

## Cover

Palmer Station graces the cover of this year's *Science Planning Summary*. March 2018 marked the fiftieth anniversary of this USAP station located on Anvers Island in the Antarctic Peninsula region. Shaun O'Boyle, an Antarctic Artists and Writers participant to both McMurdo Station (2015-16) and Palmer Station (2017-18), took the photo in October 2017.

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**2018 - 2019**

## **Science Planning Summary**

### **United States Antarctic Program**



This Science Planning Summary is also available online via the USAP web site at [www.usap.gov/sps](http://www.usap.gov/sps) or by scanning the QR code below with a smart phone or other mobile device.



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## Planning and On-Ice Support Points of Contact

Each project has both a planner and implementer point of contact (POC). Some projects may also have a project manager. POCs are listed on the bottom right of project pages (see below).

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### Program Director

### ASC Points of Contact

Dr. Program Director      Joe Planner / Jane Implementer / Jack Project Manager

The planner is the point of contact during the proposal and early planning phases of a project; six planners are based in Alexandria, Virginia and one in Centennial, Colorado. A project's implementer becomes the point of contact when the support information package (SIP) is submitted and detailed planning and resource allocation begins. The implementer develops and distributes the research support plan (RSP) and will deploy to Antarctica. Each planner and implementer is responsible for a portfolio of projects as well as other duties.

The first name will always be the planner; In some cases where projects are supported from more than one station, there may be two or more implementers. The order of the implementers' names will correspond with the order of the location designation included in the science event number. (For more information on the science event numbering system, please turn to page iii.)

Finally, a project manager is assigned when the scope of the science proposal is unusually complex and/or requires greater oversight and budgetary responsibilities. The project manager may be assigned either during the proposal review or planning phase, depending on the project's needs and complexity.

## Science Event Numbering System

Every funded science project is assigned a unique science event number, e.g., A-000-S.

The first letter, or prefix, indicates the USAP program funding the project.

Prefix	USAP Program
A	Astrophysics and Geospace Sciences
B	Organisms and Ecosystems
C	Integrated System Science
D	Instrumentation and Technology Development
G	Earth Sciences
I	Glaciology
O	Ocean and Atmospheric Sciences
T	Technical Events
W	Artists and Writers Events
X	Other Science Events
Y	Education and Outreach Events

The three digits in the middle are issued consecutively as needed.

The suffix represents the supporting station. If field work will occur at multiple locations, event numbers may have more than one suffix separated by a slash.

Suffix	Supporting Station
E	Special projects supported by the USAP, e.g., investigators working with other national programs
L	ARSV* <i>Laurence M. Gould</i>
M	McMurdo Station
N	RV/IB** <i>Nathaniel B. Palmer</i>
P	Palmer Station
S	South Pole Station
*ARSV: Antarctic Research and Supply Vessel **RV/IB: Research Vessel/Icebreaker	

## Station and Vessel Schedules

Below are the 2018-19 USAP station and vessel schedules. Opening and closing dates are subject to change depending on weather, ice conditions, aircraft availability, and other factors.

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Austral Summer Season Openings			Austral Winter Season Opening
Station	Operational	Science	
McMurdo (early season)	22 Aug 2018	23 Aug 2018	24 Feb 2019
McMurdo (Mainbody)	01 Oct 2018	14 Oct 2018	
South Pole	01 Nov 2018	06 Nov 2018	15 Feb 2019
Palmer	06 Oct 2018	06 Oct 2018	05 Apr 2019
Research Vessels	Year-round operations; Vessel schedules are available at <a href="http://www.usap.gov/vesselScienceAndOperations">www.usap.gov/vesselScienceAndOperations</a>		

Estimated Population		
Location	Summer	Winter
McMurdo	850 (weekly average) 2,300 (total)	180 (winter total)
South Pole	150 (weekly average) 450 (total)	42 (winter total)
Palmer	36-44 (weekly average) 196 (total)	
RV/IB <i>Nathaniel B. Palmer</i>	39 science and staff/25 crew (per cruise)	
ARSV <i>Laurence M. Gould</i>	Capacity per cruise: 27 science and staff Capacity per transit to/from Palmer Station: 37 science and staff with two berthing vans	

## Staffed Field Camps

In 2018-19, five field camps will have resident staff providing logistics and operations support to McMurdo-based researchers.

