PALMER STATION MONTHLY SCIENCE REPORT

NOVEMBER 2017

A handprint adjacent to southern giant petrel footprints. A fitting name for a seabird with outsize webbed feet (8-16cm) and wingspan (150-210cm). *Image Credit: Marissa Goerke*

NEWS FROM THE LAB

Randy Jones, Summer Laboratory Supervisor

A busy month here at Palmer Station - the science grantees accomplished a great deal of field science across the boating region aboard Zodiacs and through substantial use of the new RHIB platforms. The RHIBs *Rigil* and *Hadar* were utilized by the C-019-P (Schofield), C-020-P (Steinberg), and C-045-P (Ducklow) groups approximately 20 times between Nov 16 and Nov 30. Open water was generally present in the boating region following Nov 20, which enabled a rapid-fire succession of excursions for data and sample collection.

New technologies are also being utilized by the science grantees this season – they include the C-Ops instrument for measuring optical seawater properties *in situ*, the EK80 scientific wide-band echo sounder newly hull-mounted in RHIB *Rigil* for targeting middle trophic level organisms such as krill or small fish, and an imaging flow cytobot (IFCB) which can continuously measure particle size and identify species with the use of high speed photography. We're looking forward to grantee findings and results as the season progresses!

NOVEMBER 2017 WEATHER
Marissa Goerke, Research Associate

Palmer Monthly Met summary for November, 2017

Temperature
Average: -1.2 °C / 29.8 °F
Maximum: 6.6 °C / 43.88 °F on 16 Nov 04:03
Minimum: -8.8 °C / 16.16 °F on 1 Nov 04:45
Air Pressure
Average: 983.4 mb
Maximum: 1004.7 mb on 6 Nov 03:57
Minimum: 957.8 mb on 24 Nov 11:55
Wind
Average: 9.7 knots / 11.1 mph
Peak (5 Sec Gust): 51 knots / 59 mph on 29 Nov 01:33 from NNE (31 deg)
Prevailing Direction for Month: SW
Surface
Total Rainfall: 39.1 mm / 1.54 in
Total Snowfall: 40 cm / 15.6 in
Greatest Depth at Snow Stake: 100 cm / 39 in
WMO Sea Ice Observation: Fast ice with open pack ice to seaward ice boundary, 1-5 ice bergs with bergy bits and growlers, ship in open water, with floating ice in sight.
Average Sea Surface Temperature: -1.13 °C / 30 °F

Winds peaked at 59 mph on the 29th and the average speed for the month was 11.1 mph. The prevailing wind direction for the month was from the south west. Temperatures warmed and snow pack diminished by -15.6 inches. Sea ice has retreated and pack ice has fluctuated greatly over the course of the month.

B-032-P: PRODUCTION AND FATE OF OXYLIPINS IN WATERS OF THE WESTERN ANTARCTIC PENINSULA: LINKAGES BETWEEN UV RADIATION, LIPID PEROXIDATION, AND CARBON CYCLING

Dr. Benjamin Van Mooy, Principal Investigator, Woods Hole Oceanographic Institution, Woods Hole, MA

Personnel on Station: Benjamin Van Mooy (WHOI) and Jamie Collins (WHOI/University of Washington)

This is a new project at Palmer Station, and November was the first field season. It was highly successful.

As the project title suggests, the goal of the work is to identify whether there are direct connections between UV radiation (UVR), reactive oxygen species (ROS) production, and lipid peroxidation in phytoplankton in the waters near Palmer Station. Lipid peroxidation, a chemical reaction between lipids and ROS that may occur through both enzymatic and abiotic pathways, is known from laboratory studies to produce highly bioreactive molecules that negatively affect both phytoplankton and the zooplankton that feed on them. The grantees hypothesized that the Antarctic marginal ice zone, with its populations of extremely lipid-rich plankton and high UVR dosages, was a setting where lipid peroxidation has substantial impacts on carbon cycling.

The team arrived on LMG17-10SB in late October and departed on LMG17-11NB in late November; the 30 days on station provided numerous sampling opportunities. Water samples were collected from the Arthur Harbor shoreline (Fig. 1), via coring of fast ice in Arthur Harbor (Fig. 2), and via CTD and diaphragm pump from various small boat platforms.

Water was pumped from the Arthur Harbor shoreline in quiescent water about 5 m from shore at a depth of about 3 m. The Palmer Marine Technicians assembled the necessary equipment to power an 110V diaphragm pump brought to station by the grantees, which was installed on sled that was readily moved to sampling locations.

Water was also pumped from beneath the fast ice at a location near the center of Arthur Harbor. Following the guidelines in the Antarctic Field Operations Manual (Peninsula Edition), the Palmer Laboratory Supervisor led a team that safely identified a route across the fast ice from shore. A sampling hole was then drilled. A full ice core was also collected and sectioned using a Kovacs corer.

Samples from various locations adjacent to the fast ice and near floes were obtained from the Zodiac F580 and *Avior* small boat platforms. Open-water samples were collected from LTER Station B in a coordinated effort between the grantees and the LTER personnel on station from the C-019-P (Schofield), C-020-P (Steinberg), and C-045-P (Ducklow) groups.

