Core data from R/V Kilo Moana KM0715, KM0817, KM0704, KM0814 in the North Pacific Subtropical Gyre north of Hawaii, and from Suva Fiji to Honolulu to Port Hueneme CA from 2007-2008 (C-MORE project)

Website: https://www.bco-dmo.org/dataset/3390
Version: (See Platform Deployments)
Version Date: 2012-02-20

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

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Table of Contents

- Dataset Description
  - Methods & Sampling
  - Data Processing Description
- Parameters
- Deployments
- Project Information
- Funding

Dataset Description

C-MORE Core measurements

Methods & Sampling

See Platform Deployments for cruise specific documentation

Data Processing Description

See Platform Deployments for cruise specific documentation

[table of contents | back to top]

Parameters

Parameter	Description	Units
sta	station number	dimensionless
cast	cast number	dimensionless
bot	rosette bottle number	dimensionless

lat	latitude	decimal degrees (south is negative)
lon	longitude	decimal degrees (west is negative)
press	pressure; from CTD	decibars
temp	temperature; from CTD	degrees Celsius (ITS-90)
sal	salinity; from CTD	dimensionless (PSS-78)
O2_CTD_umol_kg	oxygen; dissolved; from CTD	umol/kg
chlpig_tot	chloropigment; total	ug/L
potemp	potential temperature	degrees Celsius (ITS-90)
sigma_0	potential density	kg/m3
O2_umol_kg	oxygen; dissolved; from bottle	umol/kg
dic	dissolved inorganic carbon	umol/kg
TALK_ueq_kg	total alkalinity; in ueq/kg	ueq/kg
PO4_umol_kg	phosphate; in umol/kg	umol/kg
NO3_NO2_umol_kg	nitrate plus nitrite; in umol/kg	umol/kg
SiO4_umol_kg	silicate; in umol/kg	umol/kg
DOP	dissolved organic phosphorus	umol/kg
DON	dissolved organic nitrogen	umol/kg
DOC_umol_kg	dissolved organic carbon; in umol/kg	umol/kg
TDP	total dissolved phosphorus	umol/kg
TDN	total dissolved nitrogen	umol/kg
LLN	low-level nitrogen	umol/kg
LLP	low-level phosphorus	umol/kg
PC	particulate carbon	umol/kg
PN	particulate nitrogen	umol/kg
PP	particulate phosphorus	nmol/kg
PSi	particulate silica	nmol/kg
chl_a_fluor	chlorophyll a; fluorometric method	ug/L
phaeo	total phaeopigment	ug/L
chlide_a	chlorophyllide a	ng/L
chl_c	chlorophyll c1+c2+c3	ng/L
peridinin	peridinin	ng/L
fucox_but	19’ butanoyloxyfucoxanthin	ng/L
fucox	fucoxanthin	ng/L
fucox_hex	19’ hexanoyloxyfucoxanthin	ng/L

prasinox	prasinoxanthin	ng/L
violax	violaxanthin	ng/L
diadinox	diadinoxanthin	ng/L
allox	alloxanthin	ng/L
lutein	lutein	ng/L
zeax	zeaxanthin	ng/L
chl_b	chlorophyll b	ng/L
carotene_a	carotene-alpha	ng/L
carotene_b	carotene-beta	ng/L
chl_a2	chlorophyll a; divinyl	ng/L
chl_a1	chlorophyll a; monovinyl	ng/L
chl_a_tot	chlorophyll a like compounds; sum of	ng/L
bact_het_cyt	heterotrophic bacteria abundance; cytometry	10^5 cells/ml
coccus_p_cyt	prochlorococcus abundance; cytometry	10^5 cells/ml
coccus_s_cyt	synechococcus abundance; cytometry	10^5 cells/ml
phyto_e_u_cyt	ultra eukaryotic phytoplankton; cytometry	10^5 cells/ml
ATP	adenosine 5'-triphosphate	ng/kg
CH4	methane	nmol/kg
N2O	nitrous oxide	nmol/kg
qflag_1	quality flags for temp; sal; O2_CTD_umol_kg; chlpig_tot;potemp;sigma_0;O2_umol_kg	dimensionless
qflag_2	quality flags for dic; alkalin_ueq_kg;PO4_umol_kg;NO3_NO2_umol_kg;SiO4_umol_kg;DOP;DON	dimensionless
qflag_3	quality flags for DOC_umol_kg;TDP;TDN;LLN;LLP;PC	dimensionless
qflag_4	quality flags for PN;PP;PSi;chl_a_fluor;phaeo;chlide_a	dimensionless
qflag_5	quality flags for chl_c;peridinin;fucox_but;fucox;fucox_hex;prasinox	dimensionless
qflag_6	quality flags for violax;diadinox;allox;lutein;zeax;chl_b	dimensionless
qflag_7	quality flags for carotene_a;carotene_b;chl_a2;chl_a1;chl_a_tot;bact_het_cyt	dimensionless
qflag_8	quality flags for coccus_p_cyt;coccus_s_cyt;phyto_e_u_cyt;ATP;CH4;N2O	dimensionless