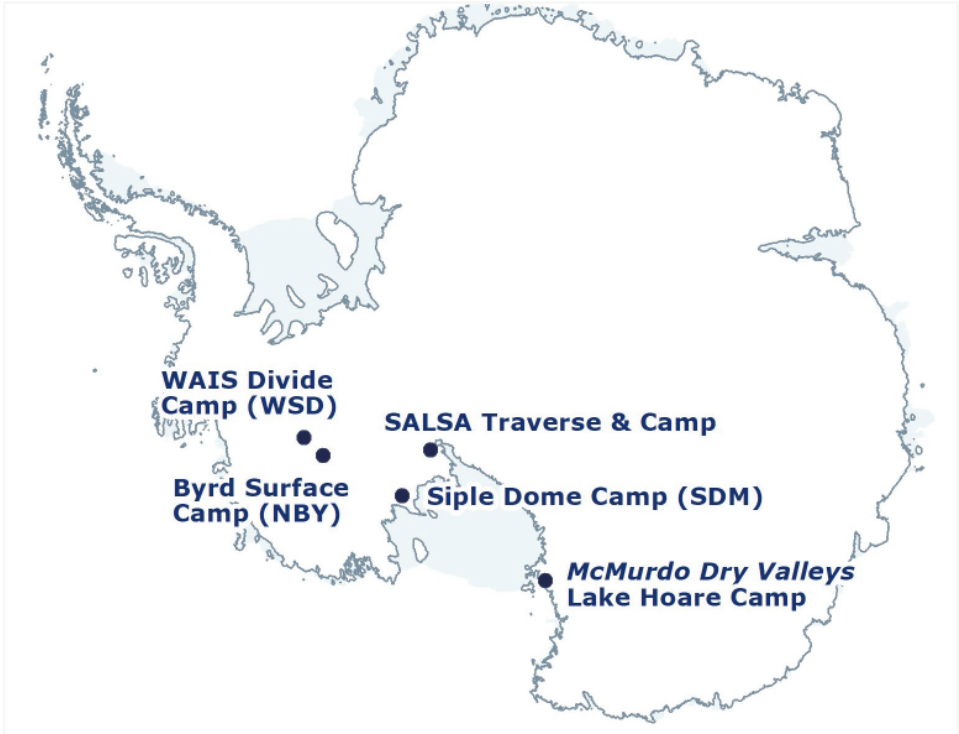


Figure 1. Map of 2018-19 USAP field-camp locations

### **Byrd Surface Camp (NBY), 80° 1.094' S, 119° 35.184' W 900 nautical miles from McMurdo Station**

Byrd Surface Camp serves as a fueling point for aircraft operating between McMurdo Station and West Antarctica. A staff of three will provide daily weather observations, maintain the camp, and receive bulk fuel for out-year operations in support of the Thwaites Glacier campaign. Byrd camp will also have the ability to house and feed KBA Twin-Otter crews as needed.

### **Dry Valleys: Taylor Valley Camps, 77° 37.38' S, 162° 53.99' E (Lake Hoare Camp) 50 nautical miles from McMurdo Station**

Each year, McMurdo Long-Term Ecological Research (LTER) grantees and other science teams conduct research in the Dry Valleys while based at the semi-permanent facilities in Taylor Valley. All the facilities are supported by helicopter operations based at McMurdo Station. This year, two resident staff based at Lake Hoare will oversee operations at Lake Hoare, Lake Fryxell, F6, and Lake Bonney



## *Staffed Field Camps*

camps, as well as a small temporary camp at Lake Miers (located farther south in the Dry Valleys). The facility at New Harbor will not be open in 2018-19.

Science teams based out of Dry Valleys camps this season include B-320-M (Schmidt), B-235-M (Salvatore), and a component of C-516-M (Tulaczyk), along with the seven McMurdo LTER teams. T-295-M (Pettit-UNAVCO (University NAVSTAR Consortium)) will provide one to two participants to support McMurdo LTER. An Artists and Writers grantee, W-220-M (Waldman), will stay for a short period at Lake Hoare and possibly one other Taylor Valley camp. In addition, Antarctica New Zealand (ANZ) researchers K080 (Hawes) will join McMurdo LTER for a short period at Lake Bonney. Also, two other ANZ teams, K240 (Morton) and K042 (Stern) have requested stays at two Taylor Valley camps.

