



Study on teleconnection and memory effects of climate change on vegetation activities in the Qinghai-Tibet Plateau

Zhaodi Guo

National Satellite Meteorological Center, China Meteorological Administration, Beijing, China (guozd@cma.gov.cn)

Over the past 30 years, climate change already have discernible effects on many ecosystems. How vegetation activities respond to climate change is an important topic for studying development of ecosystem. Therefore, it has a certain leading role that studying the response of vegetation activities to climate change in Qinghai-Tibet Plateau which regarded as "sensor" and "sensitive area" of Asia even the northern hemisphere. Based on the long time series of remote sensing data (GIMMS3g.v1 NDVI (Normalized Difference Vegetation Index) from 1982 to 2015) and various climate index data, we analyzed the teleconnection between vegetation activities and climate factors, as well as their memory effects. This research includes: (i) the trend of NDVI in the Qinghai-Tibet Plateau, (ii) teleconnection between climate change and vegetation activities, (iii) memory effects and their spatial pattern. Main conclusions from our research are as follows. (i) The spring NDVI in Qinghai-Tibet Plateau increased significantly during 1982-2015, and the growth season NDVI increased before 2000 but then decreased. (ii) Considering different time-scale, the teleconnection between vegetation activities and climate factors is different. Global Mean Land-Ocean Temperature Index and Atlantic Meridional Mode most affect the vegetation for the 1-year period, North Pacific pattern for 5-years, and SW Monsoon Region rainfall(Area averaged precipitation for Arizona and New Mexico) for 10-years. (iii) The time lag of response of different vegetation is very different from each other. On a short-term scale, grasslands tend to respond faster to climate than forests. The time-lag information of vegetation responding to climate change in this study is helpful in providing ancillary information for the prediction of vegetation growth and vegetation carbon cycle in the future.