

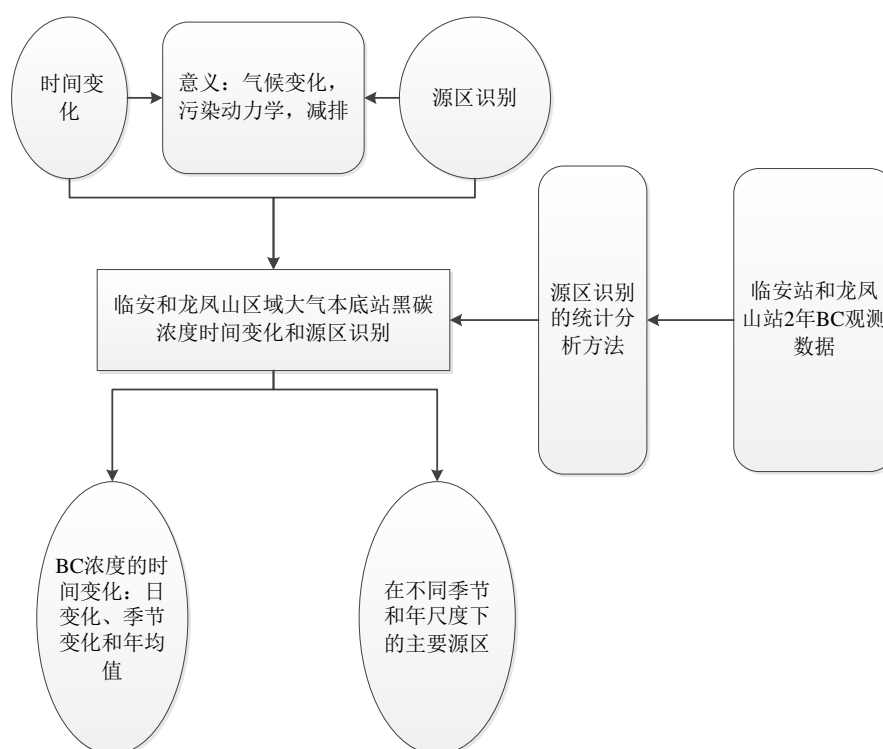
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中文题目：临安和龙凤山区域大气本底站黑碳浓度时间变化和源区识别

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**中文摘要：**黑碳（BC）作为一种细粒子成分，与天气气候、空气质量和人类健康密切相关，但是我国本底站地区大气 BC 浓度的时间变化和源区识别研究相对缺乏。文中研究了临安站和龙凤山站 2 年 BC 观测浓度。结果表明，临安站 BC 浓度的平均日变化呈现双峰分布，而龙凤山 BC 浓度变化特征与临安站不同。这可能是由于不同的排放源贡献。月均 BC 浓度在临安站和龙凤山站分别表现为双峰和单峰季节变化。从 2009 年到 2010 年临安站和龙凤山站年均 BC 浓度分别下降了  $1.63\mu\text{g m}^{-3}$  和  $0.26\mu\text{g m}^{-3}$ 。临安站 BC 年均背景浓度高于龙凤山站 2 倍以上。在临安和龙凤山站，主要的 BC 源分别是工业源和民用源。通过后向 7 天传输模拟，临安和龙凤山站的排放灵敏度区域分别是带状区域和近似圆形区域。这可能主要是夏季风和中国西北部较冷的大陆气团的影响。此外，通过统计方法使用 BC 观测数据和 FLEXPART（FLEXible PARTicle dispersion model）模拟结果进行了 BC 源区分析。夏季 BC 源区分布在临安站的西北部和南部、龙凤山站的西南部。低值 BC 浓度与来自于海上的气团关系密切。冬季 BC 源区集中在临安站的西部和南部以及龙凤山站总印痕阈值区域的东北部。我国西北部的冷气团在净化大气 BC 浓度上扮演着重要角色。在年尺度上，BC 源区大约分布在临安站西北或者东南方向的五个省以及龙凤山站的西部。文中结果对于 BC 减排以及污染控制具有重要意义。

文章结构框图：



**英文题目： Temporal Variation and Source Identification of Black Carbon at Lin'an and Longfengshan Regional Background Stations in China**

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**英文摘要：** Black Carbon (BC) is a component of fine particulate matter (PM<sub>2.5</sub>), associated with climate, weather, air quality and people's health, but studies on temporal variation of atmospheric BC concentration at background stations in China and its source area identification are lacking. In this paper, we use two years' BC observations from two background stations, Lin'an (LAN) and Longfengshan (LFS), to do the study. The results show that the mean diurnal variation of BC has two significant peaks at LAN while different characteristics are found in the BC variation at LFS, which are probably caused by the difference in emission source contributions. Seasonal variation of monthly BC shows double peaks at LAN but a single peak at LFS. The annual mean concentrations of BC at LAN and LFS decrease respectively by 1.63 $\mu\text{g m}^{-3}$  and 0.26 $\mu\text{g m}^{-3}$  from 2009 to 2010. The annual background concentration of BC at LAN is twice higher than that at LFS. The major source of the LAN BC is industrial emission while the source of the LFS BC is residential emission. Based on transport climatology on a 7-day time scale, LAN and LFS stations are sensitive to surface emissions respectively in belt or approximately circular area, which are dominated by summer monsoon or colder land air flows in Northwest China. In addition, we statistically analyze the BC source regions by using BC observation and FLEXible PARTicle dispersion model (FLEXPART) simulation. In summer, the source regions of BC are distributed in the northwest and south of LAN and the southwest of LFS. Low BC concentration is closely related to air mass from the sea. In winter, the source regions of BC are concentrated in the west and south of LAN and the northeast of the threshold area of  $S_{tot}$  at LFS. The cold air mass in the northwest plays an important role in the purification of atmospheric BC. On a yearly scale, sources of BC are approximately from five provinces in the northwest/southeast of LAN and the west of LFS. These findings are conducive to reducing BC emission and controlling air pollution.

