
AWRA 2011 ANNUAL WATER RESOURCES CONFERENCE
Albuquerque, New Mexico

November 7-10, 2011

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METRIC EVALUATION WITH HIGH RESOLUTION AIRBORNE SENSOR DATA FROM BEAREX08

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ABSTRACT: Mapping Evapotranspiration at high resolution using internalized calibration (METRIC) is a variant of the Surface Energy Balance Algorithm for Land (SEBAL) and widely used in the United States. The main objective of this study was to evaluate the METRIC algorithm using high resolution aircraft data collected during the Bushland Evapotranspiration and Agricultural Remote sensing Experiment 2008 (BEAREX08). The BEAREX08 was conducted at the USDA-ARS Conservation and Production Research Laboratory during the 2008 summer cropping season to enhance understanding of land surface hydro-meteorological process in the semi-arid, highly advective, Texas High Plains. METRIC-ET was evaluated against the ET rates measured using four large weighing lysimeters, each located at the center of 4.7 ha fields planted to irrigated and dryland cotton. Although several validation studies have been carried out in the past, this study is unique for the reason that it simultaneously compared the METRIC-based instantaneous ET against lysimetric data at different crop stages of cotton managed under both irrigation and dryland management practices to provide a more stringent evaluation of the algorithm. In addition, a modification was proposed to the METRIC by adding an excess resistance term (k_B^{-1}) to the aerodynamic resistance (r_{ah}) as in the case of SEBAL2000 to accounts for errors due to use of the radiometric surface temperature instead of the aerodynamic surface temperature and evaluated. Performance of the METRIC was evaluated using mean bias error (MBE), root mean square error (RMSE) and Nash-Sutcliffe efficiency (NSE).

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