

Japan GEOTRACES National Report 2015

Hajime Obata

Scientific Meetings

- Annual Meeting of GSJ 2014, 16 Sep, Toyama
 - GEOTRACES session
 - (Keiji Horikawa, Kazuhiro Norisuye, Hajime Obata)
 - 9 oral and 8 poster presentations
 - M. Hatta and C. I. Measures
 - “Dissolved trace metal distributions in North Atlantic Ocean during the GEOTRACES and CLIVAR expeditions ”
- Goldschmidt 2016
 - 26 Jun-1 Jul, Yokohama



GOLDSCHMIDT
YOKOHAMA 2016



Goldschmidt Conference 2016

26 June~ 1 July, Yokohama

Ocean and Atmosphere:
Past and Present
Co-ordinators:
Tim Lyons
(UC Riverside, USA)
Yoshiki Sohrin
(Kyoto University, Japan)
Laura Robinson
(Bristol, UK)

Theme:
Unique Ubiquitous Universe

GOLDSCHMIDT2016
EXHIBITION AND SPONSORSHIP
PROSPECTUS

26th June – 1st July 2016
Yokohama, Japan
goldschmidt.info/2016

Hosted by Geochemical Society, European
Association of Geochemists, Geochemical Society
of Japan & Science Council of Japan

