

Measurement of Surface Energy Fluxes for Enhancing Agricultural Productivity and Production Efficiency

Suat Irmak

Department of Agricultural and Biological Engineering, The Pennsylvania State University, University Park, PA, 16802 U.S.A

Abstract

Surface energy and water vapor fluxes play critical roles in understanding the response of agro-ecosystems to changes in environmental and atmospheric parameters. These fluxes play crucial role in exploring the dynamics of water and energy use efficiencies of these systems. Quantification of the fluxes is also necessary for assessing the impact of land use and management changes on water balances. Accomplishing these goals requires measurement of water vapor and energy exchanges between various vegetation surfaces and microclimates for long-enough periods to empathize the behavior and dynamics involved with the flux transfer so that robust models can be developed to predict these processes under different scenarios. These are critical considering the increased negative impacts of climate change on agriculture and natural resources productivity globally. This presentation will provide information about measurement of surface energy fluxes, including evapotranspiration, for different vegetation surfaces [i.e., tilled and untilled irrigated and rainfed croplands (maize and soybean), center pivot-irrigated and rainfed grasslands, *Phragmites (Phragmites australis)*-dominated cottonwood (*Populus deltoides var. occidentalis*), and willow stand (*Willow salix*) riparian plant communities; seed maize; sweet maize; winter wheat; watermelon; alfalfa, grain sorghum.] using Bowen Ratio Energy Balance Systems.

Keywords

Surface energy fluxes, Bowen ratio energy balance, agricultural productivity.