

GEOTRACES Activities in China 2011-2012

October 27, 2012

By China-GEOTRACES Working Group

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- Capacity building
- GEOTRACES-relevant research in China

A NEW R/V BEING DESIGNED



The bidding for preliminary design of XMU's new general-purpose oceanographic research vessel (GORV) has been accomplished. The Glostin Associates Inc., a design firm based in Seattle, was the winner of the design tender

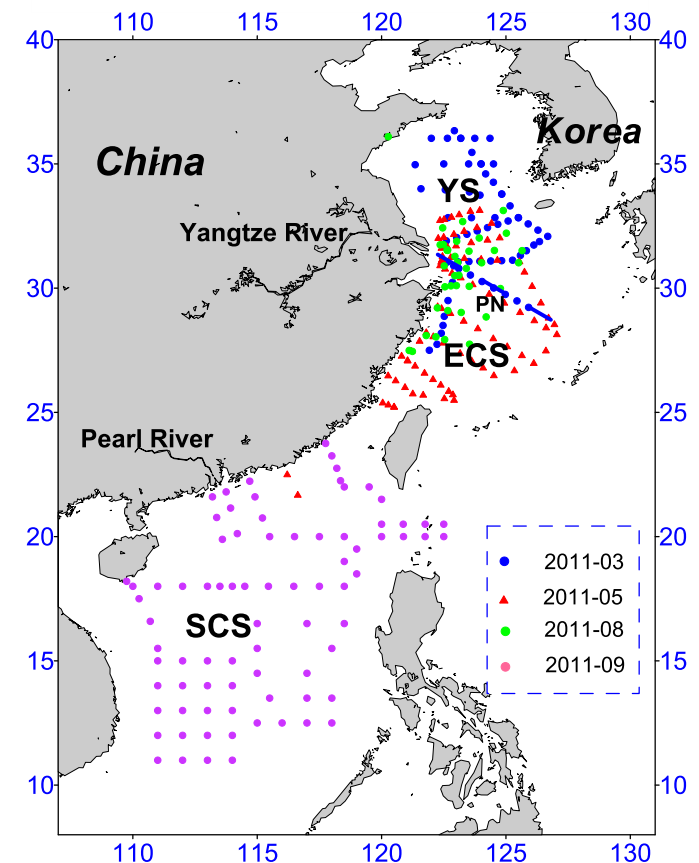
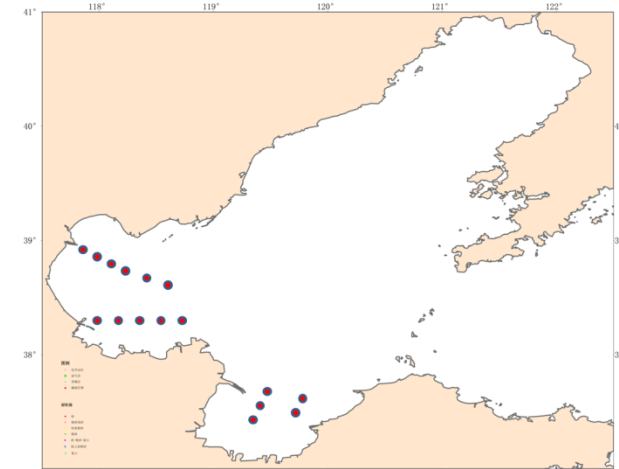
Overall vision – a highly capable RV

1. Range: global, all non-ice covered area
2. Outstanding seakeeping and station keeping capabilities
3. "Hands-free" OTS (at least CTD) handling system
4. Chemically & biologically clean, lab & sampling
5. Highly flexible deck & lab arrangements for science missions
6. Multi-parameter underway survey, integrated information system, and good internet connection to land
7. Reasonably quiet, acoustically
8. Ready to support new generation of autonomous platforms
9. Suite of acoustic systems for ocean bottom and sediment mapping

1. The new vessel will be available in 2015.
2. Chris Measures and his colleagues are helping to build up the clean sampling system.

