[EE] Evening Poster | A (Atmospheric and Hydrospheric Sciences) | A-OS Ocean Sciences & Ocean Environment

[A-OS09]Marine ecosystems and biogeochemical cycles: theory, observation and modeling

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Wed. May 23, 2018 5:15 PM - 6:30 PM Poster Hall (International Exhibition Hall7, Makuhari Messe)

The ocean accounts for about 50% of global net primary production. This production is significant for carbon cycling and ecosystem functioning, and is related directly or indirectly to a variety of climatic and ecological phenomena. The responses to natural and anthropogenic environmental stressors that influence marine production and diversity can cause perturbations to marine ecosystems that alter trophic dependencies and interactions among organisms at a range of space and time scales. Quantification of the principal mechanisms driving spatio-temporal variability of marine ecosystem remains to be done, especially in terms of evaluation of uncertainty in responses. As a result, evaluating vulnerability of marine ecosystems to environmental change requires systematic and holistic approaches that integrate physics to ecology and are based in observations and modelling. This session aims to provide a venue for discussing recent advances in understanding marine biogeochemical cycles, ecosystems and their interactions. Observational and modeling studies that consider linkages between biogeochemical and ecosystem processes, biodiversity and biogeochemistry, and the effects of multiple stressors are especially encouraged.

[AOS09-P03]Vertical fluxes of nutrients based on radium-228 data in the western subarctic Pacific

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Keywords:Vertical flux, Radium-228, western subarctic Pacific, nutrient

The Northwest and Western Central Pacific are the areas with highest and still-growing catches (FAO, 2016). Especially, in the western subarctic Pacific and Oyashio region, we can find the rich and diverse ecosystem. The ecosystem and oceanic carbon cycles are supported by primary production in this oceanic region.
It is also well known that the western subarctic Pacific is high nutrient, low chlorophyll area, in which nutrients remain undepleted in surface waters throughout the year. In this area, phytoplankton growth is limited by the availability of Fe in seawater. To improve our understanding of primary production in the subarctic Pacific Ocean, it is important to determine supply processes of both nitrate and iron.
In this study, we revealed the vertical profile of radium-228 (half-life, 5.7 years) with those of nitrate and iron, and estimated vertical fluxes of nitrate and iron at the K2 station. We will also compare the results in this study with the vertical fluxes of the nutrients by physical parameters.
Seawater samples were collected using acid-cleaned samplers with external springs mounted on CTD-CMS system during a research cruise of TS *Oshoro-maru*, June 2015. The samples for Fe analyses were collected in low-density polyethylene bottles through a 0.2 µm-pore size filter. Then, dissolved Fe was analyzed at onshore laboratory by using a flow-injection analysis chemiluminescence detection system (Obata et al. 1993).

The samples, for Ra-228 analysis, were pre-treated onboard the ship with the coprecipitation of barium sulfate (Inoue at al., 2006). Briefly, barium and iron carriers were added to seawater samples, and then sodium sulfate solution was added to coprecipitate radium with barium sulfate. Iron hydroxide was then deposited by re-adjustment to pH 7, and gathered together with barium sulfate After bring back the precipitation, the precipitations were dried and compressed for gamma-counting. The gamma-spectrometry of all water samples was performed using large-volume well-type Ge-detectors, specially designed for low-background counting and equipped at Ogoya Underground Laboratory, Japan.
The vertical fluxes were calculated based on the previous studies (Ku et al., 1995; Nozaki and Yamamoto, 2001). The vertical fluxes were calculated as 0.36-2.86 mmol/m^2/d for nitrate and 0.01-0.09 mmol/m^2/d for iron. The vertical fluxes for the nutrients were higher than those obtained by physical parameters probably because the fluxes based on Ra-228 distribution were averaged during the decay time of Ra-228. To obtain the vertical fluxes of nutrients more precisely, we will need time variation data of Ra-228 with nutrient data.