

Vegetation change and its relationship with precipitation on the southern Tibetan Plateau

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Abstract Vegetation on the Tibetan Plateau has experienced significant change during the past decades. Investigation of the relationship between vegetation and precipitation regime plays an important role in the projection of future ecosystem dynamics. In this study, the Mann-Kendall trend detection and Pearson correlation methods are employed to investigate the spatial distribution and long-term tendency of vegetation and its correlation with precipitation by using a monthly dataset of satellite-driven Normalized Difference Vegetation Index (NDVI) spanning a period from 1982 to 2002. Results show that a greenness tendency is significant in the study area, with a magnitude of $0.9 \times 10^{-3} \text{ year}^{-1}$ at a confidence level of 0.01. The trend exhibits different characteristics in different segments and vegetation types along the river. NDVI demonstrates a strong hysteresis effect towards precipitation with the greatest correlation coefficient of 0.55 with 4 months of lag time. Meanwhile, the spatial distribution of correlation shows remarkable variation ranging from -0.54 to 0.67 in the Yarlung Zangbo River basin.

Key words vegetation; NDVI; precipitation; Yarlung Zangbo River, China