Acoustic Current Meter data from SEEPC moorings collected on the R/V Oceanus (OC471-02) and R/V Atlantis (AT26-15) from 2011-2014 (SEEPC project)

Website: https://www.bco-dmo.org/dataset/561439
Version: 2015-05-01

Project
» Connectivity in western Atlantic seep populations: Oceanographic and life-history processes underlying genetic structure (SEEPC)

Contributors	Affiliation	Role
Van Dover, Cindy	Duke University	Principal Investigator
Eggleston, David B.	North Carolina State University - Marine, Earth and Atmospheric Sciences (NCSU MEAS)	Co-Principal Investigator
McVeigh, Doreen	North Carolina State University - Marine, Earth and Atmospheric Sciences (NCSU MEAS)	Contact
Copley, Nancy	Woods Hole Oceanographic Institution (WHOI BCO-DMO)	BCO-DMO Data Manager

Table of Contents

Methods & Sampling

Measurements were taken over varying time intervals in order to conserve battery for longer ACM missions. The data are time/date stamped accordingly. ACM's are manufactured by Falmouth Scientific, Inc. and are 2-Dimensional ACMs. The models are identical, and the firmware is the same except for one of the Gulf of Mexico deployment ACMs, which featured newer Firmware.

Data Processing Description

The data has been minimally processed.

[table of contents | back to top]

Data Files

File
SEEPC_ACM.csv (Comma Separated Values (.csv), 4.24 MB) MD5:2a282f9f32463fc95c7b29d7f4d78679 Primary data file for dataset ID 561439

[table of contents | back to top]

Parameters

Parameter	Description	Units
cruise_id	cruise identification	unitless
deploy_num	deployment number	unitless
mooring	mooring identification	unitless
lat	latitude; north is positive	decimal degrees
lon	longitude; east is positive	decimal degrees
depth	depth	meters
time_start	start time	HH:MM:SS
date_start	start date	mm-dd-yyyy
serial_num	serial number of instrument	unitless
AVN	northward (- is Southward) component of current velocity averaged over the averaging interval (defined in the config screenshots)	cm/s
AVE	eastward (- is Westward) component of current velocity averaged over the averaging interval (defined in the config screenshots)	cm/s
ASPD	average speed	cm/s
AVDIR	average direction	degrees from North
TIME	UTC time	HH:MM:SS
DATE	UTC date	mm-dd-yyyy
ISO_DateTime_UTC	date and time; ISO 8601:2004(E) formatted	YYYY-mm-ddTHH:MM:SS[.xx]Z (UTC time)
yrday_utc	UTC day and decimal time; eg. 326.5 = the 326th day of the year or November 22 at 1200 hours (noon)	unitless
VN	northward (- is Southward) instantaneous velocity	cm/s
VE	eastward (- is Westward) instantaneous velocity	cm/s

[table of contents | back to top]

Instruments

Dataset-specific Instrument Name	ACM
Generic Instrument Name	Deep-Sea Current Meter and Larval Trap Mooring
Generic Instrument Description	The Deep-Sea Current Meter and Larval Trap Mooring is a seafloor anchored mooring equipped to collect sediment/invertebrate larva, and record deep-sea ocean current and acoustical data. Instruments on the mooring have included sediment traps and a Falmouth Scientific Inc. Acoustic Current Meter with vector-averaged current speed and direction.

[table of contents | back to top]

Deployments

OC471-02

Website	https://www.bco-dmo.org/deployment/521430
Platform	R/V Oceanus
Report	http://dmoserv3.whoi.edu/data_docs/SEEPC/OC471-02_cruise_report.pdf
Start Date	2011-05-17
End Date	2011-05-20
Description	cruise for SEEPC project. Cruise information and original data are available from the NSF R2R data catalog. Science Objectives (from Cruise Planning Synopsis): Preliminary science activities at 3 Barbados seep sites (El Pilar, Orenoque A, Orenoque B) on the accretionary wedge for return visit to sites with DSRV Alvin in May-June 2012. Part of the Seep Connectivity Project funded by NSF to investigate historical and contemporary linkages among Barbados, Gulf OF MExico, and Blake Ridge seep species. Science Activities At each site: 1) Sub-bottom profiling to locate seep areas 2) MOCNESS tow for larval sampling 3) Deep-water (35 m HOB) mooring deployment (current meter, 2 sediment/larval traps per mooring) 4) Bone/wood package deployment

