

MIRAI MR12-02 Leg1 Photosynthetic Pigments

Last Modified: 2018-09-13

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Cruise ID: [MR12-02 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/MR12-02_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 (MR10-04 Leg1 -)



Overview

Photosynthetic pigments data by HPLC during MR12-02_leg1 cruise were obtained by the following methods.

Water sampling, filtration, devices and standard materials for analysis 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: : 3-11
- 4) Filter and filtration : Whatman GF/F 47mm was used at dark place.
- 5) Freezing and drying : 0 degC, 6 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, 35degC
- 12) Mobile phase (unit in volume ratio):
Eluant A: methanol : acetonitrile : aqueous pyridin (0.25M pyridine) = 50 : 25 : 25
Eluant B: methanol : acetonitrile : acetone= 20 : 60 : 20
- 13) Analysis pigment number : 27 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 chlorophils.

Specifications of High-performance liquid chromatography

Manufacturer: Agilent Technologies, Inc.

Instruments type: Agilent1200 modular system

G1311A Quaternary pump (low-pressure mixing system)

G1329A auto-sampler

G1315D photodiode array detector

Pigment detection and identification:

Pheophorbide a, Pheophytin a : 409nm

Chlorophyll a, Chlorophyllide a : 431nm

[3,8-Divinyl]-Protochlorophyllide, Neoxanthin, Violaxanthin, Diatoxanthin, Divinyl Chlorophyll a : 440nm

Chlorophyll c3, Chlorophyll b, Ethyl-apo-8'-carotenolate(internal standard) : 462nm

Others : 450nm

Reference material

Chlorophyll a : Sigma-Aldrich Co.
Chlorophyll b : Sigma-Aldrich Co.
trans- β -Apo-8'-carotenal (Internal standard) : Sigma-Aldrich Co.
Other 24 pigments : DHI co.

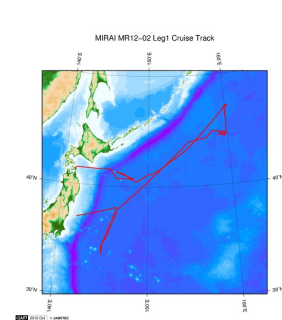
Reference

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](#)

MR12-02 Leg1

Ship Name: MIRAI
Period: 2012-06-04 - 2012-06-24
Chief Scientist: Makio Honda (JAMSTEC)
Project Name: [Station K2, Station KNOT]
Proposal ▶ Change in material cycles and ecosystem by the climate change and its feedback
Title:

Update History

2018-09-13	An observation data was registered.
2014-10-03	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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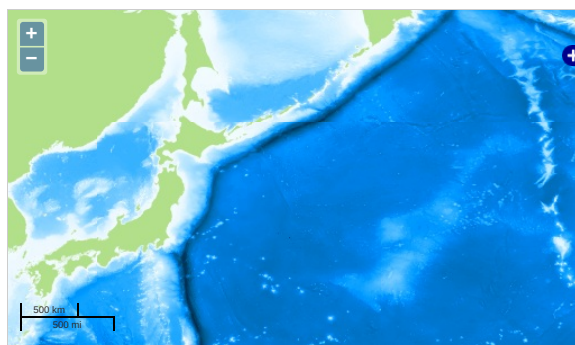
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Observation Map

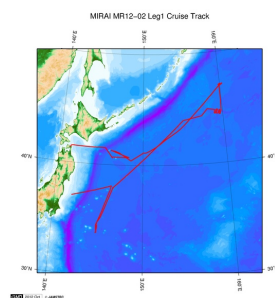


Data List

File names

☐ MR12-02_Leg1_HPLC.csv

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