**A Remote Sensing - hydrological modelling approach to estimate daily actual evapotranspiration.**

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**Keywords**: Remote sensing, SEBAL, Richards model, Actual Evapotranspiration, Eddy covariance.

**Abstract**

The quantification of the spatio-temporal dynamics of Evapotranspiration (ET) flows in natural vegetation is of fundamental importance for efficient water resource management and environmental modelling, particularly in the semi-arid areas of the Mediterranean. Satellite remote sensing-based surface energy balance (SEB) techniques have emerged as a very useful tool for quantifying actual evapotranspiration at various temporal and spatial scales. The free and long-time series data that Remote sensing (RS) offers, which is characterized by a relatively high spatio-temporal resolution, can be an added value for SEB modelling of ET. However, discontinuous data acquisitions of thermal remote sensing data due to temporal resolution of satellites and/or gaps in image acquisition due to cloud cover can limit RS utility. This study proposes a model-based approach for the construction of daily actual ET between the Landsat 8 acquisition days. The proposed HYDROSAT model integrates actual evapotranspiration (ETa) obtained by the Surface Energy Balance modelling on Landsat-8 acquisition days, RS vegetative biomass dynamics obtained from diverse platforms, on-field measurements of potential evapotranspiration and a hydrological modeling approaches of soil moisture in the root zone by using the transient flow Richards equation. The proposed approach aims for modelling the dynamics in the soil-plant-atmosphere continuum that occurs between two Landsat acquisitions to estimate the daily time series of ETa.