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Spatial-Temporal Changes Of Vegetation Coverage In Yulin City And Its Influencing Factors During The Past Two Decades Since The Implementation Of The “Grain For Green” Program

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As one of the important indicators reflecting the regional ecological environment, fractional vegetation coverage is significant for regional eco-environmental protection and sustainable utilization of resources. To understand changes in the ecological environment of the ecologically fragile areas in the Loess Plateau affected by “Grain for Green” Program and its main driving forces in the past two decades, this study taking Yulin City as a typical example of the fragile ecological environment on the Loess Plateau, to analyze spatial-temporal variations of the vegetation coverage in Yulin City during the past two decades based on the pixel dichotomy model with vegetation index, using univariate linear regression methods. The dominant factors and interaction between factors influencing the interannual changes and spatial distribution of vegetation coverage are analyzed using the partial correlation analysis and geographic detector methods during the different period in “Grain for Green” Program. Results showed that: (1) The vegetation coverage in Yulin City significantly increased ($S = 0.011$, $p < 0.01$) from 2001 to 2020. The vegetation coverage during the construction periods (2001-2010) increased significantly ($S = 0.013$, $p < 0.01$); while its increase in the consolidation periods (2011-2020) was relatively slow ($S = 0.005$, $p > 0.05$). (2) The spatial distribution of vegetation coverage in Yulin City decreased from east to west from 2001 to 2020. The vegetation coverage of all counties (districts) in Yulin City shows an overall increasing trend, among which the eastern part of Yulin City has a more significant growth trend. However, the proportion of area in the construction periods (82.1%) was larger than that in the consolidation periods (58.0%). (3) The cumulative area of the Grain for Green Program was the dominant factor in the construction periods, while it was rainfall in the consolidation period. (4) Soil texture, rainfall, and land use type mainly affected the spatial distribution of vegetation coverage from 2001 to 2020. Soil texture was closely related to changes in the vegetation coverage both in the construction and consolidation periods. The spatial heterogeneity of vegetation distribution and the interaction between the main influencing factors provides a scientific basis for the precise implementation of ecological restoration measures.