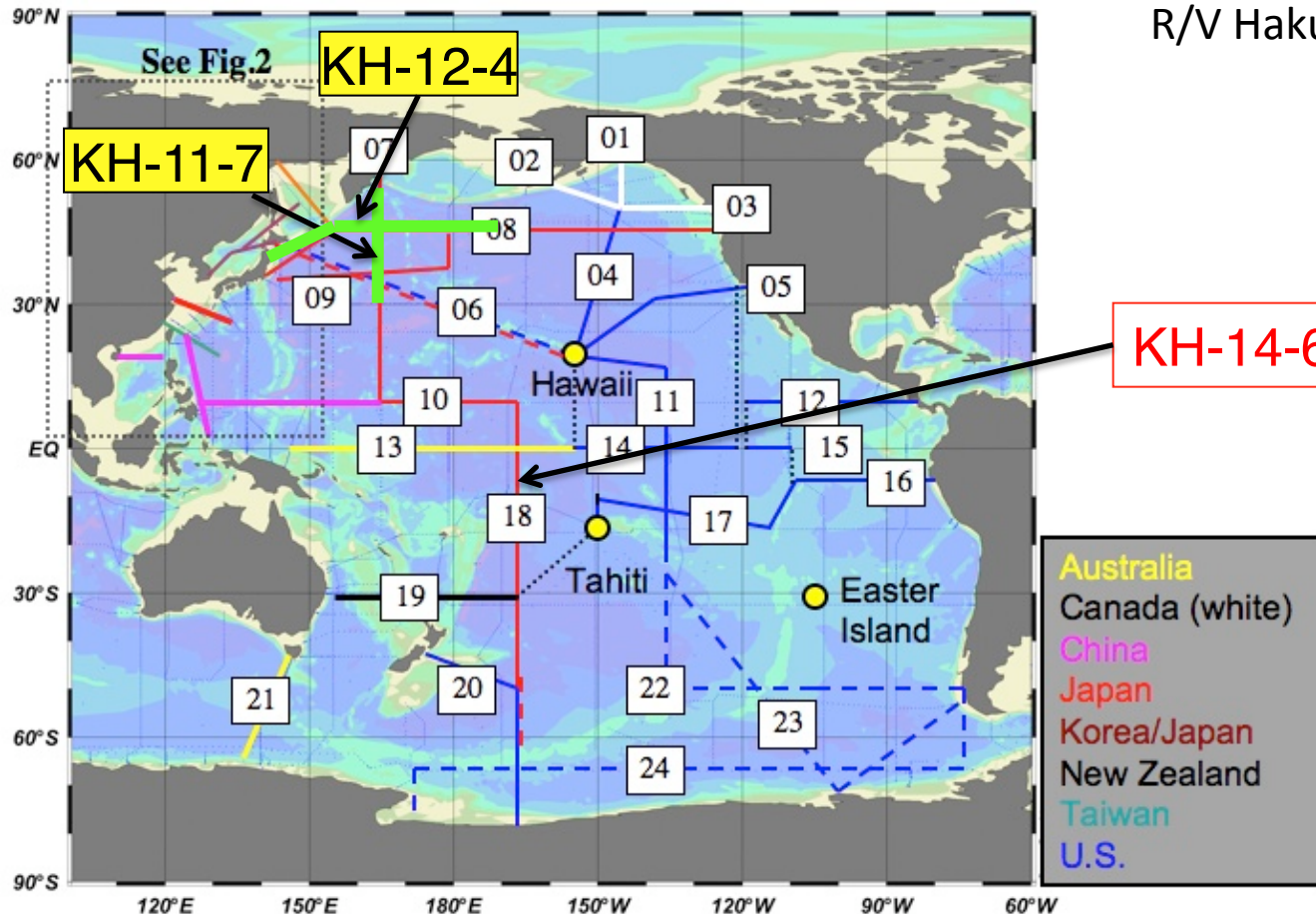


Cruises

- KH-14-6: section GP19, South Pacific
 - 2 Dec 2014-26 Feb 2015 (PI: T. Gamo)

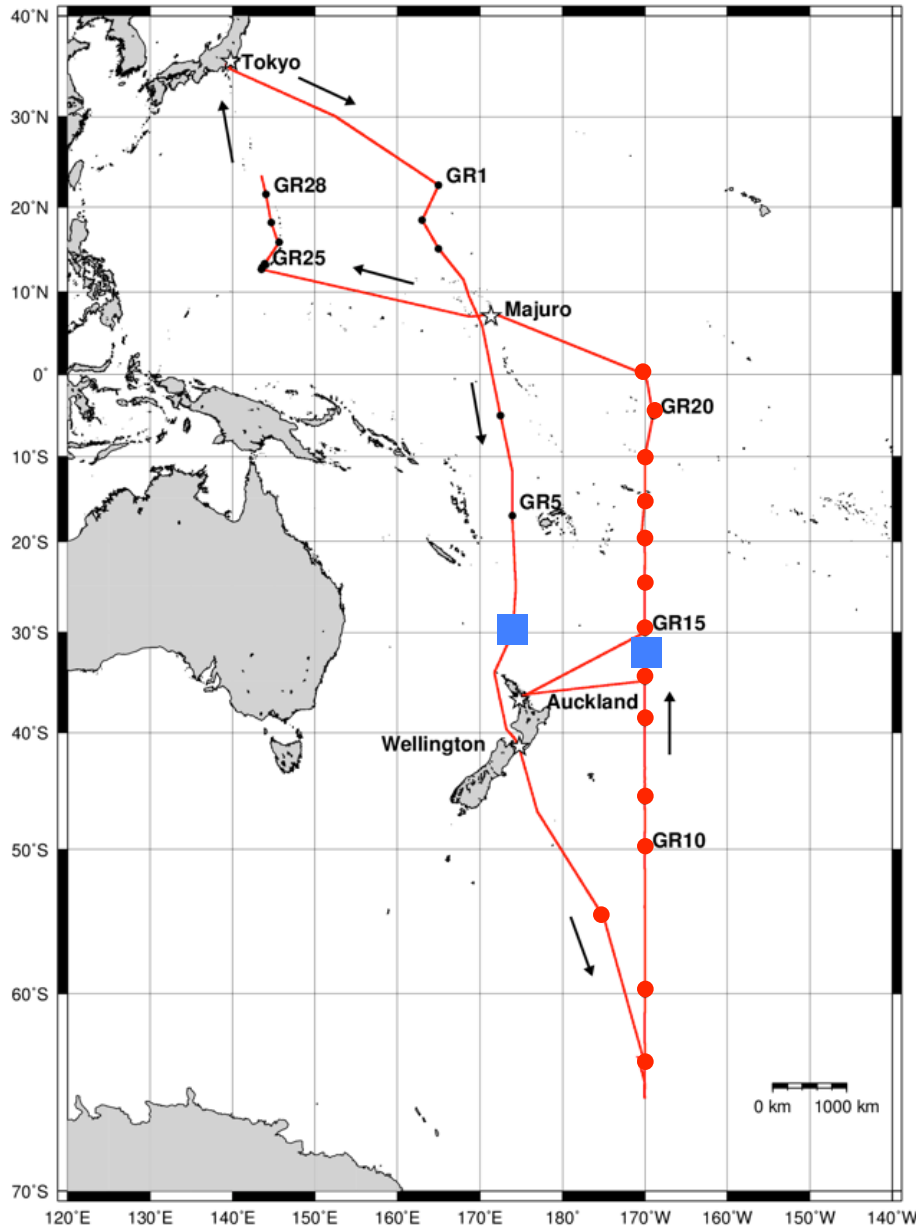


R/V Hakuho-maru



KH-14-6

- 2 Dec 2014-26 Feb 2015 (PI: T. Gamo)
- Section GP19: each 5 degree, full depths
- Crossover stations with Australia cruises (GP13)
 - GR6. 30°00'S, 174°00'E
 - GR13. 32°30'S, 170°00'W



