N2-fixation rate measurements from R/V Kilo Moana KM0715 in the North Pacific Subtropical Gyre north of Hawaii, near (24 N, 159.0 W) from August 2007 (C-MORE project)

Website: https://www.bco-dmo.org/dataset/3610
Version:
Version Date: 2011-12-07

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

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Dataset Description

N2-fixation rate measurements employed the 15N2 isotopic tracer method described by Montoya et al.

Methods & Sampling

See Platform Deployments for cruise specific documentation

Data Processing Description

See Platform Deployments for cruise specific documentation

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Parameters

Parameter	Description	Units
date	date	YYYYMMDD
sta	station number	dimensionless
depth	depth	meters
lat	latitude	negative denotes south
lon	longitude	negative denotes west
N2_fix_no_prefilter	N2 fixation rate (filtered onto GFF with no prefilter)	nmol N L-1 d-1
N2_fix_no_prefilter_stderr	standard error for the N2 fixation rate (with no prefilter)	nmol N L-1 d-1
N2_fix_10um_prefilter	average N2 fixation rate (with 10 um prefilter)	nmol N L-1 d-1
N2_fix_10um_prefilter_stderr	standard error for the N2 fixation rate (with 10 um prefilter)	nmol N L-1 d-1
N2_fix_gt_10um_fraction	N2 fixation rate for the greater than 10 um fraction	nmol N L-1 d-1
activity_and_comments	comments	text

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Deployments

KM0715

Website	https://www.bco-dmo.org/deployment/57999
Platform	R/V Kilo Moana
Report	ftp://ftp.soest.hawaii.edu/dkarl/cmore/Cruise_Reports/bloomer1//Letelier_cmore_2_rpt.pdf
Start Date	2007-08-09
End Date	2007-08-21

Description	C-MORE BLOOMER (BLOOM Ecological Reconnaissance) C-MORE 2 cruise C-MORE August 2007 cruise objectives and logistics downloaded from C-MORE site 'Cruise objectives' document, 14 September 2009 GENERAL CRUISE OBJECTIVES The primary goal this year will be the characterization of the microbial assemblage and biogeochemical fluxes associated to summer increases in cyanobacterial biomass in the vicinity of Station ALOHA. This characterization will be compared to a sampling site where no biomass increase is detected. In addition, we will try to establish transects across a bloom region, or try to sample distinct areas where blooms are detected from remote sensing and SeaGliders, to assess the spatial heterogeneity of these blooms. GENERAL CRUISE PLAN: August 8th: Loading day August 9th, 8:00 Departure from Snug. 1st scenario: If a boom is remotely detected within 100km of Station ALOHA August 9th to August 10th at 5AM: Transit to the bloom station August 10th to August 13th in the morning: Sample and carry experiments within the bloom (considers the deployment of sediment traps for at least 72 hours on August 10th and carrying on deck incubation time series for 5 days [August 15th]) August 13th noon to August 14th evening: Series of stations to characterize the spatial heterogeneity of the bloom. August 14th evening to August 15th 5AM: Transit toward Station ALOHA or a site within 100km of this site not displaying high accumulation of chlorophyll in surface waters. August 15th to August 18th in the morning: Sample and carry experiments outside the bloom. August 19th is left as a buffer and could be used to revisit the sampling site. August 20th early morning - noon: start transit back to Honolulu. 2nd scenario: If blooms are not detected in the vicinity of Station ALOHA: August 9th to August 10th at 5AM: Transit to 24N, 158W where increase sea surface chlorophyll concentration was observed on July 18 to 28. This location could change once we have developed the full MODIS chlorophyll statistics for the month of July for the study region. We will use these statistics to assess the station that has had the largest change in chlorophyll concentration as well as the station that has not seen significant chlorophyll fluctuation within 100 to 200km radius north of Station ALOHA. These will represent our primary sampling sites, replacing the bloom and non bloom sites in the 1st scenario. As in the first scenario, we will devote August 13th and August 14th to assess the spatial heterogeneity of the sampling region. 3rd scenario: A bloom develops during the cruise. We will modify the cruise plan accordingly in order to characterize the bloom evolution. C-MORE 2 BLOOMER Cruise Reports Cruise reports available from the C-MORE ftp site:ftp://ftp.soest.hawaii.edu/dkarl/cmore/Cruise_Reports/bloomer1/ each investigator contributed a separate report. Related information sources from the C-MORE Web Site: Homepage: http://cmore.soest.hawaii.edu/cruises/cmore_2/index.htm Data: http://hahana.soest.hawaii.edu/cmorebloomer/cmorebloomer.html Cruise track: http://hahana.soest.hawaii.edu/cmorebloomer/cm2LocMap.gif Cruise objectives: http://hahana.soest.hawaii.edu/cmorebloomer/cmore_2_objectives_logistics... Cruise event sheet: http://hahana.soest.hawaii.edu/cmorebloomer/cmore_2_final_master_event_s... Cruise information and original data are available from the NSF R2R data catalog. **Methods & Sampling** # Discrete samples of 15N2 fixation rates # CMORE/BLOOMER # Ocean Microbial Ecology Laboratory # Ricardo Letelier # # original file: White_KM0715_Summary.xls # originally ingested into BCO-DMO: September 28, 2009 # updated : Feb 11 2011 (ancillary columns added - data not changed) # date updated: December 7, 2011 (format and data values changed) # Using a gas tight syringe, 2.0 ml of 15N2 gas (99 atom %, Cambridge Scientific) was injected into a 4L polycarbonate bottle and the bottles were inverted several times. Samples were incubated at appropriate light levels and temperature for 24 hours. Duplicate samples were taken when adequate water was available. Incubations were terminated by filtering the entire incubation volume onto a 25 mm pre-combusted glass fiber filter (GF/F, Whatman); following filtration, the filters were stored at -20°C until later analysis. Once ashore, samples were acid-fumed, dried overnight at 60°C and then encapsulated in tin and silver capsules. Particulate C, N and the isotopic composition of particulate material (δ15NPN and δ13CPC) were determined using a PDZ Europa ANCA-GSL elemental analyzer interfaced to a PDZ Europa 20-20 isotope ratio mass spectrometer in the University of California Davis stable isotope facility. **Processing Description** discrete 15N CalcsMontoya et al, 1996

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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)

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Funding

Funding Source	Award
NSF Division of Biological Infrastructure (NSF DBI)	DBI-0424599

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