A new regional RADAR network for nowcasting applications: the RESMAR achievements

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Monitoring weather phenomena from radar has an essential role in nowcasting applications. As one of the most useful sources of quantitative precipitation estimation, rainfall radar analysis can be a very useful research tool in supporting methods for rainfall forecasting. Its short-term prediction is often needed in various meteorological and hydrological applications where accurate prediction of rainfall is essential from national service and civil protection forecasting up to agriculture and urban issues. Very recently, Tuscany region (central Italy) is equipped with two X-band radars with a maximum range of 108 km, a beam width of 3° and a high spatial resolution (i.e. radial resolution up to 90m), located in Livorno and Cima del Monte (Elba island) sites. The first system is property of Livorno's port Authority, the second one of Consorzio LaMMA (Laboratory of Monitoring and Environmental Modelling for the sustainable development) who has installed it in the framework of "RESMAR – Environmental Resources in the MARitime Space" activities, a strategic project, financed in the framework of the European Cross-Border Cooperation Programme Italy-France "Maritime", coordinated by the Liguria Region Administration. Both systems are managed by LaMMA.

The cross-border sharing of such relevant meteorological observation instruments and the integration of these data with existing tools and methodologies is intended to improve operational regional weather services in nowcasting activities and their impacts on the territory, as those related to LaMMA daily issues. This sharing is widely promoted within RESMAR project between the different partner regions (ARPA-Sardinia, Meteo-France and Liguria).

The integration of these data with other complementary and ancillary measurements is also needed to increase the reliability and accuracy of radar measurements in view of both a better meteorological phenomena understanding and quantitative precipitation estimation. The use of satellite data largely improves the spatial and temporal information on the events, filling up the gaps of uneven data distribution; for this issue LaMMA has multi-year skills in the acquisition and processing of geostationary and polar satellites. The regional raingauge network and meteorological stations will be instead used to obtain useful information both to calibration (as those related to radar reflectivity - rain rate relationships) and validation processes.

The radar system and its mosaicking will be presented, as well as some preliminary products.