HADES-M fish collection from R/V Falkor cruise FK141109 from the Mariana Trench adjacent to Guam: approximately 12 45 N and 144 50 E to 11 25 N and 144 25 E; 2014 (HADES project)

Website: https://www.bco-dmo.org/dataset/638287
Version: 10 February 2016
Version Date: 2016-02-10

Project
» Controls on Hadal Megafaunal Community Structure: a Systematic Examination of Pressure, Food Supply, and Topography (HADES)

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Dataset Description

List of individual HADES-M samples collected on cruise FK141109 - FISH

Location:
Mariana Trench adjacent to Guam: approximately 12 45 N and 144 50 E to 11 25 N and 144 25 E

Instrument Key
CR CORE RESPIROMETER
CTD CTD
LA ABYSSAL LANDER
LH HADAL LANDER
RG ROCK GRAB
TR FISH TRAP

W WATER - SURFACE BUCKET
WT WEE TRAP

Methods & Sampling

Sampling and Analytical Methodology:
Animal samples were collected using a variety of baited traps. Sediment samples were collected using megacores on a free vehicle lander. Rock samples were collected using a van veen style grab on a free vehicle lander. Water samples were collected using a conventional CTD rosette.

Investigator abbreviations are given below. These pertain to the fate of specimens and subsamples of tissues.

INITIAL	NAME	INSTITUTION
AJ	ALAN JAMIESON	UNIVERSITY OF ABERDEEN
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CORING RESPIROMETER – A free vehicle lander equipped with 4 megacore tubes that are pushed into the sediments by a drive motor after the vehicle lands on the seafloor. Each tube is equipped with an oxygen optode and water mixing pump to measure sediment community oxygen consumption in each core. Each core

is trapped by a standard megacore core catching device and returned to the surface with the lander. The instrument also includes an oxygen sensor for the ambient bottom water.

CTD – Conventional CTD rosette was used to take water samples to 5000m depth at several stations.

ABYSSAL LANDER – A free vehicle lander equipped with a still image camera and baited to attract scavengers. Images were taken once every minute. It is rated to 6000m.

HADAL LANDER – A free vehicle lander equipped with a digital video camera and baited to attract scavengers. One minute of video was recorded every 2.5 or every 5 minutes. It is rated to 11000m.

FISH TRAP – A large mesh trap with two smaller PVC tube shaped amphipod traps inside that were baited to capture megafauna. It was deployed as a free vehicle lander.

WEE TRAP – Another baited trap but smaller in size than the fish trap.

Data Processing Description

Data Processing:
Direct counts and measurements of mass and length. Mass was determined aboard ship using a motion compensated scale.

BCO-DMO Processing Notes
- Generated from original file: "HADES.M deployments and samples for BCO-DMO.xlsx" contributed by Jeff Drazen
- Parameter names edited to conform to BCO-DMO naming convention found at Choosing Parameter Name
- "nd" (no data) inserted into blank cells and cells with "-"
- Dates reformatted to YYYYMMDD

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Data Files

File
HADESM_Samples_Fish.csv (Comma Separated Values (.csv), 10.59 KB) MD5:9585564a6d875e9b663da59929308d88 Primary data file for dataset ID 638287

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Parameters

Parameter	Description	Units
DATE	Date	YYYYMMDD

DEPLOYMENT	Instrument/Lander Id CR CORE RESPIROMETER CTD CTD LA ABYSSAL LANDER LH HADAL LANDER RG ROCK GRAB TR FISH TRAP W WATER - SURFACE BUCKET WT WEE TRAP	text
LATITUDE	Latitude (South is negative)	decimal degrees
LONGITUDE	Longitude (West is negative)	decimal degrees
MULTIBEAM_DEPTH	Multibeam Depth	meters
SAMPLE_NUMBER	SAMPLE NUMBER	dimensionless
SPECIES	SPECIES	text
TOTAL_LENGTH	TOTAL LENGTH	cm
STANDARD_LENGTH	STANDARD LENGTH	cm
PRE_ANAL_FIN_LENGTH	PRE-ANAL FIN LENGTH	cm
HEAD_LENGTH	HEAD LENGTH	cm
EYE_WIDTH	EYE WIDTH	cm
SNOUT_LENGTH	SNOUT LENGTH	cm
WEIGHT	WEIGHT	g
LIVER_WEIGHT	LIVER WEIGHT	g
STOMACH_WEIGHT	STOMACH WEIGHT	g
GONAD_WEIGHT	GONAD WEIGHT	g

