GEOSPATIAL ANALYSIS OF ATMOSPHERIC HAZE EFFECT BY SOURCE AND SINK LANDSCAPE

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ABSTRACT:

Based on geospatial analysis model, this paper analyzes the relationship between the landscape patterns of source and sink in urban areas and atmospheric haze pollution. Firstly, the classification result and aerosol optical thickness (AOD) of Wuhan are divided into a number of square grids with the side length of 6 km, and the category level landscape indices (PLAND, PD, COHESION, LPI, FRAC_MN) and AOD of each grid are calculated. Then the source and sink landscapes of atmospheric haze pollution are selected based on the analysis of the correlation between landscape indices and AOD. Next, to make the following analysis more efficient, the indices selected before should be determined through the correlation coefficient between them. Finally, due to the spatial dependency and spatial heterogeneity of the data used in this paper, spatial autoregressive model and geo-weighted regression model are used to analyze atmospheric haze effect by source and sink landscape from the global and local level.

The results show that the source landscape of atmospheric haze pollution is the building, and the sink landscapes are shrub and woodland. PLAND, PD and COHESION are suitable for describing the atmospheric haze effect by source and sink landscape. Comparing these models, the fitting effect of SLM, SEM and GWR is significantly better than that of OLS model. The SLM model is superior to the SEM model in this paper. Although the fitting effect of GWR model is more unsuited than that of SLM, the influence degree of influencing factors on atmospheric haze of different geography can be expressed clearer. Through the analysis results of these models, following conclusions can be summarized: Reducing the proportion of source landscape area and increasing the degree of fragmentation could cut down aerosol optical thickness; And distributing the source and sink landscape evenly and interspersedly could effectively reduce aerosol optical thickness which represents atmospheric haze pollution; For Wuhan City, the method of adjusting the built-up area slightly and planning the non-built-up areas reasonably can be taken to reduce atmospheric haze pollution.

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