Multinet zooplankton data from R/V Polarstern (ANT-XII_2) in the Western Weddell Sea from 2004-2005 (CMarZ_2004-2010 project)

Website: https://www.bco-dmo.org/dataset/3361
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Project
» Census of Marine Zooplankton-2004-2010 (CMarZ_2004-2010)

Program
» Census of Marine Life (CoML)

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Dataset Description

The mesozooplankton community, with special emphasis on calanoid copepods, was studied with respect to its species composition, abundance, vertical distribution and developmental structure during the Ice Station POLarstern(ISPOL) expedition to the ice-covered western Weddell Sea. Stratified zooplankton tows were carried out nine times between 1 December 2004 and 2 January 2005 with a multiple opening/closing net between 0 and 1000 m depth. Copepods were by far the most abundant taxon, contributing more than 94% of the total mesozooplankton. ... *Calanoides acutus* and *Metridia gerlachei* represented other abundant calanoid species contributing an average of 8% and 7%, respectively. All other species comprised less than 3%. ... The Ice Station POLarstern(ISPOL) expedition provided the opportunity to continue the investigations on zooplankton in the western Weddell Sea but in a different season, in spring 2004. The aims of the present study were the analyses of the zooplankton communities under perennial sea ice cover in the western Weddell Sea during the transition from spring to early summer with emphasis on major differences in abundance, vertical distribution and stage composition of the three dominating calanoid copepods *Microcalanus pygmaeus*, *C. acutus* and *Metridia gerlachei*." (http://dx.doi.org/10.1016/j.dsr2.2007.12.013)

Methods & Sampling

"Zooplankton was sampled between 1 December 2004 and 2 January 2005. Sampling was carried out nine times, and the interval between sampling varied between 3 and 5 days depending on the sea-ice conditions A multiple opening/closing net system (0.25 m2 aperture) equipped with five nets of 100 micron mesh size was used. Daytime vertical hauls were conducted at 0.5 m/sec between 1000 m and the surface, covering five standard depth intervals. The filtered volume was measured for each net by a digital flow meter. The samples were preserved in 4% borax-buffered formaldehyde/seawater solution and analysed for taxa composition,

abundance, distribution and age structure."(http://dx.doi.org/10.1016/j.dsr2.2007.12.013)

Data Processing Description

"According to density, samples were split into subsamples (1/2 - 1/32) using a Folsom splitter. Rare taxa and developmental stages were counted from the entire sample. With 10 exceptions, calanoid and harpacticoid copepods were identified to species level, and the sex and developmental stage was also determined. Cyclopoid specimens were only identified to genus level. In the calanoid genera Paraeuchaeta, Scaphocalanus and Lucicutia and the harpactidoid Drescheriella, copepodite stages were not further identified to species level but combined. Mean abundance is given as geometric mean. The mean population stage was calculated according to Marin (1987), and the weighted mean depth after Bollens and Frost (1989). Female copepods of *C. acutus* and *M. gerlachei* were sorted from preserved samples, and four different gonad developmental stages were determined according to Runge (1985): immature (stage 1), medium ripe (stage 2), semi-ripe (stage 3) and ripe (stage 4)." (http://dx.doi.org/10.1016/j.dsr2.2007.12.013)

References:

Bollens, S.M. and B.W. Frost, 1989. Predator-induced diel vertical migration in a planktonic copepod, Journal of Plankton Research 11 (5) (1989), pp. 1047 - 1065.

Marin,V. 1987. The oceanographic structure of the eastern Scotia Sea IV. Distribution of copepod species in relation to hydrography in 1981, Deep-Sea Research I 34 (1) (1987), pp. 105 - 121.

Runge,J.A., 1985. Relationship of egg production of *Calanus pacificus* to seasonal changes in phytoplankton availability in Puget Sound, Washington, Limnology and Oceanography 30 (2) (1985), pp. 382 - 396.

