Data Inventory from R/V Hakuho-maru and R/V Kilo Moana cruises KH04xx-01, KH04xx-02 and KM0415 in the Northwestern Sub-Arctic Pacific in 2004 (SEEDS II project)

Website: https://www.bco-dmo.org/dataset/3160
Version: 03Aug2009
Version Date: 2009-08-03

Project
» Subarctic Pacific Iron Experiment for Ecosystem Dynamics Study II (SEEDS II)

Program
» Iron Synthesis (FeSynth)

Contributors	Affiliation	Role
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Table of Contents

Dataset Description

SEEDS 2004 Cruise Data Inventory
Status of expected SEEDS 2004 data contributions

Methods & Sampling

Generated by BCO-DMO staff from project documentation report complied and submitted by Doug Mackie, UofOtago.
Available as a PDF file

Data Processing Description

Generated by BCO-DMO staff from project documentation report complied and submitted by Doug Mackie, UofOtago.
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[table of contents | back to top]

Data Files

File
Inventory.csv(Comma Separated Values (.csv), 3.24 KB) MD5:0f2f70f262d53fe3216ae137db0dff03 Primary data file for dataset ID 3160

[table of contents | back to top]

Parameters

Parameter	Description	Units
Data_Measurement	Text description of type of data or measurement(s)	text
PI_name	name of principal investigator	text
coPI_name	name of co-principal investigator	text
Contributed	flag indicating if data have been contributed; y=yes, n=no and p=preliminary or partial dataset	text
QA	Quality flag indicating if quality control has been completed; are data final, yes or no	text
On_System	flag indicating whether data are available online: y = in OCB database; n = not available yet; L = link to local resource; R = link to remote resource	text
Status_or_Link	Indication of dataset status; comment or link to data	text
Meta	Flag indicating metadata have/have not been contributed for these data (Y/N) In some inventories, also links to the metadata file	text
Access	Data Access Flag O - Open R - Restricted	text
BCODMO_DataSet_ID	Data set Id assigned in BCO-DMO database	text

[table of contents | back to top]

Deployments

KH04xx-01

Website	https://www.bco-dmo.org/deployment/57836
Platform	R/V Hakuho Maru
Start Date	2004-07-09
End Date	2004-08-02
Description	Tsuda, A., et al. (2007): Evidence for the grazing hypothesis: Grazing reduces phytoplankton responses of the HNLC ecosystem to iron enrichment in the western subarctic pacific (SEEDS II). J. Oceanogr. 63(6), 983-994. The first iron addition was carried out from 0:50 GMT on 20 July to 0:00 GMT on 21 July (GMT). Day 1 was defined as 21 July (GMT). The ship started to inject iron and sulfur hexafluoride (SF6) as an inert tracer of the water mass, executing an 8 km by 8 km grid pattern centered on the buoy with an interval of 400 m. The ship was navigated with a lagrangian coordination system (Tsumune et al., 2005), and buoy position was transmitted to the ship every 10 min to update the navigation frame of reference to account for surface water advection. The amount of iron added to the patch was 332 kg Fe as FeSO4. During the iron fertilization, 4000 L of saturated SF6 solution was also simultaneously injected. The saturated SF6 solution was made onboard using the method previously detailed in Tsumune et al. (2005). Note that the saturated SF6 concentration in seawater is about 0.2 mM (Ledwell and Watson, 1991). A second iron addition was performed on day 6 without SF6 tracer, when an additional 159 kg of iron was added to the patch, which was traced using the SF6 signal.

KH04xx-02

Website	https://www.bco-dmo.org/deployment/57837
Platform	R/V Hakuho Maru
Start Date	2004-08-06
End Date	2004-08-25
Description	Tsuda, A., et al. (2007): Evidence for the grazing hypothesis: Grazing reduces phytoplankton responses of the HNLC ecosystem to iron enrichment in the western subarctic pacific (SEEDS II). J. Oceanogr. 63(6), 983-994. The first iron addition was carried out from 0:50 GMT on 20 July to 0:00 GMT on 21 July (GMT). Day 1 was defined as 21 July (GMT). The ship started to inject iron and sulfur hexafluoride (SF6) as an inert tracer of the water mass, executing an 8 km by 8 km grid pattern centered on the buoy with an interval of 400 m. The ship was navigated with a lagrangian coordination system (Tsumune et al., 2005), and buoy position was transmitted to the ship every 10 min to update the navigation frame of reference to account for surface water advection. The amount of iron added to the patch was 332 kg Fe as FeSO4. During the iron fertilization, 4000 L of saturated SF6 solution was also simultaneously injected. The saturated SF6 solution was made onboard using the method previously detailed in Tsumune et al. (2005). Note that the saturated SF6 concentration in seawater is about 0.2 mM (Ledwell and Watson, 1991). A second iron addition was performed on day 6 without SF6 tracer, when an additional 159 kg of iron was added to the patch, which was traced using the SF6 signal.

KM0415

Website	https://www.bco-dmo.org/deployment/57838
Platform	R/V Kilo Moana
Start Date	2004-07-15
End Date	2004-08-25
Description	Cruise information and original data are available from the NSF R2R data catalog.

[table of contents | back to top]

Project Information

Subarctic Pacific Iron Experiment for Ecosystem Dynamics Study II (SEEDS II)

Website: http://www.seeds-exp.jp/en/index.html

Coverage: Western subarctic gyre in the North Pacific at 48.5°N, 165°E, (i.e. 93 km SE of SEEDS I)

As at August 2008 the Tsuda 2007 paper is the only one to carry a general description.

