Study on ocean circulation in the Pacific using noble gas tracers

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【Outline of survey】

Noble gases can be used as sensitive and conservative tracers to constrain deep-ocean circulation because of their primordial signature, rapid mobility and chemical inertness. Particularly, mantle helium-3 signal, which is injected at mid-depth along mid-ocean ridges, can be used to trace patterns of ocean circulation thousand of kilometers away from the source region. The first objective is to infer deep current routes in the North Pacific from high-quality observation of geochemical tracers such as noble gases as well as hydrographic data and direct current measurements. The second is to understand detailed processes of ocean circulation in the Pacific in a comprehensive research, which includes observations and simulations in cooperation of geochemists and geophysicists.

【Expected results】

Our goal is to evaluate an ocean circulation model in the North Pacific with geochemical tracers, hydrographic data and direct current measurements, and to develop a reliable ocean circulation model. The production of this research may provide us new knowledge on global climate changes. This research will also form a new research system of the ocean.

【References by the principal researcher】

Y. Sano, T. Kosugi, N. Takahata, and R. Yokochi (2004), Helium Isotopes in Pacific Waters from Adjacent Region of Honshu, Japan. Journal of Oceanography, 60, 625-630, 2004.

N. Takahata, T. Watanabe, K. Shirai, M. Nishizawa and Y. Sano (2004), Helium Isotopes of Seawater in Adjacent Sea of Nansei Islands, Southwest Japan. Geochemical Journal, 38, 593-600, 2004.

【Term of project】 FY 2005 - 2009

【Budget allocation】 61,800,000 yen

【Homepage address】 http://cer.ori.u-tokyo.ac.jp/