The size distribution of black carbon aerosol in Kanto region.

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Black carbon (BC) is produced by incomplete combustion of fossil fuel and biomass. BC has a significant impact on radiative balance of Earth's atmosphere by absorbing solar radiation. BC is also important as a carrier of polycyclic aromatic hydrocarbons (PAHs), which can be harmful to human health. Therefore, it is important to understand the size distribution and mixing state of black carbon. The major purpose of this study is to investigate the temporal variation of BC size distributions in Tokyo.

The size distributions of BC were measured using a differential mobility analyzer (DMA) combined with an inlet heting system (400 deg). The relationship between the mobility diameter and volume equivalent diameter was evaluated by combining a DMA with an aerosol particle mass analyzer (APM). The mass concentrations of BC estimated from the heated-inlet DMA system agreed well with a thermal optical measurement of BC (or elemental carbon: EC), indicating that the mass size distributions measured by the heated-inlet DMA were reliable. The mass size distributions of BC in Tokyo are analyzed assuming a lognormal size distribution . The mode diameter and width of the size distribution were 1.61 (ug/m3) and 179.8 (nm), respectively, at Komaba, and 1.82 (ug/m3) and 169.7 (nm), respectively, at Kisai on average.

The effective method to separate the number distribution of BC from non-volatile number distribution is designed. It method calculate only BC number distribution from lognormal fitted mass distribution.