Cruises

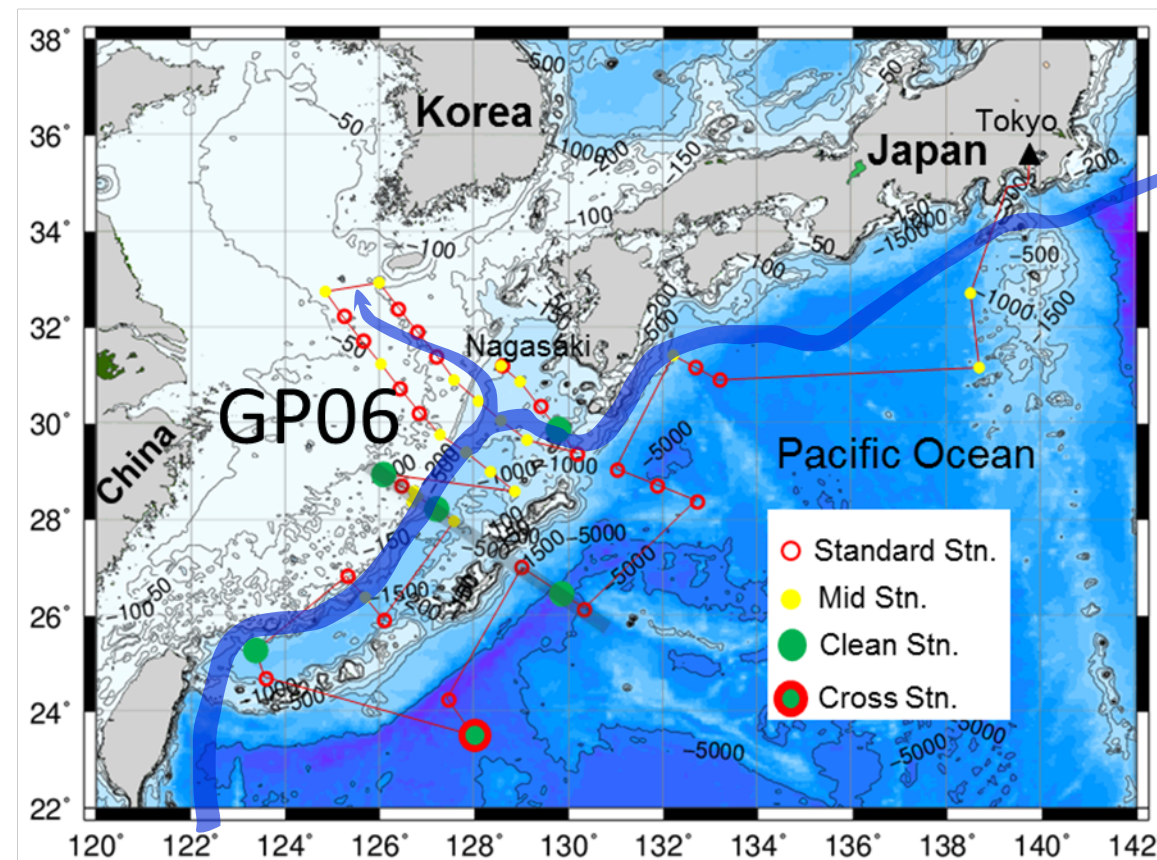
- KH-15-3: East China Sea
 - Oct, 2015 (PI: J. Zhang)
- Planning for 2016-2018
 - Eastern North Pacific, to complete section GP03

KH-15-3: Biogeochemical study in the East China Sea

(Oct 14-Nov 2, 2015, Tokyo – Nagasaki; PI: J. Zhang)

Objectives:

- 1) Quantify the distributions of trace elements and isotopes in the ECS and their fluxes to the western North Pacific.
- 2) Understand the biogeochemical/physical processes, spatial and temporal variations and cycles of nutrients in the East China Sea.
- 3) Reveal long-term biogeochemical changes in the ECS/Kuroshio area.