### **SALSA Traverse & Camp, 84° 38.415' S, 149° 30.193' W (Subglacial Lake Mercer) 535 nautical miles from McMurdo Station**

The Subglacial Antarctic Lakes Scientific Access (SALSA) camp is a traverse-supported science-drilling site that will act as a field camp for the 2018-19 field season. The camp will support all SALSA science events including: C-533-M (Priscu), C-534-M (Priscu), I-353-M (Fricker) and T-524-M (McManis). The site will support both LC-130 and Twin Otter/Basler aviation operations. All materials on site will be relocated to McMurdo Station or staged at Camp 20 for out-year retrograde movement.

### **Siple Dome (SDM), 81° 39.840' S, 149° 1.050' W 507 nautical miles from McMurdo Station**

This camp serves as a fueling point for aircraft operating between McMurdo Station and West Antarctica or South Pole. Two resident staff will provide daily weather observations and maintain the camp. Siple Dome will also house and feed Kenn Borek Air (KBA) Twin Otter crews as needed. This season, a McMurdo Station construction team will deploy to Siple Dome to relocate the Rac-Tent and freezer cave. While en route, an ANZ tractor traverse (K408-A) will briefly assist in the construction effort, supplying tractor support. Currently, there are no USAP science events scheduled to use Siple Dome.

### **WAIS Divide Field Camp (WSD), 79° 29.000' S, 112° 5.000' W 891 nautical miles from McMurdo Station**

The West Antarctic Ice Sheet (WAIS) Divide field camp with ten resident staff will act as a regional aviation hub for West Antarctica. The camp will support five science projects: C-444-M, (Holland-MELT), C-446-M (Tulaczyk-TIME), G-065-M (Mitrovica) G-079-M (Wilson-POLINET), O-283-M (Lazarra-AWS) and their Twin-Otter missions from the site. Camp staff will also assist in retrograde movement of field gear to McMurdo Station that had been cached by T-150-M (IDPO).

# Air Operations

McMurdo-based aircraft, including helicopters, fixed-wing aircraft, and unmanned aircraft systems (UAS) will continue to support USAP researchers and program logistical functions.

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## Helicopter Support

**PHI, Inc.** will provide helicopter support with four available aircraft (two AS-350-B2 "A-Stars" and two Bell 212s, plus a spare 212) based out of McMurdo Station. The helicopters will support research in and around McMurdo Sound, the McMurdo Dry Valleys, Royal Society Range, and Ross Island. In order to receive extensive maintenance during the off-season, both A-Stars and one 212 will sail north on the supply vessel in late January, and the two remaining 212s will fly north on a C-17 in late February.

In addition, Antarctica New Zealand (ANZ) will be providing a B3 A-Star (operated by **Southern Lakes Helicopters**) from about mid-October 2018 through mid-February 2019. ANZ and the USAP may collaborate on their helicopter tasking, if necessary and supportable.

~[www.phihelico.com](http://www.phihelico.com)

~[www.southernlakeshelicopters.co.nz](http://www.southernlakeshelicopters.co.nz)

## Fixed Wing Aircraft

The **New York Air National Guard (ANG) 109 AW** LC-130 Hercules will provide research and operational support to South Pole Station and deep-field locations including West Antarctic Ice Sheet (WAIS) Divide, Byrd Camp, Siple Dome, AGAP South, Camp 20, and Subglacial Lake Mercer.

~[www.109aw.ang.af.mil](http://www.109aw.ang.af.mil)

**Kenn Borek Air** will provide three DHC6 Twin Otter and one DC3 Basler aircraft to support a number of projects throughout the USAP area of operations. They will be based at South Pole and WAIS for much of the season.

In addition, ANZ will be operating a Twin Otter for a period of time during the 2017-18 season. The ANZ Twin Otter will support USAP missions for about one month.

~[www.borekair.com](http://www.borekair.com)

## Unmanned Aircraft Systems

A number of USAP and ANZ projects will operate fixed-wing and rotary-wing unmanned aerial vehicles (UAV) in the Ross Island vicinity and deep-field locations.

