CTD data from 5 stations collected on an R/V Lowell Weicker cruise in Fisher's Island Sound (NY/CT) in 2012

Website: https://www.bco-dmo.org/dataset/3714
Data Type: Cruise Results
Version: 1
Version Date: 2012-09-06

Project
» Diversity and dynamics of planktonic ciliates - what can next-generation sequencing technologies tell us? (CiliateSequencing)

Contributors	Affiliation	Role
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Abstract
Temperature, salinity, fluorescence, and sigma-t density measured by CTD are reported for 5 stations in Fisher's Island Sound.

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Coverage

Spatial Extent: **N**:41.30583 **E**:-71.93665 **S**:41.29707 **W**:-72.00127
Temporal Extent: 2012-05-30

Dataset Description

Temperature, salinity, fluorescence, and sigma-t density measured by CTD are reported for 5 stations in Fisher's Island Sound.

Methods & Sampling

Note: Stations 1, 3, and 5 were at a drogue. For stations 2 and 4, the ship moved about 1 kilometer away from the drogue. When station 2 was sampled, the drogue had moved east of it and sampling occurred up-current from the drogue. Tide was ebb --> slack --> flood.

Header Information from Sea-Bird SBE19 Data File:
Software Version 1.59
Temperature SN = 504; Conductivity SN = 504

SEACAT PROFILER V2.1e SN 504 05/30/12 13:51:21.934
pressure sensor: serial no = 184805, range = 100 psia, tc = -585
clk = 32767.742 iop = 142 vmain = 11.9 vlith = 5.3
ncasts = 5 samples = 1684 free = 19973 lwait = 0 msec
sample rate = 1 scan every 0.5 seconds
minimum raw conductivity frequency for pump turn on = 0 hertz; pump delay = 30 seconds
battery cutoff = 7.2 volts; number of voltages sampled = 4

cast 0: 05/30 09:50:19 samples 0 to 388 nquan = 7 nvalues = 389
cast 1: 05/30 10:53:36 samples 389 to 774 nquan = 7 nvalues = 386
cast 2: 05/30 11:23:25 samples 775 to 1113 nquan = 7 nvalues = 339
cast 3: 05/30 11:46:51 samples 1114 to 1358 nquan = 7 nvalues = 245
cast 4: 05/30 12:12:29 samples 1359 to 1683 nquan = 7 nvalues = 325

units = specified
name 0 = sigma-t00: Density [sigma-t, Kg/m^3]
name 1 = depSM: Depth [salt water, m], lat = 41.00
name 2 = wetStar: Fluorescence, WET Labs WETstar [mg/m^3]
name 3 = sal00: Salinity, Practical [PSU]
name 4 = t090C: Temperature [ITS-90, deg C]
name 5 = timeS: Time, Elapsed [seconds]
name 6 = flag: 0.000e+00

interval = seconds: 0.5; bad_flag = -9.990e-29

sensor 1 = Frequency 0, Temperature; Temp. Sensor ID: 55; SerialNumber: 504;
CalibrationDate: 28-Jan-11

sensor = 2 Frequency 1, Conductivity; Cond. Sensor ID: 3; SerialNumber: 504;
CalibrationDate: 28-Jan-11

sensor = 3 A/D voltage 0, Oxygen Current, Beckman/YSI; Oxygen Sensor ID: 36; SerialNumber: 230238;
CalibrationDate: 21-Mar-2011

sensor = 4 A/D voltage 1, Oxygen Temperature, Beckman/YSI; Oxygen Sensor ID: 39; SerialNumber: 230238;
CalibrationDate: 21-Mar-2011

sensor = 5 A/D voltage 2, Fluorometer, WET Labs WETstar; FluoroWetlabWetstar Sensor ID: 21;
SerialNumber: WS3S-166;
CalibrationDate: 23-Feb-2011; ScaleFactor: 15.400

sensor = 6 A/D voltage 3, Free

sensor = 7 Pressure voltage, Pressure, Strain Gauge; Pressure Sensor ID: 49; SerialNumber: 504;
CalibrationDate: 04-Feb-11

datcnv_skipover = 0

Data Processing Description

Only downcast data is included; surface equilibration has been edited out.

The WetStar Fluorometer calibrated by Seabird (Feb 2011) was NOT validated with contemporaneous filtered samples, so values reported should be considered relative. CTD data was processed with SeaBird software.

