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Evaporative fraction and energy fluxes estimations using multisensor satellite data: the case study of Basilicata (Southern Italy)

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Many water resources and forest management applications require the knowledge of evapotranspiration over a range of spatial and temporal scales. Satellite remote sensing can provide indirectly these measurements with a spatial coverage that is logistically and economically impossible to obtain through ground-based observation networks. The presented assimilation scheme allows the combined use of radiometric data from sensors with different resolution in order to obtain estimation of surface fluxes, fluxes portioning and related surface parameters. A simplified relation to estimate the degree of soil wetness, based on antecedent precipitation, is coupled to the soil surface energy balance equation. Introducing precipitation information allows a more robust estimation scheme and a better simulation of soil moisture condition and surface fluxes partitioning. The model is implemented over a semi-arid region of Southern Italy. Land surface temperature retrieved by SEVIRI, AVHRR and MODIS sensors is the assimilated state variable. The new generation of Meteosat geostationary satellites permits to easily implement this approach over mediterranean areas. The consistency of using Limited Area Model analyses as forcing data instead of interpolated micrometeorological data is investigated. LAM fields seem to be a good surrogate of ground measurements when the latter lack, and provide a better distributed dataset.