# Antarctic Astrophysics and Geospace Sciences

NSF/OPP Program Director: Dr. Vladimir Papitashvili

(Presented in order of science event number)

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A-100-M/S	Chartier, Alex	A-147-M	Devlin, Mark
A-106-M/S	Clauer, C. Robert	A-149-S	Kovac, John
A-107-S	Karle, Albrecht	A-284-M	Palo, Scott
A-111-M/P/S	Gerrard, Andrew	A-333-S	Halzen, Francis
A-112-M/S	Gerrard, Andrew	A-340-S	Vieregg, Abigail
A-115-M	Krawczynski, Henric	A-343-M/S	Conde, Mark
A-118-S	Evenson, Paul	A-364-M/S	Kulesa, Craig
A-119-M/P/S	Taylor, Michael	A-368-S	Nayak, Michael
A-123-M	Chu, Xinzhao	A-369-M/S	Bristow, William
A-127-M/S	Barwick, Steven	A-373-P	Pazhukhov, Vadym
A-128-S	LaBelle, James	A-378-M	Meshik, Alexander
A-130-M	Chu, Xinzhao	A-379-S	Carlstrom, John
A-142-M	Binns, Walter	A-382-P	Fritts, David
A-145-M	Franco, Hugo	A-454-M	Smith, David

*For more information, and for a complete list of deploying participants, go to  
[www.usap.gov/sps](http://www.usap.gov/sps)*

## **Oblique sounding of ionized patches in the Antarctic ionosphere - instrument development and testing**

**A-100-M/S**

**NSF/OPP Award 1643773**

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### **Research Locations**

T-Site / Dark Sector

### **Supporting Station/Vessel**

McMurdo Station, South Pole  
Station

### **Dates in Antarctica**

Instruments operate year  
around.

## **Project Description**

Ionospheric regions/structures associated with ionized patches are known to disrupt radio signals at high latitudes, which can impact search-and-rescue operations and other radio communications. Recent statistical studies showed a strong annual trend for ionized patches at about 300-km altitude, which appears to peak in the same months in the Arctic and Antarctic. This contrasts with established theories that predict seasonal trends, with patch occurrence peaks during each hemisphere's winter. Researchers on this project hope to confirm the Antarctic patch occurrence rates using independent sounding observations, along with observations of the ionospheric electric field behavior from existing ionospheric radars.

## **Field Overview**

The ionosonde's transmitter will be installed on Observation Hill at McMurdo Station and will send radio pulses toward South Pole, where the receiver will collect data from this oblique sounding of ionized patches, following their formation, propagation, and dynamics. The 12-month-long period of testing this instrument in Antarctica will also allow scientists to collect enough experimental data to potentially deploy an array of transmitters at remote Antarctic locations, while the oblique sounding signals will be received and processed at the ionosonde's hub receiver at South Pole.

## **Program Director**

Dr. Vladimir Papitashvili   John Rand / Elizabeth Kauffman / Timothy Ager / Neal Scheibe

## **ASC Points of Contact**

## Antarctic Organisms and Ecosystems

NSF/OPP Program Director: Dr. Christian Fritsen

(Presented in order of science event number)

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B-006-L	Watters, George	B-211-M	Catchen, Julian
B-009-M	Rotella, Jay	B-229-E	Sirovic, Ana
B-025-E	Polito, Michael	B-232-L	Costa, Daniel
B-030-M	Liwanag, Heather	B-234-P	Young, Jodi
B-031-M	Ainley, David	B-235-M	Salvatore, Mark
B-032-L	Van Mooy, Benjamin	B-236-L	Amsler, Charles
B-041-M	Schmidt, Britney	B-243-M	LaRue, Michelle
B-086-P	van Gestel, Natasja	B-258-L	Tarrant, Ann
B-195-M	Cziko, Paul	B-303-L	Sanders, Robert
B-199-M	Place, Sean	B-320-M	Schmidt, Steven
B-206-L	Friedlaender, Ari	B-459-L/P	Bernard, Kim
B-207-M	Todgham, Anne	B-461-L	Cassar, Nicolas

*For more information, and for a complete list of deploying participants, go to  
[www.usap.gov/sps](http://www.usap.gov/sps)*

