Bottle data and chemical analysis from Falkor cruise FK180624 in the Eastern Tropical North Pacific Ocean in 2018

Website: https://www.bco-dmo.org/dataset/832389
Data Type: Cruise Results
Version: 1
Version Date: 2020-12-02

Project
» Solving Microbial Mysteries with Autonomous Technology (Microbial Mysteries)

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Abstract
Bottle data and chemical analysis from Falkor cruise FK180624 in the Eastern Tropical North Pacific Ocean in 201

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Coverage

Spatial Extent: **N**:18.00001 **E**:-101.99474 **S**:13.99251 **W**:-119.002069
Temporal Extent: 2018-06-30 - 2018-07-13

Acquisition Description

The samples were taken using a 24-bottle CTD rosette with 12L bottles. Depths varied per station but were focused in the upper 1000m. 19 stations were sampled with 22 casts total.

Samples were drawn in order: pH, alkalinity, NH4, nutrients (NOx, PO4, NO2). pH, NH4, PO4, NO2 were measured within 3 hours of collection onboard. NOx were filtered (0.22um Sterivex) and frozen. NOx is generally a mean of 3 measurements. Alkalinity were poisoned with a saturated HgCl2 solution and preserved in 160mL crimped serum bottles.

Processing Description

The samples were analysed using the following instruments:

- NO2, PO4: Ocean Optics QEPRO spectrophotometer with 10cm Starna flow through quartz cell
- NOx: Teledyne T200 NOx analyzer with custom front end for vanadium reduction
- pH: Agilent 8454 spectrophotometer with custom front end for automated syringe injection
- Alkalinity: Custom total alkalinity titrator built by the lab of Andrew Dickson, UCSD-Scripps

BCO-DMO processing notes:

- Added ISO_DateTime_UTC column
- Added cruise id

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Parameters

Parameter	Description	Units
CRUISEID	cruide identifier	unitless
EXPOCODE	cruise EXPO code	unitless
STNNBR	station number	unitless
CASTNO	cast number	unitless
SAMPNO	sample number	unitless
DATE	sampling date in pacific daylight time (PDT), format:dd-mm-yyy	unitless
TIME	time in pacific daylight time (PDT), format: hh:mm:ss	unitless
LATITUDE	latitude, south is negative	decimal degrees
LONGITUDE	longitude, west is negative	decimal degrees
BOTTOM_DEPTH	bottom depth of ocean	meters (m)
CTDPRS	CTD pressure	decibar (dbar)
CTDTMP	CTD temperature, International Temperature Scale of 1990 (ITS-90)	degrees Celsius (°C)
CTDSAL	CTD salinity, Practical Salinity Scale - 1978	PSU
CTDS_FLAG_W	CTD salinity flag. WOCE standard, with 2 = good, 3 = questionable, 6 = mean of replicates, 9 = sample not drawn	unitless
CTDOXY	CTD oxygen	micromoles per liters (umol/l)
CTDOXY_FLAG_W	oxygen flag. WOCE standard, with 2 = good, 3 = questionable, 6 = mean of replicates, 9 = sample not drawn	unitless
FLOR	calibrated fluoresence from CTD	micrograms per liters (ug/l)
FLOR_FLAG_W	fluoresence flag. WOCE standard, with 2 = good, 3 = questionable, 6 = mean of replicates, 9 = sample not drawn.	unitless

NOx	nitrate + nitrite	micromoles per liters (umol/l)
NOx_FLAG_W	total NOx flag. WOCE standard, with 2 = good, 3 = questionable, 6 = mean of replicates, 9 = sample not drawn.	unitless
NOx_stdev	standard deviation of NOx	micromoles per liters (umol/l)
NOx_STD_FLAG_W	flag. WOCE standard, with 2 = good, 3 = questionable, 6 = mean of replicates, 9 = sample not drawn.	unitless
NITRIT_BabLab	nitrite	micromoles per liters (umol/l)
NITRIT_FLAG_W	nitrite flag. WOCE standard, with 2 = good, 3 = questionable, 6 = mean of replicates, 9 = sample not drawn.	unitless
PHSPHT	phosphate	micromoles per liters (umol/l)
PHSPHT_FLAG_W	phosphate flag. WOCE standard, with 2 = good, 3 = questionable, 6 = mean of replicates, 9 = sample not drawn.	unitless
NH4	ammonium	micromoles per liters (umol/l)
NH4_FLAG_W	ammonium flag. WOCE standard, with 2 = good, 3 = questionable, 6 = mean of replicates, 9 = sample not drawn.	unitless
PH_TOT	pH on the total scale at 25C	unitless
PH_TOT_FLAG_W	pH flag	unitless
PH_TEMP	temperature of pH measurements	degrees Celsius (°C)
TA	total alkalinity	micromoles per kilograms (umol/kg)
TA_FLAG_W	total alkalinity flag. WOCE standard, with 2 = good, 3 = questionable, 6 = mean of replicates, 9 = sample not drawn.	unitless
ISO_DateTime_UTC	Date and time of sample and data collection in UTC, standard ISO format (yyyy-mm-ddThh:mmZ)	unitless

