

Biogeochemical significance of Asian aerosol deposition in the southern East Sea

JEONGWON KANG¹, MAN-SIK CHOI², HAN JUN WOO¹,
KAP-SIK JEONG¹ AND HOI-SOO JUNG¹

¹Korean Seas Geosystem Research Center, KIOST, Ansan
426-744, South Korea, jwkhang7@kiost.ac.kr

²Oceanography & Ocean Environmental Sciences, Chungnam
National University, Daejeon 305-764, South Korea

We presented results from the atmospheric investigation for metals and ions in the southern East Sea (35°-39°N and 129°-134°E), a marginal sea between Korea and Japan. Five-year observations (Oct. 2003-Oct. 2008) at Ulleung Island revealed that seasonal change of the atmospheric concentration and chemical composition was related to relative intensity of crustal and anthropogenic-originated aerosols. Atmospheric metal fluxes to the southern East Sea showed that Al and Co fluxes were similar to those to the Mediterranean Sea. On the other hand, anthropogenic-originated Pb and Zn fluxes were comparable to those over the North Sea.

In addition, we investigated the transport patterns of aerosols on the east coast of Korea (37.58°N; 129.11°E) using backward trajectories and the associated concentrations of water-soluble ions (NO_3^- , NH_4^+ and nss-SO_4^{2-}) and certain metals (Al, Na, nss-Ca, V, Zn and Pb). Air masses passing slowly over eastern China contributed higher concentrations of water-soluble ions than those fast-moving northwesterly winds. With measured NO_3^- and NH_4^+ concentrations during the period Mar. 2002-Feb. 2003, the dry N deposition flux was $460 \text{ mg N m}^{-2} \text{ year}^{-1}$. Taking into account wet N deposition flux of $613 \text{ mg N m}^{-2} \text{ year}^{-1}$, the atmospheric deposition flux of N over the southern East Sea was higher than that reported for the Mediterranean Sea and the North Sea. Contribution of atmospheric N deposition was ~10% of new production on an annual scale, while it could account for over ~25% of new production during the water column stratification seasons.