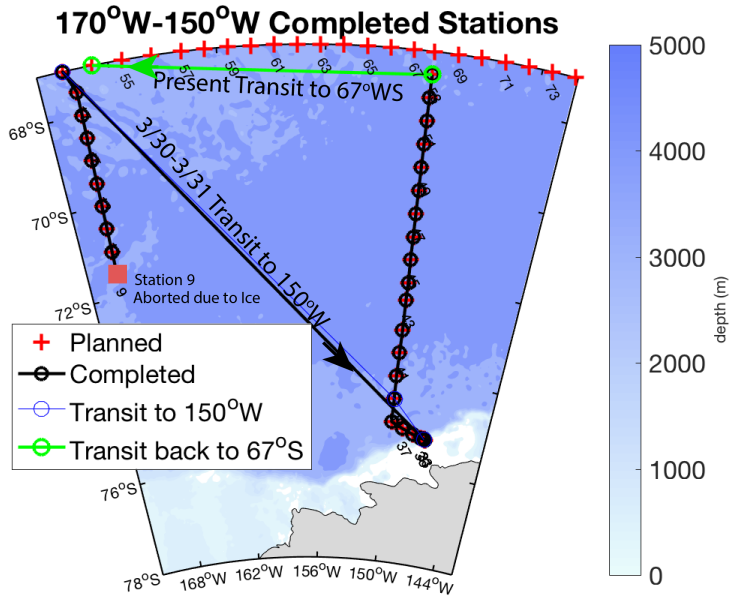
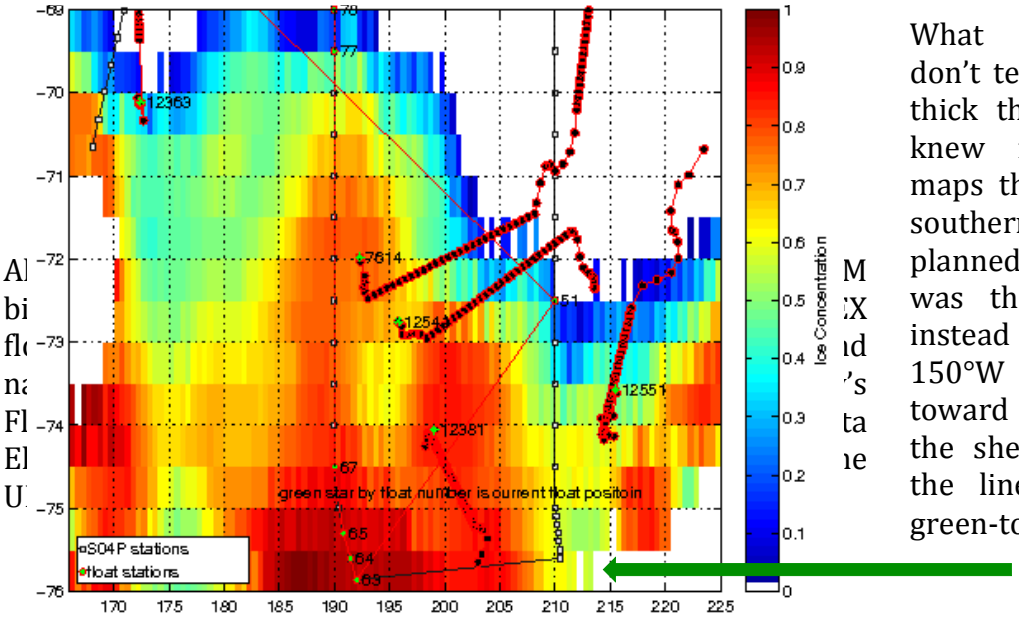
GO-SHIP 2018 S04P, NBP 18-02 **Sunday April 8, 2018**

