Scientific Cruise KH-10-02 by R/V Hakuho-maru in the Western North Pacific and the Sea of Japan in 2010

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Outline of Research

A research cruise (Cruise No: KH-10-02) is being conducted by Research Vessel Hakuho-maru in the western North Pacific and the Sea of Japan from 11 June to 23 July 2010, aiming to contribute to the international GEOTRACES project by implementing interdisciplinary studies on marine biogeochemistry and clarifying environmental change in this region with cooperation among the East Asian counties and regions.

The research cruise conducts hydrographic data sampling, water and sediment sampling, etc. in the Western Pacific and the Sea of Japan. Participating in the cruise are a total of 53 staff from 22 universities/institutions, with 18 foreign scientists (including students) from Korean, Russian, China and Vietnam.

The second leg will cover the clean work and key parameters of the GEOTRACES program.

Appendix

Details of Cruise KH10-02 by the R/V Hakuho-maru in the East Asian Marginal Seas in June-July 2010

1. Information about the Ship

Name: R/V HAKUHO-MARU
(Public vessel of Japan)
Nationality of Flag State: Japanese
Owner & Operator: Japan Agency for Marine-Earth Science and Technology (JAMSTEC)
Gross Tonnage: 3,991 tons
Cruising Speed: 16.0 kt
Overall length: 100.0 m
Maximum draught: 8.9 m

2. Responsible Organization

Atmospheric and Ocean Research Institute (AORI), University of Tokyo

3. Research Period

Leg.1: From Tokyo, Japan 11 June 2010
To Hakodate, Japan, 19 June 2010
Leg. 2: From Hakodate, Japan, 21 June 2010
To Hakata, Japan, 14 July 2010
Leg. 3: From Hakata, Korea, 17 July 2010
To Yokohama, Japan, 23 July 2010

4. Research Area

Western North Pacific and the Sea of Japan.

5. Issues on the Research Project

a. Title of the project: East Asian GEOTRACES

b. Purpose of the project:

Observations of biogeochemical cycles and abyssal circulation in the East Asian Marginal Sea

c. Nature of the project:

It has become well recognized that the Sea of Japan is a miniature of the world oceans, due to its sensitivity to environmental changes because of its small volume and high primary productivity. It is evident that climatic changes in the northern area could easily cause perturbation of its abyssal circulation system as reflected in temporal variations of chemical tracers in its deep and bottom waters. This study therefore aims at detecting such temporal variations in detail by conducting CTD-hydrocasts during which seawater samples from the surface to the bottom will be investigated. Integral to this are measurements of major chemical components, trace elements and isotopes (TEIs) in the in the Sea of Japan and Western North Pacific (Asian-GEOTRACES project) that will be carried out in collaboration with various regional scientists on the R/V *Hakuho-maru*.

d. Items of the project:

1. Hydrographic casts and water sampling: measurements of vertical CTDO (Conductivity, temperature, depth and oxygen) profiles; measurements of dissolved oxygen, nutrients, chlorophyll, trace element concentrations and isotope compositions in seawater samples, using surface water sampler, NISKIN-X type water sampler.
2. In-situ filtration casts: trace element and isotope measurements of organic/inorganic particulate materials, using in-situ filtration/extraction pump system.
3. Multiple piston coring casts: trace element and isotope measurements in pore water and surface sediment.
4. Plankton casts: plankton sampling using Towing net.
5. Casts of optical sensors: measurement of photosynthetic parameters, optical radiance and irradiance.
6. ADCP (Acoustic Doppler Current Profiler) casts: vertical profiles of current velocity with a ship-mounted ADCP.

e. Plan for management and application of research results:

The chief scientist and the office for cruise coordination of the Atmosphere and Ocean Research Institute, the University of Tokyo will manage the execution of the project and the subsequent analysis of the data. Data obtained through the measurements of major chemical components, trace elements and various isotopes during the cruise, is expected to improve our understanding of past, present and future distributions of TEIs in the East Asian Marginal Sea, and also the relationships with important global processes of material circulations.

