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Rainfall field reconstruction over Italy through lightning data.

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Italian Air force Meteorological Service set up a lightning network and put it in operation during 2004: LAMPINET. The network is based on Vaisala technology with 15 IMPACT ESP sensors distributed on the peninsula and islands. Basic requirements for the design of the network were highest reliability and easy integration with lightning detection networks managed by other National Meteorological Services.

Italy still suffers of suboptimal weather radar coverage, principally due to orography complexity, high cost of maintenance, radar-gauge inter-calibration. After the start of operation of LAMPINET the Italian Air force Meteorological Service developed tools to integrate lightning information with other systems producing weather data, such as satellite images or satellite post-processing products.

Object of this paper is to present the tool developed at the Centro Nazionale di Meteorologia e Climatologia Aeronautica, Pratica di Mare, Italy, during a fellowship sponsored by Galileo Avionica, Firenze, Italy. The tool reconstructs from LAMPINET data the rainfall field, producing in near real time a radar-like SRI (Surface Rainfall Intensity), in a robust way, filling the gaps of weather radar coverage over Italy.

The generated product is used operatively for the nowcasting of intense precipitating phenomena; two major studies will follow: 1) the role of the reconstructed rain field in storm development and dynamics, describing latent heat release in deep convective clouds, to better initialize mesoscale numerical models over the sea, lack of observation, or near storm central depression; 2) the use of lightning observation to construct

climatological records for precipitation in regions there is no synoptical observation.