

Bottle Data from multiple cruises in the Gulf of Maine, NA4, 43 30N, 69 00W, Gulf of Maine, Mass Bay to Bay of Fundy, Cape Cod Bay, 2003-2010 (ALEX-GoME project)

Website: <https://www.bco-dmo.org/dataset/3358>

Version: 21 March 2013

Version Date: 2013-03-21

Project

» [Investigations of Alexandrium fundyense dynamics in the Gulf of Maine](#) (ALEX-GoME)

Contributors	Affiliation	Role
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Kosnyrev, Olga	Woods Hole Oceanographic Institution (WHOI)	Co-Principal Investigator, Contact, Data Manager
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Table of Contents

- [Dataset Description](#)
 - [Methods & Sampling](#)
 - [Data Processing Description](#)
- [Data Files](#)
- [Related Publications](#)
- [Parameters](#)
- [Instruments](#)
- [Deployments](#)
- [Project Information](#)
- [Funding](#)

Dataset Description

Multi year bottle data 2003-2010

Note: Dataset updated with 2008/EN448 Version 3 data srg/21Mar2013

These data include version 2 data as submitted.

Version 2 NOTES: Version 2 means that Data set has been updated in part of the new data added: (1) 2010 cruises; (2) Previously unavailable Whole cell counts from the previous cruises; (3) Previously unavailable data for Underway stations (mostly date, location).

Data files newly created or updated in this version are indicated with "_v2" in file names.
(BCO-DMO Note: for original files as contributed)

Date of creation: 5/12/2011.

Matlab code used for data merging: GM_read_alex_nuts_BTL_v2.m

No data reported for cruises: OC440 (2007) or EN456 (2008).

Data not sampled or lost are indicated with NaN.

Data not available at the time but supposed to arrive are indicated with the "waiting" flag=-9.99.

Funding:

The cruises from 2003-2004 were supported by NOAA grant NA160P2785 (MERHAB). The cruises from 2005-2010 were jointly funded: NSF grant OCE-0430724, NIEHS grant 1P50-ES01274201 (Woods Hole Center for Oceans and Human Health) and NOAA grant NA06NOS4780245 (GOMTOX).

Methods & Sampling

Hydrographic profiles and water samples were collected with a standard CTD-rosette system with Niskin bottles. Nutrient samples were filtered through Millipore HA filters, placed immediately in a sea water-ice bath for 5–10 min, and frozen at -18°C . Concentrations of NO_3+NO_2 , NH_4 , $\text{Si}(\text{OH})_4$ and PO_4 were measured with a Bran Luebbe AA3 AutoAnalyzer using standard techniques.

A. fundyense cells were enumerated from water samples using an oligonucleotide probe and methods described in Anderson et al. (2005). Both *A. tamarense* and *A. fundyense* occur in the Gulf of Maine, and these are considered to be varieties of the same species. Available molecular probes cannot distinguish between them, and only detailed analysis of the thecal plates on individual cells can provide this resolution—which is not practical for large numbers of field samples. Accordingly, for the purpose of this study, the name *A. fundyense* is used to refer to both forms.

Anderson, D. M., D. M. Kulis, B. A. Keafer, K. E. Gribble, R. Marin, and C. A. Scholin. 2005. Identification and enumeration of *Alexandrium* spp. from the Gulf of Maine using molecular probes. *Deep-Sea Research II* 52: 2467-2490.

Data Processing Description

Hydrographic profiles and water samples were collected with a standard CTD-rosette system with Niskin bottles. Nutrient samples were filtered through Millipore HA filters, placed immediately in a sea water-ice bath for 5–10 min, and frozen at -18°C . Concentrations of NO_3+NO_2 , NH_4 , $\text{Si}(\text{OH})_4$ and PO_4 were measured with a Bran Luebbe AA3 AutoAnalyzer using standard techniques.

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Anderson, D. M., D. M. Kulis, B. A. Keafer, K. E. Gribble, R. Marin, and C. A. Scholin. 2005. Identification and enumeration of *Alexandrium* spp. from the Gulf of Maine using molecular probes. *Deep-Sea Research II* 52: 2467-2490.