Week 4 –The Tail-end of P16S: 150°W



Current position: 67.5°S, 150°W
Winds: from W at 15 knots
Outside Temp: -2.7°C, 30.5°F
Wind Chill: -18°C, 22°F
Surface Water Temp: -1.5°C, 31.2°F
Heading back west to 67°S, 168°W

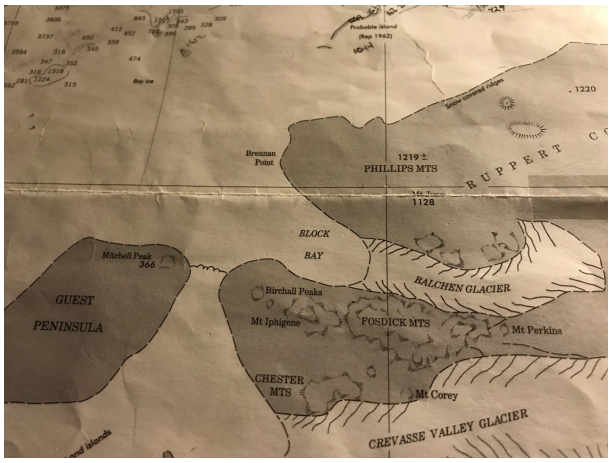
Last week we left you just as we arrived at 150°W after transiting southeast from approximately 67°S, 170°W (column of black dots on left in the map above). You'll notice that we did not transit directly to the start of the meridional 150°W line (black dots on the right). Instead we pointed ourselves toward our best guess of the latitude of the ice edge (~74.5°S). See below the April 1 version of ice concentration map provided to us by S. Escher at SIO, which includes our initial track plan (open black dots) as well as locations of SOCCOM float profiles (red dots). The ship obtains