GEOTRACES-relevant research

- **Laizhou Bay and Bohai Bay: (08-2011, FIO, Li Li)**
 - total dissolved trace metal
 - Cu speciation analysis
- **Yellow Sea (YS), East China Sea (ECS) and South China Sea (SCS):**
 - Dissolved Al, Mn, As, Sb (OUC, Jing-Ling Ren)
 - Dissolved Se isotope (SKLEC, ECNU, An-Yu Zhang, Jing Zhang)
 - Dissolved Ra and Th isotopes (SKLEC, ECNU, Jin-Zhou Du)
- **Changjiang Estuary: (07-2011)**
 - Surface “fish” sampling system for collecting clean surface water underway
 - Dissolved Al, Mn, As, Sb (OUC, Jing-Ling Ren)
 - Dissolved Fe (SKLEC, ECNU, Rui-Feng Zhang, Jing Zhang)



A new method for determining ^{224}Ra and ^{228}Th in coastal sediments has recently been developed (Cai et al., 2012, Marine Chemistry)



- ^{224}Ra : $T_{1/2} = 3.66 \text{ d}$; $K_d = 10 - 500$ (salinity dependent)
- ^{228}Th : $T_{1/2} = 1.91 \text{ yrs}$; $K_d = 10^5 - 10^7$

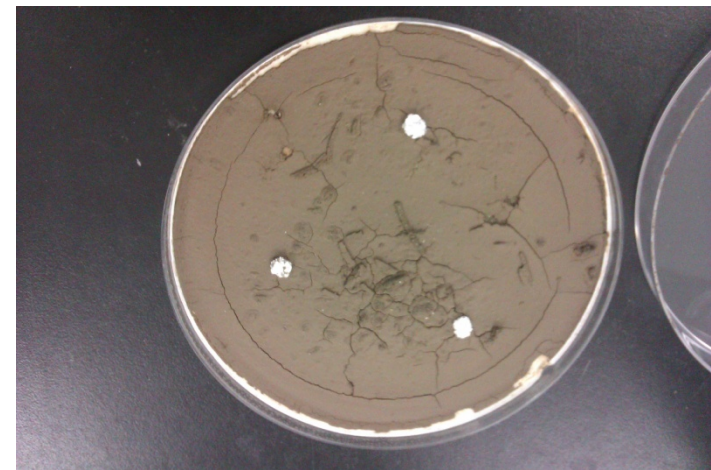
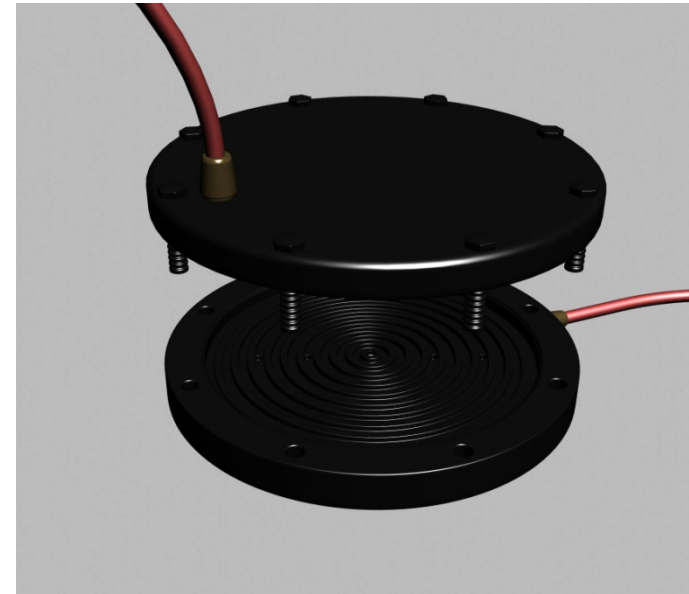
This may lead to a new approach for quantifying the exchange between water-sediment interface and thus adds to the GEOTRACES tool box

Instruments

RaDeCC system (with an array of 6 counters)

