

## Source and seasonal variation of black carbon in precipitation in Nanjing, China

南京市大气降水中黑碳颗粒物的来源和季节变化特征研究

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PI: Fang Cao

Black carbon (BC) as one of major components of carbonaceous aerosol, which have significant effect on environment, human health and climatic. Intensive studies have been carried out to investigate the composition and source of black carbon, however, little attention has been paid to the main removal process for such particles: their scavenging by wet deposition processes. In this project, we will measure particulate BC in precipitation samples collected in Nanjing, in order to understand their composition, source and seasonality. With the combination of other analysis including carbon isotopes, other chemical components, meteorological data and air mass origins, the source of BC in precipitation will be also discussed. By comparing the composition and source of particulate black carbon in both the air and wet deposition samples, wet deposition process and scavenging mechanism of BC from different sources will be illustrated. The results to be gathered from this study could help us to understand the emission, transport and sink of the black carbon particles, which could improve the simulation of the spatial and temporal distributions of atmospheric particulate black carbon and thus produce more accurate assessments of the climatic effect of carbon particles.

黑碳 (black carbon) 作为大气含碳颗粒物的重要组成部分, 对环境、气候以及人体健康有非常重要的影响。目前为止, 对于大气黑碳气溶胶的化学组成特征及来源解析等已有系统地阐述, 然而对大气降水中的黑碳颗粒物的组成、来源、清除机制等研究相对匮乏。本项目以南京大气降水中黑碳颗粒物为研究对象, 通过对降水中黑碳颗粒物的组成特征的分析, 探讨南京市降水的季节变化特征; 并综合碳同位素和其他化学组成分析、气象条件和气流轨迹分析, 对降水中黑碳颗粒物进行来源解析。通过比较大气颗粒物与湿沉降样品中黑碳颗粒物的组分和来源, 阐明降水对大气中不同来源黑碳颗粒物的清除作用, 并计算黑碳的沉降通量以及不同来源黑碳颗粒物的湿沉降清除效率。这些研究结果将为我们正确预测黑碳颗粒物在大气中的时空分布, 理解黑碳颗粒物对碳循环和气候系统的影响提供科学依据。