Fig. 1 – Laboratory Supervisor Randy Jones (left) and project participant Jamie Collins (right) conduct sampling operations at the Arthur Harbor shoreline (Image Credit: Van Mooy group).

Fig. 2 – Project participants Jamie Collins (left) and Ben Van Mooy (right) retrieve a series of vials used to measure reactive oxygen species production under natural conditions beneath the Arthur Harbor sea ice (Image Credit: Van Mooy group).

These samples were used in incubation experiments conducted in an unshaded outdoor tank (Fig. 3). Natural phytoplankton populations in the water samples were subjected to experimentally manipulated UVR dosages. ROS were measured in these experiments using HPLC methods, which confirmed high rates of UVR-catalyzed reactive oxygen species production in the marginal ice zone. Samples were also taken from the experiments for analysis of lipids, which will be conducted in the coming year at WHOI.

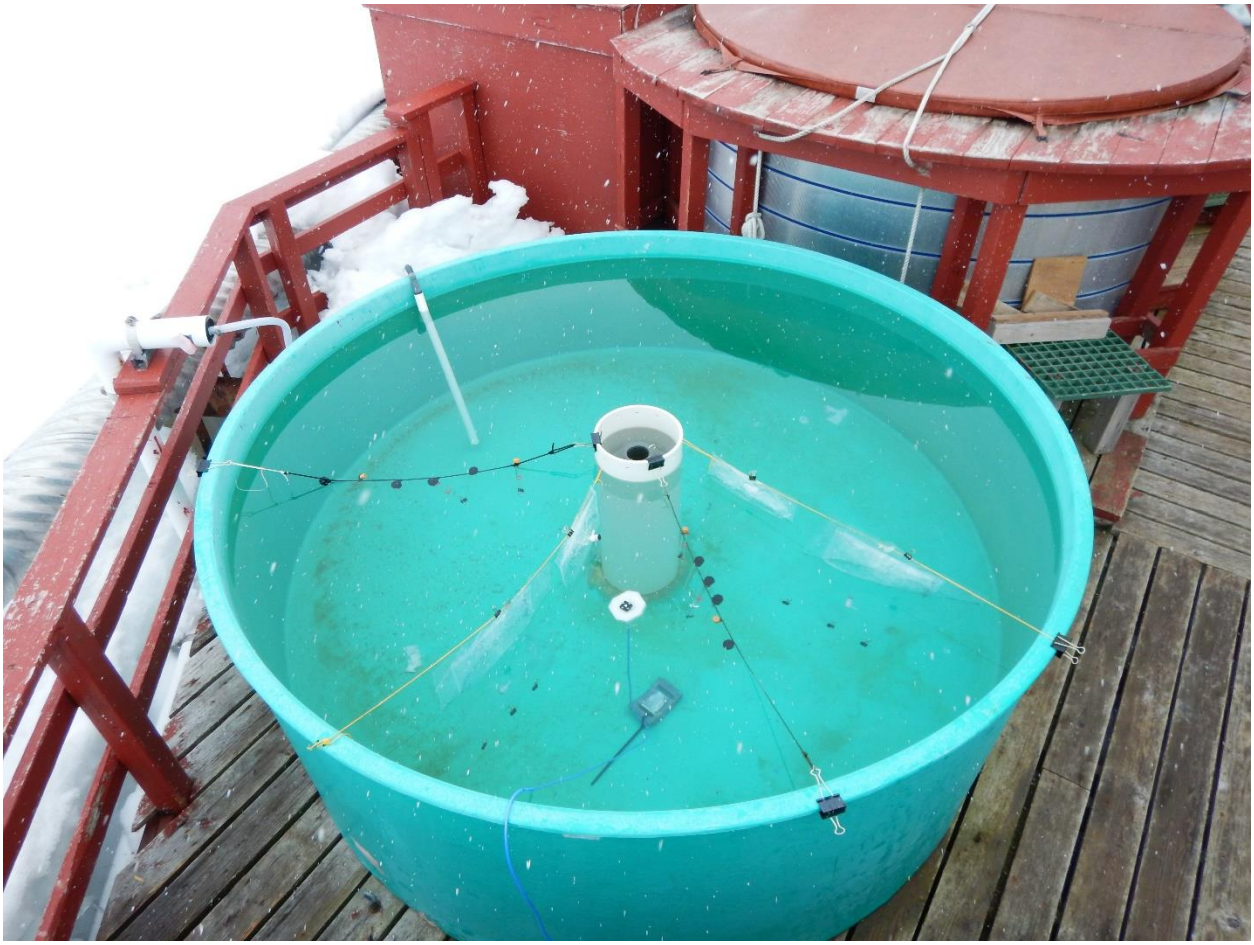

Fig. 3 – Various analytical methods were used to measure reactive oxygen species production and incident light fluxes in an open-air aquarium on the Palmer Station aquarium deck (Image Credit: Van Mooy group).

In the final days of the season, the grantees collaborated with the C-020-P (Steinberg) group on an experiment that brought the presence of zooplankton grazers into the experimental matrix. Initial results, obtained in collaboration with the C-019-P (Schofield) group, were highly suggestive of synergistic effects between UVR and grazing on the phytoplankton population.

