GRACE, Remote Sensing and Ground-based Methods in Multi-Scale Hydrology (Proceedings of Symposium J-H01 held during IUGG2011 in Melbourne, Australia, July 2011) (IAHS Publ. 343, 2011). 157-162

Irrigation demand forecasting using remote sensing and meteorological data in semi-arid regions

KALEEM ULLAH & MOHSIN HAFEEZ

International Centre of Water for Food Security (IC Water), Charles Sturt University, Locked Bag 588, Wagga Wagga, New South Wales 2678, Australia
mullah@csu.edu.au

Abstract Irrigated agriculture is a major consumer of freshwater, but a large part of the water used for irrigation is wasted due to poor management. Improving water management in irrigated areas requires the estimation of real time water demand, which is important for planning sustainable use of irrigation water. Real time irrigation demand forecasting entails a complete understanding of the spatio-temporal variability of meteorological parameters and evapotranspiration (ET). For improved irrigation system management and operation, a holistic approach of integrating remote sensing derived ET from the SEBAL method with forecasted meteorological data and water-use efficiency was used to forecast net irrigation demand in the Coleambally Irrigation Area (CIA), located in the southern Murray Darling Basin. In order to capture the spatial variability, the CIA has been divided into 22 nodes based on direction of flow and connectivity. All hydrological data of inflow and outflow were estimated at all nodes of the CIA for the estimation of water-use efficiencies. Ten Landsat 5 TM satellite images were used for mapping irrigated crops and estimation of actual ET for the summer cropping season of 2008–2009. This estimated actual ET and forecasted meteorological data was used for demand forecasting for seven days. The results were compared with the data obtained for irrigation supplies. Initial results for forecasted demand are quite promising and provide a practical way for water saving at the node scale by matching demand and supply.

Key words irrigated agriculture; water management; remote sensing; evapotranspiration