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# Recent Characteristics of the Asian Dust in Korea

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## Abstract

This study aims to investigate basic characteristics by understanding the trajectory and analyzing its components of Asian dust which is largely increasing its effect recently on Korean peninsula. This study uses the data observed in Global Atmospheric Watch at Ahan Myeon-Do located in the middle of western Korean peninsula. And  $\beta$ -ray PM<sub>10</sub> sampler for detecting particles, high volume air PM<sub>10</sub> sampler for collection sample to analysis the component of the Asian dust, and ion-chromatography (DX-500) for analyzing water soluble components is instruments used in this study. The statistical processes such as correlation analysis and factor analysis are gone through with the Statistical Version 4.2, HYSPLIT model is used to estimate the trajectory of pollutant.

The results of the study can be summarized as following. First, based on the analysis of the mass concentration observed by the  $\beta$ -ray PM<sub>10</sub> at the Ahan Myeon-Do in each Spring from 2000 to 2002, the ratio between clear and cloudy day is 6.37, 3.48, and 5.05 respectively each year and it proves that the Asian dust has large influence over the Korean Peninsula. Second, the aerosol was collected by Optical Particle Counter (OPC) at Ahan Myeon-Do during the same period and its size distribution is analyzed. It is found that the size of the most effective Asian dust particle is between 3.67 and 6.06 $\mu$ m and that of the second most effective particles is between 6.60-10.0 $\mu$ m. Third, the water soluble ion component in the sample which was collected by PM<sub>10</sub> from 2003 to 2005. In 2003, NO<sub>x</sub> concentration shows low value of 4.0 $\mu$ g/m<sup>3</sup>, while in 2004 and 2005 its concentration is up to 12.0 $\mu$ g/m<sup>3</sup> and 3 times higher than that of 2003. Forth, it is found that the characteristics of water soluble component seems to depend on the wind system. The concentration of salt of sulfuric acid is 4 times higher with a air flow from the ocean than that of the flow from the land. However, chlorine shows weak dependency on the air flow system. Lastly, the most dominant heavy metal component in the Asian dust is the magnesium. The density of the magnesium is 1799.8  $\mu$ g/m<sup>3</sup> and it is larger than the summation of all the other component of the Asian dust. It seems that the magnesium is the main component of the Asian dust. The second most dominant component is aluminum and its density is 7.31 $\mu$ g/m<sup>3</sup>. The iron and natrium shows similar concentration.

The Asian Dust differs its trajectory depending on the atmospheric conditions in the inflow, Therefore, not only regular monitoring but also scientific analysis should be continuously undertaken and international corporation is necessary because recent characteristics of the Asian dust in Korea may have an more effects on the climate change and ecological balance in the future.