Overall, all of the sampling and experimental needs of the project were met during this highly successful first season. Preliminary results suggest that the experimental design is likely to yield a definitive test of the hypotheses proposed by the grantees. The participants look forward to continued success in the Summer 2018-2019 season, when further work will be conducted at Palmer Station and on a short cruise aboard the ARSV *Laurence M. Gould*.

C-013-P: PALMER, ANTARCTICA LONG TERM ECOLOGICAL RESEARCH (LTER): LAND-SHELF-OCEAN CONNECTIVITY, ECOSYSTEM RESILIENCE, AND TRANSFORMATION IN A SEA-ICE INFLUENCED PELAGIC ECOSYSTEM – APEX PREDATOR COMPONENT

Dr. William R. Fraser, Principal Investigator, Polar Oceans Research Group, Sheridan, MT

Personnel on Station: Ben Cook and Carrie McAtee

C-013-P personnel arrived at Palmer Station on October 25th however due to ice we were unable to boat or conduct field work until November 10th. Subsequently, as ice and weather conditions continued to wax and wane, we got out on the water and accessed our research study sites on 15 out of the 20 remaining days in November.

Field work this month began with breeding chronology studies on a subset of Adélie penguin nests on Torgersen and Humble Islands. A portion of these nests were sampled at the 1-egg stage to obtain adult body condition and egg morphometric data. Timing of a peak egg census was also determined and completed for Adélies on all local islands including Biscoe and Dream. In addition to our Adélie monitoring, we also began monitoring gentoo penguin colonies on Biscoe and chinstrap penguin colonies on Dream.

Blue-eyed shag colony on Cormorant Island. *Image Credit: Carrie McAtee*

Brown skuas have arrived and we began their mark-recapture and breeding chronology studies, including leg bands re-sights and monitoring nests in the local area, as well as on Dream and Biscoe. South polar skuas began arriving locally in the middle of the month and we began our band re-sighting and nest monitoring study of them on Shortcut Island. Satellite transmitter deployments on southern giant petrels have begun and will continue through February. An early-season census of giant petrel nests was completed on Shortcut and Humble Island – with an

extensive all island census to initiate in December. We also began monitoring the small blue-eyed shag colonies on Cormorant Island this month.

Marine mammal censuses of seals and whales also began this month. Seal sightings this month included several Weddell, and a few crabeater. However, the dominant species in the Palmer area during November were elephant seals; including numerous recently weaned pups as well as several nursing mother pup pairs. The first minke whale of the season was observed south of Halfway Island on the 28th of November.

C-019-P: PALMER, ANTARCTICA LONG TERM ECOLOGICAL RESEARCH (LTER): LAND-SHELF-OCEAN CONNECTIVITY, ECOSYSTEM RESILIENCE, AND TRANSFORMATION IN A SEA-ICE INFLUENCED PELAGIC ECOSYSTEM – PHYTOPLANKTON COMPONENT

Dr. Oscar Schofield, Principal Investigator, Rutgers University, Institute for Earth, Ocean, and Atmospheric Sciences, Department of Marine and Coastal Sciences

Personnel on Station: Schuyler Nardelli and Frank McQuarrie

Although ice persisted throughout the first half of the month, November proved to be a productive month for the Schofield lab. We began our regular LTER biweekly sampling November 16th. This year, instead of sampling from the Landing Craft, we are using the new Rigid Hulled Inflatable Boat (RHIB), *Rigil*, which so far has been a huge success and has greatly expanded our science capabilities (Fig. 4). Along with the C-045-P (Ducklow) group, we managed to sample five times at both stations B and E this month, with a bonus water sample collection by the B-032-P (Van Mooy) group at station B on November 14th.

Fig. 4 – Deploying the AC9 optics cage off the stern of RHIB *Rigil* (Image Credit: Keri Nelson).

Physically, the water column was relatively well-mixed throughout the month at both stations (Fig. 5). At station B, a surface meltwater layer (~top 5 m) developed from November 20-27, with decreased salinity and increased temperature. This layer deteriorated on November 30th, when persistent strong winds (>25 knots) mixed the upper water column.

