

Drifters collected from cruises AT11-17, AT11-30, TN200, TUIM14MV, W0306A, W0308C from the Coastal Waters off Washington State and Vancouver Island; 2003-2006 (ECOHAB-PNW project)

Website: <https://www.bco-dmo.org/dataset/3231>

Version: 14 January 2011

Version Date: 2011-01-14

Project

» [ECOHAB - Pacific Northwest](#) (ECOHAB-PNW)

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Dataset Description

ECOHAB/PNW - Drifters

Methods & Sampling

ECOHAB PNW Drifter Data Summary

ARGOS-tracked drifters were deployed in the ECOHAB PNW study region during all six cruises.

Drifter models included Clearwater Instrumentation, Inc ClearSat-1 surface drifters and Brightwaters Instrument Co. models 104A and 115. The majority of drifters deployed were in the Davis/CODE configuration designed to accurately track the top 1 m of the water column.

The Brightwaters models also allow for a deep-drogued configuration in which a 10-m long "holey-sock" drogue is attached and centered at the desired depth. Drifters transmitted 1/2-hourly GPS positions to the ARGOS satellites. Individual drifter deployment locations and times, as well as drogue center depth (if applicable), are listed in tables in each cruise subdirectory (html files). Drifters were set to time-out after a set time interval

(usually 45 or 60 days). The date of last transmission (or the recovery date) are listed in the tables.

Data Processing Description

ECOHAB PNW Drifter Data Processing:

Raw drifter data has been edited to remove duplicate transmissions and occasional unrealistic positions. Final data for each drifter is in individual files with the suffix ".edt". If a drifter was deployed more than once during a cruise, the drifter id will be followed by a letter (a/b/c) indicating sequential deployments. Each file has four columns which are date, time, GPS longitude, and GPS latitude. Temperature and conductivity data are available for some drifters, but this data has not been calibrated so users should contact Barbara Hickey (hickey@u.washington.edu) if they wish to obtain this data.

BCO-DMO Processing Notes

Generated from original file ECOdrifters.zip
contributed to BCO-DMO as a zipped data/docs file by Any MacFadyen

BCO-DMO Edits

- generated a file of all ECOHAB drifter "metadata" from individual .html yearly files
- file includes drifterids, models, deployment/recovery dates/times, deployment lats/lons and comments
- file was generated manually from data contained in the .html files
- empty cells filled with "nd" (no data)
- Cruise changed from "Cruise_1,2,3,4" to ECOHAB_1, etc for consistency with other data sets

Drifter data files

- simple awk script generated to reformat ECOHAB/PNW drifter data fmt to BCO-DMO
- date reformatted to YYYYMMDD
- time reformatted to HHMMSS
- lat/lon positions output unchanged
- Sample I/P Record: 25-Sep-2006 05:00:00 -125.496333 48.247833
- Sample O/P Record: 20060925,050000,-125.496333,48.247833
- Simple plot generated of individual drifter track with coastline to provide preview capability

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Data Files

File
Drifters.csv (Comma Separated Values (.csv), 14.23 MB) MD5:ea9cced032243141b2e0a314656525dc Primary data file for dataset ID 3231

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Parameters

Parameter	Description	Units
Cruise	ECO HAB-PNW cruise name	text
Drifter_Data_File	Drifter data filename (YYYYMon_File)	text
DrifterID	Drifter id	text
Model	Drifter model	text
Date_Deployed	Drifter deployment date (GMT)	YYYYMMDD
Time_Deployed	Drifter deployment time (GMT)	HHMMSS
Lon_Deployed	Drifter deployment longitude	decimal degs (West is negative)
Lat_Deployed	Drifter deployment latitude	decimal degs (South is negative)
Date_Recovered	Drifter recovery or timed out date (GMT)	YYYYMMDD
Time_Recovered	Drifter recovery or timed out time (GMT)	HHMMSS
comments	Misc comments	text
date	Drifter data date (GMT)	YYYYMMDD
time	Drifter data time (GMT)	HHMMSS
lon_drift	Drifter data longitude	decimal degs (West is negative)
lat_drift	Drifter data latitude	decimal degs (South is negative)
Preview_Plot	Link to simple plot of drifter track with coastline	text

