Molecular distribution and stable carbon isotopic composition of low-molecular-weight dicarboxylic acids during biomass burning aerosols in Northeast China

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Organic aerosols typically contribute to 20–50% of total atmospheric aerosol mass, where 40–80% of organic aerosols are water-soluble. Low-molecular-weight dicarboxylic acids and their related polar compounds have been found as one of the most abundant water-soluble organic compound class in aerosols. Due to their water-soluble and hygroscopic properties, dicarboxylic acids play an important role in atmospheric chemistry via atmospheric processing (e.g., secondary aerosol formation), and the Earth's climate by enhancing the ability of organic aerosols to act as cloud condensation nuclei. Despite importance of dicarboxylic acid, their emissions source and formation process still remains uncertain.

Compound-specific stable carbon isotope analysis is a powerful tool to provide important information of the sources and atmospheric processing of organic aerosols. However, stable carbon isotope analysis of aerosol has never been reported in biomass burning aerosols from China. Here, we present the measurement results on molecular distribution and stable carbon isotope composition of dicarboxylic acids in PM2.5 collected at a rural background site in Sanjiang Plain, Northeast China during biomass-burning and non-biomass-burning events from one-year campaign. The results obtained from this study could be beneficial for a provide important information of the sources and atmospheric processing of organic aerosols in East Asia.