

## **Stable carbon isotopic composition of total carbon, diacids, oxoacids, $\alpha$ -dicarbonyls and fatty acids in PM<sub>2.5</sub> at Tianjin, North China**

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Organic aerosols (OA) account for a major fraction of fine aerosols and have serious impacts on the Earth's climate system and cause adverse effects on human health. They can also play an important role in atmospheric chemistry. However, their origins, secondary formation and seasonality are not fully understood yet. Stable carbon isotopic composition ( $\delta^{13}\text{C}$ ) of total carbon (TC) and specific organic compounds is very useful for investigating the origins and photochemical processing of OA in the atmosphere and to assess the contribution of effective mixing processes of the compounds during the long-range transport. High aerosol loadings, including haze events in winter, are common in East Asia, particularly in China. Tianjin is one of the most rapidly developing regions in China, located at 39°N and 117°E adjacent to Bohai Sea, and is considered as an ideal location to study the characteristics of the regional air masses. To better understand the origins and photochemical processing of OA, we studied fine (PM<sub>2.5</sub>) aerosol samples collected at an urban and a suburban (background) sites in Tianjin over a one-year period from July 2018 to June 2019 for bulk components, organic molecular distributions and  $\delta^{13}\text{C}$  of diacids and related compounds. Here, we discuss the origins, aging and seasonality of OA in North China based on  $\delta^{13}\text{C}$  of TC, diacids, oxoacids,  $\alpha$ -dicarbonyls and fatty acids in PM<sub>2.5</sub> and their seasonal variations over Tianjin, together with the backward air mass trajectories.