Video transects (Wood Fall project)

Website: https://www.bco-dmo.org/dataset/714536

Data Type: Cruise Results

Version: 1

Version Date: 2017-09-11

Project

» The energetic assembly of biological communities: a test with deep-sea woodfalls (Wood Fall)

Contributors	Affiliation	Role
McClain, Craig	Louisiana Universities Marine Consortium (LUMCON)	Principal Investigator
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Abstract

Video transects (Wood Fall project)

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Coverage

Spatial Extent: **N**:28.81147 **E**:-88.36303 **S**:27.13516 **W**:-89.92766

Temporal Extent: 2017-05-26 - 2017-06-02

Dataset Description

Datasheet provides information for all video transects taken with the remotely operated vehicle.

Acquisition Description

See description of video transect method in:

McClain, C.R. and L. Lundsten (2015) Assemblage structure is related to slope and depth on a deep offshore Pacific seamount chain. Marine Ecology 36:210-220.
DOI: 10.1111/maec.12136

McClain, C.R., L. Lundsten, J. Barry, and A. DeVogelaere (2010) Assemblage structure, but not diversity or density, change with depth on a northeast Pacific seamount. Marine Ecology, 31:1-12.
DOI: 10.1111/j.1439-0485.2010.00367.x

McClain, C.R. and Barry, J.P (2010) Habitat heterogeneity, biogenic disturbance, and resource availability work in concert to regulate biodiversity in deep submarine canyons. Ecology, 91:964-976.
DOI: 10.1890/09-0087.1

McClain, C.R., L. Lundsten, M. Ream, J. Barry, and A. DeVogelaere (2009) Endemicity, Biogeography, Composition, and Community Structure On a Northeast Pacific Seamount. PLoS One, 4:e4141.
DOI: 10.1371/journal.pone.0004141

Processing Description

Changed spaces in parameter names to underscores.
Changed to ISO date YYYY-MM-DD.
Changed times to hh:mm.
Formatted decimal degrees to 5 decimal places.

All missing data denoted with nd. NA refers to a data field that is not applicable.

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Related Publications

McClain, C. R., & Barry, J. P. (2010). Habitat heterogeneity, disturbance, and productivity work in concert to regulate biodiversity in deep submarine canyons. Ecology, 91(4), 964–976. doi:10.1890/09-0087.1

McClain, C. R., & Lundsten, L. (2014). Assemblage structure is related to slope and depth on a deep offshore Pacific seamount chain. Marine Ecology, 36(2), 210–220. doi:10.1111/maec.12136

McClain, C. R., Lundsten, L., Barry, J., & DeVogelaere, A. (2010). Assemblage structure, but not diversity or density, change with depth on a northeast Pacific seamount. Marine Ecology, 31, 14–25. doi:10.1111/j.1439-0485.2010.00367.x

McClain, C. R., Lundsten, L., Ream, M., Barry, J., & DeVogelaere, A. (2009). Endemicity, Biogeography, Composition, and Community Structure On a Northeast Pacific Seamount. PLoS ONE, 4(1), e4141. doi:10.1371/journal.pone.0004141

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Parameters

Parameter	Description	Units
transect_number	Transect number	unitless
date	Date of ROV dive	YYYY-MM-DD
rov_dive	Number and letter designation of ROV and dive number for deployment. GE refers to Oceaneering's Global Explorer.	dimensionless
start_time	Transect start time	hh:mm
end_time	Transect end time	hh:mm
start_latitude	Starting latitude of the transect	decimal degrees
end_latitude	Ending latitude of the transect	decimal degrees
start_longitude	Starting longitude of the transect	decimal degrees
end_longitude	Ending longitude of the transect	decimal degrees
heading	Heading in degrees the ROV is transited on	degrees
start_depth	Starting depth of the transect in meters	meters
end_depth	Ending depth of the transect in meters	meters

Instruments

Dataset-specific Instrument Name	ROV Global Explorer
Generic Instrument Name	ROV Global Explorer

