Geophysical Research Abstracts
Vol. 14, EGU2012-6935, 2012
EGU General Assembly 2012

Estimating plant available water content from remotely sensed evapotranspiration

A.I.J.M. van Dijk (1), G. Warren (2), and T. Doody (3)

(1) CSIRO Land and Water, Canberra ACT, Australia (albert.vandijk@csiro.au), (2) CSIRO Land and Water, Canberra ACT, Australia, (3) CSIRO Land and Water, Adelaide SA, Australia

Plant available water content (PAWC) is an emergent soil property that is a critical variable in hydrological modelling. PAWC determines the active soil water storage and, in water-limited environments, is the main cause of different ecohydrological behaviour between (deep-rooted) perennial vegetation and (shallow-rooted) seasonal vegetation. Conventionally, PAWC is estimated for a combination of soil and vegetation from three variables: maximum rooting depth and the volumetric water content at field capacity and permanent wilting point, respectively. Without elaborate local field observation, large uncertainties in PAWC occur due to the assumptions associated with each of the three variables. We developed an alternative, observation-based method to estimate PAWC from precipitation observations and CSIRO MODIS Reflectance-based Evapotranspiration (CMRSET) estimates. Processing steps include (1) removing residual systematic bias in the CMRSET estimates, (2) making spatially appropriate assumptions about local water inputs and surface runoff losses, (3) using mean seasonal patterns in precipitation and CMRSET to estimate the seasonal pattern in soil water storage changes, (4) from these, calculating the mean seasonal storage range, which can be treated as an estimate of PAWC. We evaluate the resulting PAWC estimates against those determined in field experiments for 180 sites across Australia. We show that the method produces better estimates of PAWC than conventional techniques. In addition, the method provides detailed information with full continental coverage at moderate resolution (250 m) scale. The resulting maps can be used to identify likely groundwater dependent ecosystems and to derive PAWC distributions for each combination of soil and vegetation type.