6. Principle Investigator

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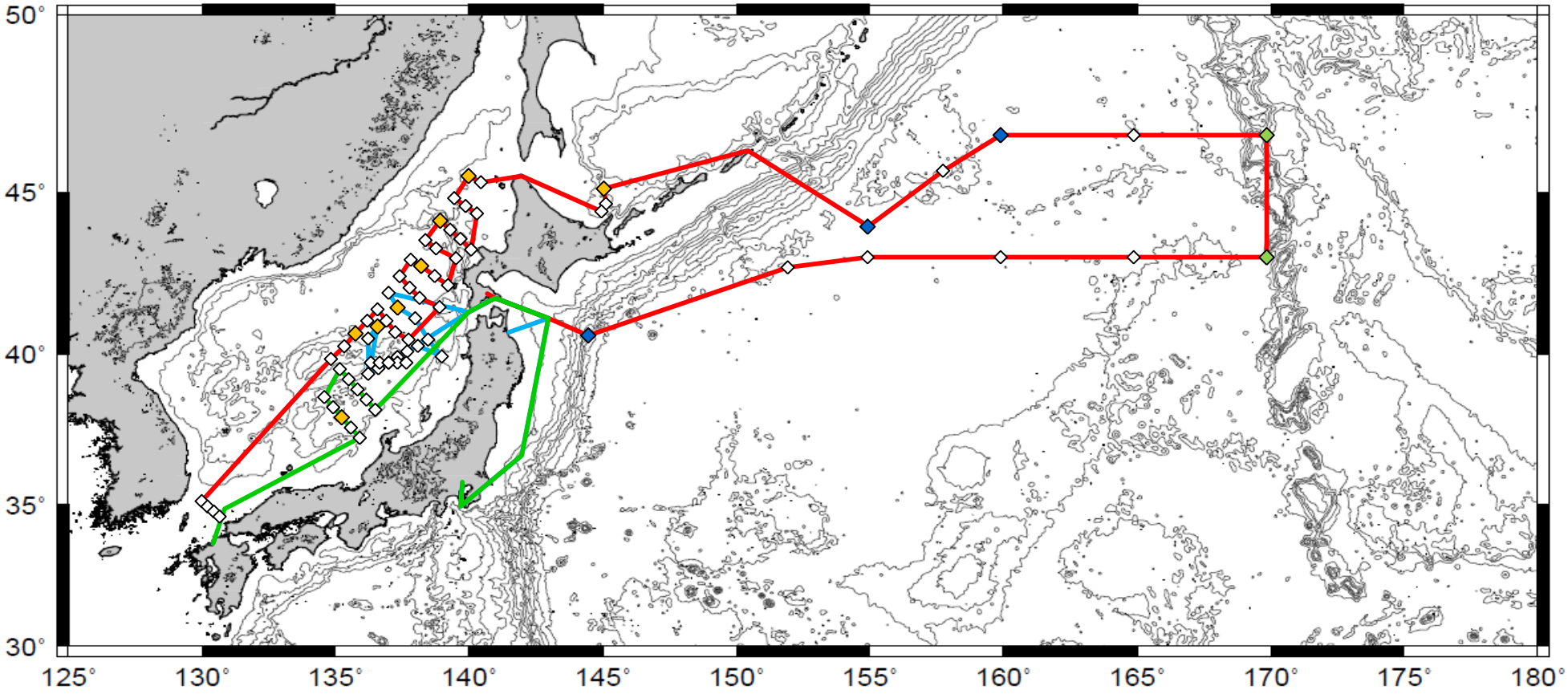
7. Participating Researchers

Japan: 38 researchers from Toyama Univ., AORI, Univ. of Tokyo, Kyoto Univ., Hokkaido Univ., Hiroshima Univ., Tokai Univ. Kinki Univ. Kochi Univ., NIES, JAEA, AIST and JAMSTEC
China: 1 researcher from Xiamen Univ.
Korea: 11 researchers from Seoul National Univ., Busan Univ., KORDI and etc..
Russia: 5 researchers from Pacific Oceanological Institute
Total: 55 researchers

8. Research items and equipment to be used in the project

Types of samples and data	Methods to be used	Instruments to be used
Water samples	Water sampling in multiple layers	Underway surface water sampler, NISKIN and NISKIN-X type water sampler
Temperature, salinity, oxygen and depth	Hydrographic casts of electric sensors and water samples with a cable winch	CTDO (Conductivity, temperature, depth and oxygen profiler)

Optical data	Measurement of photosynthetic parameters, optical radiance and irradiance	FRRF(Fast Repetition Rate Fluorometry) and PRR (Profiling Reflectance Radiometer)
Current velocity	Pinging acoustic pulses from ship bottom	Ship mounted ADCP and ADCP
Plankton samples	Plankton net	Towing net
Particulate matter	In situ filtration of particulate matters	In situ filtration
Sediment samples	Free fall of a corer over side	Multiple and piston corer



leg.1 leg.2 leg.3

◇ SS (CTD × 1)

◆ LS (CTD × 4, Mult. Core × 1, Pist. Core × 1)

◆ MS (CTD × 1, Mult. Core × 1, Pist. Core × 1)

◆ LWS (CTD × 4)