BCO-DMO Processing/Edits

- Generated from data in original file "GOM_GB_nuts_TS_Alex_v2.tar.gz" contributed by Olga Kosnyrev
- Awk routine "GoMEbottle2csv.awk" generated to convert bottle ".txt" files to BCO-DMO .csv files
- Updated with version 3 data for 2008/EN448 data 21March2013, srg
- All bottle data reprocessed to correct NH_4 data 21March2013, srg

[[table of contents](#) | [back to top](#)]

Data Files

File
Bottle_Data.csv (Comma Separated Values (.csv), 1.74 MB) MD5:3a274259fd1056b6c417df47e8f4263c
Primary data file for dataset ID 3358

[[table of contents](#) | [back to top](#)]

Related Publications

Anderson, D. M., Keafer, B. A., Kleindinst, J. L., McGillicuddy, D. J., Martin, J. L., Norton, K., ... Butman, B. (2014). Alexandrium fundyense cysts in the Gulf of Maine: Long-term time series of abundance and distribution, and linkages to past and future blooms. Deep Sea Research Part II: Topical Studies in Oceanography, 103, 6–26. doi:[10.1016/j.dsr2.2013.10.002](https://doi.org/10.1016/j.dsr2.2013.10.002)
Results

[[table of contents](#) | [back to top](#)]

Parameters

Parameter	Description	Units
station	Station Id	x.x
date	date (GMT) in yyyyMMdd format	unitless
time	time (GMT)	HHMM
lon	Station longitude (West is negative)	decimal degrees
lat	Station latitude (South is negative)	decimal degrees
depth_nominal	nominal depth	m
Alex	Number of Alexandrium fundyense cells	cells/L
Alex_Live	Number of live Alexandrium fundyense cells	cells/L
Pressure	Pressure	decibars
Temperature	Temperature	degrees Celcius
Salinity	Salinity	psu
NO3_plus_NO2	nitrate plus nitrite	uM
Silicate	Silicate	uM
NH4	ammonium	uM
PO4	phosphate	uM
Chla	total chlorophyll a pigment	ug/l
Phaeo	total phaeopigment	ug/l
Flag	Flag "NOTE" values and meaning: 1 - regular data; 2 - Alex multiple samples averaged; 3 - Nuts multiple samples averaged; 4 - Alex and Nuts multiple samples averaged; 5 - Alex Live multiple samples averaged	integer
cruise_id	Official cruise id	text
Year		unitless

[[table of contents](#) | [back to top](#)]

Instruments

Dataset-specific Instrument Name	Bran Luebbe AA3 AutoAnalyzer
Generic Instrument Name	Bran Luebbe AA3 AutoAnalyzer
Generic Instrument Description	Bran Luebbe AA3 AutoAnalyzer See the description from the manufacturer.

Dataset-specific Instrument Name	CTD Sea-Bird 9
Generic Instrument Name	CTD Sea-Bird 9
Generic Instrument Description	The Sea-Bird SBE 9 is a type of CTD instrument package. The SBE 9 is the Underwater Unit and is most often combined with the SBE 11 Deck Unit (for real-time readout using conductive wire) when deployed from a research vessel. The combination of the SBE 9 and SBE 11 is called a SBE 911. The SBE 9 uses Sea-Bird's standard modular temperature and conductivity sensors (SBE 3 and SBE 4). The SBE 9 CTD can be configured with auxiliary sensors to measure other parameters including dissolved oxygen, pH, turbidity, fluorometer, altimeter, etc.). Note that in most cases, it is more accurate to specify SBE 911 than SBE 9 since it is likely a SBE 11 deck unit was used. more information from Sea-Bird Electronics

Dataset-specific Instrument Name	CTD Sea-Bird SBE 911plus
Generic Instrument Name	CTD Sea-Bird SBE 911plus
Generic Instrument Description	The Sea-Bird SBE 911 plus is a type of CTD instrument package for continuous measurement of conductivity, temperature and pressure. The SBE 911 plus includes the SBE 9plus Underwater Unit and the SBE 11plus Deck Unit (for real-time readout using conductive wire) for deployment from a vessel. The combination of the SBE 9 plus and SBE 11 plus is called a SBE 911 plus. The SBE 9 plus uses Sea-Bird's standard modular temperature and conductivity sensors (SBE 3 plus and SBE 4). The SBE 9 plus CTD can be configured with up to eight auxiliary sensors to measure other parameters including dissolved oxygen, pH, turbidity, fluorescence, light (PAR), light transmission, etc.). more information from Sea-Bird Electronics

Dataset-specific Instrument Name	Niskin bottle
Generic Instrument Name	Niskin bottle
Generic Instrument Description	A Niskin bottle (a next generation water sampler based on the Nansen bottle) is a cylindrical, non-metallic water collection device with stoppers at both ends. The bottles can be attached individually on a hydrowire or deployed in 12, 24, or 36 bottle Rosette systems mounted on a frame and combined with a CTD. Niskin bottles are used to collect discrete water samples for a range of measurements including pigments, nutrients, plankton, etc.

