# Rainfall monitoring using a regional X-band radar network

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Weather radars have been offering prompt surveys of precipitating clouds, their structure and development. Recently, their diffuse use and technical development has been subjected to a sharp acceleration.

X-band radar systems offer implementation solutions with reduced costs compared to the more common C- and S-band systems. Their usefulness in monitoring and assessing the dynamics of precipitating systems have been widely proved, as their reliable use in operational weather nowcasting systems.

Conventional weather radars still offer better performances and higher measurements accuracies as compared to X-band systems. Conversely, these latter can provide much higher resolutions although with reduced spatial domains; they also allow using very reliable technologies, compact size with virtually no impact on landscape and simplicity of installation.

LaMMA Consortium, as regional meteorological service of Tuscany, has recently implemented a X-band weather radar network that partially overlaps and completes the Italian national one over the high Tyrrhenian area. Three radar systems have been installed, specifically in the Elba Island, Livorno harbour and Castiglione della Pescaia (near Grosseto), covering most of Tuscany coasts.

The results of the observing system implementation will be presented. As the radar systems are not coherent, a special effort was made to remove the clutter signal due to not weather fixed echoes in the radar scans. Moreover the radar proximity to the sea introduces additional clutter disturbances. To these issues, different algorithms were implemented for sea and land clutter removal, respectively. A non-conventional 3D geolocation and a mosaic algorithm were also implemented as a significant part of the process for the assessment of radar quality and performances.

Finally, a preliminary evaluation of the monitoring products was made analyzing different case studies in order to investigate radar behavior under different precipitation regimes and seasonality.