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OU Research Team Investigates Microbe-Climate Interactions In Greenhouse Gas Emissions from Oklahoma Grasslands and Croplands

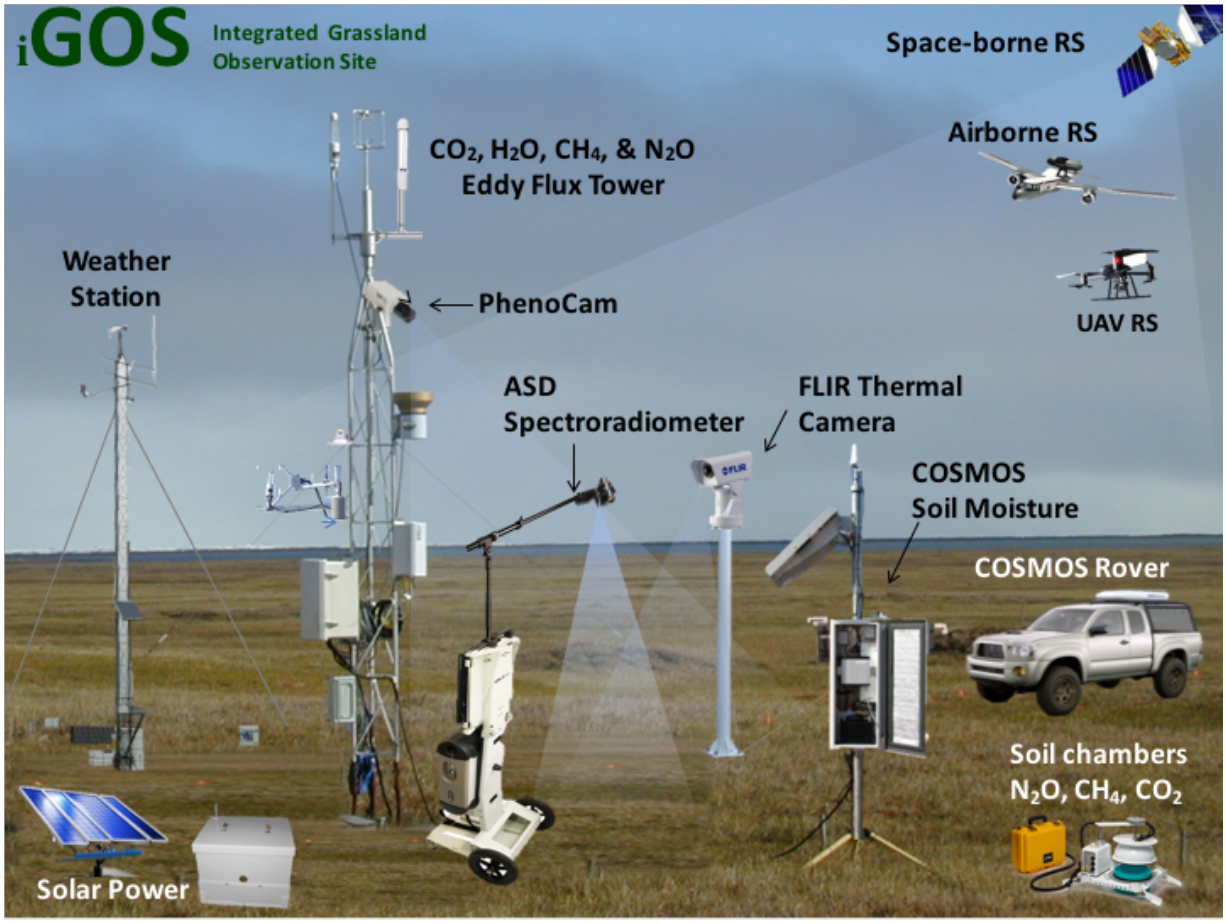
Norman, Okla.—A University of Oklahoma research team will analyze microbe-climate interactions in greenhouse gases (CO_2, CH_4 and N_2O) from grasslands and croplands in Oklahoma. The four-year, $3 million project funded by the U.S. Department of Agriculture's National Institute of Food and Agriculture will provide an understanding of microbe-climate interactions, plus educational opportunities for educators, students and professionals.

Xiangming Xiao, Boris Wawrik, Jizhong Zhou and Zhili He, professors in the Department of Microbiology and Plant Biology, OU College of Arts and Sciences, will develop and apply a multi-scale and integrated observation and modeling framework to address the major scientific questions relevant to microbe-climate interactions, with team members Jeffrey Basara, Oklahoma Climatological Survey and OU School of Meteorlogy; Linda Atkinson, OU K20 Center; Jean Steiner, USDA Agriculture Research Service Grazinglands Research Laboratory; Ann Marshall, BlueSTEM AgriLearning Center; and Steve Frolking and Jia Deng, University of New Hampshire.

Microbes play a key role in modulating greenhouse gases emissions in agro-ecosystems. Few studies have investigated microbe-climate interactions across multiple spatial (laboratory, plot, ecosystem and landscape) and temporal (hourly, daily, seasonally and inter-annually) scales under livestock grazing and manure applications. The overall research goal of this project is to improve understanding of and model microbe-climate interactions in grazed lands and manure-applied croplands across various spatial-temporal scales.

The supporting research objectives of this project are to (1) quantify the role of microbial community diversity, structure and function on greenhouse gas emissions from grasslands and winter wheat croplands; (2) develop and improve the microbial processes sub-model to estimate greenhouse gas emissions; and (3) apply the plant-soil-microbe models to estimate greenhouse gas emissions across landscape and watershed scales.

The education component of this project will include a multi-level and cross-disciplinary education framework to address the major education questions relevant to the human capacity for agriculture. The overall goal is to improve and expand the human capacity in understanding the results from agricultural research, using relevant results for agricultural decision making, and participating in agriculture research and education. The educational initiative will provide a deeper understanding of the contributions of integrated science to the research base and its practical application in our lives.



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