

ANNUAL REPORT ON GEOTRACES ACTIVITIES IN JAPAN

May 1st, 2017 to March 30th, 2018

New scientific results

We reported detailed dissolved Zn zonal section across the North Pacific (~47°N) at GP02. Our data revealed values of Zn* were strongly positive in the intermediate waters of both the western and the central subarctic North Pacific. The high Zn* in the intermediate water suggest that intermediate water masses play an important role in the decoupling of dissolved Zn and silicate in the subarctic North Pacific. (Kim et al., *Global Biogeochemical Cycles*, 2017).

New publications

Sixteen papers have been published as shown below:

- Aoyama, M., Y. Hamajima, Y. Inomata, Y. Kumamoto, E. Oka, T. Tsubono and D. Tsumune (2018): Radiocaesium derived from the TEPCO Fukushima accident in the North Pacific Ocean: surface transport processes until 2017. *Journal of Environmental Radioactivity*, 189, 93-102.
- Che, H. and J. Zhang (2018): Water Mass Analysis and End-Member Mixing Contribution Using Coupled Radiogenic Nd Isotopes and Nd Concentrations: Interaction Between Marginal Seas and the Northwestern Pacific. *Geophysical Research Letters*, 45, 2388-2395.
- Gamo, T. and K. Shitashima (2018): Chemical characteristics of hadal waters in the Izu-Ogasawara Trench of the western Pacific Ocean. *Proceedings of Japan Academy Series B Physical and Biological Sciences*, 94, 45-55.
- Kaizer, J., M. Aoyama, Y. Kumamoto, M. Molnar, L. Palcsu and P. P. Povinec (2018): Tritium and radiocarbon in the western North Pacific waters: post-Fukushima situation. *Journal of Environmental Radioactivity*, 184-185, 83-94.
- Kambayashi, S., J. Zhang, and H. Narita (2017): Spatial assessment of radiocaesium in the largest lagoon in Fukushima after the TEPCO Fukushima Dai-ichi Nuclear Power Station accident. *Marine pollution bulletin*, 122, 344 – 352.
- Kim, T., H. Obata, J. Nishioka, T. Gamo (2017): Distribution of dissolved zinc in the western and central subarctic Pacific. *Global Biogeochemical Cycles*, 31, 1454-1468.
- Kitamura, M., M. C. Honda, Y. Hamajima, Y. Kumamoto, M. Aoyama, H. Kawakami, T. Aono, M. Fukuda and Y. Mino (2017): Temporal changes in radiocesium contamination derived from the Fukushima Dai-ichi Nuclear Power Plant accident in oceanic zooplankton in the western North Pacific. *Journal of Environmental Radioactivity*, 172, 163-172.
- Mashio, A. S., H. Obata, and T. Gamo (2017): Dissolved platinum concentrations in coastal seawater: Boso to Sanriku, Japan. *Archives of Environmental Contamination and Toxicology*, 73, 240-246.
- Nakanowatari, T., T. Nakamura, K. Uchimoto, J. Nishioka, H. Mitsudera and M. Wakatsuchi (2017): Importance of Ekman transport and gyre circulation change on seasonal variation of surface dissolved iron in the western subarctic North Pacific, *Journal of Geophysical Research-Ocean*, 122, 4364-4391.
- Nishioka, J. and H. Obata (2017): Dissolved iron distribution in the western and central

subarctic Pacific - HNLC water formation and biogeochemical processes -. *Limnology and Oceanography*, 62, 2004–2022.

