Bottle data (including temperature, salinity, density, O2) from CTD rosettes from R/V Atlantis and R/V F.G. Walton Smith cruises AT18-02 and WS1010 in the Gulf of Mexico Macondo wellhead area in 2010 (DWH_Deep_Microbes project)

Website: https://www.bco-dmo.org/dataset/3727
Data Type: Cruise Results
Version: 1
Version Date: 2012-09-24

Project
» RAPID Deepwater Horizon Oil Spill: Deep pelagic and benthic impacts of the oil spill (DWH_Deep_Microbes)

Program
» Gulf of Mexico - Deepwater Horizon Oil Spill (GoMX - DHOS)

Contributors	Affiliation	Role
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Abstract
Bottle data (including temperature, salinity, density, O2) from CTD rosettes from R/V Atlantis and R/V F.G. Walton Smith cruises AT18-02 and WS1010 in the Gulf of Mexico Macondo wellhead area in 2010.

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Coverage

Spatial Extent: **N**:28.8525 **E**:-88.3097 **S**:28.65 **W**:-88.8133
Temporal Extent: 2010-05-26 - 2010-12-02

Dataset Description

Bottle data from CTD rosettes deployed on the WS1010 and AT18-02 cruises in the Gulf of Mexico.

Acquisition Description

CTD casts in the vicinity of the Macondo Wellhead were complicated by the presence of oil on the sea surface. A saltwater hose was used to spray the sea surface, parting the oil to create a clean area for the CTD to be dropped through; a similar procedure was used for deployment and recovery.

Processing Description

WS1010 bottle data was processed using Seasave software v. 7.18.
AT18-02 bottle data was processed using Seasave software v. 7.20f.

Parameter names have been changed to conform with BCO-DMO conventions. month_utc, day_utc, lat_start, and lon_start were added from the header information in the original bottle data files.

BCO-DMO made the assumption that the WS1010 file named '6.01' was actually for cast '6.02' and the file named '16.01' was actually cast '16.02', based on the dates and station numbers in the headers of those files. It was also assumed that the AT18-02 file named '12.04' was actually for cast '12.05' based on the event log.

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Parameters

Parameter	Description	Units
cruiseid	Unique identifier for the cruise.	text
cast	Consecutive CTD cast number.	unitless
event	Unique event number. First two digits are the station number. The two digits after the decimal are the cast number at that station.	unitless
month_utc	2-digit (mm) month of year; UTC.	mm (01 to 12)
day_utc	2-digit (dd) day of month; UTC.	dd (01 to 31)
year_utc	4-digit year; UTC.	YYYY
lat_start	Latitude at start of cast; postive values = North.	decimal degrees
lon_start	Longitude at start of cast; negative values = West.	decimal degrees
bottle	Consecutive bottle number.	unitless
time_utc	Time when the bottle was fired; 24-hour clock; UTC.	HHMM
lat	Latitude; positive values = North.	decimal degrees
lon	Longitude; negative values = West.	decimal degrees
press	Pressure. Originally named 'PrDM'.	decibars
depth	Depth. Originally named 'DepSM'.	meters
temp	Primary temperature measurement. Originally named 'T090C'.	degrees Celsius
temp2	Secondary tempearture measurement. Originally named 'T190C'.	degrees Celsius
sal	Primary salinity measurement. Originally named 'Sal00'.	PSU
sal2	Secondary salinity measurement. Originally named 'Sal11'.	PSU
density	Density in kilograms per cubic meter.	kg/m^3
sigma_0	Sigma theta density. Orignally named 'Sigma-e00'.	kg/m^3

sigma_t	Sigma-t density. Originally named 'Sigma-t00'.	kg/m^3
O2_mg_L	Oxygen in milligrams per liter. Originally named 'Sbeox0Mg/L'.	mg/L
O2_sat_pcnt	Percent oxygen saturation. Originally named 'Sbeox0PS'.	%
O2_umol_kg	Oxygen in micromoles per kilogram. Originally named 'Sbeox0Mm/Kg'.	umol/kg
beam_c	Beam attenuation. Originally named 'Bat'.	1/m
trans	Beam transmission. Originally named 'Xmiss'.	%
fluor	Fluorescence measured by FIECO-AFL	unknown
CDOM	CDOM measured by WetCDOM	unknown
fluor_ug_L	Fluoroscence measured by FICUVA	micrograms per liter (ug/L)
fluor_scufa	FIScufa	unknown
turbidity	Turbidity measured by TurbWETntu0	unknown

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Instruments

Dataset-specific Instrument Name	Niskin bottle
Generic Instrument Name	Niskin bottle
Generic Instrument Description	A Niskin bottle (a next generation water sampler based on the Nansen bottle) is a cylindrical, non-metallic water collection device with stoppers at both ends. The bottles can be attached individually on a hydrowire or deployed in 12, 24 or 36 bottle Rosette systems mounted on a frame and combined with a CTD. Niskin bottles are used to collect discrete water samples for a range of measurements including pigments, nutrients, plankton, etc.

