

MIRAI MR10-01 Leg1 Irradiance/Radiance

Last Modified: 2012-09-28

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

Irradiance/Radiance: Processed (DMO)-QCed

Data Policy: [JAMSTEC](#)

Observation Items: Radiance, Irradiance, Fluorescence, PAR, Relative irradiance, Extinction coefficient

Science Keywords:

OCEANS > OCEAN OPTICS > EXTINCTION COEFFICIENTS
OCEANS > OCEAN OPTICS > IRRADIANCE
OCEANS > OCEAN OPTICS > PHOTOSYNTHETICALLY ACTIVE RADIATION

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.

Overview

Optical measurement data during MR10-01 Leg1 cruise were obtained by the following methods. See Data List for available data at each station. Observation and devices for this method are outlined below. For further information, please see Cruise Report.

Outline of Optical measurement

The Optical measurement system consists of two instruments of the SeaWiFS Profiling Multichannel Radiometer (SPMR) and the SeaWiFS Multichannel Surface Reference (SMSR), as well as deck unit, winch and PC.

These instruments measure downwelling irradiance (Ed), upwelling radiance (Lu) and irradiance above the water surfaces (Es) continuously. (Photosynthetic organisms are able to use only the specific spectral range of solar radiation in the process of photosynthesis.) Upwelling radiance (Lu) is used to provide normalized water leaving radiance for SeaWiFS calibration and validation and the empirical development of radiative transfer algorithms for the exploration of ocean color satellite data. Details for these instruments are outlined below.

About SPMR

The SPMR measures vertical profiles of downwelling irradiance (Ed) and upwelling radiance (Lu) in 13-channel spectral bands, as well as instrument tilt, fluorometry, conductivity and an external temperature sensor.

It is deployed in a freefall mode through the water column.

- 1) Measurement method : Freefall
- 2) Observation depth : 0-200m (1.00 m/s)
- 3) Tilt : less than 3 degrees
- 4) Ed and Lu sensor : 13 channels
- 5) Other sensors : Tilt meter, fluorometer, conductivity and external temperature probe

About SMSR

The SMSR measures irradiance above the water surfaces (Es) in 13-channel spectral bands, which also has tilt meter and an internal temperature sensor. The SMSR is used for the derivation of the penetration of visible and ultra-violet light in the ocean, and for the determination of the vertical distribution of apparent optical properties for comparison with in-situ pigment measurements.

- 1) Measurement method : As a reference sensor which mounted on the anti-rolling system's deck and never shadowed by any ship structure.
- 2) Es sensor : 13 channels
- 3) Other sensors : Tilt meter

Observed data was analyzed by software and extinction rate and photosynthetically available radiation (PAR) were computed.

Specifications of the SPMR

- 1) Manufacture : Satlantic Inc.
- 2) Instrument name : SeaWiFS Profiling Multichannel Radiometer
- 3) Field of view : Cosine response (Irradiance), 10degree in water(Radiance)
- 4) Collector area : 86.0mm² (Irradiance)
- 5) Entrance aperture : 9.5mm diameter
- 6) Irradiance detector type : Custom 17mm² and 33mm² silicone photodiodes
- 7) Radiance detector type : Custom 13mm² and 33mm² silicone photodiodes
- 8) Spectral bandwidth : 10nm
- 9) Bandwidth range : 370-705nm
- 10) Filter type : Custom low fluorescence interference
- 11) Winch : Brook Ocean Technology Limited.

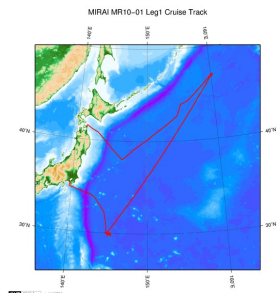
Data processing

Device control and processing soft : Satlantic PROSOFT 6 (Satlantic Co. Ltd.)

Two types of data files are produced : BIN file and PAR file.

(see Data Format for the details.)

Related Information



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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

2012-09-28	An observation data was registerd.
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Optical Measurement Data Sheet Format

Format information describes column no., column heading mnemonic and comments of optical measurement data sheet in MR10-01 Leg1.

Optical measurement data are produced two types of data files: BIN file and PAR file.

(see below.)

BIN file : Digital data of upwelling, downwelling radiance, irradiance above the water surfaces and fluorescence for every 1m from near surface to approximately 200m for respective wave lengths during freefall deployment.

PAR file : In situ PAR, surface PAR, relative irradiance and extinction coefficient each 1m from near surface to approximately 200m during freefall deployment.

Format Description for BIN file

Each data file contains seven lines header (meta data) followed by data lines for each cast.

Missing value is presented by -999.

