March 9 2024

GOSHIP I08S 2024 cruise, weekly update #2: " Berg-A-Lot"

Shortly after sending our first weekly update our luck turned for the better. The weather improved and R/V Thompson steamed southward, passing through the 50s in a breeze. We had sailed so far west during our crossing of the 40s that we were actually pretty much following the I08S line southward. We thought about doing stations on our way but kept going since our priority remained sampling near Antarctica's shelf before ice blocked our path. We did deploy four core Argo floats and nine surface drifters while underway, as well as our first BGC float with concomitant samplings from the chemical and biological labs from the ship's seawater flow-through system.

**Fig. 1.** CTD watchstanders Nektaria and Jacob deploy one of the ten surface drifters from the port aft quarter of R/V Thompson.

As we approached the 60 °S latitude, sea and air temperature dropped quickly each day. The ship's engineers placarded signs inviting us to do laundry before sea temperature would drop below 2 °C, at which point the ship's reverse osmosis system becomes much less efficient at making fresh water. On March 2nd, as we crossed paths near the computer room, Katelyn, who had just started her day shift, said in an excited voice, "Ice on the starboard side!". Slightly groggy from my night shift, I slowly made my way outside thinking a growler or some "chunk" of ice was out there. But as I finally got outside and turned the corner around the ship's main structure, there it was, blocking the horizon on the starboard aft quarter: a majestic iceberg, tall and wide, flour white and carved like the straight cliffs of Albion, with hues of blue ice illuminating the shrouding fog around it. With its "Wow!" effect, this first harbinger of the polar world suddenly made our trip more real. Mixed emotions of excitement, wonder and humility emerged. We saw three more icebergs on the radar that evening and with more than 500 nautical miles to go before arriving at our destination, the Jaws movie quote, "We'll need a bigger boat" did come to mind. The next day, we celebrated our future crossing of the south polar circle with made up acts of comedy, puppetry, singing and dancing.

**Fig. 2.** Picture of iceberg taken with iPhone through binoculars from R/V Thompson's bridge.

On March 4th, we entered Prydz Bay, slightly to the west of previous occupations, as the Davis Sea in the East was under high winds from a storm that stalled there for several days and easterly winds were pushing the ice edge westward. The captain waited until daybreak to enter the bay so that we could adequately monitor ice conditions. We conducted our first CTD cast on the shelf in 317 m of water. The altimeter did not detect the bottom so we did not lower the CTD past 300 m. Following A13.5's experience, we confirmed the CTD distance from the seafloor using the LADCP after recovery. Instead of conducting our second station on the 500 m isobath we went near the 1100 m isobath where we did a Bio cast that did not need to get close to the bottom, ~~but also~~ allowing used to safely test the altimeter again. Eventually, after a bit of tinkering with the altimeter we realized the configuration for the analog data stream was set with a 10 m bottom detection instead of 100 m, and the altimeter was made fully functional again. For our third station, at the 500 m isobath, drifting ice approaching the ship in the afternoon obliged us to move 4 nm to the west of the planned location. During the first two days or CTD work, casts to 300 m, 500 m, 1000 m and every 500 m down the continental slope were performed.

