

Spatially distributed evapotranspiration estimation using remote sensing and ground-based radiometers over cotton at Maricopa, Arizona, USA

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Abstract Spatially distributed estimates of evapotranspiration (ET) could be valuable for monitoring croplands. Recently various ET estimation approaches have been developed that include visible and near infrared for vegetation indices and thermal infrared for surface temperatures. However, these approaches rely on high-resolution remotely sensed data (<100 m) that are too infrequent for operational use. To help fill the gap, a two-part ground and remote sensing approach is developed. The first part projects vegetation cover from the latest NDVI scenes using a simplified crop model. The second part projects spatially distributed surface temperatures using cover projections and ground-based radiometers. The projections from both parts are then input to a two-source energy balance model. The approach is demonstrated using data over a 2003 cotton experiment conducted in Maricopa, Arizona, USA. Using soil moisture depletion observations for validation, estimates were usually accurate to within 1 mm/d for two weeks beyond the latest remote sensing acquisition.

Key words evapotranspiration; surface energy balance; surface temperature; remote sensing; Maricopa, Arizona, USA