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Data Files

File
CTD.csv (Comma Separated Values (.csv), 35.24 KB) MD5:32cc6d2e193d98f34cd85dd03484a101 Primary data file for dataset ID 3714

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Parameters

Parameter	Description	Units
day_local	Day of month (local time).	dd (01 to 31)
month_local	Month of year (local time).	mm (0 to 12)
year	4-digit year. in YYYY format	unitless
sta	Station ID number.	unitless
lat_start	Latitude at start of CTD cast. North = positive.	decimal degrees
lon_start	Longitude at start of CTD cast. West = negative.	decimal degrees
depth_w	Depth of water at sampling station.	meters
time_start_local	Local time at start of CTD cast; 24-hr clock.	HHMM
depth	Depth of cast.	meters
time_elapsed	Time elapsed from start of measurement.	seconds
sigma_t	Sigma-t density.	kg/m^3
fluor	Chlorophyll fluorescence from WetStar Fluorometer.	mg/m^3
sal	Salinity measured by CTD.	PSU
temp	Temperature, in degrees Celsius.	degrees C
time_diff	The number of hours added to local time to convert to GMT.	hours
ISO_DateTime_Local	Date and time formatted to ISO8601 standard (local time). See time_diff for time zone info. in yyyy-MM-dd'T'HH:mm:ss'Z' format	unitless

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Instruments

Dataset-specific Instrument Name	CTD Sea-Bird SEACAT 19
Generic Instrument Name	CTD Sea-Bird SEACAT 19
Generic Instrument Description	The Sea-Bird SBE 19 SEACAT Recorder measures conductivity, temperature, and pressure (depth). The SEACAT is self-powered and self-contained and can be deployed in profiling or moored mode. The SBE 19 SEACAT was replaced in 2001 by the 19plus. more information from Sea-Bird Electronics

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Deployments

LW_053012

Website	https://www.bco-dmo.org/deployment/58854
Platform	R/V Lowell Weicker
Start Date	2012-05-30
End Date	2012-05-30
Description	One-day cruise on R/V Lowell Weicker for the project 'Diversity and dynamics of planktonic ciliates – what can next-generation sequencing technologies tell us?'. Sampling stations were located in Fisher's Island Sound (NY/CT, USA).

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Project Information

Diversity and dynamics of planktonic ciliates - what can next-generation sequencing technologies tell us? (CiliateSequencing)

Website: http://microzooplankton.uconn.edu

Coverage: NW Atlantic Continental Shelf

The Ocean's biomass and diversity are predominantly microbial, yet this aspect of diversity remains underexplored. Efforts in recent years have begun to document microbial diversity in marine systems, and to elucidate the processes that structure assemblages across space and time. This project focuses on two important sister clades of microbial eukaryotes, the oligotrich and choreotrich ciliates. These organisms comprise a major component of planktonic food webs as they graze on phytoplankton, and are in turn eaten by zooplankton and larval fish.

Earlier molecular work on ciliate diversity relied on light microscopy, construction of clone libraries and Sanger sequencing. This revealed a high degree of cryptic diversity (similar species that are genetically distinct), which is surprising, given the long-held idea that all microbes are globally distributed and that few species exist, at least as compared to animals and plants. This past work also showed that ciliate assemblages contain a few highly abundant forms and many rare ones, consistent with the concept of a "rare biosphere". However, these methods are limited by high costs of both labor and materials, so that efforts to sample any local assemblage comprehensively usually resulted in undersaturation (repeated sampling continued to uncover new species). Next generation approaches are needed to truly assess the depths of biodiversity in planktonic ciliates.

This project brings together investigators with strengths in ecology, taxonomy and oceanography (PI

McManus) and in molecular evolution, systematics and bioinformatics (PI Katz). Pyrosequencing will be used to sample the oligotrich and choreotrich ciliates 'to exhaustion' in coastal environments. Denaturing gradient gel electrophoresis (DGGE), a technique that generates a fingerprint of the diversity in a sample, will be used to pre-select samples for pyrosequencing based on where strong gradients are observed in the composition of assemblages in relation to environmental factors (density fronts, thermolclines, etc.). Using these approaches, combined with the informatics pipeline already in place, this project will address three specific objectives:

Objective 1. Determine the spatial scale of variability in ciliate diversity by measuring how ciliate assemblages change over meter, kilometer, 100 km, and basin scales.

Objective 2. Assess the contributions of different size classes of ciliates to overall assemblage diversity.

Objective 3. Experimentally evaluate factors that control the temporal shift of individual species from rarity to commonness in a natural assemblage, and vice versa.

Note: See the related collaborative project, "Patterns of diversity in planktonic ciliates: spatio-temporal scales and community assembly in the coastal ocean", funded by awards OCE-1435515 and OCE-1436003.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1129734
NSF Division of Ocean Sciences (NSF OCE)	OCE-1130033

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