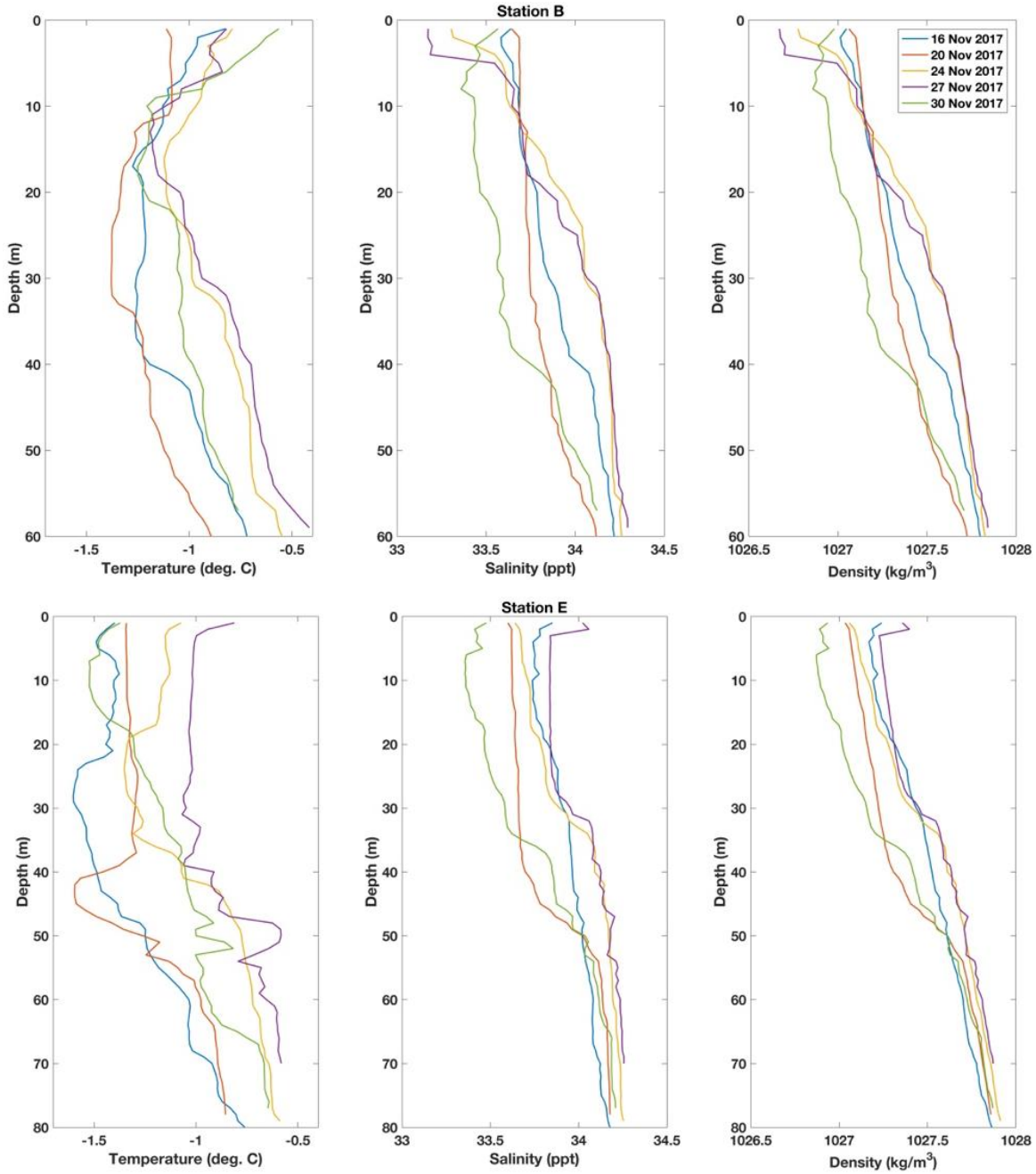

Fig. 5 – CTD profiles at Station B (top row) and E (bottom row) from November 16-30, 2017. Temperature, salinity, and density show relatively well-mixed water columns.

There was an increase in chlorophyll concentrations across all depths at both stations (Fig. 6). In conjunction, water column integrated phytoplankton concentrations increased for both (Fig. 7), with average particle sizes remaining relatively constant of 26.69 microns for station B and 21.80 microns for station E (Fig. 8). Primary production and maximum quantum yield (Fv/Fm; describes how well phytoplankton are photosynthesizing) were variable throughout the time period with no distinct trends.

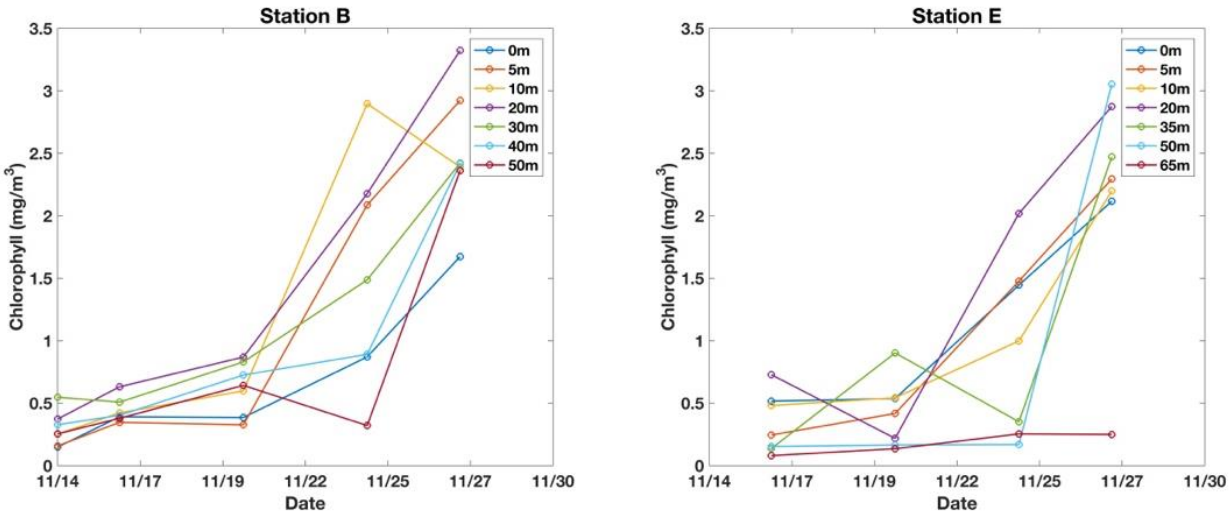

Fig. 6 – Chlorophyll concentrations at stations B (left) and E (right) for all sample depths over the time period from November 14-30, 2017.

