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Analysis of Changes in NDVI Based Vegetation Greening in Yarlung Zangbo River Basin

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Monitoring changes in vegetation greening has been the subject of considerable research during the past three decades, because of the important role in regulating the terrestrial carbon cycle and the climate system. To improve the knowledge about impacts of vegetation responses to climate factors and elevations, we combined remotely sensed Normalized Difference Vegetation Index (NDVI) data with climatic factors and elevation to analyze spatio-temporal variations in vegetation greening and their linkage with changes in temperature, precipitation and elevation in Yarlung Zangbo River basin during 1982-2010. The results indicate that multi-year average growing season NDVI and precipitation shows no significant ($P<0.05$) changes, while multi-year average growing season temperature increased by 5.65% from 1982 to 2010. Then we conclude that 14% of basin area exhibits statistically significant positive partial correlation between multi-year average growing season NDVI and precipitation, which is mainly in middle-reach region; 32.6% of basin area also shows significant positive partial correlation between annual average growing season NDVI and temperature. More specially, increased temperature may be one possible reason for the changes of vegetation greening in the Mila Mountains and other high elevation regions. Further correlation analysis shows that multi-year average growing season NDVI has significantly increased under maximum 700mm yr-1 precipitation of this basin. In contrast, the correlation between the NDVI and temperature signifies that when annual temperature above 15 degree Celsius, vegetation growth is not limited by temperature. In particular, the NDVI changes largely in a specified elevation range, which illustrates the fragility of NDVI changes in Yarlung Zangbo River Basin.