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Chemical characteristics of $PM_{2.5}$ during summer at a background site of the Yangtze River Delta in China

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Abstract:

With rapid economic development and urbanization, particular attention has been paid to atmospheric chemical studies in the Yangtze River Delta in China. $PM_{2.5}$ samples were collected by a MiniVol™ air sampler in summer time at a background site of the Yangtze River Delta in China. Carbonaceous components, i.e., OC and EC, levoglucosan and water-soluble inorganic ions, including sulfate, nitrate, ammonium, etc., were quantified. The average concentration of $PM_{2.5}$ in summer at Lin'an was 30.19 ± 8.86 μg m^{-3}, lower than previous studies reported, confirming that air pollution in China is improving, e.g., by emission control measures and subsequent reduction in PM emissions in China. Investigating the relationship among sulfate, nitrate and ammonium showed that SO_4^{2-} existed as $(NH_4)_2SO_4$, while NO_3^- may have been present as $NaNO_3$ and KNO_3. Based on molecular tracer, synoptic data as well as air mass back trajectory analysis, it was revealed that regional transport and stable synoptic conditions both play an important role in controlling the variations of aerosol chemical components. The comparison of aerosol chemical components between clean and hazy days showed that secondary organic and inorganic aerosols have different production processes. Secondary organic carbon (SOC) was much more important during clean days, while secondary inorganic aerosol species were readily produced and