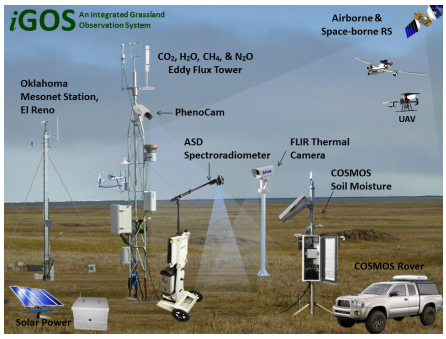
OBSERVATORY FLUX TOWERS

Oklahoma NSF EPSCoR researchers and the USDA ARS Grazinglands Research Laboratory have been working together to establish and operate Integrated Grassland and Cropland Observation Sites (IGOS and ICOS) in El Reno, Oklahoma. IGOS sites are placed in native tall grass prairie and improved pasture, while the ICOS sites are placed in tilled and non-tilled winter wheat fields.

INTEGRATED OBSERVATIONS

At each site, comprehensive measurements of the soils, vegetation and atmosphere are carried out across multiple spatial scales. Eddy covariance technology is used to capture CO_2, CH_4, water and energy fluxes; COSMOS instruments are used to gather information about soil moisture; a phenocam has been included to measure phenology; and hyperspectral remote sensing is being used to capture changes in vegetation. The flux towers provide us with the opportunity to quantify the impacts of climate variability and land use/land cover change in greenhouse gases and the productivity of a ecosystem. Data from these instruments are used to support various models of the biogeochemical cycle, water cycle, and climate, which all play an important role in Oklahoma's adaptability to increased climate variability.



Setup of the flux tower sites at El Reno, including the names of instruments leveraged as part of this project.

SETTING UP THE FLUX TOWERS

The images displayed above show the layout of the flux towers (left) and the engagement of EPSCoR participants in constructing one of the flux towers (right). Two ICOS and two IGOS sites are already in operation. An additional portable flux tower system and one mixed grass/red cedar flux tower are expected to be built by the end of this project.

KEY FINDINGS

- Various management practices - fire burning, livestock grazing, and hay harvesting - have significant impacts on the phenology and gross primary production of tallgrass prairie ecosystems.
- Winter-wheat agro-ecosystem is a carbon sink during its growing season, but a carbon source in a year.
- Tallgrass prairie ecosystem is a carbon sink in a year.

FOR MORE INFORMATION

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