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1 The characteristics of carbonaceous aerosol in Beijing during a season of transition

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14 Abstract

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

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