APPENDIX 2. VOYAGE MANAGER SITUATION REPORTS

01: 20170115

SITREP date/time: 20170115/1600
Noon location: 44°29.1S, 146°22.4E
Speed: 9 knots
Heading: 209
Air Temperature (°C): 13
Water Temperature (°C): 14.6
Wind Speed (knots): 35
Wind Direction: 280
Barometer (mbar): 1006.7 falling
Visibility: good
Cloud: 4/8 low level Cumulus
Sea: Westerly swell 4-6 metres

The RV Investigator departed Hobart on the afternoon of the 14th January at 1757, and is currently heading south-west towards our target survey area north of the Totten Glacier region in Antarctic waters, some 1560 nm away. Our departure was delayed 8 hours due to a particularly nasty low pressure system with associated (even nastier) seas. We probably missed the worst of it, but even with our hesitant departure, when we finally cleared the more sheltered waters afforded by the Tasmanian coastline, it was immediately apparent that we were in for a less than gentle introduction to the Southern Ocean.

As we rounded Pedra Branca at 0700 this morning the swell asserted its already obvious presence, and things on board became even more challenging. Breakfast and lunch were quiet affairs. Despite the rough ride, we are making good speed in what appears to be gradually improving conditions.

02: 20170116

SITREP date/time: 20170116/1615
Noon location: -47°54.7S, 143°28.7E
Speed: 11.4 knots
Heading: 209
Distance Run (noon – noon): 238 NM
Distance Run (total): 353 NM
Air Temperature (°C): 11.5
Water Temperature (°C): 11.23
Wind Speed (knots): 26 – 35
Wind Direction: 314
Barometer (mbar): 988.4 falling
Visibility: reduced in showers
Cloud: 8/8 low level stratus
Sea: Northwesterly swell 3-4 metres

Conditions eased overnight, much to everyone’s relief, and there have been new, happy faces seen at meal time today. The wind is still pretty fresh though, and with the barometer still falling, we’re probably in for a bit more of a bounce coming our way.

The main focus for us at the moment is transit, and if we can maintain our current speed, we should arrive at our first waypoint late on Friday night this week. Our primary scientific activity is hydroacoustic (aka swath) mapping, which has revealed some interesting relief on the seafloor as we approach the SE Indian Ridge. The gravity meter is also showing an increase, suggesting a thickening of the crust beneath us. Water depth is currently 4187 metres (4884 m the deepest noted so far on our trip), an increase in depth of some 2 km after we crossed the shelf boundary yesterday.
Overall, everyone is coming along well, and getting accustomed to the motion of the ship. Many folks are beavering away at various tasks, checking their gear is all in one piece, and making plans for the near future.

03: 20170117

SITREP date/time: 20170117/1530
Noon location: 51°53.2S, 139°53.2E
Speed: 12.2 knots
Heading: 209
Distance Run (noon – noon): 279 NM
Distance Run (total): 629 NM
Air Temperature (°C): 7.5
Water Temperature (°C): 6.64
Wind Speed (knots): 19.5
Wind Direction: 307
Barometer (mbar): 985.0 falling
Visibility: good
Cloud: 6/8 low level Cu
Sea: NW swell 2-3 metres

More and more people seem to be making it to meals, which in some ways is great, but when the ricotta and spinach ravioli runs out before the Voyage Manager gets a crack at it, things are grim.

Based on everyone’s high spirits though, I thought another PowerPoint presentation should slow them down a bit, so after a general meeting at 1400, we embarked on a lab induction for the folks who will be working in the various labs about the ship. Following the presentation, we split into two shift groups to walk through the labs, and discuss what was where, and in some cases, what wasn’t there, and where you would go to find the nearest one. Sure enough, a number of people mysteriously felt unwell…

Seriously though, it was a good exercise, and gave people the opportunity to explore the lab spaces with “safety” at the forefront of their mind.

Pretty grand weather out here today, but it’s obvious we’re heading “south” and have definitely left the balmy Tasmanian summer behind us. Cold weather clothing issue has started, with a “try before you borrow” facility having sprung up in the library overnight. Sizes from XS to 3XL, but only yellow I’m afraid…

04: 20170118

SITREP date/time: 20170118/1700
Noon location: 55°37.3S, 135°45.2E
Speed: 11 knots
Heading: 209
Distance Run (noon – noon): 268 NM
Distance Run (total): 897 NM
Air Temperature (°C): 5.4
Water Temperature (°C): 5.87
Wind Speed (knots): 16
Wind Direction: 318
Barometer (mbar): 1000.5 falling
Visibility: good
Cloud: 7/8 low level Cu, Strato Cu
Sea: SW swell 2-3 metres

The Furious Fifties continue to not live up to their name, which is absolutely fine by us.

Overnight, the multibeam survey revealed some amazing seamounts beneath us rising about 1.7 km above the surrounding seafloor. We also had an aurora in the early hours of the morning, which has sparked a lot of interest in staying up later, or getting up earlier, depending on what shift you happen to be on. Which brings me to shifts:
most people are now trying to get into the swing of what the next few weeks will be like, and are attempting to get their body clocks into the 1400 to 0200 shift, or the 0200 to 1400 shift. Your correspondent shall be keeping gentlemen’s hours…

Cold weather clothing orders were completed today, and a gang of volunteers helped transport armfuls of bright yellow gear from the bowels of the clothing container to the library for distribution. We also had a presentation from our Marine Mammal Observer Vanessa, who outlined the protocols we will be following during our seismic survey activity in the event we encounter any whales, or víca verça.

Now if you’ll excuse me I have to get to dinner before those students help themselves to thirds of whatever delightful meal the wonderful chefs Matt and Bec have prepared for us tonight. I missed out on the garlic seafood last night and I am NOT HAPPY!

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**05: 20170119**

SITREP date/time: 20170119/1600

Noon location: 59°27.2S, 130°20.8E
Speed: 12.3 knots
Heading: 221
Distance Run (noon – noon): 288 NM
Distance Run (total): 1185 NM
Air Temperature (°C): 4.2
Water Temperature (°C): 4.55
Wind Speed (knots): 14.4
Wind Direction: 033
Barometer (mbar): 984 falling
Visibility: variable; poor in fog, reduced in light showers
Cloud: 8/8 stratus/fog
Sea: NE swell 1-2 metres

As I write my report today, we have just ticked over 60 degrees south, and are making great speed in delightful conditions for this part of the world. We awoke to a foggy morning, with water temperatures slightly warmer than air temperature, so we are yet to cross into truly Antarctic waters. Light rain has accompanied us throughout the day.

Anticipation is building for the first iceberg, with a sweep being run with 15 minute time slots, and an "amazing"* first prize on offer from the Chief Scientist. The berg has to meet a number of criteria, including being visible to the naked eye, at least half the size of the ship, and the exact time of sighting is deemed to be when it is abeam the ship, called by the Officer on Watch. Spots for tonight and tomorrow morning filled up fast, but even though hours of darkness are becoming scarce, the chance of the first berg being the proverbial "ship passing in the night" exists. Heavy betting continues throughout tomorrow though, so I’m sure someone will come away with the prize…

Plenty of activity on the back deck, with the Italian seismic crew, our chaps from SIT (the SAS of the CSIRO world…), and the deck crew tweaking the seismic gear, and smiling, so we think we’re good to go for that particular bit of gear. It will still effectively be a sea trial for seismic though, having never fired a shot from the ship before.

All on board are well, and getting excited as we approach our first survey locality.

*NB: Levels of amazingness may vary.

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**06: 20170120**

SITREP date/time: 20170120/1630

Noon location: 62°58.3S, 123°46.7E
Speed: 12 knots
Heading: 227

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Distance Run (noon – noon): 282 NM
Distance Run (total): 1468 NM

Air Temperature (°C): 1.8
Water Temperature (°C): 1.54
Wind Speed (knots): 19
Wind Direction: 080
Barometer (mbar): 979 falling
Visibility: variable; poor in fog
Cloud: 8/8 stratus/ occasional fog
Sea: NE swell 1-2 metres

We’ve made it to Antarctic waters, with a marked drop in sea surface temperature signaling our crossing the Antarctic Convergence. That, and the encounter with our first icebergs of the trip at 2225 last night, was probably the biggest hint that we were in the right part of the world for our science objectives. The ‘bergs caused much celebration and excitement, particularly amongst those on board who had never seen one, but even amongst those of us who had (the exuberance of youth rubs off on crusty old “repeat offenders” like me). IR Kel won the Iceberg Sweep, and swiftly donated his prize of a whole packet of Wagon Wheels to anyone who wanted one.

Yesterday Phil O’Brien gave us a great run down on the design of the project and what we were out here trying to achieve. Although there is little likelihood of us getting close enough to see the Totten Glacier, we hope to recover sediment records from the offshore Sabrina Basin that contain a geological record of the interaction between the Glacier and the ocean/atmosphere. With the help of seismic and sub-bottom profiling, we will target the most likely spots for a number of piston cores that will hopefully cover several glacial and interglacial cycles.

A full briefing was held today outlining the process of how we think seismic will be deployed from the ship. This was attended by all who will be involved, and a number of people who won’t be as well. There will be lots of interest generated with what is effectively a trial deployment of this technology from this ship.

We’re due at our survey start location tonight at 2200. All of the science team are now on a 12 hour shift, and are poised and ready to record what will be the first detailed combined hydroacoustic and seismic survey of this remote part of the world.

On a side note, today is funky shirt Friday, and it was pleasing to see a bit of old-shirt bad taste magic and colour being worn around the vessel.

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**07: 20170121**

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Sitrep date/time: 20170121/1800

Noon location: 64°03.5S, 116°43.2E
Speed: 08 knots
Heading: 271
Distance Run (noon – noon): 215 NM
Distance Run (total): 1683 NM

Air Temperature (°C): 1.9
Water Temperature (°C): 1.19
Wind Speed (knots): 19
Wind Direction: 098
Barometer (mbar): 980.5 rising
Visibility: variable; poor in fog
Cloud: 8/8 stratus/ occasional fog, clearing this evening
Sea: NE swell 1-2 metres

We arrived at the NE corner of survey area “C” at 2032, changed course to 273, and truly started our survey of the Sabrina Basin. Overnight conditions deteriorated as far as visibility goes, with thick fog forcing us to slow from 8 knots to 3.5 knots at one stage, with the occasional refrigerator-sized growler bobbing in the water. There have been a number of pretty impressive icebergs throughout the day, many showing their origins as a tabular ‘berg, but all now rolled and melted somewhat, revealing sculptured keels and pinnacles.

At 0757 we arrived at the NE corner of area “A” (or the NW corner of area “C”, take your pick), which is our primary survey target area. We’ve maintained 8 knots throughout the day, despite fog patches and the occasional zag to avoid a larger ‘berg or two. We anticipate making a “U” turn at about 2000 this evening, and turning onto a reciprocal course to “mow the lawn”: the common euphemism for the tightly spaced survey lines that allow the multibeam “swath” to overlap, and cover the area 3 to 4 km beneath us with bathymetric data.
Overnight, our plan is to continue multibeam surveying until we are within range of our first seismic survey line, sometime between 0800 and 1000 tomorrow morning.

Today we were briefed by our on board doctor on the potential for cold injury in this environment. It’s easy to forget we’re in the Antarctic sometimes, when we’re inside a comfortable warm ship. Dr. Sheri reminded us about the perils of falling in water at just over one degree Celsius, and our survival time being in the order of 10 minutes. My personal favorite bit of info from today was the phenomenon of “paradoxical undressing”. I suspect none of us will suffer from it on this trip, but you never know... Google it!

