

## Biogeochemical linkages between the ocean and the atmosphere during phytoplankton blooms in the Oyashio region

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The Oyashio is a western boundary current of the western North Pacific, where a large phytoplankton blooms regularly occur in spring. The spring phytoplankton blooms leads to extensive transport of organic carbon to the deep ocean, causing the drawdown of nutrients and  $p\text{CO}_2$ . Therefore, the Oyashio plays an important role not only in the global carbon cycle, but also in supporting various marine resources. The Coastal Oyashio Water (COW) has the characteristics of low temperature and low salinity. The COW spreads extensively over the Oyashio region and has a great influence on the phytoplankton bloom in the Oyashio region. Regarding the origin of the COW, influence of sea ice melt water from the Sea of Okhotsk and/or the East Sakhalin Current has been proposed, but that has not been fully understood yet. In addition, the COW might be influenced by river water and coastal sediments around the Hokkaido island. Multi-scale vertical and horizontal ocean mixing processes can strongly influence the distribution of dissolved and suspended substances including macro- and micro-nutrient availability, and may impact on the phytoplankton bloom formation. The changes in nutrient dynamics generally affect the abundance, composition and metabolic activity of marine organisms such as phytoplankton and bacteria during the blooms.

Marine phytoplankton can produce volatile organic compounds and marine atmospheric aerosols, which strongly influence on atmospheric chemistry. Primary and secondary organic and inorganic components produced via marine phytoplankton activity can contribute to the formation of cloud droplets and subsequently affect the climate change. Therefore, the biogeochemical cycles related to the phytoplankton blooms have a tight linkage between the ocean and the atmosphere.

In order to investigate "Biogeochemical linkages between the ocean and the atmosphere during phytoplankton blooms", a field campaign in the Oyashio region was carried out using the research vessel Hakuho-maru from March 6 to 26, 2015. In this presentation, we report the outline of the research cruise, especially focusing on the nutrient dynamics in the pre-bloom condition.

Keywords: phytoplankton bloom, linkages between the ocean and the atmosphere, Oyashio - Coastal Oyashio water, micro- and macro-nutrients dynamics