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Instruments

Dataset-specific Instrument Name	Custom total alkalinity titrator
Generic Instrument Name	Automatic titrator
Dataset-specific Description	Custom total alkalinity titrator built by the lab of Andrew Dickson, UCSD-Scripps
Generic Instrument Description	Instruments that incrementally add quantified aliquots of a reagent to a sample until the end-point of a chemical reaction is reached.

Dataset-specific Instrument Name	Ocean Optics QEPRO spectrophotometer
Generic Instrument Name	Spectrophotometer
Dataset-specific Description	NO2, PO4: Ocean Optics QEPRO spectrophotometer with 10cm Starna flow through quartz cell
Generic Instrument Description	An instrument used to measure the relative absorption of electromagnetic radiation of different wavelengths in the near infra-red, visible and ultraviolet wavebands by samples.

Dataset-specific Instrument Name	Agilent 8454 spectrophotometer
Generic Instrument Name	Spectrophotometer
Dataset-specific Description	pH: Agilent 8454 spectrophotometer with custom front end for automated syringe injection
Generic Instrument Description	An instrument used to measure the relative absorption of electromagnetic radiation of different wavelengths in the near infra-red, visible and ultraviolet wavebands by samples.

Dataset-specific Instrument Name	Teledyne T200 NOx analyzer
Generic Instrument Name	Chemiluminescence NOx Analyzer
Dataset-specific Description	NOx: Teledyne T200 NOx analyzer with custom front end for vanadium reduction.
Generic Instrument Description	The chemiluminescence method for gas analysis of oxides of nitrogen relies on the measurement of light produced by the gas-phase titration of nitric oxide and ozone. A chemiluminescence analyzer can measure the concentration of NO/NO2/NOX. One example is the Teledyne Model T200: http://www.teledyne-api.com/products/T200.asp

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Deployments

FK180624

Website	https://www.bco-dmo.org/deployment/776768
Platform	R/V Falkor
Start Date	2018-06-24
End Date	2018-07-15
Description	Sampling for the "Solving Microbial Mysteries" project.

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Project Information

Solving Microbial Mysteries with Autonomous Technology (Microbial Mysteries)

Website: https://schmidtocean.org/cruise/solving_microbial_mysteries_with_autonomous_technology/

Coverage: Eastern Tropical North Pacific Ocean

Phytoplankton form the base of the marine food web. These microscopic, single-celled organisms float in seawater, taking in carbon dioxide and using light energy to make carbohydrates. Like land plants, phytoplankton need other elements and compounds (fertilizer) to perform photosynthesis in order to survive and thrive: Nitrogen is one of these key ingredients for phytoplankton growth.

Nitrogen is fascinating and somewhat unique because it cycles through many oxygenation states. This means that there is plenty of energy for organisms to harness and the nitrogen cycle can be used as a lens to understand microbial communities. The quantity of “fixed nitrogen” in the ocean, usually nitrate (NO3–) and ammonium (NH4+), is critical for the existence and development of phytoplankton, and plays a role in the biological carbon pump sequestering carbon dioxide from the atmosphere.

Being able to recognize the role of fixed nitrogen in ocean processes is important for understanding low-oxygen areas in the world’s oceans. Insight into microbial interactions in oxygen deficient waters will allow researchers to better predict the marine response to increased nutrient runoff, eutrophication, and hypoxia – all of which currently threaten the livelihoods of many coastal communities as a warming climate leads to the expansion of low oxygen “dead” zones.

Data Management Plan: The resulting shipboard dataset is being archived at Rolling Deck to Repository and is now available. ADCP data is curated and processed by University of Hawaii.Iodine Speciation measurements are archived in BCO-DMO

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Funding

Funding Source	Award
Schmidt Ocean Institute (SOI)	No Award Number

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