

YOKOSUKA YK13-04 Leg2 Shipboard Three Component Magnetometer (STCM)

Last Modified: 2019-06-15

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

Cruise ID: [YK13-04 Leg2](#)

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

Data Policy: [JAMSTEC](#)

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

Science Keywords:

OCEANS > MARINE GEOPHYSICS > MARINE MAGNETICS
SOLID EARTH > GEOMAGNETISM

Cruise Report

http://www.godac.jamstec.go.jp/catalog/data/doc_catalog/media/YK13-04_leg2_all.pdf

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)

2013-05-11 09:46 – 2013-05-22 20:43

Instrument

Instrument:

3 component magnetometer



Overview

The data provided is for corrected three component geomagnetic field anomalies. 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.

The effect of ship motion was eliminated by roll and pitch data which was provided by a tilt sensor. The apparent magnetic influence can be detected through a "Figure of 8 turn"(a pair of clockwise and anti-clockwise turns) on each cruise. If no Figure of 8 turn on the cruise was completed, the latest Figure of 8 turn from the previous cruise was applied. As a quality control, data of low reliability was removed (see Data processing for quality control criteria). Synthetic geomagnetic field values were calculated from IGRF models.

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 and Gyro compass

Manufacturer : IXBLUE
Type : OCTANS
Measurement range : ± 180 degree(Roll), ± 90 degree(Pitch), 0 to +360 degree(Gyro)
Accuracy(Roll, Pitch) : 0.01 degree
Accuracy(Gyro) : 0.05 degree *Secant(Lat.)
Location : Tank top(on the bottom of ship)

Duration of the Figure of 8 turn

In YK13-03 cruise

Date (UTC)

2013-03-08 13:00:00 - 2013-03-08 13:20:00
2013-03-12 06:32:00 - 2013-03-12 06:53:00
2013-03-12 13:52:00 - 2013/03/12 14:12:00
2013-03-25 11:19:00 - 2013/03/25 11:38:00
2013-03-26 00:00:00 - 2013/03/26 00:00:00

Data processing

The following corrections and calculations were performed.

- (1) Ship magnetization correction
 - Hob = ARPYF + Hp ---(i)
 - Hob: Observed magnetic field vector (Ship coordinates)
 - 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.

- RPYF = BHob + Hbp ---(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 11th 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>]

- (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

	1.0800	0.0112	0.0148		-482.8966
B=	-0.0011	1.2097	0.0519	Hbp=	6313.9361
	0.0117	0.1412	0.9215		-2254.7938

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

YOKOSUKA YK13-04 Leg2 Cruise Track

Enlarge Image

YK13-04 Leg2

Ship Name: YOKOSUKA

Period: 2013-05-10 - 2013-06-11

Chief Scientist: Katsunori Fujikura (JAMSTEC)

Project Name: [QUELLE2013]

Proposal ▶ The Brazil-Japan Joint Research Initiative in the South Atlantic - R/V Yokosuka and HOV Shinkai 6500 "Iata-piuna Cruise" in 2013

Title:

Update History

2019-06-15	An observation data was registerd.
2019-06-14	An observation data was registerd.
2018-03-01	An observation data was registerd.
2017-09-07	An observation data was registerd.
2014-11-30	An observation data was registerd.

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[6K Camera DEEP TOW](#)
[6K Sonar DEEP TOW](#)
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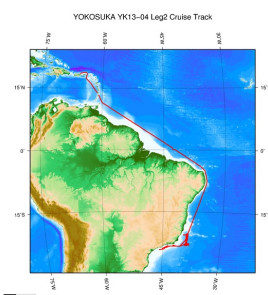
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STCM Corrected

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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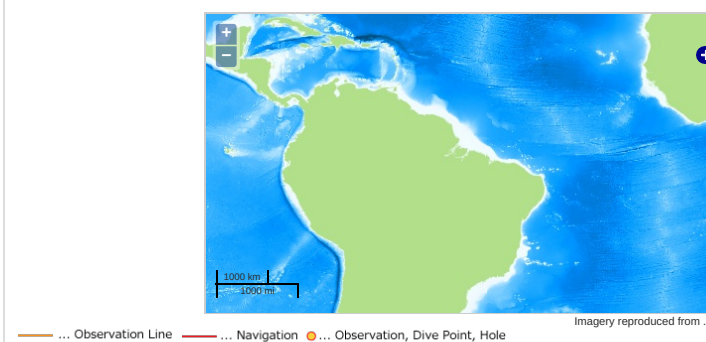
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Science Keywords:

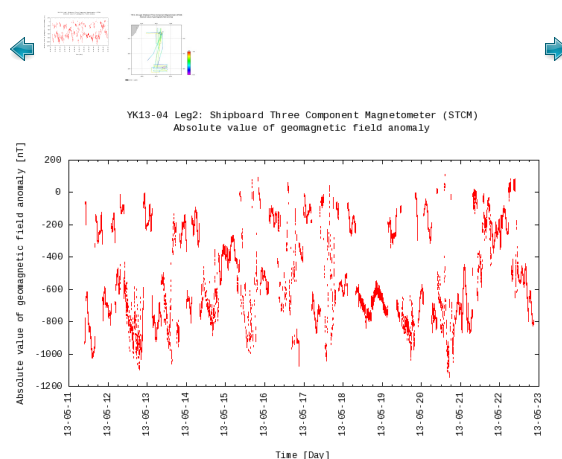
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Observation Map



Figures



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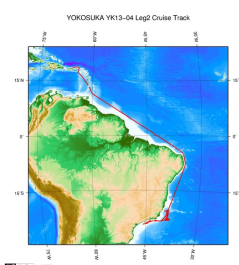
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File names

☐ YK13-04_2e_corr.stcm

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