The first iron addition was carried out from 0:50 GMT on 20 July to 0:00 GMT on 21 July (GMT). Day 1 was defined as 21 July (GMT).

Tsuda, A., et al. (2007): Evidence for the grazing hypothesis: Grazing reduces phytoplankton responses of the HNLC ecosystem to iron enrichment in the western subarctic pacific (SEEDS II). J. Oceanogr. 63(6), 983-994.

A mesoscale iron-enrichment study (SEEDS II) was carried out in the western subarctic Pacific in the summer of 2004. The iron patch was traced for 26 days, which included observations of the development and the decline of the bloom by mapping with sulfur hexafluoride. The experiment was conducted at almost the same location and the same season as SEEDS (previous iron- enrichment experiment). However, the results were very different between SEEDS and SEEDS II. A high accumulation of phytoplankton biomass (~18 mg chl m-3) was characteristic of SEEDS. In contrast, in SEEDS II, the surface chlorophyll-a accumulation was lower, 0.8 to 2.48 mg m-3, with no prominent diatom bloom. Photosynthetic competence in terms of Fv/Fm for the total phytoplankton community in the surface waters increased after the iron enrichments and returned to the ambient level by day 20. These results suggest that the photosynthetic physiology of the phytoplankton assemblage was improved by the iron enrichments and returned to an iron-stressed condition during the declining phase of the bloom. Pico-phytoplankton (<2 um) became dominant in the chlorophyll-a size distribution after the bloom.

We observed a nitrate drawdown of 3.8 uM in the patch (day 21), but there was no difference in silicic acid concentration between inside and outside the patch. Mesozooplankton (copepod) biomass was three to five times higher during the bloom-development phase in SEEDS II than in SEEDS. The copepod biomass increased exponentially. The grazing rate estimation indicates that the copepod grazing prevented the formation of an extensive diatom bloom, which was observed in SEEDS, and led to the change to a pico- phytoplankton dominated community towards the end of the experiment.

SEEDS II was conduced in the same western subarctic Pacific region as the initial SEEDS experiment, and was an international collaborative study utilizing two research vessels (R.V. Hakuho Maru and R.V. Kilo Moana). This experiment was designed to characterize the evolution of the fertilized patch over a longer time scale (1 month) and with a greater range of parameters than measured during SEEDS.

The preliminary results from SEEDS II showed both the iron-induced increase and subsequent decline in phytoplankton biomass. However, the iron-initiated bloom was much less intense than observed in SEEDS. Chlorophyll-a concentrations increased only 2 to 3 times over initial values, and the drawdown of nutrients and pCO2 were small.

Related files

SEEDS II Project Documentation
SEEDS II Workshop Summary

[table of contents | back to top]

Program Information

Iron Synthesis (FeSynth)

Coverage: Global

The two main objectives of the Iron Synthesis program (SCOR Working Group proposal, 2005), are:
1. Data compilation: assembling a common open-access database of the *in situ* iron experiments, beginning with the first period (1993-2002; Ironex-1, Ironex-2, SOIREE, EisenEx, SEEDS-1; SOFeX, SERIES) where primary articles have already been published, to be followed by the 2004 experiments where primary articles are now in progress (EIFEX, SEEDS-2; SAGE, FeeP); similarly for the natural fertilizations S.O.JGOFS (1992), CROZEX (2004/2005) and KEOPS (2005).

2. Modeling and data synthesis of specific aspects of two or more such experiments for various topics such as physical mixing, phytoplankton productivity, overall ecosystem functioning, iron chemistry, CO2 budgeting, nutrient uptake ratios, DMS(P) processes, and combinations of these variables and processes.

SCOR Working Group proposal, 2005. "The Legacy of *in situ* Iron Enrichments: Data Compilation and Modeling".
http://www.scor-int.org/Working_Groups/wg131.htm

See also: SCOR Proceedings Vol. 42 Concepcion, Chile October 2006, pgs: 13-16 2.3.3 Working Group on The Legacy of *in situ* Iron Enrichments: Data Compilation and Modeling.

The first objective of the Iron Synthesis program involves a data recovery effort aimed at assembling a common, open-access database of data and metadata from a series of *in-situ* ocean iron fertilization experiments conducted between 1993 and 2005. Initially, funding for this effort is being provided by the Scientific Committee on Oceanic Research (SCOR) and the U.S. National Science Foundation (NSF).

Through the combined efforts of the principal investigators of the individual projects and the staff of Biological and Chemical Oceanography Data Management Office (BCO-DMO), data currently available primarily through individuals, disparate reports and data agencies, and in multiple formats, are being collected and prepared for addition to the BCO-DMO database from which they will be freely available to the community.

As data are contributed to the BCO-DMO office, they are organized into four overlapping categories:
1. Level 1, basic metadata
(e.g., description of project/study, general location, PI(s), participants);
2. Level 2, detailed metadata and basic shipboard data and routine ship's operations
(e.g., CTDs, underway measurements, sampling event logs);
3. Level 3, detailed metadata and data from specialized observations
(e.g., discrete observations, experimental results, rate measurements) and
4. Level 4, remaining datasets
(e.g., highest level of detailed data available from each study).

Collaboration with BCO-DMO staff began in March of 2008 and initial efforts have been directed toward basic project descriptions, levels 1 and 2 metadata and basic data, with detailed and more detailed data files being incorporated as they become available and are processed.

Related file

Program Documentation

The Iron Synthesis Program is funded jointly by the Scientific Committee on Oceanic Research (SCOR) and the U.S. National Science Foundation (NSF).

[table of contents | back to top]