Key Parameters

TEIs:

Fe, Al, Zn, Mn, Cd, Cu
 $\delta^{15}\text{N}$, $\delta^{13}\text{C}$, Nd and Pb isotopes

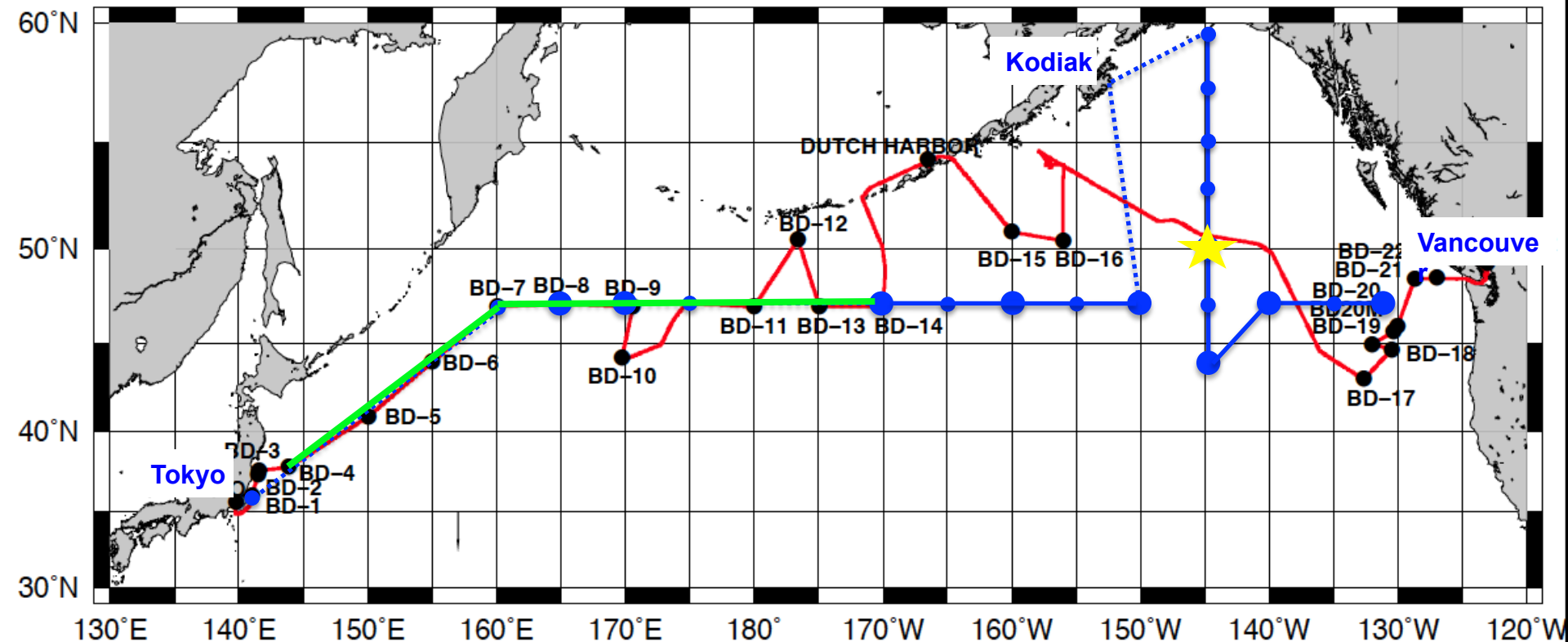
Particles/Aerosols

Other parameters:

REEs, Ni, Co, Ti, Hg, Ba,
 ^{228}Ra , ^{226}Ra , $\delta^{18}\text{O}$, $\delta^{56}\text{Fe}/\delta^{54}\text{Fe}$,
 $\delta^{30}\text{Si}$, $\delta^{65}\text{Cu}$,
DON, DOP, Vitamin B Group
RRF, PRR
Vertical eddy diffusivity etc.

