A Remote Sensing-Based Land Surface Phenology Application for Cropland Monitoring in the Volta River Basin of West Africa

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The current debate on global and climate change is for the most part dominated by the fate of natural systems due to their spatial extent, momentum, and complexity. Cropped and managed lands, although play a major role also, figure very little into this debate, maybe due to the fact that they are managed making it quite hard to tease out the natural from unnatural changes they may be undergoing. Crop production sensitivity to climate is however key due to the percent of cropped lands and its human dimension. To that end, a key aspect of crop production that is expected to show immediate responses to climate change has been the crop phenology, which defines the shape and progress of the growing season and is an integrator of all environmental factors controlling crop production. The aim of was to characterize remote sensing-based land surface phenology of cropped areas and compare them with the actual crop growing seasons recorded by farmers: planting, emergences, flowering, fruiting, and harvest date. We used the 2000-2013 MODIS Terra 16-day record of vegetation index to extract 4 phenometrics (*Start and Length of Growing season, Date of growing season peak, and the growing season cumulative signal*). Most of these metrics are simple time related phenometrics. We plan to validate these metrics using the farmers kept record within the basin. The spatiotemporal phenological characterization of cropped/managed lands in the basin shows distinction response patterns and trajectories along climate gradients. This permits to monitor cropped lands and its response to disturbance, such as drought, fire, flooding, and human activities. This study provides an accurate way to validate remote sensing LSP algorithms, and more crucially, helps characterize the remote sensing-based metrics that contrast with the actual biological phenophases of the crops. The study demonstrates the fundamental role that remote sensing can play globally within the agriculture sector to inform conservation and management practices.