[[table of contents](#) | [back to top](#)]

Deployments

OC447

Website	https://www.bco-dmo.org/deployment/58064
Platform	R/V Oceanus
Start Date	2008-05-28
End Date	2008-06-04
Description	The research objective is synoptic mapping of Alexandrium fundyense, hydrography, and velocity in the coastal current from Cape Cod to Bay of Fundy. The planned activities include CTD casts, drifter deployments, and water pumping. Scientific personnel: Dr. Dennis McGillicuddy, Chief Scientist, Woods Hole Oceanographic Institution Dr. Valery Kosnyrev, Woods Hole Oceanographic Institution Ms. Olga Kosnyreva, Woods Hole Oceanographic Institution Mr. Keston Smith, Woods Hole Oceanographic Institution Mr. Bruce Keafer, Woods Hole Oceanographic Institution Mr. Kerry Norton, Woods Hole Oceanographic Institution Dr. Bibiana Gomez Crespo, IIM/CSIC, Spain Dr. Luciano Fernandes, Woods Hole Oceanographic Institution Ms. Stacey Lee, Woods Hole Oceanographic Institution Dr. David Townsend, University of Maine Ms. Maura Thomas, University of Maine Mr. Nathan Rebeck, University of Maine Ms. Rachel Gettings, University of Maine Mr. Morgan Brunbauer, University of Maine Dr. Jefferson Turner, University of Massachusetts Dartmouth Mr. Peter Milligan, University of Massachusetts Dartmouth Ms. Meribeth Ratzel, Cape Cod Community College Dr. Laurence Anderson, Woods Hole Oceanographic Institution Mr. Alexander Dorsk, Woods Hole Oceanographic Institution WHOI cruise planning synopsis Cruise information and original data are available from the NSF R2R data catalog.

OC391

Website	https://www.bco-dmo.org/deployment/58678
Platform	R/V Oceanus
Start Date	2003-05-28
End Date	2003-06-07
Description	Synoptic mapping of Alexandrium fundyense, hydrography, and velocity in the coastal current offshore of Casco and Penobscot Bays WHOI cruise planning synopsis Cruise information and original data are available from the NSF R2R data catalog.

OC402

Website	https://www.bco-dmo.org/deployment/58679
Platform	R/V Oceanus
Start Date	2004-05-18
End Date	2004-05-28
Description	MERHAB - Synoptic mapping of Alexandrium fundyense, hydrography, and velocity in the coastal current offshore of Casco and Penobscot Bays WHOI cruise planning synopsis Cruise information and original data are available from the NSF R2R data catalog.

OC412

Website	https://www.bco-dmo.org/deployment/58680
Platform	R/V Oceanus
Start Date	2005-05-09
End Date	2005-05-18
Description	COHH - Synoptic mapping of Alexandrium fundyense, hydrography, and velocity in the coastal current in the Gulf of Maine WHOI cruise planning synopsis Cruise information and original data are available from the NSF R2R data catalog.

TI096

Website	https://www.bco-dmo.org/deployment/58693
Platform	R/V Tioga
Start Date	2005-05-28
End Date	2005-05-29

TI098

Website	https://www.bco-dmo.org/deployment/58694
Platform	R/V Tioga
Start Date	2005-06-03
End Date	2005-06-03

TI100

Website	https://www.bco-dmo.org/deployment/58695
Platform	R/V Tioga
Start Date	2005-06-09
End Date	2005-06-10

TI102

Website	https://www.bco-dmo.org/deployment/58696
Platform	R/V Tioga
Start Date	2005-06-15
End Date	2005-06-15

TI103

Website	https://www.bco-dmo.org/deployment/58697
Platform	R/V Tioga
Start Date	2005-06-16
End Date	2005-06-17

TI105

Website	https://www.bco-dmo.org/deployment/58698
Platform	R/V Tioga
Start Date	2005-06-22
End Date	2005-06-22

TI109

Website	https://www.bco-dmo.org/deployment/58699
Platform	R/V Tioga
Start Date	2005-06-28
End Date	2005-06-29

TI112

Website	https://www.bco-dmo.org/deployment/58700
Platform	R/V Tioga
Start Date	2005-07-06
End Date	2005-07-06

OC425

Website	https://www.bco-dmo.org/deployment/58681
Platform	R/V Oceanus
Start Date	2006-06-06
End Date	2006-06-17
Description	Synoptic mapping of Alexandrium fundyense, hydrography, and velocity in the coastal current from Cape Cod to the Bay of Fundy WHOI cruise planning synopsis Cruise information and original data are available from the NSF R2R data catalog.