Planning for 2016-2018

KH-17-1

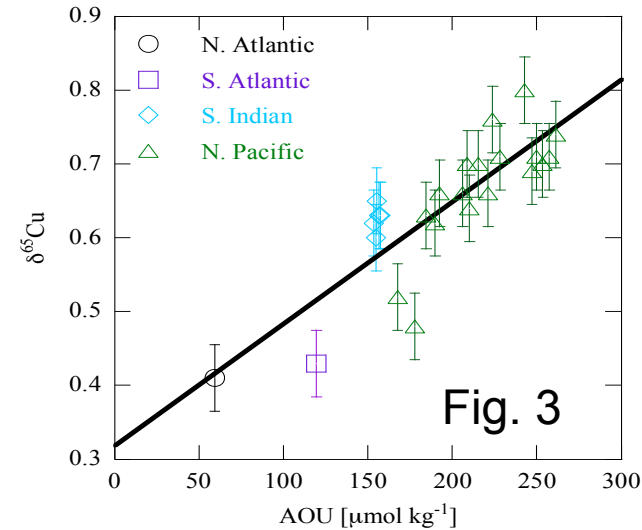
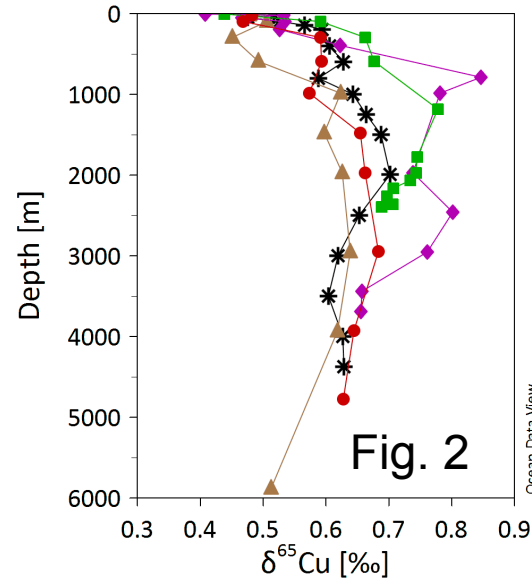
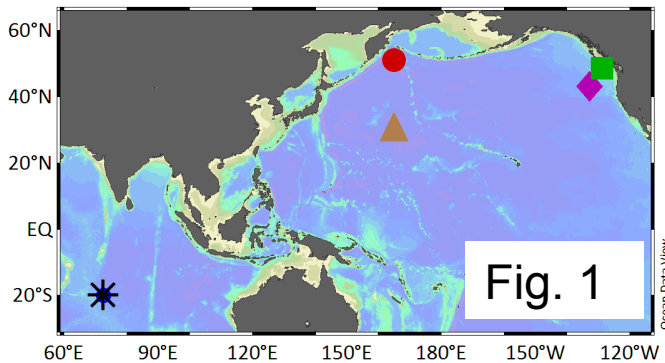


Tentative plan: 23 June – 07 August, 2017
(Tokyo – Vancouver)
PI: H. Obata

Publications (30 in 2014-2015)

- Gamo, T., Okamura, K., Hatanaka, H., Hasumoto, H., Komatsu, D., Chinen, M., Mori, M., Tanaka, J., Hirota, A., Tsunogai, U., Tamaki, K. (2015): Hydrothermal plumes in the Gulf of Aden, as characterized by light transmission, Mn, Fe, CH₄ and d¹³C-CH₄ anomalies. ***Deep-Sea Res. II***, in press.
- Horikawa, K., Martin, E. E., Basak, C., Onodera, J., Seki, O., Sakamoto, T., Ikehara, M., Sakai, S., Kawamura, K. (2015): Pliocene cooling enhanced by flow of low-salinity Bering Sea water to the Arctic Ocean. ***Nature Communications***, 6, doi:10.1038/ncomms8587.
- Kim, T-J., Obata, H., Kondo, Y., Ogawa, H., Gamo, T. (2015): Distribution and speciation of dissolved zinc in the western North Pacific and its adjacent seas. ***Marine Chemistry***, 173, 330-341.
- Kim, T-J., Obata, H., Gamo, T., Nishioka, J. (2015): Sampling and onboard analytical methods for determining subnanomolar concentrations of zinc in seawater. ***Limnol. Oceanogr. Methods***, 13, 30-39.
- Minami, T., Konagaya, W., Zheng, L., Takano, S., Sasaki, M., Murata, R., Nakaguchi, Y., Sohrin, Y. (2015): An off-line automated preconcentration system with ethylenediaminetriacetate chelating resin for the determination of trace metals in seawater by high-resolution inductively coupled plasma mass spectrometry. ***Analytica Chimica Acta***, 854, 183-190.
- Suzuki, A., Obata, H., Okubo, A., Gamo, T. (2014): Precise determination of dissolved platinum in seawater of the Japan Sea, the Sea of Okhotsk, and the western North Pacific. ***Marine Chemistry***, 166, 114-121.
- Takano, S., Tanimizu, M., Hirata, T., Sohrin, Y. (2014): Isotopic constraints on biogeochemical cycling of copper in the ocean. ***Nature Communications***, 5, doi: 10.1038/ncomms6663.
- Otosaka, S., Nakanishi, T., Suzuki, T., Satoh, Y., Narita, H. (2014): Vertical and lateral transport of particulate radiocesium off Fukushima. ***Environmental Science & Technology***, 48, 12595-12602.

