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The operational platform XTREM for rainfall measurement and monitoring

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Nowadays in the risk management field, new tools to anticipate extremes meteorological events are in development. Over the last 20 years, the occurrence of such types of events has increased and today they represent a serious threat for human activities and health. In particular, local and intense precipitation events cause significant damages on private and public materials and properties and even loss of lives, especially in vulnerable areas such as urban or mountain environments.
The XTREM platform (X-band radar and operational plaTform for high REsolution precipitation Monitoring and forecasting) is an operating system designed to monitor, quantify and even forecast rain events with high time and space resolutions. This is also a useful tool for decision support in the environmental risk management domain.

The main instrument of XTREM is an X band radar which is able to measure precipitations with high spatial and temporal resolutions (100 m, 1 minute) on local areas, in real time and continuously, in addition to the existing meteorological radars network. This radar is particularly well adapted in urban areas or in complex orography regions (such as mountains).

In this communication, the data processing of X band radar data will be first described, then the XTREM platform products will be presented.
Concerning the data processing, the first step is to estimate the attenuation due to the hydrometeors. Then the conversion of reflectivity in rain rate R is made with specific Z-R relationships to provide accurate estimates. Thanks to a system of alerts with customizable thresholds, the real time mode will generates useful information to users to anticipate risks linked to strong rainfall, such as an estimation of the rain height and cumulative rain on defined areas. XTREM is also able to integrate a rain gauge network. The user gets the opportunity to compare in real time radar retrievals with rain gauge data, which allows assessing radar retrievals accuracy. XTREM includes also nowcasting/forecasting products, derived from various methods (extrapolation technique, blending with numerical modelling). Furthermore, an analysis mode is available to study in details a specific event. In this mode, more scientific tools are available (various attenuation calculation methods or various Z-R relationships) in order to carry detailed investigation on particular events observed.
Finally, the case study of a local and strong precipitation event which took place in Clermont-Ferrand will be presented, showing the products and impact provided by XTREM.