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英文题目: The Seasonal Variations in Aerosols over East China and India and Their Relationships with Asian Monsoon Circulation Patterns

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英文摘要: The features of the seasonal variation in aerosol optical depth (AOD) over East China and India in association with monsoon variations are investigated using the latest AOD data (Collection 6, C06) derived from the Moderate Resolution Imaging Spectroradiometer (MODIS) aboard the Terra satellite, the National Centers for Environmental Prediction Final (NCEP FNL) Operational Global Analysis data, Climate Prediction Center (CPC) Merged Analysis of Precipitation (CMAP) data, and NCEP/National Center for Atmospheric Research (NCAR) reanalysis data from March 2000 to February 2017. The results indicate that the AOD in East China is significantly larger than that in India, especially in spring. The seasonal mean AOD in East China is high in both spring and summer but low in fall and winter. However, the AOD averaged over India is highest in summer and is lower in spring, fall, and winter. Based on analysis of the relationships between AOD and precipitation and surface wind velocity, no obvious relation is observed between precipitation and the AOD distribution during the seasonal changes, but the surface wind speed exerts a significant influence on the aerosol distribution, especially in East China, where the change in AOD is more closely related to the change in surface wind speed. Because aerosols are mainly distributed in the atmospheric boundary layer (ABL), the atmospheric circulation and the stability of the ABL both influence the spatial distribution of AOD, which is supported by the relationship between the Richardson number (R_i) and the AOD and by the influence of the upper and lower tropospheric circulation patterns on the AOD. The upper and lower tropospheric circulation patterns significantly differ between East China and India, resulting in different effects on the AOD. The effect of advection associated with lower tropospheric circulation on the AOD and the influence of convergence and divergence on the AOD distribution play different roles in maintaining the AOD in East China and India. These results improve our understanding of the mechanism responsible for and differences among aerosol changes in East China and India.

中文题目: 中国东部和印度地区气溶胶的季节变化及其与季风环流的联系

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中文摘要: 利用 2000 年 3 月—2017 年 2 月 Terra 卫星反演的 MODIS 最新版本 C06 的气溶胶光学厚度 (aerosol optical depth, 简称 AOD)、NCEP fnl 全球业务分析数据、CMAP 降水、NCEP/NCAR 再分析资料等, 分析了中国东部与印度地区 AOD 的季节变化特征及其与季风环流的联系。结果表明, 中国东部 AOD 值远远大于印度地区, 尤其是春季最明显。中国东部历年平均 AOD 春、夏季最大, 秋、冬季次之; 印度地区历年平均 AOD 夏季最大, 春季及秋、冬季较小。通过分析降水及地面风速与 AOD 的相关关系发现, 在季节变化过程中, 降水与 AOD 分布没有明显的联系, 但地面风速对气溶胶分布的影响较显著, 尤其是在中国东部, AOD 变化与地面风速变化关系更为密切。由于气溶胶主要分布在大气边界层, 边界层大气环流和层结稳定性对气溶胶分布有影响。 R_i 数与 AOD 的关系以及对流层高、低层环流的配置对 AOD 的影响说明了这一点。中国东部与印度地区对流层高、低层环流配置特点明显不同, 且对 AOD 产生不同影响。对流层低层大气环流对 AOD 的平流作用以及辐散辐

合运动对 AOD 分布的影响对中国东部与印度地区 AOD 的维持起到了不同作用。这些结果对理解中国东部和印度地区气溶胶变化机理及其差别具有重要意义。

思维导图或文章结构框图：