TI171

Website	https://www.bco-dmo.org/deployment/58701
Platform	R/V Tioga
Start Date	2006-04-11
End Date	2006-04-12

TI177

Website	https://www.bco-dmo.org/deployment/58702
Platform	R/V Tioga
Start Date	2006-04-25
End Date	2006-04-26

TI180

Website	https://www.bco-dmo.org/deployment/58703
Platform	R/V Tioga
Start Date	2006-05-11
End Date	2006-05-11

TI181

Website	https://www.bco-dmo.org/deployment/58704
Platform	R/V Tioga
Start Date	2006-05-17
End Date	2006-05-18

TI184

Website	https://www.bco-dmo.org/deployment/58705
Platform	R/V Tioga
Start Date	2006-05-24
End Date	2006-05-25

TI185

Website	https://www.bco-dmo.org/deployment/58706
Platform	R/V Tioga
Start Date	2006-05-31
End Date	2006-06-01

TI191

Website	https://www.bco-dmo.org/deployment/58707
Platform	R/V Tioga
Start Date	2006-06-29
End Date	2006-06-30

EN435

Website	https://www.bco-dmo.org/deployment/58687
Platform	R/V Endeavor
Start Date	2007-05-17
End Date	2007-06-01

EN437

Website	https://www.bco-dmo.org/deployment/58688
Platform	R/V Endeavor
Start Date	2007-06-27
End Date	2007-07-06

EN448

Website	https://www.bco-dmo.org/deployment/58689
Platform	R/V Endeavor
Start Date	2008-06-27
End Date	2008-07-03

EN451

Website	https://www.bco-dmo.org/deployment/58690
Platform	R/V Endeavor
Start Date	2008-08-07
End Date	2008-08-13

OC445

Website	https://www.bco-dmo.org/deployment/58677
Platform	R/V Oceanus
Start Date	2008-04-28
End Date	2008-05-05
Description	<p>The research objective is synoptic mapping of Alexandrium fundyense, hydrography, and velocity in the coastal current from Cape Cod to Georges Bank. The planned activities include CTD casts, drifter deployments, and water pumping. Scientific personnel: Dr. Dennis McGillicuddy, Jr., Chief Scientist, Woods Hole Oceanographic Institution Dr. Valery Kosnyrev, Woods Hole Oceanographic Institution Mr. Keston Smith, Woods Hole Oceanographic Institution Mr. Bruce Keafer, Woods Hole Oceanographic Institution Mr. Kerry Norton, Woods Hole Oceanographic Institution Dr. Bibiana Gomez Crespo, IIM/CSIC, Spain Dr. Luciano Fernandes, Woods Hole Oceanographic Institution Ms. Stacey Lee, Woods Hole Oceanographic Institution Dr. David Townsend, University of Maine Ms. Maura Thomas, University of Maine Mr. Nathan Rebeck, University of Maine Dr. Jefferson Turner, University of Massachusetts Dartmouth Mr. Peter Milligan, University of Massachusetts Dartmouth Ms. Meribeth Ratzel, Cape Cod Community College Mr. Artur Palacz, University of Maine Dr. Laurence Anderson, Woods Hole Oceanographic Institution Ms. Katherine Libera, Woods Hole Oceanographic Institution Ms. Erin Dupuis, Woods Hole Oceanographic Institution Mr. Alexander Dorsk, Woods Hole Oceanographic Institution WHOI cruise planning synopsis Cruise information and original data are available from the NSF R2R data catalog.</p>

TI303

Website	https://www.bco-dmo.org/deployment/58692
Platform	R/V Tioga
Start Date	2008-05-15
End Date	2008-05-16

TI313

Website	https://www.bco-dmo.org/deployment/58708
Platform	R/V Tioga
Start Date	2008-06-16
End Date	2008-06-17

TI314

Website	https://www.bco-dmo.org/deployment/58709
Platform	R/V Tioga
Start Date	2008-06-18
End Date	2008-06-19

TI326

Website	https://www.bco-dmo.org/deployment/58710
Platform	R/V Tioga
Start Date	2008-07-29
End Date	2008-07-30

TI383

Website	https://www.bco-dmo.org/deployment/58711
Platform	R/V Tioga
Start Date	2009-07-12
End Date	2009-07-12

TI386

Website	https://www.bco-dmo.org/deployment/58712
Platform	R/V Tioga
Start Date	2009-07-19
End Date	2009-07-23

EN476

Website	https://www.bco-dmo.org/deployment/58691
Platform	R/V Endeavor
Start Date	2010-05-26
End Date	2010-06-04
Description	Cruise information and original data are available from the NSF R2R data catalog.

