

## MIRAI MR08-05 Photosynthetic Pigments

Last Modified: 2018-09-13

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

Cruise ID: [MR08-05](#)

Photosynthetic Pigments: Processed (DMO)-QCed

Data Policy: [JAMSTEC](#)

Observation Items: photosynthetic pigments

Science Keywords:

OCEANS > OCEAN CHEMISTRY > CHLOROPHYLL  
BIOSPHERE > AQUATIC ECOSYSTEMS > PLANKTON > PHYTOPLANKTON  
BIOSPHERE > ECOLOGICAL DYNAMICS > ECOSYSTEM FUNCTIONS > PHOTOSYNTHESIS

### Cruise Report

[http://www.godac.jamstec.go.jp/catalog/data/doc\\_catalog/media/MR08-05\\_all.pdf](http://www.godac.jamstec.go.jp/catalog/data/doc_catalog/media/MR08-05_all.pdf)

### For Using Data

#### Principal Investigator

PI (Principal Investigator) : Kazuhiko Matsumoto (JAMSTEC)

#### Use Constraints

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

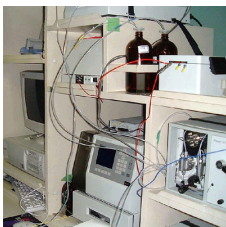
#### Data Citation

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

### Instrument

Instrument:

High-performance liquid chromatography (- MR10-03 Leg2)



### Overview

Photosynthetic pigments data by HPLC during MR08-05 cruise were obtained by the following methods.

Water sampling, filtration, and devices and standard materials for analysis for this method are outlined below.

For further information, please see Cruise Report.

#### Outline of water sampling, filtration and analysis

- 1) Vertical sampling : Niskin
- 2) Surface sampling : Bucket
- 3) Sampling layer: : 8
- 4) Filter and filtration : Whatman GF/F 47mm was used at dark place.
- 5) Freezing and drying : -20degC, 5 hours
- 6) Extract reagent : N,N-dimethylformamide (HPLC-grade)
- 7) Extract time : -20degC, 24 hours
- 8) Preservation period of frozen filter paper : a few days
- 9) Analysis place : MIRAI
- 10) Analysis device : High-performance liquid chromatography (HPLC)
- 11) Stationary phase : YMC C8 column, 150×4.6mm, 25degC
- 12) Mobile phase (unit in volume ratio):  
Eluant A: methanol : acetonitrile : aqueous pyridin (0.25M pyridine) = 50 : 25 : 25  
Eluant B: acetonitrile : acetone = 80 : 20
- 13) Analysis pigment number : 26 pigments (see cruise report)

#### About High-performance liquid chromatography (HPLC) and its utilization in MIRAI

High-performance liquid chromatography (HPLC) is a kind of column chromatography to separate, identify, and quantify individual chemical compounds from mixtures of compounds by a difference of chemical attractions with the column's stationary phase.

High pressure to propels the mobile phase allow for a better separation resolution and sensitivity than ordinary column chromatography.

In MIRAI, HPLC are used for separating and quantifying various phytoplankton pigments in natural seawater.

Taxonomic composition of phytoplankton can be estimated by measuring composition of their pigments.

In this cruise, reversed phase C8 Columns and pyridine are used as stationary and mobile phases, respectively, based on a method of Zapata et al. (2000). More pigments can be separated by using C8 column than C18 column which was conventionally used. Pyridine used as a mobile phase is suitable for a better separation of phytoplankton ingredients such as carotenoids and chlorophylls. HPLC consists of pump, pump controller, auto-sampler, PDA detector, Fluorescence detector, column heater, control PC and printer.

Please refer to the following for the device whole view.

[PDF file](#)

#### Specifications of High-performance liquid chromatography

Manufacturer: Waters co.

