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全国大气扩散输送模态与区划研究

Atmospheric transport patterns and their regional characteristics over mainland China

关键词: [大气扩散](#) [长距离输送](#) [轨迹分析](#) [HYSPLIT模式](#) [中国地区](#)

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摘要: 基于NCEP再分析气象资料,使用HYSPLIT模式对我国大陆区域进行了一整年的连续轨迹计算.轨迹以 $1^{\circ} \times 1^{\circ}$ 的网格化经纬度分辨率进行计算.考虑气候、地理及经济因素,将全国计算区域分为10个大区,分别统计各大区出发的轨迹在全国的分布频率.根据全年和各季的轨迹统计结果,分析我国不同区域的大气输送扩散特征以及区域间大气环境的相互影响潜势.结果表明,全国10个大区的大气扩散输送模态可分为特性不同的7大类,其中以西北方向的3个大区为一类,西南高原的2个大区为另一类,其它各区自成一类.10个大区大气扩散物质的累积效应差异显著且季节变化特征各异.全国以西南区(XN)东部大气累积效应最强,东北区(DB)累积效应最弱.

Abstract: By using HYSPLIT model and NCEP re-analysis data, a whole year of atmospheric transport trajectories were calculated in a domain covering mainland China. Trajectories started at each grid point of a $1^{\circ} \times 1^{\circ}$ longitudinal and latitudinal network. Trajectory segment endpoints in the study domain were counted at each grid to yield a trajectory frequency field. Such frequency fields were calculated for ten districts across the country divided according to the geographical, economical and climatic conditions. The frequency fields were used to illustrate atmospheric diffusion and long-range transport characteristics for the respective districts, as well as their seasonal variation. Potential interactions for airborne materials among different districts were shown. The results were grouped into seven categories to represent atmospheric characteristics of ten districts. Three districts in the northwest of China belonged to one category, and two districts in the southwest plateau belonged to another category. The rest five categories corresponded to each of the other five districts. It was found that atmospheric accumulation effects varied greatly among the districts, and they also seasonally evolved in different ways. Strongest accumulation was found in the eastern part of the Southwest District, while the weakest in the Northeast District.

Key words: [atmospheric diffusion](#) [long-range transport](#) [trajectory analysis](#) [HYSPLIT model](#) [mainland China](#)

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