

Grassland Phenology in Different Eco-Geographic Regions over the Tibetan Plateau

Authors : Jiahua Zhang, Qing Chang, Fengmei Yao

Abstract : Studying on the response of vegetation phenology to climate change at different temporal and spatial scales is important for understanding and predicting future terrestrial ecosystem dynamics and the adaptation of ecosystems to global change. In this study, the Moderate Resolution Imaging Spectroradiometer (MODIS) Normalized Difference Vegetation Index (NDVI) dataset and climate data were used to analyze the dynamics of grassland phenology as well as their correlation with climatic factors in different eco-geographic regions and elevation units across the Tibetan Plateau. The results showed that during 2003-2012, the start of the grassland greening season (SOS) appeared later while the end of the growing season (EOS) appeared earlier following the plateau's precipitation and heat gradients from southeast to northwest. The multi-year mean value of SOS showed differences between various eco-geographic regions and was significantly impacted by average elevation and regional average precipitation during spring. Regional mean differences for EOS were mainly regulated by mean temperature during autumn. Changes in trends of SOS in the central and eastern eco-geographic regions were coupled to the mean temperature during spring, advancing by about 7d/°C. However, in the two southwestern eco-geographic regions, SOS was delayed significantly due to the impact of spring precipitation. The results also showed that the SOS occurred later with increasing elevation, as expected, with a delay rate of 0.66 d/100m. For 2003-2012, SOS showed an advancing trend in low-elevation areas, but a delayed trend in high-elevation areas, while EOS was delayed in low-elevation areas, but advanced in high-elevation areas. Grassland SOS and EOS changes may be influenced by a variety of other environmental factors in each eco-geographic region.

Keywords : grassland, phenology, MODIS, eco-geographic regions, elevation, climatic factors, Tibetan Plateau

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