SEX	SEX	text
GEL_FROZEN	GEL FROZEN	text
BLOOD	BLOOD	text
WM_JD_FROZEN	WM (White Muscle) JD FROZEN	number
WM_DM_FROZEN	WM (White Muscle) DM FROZEN	number
WM_PY_FROZEN	WM (White Muscle) PY FROZEN	number
WM_TS_FROZEN	WM (White Muscle) TS FROZEN	number
WM_TS_EtOH	WM (White Muscle) TS EtOH	number
WM_TS_RNALATER	WM (White Muscle) TS RNALATER	number
LIVER_JD_FROZEN	LIVER JD FROZEN	number
LIVER_DM_FROZEN	LIVER DM FROZEN	number
HEART_SP_FROZEN	HEART SP FROZEN	number
GONAD_TL_FORMALIN	GONAD TL FORMALIN	number
SPLEEN_TS_RNALATER	SPLEEN TS RNALATER	number
GUT_DB_FROZEN	GUT DB FROZEN	number
STOMACH_JD_FORMALIN	STOMACH JD FORMALIN	number
OTOLITH_MG_EtOH	OTOLITH MG EtOH	number
CARCASS	CARCASS	text
NOTES	NOTES	text

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Instruments

Dataset-specific Instrument Name	Van Veen Grab
Generic Instrument Name	Bottom Sediment Grab Samplers
Dataset-specific Description	Sampling and Analytical Methodology: Animal samples were collected using a variety of baited traps. Sediment samples were collected using megacores on a free vehicle lander. Rock samples were collected using a van veen style grab on a free vehicle lander. Water samples were collected using a conventional CTD rosette.
Generic Instrument Description	These samplers are designed to collect an accurate representative sample of the sediment bottom. The bite of the sampler should be deep enough so all depths are sampled equally. The closing mechanism is required to completely close and hold the sample as well as prevent wash-out during retrieval. Likewise, during descent the sampler should be designed to minimize disturbance of the topmost sediment by the pressure wave as it is lowered to the bottom.

Dataset-specific Instrument Name	Baited Traps
Generic Instrument Name	Flounder Trap
Dataset-specific Description	Sampling and Analytical Methodology: Animal samples were collected using a variety of baited traps. Sediment samples were collected using megacores on a free vehicle lander. Rock samples were collected using a van veen style grab on a free vehicle lander. Water samples were collected using a conventional CTD rosette.
Generic Instrument Description	Based on an historical design used previously in the Gulf of Maine to target Winter Flounder, this experimental trap is a converted lobster trap fitted with a standard crab hoop acting as one long entrance. The crab hoop measures 8 inches across and 2 1/2 inches in height and it was hoped that this hoop would allow flatfish, crabs and some finfish to enter while excluding most lobsters. These traps were built by Kelo Pinkham and Jim Lowe, from Boothbay, Maine. Collapsible square fish traps are also available commercially for eel, crawfish and flounder.

Dataset-specific Instrument Name	HADAL-Lander
Generic Instrument Name	HADAL-Lander
Dataset-specific Description	Sampling and Analytical Methodology: Animal samples were collected using a variety of baited traps. Sediment samples were collected using megacores on a free vehicle lander. Rock samples were collected using a van veen style grab on a free vehicle lander. Water samples were collected using a conventional CTD rosette.
Generic Instrument Description	The HADAL-Lander is a free-falling baited lander composed of two major components; the scientific payload and delivery system. HADAL-Lander A HADAL-Lander-B

Dataset-specific Instrument Name	Mega Cores
Generic Instrument Name	Multi Corer
Dataset-specific Description	Sampling and Analytical Methodology: Animal samples were collected using a variety of baited traps. Sediment samples were collected using megacores on a free vehicle lander. Rock samples were collected using a van veen style grab on a free vehicle lander. Water samples were collected using a conventional CTD rosette.
Generic Instrument Description	The Multi Corer is a benthic coring device used to collect multiple, simultaneous, undisturbed sediment/water samples from the seafloor. Multiple coring tubes with varying sampling capacity depending on tube dimensions are mounted in a frame designed to sample the deep ocean seafloor. For more information, see Barnett et al. (1984) in Oceanologica Acta, 7, pp. 399-408.