## NOAA / AMLR

B-006-L

### NSF / NOAA / AMLR Agreement

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### Research Locations

PAL-LTER Grid

### Supporting Station/Vessel

ARSV *Laurence M. Gould*

### Dates in Antarctica

November and February

## Project Description

National Oceanic and Atmospheric Administration (NOAA) Fisheries' Antarctic Marine Living Resources (AMLR) program supports the development of US policy regarding the conservation and management of marine living resources in the Southern Ocean. For the past 25 years, the AMLR field program has been conducted in the vicinity of Elephant Island, the South Shetland Islands, and the Antarctic Peninsula during the austral summer. This austral summer, researchers will participate on two cruises aboard the ARSV *Laurence M. Gould* (LMG) to continue testing newly developed US AMLR sampling techniques using autonomous technology. The broad-scale survey will be augmented to better understand the small-scale patterns of krill distribution in relation to circulation and to understand habitat use in enclosed bays.

## Field Overview

The team will deploy six subsurface moorings and two Slocum gliders from the LMG in December 2018 and will recover them in March 2019. Deployment and recovery operations will coincide with Cape Shirreff field camp opening and closing cruises. Two team members will sail on the deployment cruise and two on the recovery cruise. The Cape Shirreff field camp team will be available to assist as needed.

## Program Director

Mr. Tim McGovern

## ASC Points of Contact

David Rivera / Cara Ferrier

## Antarctic Integrated System Science

NSF/OPP Program Director: Dr. Jennifer Burns

(Presented in order of science event number)

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C-013-L/P	Fraser, William	C-504-M	Gooseff, Michael
C-019-L/P	Schofield, Oscar	C-505-M	Priscu, John
C-020-L/P	Steinberg, Deborah	C-506-M	Gooseff, Michael
C-021-L	Martinson, Doug	C-507-M	Adams, Byron
C-024-L/P	Friedlaender, Ari	C-508-M	Takacs-Vesbach, Cristina
C-045-L/P	Ducklow, Hugh	C-509-M	Gooseff, Michael
C-443-N	Goehring, B.; Johnson, J.	C-511-M	Doran, Peter
C-444-M	Holland, D.; Nicholls, K.	C-516-M	Tulaczyk, Slawek
C-445-N	Pettit, Erin; Heywood, K.	C-533-M	Priscu, John
C-446-M	Tulaczyk, S.; Christoffersen, P.	C-534-M	Priscu, John
C-447-N	Wellner, J.; Larter, R.		

*For more information, and for a complete list of deploying participants, go to  
[www.usap.gov/sps](http://www.usap.gov/sps)*

## Palmer LTER: Land-shelf-ocean connectivity, ecosystem resilience and transformation in a sea-ice influenced pelagic ecosystem

C-013-L/P

NSF/OPP Award 1440435

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### Research Locations

LTER study site / Islands in the Palmer Station extended boating area

### Supporting Station/Vessel

ARSV *Laurence M. Gould*,  
Palmer Station

### Dates in Antarctica

Early November to early April

## Project Description

Palmer Long-Term Ecological Research (PAL-LTER) started in 1990 to address the hypothesis that the annual sea ice cycle may be the major determinant of spatial/temporal changes in the structure and function of Antarctic marine communities. Research now includes bacteria, viruses, phytoplankton, krill, macrozooplankton, penguins, seabirds, and marine mammals. The PAL-LTER model traces the effects of changing climate, and the extent, duration, and seasonality of sea ice on ecosystem composition and dynamics in the Western Antarctic Peninsula (WAP), where satellite observations over the past 35 years indicate the average duration of sea ice cover is now about 90 days shorter. Six collaborative projects deploy on January's ARSV *Laurence M. Gould* (LMG) cruise and/or to Palmer Station. Team members use airborne and underwater vehicles, moorings, numerical modeling, oceanographic cruises, and environmental sampling to address core hypotheses.

## Field Overview

### Penguins and other Seabirds

One component of the C-013-L/P project will sail on the LMG. The vessel will transport the team to Avian Island where they will establish a field camp and conduct research on penguins and other seabirds for five days. The second component of the project will be based at Palmer Station from late October to early April. The team will use small boats to access local islands in the station vicinity and will make some day trips to bird colonies in the extended boating area including Dream Island, Biscoe Point, the Joubin Islands, Cape Monaco, the Wauwermans Islands and the Rosenthal Islands.

