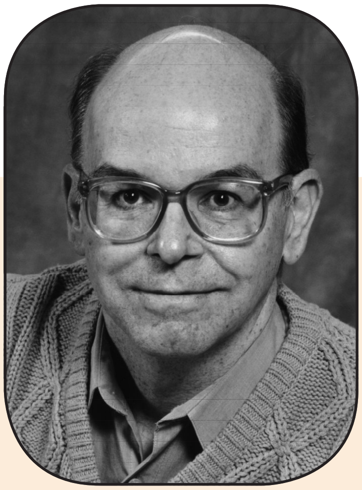
Presented jointly by the Department of Crop and Soil Sciences and the Center for Environmental Research, Education, and Outreach (CEREO)

2009 Campbell Lecture

in Environmental Soil and Water Science



Dr. John Norman

Professor of Atmospheric and Oceanic Sciences at the University of Wisconsin

"Evapotranspiration Estimates on Scales From Canopies to Continents"

Monday, March 2, 2009

2:10 p.m.

Center for Undergraduate Education 203

–reception to follow

Free and open to the public.

John M. Norman has been Professor of Soil Science and also Professor of Atmospheric and Oceanic Science at the University of Wisconsin-Madison since 1988. Following his Ph.D. in 1971 from the University of Wisconsin-Madison and a fellowship in botany at the University of Aberdeen, Scotland, he was an Associate Professor of Meteorology at the Pennsylvania State University until 1978 and Professor of Agronomy at the University of Nebraska-Lincoln until 1988.

He conducts biophysical research involving studies of the interaction between plants and their environment including instrument design, measurements of soil, plant, and atmospheric characteristics and integrative modeling of the soil-plant-atmosphere system. Applications to ecology, agriculture, forestry, hydrology and meteorology have included plant productivity and water use efficiency, integrated pest management, irrigation water use, precision agriculture, agro-chemical leaching and runoff losses, erosion, remote sensing, plant canopy architecture, and measurement and modeling of soil surface carbon dioxide fluxes.

Evapotranspiration, which is water use by plants, is necessary for plant productivity and responds to the availability of soil water for plant growth. Although humans have studied drought and plant water use for hundreds of years, reliable measurement of evapotranspiration on leaves and canopies has developed only in the last half century. In recent decades satellite and weather data have become available operationally in the U.S. and much of the world, but linking these satellite observations to ground measurements of evapotranspiration has been problematic. With recent developments, geosynchronous satellites and synoptic weather data can be used to estimate evapotranspiration on the continental scale at a spatial resolution of 10 km on a daily basis. Using satellites with higher spatial resolution, evapotranspiration can be estimated down to a scale of about 100 m at any location within the region served by the geosynchronous satellites, and with remotely-sensed data from aircraft, estimates down to spatial scales of a few meters are possible. In this presentation, the approach that is used to estimate evapotranspiration over this range of scales is described along with efforts to validate these estimates with direct measurements on the ground and with aircraft. Using several years of data, results from drought mapping over the continental U.S. is presented.

The Campbell Lecture was created to help further understanding of environmental soil science. It is named for Gaylon Campbell, who spent nearly 30 years as a professor of environmental biophysics and soil physics in the WSU's crop and soil sciences department. He retired from WSU in 1998 to become vice president of engineering at Decagon Devices, a local manufacturer of biophysical research instrumentation. The lecture was created through gifts from Campbell Scientific, Inc., and Decagon Devices, Inc.

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