All on board are well, and excited to be recording the things we have travelled so far to record.

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**08: 20170122**

**SITREP date/time:** 20170122/1600

**Noon location:** 64°15.0S, 115°43.0E

**Speed:** 08 knots

**Heading:** 092

**Distance Run (noon – noon):** 144 NM

**Distance Run (total):** 1827 NM

**Air Temperature (°C):** 0.3

**Water Temperature (°C):** 0.96

**Wind Speed (knots):** 19

**Wind Direction:** 125

**Barometer (mbar):** 989 steady

**Visibility:** variable; poor in fog

**Cloud:** 8/8 stratus/ occasional fog, increasing throughout the day

**Sea:** ENE swell 1-2 metres

Multibeam surveying was the order of the evening last night, but not in the original order we had planned. Our lawn mowing went somewhat askew: initially we had planned to commence our seismic survey line at the eastern end and head west, which would have worked out OK as far as lawn mowing went and timing, but the Master pointed out that we would be downwind, and that wouldn’t work at all. It’s difficult enough controlling the vessel at 2 knots downwind, but trying to deploy 300 metres of seismic streamer at the same time is a recipe for marine macrame. Back to the drawing board, and cunning plan #23 produced the interesting excursion you see below:

This allowed us to cover ground at 8 knots that we had intended to cover at some stage, and arrive at the western end of our start point at 0600, allowing us a good distance lead-in to the seismic start point. As mentioned elsewhere, this was to be the first deployment of seismic gear from Investigator. All the gear had been checked and rechecked, and hopes were high for a good day’s shooting.

Our Marine Mammal Observer (MMO) Vanessa began scanning the area around the ship for signs of any whales at 0800. Deployment of the streamer commenced at 0822, with Vanessa giving the all clear for seismic start at 0830.

Spotting whales is not as easy as you may think, but an even harder task out here is determining how far they are away from the ship. We are obliged under our environmental permits to cease operations when a whale comes within a certain approach distance to the vessel, but getting a handle on how far away a whale’s “blow” may be (“that she blows!”) is tricky for us landlubbers, especially in the absence of recognizable landmarks for scale. The least technological solution involves trigonometry and a sextant, both of which kept the third officer and the voyage manager happily occupied for at least half an hour, determining the angle that a certain distance from the height of the ship’s bridge would subtend from the horizon. A (literal) “rule of thumb” was developed to help with the distance problem. Also handy to know is the buoy at the end of the seismic streamer is 400 metres from the bridge.

The streamer was fully deployed at 0840, and five minutes later a whale turned up to see what we were up to. By 0913 the whale had moved on, and the seismic guns were deployed in the water at 0947. Our Italian seismic guys cranked up AC/DC “Thunderstruck” to get everyone in the mood. A “soft start” to the seismic guns commenced at 1004, and another whale popped by for a look, but maintained a distance of more than one kilometre, and was well clear by 1042. Full power was reached at 1124 and we were officially shooting seismic at 3.5 knots.

Visibility deteriorated after 1200. We continued on our seismic line, with an occasional lifting of the fog and not much else to report. Team Italia were all happy with the data coming in, and all the equipment was working as it was designed to. Kudos to all involved.
The line came to an end when two humpback whales made a sudden appearance very close to the ship at 1420, heading close down our port side towards the streamer trailing behind us. This prompted an immediate shut down of the seismic guns, and as we were only some 6 km from the end of the line, it was decided not to persevere, and to pull the gear in. All gear was back on deck and secure by 1520, and multibeam survey has recommenced and our speed is back to 8 knots.

A debrief of the days’ seismic operation revealed a group of pretty contented people, from the deck to the bridge. We acquired 1,213 shots along 22 km of line. The Master declared “dinner’s on me”, and Sunday roast finished a pretty important day for the RV Investigator.

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**09: 20170123**

**SITREP date/time:** 20170123/1700  
**Noon location:** 64°19.0S, 114°57.7E  
**Speed:** 08 knots  
**Heading:** 091  
**Distance Run (noon – noon):** 172 NM  
**Distance Run (total):** 1999 NM  
**Air Temperature (°C):** -1.7  
**Water Temperature (°C):** 0.34  
**Wind Speed (knots):** 16  
**Wind Direction:** 130  
**Barometer (mbar):** 983 falling  
**Visibility:** unlimited  
**Cloud:** 1/8 Cu  
**Sea:** ENE swell 1-1.5 metres  

A colourful sunrise greeted those who were on the 0200-1400 shift this morning, which made for a nice change to the fog that has greeted us over the last few days. Morning cloud has given way to a blue-sky afternoon, a fresh breeze and subzero temperatures.

“Lawn mowing” continues (just like summer at home… only different) with the occasional iceberg on track providing a distraction from pinging the seafloor. We had a close approach to a handsome ‘berg this morning, with a nice surf breaking on its icy undersea keel extension: a reminder why you don’t get too close to icebergs.

We’ll be adjusting our survey pattern to arrange for the ship to be in position tomorrow morning, heading east at the start of Seismic line 2. There have been lots of whale sightings in the last 24 hours, so we’re anticipating a bit of interest in our seismic guns, but hope there’s not too much interest…

The Voyage Manager dutifully attempts to match the Master in engaging and entertaining sitreps, but has his doubts about keeping it up for the next 41 days.

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**10: 20170124**

**SITREP date/time:** 20170124/1700  
**Noon location:** 64°33.3S, 116°30.2E  
**Speed:** 3.5 knots  
**Heading:** 091  
**Distance Run (noon – noon):** 155 NM  
**Distance Run (total):** 2154 NM  
**Current Weather:**  
**Air Temperature (°C):** -1.8  
**Water Temperature (°C):** -0.67  
**Wind Speed (knots):** 20  
**Wind Direction:** 134  
**Barometer (mbar):** 982 steady  
**Visibility:** <8 NM
An almost cloud-free morning has evolved into a completely overcast, slightly foggy afternoon, but no matter: it’s been another successful day down here. Multibeam survey continued overnight, with quite a few whales paying us a visit.

The sunrise gave us colourful skies yet again, and we were in the company of some impressive icebergs. One particularly large tabular ‘berg is beckoning us on the southern horizon, and may be the site of a future CTD dip.

Our “oceanic wilderness” experience was slightly diminished by the encounter with the Spanish fishing trawler “Tronio” this morning at 0630, with our bridge crew and theirs exchanging pleasantries on Marine VHF 16. Their time at sea fishing makes our 51 day voyage seem like a long weekend: they sailed from Port Stanley in the Falkland Islands on November 3rd 2016 and weren’t quite sure when they’d end up. “Maybe Cape Town”. Good luck guys...

The order of the day was seismic line #2, and whale spotting officially began at 0800, some 3 nautical miles before the planned start of the line. I say “officially” because we had been unofficially spotting whales most of the morning, and were anticipating a real start-stop kind of day. To our surprise, the whales stayed away, and we had an uneventful streamer deployment and seismic gun pressure ramp-up to full pressure at 0920.

Our line continued uninterrupted until 1253, when a young humpback whale decided to cross our path, feeding all the while and occasionally rolling on its side, and rudely raising a pectoral fin. This resulted in a shut-down of the seismic. Vanessa, our MMO, described the whale as a “teenager”: Typical: no respect, and eating all the time... Vanessa was very excited by the encounter, momentarily forgetting that when we’re shooting seismic, we don’t want to see whales.

To close the resultant gap in our line, we did a 360 turn and re-joined our track, hoping that no more teenagers would turn up. Maybe we got lucky, but hopefully it’s a sign of seismic lines yet to come, but we made it to the end of the line at 1634, and are retrieving the gear as I write.

The science team are thrilled with the data, and the quality has improved over line #1 thanks to some magic weaved by Chief Engineer Genna and Co. to rectify a problem with a valve (Fisher valve) that controls the high pressure from the compressor to the seismic guns. This MacGyver fix resulted in perfect synchronicity of the guns, and happy “Team Seismic Italia”.

Now, it’s back to the “lawn”.

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**SITREP date/time:** 20170125/1830

**Noon position:** 64°36.4S, 115°34.2E  
**Speed:** 3.5 knots  
**Heading:** 091  
**Distance Run (noon – noon):** 143 NM  
**Distance Run (total):** 2297 NM

**Current Weather:**  
**Air Temperature (°C):** 0.4  
**Water Temperature (°C):** 0.59  
**Wind Speed (knots):** 10  
**Wind Direction:** 121  
**Barometer (mbar):** 985 steady  
**Visibility:** 10 NM  
**Cloud:** 8/8 Stratocumulus  
**Sea:** ESE swell 1 metres

We awoke to a snow dusted deck and overcast skies this morning, passing through some heavy snow showers as we set up for seismic deployment #3. Whale spotting commenced at 0800 and was followed by gear deployment at 0806, with the full streamer in the water at 0819 (slick!), and full seismic operations commencing at 0903. We have been fortunate with the sea conditions since we arrived in the survey area, and despite the weather being fickle, being in and out of fog, snow, gloom, and occasionally a spray of sunshine, the sea has “played nice” to date.
Snow showers became fog, with visibility <300 m, and at 1137 we encountered an icy field of rubble in our path, originating from a large (4 km long) tabular iceberg that we had spotted yesterday, and had been aware of from satellite radar imagery a number of days before. Our radar informed us that we were only 1.4 nautical miles north of it, but could see nothing of it through the fog. Even though the ice posed no threat to the ship, we couldn’t see what was coming up, and the seismic gear was not worth risking so early in the venture, so the decision was made to end the line and bring the gear back on board.

Almost immediately, conditions improved: visibility increased as the fog lifted, and the large berg appeared to our south, complete with its own weather system. We had floated the idea of a shallow (200 m) CTD “dip” adjacent to just such a berg yesterday, so plans were quickly rejigged to get some water for the biologists from nearby: the colder (-1.0 °C) less saline water near the slowly melting iceberg should harbor a different community than the surrounding warmer waters. The vessel was positioned to within 900 m of the berg, and preparations made. At 1347 the CTD was deployed and was down to 200 m at 1404. Samples were collected at 50 m intervals, and just below the surface, and the CTD was back on deck at 1415. This short “test dip” returned useful samples, but also allowed the gear to be given a run on a short, less critical dip, and revealed the communications cables needed re-terminating. Better to find out now than on a 2000 m dip.

During the CTD, our drone came out for two test flights, and captured a great shot of our good ship in front of the berg, cap cloud and all.

We shall continue “mowing the lawn” tonight, and perhaps test the boundaries of the sea ice zone to our south.

There have been a couple of threatening notes (well, essays) from King Neptune of late, the latest being a Subpoena and Summons for all Pollywogs (those who have not previously been south of 60° S) to appear before the Royal high court of King Neptune “to accept the pains and penalties of the awful tortures that will be inflicted upon those who dare to enter our aqueous polar regions without due and submissive examination for fitness to become a trusty Shellback.” Perhaps unsurprisingly, only five people have so far admitted to being a Pollywog.

