POLARIMETRIC DOPPLER RADAR ANALYSIS OF THE 3 AUGUST 2006 SUPERCELL STORM .

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I. INTRODUCTION

On 3rd August 20065 a Supercell storm sweep over the eastern part of the Po Valley, this study present an analysis on the case using the ARPA-SIM polarimetric C-band radar network.

It is well known that radar reflectivity measures are affected by a wide spectrum of error sources. Their variable effect in time and space is the major limitation to the systematic use of radar informations in the description of severe storms. The correction procedures implemented commonly in the systems managing radar data are often not complete to handle each type of problem or they are not able to totally remove their impact; the efficiency is also a function of the type of event.

In convective cases, attenuation, ground clutter, hail echo, melting zone, high dis-homogeneity in the DSD should be correctly considered to extract a valuable information from radar data and to avoid mistakes in radar images interpretation. In order to reduce such problems quality flags have been used in reconstruct radar fields (Fornasiero, 2006, Fornasiero et al. 2005).

Further, polarimetric Doppler C-Band radars are strategic instruments for the 3-D reconstruction of thunderstorms, allows to identify the prevailing hydrometeor type and their spatial distribution within the meteorological event and the dynamic evolution of the cloud system. A fuzzy logic hydrometeor classification scheme, developed at the National Severe Storms Laboratory (NSSL, Zrnic et al., 2001), and recently extended from S-band to C-band radar data (Marzano et al., 2006), is used to detect the microphysical structure the event.

To better localize the storm position and the locations damaged during its evolution the high-resolution Google-Earth visualization platform have been used (Smith and Lakshmanan 2006).

II. CASE STUDY ANALYSIS

On 3rd August 2006 a Supercell storm sweep over the Po Valley. Fig. 1 shows a time frame of such event and the associated quality index pattern. The occurrence of severe attenuation is highlighted in a cone-shape feature behind the storm core.

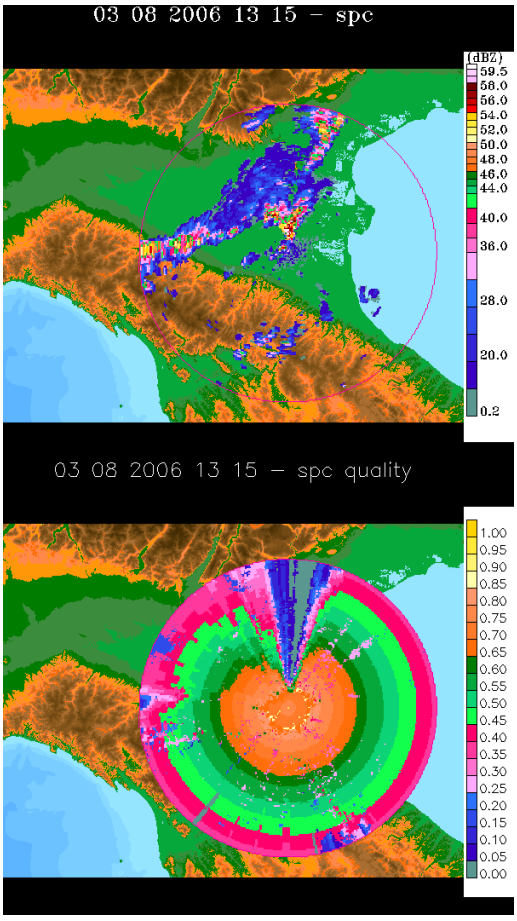

FIG. 1: 03-08-2006 13:15 UTC San Pietro Capofiume radar; (above) radar reflectivity map; (below) quality index map.

A first immediate advantage offered by the quality descriptor is that it 'warns' the data user about possible bad quality of data in some areas of radar fields and 'invites' him to critically consider the information in such areas; the second considerable advantage is that it permits to merge multiple radar data in a selective way, offering a method to

generate the 'best data' composed field.

The occurence of such a system, the strong winds associated and the hailfall are at the bottom of the heavy damge observed.

The Doppler analysis detected the presence of the typical Supercell vortex, while unfortunately the hydrometeor classification was limited by the strong attenuation phenomenon.

Radar products have been geo-located and visualized using the Google Earth platform, allowing a detailed analysis of the storm path and a comparison with damages report.

III. RESULTS AND CONCLUSIONS

The quality concept is applied to this Supercell case. An extended analysis, based on the informations extracted from the reflectivity radar data, has been carried out. The capability of the quality descriptor to improve the information extracted from radar data is hence discussed.

A meteorological description has been carried out and linked with the Doppler-polarimetric analysis of severe events, to complete event reconstructions.

Further Google-Earth as been applyed to provides an easy-to-use GIS platform that allows a easy real-time integration of different data, that can be very helpful in the operational application and monitoring.

IV. AKNOWLEDGMENTS

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V. REFERENCES

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