even more detailed ice concentration maps with estimates of ice age (less than a week old, less than a month old, etc. out to multi-year fast ice).



What these maps don't tell you is how thick the ice is. We knew from earlier maps that the ice at southern end of the planned 150°W track was the oldest, so instead of staying on 150°W we headed toward a portion of the shelf to east of the line. This light green-to-white area.

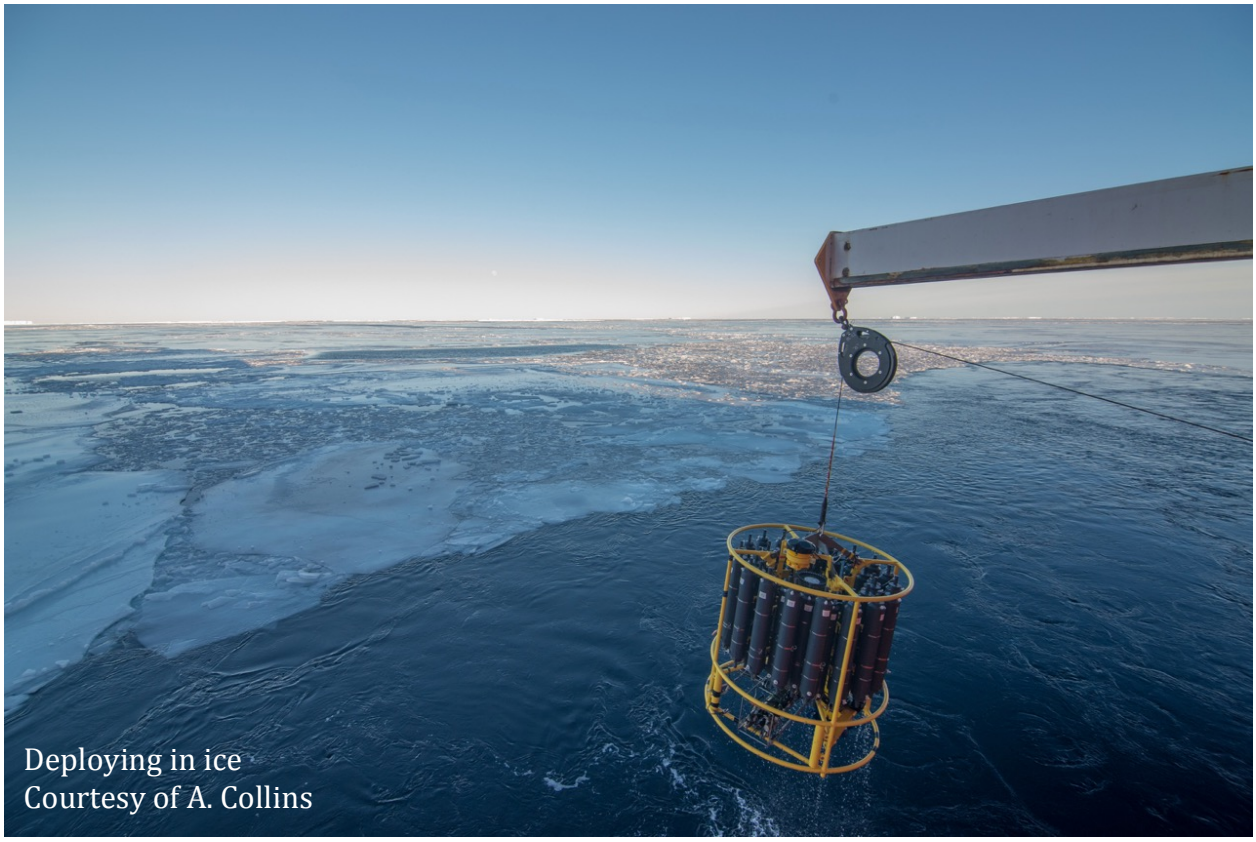
We arrived at our ice-edge estimated position on April 1 and throughout the day we crunched through ice. In the evening, I was awoken as we neared the slope. We began our approach toward the shelf with calm seas, flat ice and clear water, and a brilliant sky filled with the light of the Aurora Australis, the Southern Cross and a full moon. Who could ask for anything more?