- Obata, H., J. Nishioka, T. Kim, K. Norisuye, S. Takeda, Y. Wakuta and T. Gamo (2017): Dissolved iron and zinc in Sagami Bay and the Izu-Ogasawara Trench. *Journal of Oceanography*, 73, 333-344.
- Otsuka, S. (2017): Processes affecting long-term changes in ¹³⁷Cs concentration in surface sediments off Fukushima. *Journal of Oceanography*, 73, 559-570.
- Takahata, N., Y. Tomonaga, Y. Kumamoto, M. Yamada, Y. Sano (2018): Direct tritium emissions to the ocean from the Fukushima Dai-ichi nuclear accident. *Geochemical Journal*, 52, 211-217.
- Takano, S., M. Tanimizu, T. Hirata, K.-C. Shin, Y. Fukami, K. Suzuki, Y. Sohrin (2017): A simple and rapid method for isotopic analysis of nickel, copper, and zinc in seawater using chelating extraction and anion exchange. *Analytica Chimica Acta*, 967, 1-11.
- Yoshimura, T., J. Nishioka, H. Ogawa, A. Tsuda (2018): Dynamics of particulate and dissolved organic and inorganic phosphorus during the peak and declining phase of an iron-induced phytoplankton bloom in the eastern subarctic Pacific, *Journal of Marine Systems*, 177, 1-7.
- Zheng, L., T. Minami, S. Takano, H. Minami and Y. Sohrin (2017): Distribution and stoichiometry of Al, Mn, Fe, Co, Ni, Cu, Zn, Cd, and Pb in seawater around the Juan de Fuca Ridge. *Journal of Oceanography*, 73, 669-685.

Meetings

- We had a national GEOTRACES session during annual meeting of Geochemical Society of Japan 2017 in September 13 - 15, 2017, for pursuing scientific discussion on recent Japanese GEOTRACES studies (22 papers were presented). This annual meeting was held at Tokyo Institute of Technology, Tokyo.
- During Goldschmidt Conference 2017, several GEOTRACES-related sessions were held. More than 11 papers were presented by Japanese scientists during the Goldschmidt Conference 2017 as listed below.
 - Aoyama, M., Y. Hamajima, Y. Inomata, Y. Kumamoto, E. Oka, T. Tsubono and D. Tsumune. Radiocaesium derived from FNPP1 Accident in the North Pacific Ocean as tracer of transfer processes in layers of surface, STMW, and CMW. Goldschmidt Conference 2017, Paris (France), 13 – 18 August, 2017.
 - Hara, T., H. Tazoe, H. Obata and T. Gamo. Distributions of Nd isotopic composition and REE concentrations in surface seawater in the North Pacific Ocean. Goldschmidt Conference 2017, Paris (France), 13 – 18 August, 2017.
 - Kim, T., H. Obata, H. Ogawa and T. Gamo. Tracing the subarctic North Pacific intermediate water by using decouple of dissolved zinc and silicate. Goldschmidt Conference 2017, Paris (France), 13 – 18 August, 2017.
 - Maki, K., J. Nishioka, H. Obata, Y. Kondo, I. Yasuda and H. Saito. Iron distribution and supply along the Kuroshio current in the North Pacific, Goldschmidt Conference 2017, Paris (France), 13 – 18 August, 2017.
 - Mashio, A. S., H. Obata and T. Gamo. Distributions and biogeochemical cycles of platinum in seawaters at coastal areas around Japan. Goldschmidt Conference 2017, Paris (France), 13 – 18 August, 2017.