Header part of BIN file

Line No.	Column Heading Mnemonic	Comments
1	CRUISEID	Cruise ID
2	STATIONID	Station name
3	CAST NAME	Cast name
4	STARTDATE	Observation start date (UTC: yyyyymmdd)
5	STARTTIME	Observation start time (UTC: hhmm)
6	LATITUDE	Observation start position Latitude degree
7	LONGITUDE	Observation start position Longitude degree

Data part of BIN file

Column No.	Column Heading Mnemonic	Comments
1	Pressure	Depth (dbar)
2	Time	Hour (UTC: hh)
3	Time	Minute (UTC: mm.mm)
4	Lu380.3	Upwelling radiance ($\mu\text{W}/\text{cm}^2/\text{nm}/\text{sr}$)
5	Lu399.8	Upwelling radiance ($\mu\text{W}/\text{cm}^2/\text{nm}/\text{sr}$)
6	Lu412.4	Upwelling radiance ($\mu\text{W}/\text{cm}^2/\text{nm}/\text{sr}$)
7	Lu442.8	Upwelling radiance ($\mu\text{W}/\text{cm}^2/\text{nm}/\text{sr}$)
8	Lu455.8	Upwelling radiance ($\mu\text{W}/\text{cm}^2/\text{nm}/\text{sr}$)
9	Lu489.6	Upwelling radiance ($\mu\text{W}/\text{cm}^2/\text{nm}/\text{sr}$)
10	Lu519.3	Upwelling radiance ($\mu\text{W}/\text{cm}^2/\text{nm}/\text{sr}$)
11	Lu554.5	Upwelling radiance ($\mu\text{W}/\text{cm}^2/\text{nm}/\text{sr}$)
12	Lu564.6	Upwelling radiance ($\mu\text{W}/\text{cm}^2/\text{nm}/\text{sr}$)
13	Lu619.2	Upwelling radiance ($\mu\text{W}/\text{cm}^2/\text{nm}/\text{sr}$)
14	Lu665.6	Upwelling radiance ($\mu\text{W}/\text{cm}^2/\text{nm}/\text{sr}$)
15	Lu682.6	Upwelling radiance ($\mu\text{W}/\text{cm}^2/\text{nm}/\text{sr}$)
16	Lu704.5	Upwelling radiance ($\mu\text{W}/\text{cm}^2/\text{nm}/\text{sr}$)
17	LuDARK	Counts
18	Ed380.0	Downwelling irradiance ($\mu\text{W}/\text{cm}^2/\text{nm}$)
19	Ed399.7	Downwelling irradiance ($\mu\text{W}/\text{cm}^2/\text{nm}$)
20	Ed412.4	Downwelling irradiance ($\mu\text{W}/\text{cm}^2/\text{nm}$)
21	Ed442.9	Downwelling irradiance ($\mu\text{W}/\text{cm}^2/\text{nm}$)
22	Ed455.2	Downwelling irradiance ($\mu\text{W}/\text{cm}^2/\text{nm}$)
23	Ed489.4	Downwelling irradiance ($\mu\text{W}/\text{cm}^2/\text{nm}$)
24	Ed519.8	Downwelling irradiance ($\mu\text{W}/\text{cm}^2/\text{nm}$)
25	Ed554.9	Downwelling irradiance ($\mu\text{W}/\text{cm}^2/\text{nm}$)
26	Ed565.1	Downwelling irradiance ($\mu\text{W}/\text{cm}^2/\text{nm}$)
27	Ed619.3	Downwelling irradiance ($\mu\text{W}/\text{cm}^2/\text{nm}$)
28	Ed665.5	Downwelling irradiance ($\mu\text{W}/\text{cm}^2/\text{nm}$)
29	Ed682.8	Downwelling irradiance ($\mu\text{W}/\text{cm}^2/\text{nm}$)
30	Ed705.2	Downwelling irradiance ($\mu\text{W}/\text{cm}^2/\text{nm}$)
31	EdDARK	Counts
32	Es379.5	Irradiance above the water surfaces ($\mu\text{W}/\text{cm}^2/\text{nm}$)
33	Es399.6	Irradiance above the water surfaces ($\mu\text{W}/\text{cm}^2/\text{nm}$)
34	Es412.2	Irradiance above the water surfaces ($\mu\text{W}/\text{cm}^2/\text{nm}$)
35	Es442.8	Irradiance above the water surfaces ($\mu\text{W}/\text{cm}^2/\text{nm}$)
36	Es456.1	Irradiance above the water surfaces ($\mu\text{W}/\text{cm}^2/\text{nm}$)
37	Es490.9	Irradiance above the water surfaces ($\mu\text{W}/\text{cm}^2/\text{nm}$)
38	Es519.0	Irradiance above the water surfaces ($\mu\text{W}/\text{cm}^2/\text{nm}$)