## Program Director

Dr. Jennifer Burns

## ASC Points of Contact

Samina Ouda / Jamee Johnson / Bruce Felix



## Antarctic Earth Sciences

NSF/OPP Program Director: Dr. Douglas Kowalewski

(Presented in order of science event number)

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G-055-M	Lamp, Jennifer	G-079-M	Wilson, Terry
G-058-M	Harvey, Ralph	G-090-P/S	Anderson, Kent
G-065-M	Mitrovica, Jerry	G-094-P	Yu, ZiCheng
G-066-M	Phillips, Fred	G-116-N	Koppers, Antonius
G-071-M	Shubin, Neil	G-412-L	Simms, Alexander
G-078-M	Kemerait, Robert	G-437-E	Wilcock, William

*For more information, and for a complete list of deploying participants, go to  
[www.usap.gov/sps](http://www.usap.gov/sps)*

## **Landscape evolution in the McMurdo Dry Valleys: Erosion rates and real-time monitoring of rock breakdown in a hyper-arid, sub-zero environment**



**G-055-M**

**NSF/OPP Award 1744895**

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**Research Locations**

Beacon Valley

**Supporting Station/Vessel**

McMurdo Station

**Dates in Antarctica**

Late November to early  
February

### **Project Description**

Moisture plays a part in the erosion of rocks, but in the ice-free Dry Valleys region of Antarctica – one of the driest places on the planet – little is known about the rates and causes of rock erosion. To better understand them, researchers will instrument boulders with sensors that act as miniature seismographs, recording even the smallest microcracking on and within the rocks. They will also monitor the weather and environment around the rocks to record the conditions that trigger cracking events and will collect a variety of rock samples to study how quickly rocks break down and how their characteristics change over geologic time. The combined datasets will allow future scientists to more accurately understand the paleoclimates and landscapes of Antarctica, and possibly even Mars.

### **Field Overview**

A research team of three participants will travel by helicopter from McMurdo Station to a field camp in the Beacon Valley. Near the campsite, they will deploy an acoustic emission (AE) monitoring system and will instrument four boulders with AE sensors, micrometeorological sensors (surface temperature, surface moisture), and will construct a full meteorological station (wind speed/direction, air temperature/relative humidity, solar irradiance, and air pressure). A helicopter-supported day trip will drop off the research team near the headwall of Mullins Glacier; they will hike back down to their campsite, collecting rock and sediment samples while hiking, and caching their samples along the way to be retrieved by helicopter later in the season.

**Program Director**

Dr. Michael Jackson

**ASC Points of Contact**

Jenny Cunningham / Bija Sass

# Antarctic Ocean and Atmospheric Sciences

NSF/OPP Program Director: Dr. Peter Milne

(Presented in order of science event number)

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O-124-N	Thompson, Andrew	O-264-P	Butler, James
O-131-N	Dunbar, Robert	O-270-L	Shadwick, Elizabeth
O-214-L	Munro, David	O-283-M/S	Lazzara, Matthew
O-257-M	Butler, James	O-317-L	Chereskin, Teresa
O-257-S	Butler, James	O-399-S	Taylor, Susan
O-260-L	Sprintall, Janet	O-456-M	Seefeldt, Mark

*For more information, and for a complete list of deploying participants, go to [www.usap.gov/sps](http://www.usap.gov/sps)*

## Initiation of the Antarctic slope front in West Antarctica

O-124-N

NSF/OPP Award 1644172

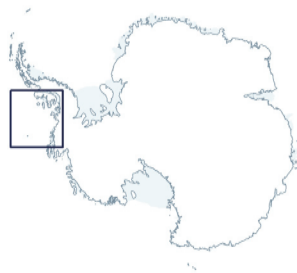
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### Research Locations

Bellingshausen and Amundsen seas

### Supporting Station/Vessel

RV/IB *Nathaniel B. Palmer*

### Dates in Antarctica

Early August to early October

## Project Description

The Antarctic Slope Front (ASF) is a persistent, V-shaped feature of the continental shelf and slope around much of Antarctica. It is a notable yet under-sampled component of Southern Ocean circulation. The ASF is a primary source region for the renewal of Antarctic surface water from below and also bottom water flow into the global deep ocean. There is considerable interest in understanding the exchanges and transformations of ASF ocean heat, gases, salt, nutrients, particulates, and carbon through exchanges with components of the high-latitude ocean, polar atmosphere, sea ice, and land ice. This project will conduct a survey of the frontal circulation along the continental shelf break and the major troughs of the Bellingshausen Sea using both ocean gliders and ship-based instruments.