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**12: 20170126**

**SITREP date/time:** 20170126/2000

**Noon position:** 64°40.4S, 114°44.8E

**Speed:** 6 knots

**Heading:** 271

**Distance Run (noon – noon):** 137 NM

**Distance Run (total):** 2434 NM

**Current Weather:**

- **Air Temperature (°C):** -1.4
- **Water Temperature (°C):** -0.12
- **Wind Speed (knots):** 7
- **Wind Direction:** 135
- **Barometer (mbar):** 984 falling
- **Visibility:** 10 NM
- **Cloud:** 8/8 Altocumulus/altostratus, low level cumulus
- **Sea:** ESE swell <1 metre

A busy Australia Day for us out here. Last night we continued with our multibeam survey of Area A, and it looked like being a fairly uneventful evening for us. Well, for most of us it was, however a fire alarm in the Main Switchboard Room at 1915 meant things got interesting for a number of the crew. The Master Mike explains:

“Ship crew investigated and found a rapidly dissipating haze near the overhead and no sign of fire. Inspection inside every switchboard panel revealed no sign of fire either. Engineering staff continued to investigate deeper into the larger panels and eventually found a large failed capacitor about 30 minutes later.

We continued swath mapping at a reduced speed of 6 knots overnight on the starboard motor. Repairs were underway this morning to replace the capacitor with an identical unit from the bow thruster room as well as testing the remaining bank of capacitors for proper operation.

Chief Engineer Genna reckons he’ll have the propulsion motor back on-line by 1500 this afternoon. Until he can consult further with the manufacturer we won’t have the use of the bow thruster. This won’t affect any of our voyage goals however with coring ops well within our capability on two main engines.”
No reason for alarm. We conducted most of our surveying today on one engine, and by this afternoon we were back to two main engines.

The morning ritual of fog and heavy snow continued today, with the distraction of another fishing vessel appearing on radar at 0825. Given the visibility, it was obvious we were never going to see them. Heavy snow showers came and went as we tracked them on radar, initially paralleling our course, then altering course to cross ahead of us. They were doing 11 knots, we were doing 5. Their AIS eventually informed us it was the Korean flagged “Kingstar”, and after a number of attempts at hailing them, they gave us a response and we exchanged information on what we each were doing. They were a bit surprised that we weren’t a fishing vessel. Like our Spanish fisherman the other day, these Korean guys have been at sea since early November last year. In such a large ocean, it seemed pretty weird for a ship to pass so close in such poor visibility. Like Mike said, “seems as if there are bad drivers no matter where you go.”

It seems like we’ve been eating all day! Australia Day: a day of gluttony! Nicole, one of our SIT gurus did an amazing job by single-handedly decorating the Mess with Australia Day bunting. The feeding began: Lamingtons for morning tea, an “all you can eat” lunchtime buffet, with damper, garlic prawns, oysters, homemade sausage rolls, lamb cutlets, satay chicken, and salads. JJJ’s hottest 100 was streamed live via our tech savvy DAP crew Karl and Hugh, and our embedded comms media champion Asaesja had a phone hook-up with JJJ to let them know what we were up to. Leanne had brought along some fake grass, which was rolled out at the 1400 meeting for us to run our toes through. The Engineering crew followed up lunch with a BBQ on the bridge wing, which was well attended, despite everyone being full from lunch. It did, however, seem like a violation of our (Australian) human rights to be at a BBQ without a beer on Australia Day! Somehow, we struggled on…

After another row of “mowing”, we turned south then east once more, and prepared for a plankton net deployment after dinner (more amazing food, including an “ultimate parmy” and pavlova for dessert). The biologists were targeting a cold water plume emanating from the large iceberg that has now become a local feature to us, either by sight or on radar. Near the berg, water temperatures drop markedly, as does salinity. We had to deviate to the north of our new line to locate the best part of the plume, and the net was in the water at 1832, at -100 m depth by 1840, and back on deck at 1855. Happy biologists.

We are now heading southwest to intersect the next line heading west. The calm conditions of the last couple of days have seen an easing of the well-defined ice edge to our south, and it appears to be moving north slightly. The GSM team have produced a “map so far” and a 3D model of the survey area, which has revealed a large canyon and other interesting bathymetry, and potential targets for coring. We will continue surveying tonight, and have tentative plans for CTD and underwater towed video tomorrow.

13: 20170127

SITREP date/time: 20170127/2000

Noon position: 64°45.0S, 114°11.9E
Speed: various
Heading: various
Distance Run (noon – noon): 163 NM
Distance Run (total): 2597 NM

Current Weather:
Air Temperature (°C): -1.2
Water Temperature (°C): 0.27
Wind Speed (knots): 4-6
Wind Direction: 118
Barometer (mbar): 980 rising
Visibility: unlimited
Cloud: 7/8 Altocumulus/altostratus
Sea: S <1 metre

Our first penguin sighting of the trip last night: four Adelie penguins on a large “growler”. In the olden days, they would have been subjected to a bad case of Kodak poisoning, but these days I’m not sure what the equivalent is…

After our plankton net cast last night we headed south and continued multibeam surveying to fill in what we could before encountering the southern ice-edge. This line was well defined a few days ago, but with the light winds from the SE, the pack has eased, and is slowly dispersing and drifting northwards, covering our area of interest a bit more each day. These conditions will persist for a couple more days, during which time we will concentrate on the northern part of Area A.
At 0314 we did a CTD cast to 400 metres, which was back on board with samples for the biologists at 0359. We continued multibeam to cover the ground we had missed on some of our earlier lines, and then headed southwest again and deployed the towed camera. The camera was in the water at 1031, on its way to -1655 m. The sight of people crowding around the video feed in the Operations Room was reminiscent of the anticipation of watching a moon landing. The tow revealed fish, sea stars, anemone and far too many “drop stones” (rocks that have melted out of icebergs and fallen to the sea floor) for folks interested in sediment coring.

Once the camera was back on board, we had a short transit to a new seismic line bearing 056 degrees, which would tie in an old Russian and Australian line providing the geologists with a better 3D feel for what the underlying stratigraphy was doing. Whale observations started in not-quite mirror smooth conditions (I did see the cup anemometer stop spinning at one point today), and there were lots about, probably as we were closer to the ice edge than our other lines. No sooner had we started than we had to shut down as a female Humpback and her calf came very close to investigate the Investigator, and inspect the buoy at the end of the seismic streamer. They eventually moved off, and by 1540 the seismic crew were cleared to ramp up to full power.

We are still on the line, with no further whale encounters, and are expecting to finish by 2200 this evening. A particularly handsome berg finished a busy day, only 500 m from our line, castellated, with an electric blue “dry-dock”, birds perched on its upper plateau, and a breaching humpback to complete the definitive Antarctic picture postcard perfect memory (no, I didn’t have my camera…).

SITREP date/time: 20170128/2000

Noon position: 64°28.3S, 115°37.4E
Speed: various, including hours motionless on site at A-005
Heading: various
Distance Run (noon – noon): 88 NM
Distance Run (total): 2679 NM

Current Weather:
Air Temperature (°C): 0.2
Water Temperature (°C): 1.34
Wind Speed (knots): 4-6
Wind Direction: 136
Barometer (mbar): 984.5 steadying
Visibility: unlimited
Cloud: 7/8 Altocumulus/altostratus
Sea: Calm…

Yesterday’s seismic line was completed early, at 2111, and all gear was back on board by 2141. The ship then repositioned for the first of two CTD casts at planned coring sites. We reached the station A-005 at 2245, the CTD was in the water at 2252, and back on deck at 0030 after a cast of -2151 metres. We then transited to the next site, (A-006) with the CTD in at 0304 and back on deck at 0435, having ventured to -1853 metres. Both casts took samples from 10 metres above the sea floor (a distance determined by a sonar altimeter on the CTD).

We then returned to site A-005 via the scenic route, covering a hole in our multibeam survey data: we’re aiming to completely map Area A, and have so far mapped in the order of 15,000 square kilometres of the sea floor. But today was about getting some of the seafloor, not just mapping it.

We were on site and ready to deploy the Kasten core at 0800. It seems impossible, but today was even calmer than yesterday, with only the faintest of zephyrs wafting past us every now and then. The corer was on its way to the ocean floor, some 2161 m below our ship, at 60 metres per minute at 0814.

Determining the actual depth to the sea floor is not as straightforward as you might imagine. We have a very sophisticated multibeam sonar system at our disposal, which uses the speed of sound in water to determine distance, but this calculation is affected by the temperature and salinity of the water, which varies with depth and water masses. We know how much wire we’re paying out with our corer on the end, but that figure varies with how much mass is hanging off your wire, the currents beneath the ship that may move your corer slightly, the motion of the ship moving up and down in the swell (hardly an issue today). Anyway: there are variables. The trick is to get to about 50 metres above what you think is the sea floor, pause to steady any motion, then lower until you are a few tens of metres past where you think you thought the sea floor is, and then stare intently at the tension readout on the winch. If you have sunk your core barrel in the goo that covers the ocean floor, you should see a spike in the tension as the core barrel is extracted from the mud, then freed as the winch is hauled in.
To put you out of your misery, it seems we did the improbable today: we lowered the Kasten core until it was 50 m above the sea floor, paused, and then managed to lower it sufficiently to only penetrate about 3 cm into the mud we were so desperate to recover. After a nervous wait of 40 minutes (no real spike noted on the winch tension) the core came up empty, with a neat little “kiss” of mud on the bottom of the barrel.

Anyway, we tried again. And this time, we added a bit more to what we thought we should have added last time, and pulled up a 2.4 m core of mud. There was much rejoicing. The core opening attracted a crowd of onlookers, and then a crowd of samplers, who are still sampling as I write.

Following the Kasten core, we deployed a Multicore at 1319 which was back with more samples at 1444. The crowd of humpback whales that had been hanging around us all day decided that that was an opportune moment to come very close for a look, and we had quite a show as one 18-metre-long humpback rolled and stared at our ship.

The multicore was followed by a vertical plankton net cast at 1515, which was retrieved at 1558.

We are now underway at 11.5 knots to an area in the east of Area A that is multibeam free, which we will spend the evening “mowing”, and then return to A-005 once more to attempt a 15 metre piston core.

**15: 20170129**

*SITREP date/time: 20170129/2000*  
*Noon position: 64°28.3S, 115°37.4E*  
*Speed: various, including more hours motionless on site at A-005*  
*Heading: various*  
*Distance Run (noon – noon): 146 NM*  
*Distance Run (total): 2825 NM*  
*Current Weather:*  
*Air Temperature (°C): -0.87*  
*Water Temperature (°C): 1.56*  
*Wind Speed (knots): 10*  
*Wind Direction: 189*  
*Barometer (mbar): 984 falling*  
*Visibility: good*  
*Cloud: 7/8 cumulus/stratocumulus*  
*Sea: Calm… again*

Yet another calm day. No complaints here...

We "coloured in" the uncharted areas of the mid-eastern part of Area A last night, and arrived back on station A-005 this morning at 0800, ready to go for gold as far as piston coring from the Investigator went. Fifteen metres of core tube was ready to go, and the merry dance of core davit and core handler cradle had the corer in the water and on its way down at 60 metres per minute by 0857. Third officer Andrew carefully positioned the ship so we didn’t drop the core in the same hole we made yesterday… well, in calm conditions like this, and considering what we managed to do with the Kasten corer yesterday, the impossible could have happened. So, we moved about 10 metres south.

At 0943 we were on the bottom, with an obvious spike in the winch tension, and a visible shudder in the wire as the piston core triggered the main core barrel to drop. Hopes were high for a good core.

At 1047 the weights at the top of the core were visible at the surface, and they were covered in mud! The corer had penetrated to its maximum extent. It was back on deck at 1104, with the final core tube extracted at 1209, with just over 13 metres of sediment recovered. A new record! The Chief Scientist was seen doing a “happy dance” on the main deck, as was Principal Investigator Phil. There were even reports of high fives and fist pumping. I don’t know, the kids of today...

