

Test of the new LAS MkII Scintillometer for validation of statewide New Mexico evapotranspiration maps

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Purpose of Study

The objective of this research is to evaluate an improved scintillometer for evapotranspiration (ET) estimation under New Mexico conditions at the km-scale. This project is part of a larger WRI initiative to develop a Statewide Water Assessment. The components of the assessment include precipitation, evapotranspiration, stream flow, groundwater recharge, and changes in aquifer water storage.

Study Underway

The direct measurement of ET at the km-scale of the Statewide Water Assessment is difficult and costly. Therefore, this study will use scintillometry for measuring the daily sensible heat flux and radiation meters or remote sensing for net radiation. Then, the latent heat flux or ET is found as the difference between net radiation and sensible heat flux since the daily soil heat flux is close to zero. Dr. Hendrickx, Brown's advisor, has a great deal of experience operating a statewide scintillometer network. Unfortunately, this network had to be abandoned when the measurements revealed severe biases (5 to 20%) in the sensible heat flux measurements of the first generation scintillometers. Pushed by the research results in New Mexico and elsewhere, a second generation LAS MkII Scintillometer¹ has been developed and has a greatly reduced bias (1-3%) for quantifying ET. The objective of this research is to evaluate this improved scintillometer for ET estimation under New Mexico conditions.

Benefits

Given the reliable, but biased, performance of the first generation scintillometers under the harsh conditions in New Mexico and the successful tests of second generation scintillometers, this project carries a low risk. The expected positive test in the Sevilleta will give Dr. Hendrickx the data needed to seek funding for retrofitting and converting his 10 first-generation into second-generation scintillometers. After this upgrade, these ten scintillometer transect sensor sets can be deployed at strategic locations in New Mexico for validation of the operational ET products needed for the Statewide Water Assessment.

Reid Brown is packaging a scintillometer for transport to the Sevilleta National Wildlife Refuge. Reid is from Athens, GA and attended the University of Georgia where he earned his undergraduate degree in ecology, focusing on freshwater ecosystems. Presently he is working on an MS in hydrology at the New Mexico Tech. Reid's project is on evaluating operational evapotranspiration and precipitation products for use in the Statewide Water Assessment.

