

# PALMER STATION MONTHLY SCIENCE REPORT

**JULY 2020**



**A colony of Gentoo penguins can be enjoyed by those who make the trek over the glacier to Point 8 during weekend or evening hours.**

*Image Credit: Mike Rice*

## **NEWS FROM THE LAB**

Hannah James, Winter Laboratory Supervisor

The first full month of winter was a bit quieter than in years past, but there is always science being supported by our Research Associate in Terra Lab. Due to the reduced number of ships scheduled to arrive in the upcoming summer season, a lot of focus in Bio Lab was put into preparations for the Long Term Ecological Research group that is scheduled to deploy this summer. Supplies were pulled off of shelves and placed into lab spaces, and anything that was not available on station was ordered.

Though temperatures dropped slightly from the previous month, the winds remained fairly calm for most of the month providing plenty of opportunity to enjoy our beautiful scenery here at Palmer Station. Wildlife sightings remained the same as the previous month: Antarctic terns, cormorants, giant petrels, and snow petrels were all seen throughout the month. A colony of over 100 Gentoo penguins remain at the Point 8 shoreline, and can be seen by a late afternoon/early evening hiker or skier. Elephant seals and fur seals have remained in their usual land-based locations, while leopard seal sightings were rare.

## **JULY 2020 WEATHER**

Lance Roth, Research Associate

<b>Temperature</b>
<b>Average:</b> -5°C / 23°F
<b>Maximum:</b> 4.3°C / 39.74°F on 9 Jul 12:51
<b>Minimum:</b> -12.9°C / 8.78°F on 29 Jul 04:10
<b>Air Pressure</b>
<b>Average:</b> 998 mb
<b>Maximum:</b> 1015.9 mb on 6 Jul 05:55

<b>Minimum:</b> 959.9 mb on 23 Jul 23:32
<b>Wind</b>
<b>Average:</b> 7.9 knots / 9.1 mph
<b>Peak (5 Sec Gust):</b> 56 knots / 65 mph on 27 Jul 13:41 from SW (227 deg.)
<b>Prevailing Direction for Month:</b> SW
<b>Surface</b>
<b>Total Rainfall:</b> 10.4 mm / 0.41 in
<b>Total Snowfall:</b> 36 cm / 14 in
<b>Greatest Depth at Snow Stake:</b> 61.4 cm / 23.9 in
<b>WMO Sea Ice Observation:</b> 6-10 Bergs, bergy bits, growlers, brash, grease ice, and ice rind
<b>Average Sea Surface Temperature:</b> -1.36°C / 29.6°F

July was a warm and snowy month. Temperatures averaged 23°F with a high of almost 40°F on the 9th. Our average wind speed was just over 9 mph with gusts over 60 mph on the 27th. The warm temperatures and mild winds brought us 14 inches of snow this month, raising our total snow accumulation to 24 inches. Some grease ice was present, but most of the ice was of land origin in the form of bergs, growlers, and brash ice.

**PALMER STATION  
RESEARCH ASSOCIATE MONTHLY REPORT  
July 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 consistently 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 consistently throughout the month. A new computer was installed with Windows 10, thus allowing it to be back on the network and fully operational.

**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 O<sub>2</sub> (detected through changes in O<sub>2</sub>/N<sub>2</sub> 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<sub>2</sub> 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 (N<sub>2</sub>O) 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 wind conditions and HAT samples were taken twice this month while wind conditions allowed.

**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 consistently 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 is operational. Technical support was fulfilled to aid in the mirroring of the old and new computer systems.

#### **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 consistently throughout the month. A RTK survey of the future sewage system was done for the new pier project.

#### **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 consistently this month. Six new filter rolls were installed in the RASA rack. Daily filters were processed and the monthly log was 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. A proposal has been initiated for the installation of the Tide Gauge on the new pier.

#### **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) was interrupted by the occasional rime ice on the tower throughout the month. Clear days have allowed the remote weather stations to wake up intermittently. Observations are archived on the AMRC website:

<ftp://amrc.ssec.wisc.edu/pub/palmer/>.