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Production of a two-years meteorological dataset with a coupling framework between a Limited Area Atmospheric Model and a sequential Land Surface Temperature Assimilation scheme

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The representation of the surface phenomena like the turbulent exchange of heat between the land and the atmosphere is a traditional weakness in the atmospheric models. These phenomena have been often neglected or poorly represented in the past, especially in the Global Circulation Models. The modern generation models (in particular Limited Area Models) present, on the opposite, much more accurate modelizations that require very complex parametrization, difficult or impossible to retrieve with sufficient accuracy. In this work remote sensed maps of Land Surface Temperature retrieved by MSG-SEVIRI sensor have been used in a 1D variational assimilation scheme in order to produce optimal estimates of the surface energy budget in terms of sensible and latent heat fluxes. This assimilation scheme, ACHAB, has then been coupled with the limited area atmospheric model RAMS replacing the surface module of the latter, LEAF-3, with the assimilation run products. A two years long meteorological dataset (March 1st, 2005 – December 31st, 2006) was produced on the Italian territory using this coupling framework. A control run was used in order to evaluate performances of the atmospheric model also in absence of the LST assimilation. Evaluations of the results of the coupling framework by comparison with both observations of the ground sensors network and atmospheric soundings available in the study period are presented.