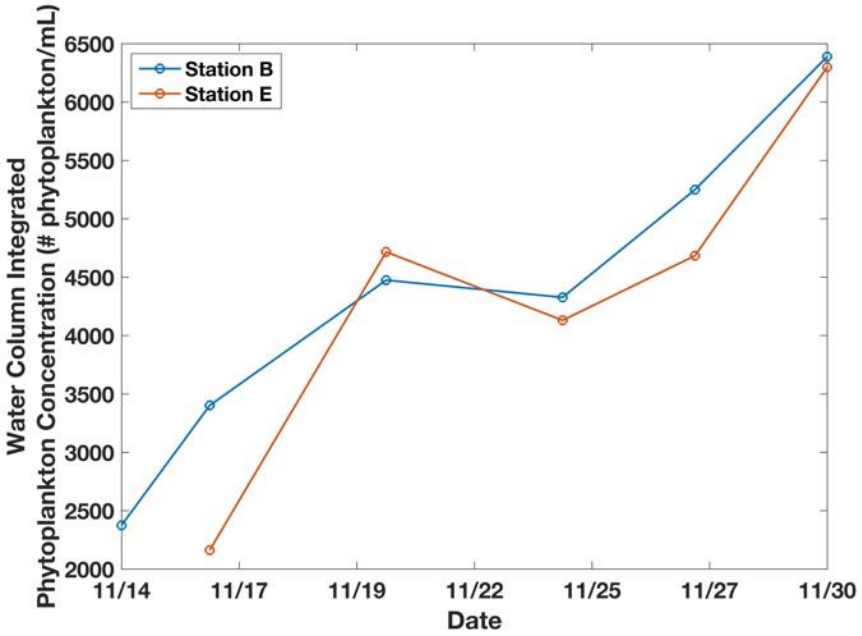

Fig. 7 – Water column integrated phytoplankton concentration over the time period from November 14-30, 2017.

In addition to our bi-weekly *in situ* LTER sampling, we ran seawater samples from the pumphouse intake through our Imaging Flow Cytobot (IFCB) twice daily for the duration of November. Over the month, phytoplankton size stayed fairly uniform with an average diameter of 20.93 microns, while overall particle and chlorophyll concentrations increased (Fig. 8). This indicates growth of the phytoplankton community, but likely without any major shifts in species composition.

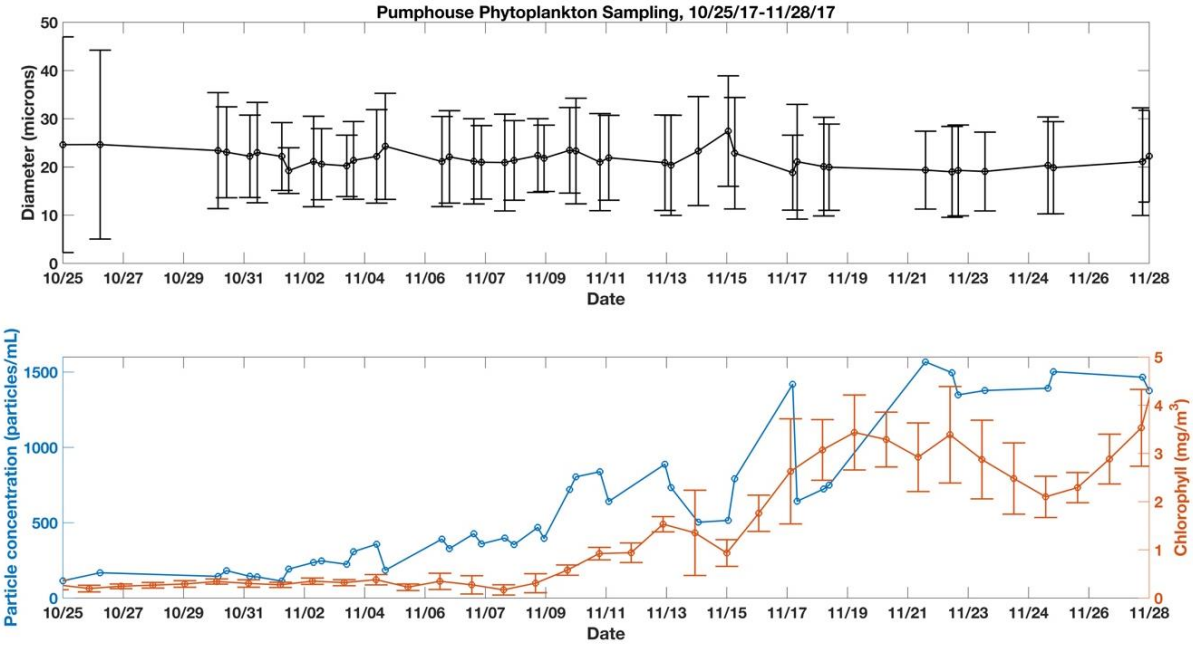

Fig. 8 – Average phytoplankton diameter (top), overall phytoplankton concentration (bottom, blue line), and average chlorophyll concentration (bottom, red line) from October 25, 2017 to November 28, 2017.