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Data Files

File
pangaea_zoo.csv(Comma Separated Values (.csv), 717.35 KB) MD5:0bfd806289971d5a9f62cf0a4c919a71 Primary data file for dataset ID 3361

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Parameters

Parameter	Description	Units
cruise_id	cruise identifier	none
station	station number; a number unique to a cruise designating a general geographic location at which one or more sampling activities may occur	
time_utc	Time in 24-hour clock.	hours and minutes
date_utc	Date, universal coordinated time.	mm/dd/yy
lat	Latitude. North is positive and South is negative.	decimal degrees
lon	Longitude. West is negative and East is positive.	decimal degrees
depth_w	Depth of water at this station.	meters
net	Which net in a multiple net system.	
depth_range	The min and max values over which the net was open.	meters
depth_min	The shallowest depth the particular net fished.	meters
depth_max	The deepest depth the particular net fished.	meters
depth_mid	The middle of the depth range over which the net sampled. The one depth chosen to represent the sample collection depth if one depth is necessary.	meters
volume_filt	How much water went through the net when it was fishing this depth.	cubic meters
species	A binomial that consists of a genus name followed byt he species name of an organism. In this case, the sex and immaturity of the animal were added onto the species name. F:female, M:male, C: copepodite.	
abundance	Individuals per cubic meter.	

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Instruments

Dataset-specific Instrument Name	MultiNet
Generic Instrument Name	MultiNet
Dataset-specific Description	The MultiNet for this dataset was a multiple opening/closing net system (0.25 m2 aperture) equipped with five nets of 100 µm mesh size.
Generic Instrument Description	The MultiNet© Multiple Plankton Sampler is designed as a sampling system for horizontal and vertical collections in successive water layers. Equipped with 5 or 9 net bags, the MultiNet© can be delivered in 3 sizes (apertures) : Mini (0.125 m2), Midi (0.25 m2) and Maxi (0.5 m2). The system consists of a shipboard Deck Command Unit and a stainless steel frame to which 5 (or 9) net bags are attached by means of zippers to canvas. The net bags are opened and closed by means of an arrangement of levers that are triggered by a battery powered Motor Unit. The commands for actuation of the net bags are given via single or multi-conductor cable between the Underwater Unit and the Deck Command Unit. Although horizontal collections typically use a mesh size of 300 microns, mesh sizes from 100 to 500 may also be used. Vertical collections are also common. The shipboard Deck Command Unit displays all relevant system data, including the actual operating depth of the net system.

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Deployments

ANT-XII_2

Website	https://www.bco-dmo.org/deployment/58065
Platform	R/V Polarstern
Report	http://doi.pangaea.de/10013/epic.27429.d001
Start Date	2004-12-01
End Date	2004-01-02
Description	**Methods & Sampling** A multiple opening-closing net ("midi type") with an opening of 0.25 m2 equipped with 5 nets of 100 um mesh size and with a digital flowmeter was used as a standard device for the quantitative sampling of mesozooplankton. The multinet was towed vertically, sampling the standard layers of 0 - 50 m, 50 - 100 m, 100 - 200 m, 200 - 300 m and 300 to the bottom layer. Sampling was carried out every third day depending on ice conditions. The net samples were preserved in borax-buffered 4 % formaldehyde/sea water solution. For molecular genetic purposes, a "maxi type" multiple opening-closing net with an opening of 0.5 m2 equipped with nine nets of 100 um mesh size and with a digital flowmeter was deployed four times. Nine successive depth layers were sampled between near the sea floor and the surface. These net samples were preserved in 90 %-ethanol. Both nets were towed vertically at 0.5 m sec-1.

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Project Information

Census of Marine Zooplankton-2004-2010 (CMarZ_2004-2010)

Website: http://www.cmarz.org/

Coverage: Global ocean

The Census of Marine Zooplankton (CMarZ) is a field project of the Census of Marine Life (see www.CoML.org). CMarZ is working toward a taxonomically comprehensive assessment of biodiversity of animal plankton throughout the world ocean. The project goal is to produce accurate and complete information on zooplankton species diversity, biomass, biogeographical distribution, genetic diversity, and community structure by 2010. Our taxonomic focus is the animals that drift with ocean currents throughout their lives (i.e., the holozooplankton, Fig. 1). This assemblage currently includes ~6,800 described species in fifteen phyla; our expectation is that at least that many new species will be discovered as a result of our efforts. The census encompasses unique marine environments and those likely to be inhabited by endemic and undescribed zooplankton species.