Dataset-specific Instrument Name	McClain benthic elevator
Generic Instrument Name	Benthic elevator
Dataset-specific Description	Elevator used was a aluminum work basket suspended from the vessel's winch. The elevator was special build for PI McClain by Theriot Machine Works (Chauvin, LA). The basket is rectangular in shape with an A-frame frame pick point and 2 independent doors on either side of A-frame. Total length is 1.96 meters, width of basket is 1.33 meters and height of basket enclosure is 0.96 meters. Maximum height at pick point is 1.85 meters. The basket lids on either side of the a-frame swivel on dual hinges and open fully to touch the a-frame where they are held in place by attached magnetic strips. Each lid has a width of 1.25 meters and a depth of 0.765 meters.
Generic Instrument Description	A platform used to carry equipment and sampled from the surface to the seafloor and back up again.

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Deployments

PE17_22

Website	https://www.bco-dmo.org/deployment/716661
Platform	R/V Pelican
Start Date	2017-05-23
End Date	2017-06-04

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Project Information

The energetic assembly of biological communities: a test with deep-sea woodfalls (Wood Fall)

Coverage: Northern Gulf of Mexico Continental Slope

Changes in both terrestrial and marine carbon production under climate change necessitate an understanding of how ecological communities are structured by carbon availability, which has long been recognized as a predictor of biodiversity. Recent research indicates global marine phytoplankton production may have declined at a rate of ~1% of the global median per year. Regional-scale changes have been more heterogeneous; with the equatorial Pacific Ocean experiencing overall declines of over 50% the last decade and Polar Regions experiencing increases of comparable magnitude. Clearly, there is a strong need for a more complete understanding of the relationship between biodiversity and carbon availability to better predict the consequences of current and forthcoming climate change on marine ecosystems. One challenge is that determinants of available carbon in natural systems are diverse and often unidentifiable. Wood-fall communities in the deep sea are an ideal experimental system for testing many theories about carbon availability and biodiversity. First, the amount of carbon available to the community can be precisely manipulated in the form of wood mass. Second, flows of carbon from wood through the community can be easily tracked

because animals supported by wood have distinct chemical signatures that can be traced with stable isotope analysis. Finally, the entire community associated with a wood fall can be sampled, allowing for accurate estimates of biodiversity, biomass, and energy flow. For these reasons, study of deep-sea wood falls provides accurate and simultaneous quantification of standing stock, diversity, and trophic structure as a function of energy availability. Through the use of ROV/submersible-deployed wood falls, the project will test how changes in carbon availability impact marine biodiversity. The results of this project will be beneficial to science in several ways. First, the project contributes significantly to climate change and biodiversity research and specifically to knowledge of the underexplored deep oceans. The project also creates abundant opportunities for public outreach. The multifaceted approach includes: employing web podcasts and blogs; sharing results through photographic exhibitions; and actively recruiting from minority-serving institutions while also providing visiting lectureships. Further, the project will recruit and train young scientists in underrepresented groups, and impact multiple audiences from primary education students, science instructors, and the general public. The goal of this project is to identify the interactions in energetic processes that regulate community structure, using ROV/submersible-deployed wood falls. Wood will be deployed in varying sizes to control the amount of chemical energy added to the community, and of different wood densities to examine assembly rules while examining total quantity and concentration of resources. This approach will allow the investigators to examining energetic tradeoffs is that multiple impacts, hypotheses, and theories of varying carbon availability on biodiversity can be evaluated simultaneously. The amount of carbon in the community can be precisely manipulated, an improvement over prior studies. The impact of the rate of carbon uptake on ecological processes will also be examined here, but has been rarely evaluated. This research will also reveal much about wood-fall biomes in the deep sea, one of the least studied systems in the ocean. For example, the project will reveal the relative importance different carbon pathways in exporting wood energy and controlling biodiversity.

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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1634586

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