

Evaluation of remotely sensed evapotranspiration products in Australian arid regions, Case study: Cooper Creek, Queensland

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Accurate estimation of spatial and temporal patterns of actual evapotranspiration is important in understanding of arid region's hydrology and conservation of natural habitats. While, characterization of flow regimes in large scale arid lands of Inland Australia is not recognized for researchers due to sparse acquisition of ground data, development of remotely sensed products has given promising insights in better quantification of spatiotemporal patterns of hydrological elements. Currently, there are two sources of remote sensing data available for estimating actual evapotranspiration in Australia: MOD-16 produced by NASA which provides evapotranspiration data in 1 km spatial resolution every 8 days and CMRSET actual evapotranspiration product which was developed by CSIRO from MODIS images with the same temporal resolution but spatial resolution of 250 meters. Despite significance of evapotranspiration in the water balance of arid lands, there is not enough scientific evidence about reliability of these products in those regions. In this study, spatiotemporal figures of these products are compared in some catchments of Cooper Creek, Australia and results are validated against ground truth data including gauged river discharges and estimates of actual evapotranspiration generated by calibration of rainfall-runoff models. Moreover, temporal changes of remotely sensed products are compared to the average monthly values prepared by Australian Bureau Meteorology and the effect of these products on performance of rainfall-runoff models is discussed. Regarding upstream catchments inflow from Thompson and Barcoo rivers as the main source of available water to the Cooper Creek floodplain with prolonged periods of drought which could last for more than a year, spatial patterns of mentioned remotely sensed evapotranspiration products are compared to inundation patterns generated by water and vegetation mapping. The given results provide valuable tools for evaluation of reliability of utilizing these products in water balance of arid regions.