The seismic line planned next was going to have a hard time beating the piston core. In the end, the whales have had the final say, and have pretty much closed down our run this afternoon. We got as far as a soft start on seismic “Line 7” before our old mate “soft start whale” turned up, but this time he brought along all his pals, and it’s been an almost endless procession of interested cetaceans all afternoon.

At 1855 we have just managed to get back to full power without an interruption, however we are halfway along the planned line, and will probably come back at a later date to attempt the first half of the line.
Plans for this evening include a CTD, a camera tow, and arrival on site tomorrow at A-006 for a Kasten core.

16: 20170130

SITREP date/time: 20170130/2000
Noon position: 64°27.8S, 115°02.6E
Speed: at station A-006
Heading: various
Distance Run (noon – noon): 139 NM
Distance Run (total): 2964 NM

Current Weather:
Air Temperature (°C): -0.4
Water Temperature (°C): 1.83
Wind Speed (knots): 7
Wind Direction: 350
Barometer (mbar): 976 falling
Visibility: good
Cloud: 8/8 cumulus/stratocumulus
Sea: Calm… again

The calm weather is allowing the ice to our south to ease and move north, into our area of interest. I never thought I’d say this, but a bit of bad weather may actually be a good thing! Another calm whale-filled day, which is fine when we’re not trying to do seismic!

Last night’s seismic line finished early when another whale showed up for a look at what we were up to. The gear was back on board at 2033, and we transited to site A-007 to conduct a CTD cast at 2225. After a cast of >2000 m it was back on board at 2350. Another transit to the west of Area A for some shallower water and a towed camera deployment at 0527. The camera showed a bleak pale-coloured sea floor, with a few drop stones and the rare fish. Slim pickings down there.

North east again to site A-006 for a Kasten core, which was in the water and heading down to -1865 metres at 1132. The three metre core was back on deck at 1245: full again. This gave the geologists hope for another decent piston core, which was prepared and ready to go. However, in what can probably be described as our first real set-back, the core trigger was damaged on deployment, and the gear was brought back on board for repairs. It should be ready to go again tomorrow, but it resulted in a change of plan.

We headed for site A-008 to conduct a CTD in 1936 m of water. Deployed at 1553, back on board at 1717. Overnight we will conduct multibeam survey along the western edge of Area A, and be back on site at A-006 to have another go at the piston core.

The ship has just endured some rough handling from someone in Spain via the internet, testing our bow thruster to its limit. Hopefully we have the all clear to continue using it. Things have settled down a bit now, but there are some grumpy people on the first platform deck who have been well and truly woken from their slumber.

17: 20170131

SITREP date/time: 20170131/1900
Noon position: 64°27.8S, 115°02.6E
Speed: at station A-006
Heading: various
Distance Run (noon – noon): 127 NM
Distance Run (total): 3091 NM

Current Weather:
Air Temperature (°C): 0.7
Water Temperature (°C): 2.33
Wind Speed (knots): 10
Wind Direction: 284
Barometer (mbar): 975 rising
Visibility: good, reduced in light snow showers  
Cloud: 8/8 cumulus/stratocumulus  
Sea: Westerly swell, 1 metre

Multibeam surveying continued overnight, and we were back at A06 at 0800, and so was a very large iceberg. It wasn’t right on the site, only about a kilometre away. Once we were on site we could track it with radar, and it was moving slowly away from us, and wouldn’t be a threat during our stay.

The piston core deployment began at 0814, and was being lowered away at 0839 to -1865 metres. It touched down at 0918 with a visible “twang” recoil on the line, and was visible back at the surface by 1010 with mud on top of the core head! The Chief Scientist was once again seen to do a little jig of happiness on the main deck. The core was on board at 1024, with a confirmed 13.36 metre recovery, just shy of our record the other day.

This was followed by a multicore deployment at 1318, which was back on deck at 1443 with what has been described as the most perfect multicore sample ever. There was even half a brittle star sampled in one of the core barrels, still in place on the undisturbed sediment surface. It was without doubt the unluckiest brittle star on the planet, but an amazing example of how delicate the multicore can be when perfectly deployed (in the perfect conditions we are experiencing down here).

We have now moved north, and will continue multibeam survey along the northern margin of Area A and C, before turning south and testing the ice margin in Area C. We are hopeful of getting further south in Area C than we are presently able to in Area A. There are also two existing French core sites from the late 1980’s in Area C that will benefit from our transect with detailed bathymetry and sub-bottom profiling; techniques that were not available back then.

18: 20170201

SITREP date/time: 20170201/1900

Noon position: 63°55.6S, 120°58.0E  
Speed: 8 knots  
Heading: 090  
Distance Run (noon – noon): 178 NM  
Distance Run (total): 3269 NM

Current Weather:  
Air Temperature (°C): 0.9  
Water Temperature (°C): 1.56  
Wind Speed (knots): 3  
Wind Direction: 075  
Barometer (mbar): 981 rising  
Visibility: excellent  
Cloud: 7/8 altostratocumulus/cumulus  
Sea: calm

Somewhere in the Southern Ocean there’s a storm, but it’s a long way from here. Conditions continue to be so delightful that it’s pretty hard to pretend that we’re intrepid explorers. In a passing nod to the many hardy individuals who have preceded us to “The Great White Hell”, the hot water supply was turned off for an hour this afternoon for some maintenance.

Some action for ship spotters this morning, with the Chinese flagged “Long Teng” factory fishing trawler visible in the distance at 0440, heading south.

Survey along the northern margin of Areas A and C was completed today at 1230, and we turned south without any of the disruption that usually accompanies a 90 degree turn in the open ocean. In fact, the turn was done without any apparent change in motion of the ship at all.

We are now heading to the southeastern corner of Area C, and at about 2330 this evening will make another turn, this time to the west. So far we have been back in deeper water (>3000 m) and as we head south, water depth will decrease, and temperatures should once again decrease too. Recent satellite imagery indicates the sea ice has not eased as far north into Area C, and we are hopeful that the multibeam survey will encounter the shelf slope, which has so far eluded us.

On our transect south this afternoon we have been accompanied by hundreds of short-tailed shearwaters, who seem to be struggling a bit without much wind to assist their flight. They form large rafts of birds on the water, and when they fly, they hug the waters’ smooth surface, trying to glean some lift from ground effect.
19: 20170202

SITREP date/time: 20170202/1900
Noon position: 65°14.9S, 120°47.4E
Speed: 8 knots
Heading: various
Distance Run (noon – noon): 172 NM
Distance Run (total): 3441 NM

Current Weather:
Air Temperature (°C): -0.2
Water Temperature (°C): 0.92
Wind Speed (knots): 14
Wind Direction: 133
Barometer (mbar): 983 steady
Visibility: good
Cloud: 7/8 cumulus/stratocumulus
Sea: SE <1 m

Our westerly turn last night resulted in an encounter with sea ice creeping northwards. Our survey had revealed an interesting valley-like feature in the seafloor, so we turned north and headed east to cross over the feature again, and had the CTD in the water at 0445 to investigate. The science crew are trying to find the origin of mid-level deep water that is suspected of being the culprit that is potentially destabilizing Totten Glacier. The CTD cast went to a depth of 3250 m, and encountered a lens of cold water at -2 °C, and a current that changed direction during the cast.

By 0700 the CTD was back on board, and we were heading southwest in search of open water that had been visible on a satellite image two days ago, skirting the now visible sea ice edge to our south. The opening was still sort-of there, and we achieved our most southerly point to date, but it didn’t give us the opportunity to survey the continental slope as we had hoped. We headed northwest and undertook another CTD cast over a second valley feature we had identified, this time casting to 3300 m at 1453. The CTD was back on deck at 1708, and we followed up with a vertical plankton net cast to 350 m, which was back on board at 1830.

A recent ice report has indicated the ice edge continues to creep northwards, and is encroaching on our areas of interest. We will resume multibeam survey this evening, and will probably concentrate on “lawn mowing” in Area C overnight.

20: 20170203

SITREP date/time: 20170203/1830
Noon position: 64°43.5S, 120°07.9E
Speed: 8 knots
Heading: 100
Distance Run (noon – noon): 165 NM
Distance Run (total): 3606 NM

Current Weather:
Air Temperature (°C): 0.4
Water Temperature (°C): 0.98
Wind Speed (knots): 17
Wind Direction: 125
Barometer (mbar): 984 rising
Visibility: good
Cloud: 8/8 cumulus/altostratus
Sea: SE 1-2 m

Multibeam survey continued overnight, heading WNW until we once again encountered the sea ice edge at 0115, and diverted NW to avoid it, and pick up the survey two lines to the north, this time heading ESE. This has been our task for much of the day, turning south at 1330 then WNW at 1410.
A few hardy souls took the opportunity afforded by Engineer Sam to subject their bodies to a polar plunge in the
seawater incubation tanks on Level 02. One tank was at ambient seawater temperature (a fraction above zero),
and the other was warmed to a bath-like temperature, which seemed to be the more popular option. The price of
entry to the warm tub was a thorough dunking in the cold tub. All came out smiling (and gasping for breath), and
happily no one required resuscitation. Yours truly took some photos…

We are soon to arrive on station for our first Kasten core in Area C (site C-012), and depending on the result of
that, we may then embark on a multicore, a CTD, a vertical plankton net cast, or if we’re feeling bold, all three.
The seismic guys are warming up for a possible run tomorrow, ice and whales permitting.

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**21: 20170204**

**SITREP date/time:** 20170204/1930

**Noon position:** 64°54.1S, 119°09.6E  
**Speed:** 3.5 knots  
**Heading:** 038  
**Distance Run (noon – noon):** 120 NM  
**Distance Run (total):** 3726 NM

**Current Weather:**  
**Air Temperature (°C):** 0.3  
**Water Temperature (°C):** 1.48  
**Wind Speed (knots):** 14  
**Wind Direction:** 124  
**Barometer (mbar):** 990 steady  
**Visibility:** good  
**Cloud:** 8/8 stratocumulus  
**Sea:** SE <1 m

We arrived at site C-012 last night at 1915. The ship was put in dynamic positioning and the Kasten core was
deployed at 1932 in 3100 m of water. It hit bottom at 2030, and after a healthy pull-out tension of 4.71 tonnes, we
knew we had some mud. Sure enough it was back on deck at 2138 with another full core. This was followed up
with a multicore cast, which set yet another record for the deepest for the system, at -3105 m, beating the
previous best by about 600 m. Five out of the six cores returned full. The CTD was postponed and multibeam
survey resumed for the night.

We stopped survey and headed southeast at 0400 to be in position for an 0800 start at an ambitiously long
seismic line that would connect two pre-existing lines in the area. I say ambitious due to the number of whales we
have been seeing. We were starting near the ice edge, where whales like to be, so we weren’t super confident of
our chances of an uninterrupted run to the end of the line, some 32 NM to the north east.

The streamer was fully deployed by 0800, and was at full power by 0847. We did encounter a few whales, but
none came within the shutdown zone of 500 m from the ship. We did have to power down to low power at 1002,
1319 and 1437, for whales that were within one kilometre, but seismic data is still able to be acquired at that
setting.

We finished the line at 1800, and the gear was back on board by 1835. At 64.2 km, this is our longest seismic line
to date. A great result.

We are now in transit to site C-012 (where we cored last night), and will complete a vertical plankton net cast and
a CTD, before resuming multibeam survey for the evening. We will then be back on station at C-012 to attempt a
new record with the piston core: going for the 18 m string. No pressure…

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**22: 20170205**

**SITREP date/time:** 20170205/2000

**Noon position:** 64°39.2S, 119°01.1E  
**Speed:** On station at C-013  
**Distance Run (noon – noon):** 127 NM  
**Distance Run (total):** 3853 NM
Activities continued last night after the completion of our seismic line, with a vertical plankton net cast and a CTD, which was back on board at 2225. Multibeam survey then continues for the rest of the evening, prior to our heading back to C-012 to be in position at 0800 for our Piston Core record attempt. It's possible I jinxed the whole show by talking it up last night, as a technical failure on deployment saw the piston trigger badly damaged, and the attempt had to be aborted.