Takano, S., Tanimizu, M., Hirata, T. , Sohrin, Y. (2014): Isotopic constraints on biogeochemical cycling of copper in the ocean. *Nature Comm.*, 5, doi: 10.1038/ncomms6663.



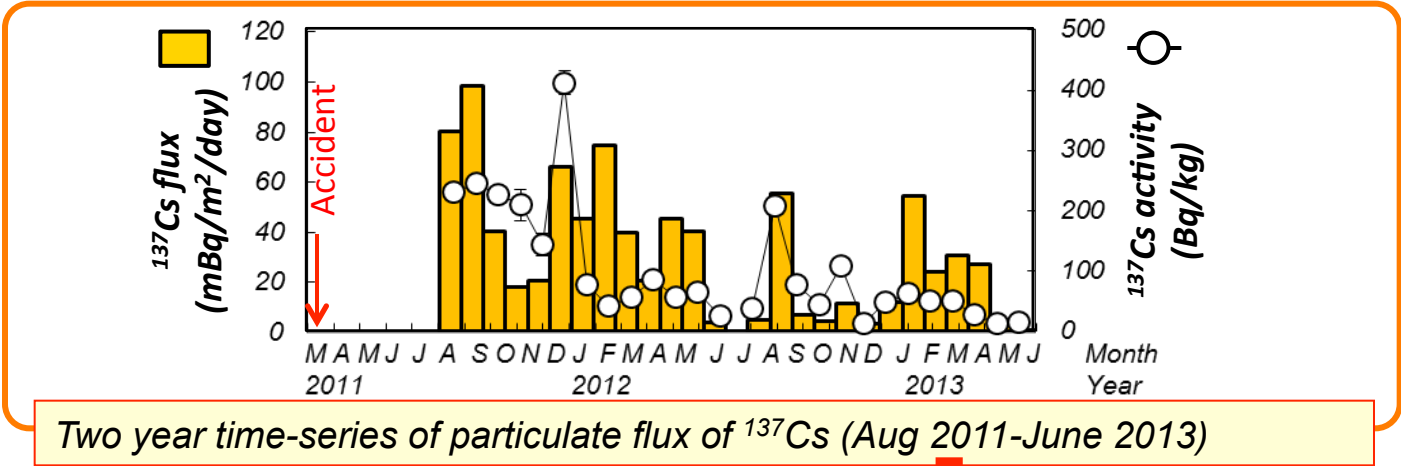
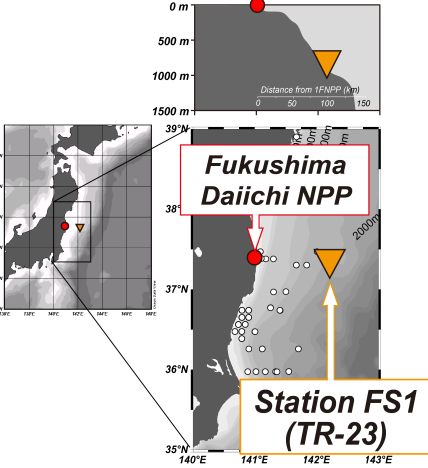
- Seventy seven of seawater samples, collected during Japanese GEOTRACES cruises, KH-09-5, KH-10-2, KH-11-7 and KH-12-4, have been analysed (Fig. 1 & Fig. 2).
- In the layer deeper than 2000 m, $\delta^{65}\text{Cu}$ correlates with apparent oxygen utilization (AOU), suggesting $\delta^{65}\text{Cu}$ becomes heavier with the age of deep water (Fig. 3).
- In surface seawater, $\delta^{65}\text{Cu}$ is mainly controlled by mixing of rain water, river water, and deep seawater. In the deep seawater, $\delta^{65}\text{Cu}$ is heavier than the surface layer and becomes heavy with the age of deep seawater because of scavenging that preferentially removed the light isotope (^{63}Cu).