AT26-15

Website	https://www.bco-dmo.org/deployment/517377
Platform	R/V Atlantis
Start Date	2014-05-21
End Date	2014-06-14
Description	Start: Depart Gulfport, MS 05/21/2014 End: Arrive St. Petersburg, FL 06/14/2014 The AT26-15 cruise was conducted as part of the project "Connectivity in western Atlantic seep populations: Oceanographic and life-history processes underlying genetic structure" (SeepC) funded by NSF OCE-1031050. The cruise included coordinated deployments of DSV Alvin and AUV Sentry. Science objectives (from the WHOI Cruise Planning Synopsis): The primary objective of the SeepC Project is to advance our general knowledge of connectivity in the deep sea using taxa found at seeps as model systems. The focus is on species and processes occurring in the Intra-American Sea (including the Caribbean, Gulf of Mexico, and eastern seaboard of the US), with attention to oceanographic circulation, life histories, and genetics. Our efforts include improving the oceanographic model for the IAS near the seabed using current data from moorings at several depths and locations and coupling this model to a Lagrangian larval transport model. We stress the importance of iterative interactions among the science teams to advance our understanding of connectivity in the deep sea through descriptive and hypothesis-driven research. We will develop effective and best methods for hypothesis testing under the constraints of working in a relatively inaccessible environment and will build capacity in understanding connectivity in deep-sea systems.

[table of contents | back to top]

Project Information

Connectivity in western Atlantic seep populations: Oceanographic and life-history processes underlying genetic structure (SEEPC)

Coverage: Western Atlantic, Gulf of Mexico, Intra-American Sea

This project will evaluate connectivity on spatial scales that match those at which vent systems are being studied (3500 km), with a set of nested seeps (within the Barbados system) within which connectivity can be explored at more local spatial scales (30 to 130 km), and with species that span depth (600 m to 3600 m) and geographic ranges (30 km to 3500 km) and that have diverse life-history characteristics. Five deep-sea seep systems in the Intra- American Sea (IAS) are targeted: Blake Ridge, Florida Escarpment, Alaminos Canyon, Brine Pool, Barbados (El Pilar, Orenoque A, Orenoque B). The primary objective is to advance our general knowledge of connectivity in the deep sea. The focus is on species and processes occurring in the IAS, with attention to oceanographic circulation, life histories, and genetics. Questions that apply in shallow-water systems motivate this study:

1. What phylogeographic breaks occur in the system? It is important to distinguish between phylogeographic history and connectivity. A phylogeographic break with no shared alleles between populations implies a long history of isolation or possibly cryptic speciation.

2. Are populations connected by ongoing migration? This is the fundamental question about connectivity and the scale of genetic variation in marine species with planktonic larvae.

3. What biophysical processes underlie observed connectivities? Biological processes (e.g., larval distributions in the water column, timing of reproduction, and planktonic larval duration) and physical processes of transport and dispersion interact to determine connectivity.

The oceanographic model for the IAS will be improved and coupled to a Lagrangian larval transport model. The field program includes time-series sampling of larvae at seeps with records of current velocities, water column sampling to determine larval distribution potential, shipboard studies of larval biology and behavior, and sampling of benthic target species. Phylogenetic and population genetic tools will be used to explore historical and contemporary gene flow. Iterative interactions among the science teams will advance our understanding

of connectivity in the deep sea and to develop effective and best methods for hypothesis testing under the constraints of working in a relatively inaccessible environment. Since their discovery, deep-sea chemosynthetic ecosystems have been novel systems within which to test the generality of paradigms developed for shallow-water species. This study will explore scale-dependent biodiversity and recruitment dynamics in deep-sea seep communities, and will identify key factors underlying population persistence and maintenance of biodiversity in these patchy systems.

Google Earth map showing positions of stations, CTD, XBT, multibeam locations (KMZ file dlownload)

[table of contents | back to top]

Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1029841

[table of contents | back to top]