We headed to site C-013 about two hours steaming away to embark on a CTD cast, while Mark and Jason with help from the Chief Engineer set to work on figuring out if the piston corer could be repaired, or if that was the end of its use on this voyage. At time of writing a repair has been made, and we're hopeful of having another attempt tomorrow morning, but the reoccurrence of this issue means that there will have to be a more permanent solution devised for geoscience voyages down the track.

At 1108 we were on site with the CTD launched at 1113, heading down to 3100 dbar. The CTD was back on board at 1329, and we headed off to continue multibeam survey, which has been our passion. We've been in and out of fog throughout the day, and it looks like we're about to head back in to the gloom again. The low to our north has not helped us at all as far as moving ice in the direction we'd like it to move, but there's still time for a blast of weather to shuffle the pack about, hopefully in our favour.

Multibeam survey continued overnight, and the picture of the seafloor being revealed gets full marks for being intriguing.

We were on site at C-012 for Piston Core attempt #2 at 0820. Repairs made yesterday included pressing our first damaged piston trigger flat (it was slightly bent, whereas the one damaged yesterday is irreparable), and welding some stainless reinforcement to the unit to hopefully prevent another bending moment. There are no more spares! The core handler was also modified to remove one of the impediments to free rotation of the corer when it is lifted from the handler. This was all achieved in short time by a very dedicated group of people determined to salvage a win from what looked like certain defeat yesterday.

The 18 m core barrel was in the water and on its way down to 3101 metres at 0852. The piston punched through the muddy sediment on the sea floor at 1949, and a very muddy core was back on board at 1122. With a total recovery of 16.28 m, we have a new winner!

We then transited to the SW to commence another seismic line run to the NE. The streamer was in the water at 1442, followed by air guns, and full power at 1534 for the start of the line. We have had two whales in the
shutdown zone on this run, and at 1806 we were back at full power, hoping to continue to the end of the line uninterrupted at about 2000.

Tomorrow, after a night of multibeam survey, it’s back to C-013 for a Kasten core for starters.

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**24: 20170207**

SITREP date/time: 20170207/1900

Noon position: 64°39.2S, 119°01.1E

Speed: at station C-013

Distance Run (noon – noon): 148 NM

Distance Run (total): 4146 NM

Current Weather:

Air Temperature (°C): -2.5

Water Temperature (°C): -0.76

Wind Speed (knots): 10

Wind Direction: 112

Barometer (mbar): 988 steady

Visibility: good

Cloud: 4/8 cumulus/stratocumulus

Sea: S <1 m

Well our hopes were dashed last night, as a whale showed up within 9 minutes of us getting back to full power. Back to low power, and then shutdown at 2006. We managed one more burst of full power from 2100 until 2155 when the line was ended. Guns and streamer were back on board at 2223, and it was back to Multibeam survey.

By this morning we were back at site C-013 for a Kasten core, which was once again successful, bringing back a lovely core at 1154 with all sorts of intriguing layers visible within. This was followed by a multicore cast, which was also a winner, with six out of six sample cores.

Just to keep us on our toes, we had a general alarm muster drill this afternoon, which everyone responded to with enthusiasm, and turned up to in (mostly) all the right gear.

We have now transited south once more to the ice edge, which recent satellite imagery has indicated has retreated in some areas, while encroaching on others. We’ll try and stay close to the edge, and attempt to get far enough south to hopefully map part of the continental slope, before heading north during the darker hours.

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**25: 20170208**

SITREP date/time: 20170208/1900

Noon position: 65°24.5S, 120°23.4E

Speed: 8 knots

Heading: 277

Distance Run (noon – noon): 147 NM

Distance Run (total): 4293 NM

Current Weather:

Air Temperature (°C): -1.7 (up from -5 this morning)

Water Temperature (°C): 1.25

Wind Speed (knots): 19 (gusting 30)

Wind Direction: 147

Barometer (mbar): 984 falling

Visibility: good

Cloud: 8/8 stratocumulus

Sea: ESE 2-3 m

Well, we’re officially at our voyage halfway point! Time for a metaphorical slice of orange and a wet sponge. We’ve had a great run so far and have achieved some great results. The remaining time will either flash past or
drag on, depending on each individual’s point of view, and what the ice allows us to do. In “half-time pep-talk
speak”, we’re winning, but the other team is unpredictable…

Last night we had a burst of sunshine as we headed south, surveying along our most southerly line to date at
65°20-ish S, heading east. The multibeam managed to get a tantalizing view of the start of the continental slope,
but no more than that. We continued survey during the evening, but on lines further north and clear of the ice
dragon.

With the morning light we headed south once more, this time following mostly open water to our most southern
point at 65°28.8 S, 120°36.6 E where we encountered the ice edge. Slightly more of the continental slope was
revealed, but not enough, or shallow enough, for us to do a camera tow. We did attempt a CTD at 0950, however
a technical problem saw this cast abandoned. After changing to another winch, the CTD was once again
deployed at 1021, but again had to be recalled, and sea ice drifting our way meant we had to move north once
again.

It was decided to head for a seismic line to our northwest, but deteriorating weather conditions (hey! We’re on a
ship! There are waves and wind and stuff!) forced us to abandon this plan too.

With few options left, we resumed multibeam survey, filling in a few gaps in our data as we head north to the
large unchartered region in the north east of Area C. We have paused in our transit to this area to conduct some
remedial testing on the troublesome CTD, with cast to 500 m so far and another planned, and will continue with
multibeam survey thereafter.

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**SITREP date/time:** 20170209/1900

**Noon position:** 65°21.0S, 119°53.4E
**Speed:** 8 knots
**Heading:** 277
**Distance Run (noon – noon):** 170 NM
**Distance Run (total):** 4463 NM
**Current Weather:**
- **Air Temperature (°C):** -1.0
- **Water Temperature (°C):** 1.73
- **Wind Speed (knots):** 22
- **Wind Direction:** 180
- **Barometer (mbar):** 973 falling
- **Visibility:** good
- **Cloud:** 1/8 stratocumulus
- **Sea:** SE 2-3 m

Three shallow CTD rosette deployments last night at 1825, 2028 and 2047 to try and trouble shoot the problem
didn’t give a definitive answer, but has confirmed that we can still use the CTD, and get meaningful results from
it. The SIT and DAP team have been through the equipment and data with the proverbial fine tooth comb and
have not resolved the issue of data “spikes”, but can filter them out to at least give clean data from a cast.

We continued mapping overnight, and throughout the day, as the weather that has finally turned up has meant no
coring and no seismic. We’ve very nearly “mown the lawn” in Area C now, and the benefit of the current wind
regime has meant the ice has once again retreated south in areas that were off limits to us only a few days ago.
So tomorrow, it’s off to the south we go again, in search of uncharted seafloor, and hopefully some of the elusive
continental slope region.

After lunch we were finally blessed (?) with a visit from King Neptune and his Queen to hear the charges against
the slimy Pollywogs, and see what they had prepared by way of entertainment for his and her Majesties, as a
way of appeasing his wrath and for trespassing in his realm. Pollywogs were required to attend the hearing
wearing clothing backwards, provide an accurate measurement of the volume of the Brown Lounge in units of
tim-tams, and a signed picture of a whale drawn by each Pollywog using only their foot. Entertainment was also
required by three groups of ‘wogs, and varied from some excellent grovelling, some original attempts at humour,
and a number of renditions of Men at Work’s classic “Down Under” with reworked lyrics.

Being easily bored, both the King and Queen decided it was all rubbish, and they all needed to be
punished/cleansed. I won’t go into detail. Suffice to say there was mud and a small amount of seafood involved.

Post dinner, and all Pollywogs are “cleansed”, and the ship is now full of Shellbacks. Onwards…
Multibeam surveying continued yesterday evening in the NE section of Area C, until about 0400 when we turned SW, heading for a chink in the sea ice armour, hinted at by a recent satellite radar image. By 1100 we were on a southern survey line heading west, into unmapped territory. At 1330 we encountered the sea ice edge, once more moving north under the influence of the renewed southerly winds in the area. We have maintained an edge-hugging course throughout the day, and as I write this we are in back Area A, covering new ground in shallower water (only -2730 m).

All going well, we will persevere with this tack until 2300, and then head north and east to “fill in” some data gaps, aiming to be on site for a Kasten core at 0830 over a submarine canyon in Area C.

All on board are well, despite the fact that the ship is moving a lot more than it has been in the last couple of weeks. Add to that the occasional blast of sunshine (after a gloomy start to the day) and lamb shanks for dinner, well… what more could a chap ask for?

A beautiful full moon, a mostly sunny and calm day, and an exciting Kasten core recovery were the highlights of today.

The ice edge once again put pay to our hopes of getting further south last night. We headed a survey line to the north and spent the evening covering gaps in our data, heading east, before arriving at site C-015 at 1105 for a Kasten core. Water depth here was -3420 m, directly over one of the channels in the seafloor that our multibeam survey has revealed. The geos were pretty confident of what they were going to recover from here (sand, maybe some gravel: typical turbidite deposits), but everyone was amazed and delighted by what actually came on board in the core at 1320. It’s not my role to steal the scientists’ thunder, but let’s just say theory and reality didn’t
coincide. The biologists were pretty excited (understatement), and it was great seeing the energy that shot through the group with this unexpected find.

After initial plans to do a Kasten core here, and then head to another site, the unexpected nature of the core encouraged a rethink, and it was decided to treat site C-015 with a bit more respect. A multicore followed at 1357, and failed first time. A vertical plankton net was next at 1635, and was back on deck in 10 minutes, full of interesting green ooze (full of diatoms).

The multicore went back down for another attempt at 1658, and is currently on its way back to the surface from -3387 m. Next “cab off the rank” will be the CTD. We will return to this site at some stage for a piston core attempt, because as Principal Investigator Phil says “it’s just too weird to leave alone!”.

Stay tuned…

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29: 20170212

SITREP date/time: 20170212/1830

Noon position: 64°24.04S, 118°29.85E
Speed: on station at C-017
Distance Run (noon – noon): 44 NM
Distance Run (total): 4855 NM

Current Weather:
Air Temperature (°C): -0.62
Water Temperature (°C): 0.86
Wind Speed (knots): 14
Wind Direction: 040
Barometer (mbar): 986 falling
Visibility: good
Cloud: 8/8 altostratus
Sea: SE 1 m with 2-3 m NW ground swell (easing in afternoon).

Yesterday’s second attempt at a multicore at site C-015 was back on board at 1910 with 6 full samples: another success at a record depth. A CTD followed, and was recovered at 2127. We then moved to site C-017 for another CTD, deployed at 2322 and back on board at 0114. There was a false start at a CTD site that wasn't a site, before transiting to C-018 and deploying the CTD again at 0435. Recovery was at 0642.

The site was then given a quick survey with the sub-bottom profiler to find the sweet spot for a Kasten core, which was underway at 0934. About this time five Humpback whales paid us an extended visit, circling the ship, rolling, pectoral fin slapping, almost spy hopping. They stayed with us for almost an hour, and put on a real show. Maybe we were putting on a show for them too, with our bow thruster deployed, and all props spinning in odd directions holding us on station, and a wire vanishing into the abyss below.