Column No.	Column Heading Mnemonic	Comments
39	Es54.3	Irradiance above the water surfaces ($\mu\text{W}/\text{cm}^2/\text{nm}$)
40	Es564.5	Irradiance above the water surfaces ($\mu\text{W}/\text{cm}^2/\text{nm}$)
41	Es619.5	Irradiance above the water surfaces ($\mu\text{W}/\text{cm}^2/\text{nm}$)
42	Es665.6	Irradiance above the water surfaces ($\mu\text{W}/\text{cm}^2/\text{nm}$)
43	Es683.0	Irradiance above the water surfaces ($\mu\text{W}/\text{cm}^2/\text{nm}$)
44	Es705.9	Irradiance above the water surfaces ($\mu\text{W}/\text{cm}^2/\text{nm}$)
45	EsDARK	Counts
46	Fluor1	Fluorescence ($\mu\text{g}/\text{L}$)
47	VEL	Free fall velocity (m/s)

Format Description for PAR file

Each data file contains eight lines header (meta data) followed by data lines for each cast.

Missing value is presented by -999.

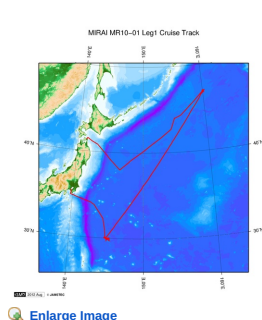
Header part of PAR file

Line No.	Column Heading Mnemonic	Comments
1	CRUISEID	Cruise ID
2	STATIONID	Station name
3	CAST NAME	Cast name
4	STARTDATE	Observation start date (UTC: yyyymmdd)
5	STARTTIME	Observation start time (UTC: hhmm)
6	LATITUDE	Observation start position Latitude degree
7	LONGITUDE	Observation start position Longitude degree
8	K_PAR(0_)	Surface extinction coefficient

Data part of PAR file

Column No.	Column Heading Mnemonic	Comments
1	Pressure	Depth (dbar)
2	Par_REF(0+)	Surface PAR (quanta/cm ² /sec)
3	Par_PRO	Each depth of PAR (quanta/cm ² /sec)
4	Light	Relative irradiance (%)
5	K_PAR	Extinction coefficient (/m)

Related Information



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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

2012-09-28 An observation data was registered.

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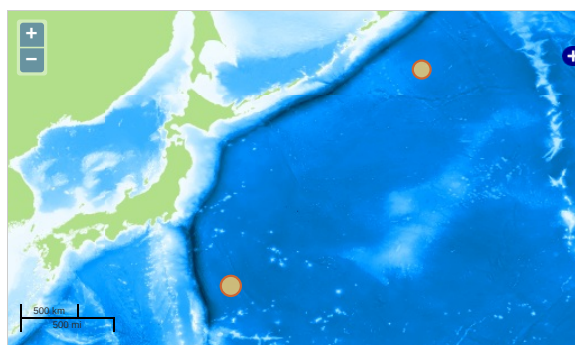
Observation Items: Radiance, Irradiance, Fluorescence, PAR, Relative irradiance, Extinction coefficient

Science Keywords:

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OCEANS > OCEAN OPTICS > IRRADIANCE
OCEANS > OCEAN OPTICS > PHOTOSYNTHETICALLY ACTIVE RADIATION

Observation Map

1. Clicking the icon displays a balloon with observation information.



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Data List

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File names

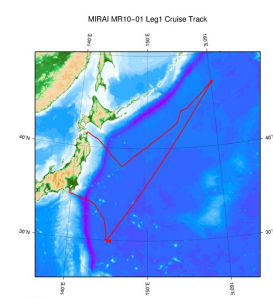
☐ MR10-01_leg1_freefall.zip

Observation List

The list of observation is shown as follows.

Observation	Time and Date	Lat. [°]	Lon. [°]
K2-1	2010-01-24 00:00	47.0000	160.0000
K2-1	2010-01-24 00:00	47.0000	160.0000
K2-2	2010-01-25 00:00	47.0000	160.0000
K2-2	2010-01-25 00:00	47.0000	160.0000
K2-2	2010-01-25 00:00	47.0000	160.0000
S1-1	2010-01-31 00:00	30.0000	145.0000
S1-1	2010-01-31 00:00	30.0000	145.0000
S1-1	2010-01-31 00:00	30.0000	145.0000
S1-2	2010-02-01 00:00	30.0000	145.0000
S1-2	2010-02-01 00:00	30.0000	145.0000
S1-2	2010-02-01 00:00	30.0000	145.0000

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