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Scale effect of land surface temperature on energy water balance model and its impact on evapotranspiration fluxes

Chiara Corbari (1), Victoria Hidalgo (2), Marco Mancini (1), and Josè A. Sobrino (2)

(1) Politecnico di Milano, DIIAR, Milano, Italy (chiara.corbari@mail.polimi.it), (2) Global Change Unit, Image Processing Laboratory, Universitat de Valencia, Valencia, Spain

The paper analyses the representativeness of land surface temperature for a distributed hydrological water balance model. The spatial resolution problem, that is an important task in hydrological modelling is discussed using LST from AHS (airborne hyperspectral scanner), with a spatial resolution between 2-4 m, LST from MODIS, with a spatial resolution of 1000 m, and thermal infrared radiometric ground measurements that are compared with the LST that solves the thermodynamic equilibrium of the energy balance model in FEST-EWB.
A distributed hydrologic model gives the opportunity to better understand this problem of spatial scale due to the fact that a distributed model predicts averaged variable values in each pixel. Moreover spatial autocorrelation and the scale of fluctuation of LST from FEST-EWB and AHS are analysed at different aggregation scales.
The acquisition time period is also critical for thermal images due to the non stable behaviour of the thermodynamic temperature, but also spatial heterogeneity induces non linear effects in land surface temperature retrieval.
The influence of the LST representativeness on latent heat fluxes is then discussed on the basis of the values retrieved from the hydrological model, AHS data and in situ measurements.
Land surface temperature relationship with soil moisture and evapotranspiration is also analysed.
The study site is the agricultural area of Barrax (Spain) that is a heterogeneous area with an alternation of irrigated and non irrigated vegetated field and bare soil. The used data set was collected during a field campaign from 10th to 15th July 2005 in the framework of the SEN2FLEX project.