The Kasten core was recovered at 1202 with another full core. No multicore was taken at this site due to the ground swell that would potentially cause the multicorer to trigger prematurely, which is what we suspected happened yesterday on our first deployment. With deteriorating weather forecast for tomorrow, we have elected to stay south, and hopefully avoid the worst of it. Winds are predicted to be in the 35-40 knot range, which will preclude putting any gear over the side. The ice edge has been our port-side companion as we head west, however it is further north than it was when we last tested it, and it doesn’t look good for us getting to survey any new ground at the moment. With some luck, the next blow may push it south again.

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30: 20170213

SITREP date/time: 20170213/1930

Noon position: 63°59.2S, 116°51.1E
Speed: 8.5 knots
Heading: 091
Distance Run (noon – noon): 159 NM
Distance Run (total): 5013 NM
Current Weather:
Air Temperature (°C): 0.4
Water Temperature (°C): 0.88
Wind Speed (knots): 32-40
Wind Direction: 276
Barometer (mbar): 975 rising (from low of 964 at 0600)
Visibility: variable
Cloud: 8/8 stratus
Sea: NW 4.5-7 m

A day spent accepting the weather. We headed NW away from the ice edge last night, as there was nothing to be achieved down south. As the weather became worse, we headed east with following seas, filling in some gaps in our multibeam survey along the north of Area A.

We have now turned into the wind and seas, and will slowly make our way back to the south of Area A to attempt some coring when the weather has eased.

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31: 20170214

SITREP date/time: 20170214/1930
Noon position: 64°31.8S, 119°08.9E
Speed: 3.5 knots
Heading: 115
Distance Run (noon – noon): 158 NM
Distance Run (total): 5172 NM

Current Weather:
Air Temperature (°C): 1.4
Water Temperature (°C): 1.48
Wind Speed (knots): 7
Wind Direction: 014
Barometer (mbar): 986 rising
Visibility: reducing
Cloud: 8/8 stratus
Sea: NW 1 m

Conditions eased dramatically overnight, with the wind and “motion in the ocean” giving way to the calm conditions we have become accustomed to on this voyage. Despite the delightful morning conditions, yesterday’s storm had done the opposite of what we had hoped it might achieve, and icy tendrils of sea ice cancelled plan A to piston core at A-007, and really do anything in Area A, so we headed to Area C, where sea ice cancelled plan B to piston core at C-015, seismic lines plans C and D were scrubbed (due ice), and it wasn’t until 0930 that plan E (modified seismic line D) was looking promising, and we were going to get a start to the day.

All we needed now were for the whales to stay away… which didn’t seem likely given past experience, and the fact that putting seismic guns in the water seems to be like shouting “hey you!” underwater to every whale in the Antarctic every 8 seconds.

Nevertheless, as I type, we have just completed a 9.5 hour seismic run with only two whale interruptions, one of which was a low power episode, and one a complete shut down (for half an hour). Pretty good!

The fine conditions of this morning have given way to complete overcast and light falling snow this evening, as we now head to the east of Area C to extend our multibeam coverage overnight. Tomorrow we will attempt a couple of Kasten cores in the eastern canyons of Area C.

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32: 20170215

SITREP date/time: 20170215/1930
Noon position: 64°49.1S, 120°08.6E
Speed: On station at C-019 for Piston Core
Distance Run (noon – noon): 151 NM
Distance Run (total): 5323 NM

Current Weather:
Air Temperature (°C): -0.6
Water Temperature (°C): 1.18
Wind Speed (knots): 27-30
Wind Direction: 142
Barometer (mbar): 971 falling
Visibility: reducing, poor in snow/fog
Cloud: 8/8 stratus
Sea: ESE 2-3 m, increasing as I write…

Overnight our multibeam survey saw us extend our coverage to the east, prior to returning to Area C in the morning for a piston core attempt at site C-019. The core was set up for 18 m, which to the untrained observer may have seemed ambitious, seeing as we hadn’t done our traditional Kasten core at this site first. Well, truth be known it seemed ambitious to some of us too, but our experience of other sites suggested that it could be done, and rather than rebuild the core barrel, it was deemed an acceptable risk. The core was lowered into the depths at 0909, and was back on board at 1158 with a 15.66 m core, which was a great result.

With the core secured we transited west a short distance to site C-020, and a Kasten core was on its way down to -3250 m at 1525, and back on deck at 1744. On opening, one of the first remarks I heard was “what the hell is that?”, so I’m guessing it was pretty interesting.

With increasing wind and swell, and a forecast for not so nice conditions tomorrow, we may not get much done in the next 24 hours. We’re currently heading south to try and run the sub-bottom profiler over a likely target area (ice permitting), and will then resume multibeam survey in the ice free zone to our NE.

33: 20170216

SITREP date/time: 20170216/1930

Noon position: 64°33.0S, 121°15.4E
Speed: 12 KTS
Heading: 243
Distance Run (noon – noon): 143 NM
Distance Run (total): 5466 NM

Current Weather:
Air Temperature (°C): 0.9
Water Temperature (°C): 1.44
Wind Speed (knots): 23
Wind Direction: 105
Barometer (mbar): 977 rising
Visibility: poor in snow/fog
Cloud: 8/8 stratus
Sea: E 1 m with a 2-3 m ground swell

The sub-bottom profile run was completed last night at 2155, providing us with a potential target for a piston core. We continued multibeam survey in the “eastern verandah extension” of our survey area, which has revealed yet more channel-dissected seafloor. Conditions weren’t great in the morning, with heavy fog and a noticeable swell. Out of the gloom at 1030 a mid-sized tabular ‘berg appeared, with a cloud on its summit plateau, and some spectacular waves battering its flank. Many-a-photo was taken of that one…

By 1115 the wind was dropping and it seemed like we may get a Kasten core in at least, so we paused our survey and headed SW to site C-021.

We’ve had two attempts at this site today, with the second unsuccessful Kasten core just coming back on board at 1917, as empty as our first one. Both attempts got dirty, with mud on the side of the core, and even had a noticeable high-tension pull-out, but may have hit a rock or gravel/sand covered surface under the mud veneer, and not penetrated. The second cast was even lowered faster than usual in an attempt to punch through this layer, but no luck.

We’re now underway again, heading to a new multibeam survey line to our south, with an ETA back at the soon to be named site C-022 (targeted last night) for a piston core bright and early.
Piston coring was the first order of business today. Got the 18 m core in the water and heading down at 0806, and recovered at 1118, with mud all the way to the top. Once dismantled though, the recovery was only about 12.6 m, our shortest to date. No complaints though, after our two 0.0m recoveries on the Kasten core yesterday.

Following that we deployed a Kasten core at 1255, which was back on deck at 1445 with a good sample 2.52 m long. We are now heading south to see where the ice edge might be, prior to continuing multibeam survey overnight. Blue skies and bright sunshine have lured nearly everyone out on deck, getting a healthy dose of Vitamin D and probably a less than healthy (but who cares?) dose of UV.

Our track south took us past yet another picturesque iceberg, with some serious surf pounding its flanks. It was so good looking that we herded as many folks as we could onto the foredeck for a group photo. The weather may never be this good again… the wind has dropped right off from 20 knots, and the swell, which was noticeable this morning, has disappeared.
As we approached the ice edge last night the Master’s keen gaze spotted a pretty good looking berg that he suggested might need closer inspection, so I got my “drone” ready for an outing, and managed to get some nice shots of the ship and the berg, as well as some video.

The second hardest thing about flying down here is getting the aircraft to start: the software that drives it is smart enough to know that there’s strong magnetic interference with its onboard compass (due to all the steel in the ship), and the movement of the ship messes with its Inertial Measurement Unit, which flags a whole list of errors and it refuses to arm the motors. It’s not smart enough to know that I know that I’m on a ship near the South Magnetic Pole, and unfortunately there’s no “over-ride button” for the software, and often it seems to come down to how I’m holding my tongue when I power-up whether it will start or not. I’ve found that starting inside the ship sometimes works without any issues whatsoever, but it’s pretty stressful walking from inside the ship to the rear main deck with the equivalent of a 3.5 kg angry wasp in your hand.

The hardest thing about flying down here is watching $11,000 worth of “drone” fly 500 m away from the ship over water, and trying to set up a decent photo as well. My heart rate was way up yesterday…

Once I was back on the “helideck” (drone-deck?), we moved clear of the ice and bergs and conducted a CTD dip between 2048 and 2226. We continued with our customary multibeam survey before returning to site C-022 for a CTD cast between 0329 and 0534 this morning. We then moved to the NW for a seismic run to the east, starting at 0837 and finishing at 1308 as conditions deteriorated, completing a pretty good run with only two interruptions due to our local cetacean population.

We are now heading back to our multibeam survey line in the east, and will be keeping a weather eye on conditions, prepared to pounce if a piston coring opportunity presents itself tomorrow, or soon after.

**SITREP date/time: 20170219/1900**

Noon position: 64°57.2S, 120°51.8E

Speed (knots): On station at C-025 for Kasten core, and others.

Distance Run (noon – noon): 166 NM

Distance Run (total): 5854 NM

Current Weather:

Air Temperature (°C): -0.1

Water Temperature (°C): 1.42

Wind Speed (knots): 15.8 (average last hour)

Wind Direction: 141

Barometer (mbar): 978 falling

Visibility: poor, further reduced in snow

Cloud: 8/8 stratus

Sea: NE 3 m

An overcast snowy day today; light snow falling as I type. Our fall-back position of multibeam survey was once again what kept us chugging away through the night. Wind and waves had coring looking within the realms of “possible” this morning, and we headed SW once more to a new site on a ridge between two channels: site C-025.

Our timing was a bit out for a piston core, partly due to the core having to be rebuilt from the other day (the weather precluded this being done yesterday), and partly due to our transit to the site continuing with multibeam survey (at reduced speed). Our best case scenario is the piston core is deployed first thing in the day, using the same team. It’s a complex deployment, made more difficult in the cold. As we were on site at 1019 we played our alternate core for the job, the Kasten core, followed by a multicore, plankton net, and finally a CTD.

The Kasten core was back on deck at 1222 with a 2.32 m sample, revealing more evidence of bioturbation (there’s a “word of the day” for you!) as well as fine laminations in solid mud at its base. Another (small) “Mamma Mia!” moment from our European contingent. We were less fortunate with the multicore, which came up with ziltch, probably being triggered on its way to the sea floor by the ship pitching. The plankton net was next for a dip, going in at 1602 and coming back on deck at 1621. And finally, the CTD was on its way to 2806 dbar at 1630, returning to the surface with salt-watery goodness at 1822.

Tonight we are staying close to this station to deploy the piston core, weather permitting, tomorrow morning.
Sitrep date/time: 20170220/1900

Noon position: 64°57.2S, 120°51.8E
Speed (knots): On station at C-025 for piston and multi cores.
Distance Run (noon – noon): 1.5 NM
Distance Run (total): 5855 NM

Current Weather:
Air Temperature (°C): 0.6
Water Temperature (°C): -1.38
Wind Speed (knots): 10.6 (average last hour)
Wind Direction: 168
Barometer (mbar): 996.5 steady
Visibility: good
Cloud: 7/8 strato cumulus
Sea: N 1-2 m

We remained very near station C-025 last night in readiness for the morning piston core. Overnight the decorators moved in and gave the Mess a makeover for the Chief Scientist’s birthday, with an amazing array of recycled paper repurposed and used for festive effect around the room. The piston core was deployed at 0809, and back from its rendezvous with the sea floor (-2680 m here) at 1058 with a 12.0 m sample.