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Instruments

Dataset-specific Instrument Name	Drifter Buoy
Generic Instrument Name	Drifter Buoy
Dataset-specific Description	Clearwater Instrumentation, Inc ClearSat-1 surface drifters Brightwaters Instrument Co. models 104A and 115.
Generic Instrument Description	Drifting buoys are free drifting platforms with a float or buoy that keep the drifter at the surface and underwater sails or socks that catch the current. These instruments sit at the surface of the ocean and are transported via near-surface ocean currents. They are not fixed to the ocean bottom, therefore they "drift" with the currents. For this reason, these instruments are referred to as drifters, or drifting buoys. The surface float contains sensors that measure different parameters, such as sea surface temperature, barometric pressure, salinity, wave height, etc. Data collected from these sensors are transmitted to satellites passing overhead, which are then relayed to land-based data centers. definition sources: https://mmisw.org/ont/ioos/platform/drifting_buoy and https://www.aoml.noaa.gov/phod/gdp/faq.php#drifter1

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Deployments

AT11-17

Website	https://www.bco-dmo.org/deployment/58003
Platform	R/V Atlantis
Report	http://bcodata.whoi.edu/ECOHAB_PNW/ECOHAB_Cruise3_Report.pdf
Start Date	2004-09-08
End Date	2004-09-28
Description	AT11-17: This is ECOHAB_3 (ECOHAB Cruise 3). Third cruise of the 6 ECOHAB-PNW cruises. Numbered sequentially from Cruise_1 - Cruise_6 as ECOHAB_1 - ECOHAB_6. Original cruise data are available from the NSF R2R data catalog

AT11-30

Website	https://www.bco-dmo.org/deployment/58004
Platform	R/V Atlantis
Report	http://bcodata.whoi.edu/ECOHAB_PNW/ECOHAB_Cruise4_Report.pdf
Start Date	2005-07-07
End Date	2005-07-27
Description	AT11-30: This is ECOHAB_4 (ECOHAB Cruise 4). Fourth cruise of the 6 ECOHAB-PNW cruises. Numbered sequentially from Cruise_1 - Cruise_6 as ECOHAB_1 - ECOHAB_6 Original cruise data are available from the NSF R2R data catalog

TN200

Website	https://www.bco-dmo.org/deployment/58006
Platform	R/V Thomas G. Thompson
Report	http://bcodata.whoi.edu/ECOHAB_PNW/ECOHAB_Cruise6_Report.pdf
Start Date	2006-09-11
End Date	2006-10-04
Description	Cruise TN200 is also known as ECOHAB_6 (ECOHAB Cruise 6) the sixth of 6 ECOHAB-PNW cruises that are numbered sequentially from Cruise_1 - Cruise_6 as ECOHAB_1 - ECOHAB_6. Cruise information and original data are available from the NSF R2R data catalog.

TUIM14MV

Website	https://www.bco-dmo.org/deployment/58005
Platform	R/V Melville
Report	http://bcodata.whoi.edu/ECOHAB_PNW/ECOHAB_Cruise5_Report.pdf
Start Date	2005-09-02
End Date	2005-09-22
Description	Cruise TUIM14MV is also known as ECOHAB_5 (ECOHAB Cruise 5) the fifth cruise of the 6 ECOHAB-PNW cruises; numbered sequentially from Cruise_1 - Cruise_6 as ECOHAB_1 - ECOHAB_6. Cruise information and original data are available from the NSF R2R data catalog.

W0306A

Website	https://www.bco-dmo.org/deployment/58001
Platform	R/V Wecoma
Report	http://bcodata.whoi.edu/ECOHAB_PNW/ECOHAB_Cruise1_Report.pdf
Start Date	2003-06-02
End Date	2003-06-23
Description	W0306A: This is ECOHAB_1 (ECOHAB Cruise 1) First cruise of the 6 ECOHAB/PNW cruises. Numbered sequentially from Cruise_1 - Cruise_6 as ECOHAB_1 - ECOHAB_6. .

W0308C

Website	https://www.bco-dmo.org/deployment/58002
Platform	R/V Wecoma
Report	http://bcodata.whoi.edu/ECOHAB_PNW/ECOHAB_Cruise2_Report.pdf
Start Date	2003-08-30
End Date	2003-09-19
Description	W0308C: This is ECOHAB_2 (ECOHAB Cruise 2). Second cruise of the 6 ECOHAB-PNW cruises. Numbered sequentially from Cruise_1 - Cruise_6 as ECOHAB_1 - ECOHAB_6.

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Project Information

ECOHAB - Pacific Northwest (ECOHAB-PNW)

Coverage: Off the Pacific Northwest coast

ECOHAB-PNW is a 5-year multi-disciplinary project that will study the physiology, toxicology, ecology and oceanography of toxic *Pseudo-nitzschia* species off the Pacific Northwest coast.

