

Gelatinous zooplankton observations during four research cruises (SKQ202204S, MGL2207, SKQ202303S, SR2317) carried out in the Northern California Current from March 2022 to August 2023

Website: <https://www.bco-dmo.org/dataset/923337>

Data Type: Cruise Results

Version: 1

Version Date: 2024-04-09

Project

» [Collaborative Research: Plankton size spectra and trophic links in a dynamic ocean](#) (Plankton Size Spectra)

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Abstract

These data include a list of gelatinous zooplankton species observed during four 14-day research cruises carried out in the Northern California Current from March 2022 to August 2023. Plankton samples were collected with a coupled MOCNESS system that was towed to 100 m (or 5 m off the bottom in stations with <100 m depth). Samples were subsequently poured into sorting tray and picked for gelatinous taxa. This data set represents the first comprehensive list of gelatinous taxa from this region and includes ctenophores, cnidarians and pelagic tunicates, taxa that are largely omitted from studies in the NCC.

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Coverage

Spatial Extent: N:47.1025 E:-124.021 S:42.501 W:-126.09

Temporal Extent: 2022-03-02 - 2023-08-18

Methods & Sampling

Gelatinous zooplankton were sampled using MOCNESS (Multiple Opening-Closing Net and Environmental Sensing System) tows. The nets had opening of 1m² and 4m² with mesh sizes of 333µm and 1000µm,

respectively. The dataset describes daytime samples only.

Data Processing Description

Species was identified to the lowest taxonomic level. Length of species was measured onboard using ruler and volume was measured by displacement.

BCO-DMO Processing Description

- * Added latitude and longitude in decimal degrees to dataset
- * Changed date to ISO format (yyyy-mm-dd)
- * Adjusted parameter names to comply with database requirements
- * Converted X and - to missing data identifier (blank)

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Data Files

File
923337_v1_zooplanktonobs.csv (Comma Separated Values (.csv), 58.30 KB) MD5:fe92acbbcccc0540f606dfb884cb1010
Primary data file for dataset ID 923337, version 1

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Supplemental Files

File
Taxonomic categories and identifiers filename: species_list_and_IDs.csv (Comma Separated Values (.csv), 16.00 KB) MD5:be365270565db71cfdfec4975e8d2596
Taxon information from WoRMS match of primary datafile of dataset 923337. WoRMS match performed Matching done 2023-11-20.
Column information (name, description): Category_type, Category type indicates which column in the dataset this category was used (either "Broad" or "Lowest" ID) Category_in_dataset, The exact term used in the dataset as the broad or lowest category taxon_in_category, Just the taxonomic name from the category term AphiaID, The taxonomic identifier for the taxon (see World Register of Marine Species (WoRMS)). LSID, The Life Sciences identifier (LSID) for the category synonym_status_20231120, Status of the name. Indicates if it is the currently "accepted" name for this organism or an "unaccepted" synonym at the time the name was checked at WoRMS on 2023-11-20. AphiaID_accepted, If the category used an unaccepted synonym, this column is the identifier for the currently accepted name. ScientificName_accepted, If the category used an unaccepted synonym, this column is the currently accepted name (accepted synonym).

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Parameters

Parameter	Description	Units
Date	Sample date in GMT timezone, ISO format (yyyy-mm-dd)	unitless
Broad_taxon_ID	Broad taxonomic group of species	unitless
Lowest_taxon_ID	Lowest taxonomic name of species	unitless
Life_stage	Life cycle stage of species	unitless
Number_of_Individuals	Number of individuals used for length and volume measurement	unitless
Length	Length range of species collected	millimeter (mm)
Volume	Displacement volume of species in ml	milliliter(ml)
Transect	Sampling transect:GH=Grays Harbor, CR=Columbia River,CM=Cape Meares, NH= Newport hydrographic ,HH=Heceta Head, RR= Rogue River	unitless
Station	Location along transect: 1=closet nearshore; 6=furthest offshore	unitless
Latitude	Latitude of tow start location in decimal degrees	decimal degrees
Longitude	Longitude of tow start location in decimal degrees	decimal degrees
MOC	Net type: 1=Moc1, 1m2 opening 333 um mesh; 4=Moc4, 4m2 opening 1 mm mesh	unitless
Net	Net open on MOCNESS	unitless
Depth	Depth range sampled by the MOCNESS net	meter (m)

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Instruments

Dataset-specific Instrument Name	
Generic Instrument Name	MOCNESS
Dataset-specific Description	Multiple Opening-Closing Net and Environmental Sensing System (MOCNESS). The nets had opening of 1m2 and 4m2 with mesh sizes of 333µm and 1000µm, respectively.
Generic Instrument Description	The Multiple Opening/Closing Net and Environmental Sensing System or MOCNESS is a family of net systems based on the Tucker Trawl principle. There are currently 8 different sizes of MOCNESS in existence which are designed for capture of different size ranges of zooplankton and micro-nekton Each system is designated according to the size of the net mouth opening and in two cases, the number of nets it carries. The original MOCNESS (Wiebe et al, 1976) was a redesigned and improved version of a system described by Frost and McCrone (1974).(from MOCNESS manual) This designation is used when the specific type of MOCNESS (number and size of nets) was not specified by the contributing investigator.

