FLASH FLOOD ON NORTHERN COAST OF SPAIN ON 27 JULY 2006

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I. INTRODUCTION

During the morning and early evening on 27th July 2006, a cloudy line, with very strong convective activity moved along the coastal line of Asturias and Cantabria, in Northern Spain on the Central Coast. They caused very strong rainfall, with torrential intensity: more than 60 mm/h (in city of Santander, 116 mm/h between 13:20Z and 13:50Z), with a large quantity of lightning discharges and strongs winds (more than 90 Km/h).

This cloudy system moved along the coast but, the south side affected some coastal villages and the city of Santander. No hail occurred. Local flooding happened.

II. PRESENTATION OF RESEARCH

Echotop and vertical profile (CMI) images from radar are shown. In these images, we can see the large vertical development that reached the convective clouds. In echotop images it is possible to see echoes of more than 12 dbz (threshold of detection) at 14 Km high, even 16 Km high (Fig. 1).

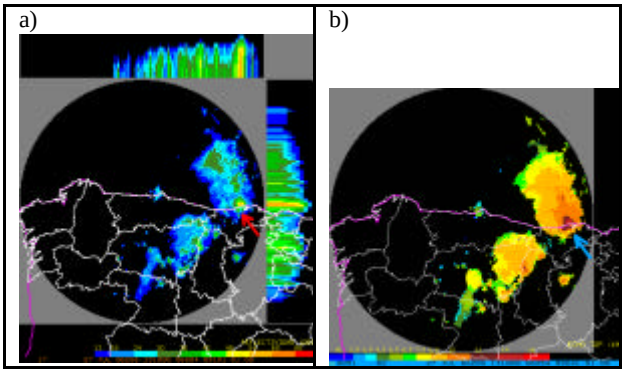

FIG 1: a) Vertical profile 13:10Z, 27th July 2006 b) Echotop image 13:10Z , 27th July 2006

In the images from YRADAR application, the characteristics and movement of each convective cell can be appreciated, with a very important signal from the cell that produces the flash flood . YRADAR is a tool, developed in INM and currently used in daily forecasting. Its aim is to identify, monitor, describe and extrapolate the convective cells, with radar and numerical models (Fig 2.)

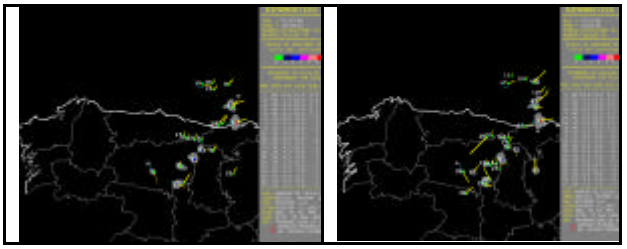

FIG 2. YRADAR images 13:00Z Y 13:10Z , 27th July 2006.

In Fig 2, the characteristics and forecast development (one hour maximum) from convective cells are depicted .

Lightning discharge images show a great density of lightning, this is typical in "cold type" convective rainfalls. In addition, there was a high percentage of positive lightning; that is common in this type of case, with heavy rainfall. Fig. 3

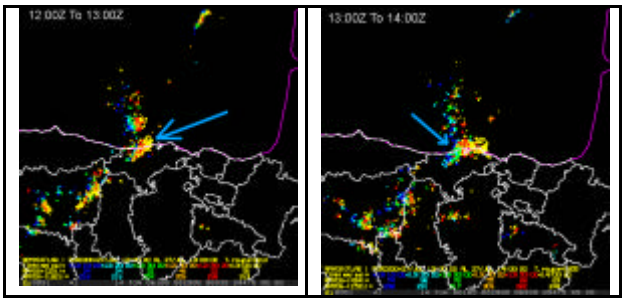

FIG 3. Lightning between 12Z and 14Z, 27th July 2006

III. RESULTS AND CONCLUSION

The mean characteristics in this case were:

- Moderate vertical shear : CIZBL6 more than 12m/seg
- High values both in instability index and precipitable water.
- Moderate CAPE
- Heavy rainfall (more than 60 mm/h)
- Very strongs winds (more than 90 Km/h)
- Great lightning activity
- Very high values in echotop images from radar (more than 14 Km).
- Deep convection, "cold type" ordinary cells

Flash flood forecasting is especially important, because they produce damages. In many cases, this forecast is not easy, because they are very local and they are influenced by mesoscalic characteristics that meteorological models can´t resolve nowadays. In this case, a possible favorable side-effect could be the high temperature of the Cantabrian Sea during that summer.

For this reason and, in case of the possibility severe convection is confirmed (with meteorological forecasting models, sounding, satellite imagery, etc) it´s necessary to pay special attention to real- time surveillance on radar images.

For this aim, the YRADAR tool is very useful.It is necessary to bear in mind the possibility of errors, because this tool uses both data from the model and radar, for making the forecast.

IV. REFERENCES

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