

Mesopelagic micronekton abundances from the Deepwater Horizon Oil Spill area, collected from the R/V Weatherbird II WB1105, WB1205 cruises in the Gulf of Mexico, from 2010-2011 (DWH Micronekton project)

Website: <https://www.bco-dmo.org/dataset/3705>

Data Type: Cruise Results

Version: 2012-08-30

Project

» [RAPID Deepwater Horizon Oil Spill: Impact of sub-surface oil plumes on mesopelagic micronekton](#) (DWH Micronekton)

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Coverage

Spatial Extent: N:28.6365 E:-86 S:27 W:-87.8685

Temporal Extent: 2010-09-03 - 2011-09-17

Dataset Description

This dataset is part of an investigation of the impact of the BP oil spill on the northern Gulf of Mexico ecosystem, focusing on the mesopelagic fauna. These observations and measurements were obtained during two R/V Weatherbird cruises in the specific regions one year apart. They will be compared to many other cruises preceding to assess mesopelagic communities at both reference and within-plume stations with respect to:

- abundance and distribution
- species composition

Methods & Sampling

WB1105:

Sampling at each of the general sampling sites will consist of two types of midwater tows interspersed with CTD casts. Tows will be at the most comfortable heading and will remain within 20 NM of each general station location.

Day tows will use the MOC-4 exclusively and will be in the upper 1000m of the water column. The winch will be in constant use during all tows, either paying out or taking up. Night tows will initially use the MOC-4, then

the net will be switched to the 9 m² Tucker tow for repetitive tows in the upper 400 m for the purpose of maximizing catch of target species.

WB1205:

Sampling will consist of one type of midwater tow (Tucker trawls) interspersed with CTD casts. Tows will be at the most comfortable heading and will remain within 20 NM of DSH-09. CTD casts will take place morning and evening.

Day and night tows will use the 9 m² Tucker trawl exclusively and will be in the upper 1000m of the water column. The winch will be in constant use during all tows, either paying out or taking up. Night tows will include, but not be limited to repetitive tows in the upper 500 m for the purpose of maximizing catch of target species.

Data Processing Description

BCO-DMO Processing Notes:

- Data table was extracted from the submitted dataset metadata form.
- Data was transposed from horizontal to vertical orientation.
- Parameter names were edited to conform to BCO-DMO convention.
- Columns for lat/lon were added for each station using proposed position information included in the dataset information form.
- Version line was added

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Data Files

File
DWH_micronekton.csv (Comma Separated Values (.csv), 58.90 KB) MD5:c4ecdbe99ab976420edcf2deea6bfa1e
Primary data file for dataset ID 3705

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Parameters

Parameter	Description	Units
cruiseid	Unique cruise identifier, extracted from metadata	dimensionless
year	Year in YYYY format, obtained from metadata.	dimensionless
station_prop	Proposed station identifier.	dimensionless
lat_prop	Nominal or proposed latitude of station locations, obtained from metadata.	degrees, decimal minutes
lon_prop	Nominal or proposed longitude of station locations, obtained from metadata.	degrees, decimal minutes
depth_w_prop	Nominal or estimated water depth, obtained from metadata.	meters
taxon	Taxon of sample individual. Most of the time, this taxon level was Order.	dimensionless
species	Species name of sample individual.	dimensionless
count	Total number of individuals counted, originally reported as 'number'.	dimensionless
weight	Total weight for each species and each order, units unknown.	unknown

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Instruments

Dataset-specific Instrument Name	MOCNESS
Generic Instrument Name	MOCNESS
Dataset-specific Description	Day tows will use the MOC-4 exclusively and will be in the upper 1000m of the water column.
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.

Dataset-specific Instrument Name	Tucker Trawl
Generic Instrument Name	Tucker Trawl
Dataset-specific Description	A 9m ² Tucker trawl (for deep tows where up to three replicate nets can be sequentially operated) for either day and/or night tows will be used within the upper 1000m of the water column.
Generic Instrument Description	The original Tucker Trawl, a net with a rectangular mouth opening first built in 1951 by G.H. Tucker, was not an opening/closing system, but shortly thereafter it was modified so that it could be opened and closed. The original had a 183 cm by 183 cm flexible rectangular mouth opening 914 cm long net with 1.8 cm stretched mesh for the first 457 cm and 1.3 cm mesh for last 457 cm. 152 cm of coarse plankton or muslin netting lined the end of the net. Tucker designed the net to collect animals associated with the deep scattering layers, principally euphausiids, siphonophores, and midwater fish. (from Wiebe and Benfield, 2003). Currently used Tucker Trawls usually have 1-m ² openings and can have a single net or multiple nets on the frame.

