

Characterization of carbonaceous aerosols in East Asia in the spring of 2015: Importance of non-fossil fuel sources

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The sources of elemental (EC) and organic carbon (OC) aerosols in the spring of 2015 in Asian outflow were investigated in terms of the radiocarbon (^{14}C) for carbonaceous aerosols and organic molecular marker analyses. The contribution of fossil fuel (FF) sources to total carbonaceous aerosols (TC) significantly increased in polluted air masses with enhancements of carbon monoxide concentrations. For EC, FF sources dominated in the polluted air masses. For OC, the contributions of non-FF and non-biomass burning (BB) sources were found to be significant (comparable to or higher than those of FF sources), especially in the air masses with higher values of both the ratio of water-soluble fraction of OC (f_{WSOC}) and ^{14}C concentrations ($F^{14}\text{C}$). Positive correlation between f_{WSOC} and $F^{14}\text{C}$ indicates that the origins of TC (mainly OC) have great effects on the variabilities in the water solubility and the following climatic impacts (i.e., cloud formation process) of OC in the regional scale within the time scale of a week. Multivariate analyses using metallic and ionic tracers revealed the insights into the characteristics of classified carbonaceous aerosols in Asian outflow.

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