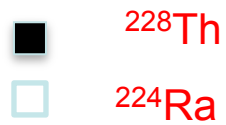
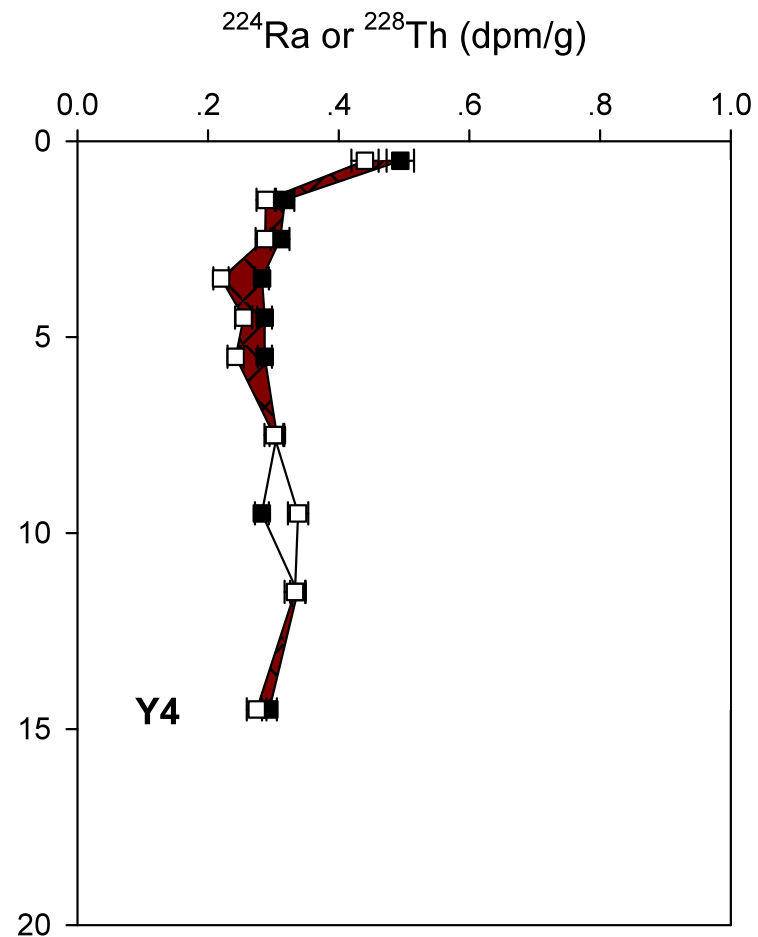
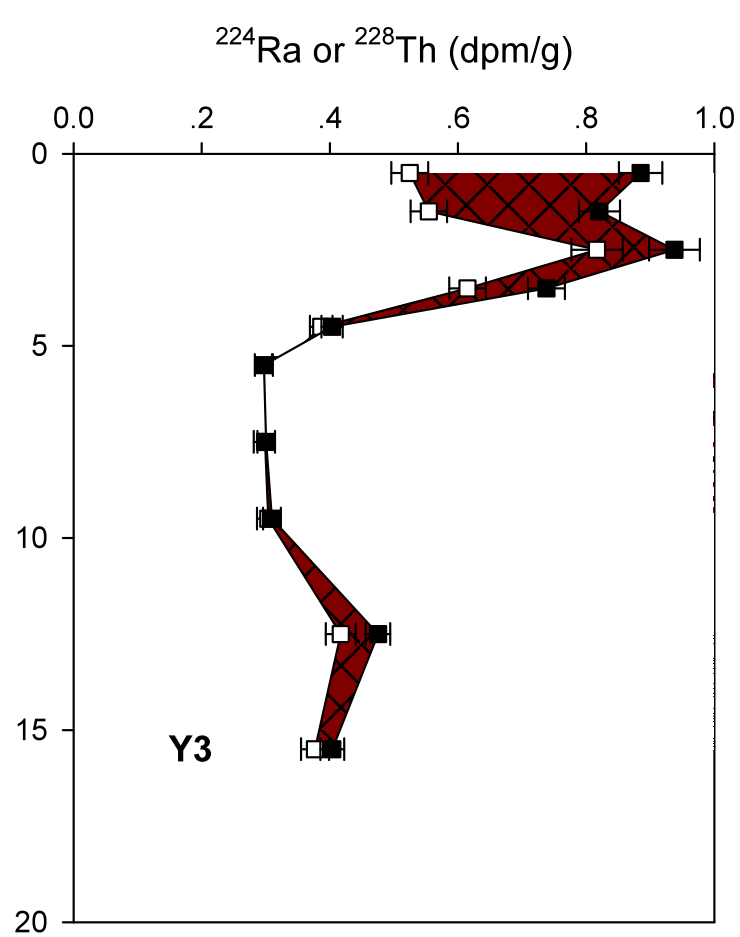


