

The Land-Atmosphere Exchange of Water, CO₂ and Energy in a California Watershed

John Kochendorfer, Joshua Viers, Richard Niswonger, Kyaw Tha Paw U,
Dept of Land Air and Water Resources, University of California, Davis, CA, 95616

jkoch@ucdavis.edu

Poster #0531

Introduction:

Along the Cosumnes River in California's Central Valley an eddy-covariance tower was erected within a twenty-year-old Cottonwood forest (*Populus fremontii*). The turbulent vertical exchange of water vapor, carbon dioxide, and sensible heat were calculated from ten hertz data and mean meteorological variables were also measured. We collected data from March 2004 through July 2005. The site is within the Cosumnes River Preserve and is subject to seasonal flooding.

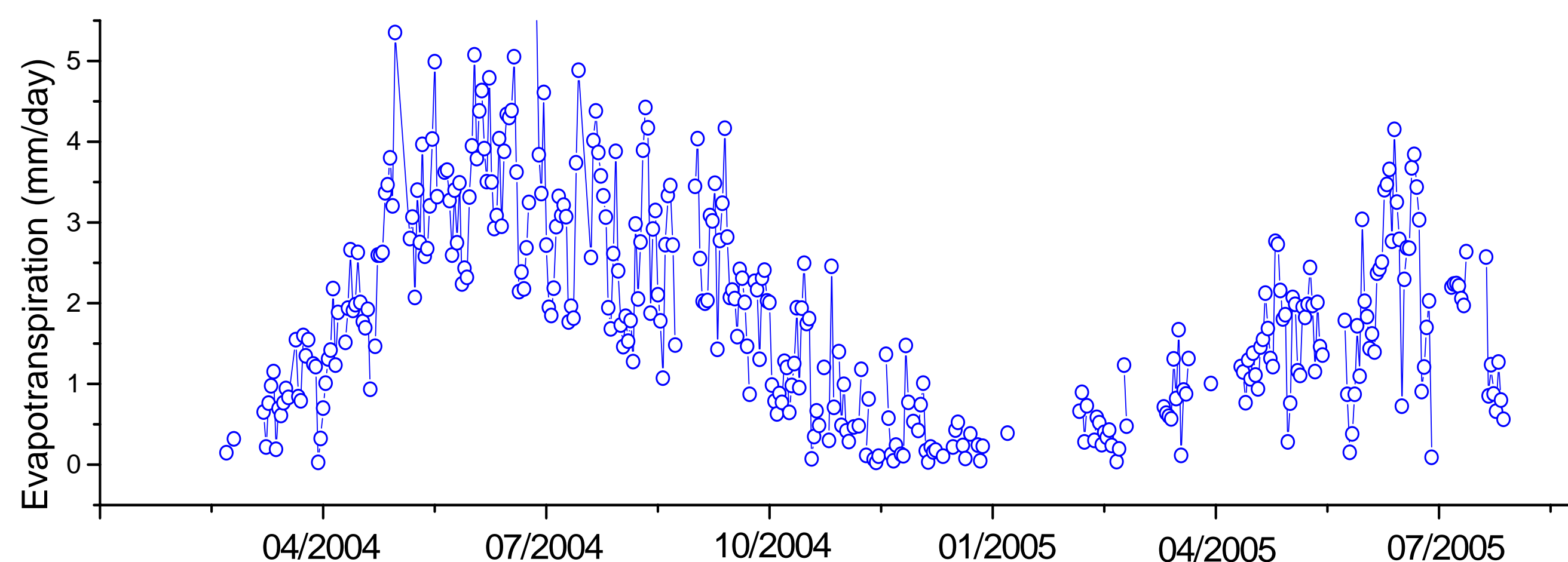
Instrumentation:

Wind velocity and sonic temperature were measured using a Campbell CSAT3 three dimensional anemometer. Carbon dioxide and water vapor concentrations were measured using an open path LiCor-7500 infrared gas analyzer. Wind velocity, temperature, and gas concentrations were recorded ten times a second and post-processed to calculate mean values, corrected covariances, and turbulent statistics. Half hour mean meteorological measurements included air temperature, humidity, net radiation, ground heat flux, barometric pressure, and surface temperature.

Acknowledgements:

This work was supported by the California Bay-Delta Authority and the UC Davis Center for Watershed Sciences.