Dataset-specific Instrument Name	CTD Sea-Bird 9
Generic Instrument Name	CTD Sea-Bird 9
Generic Instrument Description	The Sea-Bird SBE 9 is a type of CTD instrument package. The SBE 9 is the Underwater Unit and is most often combined with the SBE 11 Deck Unit (for real-time readout using conductive wire) when deployed from a research vessel. The combination of the SBE 9 and SBE 11 is called a SBE 911. The SBE 9 uses Sea-Bird's standard modular temperature and conductivity sensors (SBE 3 and SBE 4). The SBE 9 CTD can be configured with auxiliary sensors to measure other parameters including dissolved oxygen, pH, turbidity, fluorometer, altimeter, etc.). Note that in most cases, it is more accurate to specify SBE 911 than SBE 9 since it is likely a SBE 11 deck unit was used. more information from Sea-Bird Electronics

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Deployments

AT18-02

Website	https://www.bco-dmo.org/deployment/58735
Platform	R/V Atlantis
Start Date	2010-11-08
End Date	2010-12-03
Description	The AT18-02 cruise sailed from Galveston, Texas and returned to Gulfport, Mississippi. Operations consisted of sediment sampling using the DSV ALVIN, hydrographic characterizations of the water column and sampling of water for geochemical and microbiological characterization using a standard CTD/Rosette, and additional sampling using a multiple corer. See more information from the WHOI cruise planning synopsis. Cruise information and original data are available from the NSF R2R data catalog.

WS1010

Website	https://www.bco-dmo.org/deployment/58739
Platform	R/V F.G. Walton Smith
Start Date	2010-05-21
End Date	2010-06-11
Description	The WS1010 cruise departed from Gulfport, Mississippi. Operations consisted of hydrographic characterizations of the water column and sampling of water for geochemical and microbiological characterization using a standard CTD/Rosette. See more information from the R2R Cruise Catalog.

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Project Information

RAPID Deepwater Horizon Oil Spill: Deep pelagic and benthic impacts of the oil spill (DWH_Deep_Microbes)

Coverage: Gulf of Mexico; 26.9N, 90.7W

During late spring and summer of 2010, the Northern Gulf of Mexico (GoM) was exposed to an oil spill different in magnitude and scope from any previous spill. The Deepwater Horizon, an ultra-deep, offshore drilling platform, began working GoM oil fields in 2001. While working a well in Mississippi Canyon on April 20, 2010, a bolus of methane gas ascended the drill pipe and exploded at the surface. Two days later the platform sank and since then, substantial quantities of oil and gas have leaked from the damaged wellhead. This work addressed the offshore oceanic impacts of the BP spill. Sediment microbial mediated processes are capable of oxidizing oil and methane in the environment. The PI's examined the impacts of the Deepwater Horizon Oil Spill on microbially mediated processes in the deep waters and sediments in the vicinity of the spill site. The work complemented several funded or planned geochemical and microbiological sampling programs focused on the oil spill response. PI's evaluated rates of water column methane oxidation and sediment sulfate reduction and methanogenesis at multiple sites around the spill site. Additional experiments quantified the impact of nutrients, oxygen and substrate concentrations on these important microbially mediated processes. The Joye group participated in six research cruises during 2010 and received samples from another six cruises from the study area. On all cruises, water samples were collected using a CTD rosette and Niskin or Go-Flo bottles. Sediment samples were

obtained by box coring, multi-coring, or using the manned submersible ALVIN. The PI's extended the monitoring/assessment program that was initiated through the NOAA National Institute of Undersea Science and Technology (NIUST) funded cruise and further leveraged by NOAA/NIUST (cruises in July 2010, October 2010) by conducting three major expeditions in 2010. This RAPID project directly supported the PI's efforts for cruises in May/June 2010 (NSF Joye chief scientist); August 2010 (NSF Montoya, chief scientist); November/December 2010 (NSF Joye chief scientist); and July 2011 (NSF Montoya, chief scientist)

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Program Information

Gulf of Mexico - Deepwater Horizon Oil Spill (GoMX - DHOS)

Coverage: Northern Gulf of Mexico

Grants for Rapid Response Research (RAPID) The RAPID funding mechanism is used for proposals having a severe urgency with regard to availability of, or access to data, facilities or specialized equipment, including quick-response research on natural or anthropogenic disasters and similar unanticipated events. GOM - Broader Impacts The need to understand the impact of this largest oil spill to date on ecosystems and biochemical cycling is self evident. The consequences of the disaster and accompanying clean up measures (e.g. the distribution of dispersants) need to be evaluated to guide further mediating measures and to develop and improve responses to similar disasters in the future. Would it be advantageous if such oil aggregates sink, or should it rather remain suspended? Possibly measures can be developed to enhance sinking or suspension (e.g. addition of ballast minerals) once we understand their current formation and fate. Understanding the particle dynamics following the input of large amounts of oil and dispersants into the water is a prerequisite to develop response strategies for now and in the future.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1043225

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