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Assessing the impact of climate extremes and Indian summer monsoon variability on terrestrial biosphere carbon fluxes over Indian region using satellite observations and modeling.

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An increasing trend is observed in the frequency of climate extremes. Drought is a widely observed extreme event that has a significant influence on the terrestrial ecosystem functioning and carbon balance. Interannual variability in the Indian summer monsoon (ISM) rainfall, an important meteorological phenomenon providing 90 percent of the country's annual precipitation, also significantly influences the vegetation carbon processes and carbon balance. Identifying the changes in vegetation greenness and terrestrial carbon fluxes to droughts and variability in ISM is essential for planning mitigation strategies and policy making. The main objective of this study is to identify the impact of drought and ISM variability in terrestrial biosphere carbon processes and their impact on the national carbon budget. Here we attempt a comprehensive study using different meteorological datasets available and CO2 flux data prescribed from inversion, process-based, and LUE-based models to quantify the impact of extreme events and monsoonal variability on the ecosystem behavior and, thereby, on the atmosphere-biosphere CO2 exchange fluxes over the Indian region while considering prominent vegetation classes. We also use the inference from the satellite-derived Solar Induced Fluorescence (SIF) and eddy covariance flux observations over the region. Preliminary results will be presented and discussed.