

## **Vegetation Water Use Determined with Energy Balance Models Coupled with Airborne Multispectral Imagery and Weather Data**

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**Abstract.** Frequent estimates of spatially distributed vegetation water use or evapotranspiration (ET) are essential for managing water resources in irrigated regions and for general hydrologic processes modeling. In this study, two energy balance based algorithms were used to map ET. Both methods require weather data from standard agricultural weather stations. One method was METRIC (Mapping ET at high Resolutions with Internal Calibration), which was originally developed for applications with Landsat imagery. The second method was a surface aerodynamic temperature-based (SAT) method. METRIC and SAT derived ET values were compared to ET values from weighing lysimeters. As part of this experiment, high resolution aircraft imagery (0.5 m pixel size in the visible and near infrared bands and 2 m in the thermal band) were acquired. During the overpasses, ground truth data were collected for surface short-wave reflectance and long-wave thermal emittance, crop parameters, soil heat flux and net radiation. In general, METRIC seems to perform better on wetter areas with the presence of large biomass stands while the SAT method performed better on drier areas with less biomass presence.

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