Dataset-specific Instrument Name	Niskin
Generic Instrument Name	Niskin bottle
Dataset-specific Description	Sampling and Analytical Methodology: Animal samples were collected using a variety of baited traps. Sediment samples were collected using megacores on a free vehicle lander. Rock samples were collected using a van veen style grab on a free vehicle lander. Water samples were collected using a conventional CTD rosette.
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 SBE 911plus
Generic Instrument Name	Sea-Bird SBE 911plus CTD
Dataset-specific Description	Sampling and Analytical Methodology: Animal samples were collected using a variety of baited traps. Sediment samples were collected using megacores on a free vehicle lander. Rock samples were collected using a van veen style grab on a free vehicle lander. Water samples were collected using a conventional CTD rosette.
Generic Instrument Description	[tethered, real-time] The Sea-Bird SBE 911 plus is a type of CTD instrument package for continuous measurement of conductivity, temperature and pressure. The SBE 911 plus includes the SBE 9plus Underwater Unit and the SBE 11plus Deck Unit (for real-time readout using conductive wire) for deployment from a vessel. The combination of the SBE 9 plus and SBE 11 plus is called a SBE 911 plus. The SBE 9 plus uses Sea-Bird's standard modular temperature and conductivity sensors (SBE 3 plus and SBE 4). The SBE 9 plus CTD can be configured with up to eight auxiliary sensors to measure other parameters including dissolved oxygen, pH, turbidity, fluorescence, light (PAR), light transmission, etc.). more information from Sea-Bird Electronics

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Deployments

FK141109

Website	https://www.bco-dmo.org/deployment/629311
Platform	R/V Falkor
Report	https://datadocs.bco-dmo.org/d3/data_docs/Mariana_Perspectives/FK141109_Cruise_Report_JDC_2015-01-12.pdf
Start Date	2014-11-09
End Date	2014-12-09
Description	The very deepest reaches of the sea are one of the planet's last true frontiers. That's mostly because a lack of support for needed technological advancements and vehicles has severely limited access to depths beyond 7,000 meters. But the situation is finally beginning to change, and SOI is helping push the process forward. In November, the institute collaborated with a group of biologists and geologists working aboard R/V Falkor to conduct a new study of one of the deepest places in the world. The team deployed SOI's new full-ocean-depth landers—frames equipped with cameras, sensors and sample collection devices that return to the surface automatically after a set time on the seafloor—as well as three other landers, in the Mariana Trench's Sirena Deep, near Guam. The work, at depths down to almost 11,000 meters, will help answer enduring questions about the biology of such alien zones, including who lives there and how they survive the massive pressure. The research should also improve understanding of the processes that control earthquake and tsunami formation, among others geological goals. Original cruise data are available from the NSF R2R data catalog (Cruise DOI: 10.7284/900733)

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Project Information

Controls on Hadal Megafaunal Community Structure: a Systematic Examination of Pressure, Food Supply, and Topography (HADES)

