

MIRAI MR08-05 Primary Production

Last Modified: 2013-08-29

[ReadMe](#) [Observation Data](#) [Data Format](#) [Quality Information](#)

Cruise ID: [MR08-05](#)

Primary Production: Processed (DMO)-QCed

Data Policy: [JAMSTEC](#)

Observation Items: POC

Science Keywords:

BIOSPHERE > AQUATIC ECOSYSTEMS > PLANKTON > PHYTOPLANKTON
BIOSPHERE > ECOLOGICAL DYNAMICS > ECOSYSTEM FUNCTIONS > PRIMARY PRODUCTION
BIOSPHERE > ECOLOGICAL DYNAMICS > ECOSYSTEM FUNCTIONS > PHOTOSYNTHESIS

Cruise Report

http://www.godac.jamstec.go.jp/catalog/data/doc_catalog/media/MR08-05_all.pdf

For Using Data

Principal Investigator

Makio Honda (JAMSTEC)

Use Constraints

See [Terms and Conditions](#) about constrain of use.

Data Citation

See [Terms and Conditions](#) about data citation.

Instrument

Instrument:

CN mass spectrometer



Overview

Primary Production Data during MR08-05 cruise were obtained by the following methods :

- In-situ incubation method (IS)
- Simulated in-situ incubation method (SIS)

Water sampling, incubation, and devices and tracers for analysis for each method are outlined below.

For further information, please see Cruise Report.

Outline of water sampling, incubation, and analysis

1) In-situ incubation (IS) [Outline figure](#)

- 1.1) Vertical sampling : Niskin
- 1.2) Surface sampling : Bucket
- 1.3) Sampling layer : 8
- 1.4) Tracer : $\text{NaH}^{13}\text{CO}_3$, K^{15}NO_3
- 1.5) Incubation period : 24hours
- 1.6) Filtration : Whatman GF/F filter was used at dark place.
- 1.7) Preservation : Filters were kept to freeze at -20degC and dried in the oven at 45degC.
- 1.8) Preservation period of frozen filter paper : within 30 days
- 1.9) Analysis place : MIRAI
- 1.10) Analysis device : CN mass spectrometer
- 1.11) Analysis method : Dumas method, Mass spectrometry

2) Simulated in-situ incubation (SIS) [Outline figure](#)

- 2.1) Vertical sampling : Niskin
- 2.2) Surface sampling : Bucket
- 2.3) Sampling layer : 8
- 2.4) Tracer : $\text{NaH}^{13}\text{CO}_3$, K^{15}NO_3
- 2.5) Incubation period : 24hours
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- 2.9) Analysis place : MIRAI
- 2.10) Analysis device : CN mass spectrometer
- 2.11) Analysis method : Dumas method, Mass spectrometry

About CN mass spectrometer

CN mass spectrometer system equipped with R/V Mirai can measure stable isotope ratios of ^{13}C and ^{15}N comprised in liquid, solid, and gas states of biological or biogenic samples, simultaneously and continuously. This system consists of two devices, preprocessing equipment "ROBOPLEP-SL" and stable isotope ratio mass spectrometer "EUROPA20-20".

(1) ROBOPLEP-SL

A tin capsule containing the sample falls into the combustion tube and is converted in the presence of oxygen to CO_2 , N_2 , NO_x and H_2O .

An elemental copper stage reduces NO_x , a MgClO_4 trap removes water vapour,

a switchable Carbosorb trap can be used to remove CO_2 (for ^{15}N only analyses)

and a GC column separates CO_2 from N_2 (allowing dual isotope analysis).

and a GC column separates CO₂ from N₂ (permitting dual isotope analysis). And then, it is introduced into the "EUROPA20-20".

(2) EUROPA20-20

CO₂ and N₂ are collided with thermion and ionized in the high vacuum ion source.

When the generated ions are accelerated by constant voltage and pass through

the analysis tube, differences in mass (m) and electric charge (z) of isotope

ions make the different orbits by the magnetic field in the analysis tube.

Thus, isotopes can be separated by the displacement of the orbits.