A huge thank you to Resident Marine Technicians Dave Moore and Jacob Bueche for their help getting us out sampling as soon as possible, to Instrument Technician Carly Quisenberry for all her help keeping our many instruments running smoothly, and to the rest of the ASC staff for their continued support of our science. We're looking forward to an exciting December, with the addition of two glider deployments and the start of Schuyler's grid transects!

C-020-P: PALMER, ANTARCTICA LONG-TERM ECOLOGICAL RESEARCH (LTER): LAND-SHELF-OCEAN CONNECTIVITY, ECOSYSTEM RESILIENCE, AND TRANSFORMATION IN A SEA-ICE INFLUENCED PELAGIC ECOSYSTEM – ZOOPLANKTON COMPONENT

Dr. Deborah Steinberg, Principal Investigator, Virginia Institute of Marine Science, College of William & Mary

Personnel on Station: Jack Conroy and Leigh West

Jack Conroy, a second-year PhD student at the Virginia Institute of Marine Science, and Leigh West, a research technician in Dr. Debbie Steinberg's Zooplankton Ecology Lab, arrived to kick off C-020-P's first full season at Palmer Station. This summer, we will be assessing seasonal succession of the zooplankton community and its grazing impact near Anvers Island. Additional work will include experiments to identify selective feeding behavior and potential trophic cascades in the plankton food web. This work is a key component of the Palmer Long Term Ecological Research (LTER) program's goal to understand marine ecology and biogeochemistry along the changing Western Antarctic Peninsula.

Ice prevented science groups from sampling for the first few weeks of the season, so we took this time to set up the lab, build nets, cut filters, and prep for the first day on the water. Since the ice

blew out in mid-November, our group has completed six sampling trips (Fig. 9) to collect zooplankton (Fig. 10) for community composition, grazing, and biomass analyses as well as krill for trophic position analysis.

Fig. 9 – Jack Conroy, Leigh West, Dave Moore, Jakob Bueche, and Dr. Ben Van Mooy prepare to deploy a plankton net for the first time from the slick, new RHIB *Rigil* (Image Credit: Ralph Maestas).

We collaborated with Dr. Benjamin Van Mooy and Dr. James Collins (B-032-P) who are investigating the impacts of ultraviolet-induced lipid oxidation at Palmer Station. We conducted a full factorial experiment exposing the natural phytoplankton community to conditions of high and low ultraviolet radiation with and without the addition of krill predators. Preliminary results obtained using C-019-P's imaging flow cytobot are statistically interesting and suggest variable impact on the phytoplankton community across treatments.

Fig. 10 – A polychaete worm, *Tomopteris* spp., collected in a net tow at Palmer LTER Station E (Image Credit: Leigh West).

The season is off to a great start, thanks in large part to the ASC staff who have helped us get on our feet. Special shout-outs go to Marine Technicians Dave Moore and Jakob Bueche in the boathouse as well as Lab Supervisor Randy Jones and Instrument Technician Carly Quisenberry in the lab. We are excited to continue our work in the coming months and look forward to further collaborations with LTER colleagues as the RHIBs open up new scientific opportunities!

C-045-P: PALMER, ANTARCTICA LONG-TERM ECOLOGICAL RESEARCH (LTER): LAND-SHELF-OCEAN CONNECTIVITY, ECOSYSTEM RESILIENCE, AND TRANSFORMATION IN A SEA-ICE INFLUENCED PELAGIC ECOSYSTEM – MICROBIAL / BIOGEOCHEMICAL COMPONENT

Dr. Hugh Ducklow, Principal Investigator, Columbia University, Lamont Doherty Earth Observatory

Personnel on Station: Marie Zahn, Anna Wright, Emmalina Glinskis

For the first half of the month of November, we enjoyed beautiful icebergs and snow, but unfortunately could not go sampling due to the compacted sea ice around station. We set up our laboratory for the season, and began doing preliminary run-throughs with seawater intake (SWI) samples from the station pumphouse for bacterial leucine incorporation, flow cytometry, DNA, and particulate organic carbon (POC) samples. We also began sampling for dissolved iodine at each depth at Station B for a collaboration with a colleague in the UK who studies the reaction of iodate IO_3-reduction to I, which is related to community production. The Summer 2017-2018 season is the first to have two new Rigid Hull Inflatable Boats (RHIBs) named *Rigil* and *Hadar* to supplement the Zodiacs (Fig. 11). We were fortunate to be on the first true science deployment of *Rigil* on November 16th, and since then, *Rigil* has been operating smoothly. After three rounds of SWI sampling, we had our first on-water sampling day on November 14th. For the next two weeks (4 rounds of sampling), we analyzed SWI samples from the pumphouse in conjunction with the depth profiles at both stations (Fig. 12) as a parallel comparison for surface sampling. Going forward, we will only use Station B and E vertical profiles. If inclement weather prevents us from getting out on the water, we will use SWI samples on that day.

