



Validation of a MSG-based satellite rainfall estimation algorithm over the Euro-African area

S. Melani (1,2), A. Antonini (2,3), G. Giuliani (1,2), V. Levizzani (4), A. Orlandi (1,2), A. Ortolani (1,2), **G. Maracchi** (1,2)

(1) Institute of BioMeteorology, National Council of Research (IBIMET-CNR), Florence, Italy, (2) Laboratory for Meteorology and Environmental Modeling (LaMMA), Florence, Italy, (3) Hydrological Service of Tuscany Region, Florence, Italy, (4) Institute of Atmospheric Sciences and Climate, National Council of Research (ISAC-CNR), Bologna, Italy

Two years of operational satellite-based precipitation estimates at LaMMA (<http://www.lamma.rete.toscana.it>), merging MSG observations and SSM/I data, have produced an homogeneous data set wide enough for significant validation tests. The area covered spans from continental Europe to central Africa, and the sampling frequency is of 15 minutes. The analysis of such data has been primarily focused on two areas, due to their importance relatively to LaMMA operational tasks:

- Tuscany (in central Italy), because of the institutional role of LaMMA, that covers nowcasting and forecasting of extreme weather events (of interest for Civil Protection);
- Sahel, on which some initiatives strictly linked to precipitation estimation are now active, aiming to monitor and to forecast the agricultural productivity and locust cycles (to mitigate the effects of associated disasters).

Precipitation estimates are cumulated over 1 hour for validation on Tuscany area, while on Sahel the data are cumulated over 5 and 10 days. On both areas, the rainfall estimates have the MSG full space resolution (3x3 km² at nadir). A comprehensive validation work has been programmed in order to estimate errors and limits of applicability of the precipitation estimates. Here we present a large part of it, where the algorithm performances are tested under a wide variety of meteorological conditions (due to the different climatic conditions occurring in Tuscany and Sahel). Due to the differences in space and time scales of directly measured and estimated data in the

two areas, different statistical approaches have been applied in the validation process. Directly measured validation data for both regions come from rain-gauge networks, which are almost homogeneously dense in Tuscany and very sparse in Africa, thus conditioning the validation approach in some way. Results show a number of very interesting patterns that clearly suggest some improvement roadmaps to be investigated.