

## YOKOSUKA YK03-05 Leg1 Shipboard Three Component Magnetometer (STCM)

Last Modified: 2019-08-26

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Cruise ID: [YK03-05 Leg1](#)

Shipboard Three Component Magnetometer (STCM): Processed (DMO)-Corrected

Data Policy: [JAMSTEC](#)

Observation Items: X, Y and Z component of geomagnetic field

Science Keywords:

OCEANS > MARINE GEOPHYSICS > MARINE MAGNETICS  
SOLID EARTH > GEOMAGNETISM

### For Using Data

#### Principal Investigator

Data Management Office

#### Use Constraints

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

#### Data Citation

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

### Period (UTC)

2003-07-01 02:48 – 2003-07-12 23:28

### Instrument

Instrument:

3 component magnetometer



### Overview

The data provided is for three component geomagnetic field. Three-axes flux-gate sensors with ring-cored coils were fixed on the roof of the bridge.

They measure the following items :

h-component : along track line component, positive for the bow direction pitch.

s-component : across track line component, positive for the starboard side roll.

v-component : vertical component, positive for the downward direction.

### Measurement System

#### (1) Magnetometer

Manufacturer : Tierra Technica Ltd.

Type : SFG1212

Measurement range :  $\pm 100,000$  nT

Accuracy : less than 100 nT

Resolution : 1 nT

Location : No.1 Laboratory

#### (2) Magnetic Sensor

Manufacturer : Tierra Technica Ltd.

Form : flux-gate sensors with ring-cored coils

Location : Compass deck

#### (3) Attitude sensor

Manufacturer : OKI

Measurement range : 15 degree

Accuracy :  $\pm 0.2$  degree

#### (4) Gyro compass

Manufacturer : TOKIMEC INC.

Type : ES-110

Follow-Up Speed : 24 degree / sec

Accuracy :  $\pm 1.0$  degree \*Secant(Lat.)

Location : No.1 Laboratory

### Duration of the Figure of 8 turn

In YK03-03\_leg2 and YK03-12 cruise

Date (UTC)

2003/04/27 08:44:00 - 2003/04/27 09:03:00

2003/12/18 08:03:00 - 2003/12/18 08:17:00

### Data processing

The following corrections and calculations were performed.

#### (1) Ship magnetization correction

Hob = ARPYF + Hp ---(i)

Hob : Observed magnetic field vector (Ship coordinates)

Hob : Observed magnetic field vector (Ship coordinates)  
A : Effect of induced magnetization of the ship  
R : Matrix of rotation due to the roll  
P : Matrix of rotation due to the pitch  
Y : Matrix of rotation due to the heading  
F : Geomagnetic field vector  
Hp : Ship's permanent magnetic moment

Following the equation(i), we calculate the geomagnetic field F.  

$$RPF = BHob + Hbp \text{ ---(ii)}$$
B : coefficient of Figure of 8 turn  
Hbp : Permanent magnetic field vector of the ship

Reference : Isezaki,N., A new shipboard three-component magnetometer, GEOPHYSICS. VOL.51,NO10(1986);P1992-1998

## (2) International Geomagnetic Reference Field (IGRF)

Synthetic geomagnetic field values are calculated from IGRF 12th Generation models by using navigation data ; latitude, longitude and date.

Reference : IAGA Division V-MOD Geomagnetic Field Modeling[\[http://www.ngdc.noaa.gov/IAGA/vmod/igrf.html\]](http://www.ngdc.noaa.gov/IAGA/vmod/igrf.html)

## (3) Calculation of the geomagnetic field anomaly

$$An = F - Figrf$$
An : Geomagnetic field anomaly vector  
F : Geomagnetic field vector  
Figrf : Synthetic geomagnetic field vector from IGRF

## (4) Quality control of data

Following criteria were used for removal of data of low reliability:

- Time error (inversion of time, continuation of same timestamps)
- Summation of the difference of heading by one second exceeding 20 degree per 5 minutes
- Ground speed of the ship below 3knot or exceeding 20knot
- X, Y, or Z component of geomagnetic field anomaly exceeding ±4000nT

## (5) Filtering of the geomagnetic field anomaly

Due to the residual undulation of the ship, a 120 second length Gaussian filter was applied for each component of the geomagnetic field anomaly data.

