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Actual evapotranspiration estimation from satellite-based surface energy balance model in Thessaly, Greece

M. Spiliotopoulos, **A. Loukas** and L. Vasiliades

Department of Civil Engineering, University of Thessaly, Greece (aloukas@civ.uth.gr /+302421074169)

The potential of remote sensing in assessing evapotranspiration is examined for Thessaly region, Greece. Thessaly plain with an area of about 4000 km2 is one of the most productive agricultural regions of Greece. The main crops cultivated in the plain area are cotton, wheat and maize whereas apple, apricot, cherry, olive trees and grapes are cultivated at the foothills of the eastern mountains. The intense and extensive agriculture of water demanding crops, such as cotton, and the absence of reasonable water resources management practices have lead to significant water stresses and there is need for rational and sustainable management of water resources. As evapotranspiration is one of the main components of the hydrologic cycle and a determinant of agricultural water demand, a continuous effort arises in order to improve its estimation. In this study, daily evapotranspiration was calculated during the growing season periods over Thessaly plain using the SEBAL (Surface Energy Balance Algorithm for Land) algorithm. SEBAL is an image-processing model comprised of twenty-five computational submodels that calculates evapotranspiration (ET) and other energy exchanges at the earth's surface. SEBAL uses digital image data collected by NOAA/AVHRR and AQUA/MODIS satellites measuring thermal infrared radiation in addition to visible and near-infrared. In this study, ET was computed as a component of the surface energy balance on a pixel-by-pixel basis for Thessaly. Satellite estimates of ET values were compared with reference ET values computed using data from ground-based weather stations.