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Does vegetation greening partly offset increasing rainfall pressure? Risk assessment of the water erosion tendency in China over the past 20 years.

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Soil water erosion is a severe environmental issue which seriously damaging the sustainability of agriculture. Regional climate change could aggravate the threat of erosion, whereas vegetation greening in China (an increasing trend in vegetation cover) could act as a mitigation to the threat. On the basis of the Revised Universal Soil Loss Equation, we proposed a framework for performing an assessment of water erosion risk in China during 1998-2018. A contribution index was constructed to describe the influences of rainfall erosivity and cover management on water erosion risk changes in China during 1998-2018. The research objective was to explore the spatial pattern of water erosion risk change in China in recent decades and to identify the factor that has the largest contribution to the risk change. Results showed that: (a) The area with decreasing water erosion risk in China accounted for 34.97%, and the area with significant decreasing trends accounted for 20.04% of the middle and highly risky state areas. (b) The region that rainfall erosivity contributed more than cover management for absolute value accounted for 76.54%, whereas the contribution of cover management was increasing. (c) Vegetation greening can partly offset the stress caused by climate change. Water erosion risk in China decreased more than increased in risky state area. The pixels with cover management contribute more than rainfall erosivity was concentrated within the area where risk is decreasing, indicating a great contribution of vegetation greening to the risk mitigation. Consequently, enhancing the vegetation growth in the highly risky state water erosion region could reduce the erosion threat in China.