Abstract

Mapping evapotranspiration (ET) from agricultural areas in California's Central Valley is critical for understanding historical consumptive use of surface and groundwater. In addition, long histories of ET maps provide valuable training information for predictive studies of surface and groundwater demands. During times of drought, groundwater is commonly pumped to supplement reduced surface water supplies in the Central Valley. Due to the lack of extensive groundwater pumping records, mapping consumptive use using satellite imagery is an efficient and robust way for estimating agricultural consumptive use and assessing drought impacts. To this end, we have developed and implemented an algorithm for automated calibration of the METRIC remotely sensed surface energy balance model on NASA's Earth Exchange (NEX) to estimate ET at the field scale. Using automated calibration techniques on the NEX has allowed for the creation of spatially explicit historical ET estimates for the Landsat archive dating from 1984 to the near present. Further, our use of spatial NLDAS and CIMIS weather data, and spatial soil water balance simulations within the NEX METRIC workflow, has helped overcome challenges of

time integration between satellite image dates. This historical and near present time archive of agricultural water consumption for the Central Valley will be an extremely useful dataset for water use and drought impact reporting, and predictive analyses of groundwater demands.