

Glider data from the southern Ross Sea collected from the iRobot Seaglider during the RVIB Nathaniel B. Palmer (AUV-SG-503-2012, NBP1210) cruises in 2012 (Penguin Glider project)

Website: <https://www.bco-dmo.org/dataset/568868>

Version: 4

Version Date: 2015-12-09

Project

» [Penguin Foraging Reveals Phytoplankton Spatial Structure in the Ross Sea](#) (Penguin Glider)

Contributors	Affiliation	Role
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Methods & Sampling

Continuous collection of temperature, salinity, oxygen, optical backscatter, and fluorescence data; methods described in details in Kaufman et al. (2014)

Related Reference:

Daniel E. Kaufman, Marjorie A.M. Friedrichs, Walker O. Smith Jr., Bastien Y. Queste, Karen J. Heywood. (2014) Biogeochemical variability in the southern Ross Sea as observed by a glider deployment. Deep Sea Research Part 92:93-106. doi:10.1016/j.dsr.2014.06.011 ([pdf](#))

Data Processing Description

BCO-DMO Processing:

- added conventional header with dataset name, PI name, version date
- renamed parameters to BCO-DMO standard
- replaced NaN's with nd's

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Data Files

File
penguin_glider.csv (Comma Separated Values (.csv), 124.93 MB) MD5:cd1a785f1b6f2bf3405ae44b48a2b085
Primary data file for dataset ID 568868

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Parameters

Parameter	Description	Units
dive	Entire 'V-shaped' glider dives from surface to depth and back	unitless
julian_day_yr0	Matlab serial date number; 0 = 00 Jan 0000 00:00:00	unitless
ISO_DateTime.UTC	Date/Time (UTC) ISO formatted; based on ISO 8601:2004(E)	2009-08-30T14:05:00[.xx]Z (UTC time)
lon	longitude; east is positive	decimal degrees
lat	latitude; north is positive	decimal degrees
depth	Depth from pressure; GSW (Gibbs SeaWater Oceanographic) Toolbox1	meters
temp	Temperature	degrees Celsius
sal	Practical salinity from conductivity; GSW Toolbox1	PSU
sigma_0	Potential density anomaly: potential density minus 1000 kg/m ³ from absolute salinity and potential temperature; GSW Toolbox1	kilograms/meter ³
fluor	Fluorescence counts	counts
chl_raw	Chlorophyll estimated from fluorescence counts using the chlorophyll regression from Kaufman et al. 2014	milligram/meter ³
bbp700	Total volume scattering at 700 nm	/m/square radian
bbp470	Total volume scattering at 470 nm	/m/square radian
POC	Particulate organic carbon estimated from optical backscattering measurements (see Jones MS thesis; College of William and Mary; 2015)	mg C/m ³

O2_cal	Oxygen concentration; corrected for oxygen optode instrument time lag	umol/kg
O2_sat_pcmt	Air saturation; corrected for oxygen optode instrument time lag	percent

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Instruments

Dataset-specific Instrument Name	
Generic Instrument Name	Seaglider
Dataset-specific Description	Southern Ross Sea, bounded by -77.438 and 167.73E, and extending to 76.771 and 171.98E; the glider made repeated short transects in a restricted area using a repeated bow-tie?/V-shaped? pattern.
Generic Instrument Description	The Seaglider is an autonomous underwater vehicle developed through a collaboration between The Applied Physics Laboratory -University of Washington and the University of Washington School of Oceanography. These small, free-swimming vehicles can gather conductivity-temperature-depth (CTD) data from the ocean for months at a time and transmit it to shore in near-real time via satellite data telemetry. Seagliders make oceanographic measurements traditionally collected by research vessels or moored instruments. They can survey along a transect, profile at a fixed location, and can be commanded to alter their sampling strategies throughout a mission.

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Deployments

AUV-SG-503-2012

Website	https://www.bco-dmo.org/deployment/614683
Platform	iRobot Seaglider
Start Date	2012-11-22
End Date	2013-02-08
Description	Glider made dives in short sections in a small area in the Ross Sea.

NBP1210

Website	https://www.bco-dmo.org/deployment/568987
Platform	RVIB Nathaniel B. Palmer
Report	http://dmoserv3.bco-dmo.org/jg/serv/BCO-DMO/OA_Antarctic_organisms/727518.html0%7Bdir=dmoserv3.who.edu/jg/dir/BCO-DMO/OA_Antarctic_organisms/.info=dmoserv3.bco-dmo.org/jg/info/BCO-DMO/OA_Antarctic_organisms/mg_ca_ratios%7D
Start Date	2013-01-06
End Date	2013-02-09
Description	Seaglider AUV-SG-503-2012 was recovered on this cruise. Methods & Sampling NBP1210 picked up Seaglider AUV-SG-503-2012.

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Project Information

Penguin Foraging Reveals Phytoplankton Spatial Structure in the Ross Sea (Penguin Glider)

Website: <http://data.prbo.org/apps/penguinscience/>

Coverage: Southern Ross Sea in a restricted region near Ross Island

Description from NSF award abstract:

The Ross Sea is believed to contribute a huge portion (~1/3) of the primary productivity of the Southern Ocean and is home to a similar large portion of the top predators (e.g. 38% of Adelie, 28% of Emperor penguins) of the Antarctic sea ice ecosystem. The trophic pathways in this system are complex in both space and time. One scenario for the Ross Sea ecosystem is that diatoms are grazed by krill, which are in turn the preferred food of fish, penguins and other predators. Phaeocystis colonies, on the other hand lead to grazing by pteropods and other organisms that are a non-favoured food source for top predators. Remotely sensed chlorophyll, indicating all phytoplankton, is then suggested to be a relatively poor predictor of penguin foraging efforts. This is also consistent with notion that algal species composition is very important to penguin grazing pressure, mediated by krill, and perhaps resulting in selective depletion.

This collaborative research sets out to use an autonomous glider, equipped with a range of sensors, and informed by satellite chlorophyll imagery to be combined with 3-dimensional active penguin tracking to their preferred foraging sites. The effect of localized grazing pressure of krill on the appearance and disappearance of algal blooms will also be followed. Overall the objective of the research is to reconcile and explain several years of the study of the foraging habits and strategies of (top predator) penguins at the Cape Crozier site (Ross Island), with the dynamics of krill and their supporting algal food webs. The use of a glider to answer a primarily ecological questions is subject to moderate to high risk, and is potentially transformative.

Related publications:

Ainley DG, Ballard G, Jones RM, Jongsomjit D, Pierce SD, Smith WO Jr, Veloz S. 2015. Trophic cascades in the western Ross Sea, Antarctica: revisited. Mar Ecol Prog Ser 534:1-16. doi:[10.3354/meps11394](https://doi.org/10.3354/meps11394)

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Funding

Funding Source	Award
NSF Office of Polar Programs (formerly NSF PLR) (NSF OPP)	PLR-1142174

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