OC460

Website	https://www.bco-dmo.org/deployment/58683
Platform	R/V Oceanus
Start Date	2010-05-01
End Date	2010-05-10
Description	Synoptic mapping of Alexandrium fundyense, hydrography, and velocity in the coastal current from Cape Cod to Georges Bank, Cape Cod to Bay of Fundy WHOI cruise planning synopsis Cruise information and original data are available from the NSF R2R data catalog.

OC465

Website	https://www.bco-dmo.org/deployment/58684
Platform	R/V Oceanus
Start Date	2010-06-30
End Date	2010-07-08
Description	Synoptic mapping of <i>Alexandrium fundyense</i> , hydrography, and velocity in the coastal current from Cape Cod to Georges Bank, Cape Cod to Bay of Fundy WHOI cruise planning synopsis Cruise information and original data are available from the NSF R2R data catalog.

OC467

Website	https://www.bco-dmo.org/deployment/58685
Platform	R/V Oceanus
Start Date	2010-07-29
End Date	2010-08-06
Description	Synoptic mapping of <i>Alexandrium fundyense</i> , hydrography, and velocity in the coastal current from Cape Cod to Georges Bank, Cape Cod to Bay of Fundy. OC467 is one of the GOMTOX project cruises to study the dynamics of <i>Alexandrium fundyense</i> distributions in the Gulf of Maine. GOMTOX is an observational and modeling study of nearshore and offshore shellfish toxicity, vertical toxin flux, and bloom dynamics in the Gulf of Maine, a complex shelf sea region. WHOI cruise planning synopsis Cruise information and original data are available from the NSF R2R data catalog

[[table of contents](#) | [back to top](#)]

Project Information

Investigations of *Alexandrium fundyense* dynamics in the Gulf of Maine (ALEX-GoME)

Coverage: Gulf of Maine

Investigations of *Alexandrium fundyense* dynamics in the Gulf of Maine

Project Summary

Harmful algal blooms, commonly called "red tides" or HABs, are a serious economic and public health problem throughout the world. In the U.S., the most serious HAB problem is [paralytic shellfish poisoning \(PSP\)](#), a potentially fatal neurological disorder caused by human ingestion of shellfish that accumulate toxins as they feed on dinoflagellates of the genus *Alexandrium*. These organisms cause human illness and death due to PSP, repeated shellfish harvest quarantines, and the mortality of fish and marine mammals. This phenomenon, which affects thousands of miles of U.S. coastline and numerous fisheries resources, has expanded dramatically in the last two decades, especially in the Gulf of Maine. ECOHAB-GOM is a project that addresses several fundamental issues regarding *Alexandrium* blooms in the Gulf of Maine: 1) the source of the *Alexandrium* cells that appear in the fresh water plumes in the western Maine coastal current (WMCC); 2) *Alexandrium* cell distribution and dynamics in the eastern Maine coastal current (EMCC); and 3) linkages among blooms in the WMCC, the EMCC and on Georges Bank. Utilizing a combination of numerical modeling, hydrographic, chemical, and biological measurements, moored and drifting current measurements, and satellite imagery, we are working to characterize the structure, variability and autecology of the major *Alexandrium* habitats in the Gulf of Maine.

Summary of Data Sources by Year

2003 - [MERHAB](#) (McGillicuddy)

2004 - [MERHAB](#)

2005 - [WHCOHH](#) (Stegeman)

2006 - NOAA Rapid Response (Anderson) / [WHCOHH](#)
2007 - [GOMTOX](#) (Anderson) / [WHCOHH](#)
2008 - [GOMTOX](#) / [WHCOHH](#)
2009 - [GOMTOX](#) / [WHCOHH](#)
2010 - [GOMTOX](#) / [WHCOHH](#)

Summary of Funding Sources by Years

The cruises from 2003-2004 were supported by NOAA grant NA160P2785 (MERHAB).

The cruises from 2005-2010 were jointly funded:

NSF grant OCE-0430724 and NIEHS grant 1P50-ES01274201 (Woods Hole Center for Oceans and Human Health)

NOAA grant NA06NOS4780245 (GOMTOX)

[[table of contents](#) | [back to top](#)]

Funding

Funding Source	Award
National Oceanic and Atmospheric Administration (NOAA)	NA06NOS4780245 (GOMTOX)
National Institute of Environmental Health Sciences (NIEHS)	1P50-ES01274201
NSF Division of Ocean Sciences (NSF OCE)	OCE-0430724
National Oceanic and Atmospheric Administration (NOAA)	NA160P2785 (MERHAB)

[[table of contents](#) | [back to top](#)]