Characterization of the primary productivity using a year-long high resolution sediment trap experiment in the southwestern part of the East/Japan Sea

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The southwestern East/Japan Sea is one of the world's most productive fishing grounds that is readily visible from the space born satellite's day-night band due to bright lights emitted from dense assemblage of fishing fleet. Traps were deployed to collect sinking particles in the depths of 1,020 m and 2,100 m at the inter-plain gap between Ulleung and Dok islands (37°25.77′N, 132°30.27′E, 2300 m) in 1999 with shorter than 10 days sampling interval. The water temperature and current at 350 m depth using RCM 7 at the site adjacent to the sediment trap mooring site were also utilized to aid our data analysis.

This high resolution temporal observations showed many important characteristics related to the productivity of the southwestern East/Japan Sea: 1) Ulleung Warm Eddy enhanced primary productivity as evidenced by a simultaneous variation in water temperature at 100 m and particulate organic carbon fluxes at 1,020 m depth.; 2) Siliceous phytoplankton species dominated spring and autumn blooms. The ratio of biogenic silica flux to particulate organic carbon flux increased during these two seasons; 3) Calcareous productivity was observed during August when surface water temperature was the highest when the ratio of calcium flux to aluminum flux peaked its maximum; 4) Small sized primary producers such as nano- or pico- plankton dominated in summer. Dissolution of sinking particulate organic carbon appeared to be great in the water column between 1,020 m and 2,100 m compare to other seasons; 5) Nitrogen fixer appeared to contribute to comparable high productivity during the apparent N-poor oligotrophic summer and the ratio of particulate organic carbon to particulate nitrogen was relatively high compared with that in other seasons.

Determination of picomolar Zn in seawater of the North and South Pacific with clean sampling methods

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Zinc (Zn) is an essential micronutrient for bacteria and phytoplankton in the ocean. However, biogeochemical cycles of Zn have not been fully revealed yet in the ocean since determination of Zn in seawater is very difficult because of contamination problems [1]. We have established a precise determination method of picomolar level of Zn in seawater using recent clean technique. Using this method, vertical distributions of Zn were investigated.

Seawater samples were collected in the subtropical North, South Pacific and subarctic North Pacific during the R.V. Hakuho-Maru research cruises. We used Teflon-coated X-Niskin bottles, which were thoroughly cleaned with detergent, acid, and milli-Q water. Zn in seawater was determined by cathodic stripping voltammetry after UV-digestion.

We have compared three different seawater sampling methods. Teflon-coated X-Niskin samplers were 1) deployed on CTD-CMS, 2) attached to Kevlar wire and 3) attached to titanium wire. Because Zn is used as sacrificial anode in the research vessel, especially around main propellers of the Hakuho-Maru, Zn contamination was observed during Kevlar wire hydrocasts that were performed from the stern of the vessel. By minimizing the influence from the propellers, we obtained almost the same Zn concentrations within the analytical error among those three different sampling methods. In the subarctic North Pacific, surface Zn concentrations showed the decrement from west to east, indicating that high eolian dust inputs from the Asian deserts may contribute to relatively high Zn concentration in western North Pacific [2] .

[1] Fitzwater *et al* (1982) Limnology and Oceanography **27**, 544-551 [2] Jakuba *et al* (2012) Global Biogeochemical Cycles **26**, GB2015.

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