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Remote sensed evidence on the control factors of grassland ecosystem response to drought in the Tibetan Plateau

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Abstract: The Tibetan Plateau, as an ecologically fragile area with typical alpine meadow ecosystems, is sensitive to climate change, especially drought. However, spatial heterogeneity of the vegetation dynamics plays an important role in response to climate change, while there is relatively lacked evidence on their spatial control factors. Here, multivariate remote sensing data were used to construct vegetation index and multi-scale drought index to understand the vegetation dynamics and drought trend of the Tibetan plateau from 2000 to 2015, for revealing their differences or spatial response through correlation analysis. Elevation, land surface temperature, land cover and snow cover were selected as spatial control factors and the results showed that the vegetation was greening in the east while browning in the west. The vegetation indices including EVI, LAI and GPP were all closely related to drought index, while the magnitudes of response were spatially different. The contributions of control factors for the responses were not inconsistency because of the differential ecological meaning of the vegetation indices. Our results provide a spatial basis for the ecosystem management in the Tibetan Plateau by clarifying the spatial heterogeneity of control factors on the response of vegetation dynamics to drought.

Keywords: vegetation dynamics; drought response; grassland ecosystem; spatial heterogeneity; remote sensing; Tibetan Plateau