

Environmental, bulk and nutrient data from the National Geographic Endurance in the West Antarctic Peninsula in February 2025

Website: <https://www.bco-dmo.org/dataset/1008949>

Data Type: Other Field Results

Version: 1

Version Date: 2026-10-16

Project

» [RAPID: Impacts of Glacier Melting on Dissolved Organic Matter Dynamics in the West Antarctic Peninsula](#)
(DOM Dynamics in the WAP)

Contributors	Affiliation	Role
Medeiros, Patricia M.	University of Georgia (UGA)	Principal Investigator, Contact
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Abstract

These data include environmental, bulk and nutrient data collected during a cruise of opportunity aboard the National Geographic Endurance from 1–11 February 2025 in the West Antarctic Peninsula (WAP), as part of the National Geographic-Lindblad Expeditions Visiting Scientist Program. Samples were collected from a Zodiac using a 2 L bottle and analyzed with a Shimadzu TOC-VCPH analyzer and an Alpkem two-channel autoanalyzer. The WAP is a key region that accounts for a significant fraction of Antarctica’s total ice loss. These data were collected to assess dissolved organic matter (DOM) composition and dynamics in the Peninsula in response to meltwater input. The dataset was generated by Dr. Patricia Medeiros and Dr. Renato Castelao of the Department of Marine Sciences at the University of Georgia.

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Coverage

Location: West Antarctic Peninsula (upper 1 m), from Marguerite Bay to Gerlache Strait

Spatial Extent: N:-64.682 E:-62.5692 S:-68.3162 W:-67.1736

Temporal Extent: 2025-02-04 - 2025-02-08

Dataset Description

Sample collection conducted as part of the National Geographic-Lindblad Expeditions Visiting Scientist Program.

Methods & Sampling

Surface water samples (upper 1 m) were collected using pre-cleaned 2 L polycarbonate (PC) Nalgene bottles aboard a Zodiac boat. All samples were filtered through 0.7 µm Whatman GF/F filters followed by 0.2 µm Pall Supor membrane filters. Aliquots were collected for dissolved organic carbon (DOC) and nutrient analyses and stored at -20°C and 4°C, respectively. Filtrates were acidified to pH 2 with concentrated HCl, and dissolved organic matter (DOM) was isolated using solid-phase extraction (SPE) cartridges (Agilent Bond Elut PPL) and subsequently eluted with methanol. Extracts were stored frozen at -20°C until analysis.

Temperature and salinity were measured at the time of sample collection using a Sper Scientific temperature/salinity (T/S) sensor.

Data Processing Description

DOC and total dissolved nitrogen (TDN) concentrations were measured using a Shimadzu TOC-VCPH analyzer. Potassium hydrogen phthalate was used as the calibration standard for DOC, and potassium nitrate was used for TDN calibration curves.

Ammonium (NH₄⁺) concentrations were determined using the indophenol colorimetric method. Nitrate (NO₃⁻; nitrate plus nitrite) and phosphate (PO₄³⁻) concentrations were measured using cadmium reduction followed by diazotization and the molybdate blue method, respectively, with an Alpkem two-channel autoanalyzer.

BCO-DMO Curation Notes

This section documents curation actions performed prior to publication review with the submitter, and additional information relevant to understanding and reusing this dataset. It distinguishes changes made to the submitted (meta)data from unresolved issues and/or enhancements that improve future reuse and interoperability.

CURATION ACTIONS PERFORMED ON DATA

- Loaded WAP_2025_Environmental_Bulk analyses_BCO-DMO.xlsx.
- Cleaned excel file removing parameter unit row (added to parameters section) and reference to bdl.
- Converted combined Date and Time columns into a new ISO_DateTime_UTC datetime column, parsing input as America/Argentina/San_Juan local time and converting to UTC, formatted yyyy-mm-ddThh:mm
- Replaced "bdl*" values in NH4 column with "bdl" and treated as missing value
- Renamed resource wap_2025_environmental_bulk_analyses_bco-dmo-1 to 1008949_v1_dom_composition
- Renamed column "WAP Sites" to "WAP_Sites"
- Saved as final tables: 1008949_v1_dom_composition.csv

CURATION ACTIONS PERFORMED ON METADATA

- Standard metadata entry and text formatting steps were performed.

ISSUES POTENTIALLY IMPACTING REUSE

- NA

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Data Files

File
1008949_v1_dom_composition.csv (Comma Separated Values (.csv), 1.73 KB) MD5:87b54b0e85c6dd72ae7a797527207130
Primary data file for dataset ID 1008949, version 1

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Related Datasets

IsRelatedTo

Medeiros, P. M., Castelao, R. (2026) **FT-ICR MS measurements from the National Geographic Endurance in the West Antarctic Peninsula in February 2025.** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 1) Version Date 2026-10-16 doi:10.26008/1912/bco-dmo.1009751.1 [[view at BCO-DMO](#)]
Relationship Description: Measurements of the same samples.