This program studies the physiology, toxicology, ecology and oceanography of toxic *Pseudo-nitzschia* species off the Pacific Northwest coast, a region in which both macro-nutrient supply and current patterns are primarily controlled by seasonal coastal upwelling processes. Recent studies suggest that the seasonal Juan de Fuca eddy, a nutrient rich retentive feature off the Washington coast serves as a "bioreactor" for the growth of phytoplankton, including diatoms of the genus *Pseudo-nitzschia*. Existing ship of opportunity data are consistent with the working hypothesis that the seasonal Juan de Fuca eddy is an initiation site for toxic *Pseudo-nitzschia* that impact the Washington coast and that upwelling sites adjacent to the coast are less likely to develop toxicity.

The long-term program goal is to develop a mechanistic basis for forecasting toxic *Pseudo-nitzschia* bloom development here and in other similar coastal regions in Eastern Boundary upwelling systems.

Specific study objectives are:

- 1. To determine the physical/biological/chemical factors that make the Juan de Fuca eddy region more viable for growth and sustenance of toxic *Pseudo-nitzschia* than the nearshore upwelling zone;
- 2. To determine the combination of environmental factors that regulate the production, accumulation, and/or release of domoic acid (DA) from *Pseudo-nitzschia* cells in the field;
- 3. To determine possible transport pathways between DA initiation sites and shellfish beds on the nearby coast.

The scientific operations of this study included obtaining multi-disciplinary data from a large scale grid, sampling water properties while following a drifter, deployment of surface drifters, satellite imagery, laboratory studies using water collected at selected sites, and numerical modeling of both the circulation and chlorophyll concentration. Water samples included macronutrients, iron, particulate and dissolved domoic acid, *Pseudo-nitzschia* species and numbers. Experiments were done to estimate growth and grazing rates. Moored arrays were deployed to provide time series of currents and water properties from May to October, each year from 2003-2006. Numerical modeling studies on a fine scale grid focused on the seasonal development of the Juan de Fuca eddy and its change in structure during selected wind conditions. Conditions favorable to release of phytoplankton from the eddy region were assessed.

After four years of field work the research team is able to describe a possible sequence of events necessary to ingestion of domoic acid by coastal shellfish:

- (1) Plankton must become concentrated in the bloom source region. ECOHAB PNW studies suggest this requires a period of downwelling-favorable or lightly fluctuating winds.
- (2) Next the plankton must undergo stress sufficient to cause an increase in cellular toxin: in the Juan de Fuca eddy region toxin can be found on any survey of the region in both early and late summer within a 21 day time scale.
- (3) Patches of toxic plankton must then escape from the offshore source region. For the Juan de Fuca eddy region escape is favored during upwelling-favorable wind conditions that allow the geostrophic constraint of the eddy circulation pattern to be broken.
- (4) The patch must move alongshore to sites with shellfish populations, and
- (5) must retain its toxicity during the time period of transport. For a toxic source in the Juan de Fuca eddy this requires southward advection across the shelf, as occurs during periods of upwelling-favorable winds in summer and early fall. ECOHAB PNW studies show that toxin can be maintained in the 7-14 days required for transport. For an Oregon source such as Heceta bank to impact the Washington shelf, this requires northward advection across the shelf, as occurs during periods of downwelling-favorable winds in spring.
- (6) Last, the toxic patch must move onshore to coastal beaches and/or estuaries,
- (7) where it must remain there for a period sufficient for significant ingestion by shellfish.

Cruises/Platforms:

Cruise = ECOHAB-PNW cruises, numbered sequentially from Cruise_1 - Cruise_6 as ECOHAB_1 - ECOHAB_6.

Cruise_1=ECO HAB_1, R/V Wecoma, W0306A, June 2-23, 2003 [Cruise Report](#)
Cruise_2=ECO HAB_2, R/V Wecoma, W0308C, August 30 - September 19, 2003 [Cruise Report](#)
Cruise_3=ECO HAB_3, R/V Atlantis, AT11-17, September 8-28, 2004 [Cruise Report](#)
Cruise_4=ECO HAB_4, R/V Atlantis, AT11-30, July 7-27, 2005 [Cruise Report](#)
Cruise_5=ECO HAB_5, R/V Melville, TUIM14MV, September 2-22, 2005 [Cruise Report](#)
Cruise_6=ECO HAB_6, R/V Thomas G. Thompson, TN200, Sept. 11- Oct. 4, 2006 [Cruise Report](#)

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-0234587
National Oceanic and Atmospheric Administration (NOAA)	NA170P2789

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