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Jiu-meng Liu[1], Zhen-yu Du[2], Mark Gordon[3], Lin-lin Liang[4], Yong-liang Ma[5], Mei Zheng[6], Yuan Cheng[1*], Ke-bin He[5]

[1]School of Environment, Harbin Institute of Technology, Harbin, China

[2]National Research Center for Environmental Analysis and Measurement, Beijing, China

[3]Department of Earth and Space Science and Engineering, York University, Toronto, Ontario, Canada

[4]State Key Laboratory of Severe Weather & Key Laboratory for Atmospheric Chemistry of CMA, Chinese Academy of Meteorological Sciences, Beijing, China

[5]State Key Joint Laboratory of Environment Simulation and Pollution Control, School of Environment, Tsinghua University, Beijing, China

[6]College of Environmental Sciences and Engineering, Peking University, Beijing, China

[*] *Corresponding author.* Yuan Cheng (ycheng@hit.edu.cn or ycheng@mail.tsinghua.edu.cn)

Abstract

Carbonaceous aerosol was measured during fall of 2010 in Beijing. Daily variation of organic carbon (OC) was found to coincide with that of relative humidity (RH), and the OC to elemental carbon (EC) ratios were more than doubled during the more humid periods (RH above 0.75) compared to other conditions. This large increase in OC/EC could not be explained by the variations of primary biomass burning emissions but was accompanied by a five-fold increase in the sulfate to EC ratio. It was then inferred that secondary organic aerosol (SOA) formation was enhanced under the more humid conditions, presumably through aqueous-phase processes. This enhanced SOA formation might be partially associated with particles externally mixed with black carbon, as indicated by the RH-dependent relationships between aerosol optical attenuation and EC loading. In addition, organic aerosols exhibited different properties between the more humid and the other periods, such that they were less volatile and charred more significantly during thermal-optical analysis in the former case. These differences coincided with the evidence of