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A continuous hydrological model for operational flood forecast exploiting satellite observations.

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When operational hydrologic forecast is of concern, models should have some important characteristics in order to obtain timely and reliable results for civil protection purposes. They should be continuous, distributed, robust and computationally fast. This work describes the implementation of the hydrologic model C-DriFt (Continuous Discharge River Forecast) that tends match all previous properties. The model includes the most important soil processes such as infiltration, subflow, deepflow, evapotranspiration and runoff routing. The modelling of deepflow process for the estimation of the ground water table dynamics is proposed through an innovative approach, which minimize the number of model's parameters. As distinctive charactheristic, the model has, among its state variables, Land Surface Temperature (LST). Evapotranspiration is explicitly evaluated through the evolution of LST as a response to the surface energy balance, modelled via the Force-Restore Equation, an approximation of heat diffusion in the soil. The introduction of LST as state variable allows the use of distributed observations of LST available from satellite as constrains for the model. Other forcings used by the model, such as long and short wave radiations, are available as operational satellite products. A comparison of the results obtained using operational products of the LSA SAF (Land Surface Analysis - Satellite Applications Facility) data archive in alternative to traditional ground observations is presented. The model is applied to the Casentino River using data recorded during the six-months period, from June to December 2005.