Detecting the fingerprints of complex land management practices in a tallgrass prairie site
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Introduction

- Tallgrass is a major forage feed for millions of beef cattle in the Great Plains of the United States of America.
- Burning, grazing, and baling (hay harvesting) are common management practices for tallgrass prairie.
- To develop and adopt sustainable management practices, it is essential to better understand and quantify the impacts of management practices on plant phenology and carbon fluxes.

Materials and methods

Data
- Management activities recorded by GRL
- Eddy covariance data: net ecosystem CO2 exchange (NEE), ecosystem respiration (ER), and GPP
- PhenoCam images and greenness index (green chromatic coordinate, GCC)
- MODIS images and vegetation indices (VIs): Normalized Difference Vegetation Index (NDVI), Enhanced Vegetation Index (EVI), and Land Surface Water Index (LSWI)
- Landsat images and VIs

Vegetation Photosynthesis Model
- Vegetation Photosynthesis Model estimates GPP as the product of light use efficiency and the absorbed photosynthetically active radiation by chlorophyll.

Results

Conclusions

- Multiple datasets are needed to allow studying intra-annual variations caused by various management practices.
- The larger increase of GPP after large rain in baled grassland (photosynthetically more active vegetation) compensated the reduction in GPP caused by baling.
- Since management practices are often complex (e.g. grazing and baling in tallgrass pasture) and we need multyear data from different sources for better understanding of individual and confounding impacts of those management practices.
- The approach of integrating EC data with remote sensing to study the impacts of management practices on plant phenology and carbon fluxes can be helpful to extend the usage of EC data collected within the flux networks (e.g., AmeriFlux and FLUXNET) to study the impacts of different management practices.

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