

## Mineral particles suspending in the surface waters of the North Pacific and its marginal seas –atmospheric dust deposition as investigated from seawater analysis

\*Yoko Iwamoto<sup>1</sup>, Mitsuo Uematsu<sup>2</sup>

1. Graduate School of Biosphere Science, Hiroshima University, 2. Atmosphere and Ocean Research Institute, the University of Tokyo

Suspended particulate matter (SPM) in the ocean consists of a variety of components from both biogenic and crustal sources. The mineral particles from crustal sources are brought to the oceans mainly via river run-off and atmospheric deposition. The atmospheric pathway becomes important especially in the open ocean far from the continents. In addition, atmospheric dust contains iron which can be used as nutrients for marine phytoplankton. Therefore, it is important to understand the size and chemical characteristics of the mineral particles that deposit to the ocean in understanding the linkage between atmosphere and marine ecosystem.

This study presents the properties of mineral particles in the SPM collected in the North Pacific and its marginal seas (the Sea of Okhotsk, the Bering Sea and the Chukchi Sea) based on bulk and individual particle analyses.

The mineral particles were distributed ubiquitously in the North Pacific even during summer when the influence of atmospheric Asian dust transport is small. Their relative abundances in the total SPM was 5 to 15% by number and about 2 to 7% by volume. The size distribution of the suspended mineral particles in the SPM was similar to that of the atmospheric dust aerosols, indicating that mineral dust of background level occurs in the marine boundary layer even in summer.

The shipboard observation during a Kosa (Asian dust) season showed that atmospheric dust settled onto the ocean surface, and resulted in increase in the mineral particles' concentration four to five times in surface water of the western subarctic North Pacific. The deposition flux of atmospheric dust into the ocean surface by a Kosa-event was calculated to be  $270 \text{ mg m}^{-2} \text{ event}^{-1}$ . The dissolved iron flux at the Kosa-event was also estimated at  $130\text{--}230 \text{ } \mu\text{g m}^{-2} \text{ event}^{-1}$ , and is found to have a potential to supply enough iron to lead the phytoplankton bloom in HNLC waters. This result confirms that a sporadic supply of dissolved iron that leading to phytoplankton bloom can naturally occur in the western subarctic North Pacific.

Keywords: the North Pacific, Marginal seas, Suspended particulate matters in seawater, Kosa, Iron, Geographical distribution