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Program Information

Census of Marine Life (CoML)

Website: http://www.coml.org/

Coverage: global

The Census of Marine Life is a global network of researchers in more than 80 nations engaged in a 10-year scientific initiative to assess and explain the diversity, distribution, and abundance of life in the oceans. The world's first comprehensive Census of Marine Life - past, present, and future - will be released in 2010.

The stated purpose of the Census of Marine Life is to assess and explain the diversity, distribution, and abundance of marine life. Each plays an important role in what is known, unknown, and may never be known about what lives in the global ocean.

First, diversity. The Census aims to make for the first time a comprehensive global list of all forms of life in the sea. No such unified list yet exists. Census scientists estimate that about 230,000 species of marine animals have been described and reside in jars in collections in museums of natural history and other repositories. Since the Census began in 2000, researchers have added more than 5600 species to the lists. They aim to add many thousands more by 2010. The database of the Census already includes records for more than 16 million records, old and new. By 2010, the goal is to have all the old and the new species in an on-line encyclopedia with a webpage for every species. In addition, we will estimate how many species remain unknown, that is, remain to be discovered. The number could be astonishingly large, perhaps a million or more, if all small animals and protists are included. For comparison, biologists have described about 1.5 million terrestrial plants and animals.

Second, distribution. The Census aims to produce maps where the animals have been observed or where they could live, that is, the territory or range of the species. Knowing the range matters a lot for people concerned about, for example, possible consequences of global climate change.

Third, abundance. No Census is complete without measures of abundance. We want to know not only that there is such a thing as a Madagascar crab but how many there are. For marine life, populations are being estimated either in numbers or in total kilos, called biomass.

To complete the context, it is important to understand the top motivations for the Census of Marine Life. Most importantly, much of the ocean is unexplored. Most of the records in its database are for observations near the surface, and down to 1000 meters. No observations have been made in most of the deep ocean, while most of the ocean is deep.

Another important issue is that diversity varies in space. Marine hot spots, like the rain forests of the land, exist off for large fish off the coasts of Brazil and Australia. The goal is to know much more about marine hot spots, to help conserve these large fish. Their abundance and thus their diversity is changing, especially for commercially important species. Between 1952 and 1976, for example, fishermen and their customers emptied many areas of the ocean of tuna.

The Census has evolved a strategy of 14 field projects to touch the major habitats and groups of species in the global ocean. Eleven field projects address habitats, such as seamounts or the Arctic Ocean. Three field projects look globally at animals that either traverse the seas or appear globally distributed: the top predators such as tuna and the plankton and the microbes. The projects employ a mix of technologies. These include acoustics or sound, optics or cameras, tags placed on individual animals that store or report data, and genetics, as well as some actual capture of animals. The technologies complement one another. Sound can survey large areas in the ocean, while light cannot. Light can capture detail and characters that sound cannot. And genetics can make identifications from fragments of specimens or larvae where pictures tell little.

This mix of curiosity, need to know, technology, and scientists willing to investigate the unexplored and undiscovered will result in a Census of Marine Life in 2010 that provides a much clearer picture of what lives below the surface around the globe. Several reasons make such a report timely, indeed urgent. Crises in the sea are reported regularly. One recent study predicted the end of commercial fishery globally by 2050, if current trends persist. Better information is needed to fashion the management that will sustain fisheries, conserve diversity, reverse losses of habitat, reduce impacts of pollution, and respond to global climate change. Hence, there are biological, economic, philosophical and political reasons to push for greater exploration and understanding of the ocean and its inhabitants. Indeed, the United Nations Convention on Biological Diversity requires signatories to collect information on living resources, but, as yet, no nation has a complete baseline of such information. The Census of Marine Life's global network of researchers will help to fill this knowledge gap, providing critical information to help guide decisions on how to manage global marine resources for the future.

[Text copied from the CoML web site, November 5, 2008]

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Funding

Funding Source	Award
Alfred P. Sloan Foundation (Sloan)	unknown CMarZ_2004-2010 Sloan

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