Chemical characteristics of chromophoric dissolved organic matter in stormwater runoff of a typical residential area, Beijing

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ABSTRACT

Stormwater runoff acts as a vital intermediate between wet precipitation, terrestrial, and aquatic ecosystems, in which chromophoric dissolved organic matter (CDOM) plays an important role in influencing the transport, toxicity, bioavailability, and ultimate fate of many pollutants. It is important and necessary to characterize the CDOM in stormwater runoff, which is useful to clarify the relationship between CDOM with the other coexisting organic and/or inorganic components. In this study, 30 stormwater runoff samples were collected from three different stormwater events in a typical residential area in Beijing, and CDOM in the samples was characterized by UV–visible spectroscopy, excitation–emission matrix fluorescence and proton nuclear magnetic resonance (1H NMR) spectroscopy to investigate its compositions, structures, and sources. Being compared to the previous studies on wet precipitation, average molecular weight of CDOM in this study was much larger, implying the presence of more aromatic components with carbonyl, carboxyl, hydroxyl and unsaturated carbon atoms functional groups. Furthermore, both allochthonous and autochthonous sources contributed to the local CDOM, and their chemical properties were influenced by anthropogenic and biogenic factors. Thus, the CDOM in stormwater runoff is a compositionally different matrix than that discovered in wet precipitation.

Keywords: Stormwater runoff; CDOM; Chemical composition; Structure; Source

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