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GIS applications for rainfall estimation

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The La.M.M.A. laboratory, managed by CNR IBIMET, produces near real time rainfall estimates based on new generation of geostationary satellites data, as METEOSAT Second Generation series.

The procedure, operating in an autonomous, operational mode, is based on a blended technique (Turk et al., 2000a; 2000b) that dynamically correlates brightness temperatures as measured by geostationary sensors and instantaneous precipitation levels, as computed by MW passive radiometer data (Ferraro and Marks, 1995; Ferrraro, 1997), by means of a statistical correlation (Crosson et al., 1996). In other words it merges the advantages of space resolution and refresh time (every fifteen minutes) of MSG data with rainfall estimation sensitivity of SSM/I observations.

The use of MSG satellite data certainly could expand the spatial and temporal coverage of rainfall estimation and improve the consistence with the nature and development of precipitating systems.

This satellite rainfall estimation technique needs calibration and validation tests, by use of “true” data as rain gauges and weather radar. However such rainfall measurements systems are generally characterised by uneven distribution, very limited spatial coverage and non uniformity (rain gauges give point and time-cumulated measurements, weather radar measurements are spatially limited and many of them in the Mediterranean area are not carefully calibrated).

The availability of a system capable to operate cross-comparison, overlapping, and integration of such heterogeneous data comes out as a priority for calibration/validation

purposes of the different estimation techniques, and their application to different operational contexts.

The GIS environment application seems to be an optimal and flexible way to perform data comparison and merging, enabling precise geolocations and the management of different data layers such as cloud-coverage, orography, forecasted fields, etc.

Preliminary results of such a system are shown, as well as its potentiality for different meteorological applications.