## Field Overview

The team will sail to the Western Antarctic Peninsula (WAP) where they will deploy three gliders and collect high-resolution conductivity-temperature-depth (CTD) and lowered acoustic Doppler current profiler (ADCP) measurements to map the evolution of the ASF from the base of the WAP, across the Belgica Trough, to the border between the Bellingshausen and Amundsen Seas. The first glider will be deployed east of Latady Trough and fly west. The second glider will be deployed in the western Bellingshausen Sea and will travel east, eventually meeting up with the first glider. The gliders will survey the troughs for three months before transiting to Marguerite Trough for recovery by the British Antarctic Survey from Rothera Station.

## Program Director

Dr. Peter Milne

## ASC Points of Contact

David Rivera / Bruce Felix

## Estimation of Antarctic ice melt using stable isotopic analyses of seawater

O-131-N

NSF/OPP Award 1644118

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### Research Locations

Bellingshausen and Amundsen seas

### Supporting Station/Vessel

RV/IB *Nathaniel B. Palmer*

### Dates in Antarctica

Late July to late September

## Project Description

Current estimations of ice-sheet mass balance in Antarctica and Greenland rely directly on satellite-based observations of the ice-sheet surface, ice margins, and ice shelves. The extent of melting ice sheets as a driver of sea level rise is not yet well understood. This project will use independent tracers of freshwater introduction from the ice sheets to the surrounding ocean to improve the ability to track how fast and where continental ice is melting. Polar ice is greatly depleted in two stable isotopes, O-18 and deuterium, relative to Southern Ocean seawater and precipitation. Using these as tracers of freshwater introduction from the ice sheet, in conjunction with precise observations of seawater temperature and salinity, the inputs of freshwater derived from melting glacial ice can be discriminated from regional precipitation.

## Field Overview

To collect the necessary samples for this work, one scientist on the RV/IB *Nathaniel B. Palmer* will conduct near-real-time isotopic and salinity analyses of conductivity-temperature-depth (CTD) samples. Samples collected near Thwaites Glacier and Pine Island Glacier are of particular interest. For each sample taken for isotopic analyses (O-18 and deuterium), high-quality salinity data must be collected on the same sample. Analyzing samples with a salinometer, especially in highly stratified areas, will be essential for post-processing comparisons with CTD data. The USAP salinometer will be used in conjunction with a Picarro cavity ring down spectroscopy (CRDS) system. The principal investigator may also bring a Guildline Portasal salinometer on the cruise. Samples will also be collected on ships of opportunity with the USAP and other national programs from Italy, South Korea, China, New Zealand, and the United Kingdom.

## Program Director

Dr. Peter Milne

## ASC Points of Contact

David Rivera / Jamee Johnson

## Investigating biogeochemical fluxes and linkages to climate change with multi-scale observations in the Drake Passage

O-214-L

NSF/OPP Award 1543457

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### Research Locations

Drake Passage

### Supporting Station/Vessel

ARSV *Laurence M. Gould*

### Dates in Antarctica

Early August to early October

### Project Description

The Southern Ocean plays a key role in modulating the global carbon cycle, but the size and even the sign of the global ocean flux in terms of the atmospheric burden of man-made carbon dioxide is still uncertain. This is in part because of lack of measurements in this remote region of the world ocean. This project continues a multi-year time series of shipboard chemical measurements in the Drake Passage to detect changes in the ocean carbon cycle and to improve the understanding of mechanisms driving natural variability and long-term change in the Southern Ocean.

### Field Overview

This project supports ongoing surface measurements of the partial pressure of CO<sub>2</sub> (pCO<sub>2</sub>) from aboard the ARSV *Laurence M. Gould*. In addition, discrete measurements will be made from water samples collected underway. One participant may attend a vessel port call and one participant may sail on a cruise to perform maintenance on the system.