[table of contents | back to top]

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** # C-MORE BLOOMER core data # LMO, University of Hawaii # Dave Karl # original file: LMO_bloomer1.txt # submitted to BCO-DMO: November 30, 2010 # corrected longitude signs: February 20, 2012

KM0817

Website	https://www.bco-dmo.org/deployment/57998
Platform	R/V Kilo Moana
Report	http://data.bco-dmo.org/C-MORE/SUPER_HI-CAT_Chief_Scientist_Report.pdf
Start Date	2008-08-25

End Date	2008-09-05
Description	Preliminary Cruise Report from: http://cmore.soest.hawaii.edu/cruises/super/cruisereport.htm C-MORE science and volunteer crew reported to Snug Harbor at 0630 on Monday, 25 August, 2008. After fueling the ship, the R/V Kilo Moana departed from Honolulu, HI at approximately 1630. Starting at 2200 on this first day and for the duration of the cruise, daily and nightly underway samples were collected from the ship's flow-through system. Water collected from this system was processed for particulates, nutrients, ATP, chlorophyll, and a suite of other analyses for contextual data. The cruise track began with a northeasterly course from Oahu to 34° N, 151° W. Six stations were visited before heading east, approximately tracing 35° N latitude, along which 10 additional stations were taken. This track took us 27 hours off of the great circle path between Honolulu and Port Hueneme. The total distance of the sample transect was 2115 km. The first station consisted of a single CTD cast at 1300 on Tuesday, 26 August to collect water for a mixing experiment (mixing deep water with surface water to change nutrient concentrations). From Wednesday, 27 August to Monday, 1 September, two to three stations were visited per day, during which the manta trawl was deployed for 1.5 hours, the CTD rosette was cast to the deep chlorophyll maximum, and the HyperPro profiler and LISST particle analyzer were deployed to approximately 125m depth. Upon recovery of the manta trawl, the net was rinsed with sea water, and the cod end was detached and placed in a bucket on deck. The cod end was then taken to Lab 2, where the contents were sieved through three filters of the following mesh sizes: 5mm, 2mm, and 0.2mm. Large pieces that were not kept for later use were measured and photographed (the upper size limit for whether a sample was retained was determined by the size of the largest storage containers). The presence and abundance of fauna collected in the net were recorded. The metazoan community consisted primarily of Valella valella, Porpita porpita, Halobates, Janthina, isopods, copepods, amphipods, and small crabs. In the following summary of sample allocations, the "large" size class refers to plastic pieces >5mm; "medium" refers to 2-5mm sized pieces, and "small" refers to 0.2-2mm sized pieces. For each sample, 30-100 pieces of plastic were collected from the large and medium size classes for DNA and RNA analyses. For chlorophyll extractions, 3 large, 6 medium, and 30 small pieces were placed in acetone and refrigerated (each size class was divided into 3 tubes, for a total of 9 chlorophyll samples per station). For ATP, 5 large, 15 medium, and 50 small pieces were boiled in TRIS buffer and then frozen (each size class was divided into 5 tubes, yielding a total of 15 ATP tubes per station). From 6 of the 14 trawl collections,between 14-19 large and medium pieces were used for incubation experiments. The remaining plastic pieces were sorted by size class and stored in 5% formalin. All of the 2-5mm and >5mm sized pieces were counted, and as many of the 0.2-2mm sized pieces were counted as time allowed. In addition to these collections, an incubation experiment was conducted in which microbial processes were examined in treatments without plastic particles, with sterilized plastic particles, and with "in situ" (non-sterilized) plastic particles. The combined density of plastic particles in the 2-5mm and >5mm size classes ranged from 0.35-3.71 pieces m-3 across all sampling stations. Integrated over the top 0.5m of the ocean, the particle concentrations along the transect ranged from 174,000 to 1.85 million plastic fragments km-2. Related information from the C-MORE SUPER cruise Web site: Homepage: http://cmore.soest.hawaii.edu/cruises/super/index.htm Cruise Report: http://cmore.soest.hawaii.edu/cruises/super/cruisereport.htm Science plan: http://cmore.soest.hawaii.edu/cruises/super/science.htm Data: http://hahana.soest.hawaii.edu/cmoresuperhicat/superhicat.html Chief Scientist Report: http://hahana.soest.hawaii.edu/cmoresuperhicat/SUPER_HI-CAT_Chief_Scient... Cruise track: http://hahana.soest.hawaii.edu/cmoresuperhicat/super1track.gif Cruise plan: http://hahana.soest.hawaii.edu/cmoresuperhicat/SUPER_HI-CAT_final_cruise... Cruise information and original data are available from the NSF R2R data catalog. **Methods & Sampling** # C-MORE SUPER core data # LMO, University of Hawaii # Dave Karl # original file: LMO_super1.txt # submitted to BCO-DMO: November 30, 2010 # corrected longitude signs: February 20, 2012

