AGU 100 FALL MEETING
Washington, D.C. | 10–14 Dec 2018

H53O-1798: Intercomparison of Evapotranspiration Measurement Methods for Vegetable Crops in California

Friday, 14 December 2018
13:40 - 18:00
Walter E Washington Convention Center - Hall A-C (Poster Hall)

Recent drought events in California and legislation passed with the goal of increasing the sustainability of groundwater supplies have led to increased interest in tools to optimize irrigation schedules and increase on-farm water used efficiency. With more than 400 different crops produced in California, evapotranspiration-based irrigation scheduling is a promising and well-established approach. However, there is a need for accurate methods to estimate crop evapotranspiration (ET_c) across the diverse range of crops grown, coupled with cost-effective methods for quantifying the accuracy of these tools.

In this study, we evaluated remotely sensed estimates of ETc and associated crop water requirements from NASA's Satellite Irrigation Support (SIMS) system for two vegetable crops and measured crop evapotranspiration (ET_c) using multiple methods, including weighing lysimeters, eddy covariance towers (EC), and surface renewal stations. We compared ET_cdata from these measurements with remotely sensed basal crop evapotranspiration (ET_{cb}) data from SIMS as well as ET_cdata from a standard FAO-56 crop coefficient approach.

Studies were conducted for sugar beets in Five Points, CA from 2014 to 2015 and studies are ongoing for fresh market tomatoes in Firebaugh, CA. We present results from these intercomparison studies and describe implications for future studies to quantify the accuracy of remotely sensed measures of ET_c. Highlights from results to date include strong correlations between ET measured with both surface renewal instrumentation and eddy covariance calculations using a 3D sonic anemometer and ET_cdata measured with the weighing lysimeter, with respective R^2values of 0.7964 (surface renewal) and 0.8034 (eddy covariance).

This study provides insights into agreement between different approaches for monitoring evapotranspiration and provides another reference point for the community working to develop accurate and cost-effective tools that support growers in optimizing irrigation management.

Authors

Tianxin Wang
CSU Monterey Bay

CSU Monterey Bay

Forrest S Melton
CSU Monterey Bay

Florence Cassel-Sharma
CSU Fresno

Dave Goorahoo
CSU Fresno

Touyee Thao
CSU Fresno, Center for Irrigation Technology

Aldo Garcia
CSU Fresno, Center for Irrigation Technology

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