Stations from R/V Kilo Moana KM1513 (HOE-LEGACY 2A) near Hawaii (22.75 N, 158 W) from July to August 2015 (C-MORE project, SCOPE project)

Website: https://www.bco-dmo.org/dataset/641015
Version:

Project
» Center for Microbial Oceanography: Research and Education (C-MORE)
» Simons Collaboration on Ocean Processes and Ecology (SCOPE)

Contributors	Affiliation	Role
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Dataset Description

HOE-LEGACY 2A Stations
Laboratory for Microbial Oceanography, University of Hawaii
Lance Fujieki
CMORE/HOE-LEGACY-2A
date ingested into BCO-DMO: March 11, 2016

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Data Files

File
stations.csv(Comma Separated Values (.csv), 3.43 KB) MD5:349462bec8892c298030bc38f08a2a60 Primary data file for dataset ID 641015

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Parameters

Parameter	Description	Units
sta	station number	dimensionless
cast	cast number	dimensionless
date	date	YYYYMMDD
time	time of day (GMT)	HHMM
lat	latitude (north is positive)	decimal degrees
lon	longitude (east is positive)	decimal degrees
depth_cast	maximum depth of CTD cast	meters

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Deployments

KM1513

Website	https://www.bco-dmo.org/deployment/640720
Platform	R/V Kilo Moana
Start Date	2015-07-24
End Date	2015-08-05
Description	The objective of the cruise is deploy free-drifting surface drifters in the vicinity of the Hawaii Ocean Time-series (HOT) station (Station ALOHA), which is defined as a circle with a 6 nautical mile radius centered at 22° 45'N, 158°W. The surface drifters will be monitored for the duration of the cruise and the Kilo Moana will conduct water-column sampling using the CTD-rosette alongside one of the drifters for the duration of the cruise. Cruise Plan Cruise Binder

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Project Information

Center for Microbial Oceanography: Research and Education (C-MORE)

Website: http://cmore.soest.hawaii.edu/

Coverage: North Pacific Subtropical Gyre (large region around 22 45 N, 158 W)

Project summary

The **Center for Microbial Oceanography: Research and Education** (C-MORE) is a recently established (August 2006; NSF award: EF-0424599) NSF-sponsored Science and Technology Center designed to facilitate a more comprehensive understanding of the diverse assemblages of microorganisms in the sea, ranging from the genetic basis of marine microbial biogeochemistry including the metabolic regulation and environmental controls of gene expression, to the processes that underpin the fluxes of carbon, related bioelements and energy in the marine environment. Stated holistically, C-MORE's primary mission is: *Linking Genomes to Biomes*.

We believe that the time is right to address several major, long-standing questions in microbial oceanography. Recent advances in the application of molecular techniques have provided an unprecedented view of the structure, diversity and possible function of sea microbes. By combining these and other novel approaches with more well-established techniques in microbiology, oceanography and ecology, it may be possible to develop a meaningful predictive understanding of the ocean with respect to energy transduction, carbon sequestration, bioelement cycling and the probable response of marine ecosystems to global environmental variability and climate change. The strength of C-MORE resides in the synergy created by bringing together experts who traditionally have not worked together and this, in turn, will facilitate the creation and dissemination of new knowledge on the role of marine microbes in global habitability.

The new Center will design and conduct novel research, broker partnerships, increase diversity of human resources, implement education and outreach programs, and utilize comprehensive information about microbial life in the sea. The Center will bring together teams of scientists, educators and community members who otherwise do not have an opportunity to communicate, collaborate or design creative solutions to long-term ecosystem scale problems. The Center's research will be organized around four interconnected themes:

- (Theme I) microbial biodiversity,
- (Theme II) metabolism and C-N-P-energy flow,
- (Theme III) remote and continuous sensing and links to climate variability, and
- (Theme IV) ecosystem modeling, simulation and prediction.