KM0704

Website	https://www.bco-dmo.org/deployment/57997
Platform	R/V Kilo Moana
Report	http://bcodata.whoi.edu/C-MORE/BULA1_cruise_activities.pdf
Start Date	2007-04-19
End Date	2007-04-30
Description	The BULA cruise, a transect from Suva, Fiji to Honolulu, Hawaii was the inagural cruise of the Center for Microbial Oceanography: Research and Education (C-MORE). Some of the many goals were: (1) to identify prominent trends in plankton biomass, biomass structure, and elemental stoichiometry, (2) to examine latitudinal variability in upper ocean concentrations of colored dissolved organic matter and trace metal ligands, (3) to isolate new Prochlorococcus strains, (4) to optically determine upper ocean biogeochemical variables, (5) to study the distribution, production and loss rates of dissolved hydrogen and its relationship to nitrogen fixation, (6) to study viral diversity along biogeochemical gradients, (7) to assay spatial distributions of microbial community structure based on rRNA fingerprinting and sequencing, and (8) to assess spacial variability in photophysiological responses to photoautotrophs. Original sources available from C-MORE Web Site: BULA Home page: http://cmore.soest.hawaii.edu/cruises/bula/index.htm BULA Data: http://hahana.soest.hawaii.edu/cmorebula/cmorebula.html Cruise track: http://hahana.soest.hawaii.edu/cmorebula/bula1track.gif Cruise log: http://hahana.soest.hawaii.edu/cmorebula/CMOREBULA_Cruise_Log.pdf (sample log sheets) Cruise activities: http://hahana.soest.hawaii.edu/cmorebula/Cruise_activities.pdf (Cruise Report) Cruise summary: ftp://ftp.soest.hawaii.edu/dkarl/cmore/cruise.summaries/bula1.sum (station/cast locations) Cruise information and original data are available from the NSF R2R data catalog. **Methods & Sampling** # C-MORE BULA core data # LMO, University of Hawaii # Dave Karl # original file: LMO_bula1.txt # submitted to BCO-DMO: November 30, 2010 # longitude signs corrected: February 20, 20120

KM0814

Website	https://www.bco-dmo.org/deployment/58018
Platform	R/V Kilo Moana
Start Date	2008-07-30
End Date	2008-08-14
Description	OPEREX Cruise Objective The objective of the OPEREX cruise will be to explore the potential and limitations of perturbation experiments at sea. We will follow some natural perturbations including blooms and eddies, and we will perform some of the artificial perturbation experiments including bench/lab scale incubations, ship deck incubations, and ship deck pH shift experiments. Original cruise data are available from the NSF R2R data catalog Related information from the C-MORE OPEREX cruise Web site: Homepage: http://cmore.soest.hawaii.edu/cruises/operex/index.htm Science plan: http://cmore.soest.hawaii.edu/cruises/operex/science_objective.htm Data: http://hahana.soest.hawaii.edu/cmoreoperex/operex.html Cruise track: http://hahana.soest.hawaii.edu/cmoreoperex/OPEREXtrack.gif Cruise plan: http://cmore.soest.hawaii.edu/cruises/operex/documents/km0814_cruise_pla... Cruise overview: http://hahana.soest.hawaii.edu/cmoreoperex/OPEREX_overview.pdf Cruise schedule: http://cmore.soest.hawaii.edu/cruises/operex/documents/OPPEREX_schedule.xls **Methods & Sampling** # C-MORE OPEREX core data # LMO, University of Hawaii # Dave Karl # original file: LMO_operex1.txt # submitted to BCO-DMO: November 30, 2010 # corrected longitude signs: February 20, 2012

[table of contents | back to top]

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)

[table of contents | back to top]

Funding

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

[table of contents | back to top]