

# Cruise Track from RVIB Nathaniel B. Palmer NBP1005 in the Amundsen Sea, South Pacific Sector of Antarctica, Southern Ocean 73 S 115 W from 2010-2011 (ASPIRE project)

**Website:** <https://www.bco-dmo.org/dataset/3389>

**Version:** 18 November 2014

**Version Date:** 2010-11-18

## Project

» [Amundsen Sea Polynya International Research Expedition](#) (ASPIRE)

Contributors	Affiliation	Role
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## Dataset Description

Cruise track generated from MGDS:Nav files  
Cruise Id, Date/Time UTC, Lat, Lon, SOG, COG  
1 minute fixes

## Methods & Sampling

Processed ship-based Navigation Data (version 1) from the Amundsen Sea, Antarctica acquired during the Nathaniel B. Palmer expedition NBP1005 (2010)

This data set was acquired with a ship-based Navigation system during Nathaniel B. Palmer expedition NBP1005 conducted in 2010 (Chief Scientist: Dr. Patricia Yager)

The original data files are of MGDS:Nav format and include Primary Navigation data and were processed after data collection.

Data were acquired as part of the project(s): ASPIRE (Amundsen Sea Polynya International Research Expedition), and funding was provided by NSF grant(s): ANT08-39069.

Quality 1 - A level of processing has been undertaken, ensuring quality control (e.g. ping edited sonar data, edited navigation data).

## Data Processing Description

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### BCO-DMO Processing Notes

- Generated from MGDS:Nav files downloaded from MGDS data for NBP1005
- Awk routine generated to reformat original files into BCO-DMO servable file format
- Awk routine: "MGDS\_Nav\_2\_CruiseTrack.awk"
- Parameter names generated to conform to BCO-DMO naming convention found at [Choosing Parameter Name](#)
- Date/Time reformatted to ISO DateTime format
- Cruise Id added to data
- SOG and COG values not reported in original files
- SOG and COG (both set to 0.0) added to each data record for compatibility with other BCO-DMO cruise track datasets

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## Data Files

File
<b>CruiseTrack.csv</b> (Comma Separated Values (.csv), 4.35 MB) MD5:c75c40d02a5f39f63a8586cc1892a54e
Primary data file for dataset ID 3389

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## Parameters

Parameter	Description	Units
CruiseId	Official UNOLS cruise id	text
ISO_DateTime_UTC	ISO formatted UTC Date and Time	YYYY-MM-DDTHH:MM:SSZ
Latitude	Latitude Position (South is negative)	decimal degrees
Longitude	Longitude Position (West is negative)	decimal degrees
SOG	Instantaneous Speed-over-ground	meters/sec
COG	Instantaneous Course-over-ground [deg. clockwise from North]	decimal degrees

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## Instruments

<b>Dataset-specific Instrument Name</b>	GPS
<b>Generic Instrument Name</b>	Global Positioning System Receiver
<b>Dataset-specific Description</b>	This data set was acquired with a ship-based Navigation system
<b>Generic Instrument Description</b>	The Global Positioning System (GPS) is a U.S. space-based radionavigation system that provides reliable positioning, navigation, and timing services to civilian users on a continuous worldwide basis. The U.S. Air Force develops, maintains, and operates the space and control segments of the NAVSTAR GPS transmitter system. Ships use a variety of receivers (e.g. Trimble and Ashtech) to interpret the GPS signal and determine accurate latitude and longitude.