As the captain and first mate wended their way onto the slope avoiding ice ridges and seeking the patches of open waters, all of us on the bridge truly felt like explorers. *Look. If we head that way we might be able to get on the shelf more quickly. But this way looks easier. No icebergs in our way or a dark patch that looks like it might be open water.* Our two sources of *in situ* bathymetry were not working well in the ice. One minute we thought we'd crossed the 3000 m isobath (i.e. the beginning of the slope). The next, the instruments told us we were in 5000 m or 600 m of water.



What is that shape in the distance?

We consulted maps, new and old comparing the bathymetric and geographic features that did and, at the same time, did not really resemble what we were seeing: *Newman Island* or was it *Probable Island* or was it a large berg? The Nickerson Ice Shelf stretched out before us, but in spite of the full moon and ship's spotlights, it was dark. The Aurora was gone by midnight and features were blurred in the distance. We crept up the slope. Finally, in a patch of open water, we got a steady reading of about 550 m. Deciding it was good enough, the ship turned in a circle breaking a hole large enough to safely deploy the rosette. This was Station 31 with a bottom depth of 544 m.

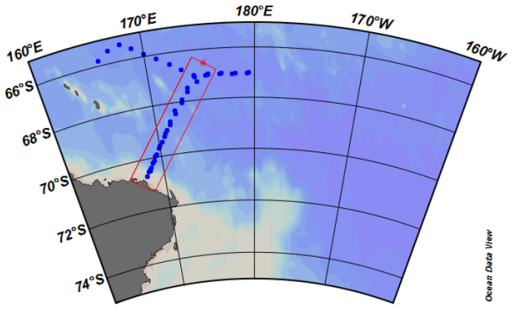


Deploying in ice
Courtesy of A. Collins

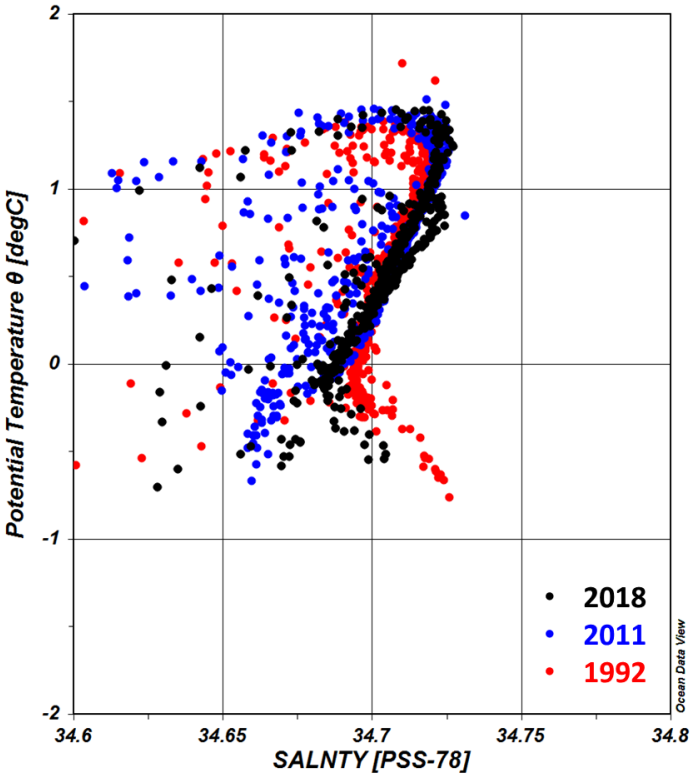
Back north up the line? But now we were finally here. We couldn't turn around right away. We saw indications of clear water to starboard, what was possibly Probable Island to port and an enticing gap between icebergs dead ahead. We kept going - still maneuvering around and through the ice until we came to what we thought was the 200 m isobath. This became Station 32 - 75.3°S, 147°W in 285 m of water, our southernmost station. Though a little deeper and east the 2011 150°W end point, it was fortunate we got there when we did as the ice began to close in as we backed out (literally) across the shelf and the slope. We attempted to follow a line perpendicular to the isobaths as we left the shelf, but in the end, the ice and its movement determined the direction we took. On Station 33, we ended up slightly further east along the slope. At Station 34 we drifted (with the ice) from 1800 m to 2200 m while the rosette was in the water.

We continued up the line, ticking off stations a little more slowly than we would like, not because of the time on station but because of fog and ice. As we left the sea ice, seas and winds began to pickup. Our wire behaved itself reasonably well until we reached Station 49 where the ASC MT noted the outer armor was starting to open. With the help of the students, the wire was cut, tied in figures eights and carried down to the hold. The wire was reterminated and our full carbon SOCCOM float (Tidal Wave) Station 50 at 69°S, 150°W went without a hitch. We have now completed 150°W and are on our way back west to where we left off 67°S (green line in the map on page 1). We recognize that the station order for this cruise is going to drive data analysts nuts well into the future, but know there has been a reason for every turn we have taken and the data set is coming together. Check out the 2016-2011-1992 comparison of our first stations at ~170°E below.

Potential temperature versus salinity below 2000 m, compares 1992 (red and in the cold water most saline), to 2011 (blue and in the cold water most fresh) and to 2018 (black, more saline than 2011, but fresher than 1992).



