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Soil-vegetation-atmosphere energy fluxes: Land Surface Temperature evaluation by Terra/MODIS satellite images

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Most of the hydrological models are by now founded on field and satellite data integration. 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 climatic and surface features and conditions. Remote sensing represent a complementary contribution to in situ investigation methodologies, furnishing repeated and real time observations. 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. In this context, satellite 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. Land Surface Temperature (LST) is a fundamental parameter to estimate most of the components of the hydrological cycle and the soil-atmosphere energy balance, such as the net radiation, the sensible heat flux and the actual evapotranspiration. Besides, LST maps can be used in models for the fire monitoring and prevention. The aim of this work is to realize, exploiting the contribution of the remote sensing, some Land Surface Temperature maps, applying different "Split Windows" algorithms and to compare them with the "Day/Night" LST/MODIS, to select the best algorithm to apply in a Two-Source Energy Balance model (STSEB). Integrated into a rainfall/runoff model, it can contribute to cope with problems of land management for the protection from natural hazards. In particular, the energy balance procedure will be included into a model for the 'in continuous' simulation and the forecast of floods. Another important application of our model is tied up to the forecast of scenarios connected to drought problems. In this context, they can contribute to the planning and the realization of mitigation interventions for the desertification risk.