



## **Effects of Asian dust on spring bloom in the East Sea (Sea of Japan)**

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Iron fertilization, the enhancement of marine biological productivity with the supply of Fe, is an important issue in regards to global warming associated with increased CO<sub>2</sub> concentration in atmosphere. Dust has been shown to be an important natural source of Fe into the ocean. In this study, the possible effects of Asian dust on biological productivity, in particular, spring bloom in the East Sea were investigated using satellite data; aerosol index of the Total Ozone Mapping Spectrometer (TOMS) and chlorophyll *a* of the Sea-viewing Wide Field-of-view Sensor (SeaWiFS) for the period of 1998~2001. The deposition process of dust was classified into dry and wet deposition with respect to precipitation. Spatial and temporal distribution of the aerosol index showed that dust originating from the Gobi and Takla Makan deserts passed over the East Sea during the time of spring bloom for every year except the year of 1999. Chlorophyll *a* increases followed the dust events during the bloom. The bloom duration and magnitude of the years of dust events were at least a week longer and two times higher than those of the year of non-dust event. The bloom duration and magnitude showed highly positive correlation with the number of the dust events during the bloom. The timing of spring bloom initiation was well explained with a conceptual model in which phytoplankton growth was controlled only by averaged solar irradiance in the surface mixed layer. However, in 2001 when wet deposition occurred, the timing of spring bloom initiation was about three weeks earlier than the simulated timing of a conceptual model. This suggests the possibility and importance of the supply of soluble Fe by precipitation for phytoplankton growth during spring, even though spring bloom initiation is mainly explained by well-known the hypothesis, Sverdrup's critical depth.