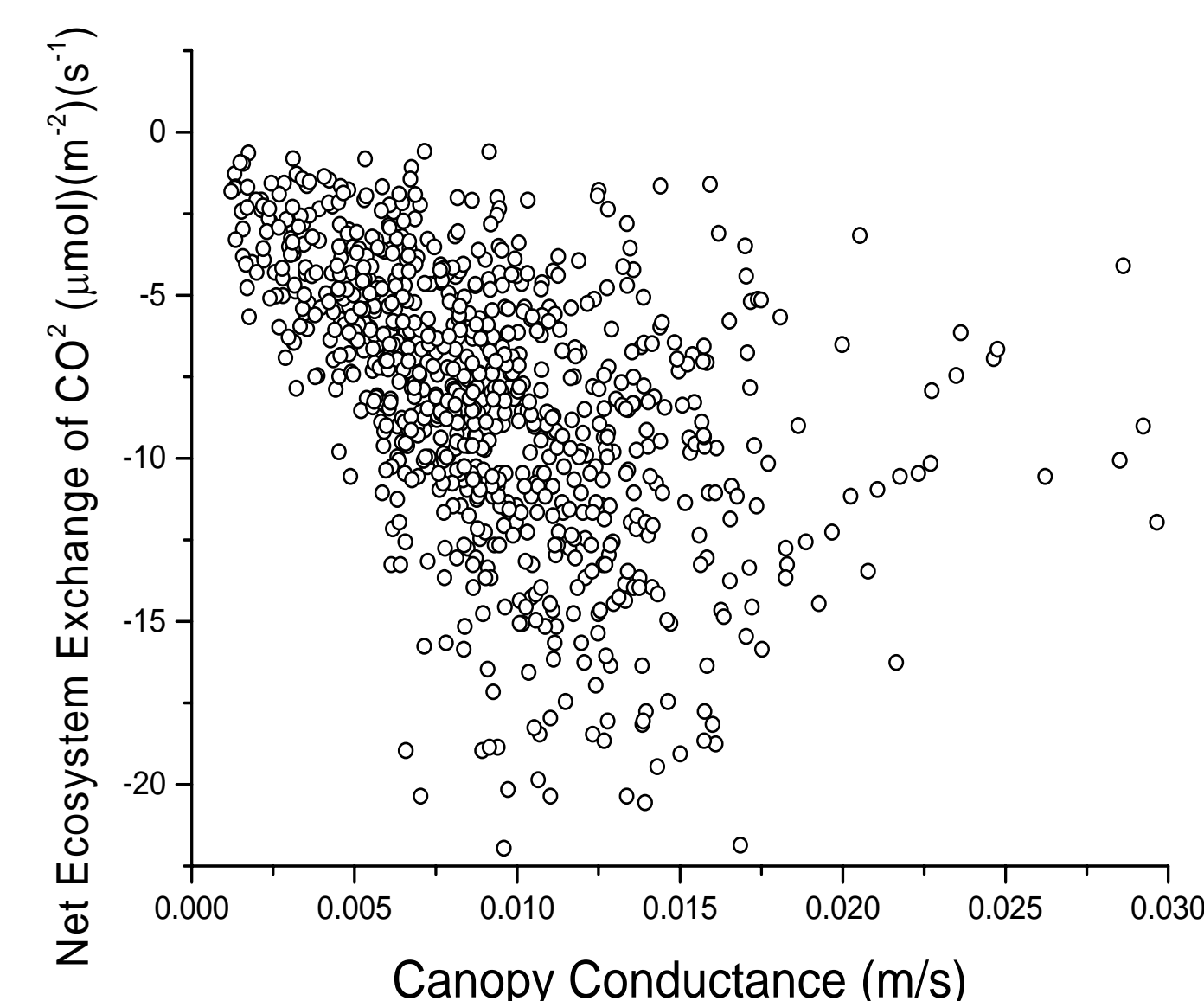
Accidental Forest Daily Evapotranspiration