- Nakaguchi, Y., Y. Ikeda, N. Oku, R. Taniura, M. Tsujisaka, L. Zheng, T. Minami and Y. Sohrin, Distributions and atmospheric input of bioactive trace metals in the East China Sea, Goldschmidt Conference 2017, Paris (France), 13 – 18 August, 2017.
 - Ootosaka, S., M. Fukuda and T. Aono. Behavior of radiocesium at sediment-water interface off Fukushima. Goldschmidt Conference 2017, Paris (France), 13 – 18 August, 2017.
 - Tazoe, H., H. Obata, T. Gamo and J. Nishioka. Latitudinal variations of neodymium isotopic composition in seawater along 160th meridian east in the western North Pacific. Goldschmidt Conference 2017, Paris (France), 13 – 18 August, 2017.
 - Tsujisaka, M., S. Takano, T. Hirata, M. Murayama and Y. Sohrin, Estimation of the paleoenvironment based on the concentration and isotope ratio of molybdenum and tungsten in the Japan Sea sediment. Goldschmidt Conference 2017, Paris (France), 13 – 18 August, 2017.
 - Zhang, J., S. Kambayashi and B. Zhang. Significance of submarine groundwater discharge on material transportation from land to ocean: Under long term climate change and environmental accident. Goldschmidt Conference 2017, Paris (France), 13 – 18 August, 2017.
 - Zheng, L., T. Minami, S. Takano, Y. Sohrin, Dissolved and labile particulate trace metal (Al, Mn, Fe, Co, Ni, Cu, Cd, and Pb) distributions in seawater along 160°W in the North Pacific. Goldschmidt Conference 2017, Paris (France), 13 – 18 August, 2017.
- During Ocean Sciences Meeting 2018, more than 7 papers were presented by Japanese scientists in several GEOTRACES-related sessions as listed below.
 - Evans, L. K., J. Nishioka, M. Yamamoto- Kawai, B. Williams and S. Zimmermann. Distribution of Dissolved and Labile Particulate Trace Metals Associated with Ice Structure in Arctic Sea Ice, Ocean Sciences Meeting 2018, Portland (USA), 11 – 16 February, 2018.
 - Misumi, K., D. Tsumune, T. Tsubono, M. C. Long, K. Lindsay, J. K. Moore, Contribution of marginal sea sediment on iron cycling in the North Pacific, Ocean Sciences Meeting 2018, Portland (USA), 11 – 16 February, 2018.
 - Nishioka, J., Y. Yamashita, H. Obata, K. Ono, I. Yasuda, A. Scherbinin, and Y. N. Volkov. Iron distribution in the East Kamchatka Current and its influence to the NPIW. Ocean Sciences Meeting 2018, Portland (USA), 11 – 16 February, 2018.
 - Obata, H., T. Kim, T. Gamo and J. Nishioka. Dissolved zinc, phosphate and silicate in the intermediate waters of the North Pacific and South Atlantic. Ocean Sciences Meeting 2018, Portland (USA), 11 – 16 February, 2018.
 - Oka, A., H. Obata, and H. Tazoe. Global distribution of rare earth elements simulated by an ocean general circulation model. Ocean Sciences Meeting 2018, Portland (USA), 11 – 16 February, 2018.
 - Takeuchi, A., K. Marumoto, and H. Obata. Vertical distributions of dissolved gaseous mercury (DGM) concentrations in the sub-Arctic Pacific Ocean (GEOTRACES-Japan). Ocean Sciences Meeting 2018, Portland (USA), 11 – 16 February, 2018.
 - Yamashita, Y., J. Nishioka, H. Obata and H. Ogawa. Distribution of allochthonous humic-

like fluorescent dissolved organic matter in the western North Pacific. Ocean Sciences Meeting 2018, Portland (USA), 11 – 16 February, 2018.

- There were more presentations in the Oceanographic Society of Japan, Japan Geoscience Union etc.

Cruise

- One GEOTRACES-related cruise in subtropical northwestern Pacific (GP02) was conducted to take clean seawater samples for trace element analyses. KH-17-3 cruise by R/V Hakuho-Maru (June 23 – August 9, 2017; PI: Hajime Obata).

Others

- A new nine-country* Working Group entitled “A framework for cooperative studies in the Western Pacific Marginal Seas: Energy and materials exchange between land and open ocean” (PI, Jing Zhang; 2017-2020), was established by the IOC Sub-Commission for the Western Pacific (WESTPAC) in 2017. Its task is to build up a framework for interdisciplinary and joint studies of the marginal seas environment. (*Japan, China, Indonesia, Korea, Malaysia, Philippines, Russia, Thailand, USA)

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