Each theme will have a leader to help coordinate the research programs and to facilitate interactions among the other related themes. The education programs will focus on pre-college curriculum enhancements, in service teacher training and formal undergraduate/graduate and post-doctoral programs to prepare the next generation of microbial oceanographers. The Center will establish and maintain creative outreach programs to help diffuse the new knowledge gained into society at large including policymakers. The Center's activities will be dispersed among five partner institutions:

- Massachusetts Institute of Technology,
- Woods Hole Oceanographic Institution,
- Monterey Bay Aquarium Research Institute,
- University of California at Santa Cruz and
- Oregon State University

and will be coordinated at the University of Hawaii at Manoa.

Related Files:

Strategic plan (PDF file)

Simons Collaboration on Ocean Processes and Ecology (SCOPE)

Website: http://scope.soest.hawaii.edu/scope.html

Coverage: North Pacific Subtropical Gyre near Hawaii, near Station ALOHA (22.75 N, 158 W).

Life on Earth most likely originated as microorganisms in the sea. Over the past 3.5 to 4 billion years, microbes have shaped and defined Earth's biosphere, and have created conditions that allowed the evolution of more complex life. Today, microbes are the 'unseen majority' of organisms that inhabit and sustain all of Earth's habitats, including marine environments.

Microbes capture solar energy, catalyze key biogeochemical transformations of important elements, produce and consume greenhouse gases, and compose the base of the marine food web. Yet our understanding of the fundamental principles that determine the distribution, composition and function of microorganisms in the sea remains incomplete. Much of our understanding about the structure and dynamics of microbial assemblages has been qualitative, descriptive and contributed by a single individual or small teams of investigators working within a discipline.

Now, with a concerted cross-disciplinary effort by a team of scientists working in a well-described ocean ecosystem, the possibility of using a quantitative theoretical framework to interpret microbial community dynamics in the context of new field observations and experimental results is within reach. The time is right to achieve a more comprehensive, qualitative, quantitative and theoretical understanding of marine microbial community structure, function and activities in the sea.

The Simons Collaboration on Ocean Processes and Ecology (SCOPE), funded by the **Simons Foundation**, will establish a collaborative effort that will measure, model and experimentally manipulate a complex system representative of a broad swath of the North Pacific Ocean. This collaboration aims to advance our understanding of the biology, ecology and biogeochemistry of microbial processes that dominate Earth's largest biome: the global ocean. A multidisciplinary team of scientists who share a common interest in microbial oceanography have committed to partner in a meaningful collaboration that will begin to address some of the long-standing scientific challenges and previously unattainable research goals of that discipline. Specifically, SCOPE will conduct highly resolved spatial and temporal analyses over multiple levels of biological organization at a representative ocean benchmark, Station ALOHA, located in the North Pacific Subtropical Gyre (NPSG).

The central mission of SCOPE is to measure, model and predict the pathways and exchanges (inputs and outputs) of energy and matter within and between specific microbial groups and their environment at relevant spatial and temporal scales, from surface waters to the deep sea (more than 4 km in depth) at Station ALOHA. A central premise of SCOPE is that we must study the ocean ecosystem in situ, at a variety of levels of biological organization (e.g., genetic, biochemical, physiological, biogeochemical and ecological), and at highly resolved, nested scales of space and time in order to fully describe and model it.

SCOPE's overarching goals are:

- To create a collaborative environment that fosters and capitalizes on cross-disciplinary interactions to advance our understanding of microbial processes, ecosystem dynamics and biogeochemical consequences at a site representative of the NPSG.
- To better understand emergent properties of ecosystems through studies of microbial community structure and function over highly resolved, nested spatial and temporal scales.
- To generate and test hypotheses that focus on microbial-community-mediated matter and energy transformations, and the interlinked roles of microbes in energy capture, nutrient transformations and carbon export to the deep sea.
- To understand the properties of relevant model microbes in terms of their genetic and metabolic diversity and their role in ecosystem processes.
- To test and validate new theory and use it as a framework to interpret the structure and dynamics of microbial communities, and their roles and influence in the NPSG ecosystem.