Fig. 11 – Deploying the AC-9 for the C-019 (Schofield) team, using the winch in a similar manner to how we would deploy our beloved CTD. (Image Credit: Keri Nelson)

In our lab, our main protocols consist of 3H-leucine incubations, flow cytometry for bacterial abundance, POC and particulate nitrogen, and community nucleic acids. 3H-leucine incorporation is used as a proxy for heterotrophic bacterial growth rates. The flow cytometer is surprisingly running without any major issues, and counts are steady. No major maintenance fixes have been necessary. On November 18th, our last instrument arrived: the equilibrator inlet mass spectrometer (EIMS). The EIMS measures the oxygen to argon ratio continuously from seawater intake from the pumphouse as a proxy for net community productivity. The instrument is calibrated with the surrounding air so a higher O_2/Ar ratio indicates productivity and autotrophy while a low O_2/Ar ratio is evidence of respiration and heterotrophy. Despite some pesky bubbles, the EIMS is set up and running without issues. Samples are normalized to argon to isolate the biological and physical sources of oxygen variability.

Fig. 12 – The three Ducklow grantees, Emmalina Glinskis, Anna Wright, and Marie Zahn, working with the CTD on RHIB *Rigil* (Image Credit: Keri Nelson).

A fancy closeup of our beloved CTD. *Image Credit: Shaun O'Boyle*

PALMER STATION
RESEARCH ASSOCIATE MONTHLY REPORT
November 2017
Marissa Goeke

G-090-P: GLOBAL SEISMOGRAPH NETWORK (GSN) SITE AT PALMER STATION

Kent Anderson, Principal Investigator, Incorporated Research Institutions for Seismology (IRIS)

Station PMSA is one of more than 150+ sites in the GSN, monitoring seismic waves produced by events worldwide. Real-time telemetry data is sent to the U.S. Geological Survey (USGS). The Research Associate operates and maintains on-site equipment for the project.

The system operated normally throughout the month.

A-111-P: THE NEXT GENERATION OF GEOSPACE RESEARCH FACILITIES AT PALMER STATION

Andrew Gerrard, Principal Investigator, New Jersey Institute of Technology

The ionosphere-thermosphere-magnetosphere (ITM) region of Earth's atmosphere, which is part of the larger geospace environment, is the portal through which the solar wind can enter and impact our planetary system. Though space weather research over the past decades has greatly increased our understanding of a wide variety of phenomena associated with ITM physics, the sum of these individual processes occurring in the geospace environment does not replicate the rich diversity and scope of this complex region. Thus, a more holistic approach to ITM research is necessary, one that integrates clustered instrumentation at multiple locations to simultaneously look at the interactions within the entire system. Using coordinated and collaborative instrumentation currently installed in Antarctica, researchers will study interrelated ITM phenomena observed at high latitudes. The goal of this research effort is a better understanding of the energy transfer and modulation of the geospace system.

The system operated normally throughout the month.

A-119-P: CONTINENTAL-SCALE STUDIES OF MESOSPHERIC DYNAMICS USING THE ANTARCTIC GRAVITY WAVE INSTRUMENT NETWORK (ANGWIN)

Michael Taylor, Principal Investigator, Utah State University

The Antarctic Gravity Wave Imaging Network (ANGWIN) is a cooperative effort of six international Antarctic programs to collect continent-wide gravity wave measurements. This network capitalizes on existing optical and radar measurement capabilities at McMurdo, Palmer, South Pole, and six other research stations: Halley (UK), Syowa (Japan), Davis (Australia), Rothera (UK), and Ferraz (Brazil). Infrared (IR) all-sky mesospheric OH (hydroxyl) imagers are installed at Davis, McMurdo, and Halley stations. The network quantifies the properties, variability, and momentum fluxes of short-period (less than one hour) mesospheric gravity waves and their dominant sources and effects over the Antarctic continent. An all-sky near-IR imager is also installed at Palmer Station to augment the existing instrumentation and create a capability for studying gravity wave properties at each site.

The IR camera has been shut down for the summer season. A hard drive containing the past years' data was shipped to the PI.

A-373-P: TROPOSPHERE-IONOSPHERE COUPLING VIA ATMOSPHERIC GRAVITY WAVES
Vadym Paznukhov, Principal Investigator, Boston College

The goal of this project is to enhance the comprehensive research understanding of troposphere-ionosphere coupling via Atmospheric Gravity Waves (AGWs) in the Antarctic region. Both experimental and modeling efforts will be used on the Antarctic Peninsula to investigate the efficiency and main characteristics of such coupling and will address several questions remaining in the current understanding of this coupling process.

The system operated well throughout the month.

