

EGU21-5776

<https://doi.org/10.5194/egusphere-egu21-5776>

EGU General Assembly 2021

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The South Asia Monsoon Break Promotes Grass Growth on the Tibetan Plateau

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As region that is highly sensitive to global climate change, the Tibetan Plateau (TP) experiences an intra-seasonal soil water deficient due to the reduced precipitation during the South Asia monsoon (SAM) break. Few studies have investigated the impact of the SAM break on TP ecological processes, although a number of studies have explored the effects of inter-annual and decadal climate variability. In this study, the response of vegetation activity to the SAM break was investigated. The data used are: (1) soil moisture from in situ, satellite remote sensing and data assimilation; and (2) the Normalized Difference Vegetation Index (NDVI) and Solar-Induced chlorophyll Fluorescence (SIF). We found that in the region impacted by SAM break, which is distributed in the central-eastern part of TP, photosynthesis become more active during the SAM break. And temporal variability in the photosynthesis of this region is controlled mainly by solar radiation variability and has little sensitivity to soil moisture. We adopted a diagnostic process-based modeling approach to examine the causes of enhanced plant activity during the SAM break on the central-eastern TP. Our analysis indicates that active photosynthetic behavior in the reduced precipitation is stimulated by increases in solar radiation absorbed and temperature. This study highlights the importance of sub-seasonal climate variability for characterizing the relationship between vegetation and climate.