

1.第四纪地质与环境演化

Tectonic or climatic control on landscape morphology of the SE Tibetan Plateau? Insights from deep data mining

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摘要: The Tibetan Plateau, often referred to as the “roof of the world”, is a vast and complex landscape that has been shaped by tectonic and climatic factors. How the modern-like landscape of the Tibetan Plateau (especially the southeastern portion) was established still remains unclear. To address this issue, we employed the bivariate and multivariate linear methods to quantify the contribution between tectonics and climate for the landscape morphology of the SE Tibetan Plateau. By analyzing a comprehensive dataset of 49 mountain ranges, we observed that the maximum elevation and local relief are both sensitive to the tectonics and climate. The precipitation, through the increasing erosion, decreases the elevation and local relief. The difference was that the higher convergence triggered the crustal thickening by faulting and folding, leading to the surface uplift, but decreasing the relief with removed materials filling the low-lying areas. Likewise, the glaciation resists the loss of the elevation by freezing the beds in contrast to reduce the local relief across the “glacial buzzsaw”. Although existing 35%-85% unexplained part of the variance, the climate significantly dominates the local relief, while tectonics plays an auxiliary role. Our findings present a comprehensive analysis to assess the tectonic and climatic controls on shaping the landscape morphology of the SE Tibetan Plateau.

关键词: Landscape morphology; tectonics; climate; linear regression; SE Tibetan Plateau.