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## Deployments

### NBP1005

<b>Website</b>	<a href="https://www.bco-dmo.org/deployment/58154">https://www.bco-dmo.org/deployment/58154</a>
<b>Platform</b>	RVIB Nathaniel B. Palmer
<b>Start Date</b>	2010-11-26
<b>End Date</b>	2011-01-16
<b>Description</b>	Expedition by the USAP RV Nathaniel B. Palmer during austral summer 2010-11 to sampled the Amundsen Sea Polynya during the Amundsen Sea Polynya International Research Expedition (ASPIRE). Also identified as OSO 2010-11 (Oden Southern Ocean - two vessel operation 2010-11) The US Research Icebreaker Nathaniel B. Palmer was joined by the Swedish Icebreaker Oden for a two-vessel expedition to the Amundsen Sea. Scientists on the Palmer focused on understanding the climate-sensitive dynamics of the open water region, known as a "polynya." Oden scientists investigated the sea ice ecosystem nearby. The aim of both groups was to improve our understanding of how climate change will impact this important ecosystem. Note R2R Link takes user to Marine Geoscience Data System (MGDS):NBP1005NBP1005A Data at MGDS were available as NBP1005 and NBP1005A. The data are from the same expedition and are combined in BCO-DMO into the one deployment - NBP1005. Nathaniel B. Palmer Systems and Specifications

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## Project Information

### Amundsen Sea Polynya International Research Expedition (ASPIRE)

**Website:** <http://AntarcticASPIRE.org/>

**Coverage:** Amundsen Sea, South Pacific Sector of Antarctica, Southern Ocean 73 S 115 W

The Amundsen Sea Polynya is areally the most productive Antarctic polynya, exhibits higher chlorophyll levels during peak bloom and greater interannual variability than the better-studied Ross Sea Polynya ecosystem. Polynyas may be the key to understanding the future of polar regions as their extent is expected to increase with anthropogenic warming. The project will examine 1) sources of iron to the Amundsen Sea Polynya as a

function of climate forcing, 2) phytoplankton community structure in relation to iron supply and mixed-layer depths, 3) the efficiency of the biological pump of carbon to depth and 4) the net flux of carbon as a function of climate and micronutrient forcing. The research also will compare results for the Amundsen Sea to existing data synthesis and modeling efforts for the Palmer LTER and Ross Sea. The project will 1) build close scientific collaborations between US and Swedish researchers; 2) investigate climate change implications with broad societal relevance; 3) train new researchers; 4) encourage participation in research science by underrepresented groups, and 5) involve broad dissemination of results via scientific literature and public outreach, including close interactions with NSF-supported PolarTrec and COSEE K-12 teachers.

This project brings together experienced US and Swedish investigators (trace metal and carbon chemists, phytoplankton physiologists, microbial and zooplankton ecologists, and physical oceanographers) to investigate climate controls on carbon dioxide uptake by one of the most productive ecosystems in the Antarctic.

The Amundsen Sea Polynya is the most productive Antarctic polynya per square meter, and exhibits higher chlorophyll levels during peak bloom and greater interannual variability than the better-studied Ross Sea polynya ecosystem to the west.

Polynyas, or recurring areas of seasonally open water surrounded by ice, are foci for energy and material transfer between the atmosphere, polar surface ocean and deep sea. Most help take up large amounts of carbon dioxide from the atmosphere.

These polar ecosystems are characterized by high biological productivity and intense biogeochemical cycling - a bit like an oasis. Polynyas may be the key to understanding the future of polar regions since their extent is expected to increase with anthropogenic warming. On the other hand, if seasonal sea ice disappears completely, the unique nature of polynyas may also be lost.

Regional reductions or growth in sea-ice over the past decade have been extensive and are coupled to climate-sensitive global cycles such as ENSO and the Southern Annular Mode. Without many historical measurements, this regional and interannual variability is our best present-day indication for what controls or “forces” these critical polar ecosystems and their sensitivity to future change.

Variability in the productivity of Antarctic polynyas is high for reasons the science community do not currently understand. The supply of trace metals such as iron is thought to determine phytoplankton community structure and production in the Southern Ocean, particularly in conjunction with mixed-layer depth controls on light limitation. A key question is whether interannual variability is driven by these two climate-sensitive factors, and whether we can expect climate-sensitive shifts in ecosystem function and carbon flux in the future. Understanding critical feedbacks between climate and the marine biosphere becomes increasingly urgent as we project rates of change into the future.

[Special ASPIRE journal feature in ELEMENTA](#)

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## Funding

Funding Source	Award
<a href="#">NSF Antarctic Sciences (NSF ANT)</a>	<a href="#">ANT-0839069</a>

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