EGU22-4408, updated on 20 Aug 2022
https://doi.org/10.5194/egusphere-egu22-4408
EGU General Assembly 2022

Weak effectiveness on vegetation greenness, cover and productivity at the edges of protected areas on the Tibetan Plateau, China

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Protected areas (PAs) are the critical societal tool to preserve global vegetation growth, but growing evidence showed the effectiveness of PAs varied in different regions. Furthermore, recent efforts to quantify conservation efficiency have primarily focused on vegetation coverage, thereby ignoring conservation efficiency's comprehensive recognition of vegetation greenness, cover, and productivity. Here, based on satellite observation and windows search strategy, we measured the conservation efficiency at the edge of PAs on vegetation greenness, cover, and productivity on the Tibetan Plateau. The results showed that PAs' edge performed a weak but significant role in vegetation growth. PAs had a noticeable opposite effect on greenness, cover, and productivity in 10.52 percent of the samples. Fragmented landscapes and landforms are more likely to impede conservation efficiency than geography background factors. This work comprehensively identified the conservation efficiency of vegetation at the edges of PAs, and these findings can help optimize the design of PAs and prevent vegetation losses.