Otosaka, S., Nakanishi, T., Suzuki, T., Satoh, Y., Narita, H. (2014): Vertical and lateral transport of particulate radiocesium off Fukushima. *Environ. Sci. Technol.*, 48, 12595-12602.

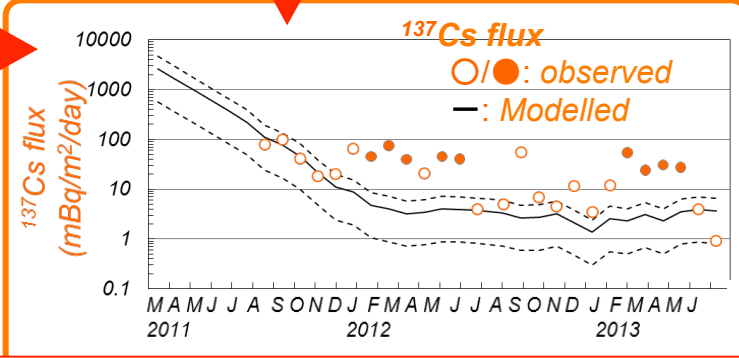
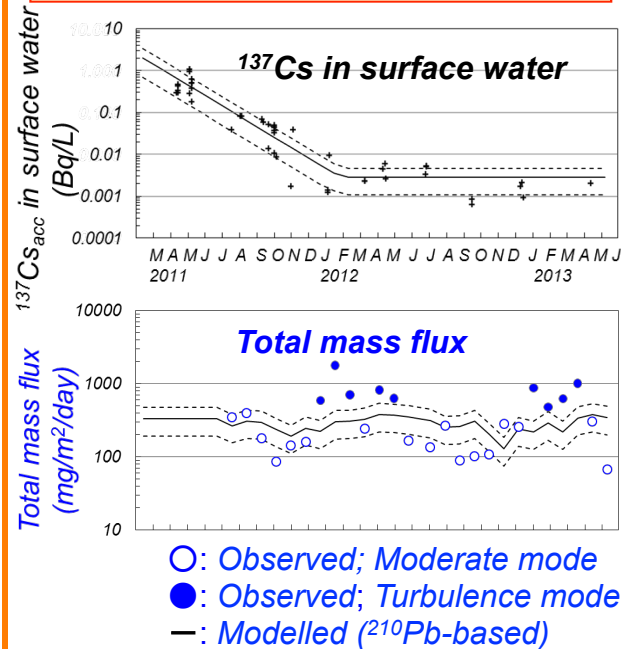
“First runner-up for ES&T’s Best Paper 2014”



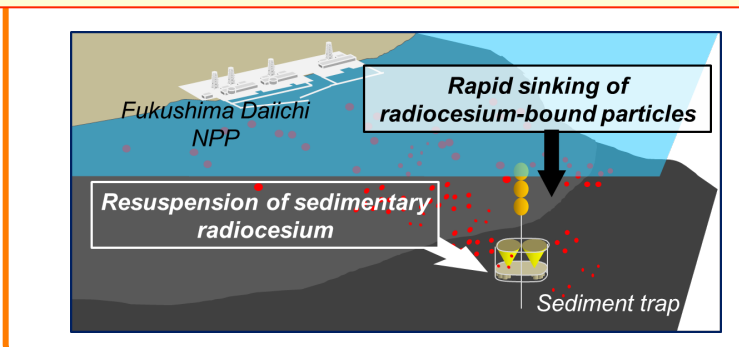
Sediment trap mooring was deployed at about 100 km east of Fukushima Daiichi NPP during Japanese GEOTRACES cruise (R/V Hakuho Maru KH-11-07 cruise, PI: Jing Zhang).



Modelled vertical transport of particulate ^{137}Cs



Two principal processes affecting ^{137}Cs flux



Funding

- GEOTRACES Japan: Grant-in-aid for scientific research (A, overseas academic research), Japan Society for the Promotion of Science
 - From 2011 to 2015
 - For GEOTRACES studies and travel fees etc.
- Individual funds obtained by members