Sample Chamber (vol = 50 ml)

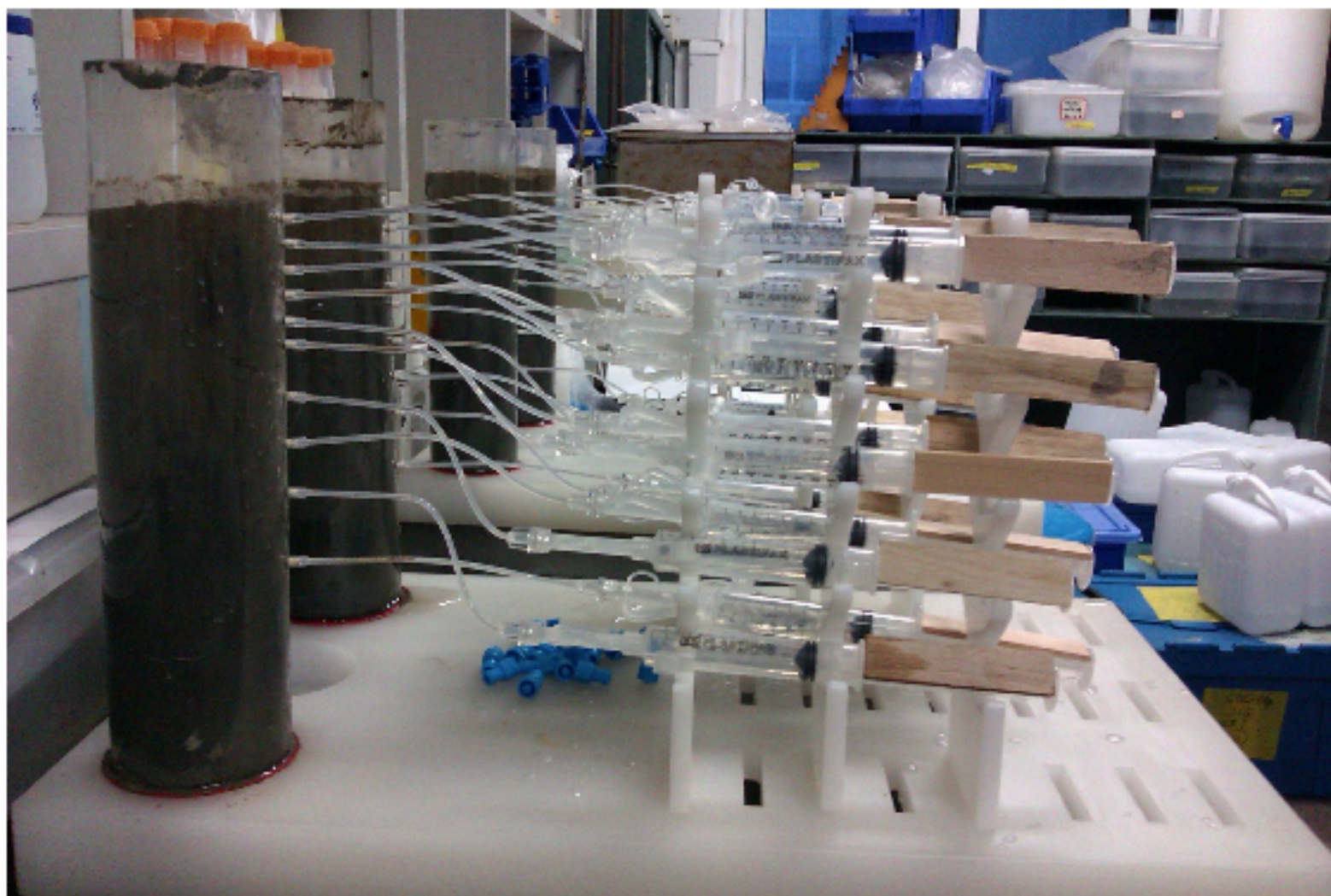


Sediment sample

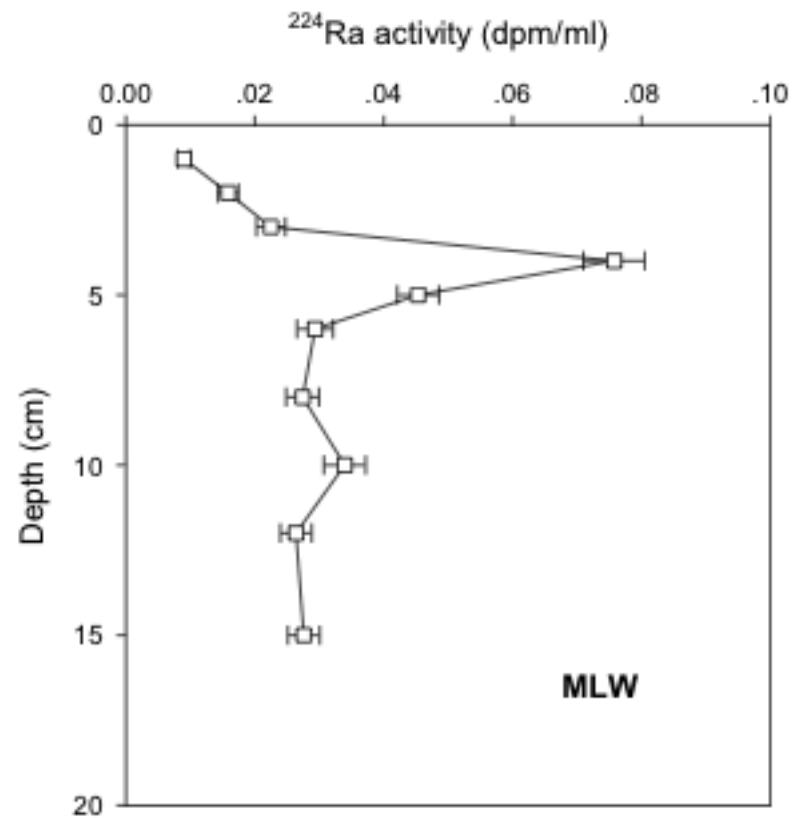
