

Application of Energy Balance Model and Landsat TM Sensor Data for Evapotranspiration Estimation

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Abstract

Spatial estimation of evapotranspiration (ET) rates is essential for agriculture and water resources management. This study aimed to estimate ET v an ET estimation algorithm called Surface Energy Balance Algorithms for Land (SEBAL) and also by using TM June 2009 satellite data in Damaneh region of Isfahan province. To calculate the ET, all the energy balance components and related parameters including net radiation, surface albedo, incoming and emitting shortwave and longwave radiation, surface emissivity, soil heat flux, sensible heat flux, NDVI vegetation index, Leaf Area Index(LAI), and surface temperature were extracted from the geometrically and radiometrically corrected TM images. Results showed that ET rate was about 7.2 mm day^{-1} in agricultural areas, which was almost equal to 6.99 mm day^{-1} extracted from the FAO Penman-Monteith method in the synoptic weather station of Daran. Results here indicate that the extraction of ET rate which is almost equal to plant water requirements from remote sensing data can be used in selecting appropriate plants for agriculture and rehabilitation purposes in extensive arid and semi-arid regions of Isfahan province where severe droughts and water shortage are major problems.

Keyword: Evapotranspiration, Energy balance model, SEBAL algorithm, Remote sensing.

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