After core recovery, the multicore was once again deployed (second time lucky?) at 1215, and back on deck at 1416, as empty as it set out (…)nope. There was no appetite for a third attempt, and armed with a new sea ice concentration “map” (which is derived from radar data, and is at a scale of one kilometre resolution… we call it the leggo map) that indicated an opening to our south that would get us on the shelf, not just to the shelf edge, we fired up the second generator and warp drove it down south.

We crossed the shelf slope at about 1730, and have just made a turn back to the north from 65°37' S 120°23' E and are about to deploy a camera tow, which will travel down the shelf slope. If conditions remain this good, we will persevere in this area and conduct a number of CTD casts, and hopefully another camera tow. Water depth here is in the order of 450 m, our shallowest soundings to date.

The sun is out now, and we’re 10 minutes away from our camera tow deployment. We’ve got some heavy weather forecast for Thursday, but for now, we’re making the most of this chink in the sea ice armour that has until now prevented us from getting to this important part of the Sabrina Coast.

Sitrep date/time: 20170221/2010

Noon position: 65°35.3S, 120°23.0E
Speed (knots): On station for CTD.
Distance Run (noon – noon): 131 NM
Distance Run (total): 5986 NM

Current Weather:
Air Temperature (°C): 0.6
Water Temperature (°C): -1.20
Wind Speed (knots): 12.5 (average last hour)
Wind Direction: 130
Barometer (mbar): 994 slight fall
Visibility: in fog
Cloud: 8/8 fog
Sea: E 1 m

We’ve done “heaps” today. The camera tow last night turned out well, with hoots and hollers of glee from the assembled onlookers as new and interesting critters came into view in the glare of the lights. It was back on board at 2037. We headed north to be well clear of any ice before deploying the CTD at 2137; back on at 2230. Our evening multibeam survey was along the shelf slope heading west, looking for potential camera tow target canyons. The continental shelf is almost completely flat, between -480 and -510 m water depth where we were
traversing it, but it isn’t featureless: our multibeam survey revealed the details of deep scours from the keels of huge icebergs, carved across the flat plain.

Alix from Geoscience Australia found a suitable camera tow target, and at 0620 we deployed the camera, and it was well on its way down when it was realized that the sonar on board the camera was not working. It had worked perfectly on the previous deployment, but after a few attempts at fixing it on the fly, it was decided to abort the tow and retrieve the unit for repair/replacement. By 0729 it was back in the water, and the ocean floor came into view on our monitors in the Ops room not long after. We completed a long tow, that revealed fields of brittle stars, their “arms” high in the water trying to snare their prey, some perched atop small boulders and even pebbles, trying for any advantage over their neighbours. Alix was pretty happy and just about to call it quits, when a field of crinoids magically came into view, and kept going. It was very cool to see. Much better than watching re-runs of QI on the ABC…

Camera was back on deck at 0908, and we continued multibeam survey heading back east to our “ice gap” that we exploited last night. We completed another CTD from 1202 to 1215 (shallow water here). We made it to our most southerly point in ordinary visibility at 1400 (65° 46.6 S 120° 24.04 E) before turning north once more to avoid the icy door shutting us in the south, for another CTD cast at 1455. This cast had a problem though, with loss of comms to the CTD, and was aborted. Quick work by Rod from SIT had it back in the water again at 1510, and back on board at 1542.

In the afternoon, we headed west once more, further south again as we paralleled the new (and improved!) ice edge in search of another CTD site, which is underway, and on its way back up as I write my (late) sitrep.

Overnight we will continue multibeam survey further north.

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39: 20170222

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**SITREP date/time:** 20170222/1915

**Noon position:** 65°23.4S, 120°21.6E

**Speed (knots):** On station for CTD.

**Distance Run (noon – noon):** 119 NM

**Distance Run (total):** 6105 NM

**Current Weather:**

- **Air Temperature (°C):** -2.1 (-5.1 this morning)
- **Water Temperature (°C):** -1.21
- **Wind Speed (knots):** 16 (average last hour)
- **Wind Direction:** 140
- **Barometer (mbar):** 968 slight fall
- **Visibility:** good
- **Cloud:** 7/8 stratocumulus
- **Sea:** SE 1m

We resembled an oceanographic cruise today, more than a geoscience one, having completed three CTDs in deeper water off the shelf slope, in line with three CTDs done in shallower water on the slope earlier. The search is on for the warmer water that “leaks” on to the shelf, and is (potentially) making its way to the base of the Totten Glacier. There’s been some interesting cold water lenses up high in the water column, and a warm layer observed at depth which caused a bit of an “aha!” moment amongst “those-that-know-about-this-stuff”. But I’m not sure the whole story has been nailed just yet…

We also managed an early camera tow this morning between 0303 and 0426, and have just deployed another one as I write. Of course, there was more multibeam in between all the above, and we will be filling in some data gaps this evening too.

Now, if you’ll excuse me, there’s something interesting on the “tele” down in the ops room…

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40: 20170223

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**SITREP date/time:** 20170223/1930
Noon position: 64°31.7S, 119°01.5E
Speed (knots): 11.5
Heading: 037
Distance Run (noon – noon): 146 NM
Distance Run (total): 6251 NM

Current Weather:
Air Temperature (°C): -2.0 (-3.5 this morning)
Water Temperature (°C): 0.40
Wind Speed (knots): 21 (average last hour)
Wind Direction: 230
Barometer (mbar): 963 slight rise
Visibility: good
Cloud: 6/8 stratocumulus/stratus
Sea: ENE 2-3 m

Another good camera tow last night, which was followed by multibeam surveying prior to arriving on site at C-015 for the long awaited piston core at this very interesting Kasten core sample site. Unfortunately, someone had placed a rather large (and recently fractured) iceberg only 0.35 NM from the “spot” we wanted to be, with its sister 'berg nearby. Our initial set up spot was deemed to be in the path of the berg, so we moved to the other side and reset.

Deployment of the piston core commenced at 1010, and with the core rotated to vertical it was noticed that the hydrostatic release pin was not correctly located, and it was necessary to recover the core and reset the pin. As the core was being moved back to the horizontal a “crack” was heard, and it quickly became apparent that the core barrel had sheared away from the core head, and was being held in place by the inner PVC tubing. The entire assembly was safely retrieved, however that was that as far as the coring attempt at this site went… for today at least.

Plan B was pressed into action, and at 1040 we travelled NE along the extension of the channel we were hoping to sample, for a Kasten core at site C-038. The Kasten core has been the “go to” bit of gear really, and has rarely let us down. On this attempt we had a 4 metre box fitted, hoping for just a bit more mud than we usually get. The core was in at 1314, and back on board at 1542 with 3.39 m: a new record for the Kasten core. We followed up at this site with a vertical plankton net, which was finished by 1614. We repositioned the ship to the centre of the channel for a CTD, in at 1648, and on board again at 1902.

We are now underway to the south, to replicate some US CTD sample sites tonight, dependent on ice conditions.

SITREP date/time: 20170224/1900

Noon position: 64°43.9S, 118°41.5E
Speed (knots): on station for piston core at C-015
Distance Run (noon – noon): 82 NM
Distance Run (total): 6333 NM

Current Weather:
Air Temperature (°C): -1.0 (-3.5 this morning)
Water Temperature (°C): -0.30
Wind Speed (knots): 12 (average last hour)
Wind Direction: 267
Barometer (mbar): 989 steady rise
Visibility: great!
Cloud: 1/8 stratocumulus on horizon
Sea: W <2 m

After a completely overcast morning, the skies have cleared once more, and we’re basking in glorious sunshine, currently on a seismic line heading 293 at 3 knots. This delightful scenario hides the fact that we haven’t had a great day today…

Last night we were defeated by ice encroaching northwards again, and the CTD sites were rejigged to account for the new world (ice) order. Our first CTD was in the water at 2340 last night, and back on board at 0130 this morning. We then headed west, diverted north, and then east to position over another of our mapped channels for another CTD at 0400, with the gear back at 0608.
At 0820 we were back at our old favourite site C-015 for another attempt at a piston core. The twin icebergs from yesterday had moved clear of our site, and the core was heading down at 0902 after a flawless deployment. The usual 5-6 tonne pull-out tension on the core was missing today (only 2.7 tonne), and speculation was running hot on what had happened down there. As the corer came to the surface, after a longer than usual entanglement with the piston trigger, it became clear that things had not gone to plan: the lower 6 m of core barrel was gone, and section 9-12 m was hanging freely, held in place by the piston itself. We suspect we finally hit one of the drop stones that we had seen so often in the camera tows, so in reality, we have been very fortunate to date with all our core deployments. As Mike says in his report today “This is just the risk inherent when you drop an 18 m pipe with a two tonne weight at the top of it into the sediment at 50 m a minute.” RIP piston corer… for the remainder of this voyage.

We then positioned for a seismic survey, with full streamer and gun deployment at 1425. Unfortunately, there were problems with the streamer, and it had to be brought back on board, a section removed, and the shortened streamer redeployed. This was done by 1521, with soft start commencing at 1530. With a full 5 minutes of soft acquisition under our belt, a whale showed up in the shut-down zone, and we were back to square one. Soft-start recommenced at 1650, and full power was finally achieved at 1720.

We have just shut down again, at 1833, due to a particularly inquisitive humpback shadowing the vessel right near the gun array, occasionally rolling on his/her side and giving us a very big “wave”. We’ll see how we go with this whale, but hope to get a bit more of this line completed, before heading west to Area A (remember Area A?) to site A-007 for a Kasten core tomorrow morning.

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**SITREP date/time:** 20170225/1830

**Noon position:** 64°32.6S, 116°40.9E  
**Speed (knots):** 11  
**Heading:** 109  
**Distance Run (noon – noon):** 96 NM  
**Distance Run (total):** 6429 NM

**Current Weather:**  
**Air Temperature (°C):** 0.2  
**Water Temperature (°C):** -0.17  
**Wind Speed (knots):** 16 (average last hour)  
**Wind Direction:** 117  
**Barometer (mbar):** 980 falling  
**Visibility:** 8 NM  
**Cloud:** 8/8 stratus  
**Sea:** E 1 m

How many roads must a man walk down? 42. Welcome to “the meaning of life day” on V01…

Our “pet” whale kept us company for about 2 hours, cavorting near the side of the ship, rolling on its back and diving beneath us, giving us the friendly fluke, spy-hopping, and generally just being a (delightful) pest. She eventually got bored with us, and wandered off, allowing us to recommence soft-start on the seismic line at 2016. This had the immediate effect of rekindling her interest, and she came charging straight back to the ship, and the show began again. Our Marine Mammal Observer Vanessa was bouncing off the walls with excitement. Even Team Seismic were slightly consoled by the performance we were being given. We’re thinking of repainting the sign on the side of the ship to read “Marine National Whale Attraction Facility”.

Consequently, the seismic gear was packed up and put away, with the deck secured at 2100, and the ship heading west for site A-007 or somewhere nearby. The late shift was treated to a pretty good aurora overnight (by all accounts), and by sunrise we were in the vicinity of “somewhere nearby”, in search of the best packet of sediment that the bottom profiler could find. This involved the Chief Scientist staring intently at a screen in the ops room, and occasionally calling the bridge to direct the ship in various directions. We found “the spot” (site A-042) and the Kasten core, which was poised and ready to go, was in the water at 0904. Happily, for all concerned, after a less than impressive pull-out tension, it returned full of muddy goodness with a length of 3.36 m at 1033.
After a quick dip with the plankton net, we are underway heading east towards the SE corner of Area C, and our final attempt at some multibeam survey to fill some gaps and extend some pre-existing (US) multibeam survey lines.

