

Distinct Differences in Wet Deposition of Char and Soot: A Comparative Study in PM₁₀ and Rainwater

GUOHUA ZHANG

Guangzhou Institute of Geochemistry, Chinese Academy of
Sciences

Wet scavenging of black carbon (BC) is essential for evaluating their atmospheric lifetime and radiative forcing. However, it is crucial to differentiate atmospheric BC into char and soot subgroups, given their significant disparities in physicochemical properties and potential impacts. We first conducted a comparative study of char/soot in PM₁₀ and rainwater, collected over a year in urban Guangzhou, China. The mean char/soot ratio in PM₁₀ (~2.5) is obviously higher than that in rainwater (~0.8), corresponding to higher wet scavenging efficiency of soot. Through sequence rainwater sampling during individual rainfall events, we further distinguished the contributions of in-cloud and below-cloud scavenging, with in-cloud scavenging predominantly contributed to the distinct difference between char and soot. Such a distinct wet scavenging behavior of char and soot would have substantial implications for the atmospheric behavior of BC, which should be considered in future models for accurate evaluation of its lifetime and climate impact.