Warning procedures for extreme events in the Emilia-Romagna Region

Anna Fornasiero
ARPA Emilia-Romagna, Italy

Celano, Miria (ARPA Emilia-Romagna)
Amorati, Roberta (ARPA Emilia-Romagna)
Poli, Virginia (ARPA Emilia-Romagna)
Alberoni, Pier Paolo (ARPA Emilia-Romagna)

E-mail: afornasiero@arpa.emr.it

Recently the Emilia-Romagna Region has been hit by several extreme events, among which heavy snowfalls, severe thunderstorms and flash floods, that caused damages and fatalities. This highlighted the need to predispose guidelines for operational procedures to support forecasters in monitoring and nowcasting activities, also according to the National Civil Protection requirements.

The aim of this work is to define season dependent procedures making use of radar and satellite products and data from ground stations. The first task deals with the identification of the products playing a key role for any relevant meteorological situation. Then warning thresholds are evaluated by means of statistical analysis and literature research.

The summer procedure partially refers to the 2 years-experiments (2010 and 2011) of thunderstorm detection and monitoring carried on by ARPA Emilia-Romagna. In that pilot project some radar indicators, such as thresholds over 1h-accumulated precipitation, had been already identified. In the new scheme, additional products, including velocity-azimuth display (VAD), 45 dBZ-echo top, vertical integrated liquid (VIL), hydrometeor classification and probability of hail (POH) are taken into account. Moreover some satellite information are considered (i.e. HRV-enhanced IR) and the RDT (Rapid Development Thunderstorm) of the SAFNWC is implemented and tested.

In winter events different products are considered; among the radar products the vertical profile of reflectivity, the identification of the zero-degree height and the hydrometeor classification are used in addition to other several information provided by ground stations (i.e. snow layer depth or river level for floods).

To assess the features and the reliability of the presented warning procedures, some winter and summer case studies are analyzed.