

## MIRAI MR02-K02 Total CO<sub>2</sub> (TCO<sub>2</sub>)

Last Modified: 2012-12-25

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

Cruise ID: [MR02-K02](#)

Total CO<sub>2</sub> (TCO<sub>2</sub>): Processed (PI)

Data Policy: [JAMSTEC](#)

Observation Items: Total Dissolved inorganic carbon, Total alkalinity, Sea surface temperature, Sea surface salinity

Science Keywords:

OCEANS > OCEAN CHEMISTRY > INORGANIC CARBON  
OCEANS > SALINITY/DENSITY > SALINITY  
OCEANS > OCEAN TEMPERATURE > SEA SURFACE TEMPERATURE  
OCEANS > OCEAN CHEMISTRY > ALKALINITY

### [For Using Data](#)

#### Principal Investigator

Masao Ishii (Meteorological Research Institute)

#### Use Constraints

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

#### Data Citation

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

### Instrument

Instrument:

TCO<sub>2</sub> measurement system ( - MR09-03 Leg3)



### Information on Underway TCO<sub>2</sub> data observed on R/V MIRAI

Instrument : Underway TCO<sub>2</sub> measuring system ; Nippon ANS Ltd.

Method : Coulometric

Precision : -

Reference Material/Calibration : Certified Reference Material for TCO<sub>2</sub> analysis provided by Dr A. G. Dickson

- Measured by Meteorological Research Institute using coulometric technique (Ishii, et al., 1998).

- Total alkalinity (TA) has been calculated from TCO<sub>2</sub>, SST, salinity and pCO<sub>2</sub> that have been concurrently measured using carbonic acid dissociation constants given by Roy et al., 1993.

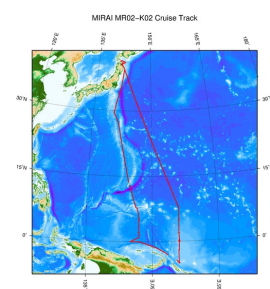
#### Reference

Masao Ishii, Hisayuki Y. Inoue, Hidekazu Matsueda and Eiichiro Tanoue (1998) Close coupling between seasonal biological production and dynamics of dissolved inorganic carbon in the Indian Ocean sector and the western Pacific Ocean sector of the Antarctic Ocean.  
Deep Sea Research Part I: Oceanographic Research Papers, Volume 45, 7, 1187-1209

Roy, R.N., L.N. Roy, K.M. Vogel, C.P. Moore, T. Pearson, C.E. Good, F. J. Millero and D.J. Cambell (1993) Determination of the ionization constants of carbonic acid in seawater in salinities 5 to 45 and temperatures 0 to 45 degree-C.

Marine Chemistry, 44, 249-267.

### Related Information



© 2002 JAMSTEC

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#### MR02-K02

Ship Name: MIRAI

Period: 2002-02-21 - 2002-03-30

Chief Scientist: Kentaro Ando (JAMSTEC)

Project Name: [Tropical Ocean Climate Study (TOCS)]

### Update History

2012-12-25 An observation data was registered.

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Samples  
Data Policy  
**What's New**  
Update History  
Feeds

Amount of Public Info.  
**Data**  
Map Search  
Data Tree  
Detailed Search

KAIYO  
YOKOSUKA  
MIRAI  
KAIREI  
CHIKYU  
KAIMEI  
SHINSEI MARU  
HAKUHO MARU

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

Cruise ID:

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### TCO<sub>2</sub> MRI

#### Data Format

The file is in variable length, comma separated text file (csv) format.

The line starts with "#" is a comment line which contains version information and so on.

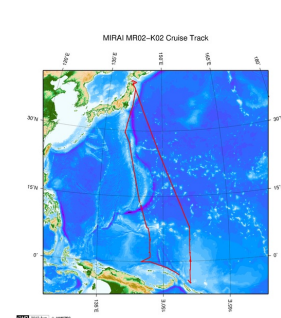
Column NO.	Column Heading	Comments
1	Ship	Ship name
2	Cruise	Cruise ID
3	Serial No.	Serial No.
4	Date	year (YYYY) in UTC
5		month (MM) in UTC
6		day (DD) in UTC
7	Time	hour (HH) in UTC
8		minute (MM) in UTC
9	Latitude	Latitude (degree) ; Positive in north
10	Longitude	Longitude (degree) ; degree in eastward (0 - 360)
11	TCO <sub>2</sub>	Total Dissolved inorganic carbon (umol/kg)
12	F	Quality flag for TCO <sub>2</sub>
13	TA_calcd	Total alkalinity (umol/kg) *
14	F	Quality flag for TA_calcd
15	SST	Sea surface temperature (degree-C)
16	F	Quality flag for SST
17	SSS	Sea surface salinity
18	F	Quality flag for SSS

\* : calculated from TCO<sub>2</sub>, SST, SSS and pCO<sub>2</sub> (Roy et al., 1993)

#### Definition of Quality Control Flags

- 2 - Good
- 3 - Questionable
- 4 - Bad
- 5 - Not reported
- 9 - No data

### Related Information



[Enlarge Image](#)

#### MR02-K02

Ship Name: MIRAI

Period: 2002-02-21 - 2002-03-30

Chief Scientist: Kentaro Ando (JAMSTEC)

Project Name: [Tropical Ocean Climate Study (TOCS)]

### Update History

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Feeds

Lists  
Publication List  
Amount of Public Info.  
Data  
Map Search  
Data Tree  
Detailed Search

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

#### Go to a Cruise Information

Cruise ID:

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## MIRAI MR02-K02 Total CO2 (TCO2)

Last Modified: 2012-12-25

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Cruise ID: [MR02-K02](#)

Total CO2 (TCO2): Processed (PI)

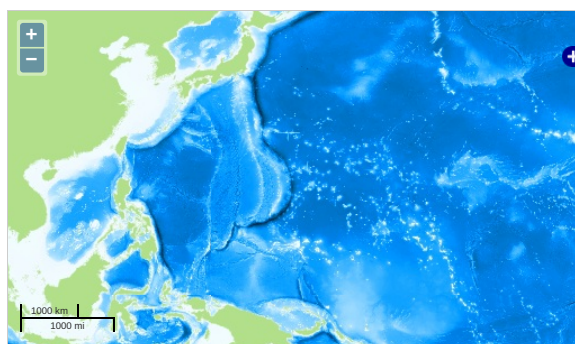
Data Policy: [JAMSTEC](#)

Observation Items: Total Dissolved inorganic carbon, Total alkalinity, Sea surface temperature, Sea surface salinity

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OCEANS > OCEAN CHEMISTRY > ALKALINITY

### Observation Map



Imagery reproduced from ...

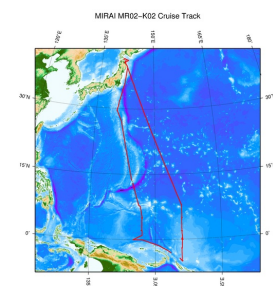
— ... Observation Line — ... Navigation ● ... Observation, Dive Point, Hole

### Data List

File names

☐ MR02-K02\_uwDIC.csv

### Related Information



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#### MR02-K02

Ship Name: MIRAI  
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Chief Scientist: Kentaro Ando (JAMSTEC)  
Project Name: [Tropical Ocean Climate Study (TOCS)]

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