



Concentration and source of black carbon in urban soils and its environment implications

Y. He (1,2), G. Zhang (1,2)

(1) State Key Laboratory of Soil and Sustainable Agriculture, Institute of Soil Science, Chinese Academy of Sciences, Nanjing, China, (2) Graduate school of the Chinese Academy of Sciences, Beijing, China (hey@issas.ac.cn / Fax: +86 25-86881000 / Phone: +86 25-86881299)

Owing to human activity during urbanization, the physical and chemical properties of urban soils change dramatically. However, recent knowledge about properties of urban soils and their soil organic matter (SOM) is still scarce. Black carbon (BC) or elemental carbon (EC) was defined as the broad continuum of recalcitrant residues produced from biomass burning to fossil fuel combustion. Recently, as a component of SOM, BC has been found in urban soils, anthropogenic soils and marine sediments. The purpose of this study is to deliver some data of SOM properties of urban soils and to evaluate environmental consequences of human activities in urban environment. The method used to analyze organic carbon (OC) and BC is wet chemical oxidation treatment (acid dichromate), in which removal of OC is a critical process in determination of BC.

A case study in Nanjing, Jiangsu province of China, shows that the concentrations of OC and BC are significantly different among function zones (including roadside, park, university, residential and suburb). The concentrations of BC range from 2.44g kg⁻¹ to 37.21g kg⁻¹ in 30 topsoil samples (0~10 cm layer). The highest average concentration of BC reaches 13.67g kg⁻¹ in roadside soils, suggested its substantially different human activity and pollution source. Meanwhile, the average ratio of BC/OC ranges from 0.12 to 0.45. These preliminary data mean that the high contents of BC and the high ratio of BC/OC may reflect different processes of human activities and pollution intensities in urban soils, to a certain extent. Pollution particles emitted from gasoline and diesel vehicles may be the main source of BC in roadside soils. The next work is to explore BC's environmental implications and its process in global

biogeochemical carbon cycles due to local biomass and fossil fuel burning.

Key Words Urban soils; Black carbon; Environmental implications; Human activity

Reference

He Y., Zhang G.-L., Concentration and sources of organic carbon and black carbon of urban soils in Nanjing, *Acta Pedologica Sinica*, 2006, 43(2): 177-182. (In Chinese)