Non-fossil emissions were the predominant sources of carbonaceous aerosol in the atmosphere of the ten cities during early winter in China

DI LIU, JUN LI*, GAN ZHANG

State Key Laboratory of Organic Geochemistry, Guangzhou Institute of Geochemistry, Chinese Academy of Sciences, Guangzhou, 510640, China

Fine particulate matter ($PM_{2.5}$) was collected at ten urban sites in China from October to November 2013. Elemental carbon (EC), organic carbon (OC), water-soluble OC (WSOC), and water-insoluble OC (WINSOC) were analyzed for ^{14}C in order to distinguish fossil from non-fossil emissions. ^{14}C-derived source apportionments show that non-fossil source generally has a great contribution to the total carbonaceous aerosol in ten urban cities. During the non-haze days, the non-fossil sources are responsible for 74.4±7.9% and 55.2±10.8% of organic carbon (OC) and elemental carbon (EC), respectively, whereas, these values decrease to 70.0±6.7% and 45.3±11.9%, respectively. The total carbonaceous aerosol is composed of secondary organic carbon, primary fossil-fuel carbon and primary biomass-burning carbon. SOC is mainly formed from non-fossil volatile organic compounds.