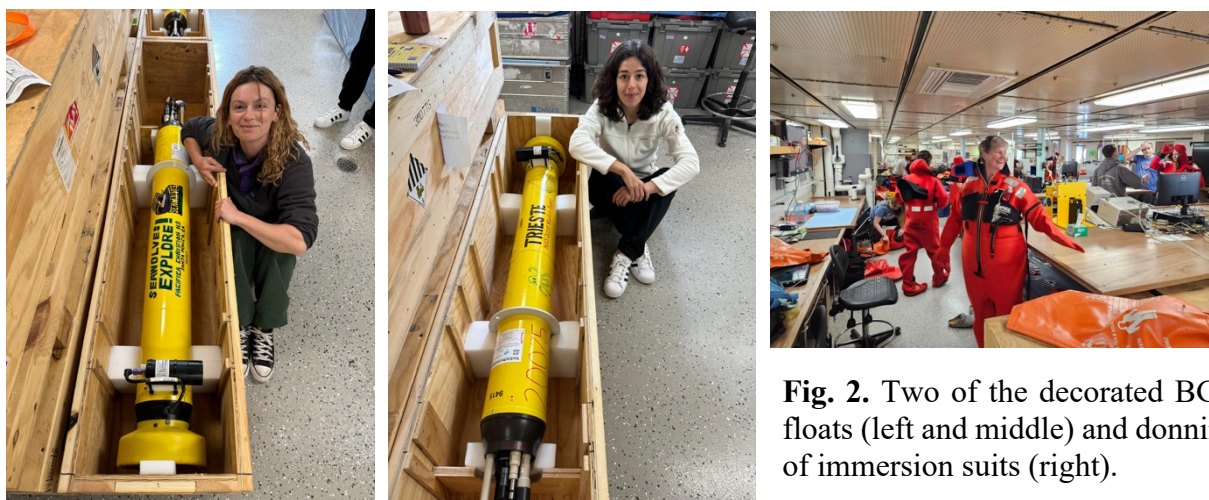


Fig. 2. Two of the decorated BGC floats (left and middle) and donning of immersion suits (right).

On Feb 25, we deployed our first core Argo float in the morning. A few hours earlier the ship diverted west to avoid a weather system. As predicted by several weather models this storm created seas with significant wave height 30 ft around us and winds 40 to 50 knots. Winds have remained above 40 knots as a high pressure to our northwest kept pinching isobars across the South Indian Ocean for the past two days and seas are not coming down. So, here we were, stuck in the never-ending roaring forties, trudging west at less than 5 knots. Finally last night, conditions abated a bit and the ship turned southward and we are currently steaming at 11 knots towards Antarctica, with occasional rolls from the large westerly swell on our starboard bow. Unfortunately, stalling from this storm and more that are projected down south could delay our first CTD cast near Antarctica by up to four days according to some estimates.

Apart from learning about the vicissitudes of the Indian Ocean, we have also learned a great deal about the maintenance of Bullister bottles, making new lanyards and replacing the existing ones. The DIC lab has been busy nonstop troubleshooting a wide gamut of issues, encompassing software, hardware, and plumbing, all of this in heavy seas which are creating instabilities in the instruments and complicating their fine setup. In fact, the DIC folks deserve a medal for persistence after dealing with so many issues in the last few months, such as shipping delays of their equipment back from GOSHIP’s previous I05 cruise, quick turnaround of that equipment for I08S, and the unexpected detention of their lab van in Singapore. The latter one resulted in the decision to air

ship backup equipment from the US to Australia less than three weeks before our cruise departure. To do this, groups at AOML, PMEL, and Scripps pulled together last-minute shipments consisting of two back up plans to obtain DIC measurements for the cruise. Two full DIC systems were shipped with the goal of setting up inside the ship. The three groups also sent a combined ~2,200+ bottles to collect samples and ship back for measurement after the cruise in case the shipments with the systems didn't arrive in time. Somewhat miraculously, all shipments arrived minus one chemical that was sourced from a nearby university. Additionally, compressed gases were found locally in Perth.

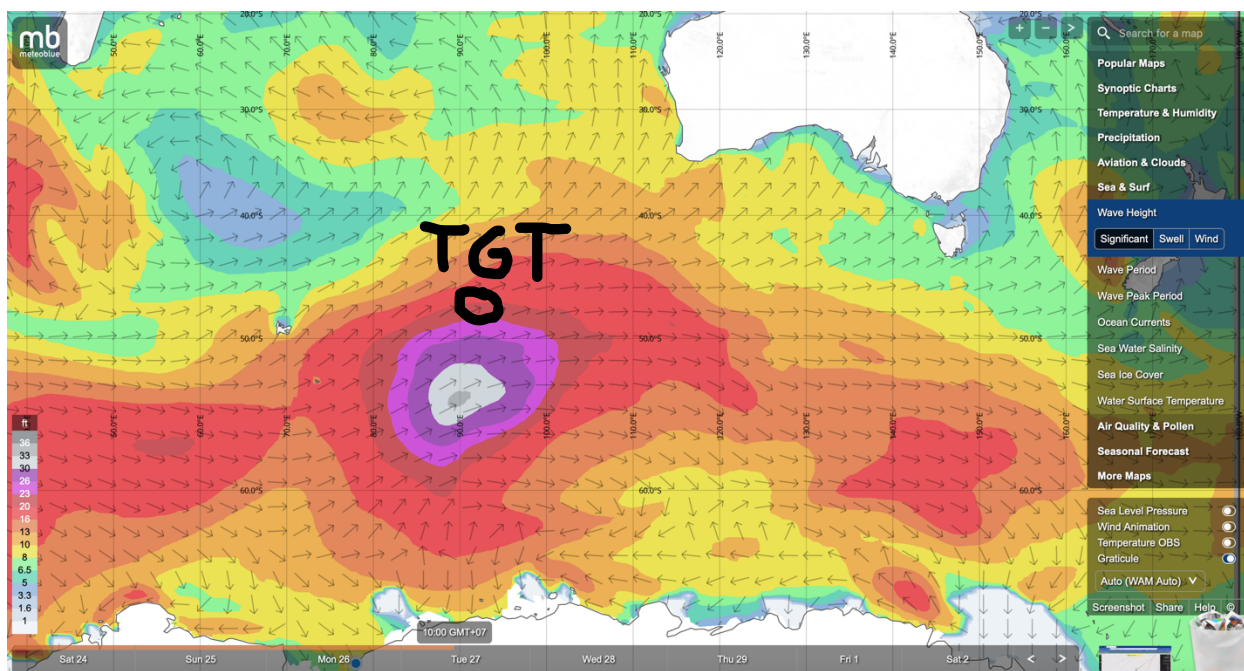


Fig. 3. Map of significant wave height taken from Windy.com showing the large storm and location of the Thomas G. Thompson (TGT).

So, everyone tries to keep busy indoors as decks are secured due to weather. Occasionally we have been allowed to peek outside the rear of the high bay during float or drifter deployments. To date, we've deployed three core Argo floats and one drifter. Thankfully, the food is really good and the science party is going along together well.

Until next time, so long and thanks for all the fish!

Seb and Katelyn