

MIRAI MR10-01 Leg1 Photosynthetic Pigments

Last Modified: 2018-09-13

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

Cruise ID: [MR10-01 Leg1](#)

Photosynthetic Pigments: Processed (PI)

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/MR10-01_leg1-2_all.pdf

For Using Data

Principal Investigator

Kazuhiko Matsumoto (JAMSTEC)

Use Constraints

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

Data Citation

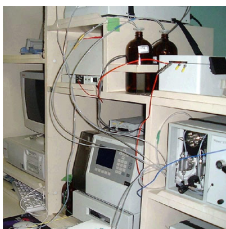
See [Terms and Conditions](#) about data citation.

Instrument

Instrument:

High-performance liquid

chromatography (- MR10-03 Leg2)



Overview

Photosynthetic pigments data by HPLC during MR10-01 Leg1 cruise were obtained by the following methods. See Data List for available data at each station. 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, incubation, 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 : 0degC, 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.

Instruments type: Waters 616 (pump)

Waters 600S (pump controller)

Waters 717plus (auto-sampler)

Waters 996 (photodiode array detector)

Waters 474 (Fluorescence detector)

Waters 10000 (column heater)

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- β -Apo-8'-carotenal (Internal standard) : Sigma-Aldrich Co.

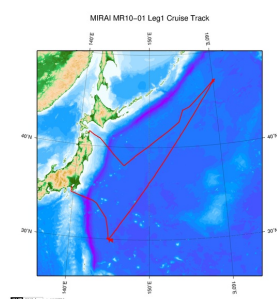
Reference

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](#)

MR10-01 Leg1

Ship Name: MIRAI
Period: 2010-01-19 - 2010-02-06
Chief Scientist: Kazuhiko Matsumoto (JAMSTEC)
Project Name: [Station K2, Station S1, Station KEO, Station KNOT]
Proposal ▶ Change in material cycles and ecosystem by the climate change and its feed back
Title:

Update History

2018-09-13	An observation data was registered.
2013-08-29	An observation data was registered.
2012-09-28	An observation data was registered.

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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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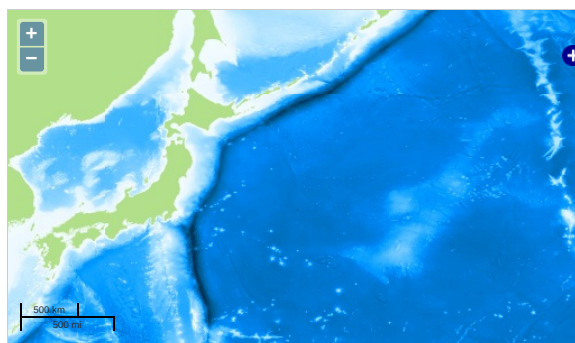
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Observation Map



... Observation Line ... Navigation ... Observation, Dive Point, Hole

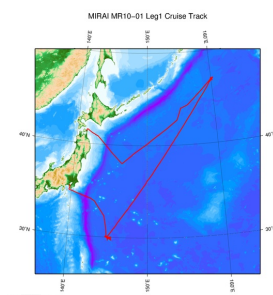
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Data List

File names

☐ MR10_01_leg1_HPLC.csv

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