Instrument type: Waters 845 (series)

Instruments type: waters 616 (pump)  
Waters 600S (pump controller)  
Waters 717plus (auto-sampler)  
Waters 996 (photodiode array detector)  
Waters 474 (Fluorescence detector)  
Waters N62009 (column heater)  
COMPAC DESKPRO (control PC)

Pigment detection and identification:

Divinyl Chlorophyll a, Chlorophyll a : 661.4nm-absorption maximum in red band  
Chlorophyllide a, Pheophorbide a, Pheophytin a : 663.9nm-absorption maximum in red band  
Chlorophyll b : 457.2nm-absorption maximum in red band  
[3,8-Divinyl]-Protochlorophyllide : 440.0nm-absorption maximum in red band  
Others : 460.0nm-absorption maximum in red band

Data processing

Device control and processing soft: Millennium32 (Waters Co. Ltd.)  
Fully compatible with Windows 98 Second edition

Reference material

Chlorophyll a : Sigma-Aldrich Co.  
Chlorophyll b : Sigma-Aldrich Co.  
Other 23 pigments : DHI co.  
trans- $\beta$ -Apo-8'-carotenal (Internal standard) : Sigma-Aldrich Co.

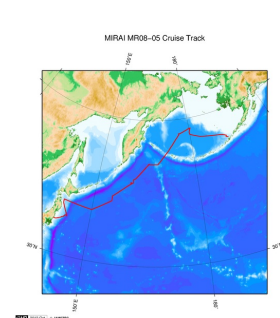
Reference

Zapata, M., Rodriguez, F. and Garrido, J. L. (2000)  
Separation of chlorophylls and carotenoids from marine phytoplankton: a new HPLC method using a reversed phase C8 column and pyridine-containing mobile phases. Mar. Ecol. Prog. Ser., 195, 29-45.

About this data

There are some description error for photosynthetic pigment data of this cruise.  
Please refer to the errata of the cruise report.

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

2018-09-13	An observation data was registered.
2013-08-29	An observation data was registered.
2012-10-26	An observation data was registered.

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Information of the Ships

NATSUSHIMA  
KAIYO  
YOKOSUKA  
MIRAI  
KAIREI  
CHIKYU  
KAIMEI  
SHINSEI MARU  
HAKUHO MARU

Information of the Submersibles

KAIKO  
SHINKAI 2000  
SHINKAI 6500  
DEEP TOW  
HYPER-DOLPHIN  
URASHIMA  
YOKOSUKA DEEP TOW  
6K Camera DEEP TOW  
6K Sonar DEEP TOW  
KM-ROV  
POWER GRAB SAMPLER (SHELL)  
POWER GRAB SAMPLER (CLOW)  
BMS

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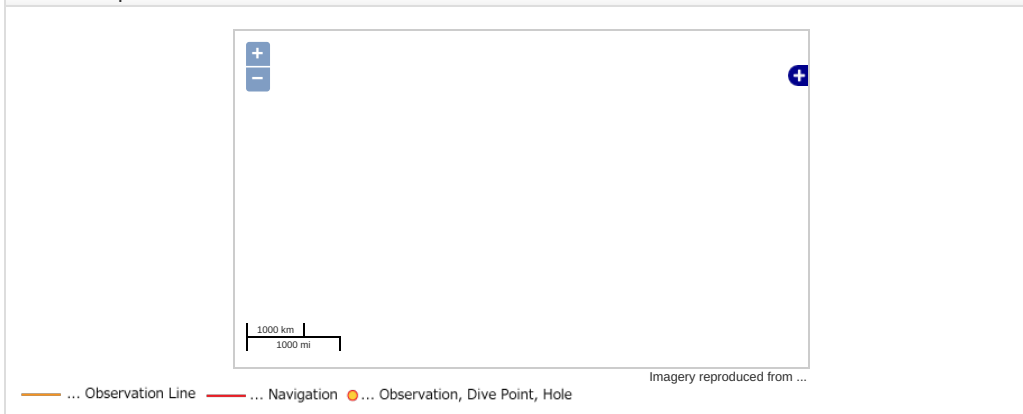
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### Observation Map

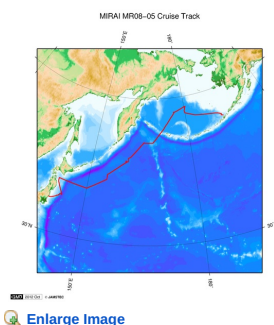


### Data List

File names

☐ MR08-05\_HPLC.csv

### Related Information



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