# Plankton net cast deployments and collection information from R/V Endeavor cruise EN658 from Narragansett, Rhode Island to Gulfport, Mississippi in October and November of 2020

**Website**: https://www.bco-dmo.org/dataset/945103
**Data Type**: Cruise Results
**Version**: 1
**Version Date**: 2024-12-03

**Project**
» Collaborative Research: dispersal depth and the transport of deep-sea, methane-seep larvae around a biogeographic barrier (SALT)



| Contributors | Affiliation | Role |
|---|---|---|
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**Abstract**
This dataset is a summary of the surface, vertical hand net tows that occurred on R/V Endeavor cruise EN658 in the Western Atlantic margin and Gulf of Mexico (from the University of Rhode Island to Gulfport, Mississippi) in October and November 2020. This was the second sampling cruise of a series of four for the project titled "Collaborative Research: dispersal depth and the transport of deep-sea, methane-seep larvae around a biogeographic barrier", also called "SALT" for short.

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## Coverage

**Location**: Methane seep sites along the Western Atlantic margin and within the Gulf of Mexico.
**Spatial Extent**: **N**:38.05266 **E**:-73.812477 **S**:23.981813 **W**:-91.507183
**Temporal Extent**: 2020-10-24 - 2020-11-05

### Methods & Sampling

A vertical plankton tow was conducted by clipping the cod end of the net to a weighted line, lowering the net to

200 meters, and then returning the apparatus to the surface. The plankton tow was then sorted by hand using microscopes and pipettes to isolate any larval forms present.

### BCO-DMO Processing Description

* Table contained in "en658_handnet_collection_summary.csv" was imported into the BCO-DMO data system for this dataset. Values "N/A" imported as missing data values.
** In the BCO-DMO data system missing data identifiers are displayed according to the format of data you access. For example, in csv files it will be blank (null) values. In Matlab .mat files it will be NaN values. When viewing data online at BCO-DMO, the missing value will be shown as blank (null) values.

* Date converted to ISO 8601 format

* "(min)" removed from

* Time zone of "Start" and "End" were indicated to be local time, so to aid in conversion to UTC an additional column local_Time_Zone was added since the cruise was in different timezones (Eastern and Central) and also crossed the daylight savings time boundary.
* ISO DateTime with timezone (UTC) column added in ISO 8601 format. Using Start and End local times and utc offset information. UTC offset sent to the data submitter for verification. Start and End renamed Start_local and End_local for clarity.

* Cruise_ID column added for consistency with related datasets.

* "min" removed from Duration column values and added to column description and unit information. Column typed as interger ("20min"->20).

* lat and lon columns renamed to reflect column contents. Verification request sent to the data submitter.
Columns were labeled:
Start_lat, Start_long, End_lat, End_long
Changed to:
Start_lat, End_lat, Start_long, End_long

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## Related Datasets

### IsRelatedTo

Young, C. M., Arellano, S. M., Eggleston, D. B., He, R. (2023) **Summary of AUV Sentry dives conducted on R/V Endeavor cruise EN658 from Narragansett, Rhode Island to Gulfport, Mississippi in October and November of 2020.** Biological and Chemical Oceanography Data Management Office (BCO-DMO). (Version 1) Version Date 2023-12-03 http://lod.bco-dmo.org/id/dataset/893961 [view at BCO-DMO]
*Relationship Description: A series of 200-meter vertical plankton net tows were conducted to supplement the Sentry dives.*

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## Parameters

| Parameter | Description | Units |
|---|---|---|
| Date | Date of the hand net deployment | unitless |

| | | |
|---|---|---|
| Cruise_ID | Cruise identifer | unitless |
| Site_name | The name of the sample site; unitless | unitless |
| Deployment_ID | The cast identification number for each plankton net tow | unitless |
| Start_lat | Beginning latitude of the plankton net tow | decimal degrees |
| Start_long | Beginning longitude of the plankton net tow | decimal degrees |
| End_lat | Concluding latitude of the plankton net tow | decimal degrees |
| End_long | Concluding longitude of the plankton net tow | decimal degrees |
| Tow_type | Directionality of the plankton net tow | unitless |
| Depth | Maximum depth the plankton net was lowered to | meters (m) |
| Duration | Amount of time the plankton net tow ran for; given in minutes | count (minutes) |
| Start_DateTime_UTC | Start datetime with timezone of the plankton net tow; given in ISO 8601 format (Z indicates UTC) | unitless |
| Start_local | Start time of the plankton net tow; given in local time | unitless |
| End_local | End time of the plankton net tow; given in local time | unitless |
| local_Time_Zone | Time zone (UTC "+-hhmm", ISO 8601 format). UTC offset from local time reported in "Start_local" and "End_local" columns. | unitless |
| Volume | Volume of water filtered by the plankton net during the tow | liters (L) |
| Num_Morpho | The total number of larval morphotypes, or unique larval types/forms observed in the sample | unitless |
| Total_Larvae | The total number of larvae seen (or calculated) within a sample | unitless |
| Num_New_Morpho | Number of new or unique larval types/forms (morphotypes) not observed in previous samples | unitless |

| | | |
|---|---|---|
| Notes | Additional pertinent information regarding the plankton net tow or the subsequent processing of samples | unitless |