### Program Director

Dr. Peter Milne

### ASC Points of Contact

Rachel Shackelford / Bruce Felix

## **UV measurements at McMurdo Station for the NOAA/Global Monitoring Division (GMD) Antarctic UV network**

**O-257-M**

**NSF / NOAA agreement**

**Dr. James Butler, Principal Investigator**

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**Research Locations**

Arrival Heights

**Supporting Station/Vessel**

McMurdo Station

**Dates in Antarctica**

Early January to early February

### **Project Description**

The National Oceanic and Atmospheric Administration (NOAA) Earth System Research Laboratory (ESRL) GMD will continue measurements of ultra-violet (UV) radiation that influences climate and the ozone layer. McMurdo Station work is in conjunction with ongoing worldwide measurements of carbon dioxide, methane, carbon monoxide, aerosols, water vapor, surface and stratospheric ozone, chlorofluorocarbons, and the ozone layer. Measurements will be used for time-series analysis of multi-year data records that focus on stratospheric ozone depletion; trans-Antarctic transport and deposition; interplay of trace-gas aerosols with polar-plateau solar and terrestrial radiation fluxes; the magnitude of seasonal and temporal variations in greenhouse gases; and the development of polar stratospheric clouds over Antarctica.

### **Field Overview**

At McMurdo Station, the research associate (RA) will support the instrument at Arrival Heights with daily checks, routine calibrations, and troubleshooting.

**Program Director**

Dr. Peter Milne

**ASC Points of Contact**

John Rand / Elizabeth Kauffman

## **UV measurements at McMurdo Station for the NOAA/Global Monitoring Division (GMD) Antarctic UV network**

**O-257-S**

### **NSF / NOAA agreement**

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### **Research Locations**

Atmospheric Research  
Observatory (ARO)

### **Supporting Station/Vessel**

South Pole Station

### **Dates in Antarctica**

Early January to early February

## **Project Description**

The National Oceanic and Atmospheric Administration (NOAA) Earth System Research Laboratory (ESRL) GMD will continue long-term measurements of ultra-violet (UV) radiation that influences climate and the ozone layer. The McMurdo Station work is in conjunction with ongoing worldwide measurements of carbon dioxide, methane, carbon monoxide, aerosols, water vapor, surface and stratospheric ozone, chlorofluorocarbons, and the ozone layer. The measurements will be used for time-series analysis of multi-year data focusing on stratospheric ozone depletion; trans-Antarctic transport and deposition; interplay of the trace-gases aerosols with the solar and terrestrial radiation fluxes on the polar plateau; the magnitude of seasonal and temporal variations in greenhouse gases; and the development of polar stratospheric clouds over Antarctica.

## **Field Overview**

At South Pole Station, the Atmospheric Research Observatory (ARO) will be used for the NOAA instrument suite and the management of the Clean Air Sector. Two NOAA personnel will staff the observatory year around. Scientists will deploy for short periods throughout the austral summer performing upgrades and routine maintenance on the instruments at the South Pole and working at the ARO, in addition to the two core staff.

## **Program Director**

Dr. Peter Milne

## **ASC Points of Contact**

John Rand / Timothy Ager / Neal Scheibe



## High-resolution underway air-sea observations in Drake Passage for climate science

O-260-L

NSF/OPP Award 1542902

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### Research Locations

Drake Passage

### Supporting Station/Vessel

ARSV *Laurence M. Gould*

### Dates in Antarctica

Early August to early October

## Project Description

In collaboration with Chereskin (O-317-L), this project continues a long-term study of ocean properties and variability in the Antarctic Circumpolar Current (ACC) by repeat transects across the Drake Passage from Punta Arenas, Chile to Palmer Station. This aspect of the project measures the seasonal to interannual variability of upper-ocean temperature and geostrophic transport through the Drake Passage with closely spaced expendable BathyThermograph (XBT) deployments.

## Field Overview

ARSV *Laurence M. Gould* (LMG) personnel and passenger volunteers will hand-launch about 70 XBTs at predetermined locations on each of six Drake Passage crossings of the LMG. Salinity bottle samples will also be collected at various sites. This bottle data will be used to calibrate the underway thermosalinograph (TSG) data.

## Program Director

Dr. Peter Milne

## ASC Points of Contact

Rachel Shackelford / Bruce Felix