

14C-based source apportionment of carbonaceous component in PM2.5 in Nagoya city

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The measurement of radiocarbon (¹⁴C) has been used to estimate the relative contributions of fossil and contemporary carbon sources in particulate matter throughout the world. In this study, we use ¹⁴C to provide quantitative estimates of carbon origin sources in Nagoya in April 2003 to March 2004. pMC and OC/EC showed similar seasonal variations and high values (range 39.8 to 68.4, 1.0 to 2.0; average 53.4, 1.5, respectively) in May and early June, whereas the values of pMC stayed relatively low values (range 28.3 to 41.9, 0.7 to 1.2; average 34.2, 1.0, respectively) after middle June. To estimate the source region of high pMC values, backward air mass trajectories were calculated during the sampling period in April to June. The air mass appeared to have passed through eastern Siberia when the pMC values showed high values in May and early June which also showed high values of OC/EC ratio and OC concentrations. In 2003, many researchers reported the influence of large forest burning in Siberia. This large forest burning occurred in spring to summer. The smoke from this forest burning had reached to Korea, Japan, and North America. The influences from the Siberian forest fires had an important implication for air quality over East Asian region. We conclude that high pMC values measured in spring are originated from large forest fires in Siberia and transported long distance.

Keywords: atmospheric aerosol, PM2.5, radiocarbon