



Relative importance of natural and anthropogenic factors influencing karst rocky desertification

Erqi Xu and Hongqi Zhang

Key Laboratory of Land Surface Pattern and Simulation, Institute of Geographic Sciences and Natural Resources Research, Chinese Academy of Sciences, Beijing 100101, PR China

As the most severe ecological issue in southwest China, karst rocky desertification (KRD) has both threatened and constrained regional sustainable development. Comprehensively understanding the relationship between the evolution of KRD and relevant driving data would provide more information to combat KRD in such complex karst environments. Past studies have been limited in quantifying the relative importance of driving factors influencing fine-scale KRD evolution, and have also lacked insight into their interactive impacts. To address these issues, we have used geographical information system techniques and a geographical detector model to explore the spatial consistency of driving factors and their interactions in relation to the evolution of KRD. Changshun County in China was selected as a representative area for the study. Nine relevant driving factors, including both natural and anthropogenic factors, were studied in regard to their relationships with KRD transformation between 2000 and 2010. Our results demonstrate the relative importance of driving data in influencing the improvement and deterioration of KRD. Lithology, soil type and road influence are identified as the leading factors. Interestingly, to our study at least, there is no significant difference between the impacts of natural and anthropogenic factors influencing KRD improvement, and even natural factors have a higher impact on KRD deterioration. Factors were found to enhance the influence of each other for KRD transformation. In particular, the results show a non-linearly enhanced effect between driving factors, which significantly aggravates KRD. New information found in our study helps to effectively control and restore areas afflicted by KRD.