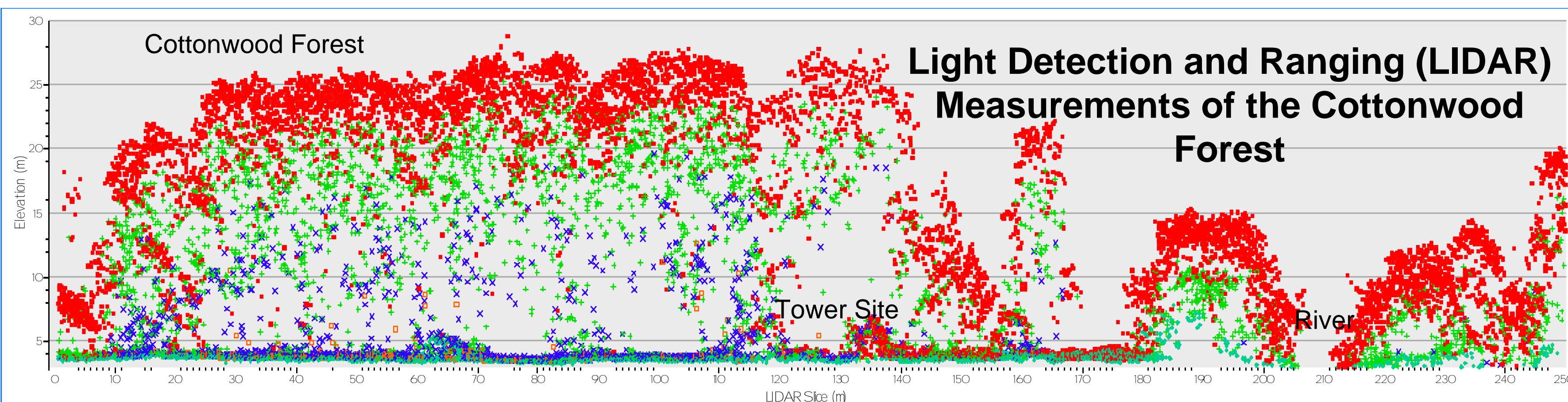
Eddy Covariance Tower

CO₂ Fluxes vs. Canopy Conductance

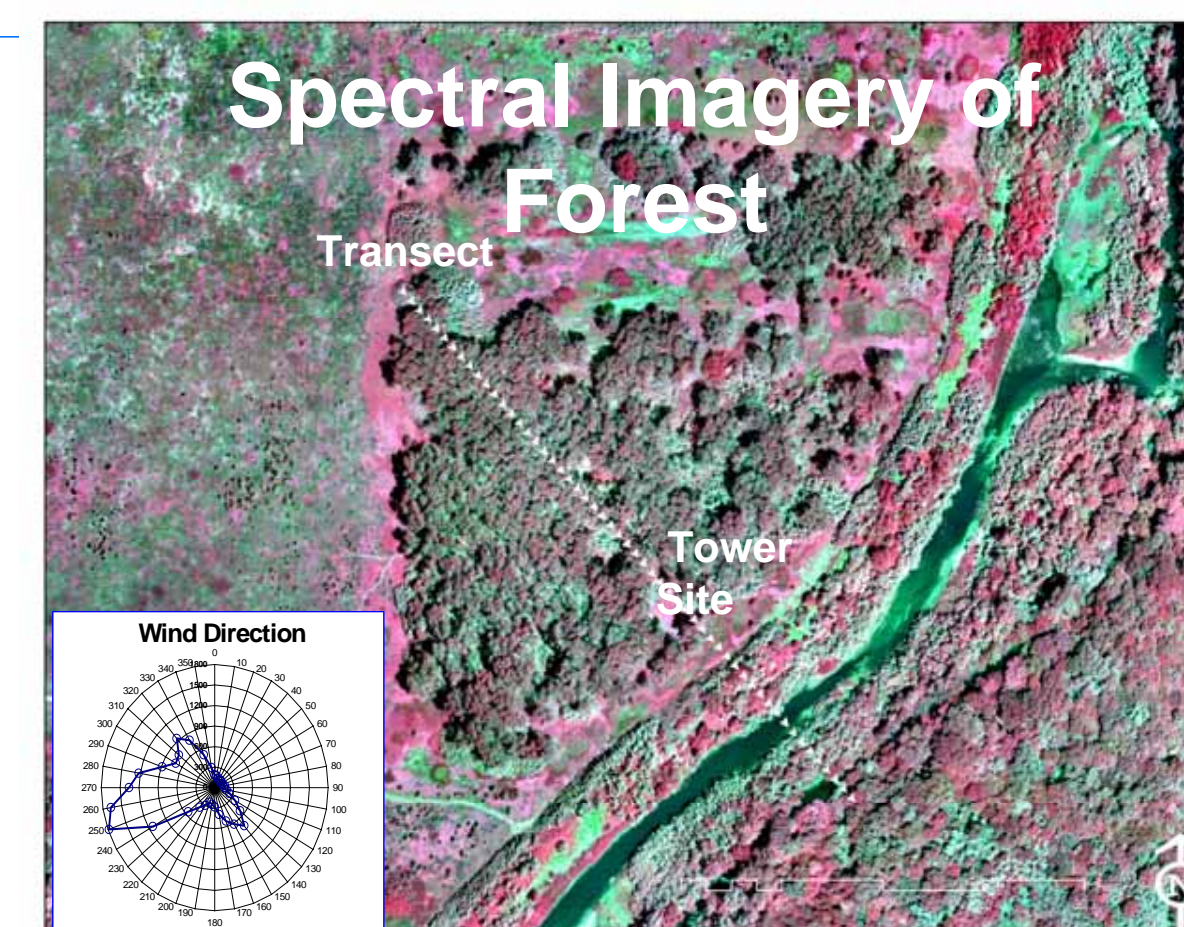
863 Half-Hour Values



Site Locations



Light Detection and Ranging (LIDAR) Measurements of the Cottonwood Forest



Spectral Imagery of Forest