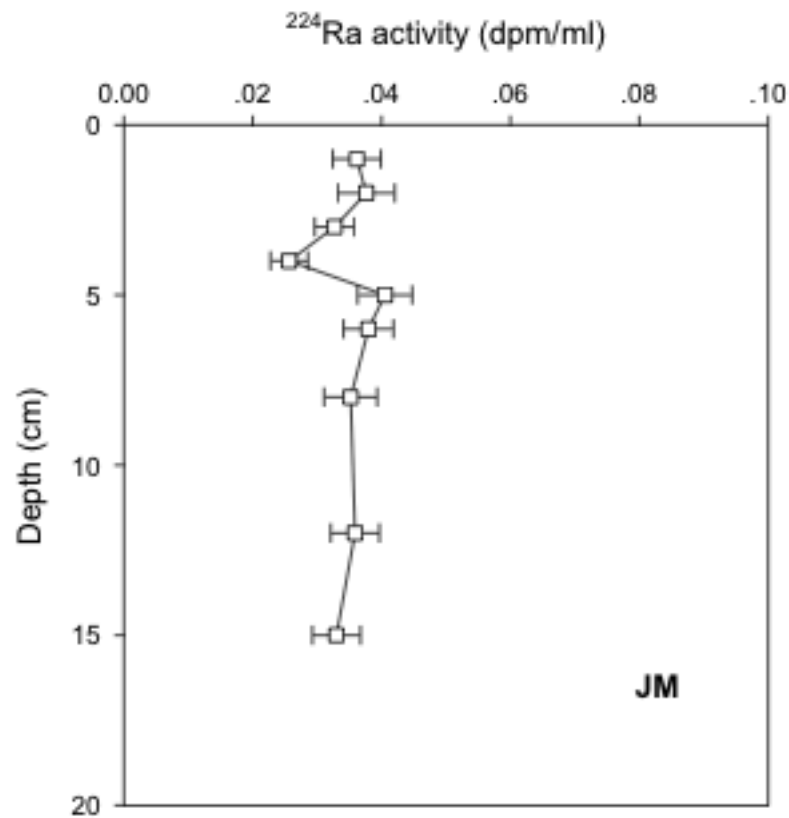
First robust measurements on $^{224}\text{Ra}/^{228}\text{Th}$ in sediments: Yangtze Estuary