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Deployments

SKQ202303S

Website	https://www.bco-dmo.org/deployment/914489
Platform	R/V Sikuliaq
Start Date	2023-02-16
End Date	2023-03-01
Description	Newport to Newport, OR

SKQ202204S

Website	https://www.bco-dmo.org/deployment/923356
Platform	R/V Sikuliaq
Start Date	2022-03-01
End Date	2022-03-12

MGL2207

Website	https://www.bco-dmo.org/deployment/923370
Platform	R/V Marcus G. Langseth
Start Date	2022-07-18
End Date	2022-07-30

SR2317

Website	https://www.bco-dmo.org/deployment/923378
Platform	R/V Sally Ride
Start Date	2023-08-09
End Date	2023-08-21

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Project Information

Collaborative Research: Plankton size spectra and trophic links in a dynamic ocean (Plankton Size Spectra)

Website: <http://hmsc.oregonstate.edu/research-labs/planktonlab/current-research>

Coverage: Northern California Current

NSF Award Abstract:

Marine plankton form the base of most ocean food webs that support valuable fisheries. This highly diverse and complex community is composed of organisms that drift with ocean currents. Planktonic organisms remain understudied: they are difficult to sample given that their sizes span more than six orders of magnitude from less than one micron to meters. Yet, understanding how these communities respond to climate change, and ultimately how these responses affect valuable fisheries, and therefore food security, is critical. Because many ecological and physiological processes are dictated by relative size, the theory of size spectra (i.e., the relationship between size and organism abundance as it drives ecosystem properties such as food webs) provides a valuable framework for forecasting climate change impacts on marine ecosystems. A deeper understanding of the scope and nature of variability in size spectra under contrasting environmental conditions

is needed. The dynamic, highly productive northern California Current off Oregon and Washington, during the summer and winter seasons, produces a patchwork of oceanographic conditions including those associated with hypoxia and ocean acidification. This study is sampling the plankton communities in this region to investigate how gradients of temperature, nutrients, dissolved oxygen, and pH conditions impact size spectra. The broader impacts include the training of students, building scientific resources, and outreach to broader communities. Undergraduate and graduate students are being trained in oceanography, field research and new technologies. The automated image analysis pipeline developed as part of the project is openly accessible to the oceanographic community and the image data are available through the novel Global Plankton Imagery Library, an open-access repository for plankton imagery. Size spectra data from this study are shared directly with ecosystem modelers. The project's flagship outreach activity is the collaboration with the Sitka Center for Art and Ecology and the hosting of an Artist-At-Sea Program. A professional artist is competitively selected to join the research cruises and to create artistic products that give a unique voice to oceanographic research and the organisms under study. The artwork is being assembled into a traveling public Art Exhibit with planned displays at the Sitka Center, Oregon State University's Hatfield Marine Science Center, University of Oregon's Charleston Marine Life Center and centers located in underserved coastal communities. Finally, imagery data from the project are being shared via the Plankton Portal, a public website developed in partnership with the Citizen Science Alliance's Zooniverse, that invites citizen scientists to participate in classifying plankton images.

The coupling of in situ plankton imagery and morphometric data allows quantifying scales of variation in plankton size spectra as well as testing predictions of how changes in environmental conditions (notably, temperature, nutrients, oxygen, pH) correlate with shifts in size spectra to reveal functional consequences to the food web. Plankton size spectra are being compared across environmental conditions by sampling in a habitat with steep environmental gradients and during two contrasting seasons. Planktonic organisms spanning 10 orders of magnitude in biomass are sampled using two complementary high-resolution imaging systems: the In Situ Ichthyoplankton Imaging System (ISIIS) and the Laser In-Situ Scattering and Transmissometry (LISST) particle imager. High-throughput image analysis software is used to create size distributions together with taxonomic classification. Depth-discrete meso-zooplankton samples are collected in parallel to examine community shifts in carbon, obtain length-to-carbon conversions and calibrate image data. The normalized biomass size spectra computed from the image data are tested for deviations from expected patterns. The plankton collections are also being analyzed for diet and reproductive status of gelatinous zooplankton, and diet and daily growth rate of representative larval fishes. These two groups have been historically understudied yet play central roles in ecosystem function. The data are being used to examine how these organisms are impacted by environmental conditions, and how they affect plankton size spectra. This study is foundational to the understanding of marine ecosystems within the context of climate change.

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-2125408

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