To achieve these goals, SCOPE will engage in the four focused research themes listed below that will organize, guide and integrate its collaborative efforts. Field studies, laboratory characterization, and theory and modeling will interact hand-in-hand within each of these themes. The themes are intended as guides and foci for specific questions, observations and field experiments. The SCOPE mission will be pursued by Simons Investigators and Associate Investigators. The Simons Investigators who will work with SCOPE are path-finding scientists who hold tenure-track, tenured or equivalent positions. Associate Investigators are scientists or engineers who will work on SCOPE goals and objectives, but who need not hold tenure-track-equivalent positions. Simons Investigators and Associate Investigators who work with SCOPE will be recruited to collaborate and participate in research at the SCOPE field site (Station ALOHA, 100 km north of Oahu).

Theme I. The microbial trade market at Station ALOHA

Fluxes of matter, energy and genetic information at Station ALOHA are governed by the organization, structure and complexity of species, populations and community assemblages in marine plankton. Furthermore, the macromolecular information content (DNA/RNA/protein) of the plankton community encodes the network instructions that specify community structure, organization, function and interactions. Investigators in this SCOPE theme will focus on ecologically relevant laboratory experiments and studies of pure and mixed cultures (and their gene content, regulation and physiology) as model systems that are relevant to the Station ALOHA ecosystem. Theme I studies are thus specifically focused on laboratory-based model microbial systems, and interpretation of laboratory data and experiments, in the context of SCOPE field data (derived from Theme II-IV efforts).

Theme II. High-resolution spatial and temporal dynamics: from genes, populations and communities, to biogeochemical cycles and ecosystem function

The ability to sample microbial processes at appropriate spatial and temporal scales in situ will revolutionize our quantitative understanding of the dynamics of microbial inputs and outputs. The ultimate goal of this theme is to produce and analyze highly resolved, four-dimensional field-based 'motion pictures' of the genetic, taxonomic, transcriptional, metabolic, physical and chemical fields that drive the ecological dynamics of microbes at Station ALOHA. In contrast to Theme I, which focuses on studies of individual microbes in the lab, Theme II is field-based, and targets in situ studies of microbes and microbial communities in the wild at Station ALOHA.

Theme III. Microbes, energy, matter and gravity: fluxes into the ocean interior at Station ALOHA

Rates of primary production in the NPSG are directly linked to solar radiation. Less predictable are the conditions that create aperiodic seasonal phytoplankton blooms, the specific microbial assemblages associated in and around those blooms, and the biogeochemical processes responsible for export and transformation of phytoplankton-derived fluxes to the deep sea. SCOPE Investigators will aim to resolve some of these uncertainties with high-resolution observations of episodic bloom dynamics, model and theory.

Theme IV. Ecosystem-scale experiments

Field measurements to assess the ecosystem responses to nutrient perturbation have typically been conducted in small volumes of seawater in closed containers, which may induce methodological artifacts. Recently, whole-ecosystem nutrient-perturbation experiments have become feasible. To help advance this promising area, SCOPE Investigators will conduct both closed (mesocosm) and open ecosystem perturbation experiments in the open-ocean environment at Station ALOHA.

SCOPE is co-directed by Edward DeLong and David Karl, who chair a steering committee that includes Ginger Armbrust, Marian Carlson, Mick Follows, and Jon Zehr. SCOPE comprises sixteen Simons Investigators.

BCO-DMO Note: The SCOPE project is affiliated with the C-MORE project (there is substantial overlap in investigators). The SCOPE project is funded by the Simons Foundation, not NSF. However, in order to appropriately credit both NSF and the Simons Foundation for the joint datasets, a SCOPE Project page was created.

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Funding

Funding Source	Award
NSF Division of Biological Infrastructure (NSF DBI)	DBI-0424599
Simons Foundation (Simons)	unknown SCOPE Simons

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