^{224}Ra measurement in pore water using a Rhizon sampling system

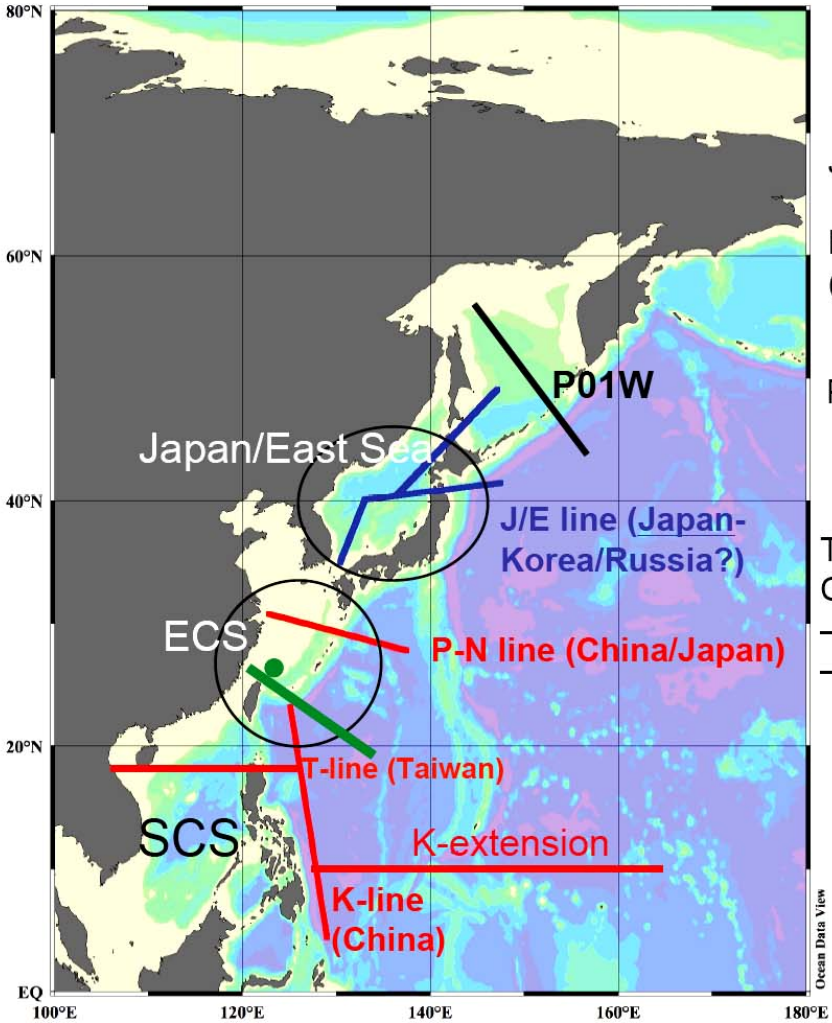


Depth distribution of ^{224}Ra in pore water



Outlook

Study area and proposed cruise lines



Lines for the marginal seas in the Northwest Pacific:

P01W line

J/E line :
 ECS (the Korea/Tsushima strait) - NW Pacific (Tsugaru strait)/Okhotsk Sea (Soya Strait)

P-N line :
 Yangtze estuary – ECS shelf
 Okinawa Trough – the NW Pacific

T- line :
 Coast of China – north coast of Taiwan
 – Okinawa Trough (hydrothermal vent)
 – the NW Pacific

K- line :
 East coast of the Philippine –
 Southern part of Okinawa Trough
 K-extension: along 18°N to 165°E

SCS-line

Ocean Data View

GEOTRACES process study cruise in NW Pacific

- When the new vessel is available, we should organize a GEOTRACES cruise in 2016.