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# An integrated management system of field and satellite data for the hydrological cycle components evaluation

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Most of the hydrological models are now founded on the integration of field and satellite data. In fact, the use of remote sensing techniques supplies the frequent lack of field-measured variables and parameters required to apply evaluation models of the hydrological cycle components at a regional scale. These components are very sensitive to the surface features and conditions. For this reason, a regional model must account for the surface variability. In this context, remote sensing has become a basic tool since it allows the regular monitoring of extensive areas. Different surface variables and parameters can be extracted from the combination of the multi-spectral information contained in a satellite image. The surface can be characterized with a detail depending on the spatial resolution of the used sensor. Remote sensing represent a complementary contribution to methodologies of investigation *in situ*. It places in the *scenario* of the territorial planning and the environmental resources management as a tool that allows the study and the understanding of phenomena not in other way investigable, providing repeated and real time adjourned observations. Beside, taking information directly from the vegetation, rather than from the conditions of the atmosphere, satellite images allow to get a more direct respect of the croplands contribution to the soil-atmosphere energy fluxes. Naturally, the interest of these techniques is tied up to the existence of a solid correlation among the greatness to evaluate and the remote sensing information obtainable from the images, or to the possibility of using experimental and algorithmic procedures for the integration of *in situ* data and remote sensing information.

In this paper, it's proposed an integrated management system of field and satellite data for the hydrological cycle components evaluation. Particularly, a new methodology to estimate actual daily evapotranspiration at a regional scale, combining remote sensing techniques and field-measured data, is presented. A multitemporal sequence of satellite-based surface energy fluxes images are analyzed over an extensive area covering the whole Basilicata region (Southern Italy) characterized by a varied vegetation cover and different soil uses. A two-source energy balance model is used to retrieve the surface sensible heat flux and a balance between the longwave and shortwave radiation is applied to extract the net radiation flux. Finally, the evapotranspiration (LE) is obtained as a residual term of the energy balance equation. The different croplands are characterized from a local land use map, obtained by applying a supervised classification method, while the required meteorological variables are obtained by interpolating the data of several meteorological stations distributed within the region.

Maps of the different fluxes are performed and a comparison between the different dates is established, to obtain a seasonal course of the fluxes. Finally, LE results are compared with the field energy fluxes measurements from an Eddy Covariance station situated in Torre Montonata, Pisticci (MT – Southern Italy).