## (6) Output of the data

Time (UTC)  
Latitude (degree)  
Longitude (degree)  
X : Northward (positive on the north) component of geomagnetic field anomaly (nT)  
Y : Eastward (positive on the east) component of geomagnetic field anomaly (nT)  
Z : Vertical (positive for downward) component of geomagnetic field anomaly (nT)  
T : Absolute value of geomagnetic field anomaly (nT)

## Coefficient of the Figure of 8 turn and Permanent magnetic field vector of the ship

This coefficient was calculated from the above-mentioned Figure of 8 turn

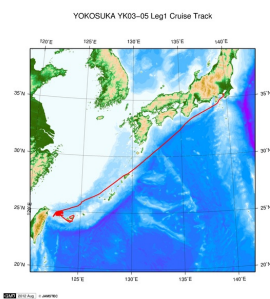
	1.0844	0.0601	0.0314		-2620.9056
B =	-0.0402	1.2188	0.0764	Hbp=	3229.8807
	-0.0018	0.1298	0.8981		-5200.6231

## Note

- (1) File naming rule : Cruise ID\_corr.stcm
- (2) Sampling rate : 10 seconds
- (3) Geodetic system : WGS84
- (4) If you would like the raw data set, please contact us from "Contact Us" above.

## Related Information

☒Cruise Data    ☐Dive Data



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## YK03-05 Leg1

Ship Name: YOKOSUKA  
Period: 2003-07-01 - 2003-07-12  
Chief Scientist: Takurou Nunoura (JAMSTEC)

## Update History

2019-08-26	An observation data was registerd.
2019-06-18	An observation data was registerd.
2018-07-20	An observation data was registerd.
2018-03-08	An observation data was registerd.
2012-12-25	An observation data was registerd.

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NATSUSHIMA  
KAIYO  
YOKOSUKA  
MIRAI  
KAIREI

## Information of the Submersibles

KAIKO  
SHINKAI 2000  
SHINKAI 6500  
DEEP TOW

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Dive ID:

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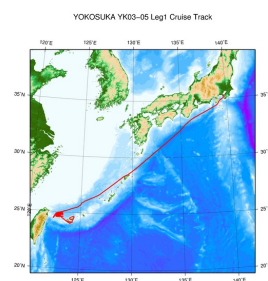
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### STCM Corrected

No.	Column	Content	Format	Unit	Remarks
1	1 - 8	Date	i4,i2,i2		YYYYMMDD (UTC)
2	10 -15	Time	i2,i2,i2		hhmmss (UTC)
3	17 -25	Latitude	f9.5	degree	No sign for the northern hemisphere. Negative for the southern hemisphere.
4	27 -36	Longitude	f10.5	degree	No sign for eastern hemisphere. Negative for the western hemisphere.
5	38 -43	X component of geomagnetic field anomaly	f6.0	nT	Positive on the north
6	45 -50	Y component of geomagnetic field anomaly	f6.0	nT	Positive on the east
7	52 -57	Z component of geomagnetic field anomaly	f6.0	nT	Positive for downward
8	59 -64	Absolute value of geomagnetic field anomaly	f6.0	nT	

### Related Information

☒ Cruise Data ☐ Dive Data



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Chief Scientist: Takurou Nunoura (JAMSTEC)

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POWER GRAB SAMPLER (SHELL)  
POWER GRAB SAMPLER (CLOW)  
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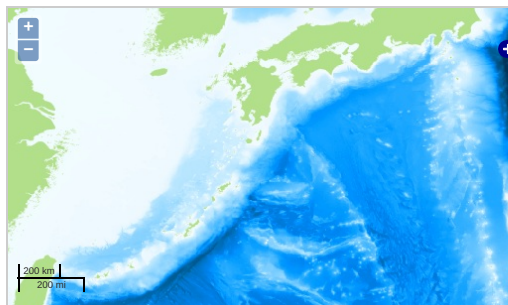
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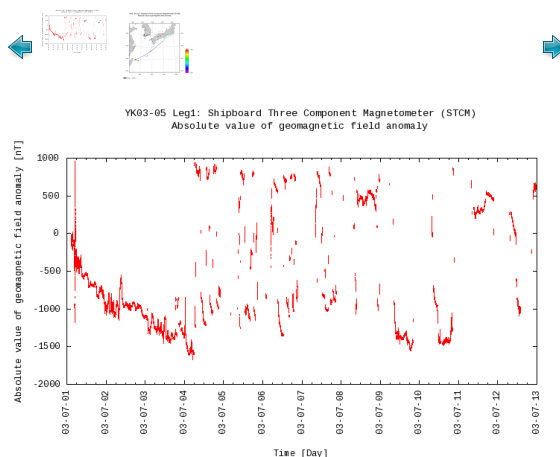
### Observation Map



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

Imagery reproduced from ...

### Figures



### Data List

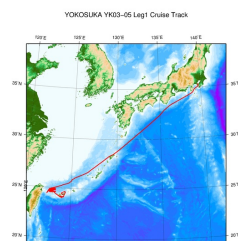
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File names

☐ YK03-05\_leg1\_corr.stcm

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