

BBG005-P10

Room: Convention Hall

Time: May 23 17:15-18:45

Change of iron species in Asian dust during long-range transport increases iron solubility in seawater

Yoshio Takahashi^{1*}, Masayuki Higashi¹

¹Hiroshima University

In the North Pacific, transport and deposition of mineral dust from Asia appear to be a major source of iron, or become available to phytoplankton for growth. It is essential to identify chemical species of iron contained in Asian dust, because the bioavailability of iron in the ocean is strongly influenced by its solubility, which is dependent on iron species. Here, we report iron speciation using XAFS spectroscopy and solubility experiments in an attempt to assess the biogeochemical impact of the atmospheric input. While iron species in the dust source were primarily clay minerals (illite and chlorite) derived from the Taklimakan Desert, transported dust contains ferrihydrite which is secondary ferric weathering product formed by atmospheric chemical processes. Moreover, transported dust was more soluble than desert dust, suggesting the modification of iron solubility due to the formation of ferrihydrite during long-range transport. Our findings demonstrate that neo-formed ferrihydrite is a significant source of soluble Fe species and controls phytoplankton growth in the North Pacific.

Keywords: Asian dust, Fe, chemical species, XAFS, solubility