43: 20170226

SITREP date/time: 20170226/1830

Noon position: 65°24.6S, 122°59.3E
Speed (knots): 8
Heading: Various, to ice conditions, tending easterly
Distance Run (noon – noon): 219 NM
Distance Run (total): 6649 NM

Current Weather:
Air Temperature (°C): -3.2
Water Temperature (°C): 0.81
Wind Speed (knots): 31 (average last hour)
Wind Direction: 120
Barometer (mbar): 969 falling
Visibility: good
Cloud: 7/8 cumulus/stratocumulus
Sea: ESE 2-3 m

We covered a lot more ground than usual overnight, with a bit of dodging and weaving early this morning due to ice, before heading south and locating a channel to conduct our final "science" CTD cast at 0920. As the CTD door opened onto a bright sunny morning, the 30 knot winds and -5.5 °C air greeted the crew in the CTD room, our coldest morning on the trip: slightly warmer than Canberra in winter, without the fog.

The CTD was 10 m off the sea floor at 1013, having encountered some interesting temperature fluctuations on the way down. Back on board with samples, all secure, and we were under way again at 1115, heading N, parallel to a growler-rich ice edge, with some mighty tabular bergs in the vicinity. The sextant made another appearance on the bridge, and we calculated the height of one particular berg at 54 m.

The "final" CTD spells the end for science equipment over the side for our voyage (with the exception of a test cast when we get back into warmer waters near Tasmania). To celebrate this milestone, we had a post lunch BBQ on the bridge. Silly hats coupled with Herb Albert and his Brass Band kept the mood suitably festive.

We are heading east-ish, with a lot more ship motion than we are accustomed to, parallel to and north of an existing multibeam line, and will continue mapping until 0400, when we will finally leave the Antarctic coast, and head homewards.

44: 20170227

SITREP date/time: 20170227/1845

Noon position: 63°45.8S, 128°51.9E
Speed (knots): 11.5
Heading: 018
Distance Run (noon – noon): 210 NM
Distance Run (total): 6859 NM

Current Weather:
Air Temperature (°C): 1.35
Water Temperature (°C): 3.96
Wind Speed (knots): 16.3 (average last hour)
Wind Direction: 200
Barometer (mbar): 976 rising
Visibility: <10NM
Cloud: 8/8 stratus
Sea: SE 5-6 m combined with a long period NW swell at 6-7 m
We altered course at 0500, leaving our multibeam survey line, and finally “heading for home”. Big swells today made for big ship movement, but apart from a less than ideal sleep, all on board are travelling well. Still some light snow falling outside, and the decks are closed due to the conditions, but the water and air are warming up. Hopefully there will be some summer left when we get back to Tassie. We made a start on getting gear ordered today, with cold weather clothing returns, as well as sample tidy-up and labelling. There’s an “end of science” Costume Party and quiz night coming up, so I have to run and get my costume ready. I was thinking of going as a “grumpy voyage manager”… shouldn’t be too hard.

45: 20170228

SITREP date/time: 20170228/1755
Noon position: 59°06.1S, 131°40.1E
Speed (knots): 12.5
Heading: 018
Distance Run (noon – noon): 291 NM
Distance Run (total): 7151 NM
Current Weather:
Air Temperature (°C): 4.3
Water Temperature (°C): 5.08
Wind Speed (knots): 20 (average last hour)
Wind Direction: 280
Barometer (mbar): 996 rising
Visibility: good
Cloud: 5/8 cumulus/stratocumulus
Sea: W 2 m

Great conditions today, allowing us to make good progress, prior to some less than ideal weather forecast for tomorrow. Clean up in the mud lab went well, as did packing up the Geotek logger. All well aboard.

46: 20170301

SITREP date/time: 20170301/1645
Noon position: 54°51.5S, 135°12.2E
Speed (knots): 11
Heading: 031
Distance Run (noon – noon): 284 NM
Distance Run (total): 7434 NM
Current Weather:
Air Temperature (°C): 8.0
Water Temperature (°C): 6.75
Wind Speed (knots): 27 (average last hour)
Wind Direction: 341
Barometer (mbar): 986 falling
Visibility: <5 NM
Cloud: 8/8 stratus, raining
Sea: NNW 4 m

Conditions have deteriorated during the day, with air pressure decreasing, and wind speed and ocean swell increasing. Our most “water over the bow” moments of the entire voyage today, with sheets of water hammering into my office window. Pack up continued today, mainly in the morning when conditions were more forgiving. The first of our on board science debriefs was held today, covering the 11 Kasten cores, and discussing some preliminary ideas, as well as highlighting the weird and exciting bits that only detailed study will decipher.
SITREP date/time: 20170302/1655

Noon position: 52°01.7S, 195°16.6E
Speed (knots): 3.5
Heading: 295
Distance Run (noon – noon): 241 NM
Distance Run (total): 7676 NM

Current Weather:
Air Temperature (°C): 8.1
Water Temperature (°C): 8.77
Wind Speed (knots): 41.5 (average last 12 hours), gusting 55
Wind Direction: 270
Barometer (mbar): 1006 rising
Visibility: currently, good. Passing squalls
Cloud: 6/8 cumulus
Sea: Big! WNW 8-11 m

The “furious fifties” are making up for the fact they let us off on the way down… An uncomfortable day has followed an uncomfortable night, with some heavy rolling occasionally catching us off guard. The wind has been a constant (check that 12 hour average!), and the swell has built with it, putting on quite a show for those amongst us who felt their life was lacking in adventure. Others have seen enough, and would like it to stop now please.

Consequently, our course has altered somewhat to give us a more tolerable ride, and our speed has been pegged back too. We’re currently making 5 knots heading 300. The forecast has conditions easing as the system moves east. Master Mike Watson will reassess our ETA and advise if we can still make our original target of 0900 Sunday when we are back on course.

Another science meeting today, this time discussing the Piston Core preliminary results. The fact that there are any results at this stage is mainly due to the Geotek logger that was installed in the Clean Dry Lab, which has the ability to measure the natural gamma radiation given off by the sediment (at incredibly low levels) as well as the magnetic susceptibility of the minerals. The early results can be related to known properties of gross sediment packets that are either terrigenous (derived from land sources) or marine (mainly biogenic origin), and further related to known glacial and interglacial cycles. This has allowed prioritization of the most interesting cores for detailed work, all without even opening a core barrel yet.

All on board are well, although with varying degrees of tiredness, and looking forward to less challenging conditions tomorrow.

SITREP date/time: 20170303/1715

Noon position: 49°03.3S, 141°58.1E
Speed (knots): 11.5
Heading: 034
Distance Run (noon – noon): 236 NM
Distance Run (total): 7912 NM

Current Weather:
Air Temperature (°C): 11.0
Water Temperature (°C): 11.26
Wind Speed (knots): 29 (average last 12 hours)
Wind Direction: 274
Barometer (mbar): 1018 rising
Visibility: currently, good.
Cloud: 8/8 stratuscumulus
Sea: W 3-5 m
Into the “roaring forties” today, and the wind has kept some of its energy, but happily the swell has died down enough to make for happier travelling companions. Check those temperatures! Back into double figures for water and air. Nice. We turned back on track last night at 1930, and are making good speed once more, with our ETA unchanged at 0900 Sunday.

Given good conditions tomorrow, we will conduct a quick test run of the CTD to 1000 m.

Science meeting today discussed the seismic results; the first such results obtained from the Investigator. In all we ran 10 seismic profiles, covering 322 km. There were 13 full stops due to whales, and another 7 instances where whales forced a power down to low power acquisition. The longest uninterrupted profile was 64.207 km, and the most interrupted (our last) resulted in only 11.268 km out of a planned 36 km being shot. Only one line was aborted due to weather. Also mentioned was the gravity data being collected (and the difficulties associated with making that measurement on a moving ship), with over 4.5 million data points being generated for the voyage.

SITREP date/time: 20170304/1715

Noon position: 45°07.4S, 144°52.7E
Speed (knots): 9
Heading: 035
Distance Run (noon – noon): 267 NM
Distance Run (total): 8179 NM

Current Weather:
Air Temperature (°C): 13.1
Water Temperature (°C): 16.80
Wind Speed (knots): 22 (average last hour)
Wind Direction: 266
Barometer (mbar): 1017 rising
Visibility: good.
Cloud: 5/8 cumulus/stratocumulus
Sea: SW 2-3 m

Comfy seas for our last day at sea. What a delight.

We stopped the ship after breakfast to conduct a CTD test to 1000 m, trying to determine if the “spiking” in the data we have been observing has been cold-water related. No. Still evidence of spiking in the data, so further testing of the system will be required. On the plus side, the testing of the “new” software for the CTD went well.

Our science overview today was from the Microbio team, who are studying phytoplankton and viruses, both present day and ancient (as found in our sedimentary records), primarily because they are excellent climate indicators. The team hopes to isolate ancient DNA from the sediment cores, hoping to look back in the order of 30,000 years.

We’ve just wrapped up our “wrap-up” meeting, and gone over some of the highlights and “firsts” of this voyage. The following has been compiled by our Chief Scientist, Leanne Armand, with input from many sources:

- First dedicated Antarctic geoscience mission by RV Investigator.
- First seismic survey by RV Investigator in collaboration with the Italian Antarctic Program (PRNA) and Instituto Nazionale di Oceanografia e di Geofisica Sperimentale OGS, Italy.
- First use of drone for PR purposes on mission
- First inclusion of a CSIRO Educator at Sea
- Longest RV Investigator mission to date: 49 full days at sea
- Record for consecutive number of days spent in science operations: 38 days
- Longest RV Investigator mission to operate below 60° S = 39 days, 16 hours, 10 minutes
- Second longest berth-to-berth distance: ~8300 nm
- Most southerly position: 65° 46.6’ S, 120° 24.0’ E
- Coldest Air temp: - 6.5°C
- Coldest water temp: -1.6 C
- Highest winds encountered: Beaufort scale Force 11 (56-63 knots)
- Longest piston core recovery from 18 m barrel: 16 m 28.5 cm.
- Longest piston core recovery from 15 m barrel: 13 m 60.3 cm.
- Longest kasten core recovery from 3 m barrel: 2.65 m.
• Longest kasten core recovery from 4 m barrel: 3.38 m.
• Longest consecutive run of successful multicores: 4
• 28.98 m in 10 Kasten cores, 0.65 m³, 440.38 kg kept
• 67.43 m in 6 piston cores (proposed 2-4), 0.706 m³
• 9.47 m in 5 multicores 0.07 m³ 14.76 kg
• Total sediment 1609 kg
• 1741 litres water sampled or filtered
• 33 CTDs
• Longest camera tow duration: 55 minutes on the seafloor.
• Deepest seafloor mapped: 4236 m
• Shallowest seafloor mapped: 430 m
• Total area mapped: 48,683 km² science ops. (0.9 x the size of Tasmania), ~130,000 km² including transits
• Longest seismic line without whale interruptions: 64.207 km
• 322 km seismic total
• Most Pollywogs initiated by King Neptune to Red Nose Order on RV Investigator mission: 22

IN2017-V01 has been a fantastic voyage, with some amazing science outcomes. It’s been an absolute pleasure travelling with such a talented and easy-going group of young, and young-at-heart scientists, ably supported by our amazing CSIRO support staff, on a vessel crewed by a delightful and skilled group of professionals from ASP.

It’s been a privilege to have been Voyage Manager on such an adventure. Thanks for following along, and ‘bye for now!