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Monitoring surface energy fluxes from Landsat over the Basilicata Italian region

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A sequence of three high-resolution satellite-based surface energy fluxes images were analyzed over an extensive area with a large variety of land uses. Two images from Landsat 7 (1999, 2002) and one from Landsat 5 (2004) were collected covering the whole Basilicata region (southern Italy). A two-source energy balance model was used to retrieve the surface sensible heat flux and a balance between the longwave and shortwave radiation was applied to extract the net radiation flux. Finally, the evapotranspiration (LE) was obtained as a residual term of the energy balance equation. The different croplands were characterized from the CORINE Land Cover land use maps and the required meteorological variables were obtained by interpolating the data of forty meteorological stations distributed within the region. Besides, atmospheric profiles from radiosoundings were used in the radiative transfer model MODTRAN 4.0 to correct the satellite data.

Maps of the different fluxes were performed and a comparison between the different dates was established. LE results were compared with some ground measurements and an analysis was made taking the land use classification as a basis. Finally, the feasibility of using lower-resolution satellite images to retrieve surface fluxes was also discussed.