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Assessment of Tibetan grassland degeneration via landscape analysis

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Desertification as one of the most severity social-economic-environmental issues has been extensive researched, and the assessments of desertification can be implemented accurately and efficiently based on the landscape indicators of vegetation coverage. Consequently, we explored the relationships of the degeneration index of the grassland with climate factors (temperature and precipitation), and human disturbance factors (livestock quantity and animal husbandry output value) via a landscape assessment approach across Tibet. The results showed that the vegetation coverage presented an increase tendency in the central region of Tibet, but the adverse phenomenon was observed in the northwest region. Meanwhile, the correlation of vegetation coverage with precipitation presented as positive effect in most region of Tibet except some regions of the alpine steppe, and the positive correlation of vegetation coverage with temperature also was observed in the less northwest region of Tibet. In addition, we found that the livestock quantity play a key roles in regulating vegetation coverage of the central region. Furthermore, the landscape indexes [number of patches (NP), patch density (PD), contagion index (CONTAG), landscape shape index (LSI), aggregation index (AI)] of grasslands were analyzed, the results exposed that vegetation coverage (1%-20%) has the positive influences on CONTAG and AI, but negative affects LSI, PD and NP. Morreover, there are opposite correlations among vegetation coverage and landscape indexes when vegetation coverage is 21%-40%. We concluded that overgrazing is the main reason of grassland degradation in Tibet, especially the number of livestock aggravates the landscape fragmentation. The results highlighted the alpine grassland management in future.