O-202-P: ANTARCTIC METEOROLOGICAL RESEARCH CENTER (AMRC) SATELLITE DATA INGESTOR
Mathew Lazzara, Principal Investigator, University of Wisconsin

The AMRC computer processes satellite telemetry received by the Palmer Station TeraScan system, extracting Automated Weather Station information and low-resolution infrared imagery and sending the results to AMRC headquarters in Madison, WI. The Research Associate operates and maintains on-site equipment for the project.

The data ingestor computer system operated normally until Nov 22, 2017 when the TeraScan system was upgraded and the two systems became incompatible. The AMRC data ingestor will remain down until further notice.

O-264-P: A STUDY OF ATMOSPHERIC OXYGEN VARIABILITY IN RELATION TO ANNUAL DECADAL VARIATIONS IN TERRESTRIAL AND MARINE ECOSYSTEMS
Ralph Keeling, Principal Investigator, Scripps Institution of Oceanography

The goal of this project is to resolve seasonal and interannual variations in atmospheric O_2 (detected through changes in O_2/N_2 ratio), which can help to determine rates of marine biological productivity and ocean mixing as well as terrestrial and oceanic distribution of the global anthropogenic CO_2 sink. The program involves air sampling at a network of sites in both the Northern and Southern Hemispheres. The Research Associate collects samples fortnightly from Terra Lab.

Air samples were taken twice this month.

O-264-P: COLLECTION OF ATMOSPHERIC AIR FOR THE NOAA/GMD WORLDWIDE FLASK SAMPLING NETWORK
Don Neff and Steve Montzka, Principal Investigators, National Oceanic and Atmospheric Administration / Global Monitoring Division; Boulder, CO

The NOAA ESRL Carbon Cycle Greenhouse Gases (CCGG) group makes ongoing discrete measurements to document the spatial and temporal distributions of carbon-cycle gases and provide essential constraints to our understanding of the global carbon cycle. The Halocarbons and other Atmospheric Trace Species (HATS) group quantifies the distributions and magnitudes of the sources and sinks for atmospheric nitrous oxide (N2O) and halogen containing compounds. The Research Associate collects weekly air samples for the CCGG group and fortnightly samples for the HATS group.

CCGG samples were taken once a week in favorable winds and HATS Air samples were taken every other week.

Jack Conroy of the C-020-P (Steinberg) group transfer Antarctic krill caught in a net tow between buckets. *Image Credit: Randy Jones*

O-264-P: ULTRAVIOLET (UV) SPECTRAL IRRADIANCE MONITORING NETWORK
James Butler, Principal Investigator, National Oceanic and Atmospheric Administration / Global Monitoring Division; Boulder, CO

A Biospherical Instruments (BSI) SUV-100 UV spectroradiometer produces full sky irradiance spectra ranging from the atmospheric UV cutoff near 290nm up to 605nm, four times per hour. A BSI GUV-511 filter radiometer, an Eppley PSP Pyranometer, and an Eppley TUVR radiometer also continuously measure hemispheric solar flux within various spectral ranges. The Research Associate operates and maintains on-site equipment for the project.

The system operated normally throughout the month. Bi-weekly calibrations were completed as necessary.

T-295-P: GPS CONTINUOUSLY OPERATING REFERENCE STATION
Joe Pettit, Principal Investigator, UNAVCO

Continuous 15-second epoch interval GPS data files are collected at station PALM, compressed, and transmitted to the NASA-JPL in Pasadena, CA. The Research Associate operates and maintains on-site equipment for the project.

The system operated normally throughout the month.

T-312-P: TERASCAN SATELLITE IMAGING SYSTEM

The TeraScan system collects, processes, and archives DMSP and NOAA satellite telemetry, capturing approximately 25-30 passes per day. The Research Associate operates and maintains on-site equipment for the project. The TeraScan weather and ice imagery is used for both research and station operations.

The Tera Scan system was upgraded successfully Nov 20-24, 2017 during an onsite visit from Kevin Bliss. The system has operated normally since the upgrade.

T-998-P: INTERNATIONAL MONITORING STATION (IMS) FOR THE COMPREHENSIVE NUCLEAR TEST BAN TREATY ORGANIZATION (CTBTO)
Managed by General Dynamics

The IMS Radionuclide Aerosol Sampler and Analyzer (RASA) is part of the CTBTO verification regime. The automated RASA continually filters ambient air and tests for particulates with radioisotope signatures indicative of a nuclear weapons test. The Research Associate operates and maintains the instrument.

The system operated normally throughout the month.

OCEANOGRAPHY

Daily observations of sea ice extent and growth stage are also recorded, along with continuous tidal height, ocean temperature, and conductivity at Palmer's pier.

Observations of sea ice around station were made daily and the tidegauge worked well throughout the month.

METEOROLOGY

The Research Associate acts as chief weather observer, and compiles and distributes meteorological data. Weather data collected using the automated electronic system is archived locally and forwarded once per month to the University of Wisconsin for archiving and further distribution. Synoptic reports are automatically generated every three hours by the Palmer Meteorological Observing System and emailed to the National Weather Service for entry into the Global Telecommunications System.

The local weather station (PAWS) is working well. Both the Joubin site and the Wauwermans site have come back online. The observations are archived on the AMRC website: ftp://amrc.ssec.wisc.edu/pub/palmer/.