

PALMER STATION MONTHLY SCIENCE REPORT

JUNE 2020



After a successful week of turnover, the ARSV *Laurence M. Gould* starts its journey north with the outgoing summer/fall crew onboard. *Image Credit: Hannah James*

NEWS FROM THE LAB

Hannah James, Winter Laboratory Supervisor

June brought not only the official seasonal transition from Fall to Winter, but a welcomed change of staff at Palmer Station. The ARSV *Laurence M. Gould* arrived on station on June 10, bringing with it 15 enthusiastic crew members to replace the outgoing extended summer crew. (The summer electrician elected to stay through the winter, resulting in a station winter population of 16.) Turnover went smoothly, and on June 17 the ship was untied and sailed north to bring folks home. I would like to extend a huge thank you to all the summer crew, with extra gratitude to Randy Jones, Carolyn Lipke, and Marissa Goerke. All the science spaces on station are in excellent shape, and we have them to thank for that.

The calm weather provided excellent opportunities for wildlife viewing throughout the month. Snow petrels, Antarctic terns, and cormorants were frequently seen, while sightings of sheathbills, giant petrels, and gentoo penguins were less common. Weekend visits to Point 8 allowed station members to catch a glimpse of elephant and fur seals, and if a visit is made towards the end of daylight hours dozens of gentoos can be seen coming in after a day out at sea. Leopard seals and crabeaters were occasionally seen hauled out on icebergs.

From the beginning of the month through June 20, the winter solstice, Palmer station lost 45 minutes of daylight. In the eleven days following, we gained just about 15 minutes, but have enjoyed the spectacular long sunrises and sunsets during these short days. With the winter solstice came mid-winter festivities, though it seemed strange to celebrate so soon after our arrival and without the recently-departed outgoing crew. As the winter science support team, we have settled back into our roles and look forward to maintaining the ongoing science at Terra Lab, collecting chlorophyll samples for C-019 (Schofield), and preparing the Bio Lab spaces for the upcoming summer season.

JUNE 2020 WEATHER
Lance Roth, Research Associate

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| Temperature |
| Average: -2.4 °C / 27.6 °F |
| Maximum: 3.5 °C / 38.3 °F on 7 Jun 13:20 |
| Minimum: -7.9 °C / 17.78 °F on 19 Jun 18:05 |
| Air Pressure |
| Average: 989.6 mb |
| Maximum: 1015.3 mb on 30 Jun 23:58 |
| Minimum: 941.2 mb on 4 Jun 04:02 |
| Wind |
| Average: 9.2 knots / 10.5 mph |
| Peak (5 Sec Gust): 55 knots / 64 mph on 5 Jun 02:38 from NE (53 deg) |
| Prevailing Direction for Month: NE |
| Surface |
| Total Rainfall: 17.8 mm / 0.7 in |
| Total Snowfall: 21 cm / 8.2 in |
| Greatest Depth at Snow Stake: 35.8 cm / 14 in |
| WMO Sea Ice Observation: 6-10 Bergs, bergy bits, growlers, brash, grease ice, and ice rind |
| Average Sea Surface Temperature: -1.09 °C / 30 °F |

June was a relatively calm month with an average wind speed of 10.5 mph. The temperature peaked at 38.3° F and averaged 27.6° F. 8.2 inches of snow fell but was interspersed with warmer rain events and freezing fog resulting in rime ice on several occasions. Sea ice was observed in various states of formation on several occasions.

PALMER STATION
RESEARCH ASSOCIATE MONTHLY REPORT
June 2020
Lance Roth

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.

Both the ELF/VLF operated normally throughout the month. A new computer and several hard drives arrived on the turnover vessel.

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 inter-annual variations in atmospheric O₂ (detected through changes in O₂/N₂ 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 CO₂ 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 successfully 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 during favorable conditions and HAT samples were taken twice a month during favorable wind conditions.

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 this month. Bi-weekly absolute scans were completed as scheduled without complications.

R-938-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 system remained in its ~75% operational configuration while Sea Space contacts continue to engineer a solution to the problem. Several requests for technical support were fulfilled to aid in the search for a solution.

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-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. Filters were processed and monthly logs sent as needed.

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.

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) operated normally throughout the month. Clear days have allowed the remote weather stations to wake up occasionally.

Observations are archived on the AMRC website: <ftp://amrc.ssec.wisc.edu/pub/palmer/>.