



Monitoring Seasonal Evapotranspiration in Vulnerable Agriculture using Time Series VHSR Satellite Data

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The research work stems from the hypothesis that it is possible to perform an estimation of seasonal water needs of olive tree farms under drought periods by cross correlating high spatial, spectral and temporal resolution (~monthly) of satellite data, acquired at well defined time intervals of the phenological cycle of crops, with ground-truth information simultaneously applied during the image acquisitions. The present research is for the first time, demonstrating the coordinated efforts of space engineers, satellite mission control planners, remote sensing scientists and ground teams to record at specific time intervals of the phenological cycle of trees from ground “zero” and from 770 km above the Earth’s surface, the status of plants for subsequent cross correlation and analysis regarding the estimation of the seasonal evapotranspiration in vulnerable agricultural environment. The ETo and ETc derived by Penman-Montieth equation and reference Kc tables, compared with new ETd using the Kc extracted from the time series satellite data. Several vegetation indices were also used especially the RedEdge and the chlorophyll one based on WorldView-2 RedEdge and second NIR bands to relate the tree status with water and nutrition needs.

Keywords: Evapotranspiration, Very High Spatial Resolution – VHSR, time series, remote sensing, vulnerability, agriculture, vegetation indices.