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## Instruments

| | |
|---|---|
| **Dataset-specific Instrument Name** | |
| **Generic Instrument Name** | Plankton Net |
| **Dataset-specific Description** | A plankton net with a mesh size of 150 microns was used to filter water and obtain samples. |
| **Generic Instrument Description** | A Plankton Net is a generic term for a sampling net that is used to collect plankton. It is used only when detailed instrument documentation is not available. |

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## Deployments

**EN658**

| | |
|---|---|
| **Website** | https://www.bco-dmo.org/deployment/893849 |
| **Platform** | R/V Endeavor |
| **Start Date** | 2020-10-22 |
| **End Date** | 2020-11-07 |
| **Description** | See more information at R2R: https://www.rvdata.us/search/cruise/EN658 During this cruise, we had four dives with AUV Sentry to use the SyPRID plankton sampler. We also took 14 plankton samples from 0-200 m depth using a standard plankton net. |

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## Project Information

**Collaborative Research: dispersal depth and the transport of deep-sea, methane-seep larvae around a biogeographic barrier (SALT)**

**Website**: https://wp.wwu.edu/arellanolab/category/salt/

**Coverage**: Methane seeps on the shelf and slope of Louisiana, Mississippi, Florida, North Carolina, Virginia and Maryland

*NSF Award Abstract:*
Ever since hydrothermal vents and methane seeps were first discovered in the deep ocean more than 40 years ago, scientists have wondered how these isolated communities, fully dependent on underwater "islands" of toxic chemicals, are first colonized by organisms, and how the populations of these specialized animals are exchanged and maintained. These fundamental processes depend on the transport of babies (larvae) by the ocean currents, yet because the larvae are microscopic and diluted in the vastness of the ocean, it is very

difficult to determine where and how they drift. This project uses an autonomous underwater vehicle to collect larvae from precise regions of the water column. Larval traps on the bottom and chemical analyses of larval shells will also be used to determine the depths where larvae swim. These findings will provide realistic estimates for mathematical models that show how biology interacts with ocean currents to predict which methane seeps will be colonized by larvae originating at different depths. A detailed knowledge of larval dispersal is needed for conservation and management of the deep sea. Without such information, we cannot know the best placement of marine protected areas, nor can we facilitate the reestablishment of communities impacted by deep-sea mining, drilling, or other human activities. This project will provide hands-on at-sea training for college students to learn the rapidly vanishing skills needed for studies of larvae and embryos in their natural habitats. Learning opportunities will also be available to individuals of all ages through new, interactive exhibits on deep-sea biology and larval ecology produced for small museums and aquaria on the coasts of Oregon, Washington and North Carolina.

Reliable estimates of connectivity among metapopulations are increasingly important in marine conservation biology, ecology and phylogeography, yet biological parameters for biophysical models in the deep sea remain largely unavailable. The movements of deep-sea vent and seep larvae among islands of habitat suitable for chemosynthesis have been inferred from current patterns using numerical modeling, but virtually all such models have used untested assumptions about biological parameters that should have large impacts on the predictions. This project seeks to fill in the missing biological parameters while developing better models for predicting the dispersal patterns of methane seep animals living in the Gulf of Mexico and on the Western Atlantic Margin. Despite the existence of similar seeps at similar depths on two sides of the Florida peninsula, the Western Atlantic seeps support only a subset of the species found in the Gulf of Mexico. It is hypothesized that the ability of larvae to disperse through the relatively shallow waters of the Florida Straits depends on an interaction between the adult spawning depth and the dispersal depth of the larvae. Dispersal depth, in turn, will be influenced by larval flotation rates, swimming behaviors, feeding requirements, and ontogenetic migration patterns during the planktonic period. The recently developed SyPRID sampler deployed on AUV Sentry will be used to collect larvae from precise depth strata in the water column, including layers very near the ocean floor. Larval traps deployed on the bottom at three depths in each region will be used in conjunction with the plankton collections to determine what proportion of larvae are demersal. Comparisons of stable oxygen isotopes between larval and juvenile mollusk shells will provide information on the temperatures (and therefore depths) that larvae develop, and geochemical analyses of larval and juvenile shells will determine whether larval cohorts mix among depth strata. Ocean circulation and particle transport modeling incorporating realistic biological parameters will be used to predict the movements of larvae around the Florida Peninsula for various spawning depths and seasons.

This award reflects NSF's statutory mission and has been deemed worthy of support through evaluation using the Foundation's intellectual merit and broader impacts review criteria.

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## Funding


| Funding Source | Award |
|---|---|
| NSF Division of Ocean Sciences (NSF OCE) | OCE-1851383 |
| NSF Division of Ocean Sciences (NSF OCE) | OCE-1851286 |
| NSF Division of Ocean Sciences (NSF OCE) | OCE-1851421 |


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