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Vegetation dynamics in response to climate change based on satellite derived NDVI in Nepal

Binod Baniya (1) and Qiuhong Tang (2)

(1) Chinese Academy of Science, Institute of geographical Science and Natural Resource Research (IGSNRR), beijing, China (baniya@igsnrr.ac.cn), (2) University of Chinese Academy of Sciences, Beijing, China

Abstract: Climate change has rapidly altered terrestrial vegetation in Nepal. The spatio-temporal evolution of vegetation in Nepal and its linkage to climatic variables were analyzed using latest version of the Normalized Difference Vegetation Index (NDVI) data obtained from Advanced Very High Resolution Radiometer (AVHRR) sensors. A linear regression model and Sen's slope method were used to estimate changing trend of NDVI and the Pearson correlation between NDVI and climatic variables i.e. temperature and precipitation were calculated to identify the impacts of climate change on vegetation. Results show that NDVI experienced an overall increasing trend in Nepal during 1982-2015.The NDVI has significantly increased at the rate of 0.0008yr-1 (p=0.0001). At the same time, temperature has significantly increased (0.030Cyr-1, p=0.0001) and precipitation has decreased (-3.96 mmyr-1, p=0.15).The NDVI Relative Change Ratio (RCR) has been 6.29% during the study period with small increases (4.14%) in the winter season. The correlation between NDVI and temperature was significantly positive (r=0.38, p=0.03) but it has negative correlation with precipitation (r= -0.13, p=0.10). Altogether, 81.89% of the study areas shows positive correlation with temperature in which 36.95% is significant and 53.08% of the study areas have positive correlation (1.49% significant, p<0.05) with precipitation. It suggests that vegetation is more sensitive toward temperature than precipitation change.
Keywords: vegetation dynamic; NDVI3g; temperature; precipitation; Nepal