Website: http://www.whoi.edu/hades/

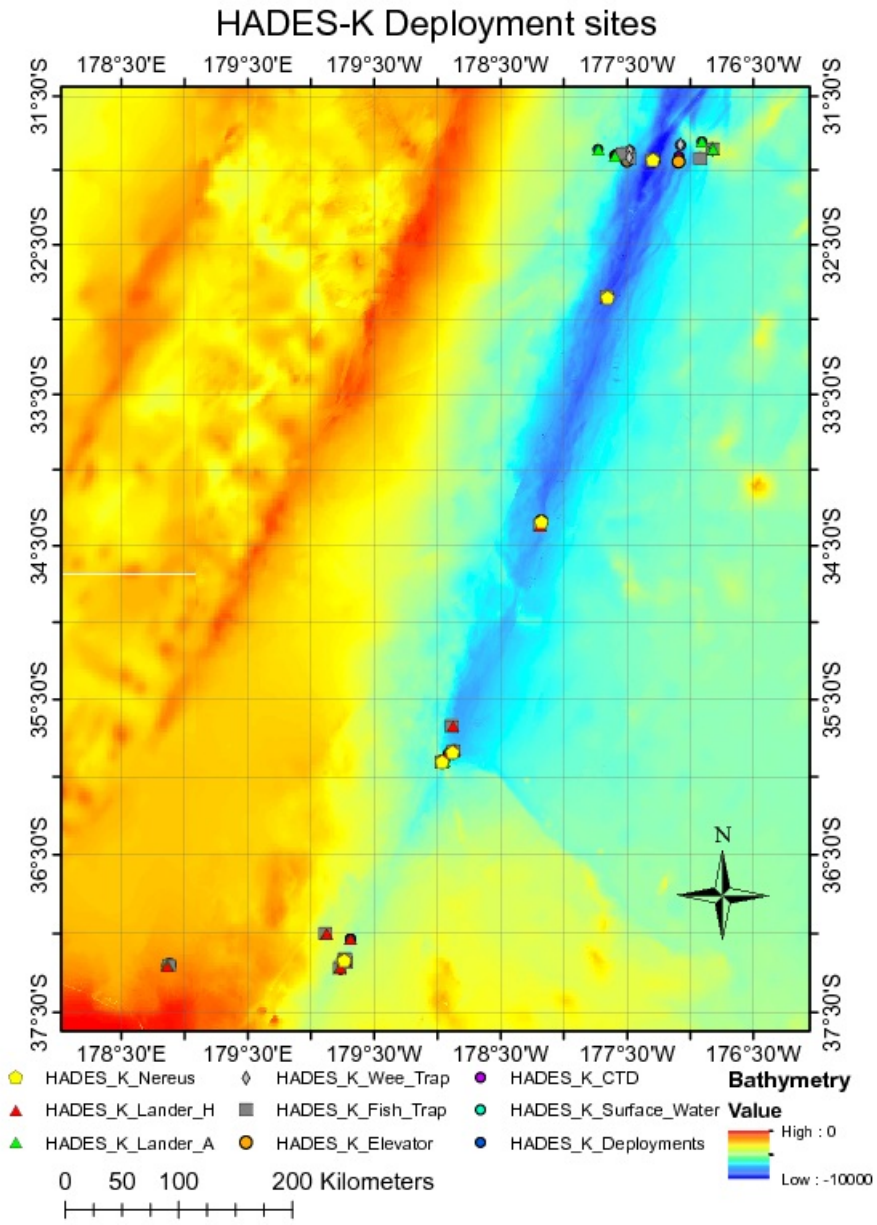
Coverage: Kermadec Trench adjacent to New Zealand: approximately 37 12.75 S and 178 51.43 E to 31 51.29 S and 176 49.07 W

Extracted from the NSF award abstract:

Severe technical challenges associated with the extremes of hydrostatic pressure have prevented major advances in hadal ecological studies, and relegated hadal systems to among the most poorly investigated habitats on Earth. Through this project, Hadal Ecosystems Studies (HADES) program, PIs will determine the composition and distribution of hadal species, the role of hadal pressures (piezolyte concentrations, enzyme function under pressure), food supply (distribution of POC with the abundance and biomass of trench organisms, and metabolic rates/energetic demand), and depth/topography (genetic divergence and spatial connectivity of populations) have on impacting deep-ocean community structure. This project will examine these factors using the world's first full-ocean depth hybrid remotely operated vehicle (HROV) in conjunction with the only full-ocean depth imaging lander (Hadal-Lander). This project will provide the first seafloor data and samples in one of the world's best, yet little known trenches- the Kermadec Trench (SW Pacific Ocean). Megafaunal community structure and the relationship between POC and benthic bacterial biomass will be examined as a function of depth and location by systematic high-definition imaging and sediment/faunal sampling transects from abyssal to full trench depths both along and perpendicular to the trench axis. Population genetic approaches will provide levels of genetic divergence and evolutionarily independent lineages to assess the role of depth and topography in trenches and their adjacent abyssal plain in promoting the formation of species. Physiological constraints will be investigated by examining in-situ respiration of selected fauna and tissue concentrations of such protein stabilizers as trimethylamine oxide (TMAO), and the structural

adaptations of macromolecules.

Image of NEREUS Deployment Sites. [click on the image to view a larger version]



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Funding

Funding Source	Award
NSF Division of Ocean Sciences (NSF OCE)	OCE-1131620
NSF Division of Ocean Sciences (NSF OCE)	OCE-1130712
NSF Division of Ocean Sciences (NSF OCE)	OCE-1130494
Schmidt Ocean Institute (SOI)	R/V Falkor SOI Hadal Ecosystems Studies Program

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