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Parameters

Parameter	Description	Units
WAP_Sites	Site name	unitless
Date	Date of collection in ISO format (yyyy-mm-dd)	unitless
Time	Argentina Standard Time (ISO Format: hh:mm)	unitless
Longitude	Longitude	decimal degrees
Latitude	Latitude	decimal degrees
Temperature	Temperature	degrees Celsius (°C)
Salinity	Salinity	PSU
DOC	Dissolved organic carbon	micromolar (uM)
TDN	Total dissolved nitrogen	micromolar (uM)
NH4	Ammonium (bdl = below detection limit).	micromolar (uM)
Nox	Nitrite + Nitrate	micromolar (uM)
NO2	Nitrite (bdl = below detection limit).	micromolar (uM)
NO3	Nitrate	micromolar (uM)
DIN	Dissolved inorganic nitrogen	micromolar (uM)

DON	Dissolved organic nitrogen	micromolar (uM)
PO4	Phosphate	micromolar (uM)
TDP	Total dissolved phosphorus	micromolar (uM)
DOP	Dissolved organic phosphorus (bdl = below detection limit).	micromolar (uM)
ISO_DateTime_UTC	Datetime of collection in UTC time and ISO format: yyyy-mm-dd:hh:mm	unitless

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Instruments

Dataset-specific Instrument Name	Alpkem Two-Channel Autoanalyzer
Generic Instrument Name	Continuous Flow Analyzer
Dataset-specific Description	Concentrations were measured using cadmium reduction followed by diazotization and the molybdate blue method, respectively, with an Alpkem two-channel autoanalyzer.
Generic Instrument Description	A sample is injected into a flowing carrier solution passing rapidly through small-bore tubing.

Dataset-specific Instrument Name	Sper Scientific T/S Sensor
Generic Instrument Name	Multi Parameter Portable Meter
Generic Instrument Description	An analytical instrument that can measure multiple parameters, such as pH, EC, TDS, DO and temperature with one device and is portable or hand-held.

Dataset-specific Instrument Name	Shimadzu TOC-VCPH analyzer
Generic Instrument Name	Shimadzu Total Organic Carbon Analyzer TOC-VCPH
Dataset-specific Description	Potassium hydrogen phthalate was used as the calibration standard for DOC, and potassium nitrate was used for TDN calibration curves.
Generic Instrument Description	The Shimadzu Total Organic Carbon Analyzer TOC-VCPH is a PC-controlled, total organic carbon analyzer (high-sensitivity model), designed to measure total carbon (TC), inorganic carbon (IC), total organic carbon (TOC), and non-purgeable organic carbon (NPOC); an optional accessory enables the measurement of particulate organic carbon (POC) and total nitrogen (TN) as well. The instrument uses the 680 degrees Celsius combustion catalytic oxidation method to analyze aqueous samples, and optionally solid and gas samples.

Deployments

ANTA: Journey to Antarctica: The White Continent

Website	https://www.bco-dmo.org/deployment/1009139
Platform	National Geographic Endurance
Start Date	2025-02-01
End Date	2025-02-11

Project Information

RAPID: Impacts of Glacier Melting on Dissolved Organic Matter Dynamics in the West Antarctic Peninsula (DOM Dynamics in the WAP)

Glacier melting in polar regions can result in large amounts of freshwater being introduced into the coastal ocean, changing nutrient levels at the surface, impacting organisms like phytoplankton and influencing the distribution and composition of organic material in the water. In this project, researchers will participate in an expedition to the West Antarctic Peninsula in early 2025 that will approach several retreat glaciers, starting from the northern tip of the Peninsula and progressing toward its central region. The team will analyze physical, chemical, and biological changes in the area, and relate these changes to differences in melting trends that have been observed along the Peninsula. Results will help predict future impacts on the region due to increased melting associated with continued warming. The program will provide training for a graduate student and disseminate results of the study across a broad audience.

This project will examine the effects of meltwater input from tidewater glaciers on dissolved organic matter along the West Antarctic Peninsula. While glaciers near the northern tip of the Peninsula show no changes in grounding line discharge trends, several farther south, near Palmer Station, are characterized by significant changes, with discharge trends surging by a factor of 3 in many glaciers. This suggests a north-south gradient in the response of discharge rates to environmental forcing along the Peninsula, likely influencing the vertical flux of nutrients and affecting phytoplankton and the composition and lability of dissolved organic matter. The PIs will take advantage of a cruise-of-opportunity to the West Antarctic Peninsula in February 2025 to collect samples in transects approaching multiple tidewater glaciers, capturing the north-south gradient in discharge trends reported for the region. Samples of seawater and floating ice from glaciers will be analyzed for temperature, salinity, nutrients, chlorophyll, particulate and dissolved organic carbon concentrations and lability, and dissolved organic matter composition using ultrahigh-resolution mass spectrometry, optics and isotopic analyses. Variations in organic matter composition and lability will be identified and compared along the north-south gradient in discharge trends, which will inform how the system might respond to future increases in glacier melting. Results will also be compared with similar analyses currently being conducted in the Amundsen Sea and the Kerguelen Islands, collectively capturing the influence of meltwater originating from large ice sheets, tidewater glaciers and land-terminating glaciers. The project will support a graduate student who will be trained in the analysis of dissolved organic matter data.

This award reflects NSF's statutory mission and has been deemed worthy of support through evaluation using the Foundation's intellectual merit and broader impacts review criteria.

Funding

Funding Source	Award
NSF Office of Polar Programs (formerly NSF PLR) (NSF OPP)	OPP-2512432

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