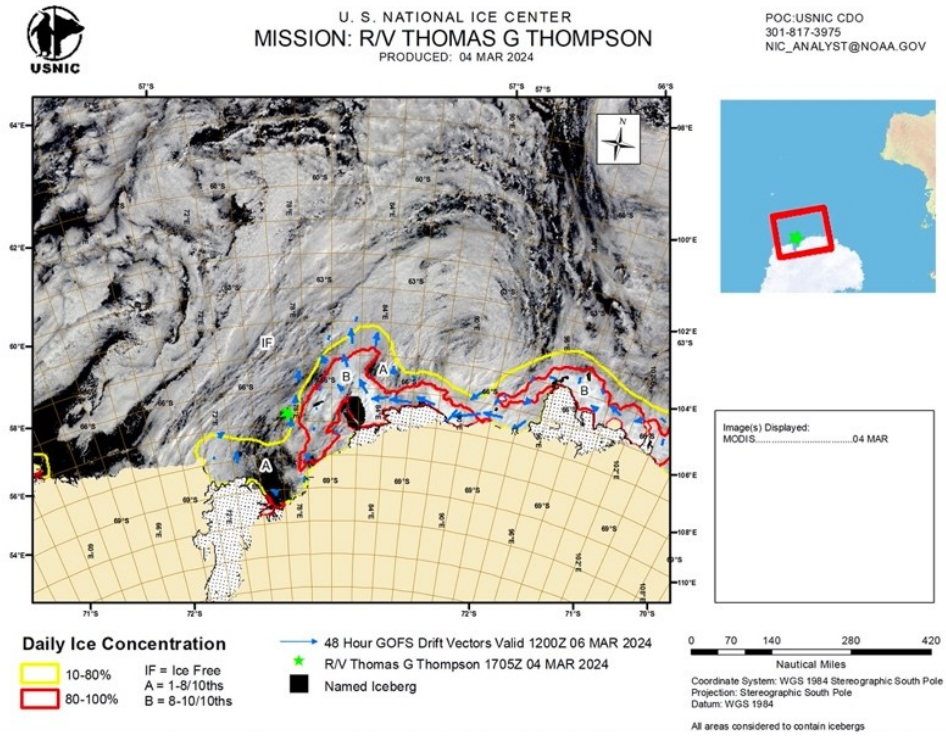


**Fig. 3.** Daily satellite ice map provided by US National Ice Center for 3/4/2024. Yellow line: 10%-80% ice cover. Green star denotes R/V Thompson daily position on east side of Prydz Bay.

The CTD stations along the shelf and slope were closely spaced, so the first few days of stations were quite busy for everyone. Labs worked diligently to keep up with sampling and running measurements. Since we have three CTD watchstanders per shift, they have been trained to take samples for other groups as necessary, which has been a big help. Data from groups is starting to be collated for some preliminary analyses, which we'll report on in our next update. We've also deployed one more BGC Argo float and crushed cups to commemorate our time in the Southern Ocean and within the Antarctic circle.

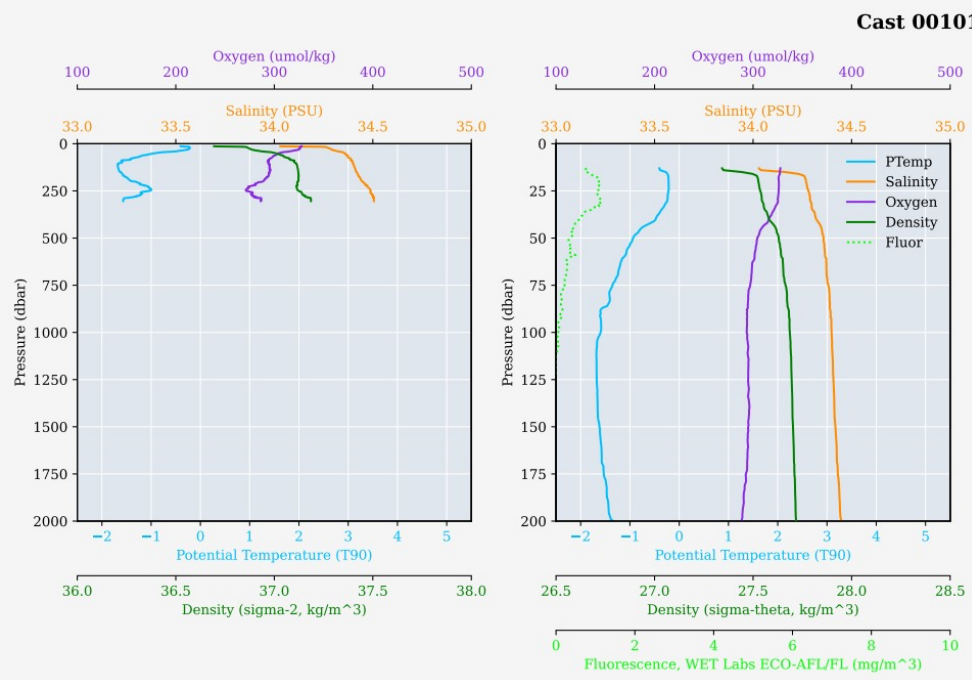


**Fig. 4.** First CTD profile from GO-SHIP I08S 2024. Station 001 at 67.1 S, 76.6 E on Antarctica's shelf, in 317 m of water.

Since the altimeter began functioning correctly, we've only had minor issues for stations 1-19 (we're currently en route to station 20). There are heaters in the staging bay where the CTD is sampled, but there is some concern with the heat being on during sampling, especially for the gas parameters. We've been trying to maintain a balance between heaters off for sample integrity while not allowing the CTD sensors get too cold. Occasionally, the ship has had to reposition as we approach station to avoid icebergs in the vicinity. At station 15, we could see three icebergs and needed to be particularly careful with our location. On a few casts, the winch operators have gone slower than the maximum 60 m/min. on the downcasts to keep from low tension on the wire. And notably, an station 8, one of the Niskin bottles was gone upon recovery of the CTD. The caps and lanyards were still attached, which made for a quick swap in of a new bottle.

A powerful storm started approaching us on the morning of March 8th, quickly downgrading weather conditions. At station 19, we were able to combine the core and bio casts into one cast since we were only at a depth of 1800 m, allowing us to complete the station before the captain called stop on operations. We've been delayed by ~24 hrs. at this point, but we hope to start back up at station 20 soon. We've spread the next several stations by 45 nm to make up for our delay.

Until next time,
Seb and Katelyn