These signals are converted into the frequency at the detector, and transmitted to control PC. Blank and drift corrections are conducted on the control software.

see flow diagram. MR08-05_pp_ANCA-SL [PDF file](#)

Specifications of CN mass spectrometer

(1) ROBOPREP-SL

Manufacturer : SerCon Ltd. (former PDZ Europa Ltd.)

Instruments : ANCA-SL ROBOPREP-SL

S/N : 17001-051

Sample Range Solids/Liquids : 10 to 1000 µgN, 10 to 1000 µgC.

Autosampler : 60 position pneumatic autosampler that takes (standard) capsules with up to 47mm in diameter.

(2) EUROPA 20-20

Manufacturer : SerCon Ltd. (former PDZ Europa Ltd.)

Instruments : ANCA-SL EUROPA 20-20

S/N : 9007-075

Analyzer and Analysis tube : 120° extended geometry with an 11 cm radius magnetic sector

Resolution : m/Δm=95 (N₂) 10% valley definition

Sensitivity : Inside Vacuum level is 4×10⁻⁶mbar in an atmosphere of helium

20 nmol CO₂

15 nmol N₂

Abundance Sensitivity : Inside Vacuum level is 4×10⁻⁶mbar in an atmosphere of helium

30 ppm for CO₂ at 4×10⁻⁶mbar in continuous flow mode.

5 ppm for N₂ at 4×10⁻⁶mbar in continuous flow mode.

(3) Precision

All specifications are for n=5 samples.

It is a natural amount and five time standard deviation of the analysis as for amount 100 µg of the sample.

¹³C (0.2 ‰)

¹⁵N (0.5 ‰)

(4) Data processing

Device control and processing soft : ANCA ver.3.5 (former PDZ Europa Ltd.)

Fully compatible with Windows 3.1 or Windows 95.

(5) Reference material

The third-order reference materials whose data values were decided by the second reference materials

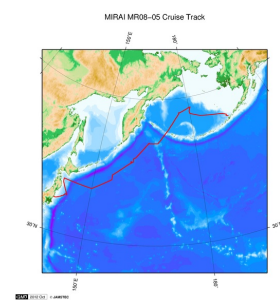
(IAEA-N-1, IAEA-N-2, and IAEA-CH-6) dealt in International Atomic Energy Agency (IAEA) were used.

Note

In this cruise, there is an observation log sheet at the time of the data acquisitions.

If necessary, please contact us from "Contact Us" above.

Related Information



[Enlarge Image](#)

MR08-05

Ship Name: MIRAI

Period: 2008-10-11 - 2008-11-07

Chief Scientist: Makio Honda (JAMSTEC)

Project Name: [Station K2, Station KNOT]

Proposal ▶ The study of ecosystem and materials' cycle in the North Pacific

Title:

Update History

2013-08-29	An observation data was registerd.
2012-10-26	An observation data was registerd.

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6K Camera DEEP TOW

6K Sonar DEEP TOW

KM-ROV

POWER GRAB SAMPLER

(SHELL)

POWER GRAB SAMPLER

(CLOW)

BMS

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Go to a Dive Information

Dive ID:

MIRAI MR08-05 Primary Production

Last Modified: 2013-08-29

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Cruise ID: **MR08-05**

Primary Production: Processed (DMO)-QCed

Data Policy: **JAMSTEC**

Primary Productivity Data Sheet Format (IS : in-situ incubation)

Format information describes column no., column heading mnemonic and comments of in-situ incubation primary productivity data sheet in MR08-05.
Missing value is presented by -999.

