Aerodynamic methods for estimating turbulent fluxes over irrigated crops

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Abstract: Aerodynamic temperature (T_o) and resistance (r_{ah}) are main components of the energy balance equation used to quantify the crops Evapotranspiration (ET). Parameterization of actual evapotranspiration has always been carried out for homogenous surfaces under many assumptions for (T_o) and (r_{ah}) that do not consider crops heterogeneity or arrangement of the field rows. Remote sensing techniques have been proven to perform successfully for well watered and managed crops. They tend to incur in errors when surface conditions are different (heterogeneous, water stress, large row spacing, etc.). The presented study is looking into the validation of remote sensing energy balance modelling based on T_o and r_{ah} derived from remote sensing imagery, and cross validating the findings using soil water content measurements, lysimeters, eddy covariance towers, and large aperture scintillometers (LAS) at multiple sites with different crops in the middle of the USA. The study is expected to develop a robust T_o model by considering the surface heterogeneity crop density, cluster location, varying crop height, and vertical/horizontal interactions of the surface elements and aerodynamic fluxes.