ADCP transects oriented either across-shelf or along-shelf, from multiple day trips in the coastal waters, Gulf of Maine from 2015-2016 (GOMEPRO project)

Website: https://www.bco-dmo.org/dataset/699755
Data Type: Cruise Results
Version:
Version Date: 2017-12-01

Project
» Intertidal community assembly and dynamics: Integrating broad-scale regional variation in environmental forcing and benthic-pelagic coupling (GOMEPRO)

Contributors	Affiliation	Role
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Coverage

Spatial Extent: **N**:44.8051 **E**:-66.9634 **S**:42.3867 **W**:-70.9252

Dataset Description

This dataset contains data from an RDI 600 kHz Acoustic Doppler Current Profiler (ADCP) oriented either across-shelf or along-shelf, from multiple day trips in the coastal waters, Gulf of Maine from 2015-2016.

A list of ADCP sampling location names and dates is available in the following dataset:
ADCP/CTD transect log

ADCP files (.ENX) can be downloaded in the following .zip file GOMEPRO_ADCP.zip (192 MB zipped, 448 MB unzipped)

Methods & Sampling

Current profiles were sampled along transects with a boat-mounted, downward-looking RDI 600 kHz ADCP (acoustic doppler current profiler). Transects were oriented either across-shelf or along-shelf. Sampling was limited to 2 hrs. in the middle of the tidal cycle, on either flood or ebb tides. Sampling was continuous along each transect.

Data Processing Description

Data are provided as partially processed files in RDI's .ENX format. ENX files contain ADCP single-ping (and navigation) data that have been bin-mapped, transformed to Earth coordinates, and screened for error velocity, vertical velocity, and false targets. These data are considered ready for averaging.

The .ENX files can be opened and viewed with VmDAS or WinADCP.

BCO-DMO Data Manager Processing Notes:
* added a conventional header with dataset name, PI name, version date
* included information in original filenames for ctd number
* Made longitudes negative where needed. Some longitudes (W) were postivie, some negative.

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Data Files

File
ADCP.csv (Comma Separated Values (.csv), 5.95 KB) MD5:8e412508f0b3124eee98d8606e49685e Primary data file for dataset ID 699755

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Parameters

Parameter	Description	Units
Year	Year of sampling	untiless
Project	Project name short name (GOMEPRO)	unitless
Location	Sampling location name	untiless
Transect	Transect identifier	unitless
Tide	Tide (flood or ebb)	unitless
Date	Date of sampling in format yymmdd. Some dates also have A or B after them	unitless
Filename	ADCP filename (.ENX) associated with the transect	unitless
Beg_Lat	Transect begin latitude	decimal degrees
Beg_Lon	Transect begin longitude	decimal degrees
End_Lat	Transect end latitude	decimal degrees
End_Lon	Transect end longitude	decimal degrees
CTD_Stations	Description of CTD stations along transect	unitless

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Instruments

Dataset-specific Instrument Name	RDI 600 kHz ADCP (acoustic doppler current profiler)
Generic Instrument Name	Acoustic Doppler Current Profiler
Generic Instrument Description	The ADCP measures water currents with sound, using a principle of sound waves called the Doppler effect. A sound wave has a higher frequency, or pitch, when it moves to you than when it moves away. You hear the Doppler effect in action when a car speeds past with a characteristic building of sound that fades when the car passes. The ADCP works by transmitting "pings" of sound at a constant frequency into the water. (The pings are so highly pitched that humans and even dolphins can't hear them.) As the sound waves travel, they ricochet off particles suspended in the moving water, and reflect back to the instrument. Due to the Doppler effect, sound waves bounced back from a particle moving away from the profiler have a slightly lowered frequency when they return. Particles moving toward the instrument send back higher frequency waves. The difference in frequency between the waves the profiler sends out and the waves it receives is called the Doppler shift. The instrument uses this shift to calculate how fast the particle and the water around it are moving. Sound waves that hit particles far from the profiler take longer to come back than waves that strike close by. By measuring the time it takes for the waves to bounce back and the Doppler shift, the profiler can measure current speed at many different depths with each series of pings. (More from WHOI instruments listing).

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Deployments

Yund_GoME

Website	https://www.bco-dmo.org/deployment/699509
Platform	R/V C-HAWK
Start Date	2012-08-01
End Date	2016-07-29
Description	The C-Hawk is a 22 ft. fiberglass modified V-hull. These were multiple single-day deployments for GOMEPRO project. Eastern Gulf of Maine Sampled with single-day cruises on: 8/1/12 8/16/12 8/22/12 7/31/13 7/22/14 8/5/14 8/6/14 8/7/14

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Project Information

Intertidal community assembly and dynamics: Integrating broad-scale regional variation in environmental forcing and benthic-pelagic coupling (GOMEPRO)

Coverage: Rocky intertidal shores and nearshore coastal waters throughout the Gulf of Maine

Rocky intertidal habitats in the Gulf of Maine (GoM) provide a model system to examine the structure and dynamics of natural communities. Throughout the Gulf of Maine, the same species are often found in these habitats but community structure, dynamics and productivity differ markedly among 3 distinct regions (southern, central and northern GoM). Past influential work, conducted primarily in the southern and central GoM, focused on the local processes driving intertidal community structure but produced very different conceptual models of how these communities are structured. This project examines whether regional differences in rocky shore community processes are driven by differences in recruitment that are shaped by

regional variation in temperature and food availability and nearshore coastal oceanography. This project will improve the understanding of how large-scale environmental forces interact with local processes to control the distribution of species and the structure and dynamics of these communities. Understanding the interaction between processes operating at different scales is fundamentally important to developing more reliable models that can be used to predict community dynamics. In addition, data resulting from this project will have important implications for regional dynamics in commercially important species and for ecosystem and fisheries management within the GoM.

The overarching hypothesis of this project is that regional differences in community-level processes are driven by very different patterns of population connectivity and recruitment in a few key species, and that these differences are ultimately caused by regional variation in temperature and food availability and mediated by physical larval transport processes. Hence, the project will test the following hypotheses with manipulative field experiments, field sampling, connectivity estimates, and integrative modeling:
1) Locally-dispersing species dominate dynamics in regions with a net export of planktonic larvae (Northern GoM), while species with planktonic larvae dominate the dynamics in regions with high settlement and extensive connectivity among populations (Southern GoM).
2) Settlement density of species with planktonic larvae increases from northern to southern regions in accord with regional variation in food availability.
3) Population connectivity varies greatly among regions, with regions differing in the degree to which they are self-seeded or serve as larval sources vs. sinks; self-seeding leads to relatively localized population dynamics in the middle portion of the GoM.
4) Patterns of population connectivity are driven by physical transport processes and can be represented by coupling basic larval behavior models with circulation models.

At 18 different sites in the GoM across ~ 600 km, surveys will evaluate variation in recruitment, food availability and secondary productivity and experiments will assess community processes in wave-exposed and sheltered habitats. We will use hydrographic, current profile, and larval vertical distribution surveys to collect data for coupled larval/circulation models. Population connectivity will be both modeled and empirically evaluated (for one species) using elemental fingerprinting. A spatially explicit metacommunity model will integrate across all project components and test the relative importance of regional and local processes in controlling community organization and dynamics.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1458188

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