Identifying key determinants of ecosystem health in the middle reaches of Yangtze River Urban Agglomerations, China

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With the rapid development of urbanization in China, urban circles and urban agglomerations are gradually formed among different cities, which in turn has brought large pressure to the ecological environment. As an important monitoring index for evaluating the sustainable development of cities, quantified evaluation on the eosystem health is lacked for urban agglomerations. In this study, ecosystem health was assessed based on the framework of ecosystem vigor, organization, resilience, and services (VORS) in the Middle Reaches of the Yangtze River Urban Agglomerations (MRYRUA) in 2000, 2005, 2010, and 2015 with county as research units. Using GeoDetector to quantitatively analyze the impact of seven factors (including the proportion of construction land, forest land, and water, land use degree, population, average annual precipitation, and digital elevation model (DEM)) on ecosystem health in different periods. The results showed that: (1) There were significant differences in the spatial distribution of ecosystem health. The ecosystem health in the central area of Wuhan Metropolis, Changsha-Zhuzhou-Xiangtan City Group, and Poyang Lake City Group were significantly lower than the surrounding areas; (2) From the time scale, the research units of ordinary well level gradually develop to relatively well and well levels. The research units of relatively weak and weak level remain relatively stable. (3) Land use degree was the main factor affecting on ecosystem health. Moreover, there were interactions between different factors affecting. The impact of factors on ecosystem health were bi-enhanced or nonlinear enhanced. (4) The impacts of the proportion of construction land on ecosystem health had become greater over the time, and risen from fourth in 2000 to second in 2015. Therefore, a reasonable layout of urban land use planning has an important impact on the ecosystem health.