EMS Annual Meeting Abstracts
Vol. 12, EMS2015-34-4, 2015
15th EMS / 12th ECAM

Importance of a good density rain gauge network to better estimate weather radar measurements

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In this study we want to highlight the importance of having a good density rain gauges network to analyze the precipitations and to monitor and forecast extreme events. In Piemonte (Italy) there is the availability of both a C-band polarimetric Doppler weather radar and several rain gauges belonging to two networks: ARPA Piemonte (the Regional Agency for Environmental Protection) and RAM (the Agro-Meteorological Network). To increase the analysis accuracy in determining the amount of rain, we have calculated the extreme events and their thresholds in order to reconstruct the rainfall field comparing weather radar observations with ground rain gauges measurements. In the first step of this analysis we have taken into account a single rain event and a single gauges network. This network is composed by more than 350 rain gauges over 25,000 km2. The second step of this study consists in improving the previous estimations by adding rain gauges belonging to the RAM, increasing the gauge density globally from one gauge every 70 Km2 to one every 50 Km2 but, locally to the event, from one station every 140 Km2 to one every 70Km2. This allowed to obtain a better estimation of average and extreme values.