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Deployments

WB1105

Website	https://www.bco-dmo.org/deployment/58850
Platform	R/V Weatherbird II
Start Date	2010-09-03
End Date	2010-09-10
Description	<p>Note: Deployment Description was obtained from a pre-cruise cruise plan. The goal of this cruise is to investigate the impact of the BP oil spill on the northern Gulf of Mexico ecosystem, focusing on the mesopelagic fauna. Results will be compared to observations and measurements obtained during the August R/V Weatherbird cruise in the same region and the many other cruises preceding. Specific objectives include: - Determine hydrocarbon concentrations in water column samples obtained via the CTD. Characterize the chemical composition of oil (chemical fingerprint) and note what depths water column backscatter was observed. - Assess mesopelagic communities at two reference stations and one within the plume with respect to: - abundance and distribution - species composition - Obtain frozen specimens of 10 target species for laboratory determinations of evidence of exposure to oil</p> <p>Geographic Area: The cruise will originate and terminate at USF/CMS in St. Petersburg, FL. We will collect samples at three general locations: USF standard station (27° N 86° W) ; Midway station: (27° 55' N 86° 55' W), and vic DSH 9 (28° 38.19' N 87° 52.11' W). To the extent that time permits we will re-occupy the Aug 2010 Weatherbird deepwater stations (DHS10, DHS09, DHS08), where subsurface oil was detected. The WB II will depart from Bayboro and dead head to standard station - roughly a 180 NM transit - at 10 kts about 18 h. Sampling at each of the general sampling sites will consist of two types of midwater tows interspersed with CTD casts. Tows will be at the most comfortable heading and will remain within 20 NM of each general station location. Day tows will use the MOC-4 exclusively and will be in the upper 1000m of the water column. The winch will be in constant use during all tows, either paying out or taking up. Night tows will initially use the MOC-4, then the net will be switched to the 9 m² Tucker tow for repetitive tows in the upper 400 m for the purpose of maximizing catch of target species. Station occupation will partially be determined on site but tentatively will be 2 d, 1d, and 2 d, at each of the general locations described above. DSH 10 and 8 are put in for reference.</p>

WB1205

Website	https://www.bco-dmo.org/deployment/58851
Platform	R/V Weatherbird II
Start Date	2011-09-12
End Date	2011-09-17
Description	<p>Note: Deployment Description was obtained from a pre-cruise cruise plan. The goal of this cruise is to re-occupy the area vic DWH to provide post-spill information on the northern Gulf of Mexico ecosystem, focusing on the mesopelagic fauna. Results will be compared to observations and measurements obtained during the Sept 3-10 R/V Weatherbird cruise to the same region. Specific objectives are to: - Assess mesopelagic communities post-spill with respect to: - abundance and distribution - species composition - Obtain frozen specimens of 10 target species for laboratory determinations of stable isotope composition to compare with information obtained previously on specimens collected pre-spill, and immediately post-spill from the same region. - Atmospheric monitoring, including rainfall collection, to be performed by FDEP staff (Kovach and Wenner) with equipment currently mounted on the vessel following protocols previously developed, utilized and conducted following consultation with FIO staff and vessel crew. - Should time and resources allow FDEP will conduct neuston tows (0.5 hr tow(s) along vessel track with provided neuston net to be deployed off hydrowire. Geographic Area. The cruise will originate and terminate at USF/CMS in St. Petersburg, FL. We will collect samples at one location: vic DSH 9 (28o 38.19' N 87o 52.11' W). Cruise overview. The WB II will depart from Bayboro at 0800 12 Sept and dead- head to DSH - 09, roughly a 275 NM transit - at 9 kts about 31 h. Sampling will consist of one type of midwater tow (Tucker trawls) interspersed with CTD casts. Tows will be at the most comfortable heading and will remain within 20 NM of DSH-09. CTD casts will take place morning and evening. Day and night tows will use the 9 m2 Tucker trawl exclusively and will be in the upper 1000m of the water column. The winch will be in constant use during all tows, either paying out or taking up. Night tows will include, but not be limited to repetitive tows in the upper 500 m for the purpose of maximizing catch of target species. Station occupation will be approximately 2.5 d. As of this writing, we are planning on 24 h operations during the entire sampling period. We plan to depart for Bayboro at 0000 16 Sept for a 1200 h arrival 17 Sept.</p>

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Project Information

RAPID Deepwater Horizon Oil Spill: Impact of sub-surface oil plumes on mesopelagic micronekton (DWH Micronekton)

Coverage: Gulf of Mexico

The mesopelagic micronekton/macrozooplankton assemblage of the GOM is both highly diverse and vertically mobile. The great majority of the fish and crustacean species reside at depths below 600 m during the day, performing a migration into the upper 250 m at night. Thus, chances of mid-water species encountering subsurface oil plumes are extraordinarily high. Briefly put, if the plumes are present, a large fraction of the mid-water community will be migrating through them.

This research project will: (1) obtain data on present-day micronekton species composition, distribution, and abundance in the upper 1000 m of the water column using ships of opportunity, and compare those data with those acquired in previous decades; (2) evaluate the degree to which the community has already been exposed to subsurface oil plumes using GCMS analysis of hydrocarbon fractions in organismal tissues, and comparing those results with previously collected specimens maintained at -80o; (3) evaluate the variability in sources of carbon and nitrogen supporting mesopelagic biomass and determine the trophic position of present day and previously collected specimens using d13C and d15N of muscle tissue. The data collected in this project will provide a stable isotope baseline allowing for evaluation of present and future subsurface oil impact.

Broader impacts. Broader impacts include training a postdoctoral fellow in shipboard sampling, the biology of mesopelagic fauna, and basic geochemical methodologies and data interpretation. The PIs have established regular interactions with TV and newspaper reporters have been on the forefront of the shipboard sampling and geochemical analyses that first described the subsurface plumes emanating from the oil spill. Interaction with print and visual media will continue throughout the study as the oil spill coverage continues.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1047693

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