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Analysis of the spatial-temporal change of the vegetation index in the upper reach of Hanjiang River Basin in 2000-2016

Jinkai Luan (1), Dengfeng Liu (1), Lianpeng Zhang (1), Qiang Huang (1), Jiuliang Feng (2), Mu Lin (3), and Guobao Li (4)

(1) State Key Laboratory Base of Eco-hydraulic in Arid Area, School of Water Resources and Hydropower Engineering, Xi'an University of Technology, Xi'an 710048, China , (2) Shanxi Provincal Water and Soil Conservation and Ecological Environment Construction Center, Taiyuan 030002, China, (3) School of statistics and Mathematics, Central University of Finance and Economics, Beijing 100081, China, (4) Work team of hydraulic of Yulin City, Yulin 719000, China

Abstract: Hanjiang River is the water souce region of the middle route of South-to-North Water Diversion in China and the ecological projects were implemented since many years ago. In order to monitor the change of vegetation in Hanjiang River and evaluate the effect of ecological projects, it is needed to reveal the spatial-temporal change of the vegetation in the upper reach of Hanjiang River quantitatively. Vegetation index is an important method to study regional vegetation changes. The study is based on MODIS/Terra NDVI remote sensing data, and analyzes the spatial-temporal changes of the NDVI in August from 2000 to 2016 at pixel scale in the upper reach of Hanjiang River Basin. The results show that, the area with increasing NDVI between 0-0.005/year accounts for 62.07% of the area of upper reach of Hanjiang River Basin, and the area with changing rate between -0.005-0/year accounts for 26.65% of the research area. The area with significant decreasing trend only accounts for 2.76%, while area significant increasing trend accounts for 13.47%, and the area with increasing NDVI is much larger than the area with reducing NDVI. The vegetation index of each county is evaluated and found that, the areal proportion with significant decreasing trend in Hantai is the biggest, reaching 35.57%, and the areal proportion with significant decreasing trend in the other counties is below 10%. The areal proportion with significant increasing trend in Zhenba County, Ziyang County, Xunyang County, Zhashui County, Shangzhou District, Shanyang county and Yun county is larger than the others, and the areal proportions are more than 20%. The largest areal proportion with significant increasing trend is in Shangzhou District and it reaches 31.11%. The spatial-temporal variation of the change of vegetation index is remarkable.
Key words: NDVI; spatial-temporal change; pixel scale; one-dimensional regression trend line; the upper reaches of Hanjiang River Basin