Column No.	Column Heading Mnemonic	Comments
1	CruiseID	CruiseID
2	STNNBR	Station name
3	CASTNO	Cast number (refer to CTD cast table of cruise report)
4	Inc.Type	Incubation method (IS : in-situ incubation)
5	UTC Date	CTD start UTC date (refer to CTD cast table of cruise report)
6	UTC Time	CTD start UTC time (refer to CTD cast table of cruise report)
7	Latitude	CTD start position Latitude north degree (refer to CTD cast table of cruise report)
8	Longitude	CTD start position Longitude east degree (refer to CTD cast table of cruise report)
9	BTLNBR	Bottle identification number
10	BTLNBR_FLAG	Bottle quality flag (for explanation see Quality flags)
11	CTD Depth	CTD Depth (m)
12	CTD PRS	CTD Pressure (dbar)
13	Light intensity	Optical transmittance (%)
14	Inc.Time	Incubation time (hour)
15	Spike 13C	Spiked 13C solution (μM)
16	Filt. Vol	Filtering volume (mL)
17	POC	POC (μg/L)
18	POC_FLAG	Flag of POC (for explanation see Quality flags)
19	13C	Ratio of 13C (atom%)
20	13C_FLAG	Flag of 13C (for explanation see Quality flags)
21	DIC	Total dissolved inorganic carbon (μmol/kg)
22	Salinity	Salinity (PSU)
23	Chl.a	Chlorophyll a. quantity (μg/L)
24	Density	Seawater density (kg/L)
25	DIC	Total dissolved inorganic carbon (μmol/L)
26	POC	POC (mg/m3)
27	13C0	Particulate organic carbon (13C) before incubation (atom%)
28	13Cxs	Ratio of 13C (atom%) - 13C0 (atom%)
29	13Csw	Concentration of 13C of ambient seawater with a tracer (%)
30	d-POC	Delta POC/hour (mgC/m3/h)
31	PP Ave	Average of delta POC/day (mgC/m3/day)
32	Integrated PP	Initial Primary Production (mgC/m2/day)
33	PB	d-POC/Chl.a (mgC/mg chl.a/h)
34	Remarks	Station number (refer to CTD cast table of cruise report)

about 29,30,31)

For calculation, please see Cruise Report.

about 32)

The equation to be used in the calculations.

ex.) 10m to 20m

Integrated PP = (PP Ave at 10m + PP Ave at 20m)×(20m-10m)/2 + more shallow than Integrated PP at 10m

about 33)

PB = d-POC/Chl.a

Primary Productivity Data Sheet Format (SIS : simulated in-situ incubation)

Format information describes column no., column heading mnemonic and comments of simulated in-situ incubation primary productivity data sheet in MR08-05.
Missing value is presented by -999.

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3	CASTNO	Cast number (refer to CTD cast table of cruise report)
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The equation to be used in the calculations.

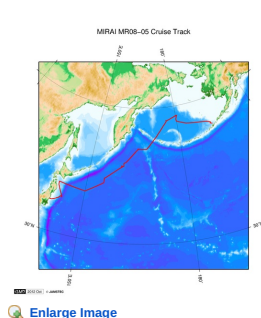
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Related Information



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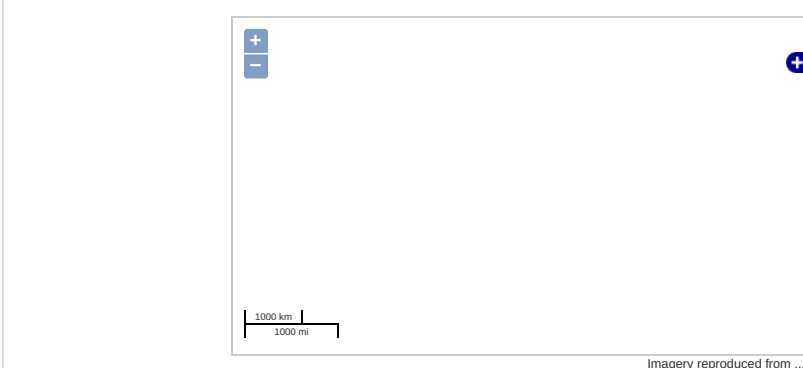
Data Policy: [JAMSTEC](#)

Observation Items: POC

Science Keywords:

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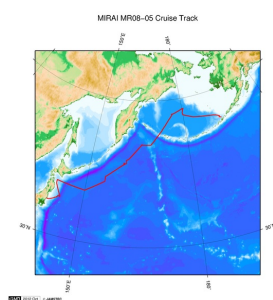
Observation Map



Data List

- ☐ File names
- ☐ MR08-05_pp_IS.csv
- ☐ MR08-05_pp_SIS.csv

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