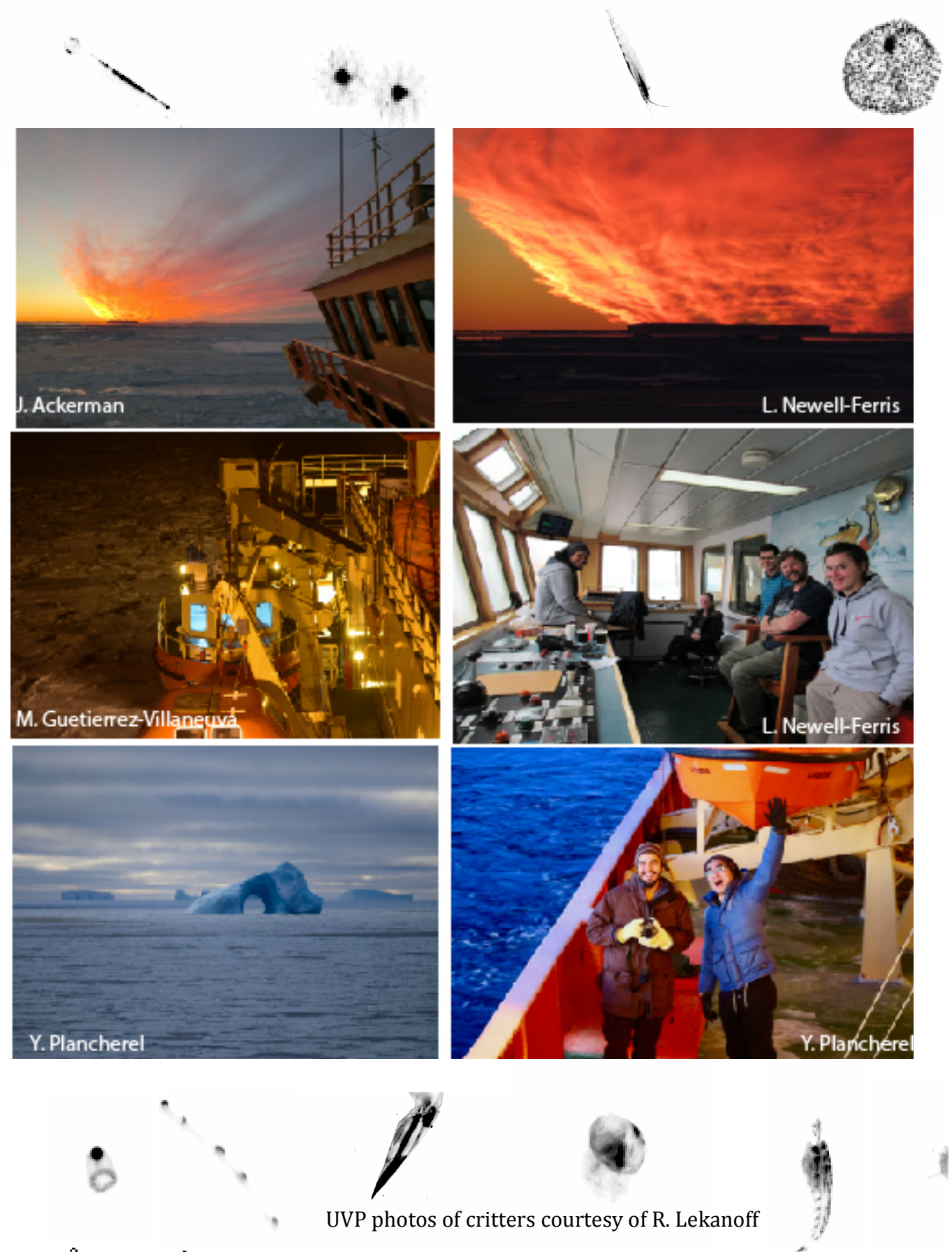
Created by E. Briggs using Ocean Data View software: Schlitzer, R., Ocean Data View, http://odv.awi.de, 2013.



We part with the thought that nature has been more than generous. As we battled ice drift, icebergs, growlers, fog, mounting winds and swell, we have been afforded many icy artistic monuments, some truly brilliant sunsets and animal life that always brings a spark of excitement. There is nowhere near enough space in a weekly report to illustrate all that we are experiencing so we leave you with just a few more photos.

Cheers

Alison Macdonald (Chief Scientist) and Ellen Briggs (Co-chief Scientist)



UVP photos of critters courtesy of R. Lekanoff