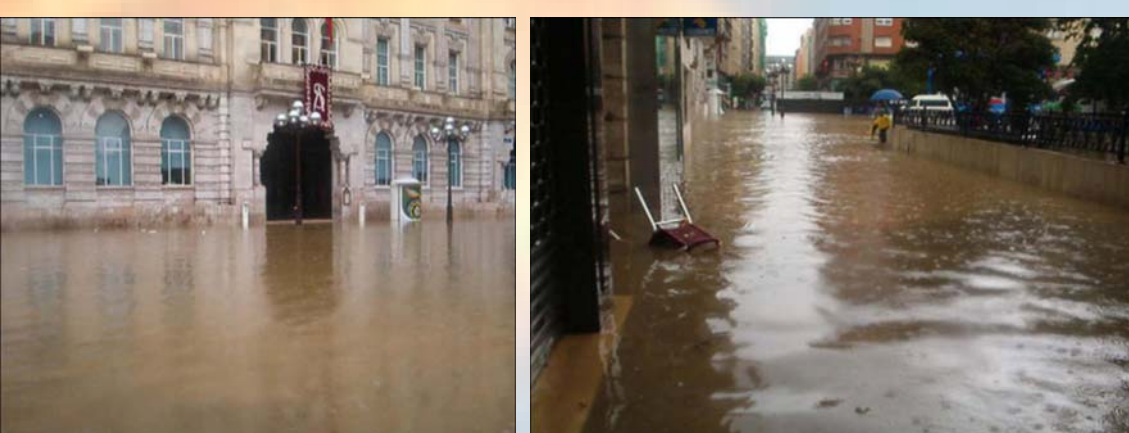


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INTRODUCTION

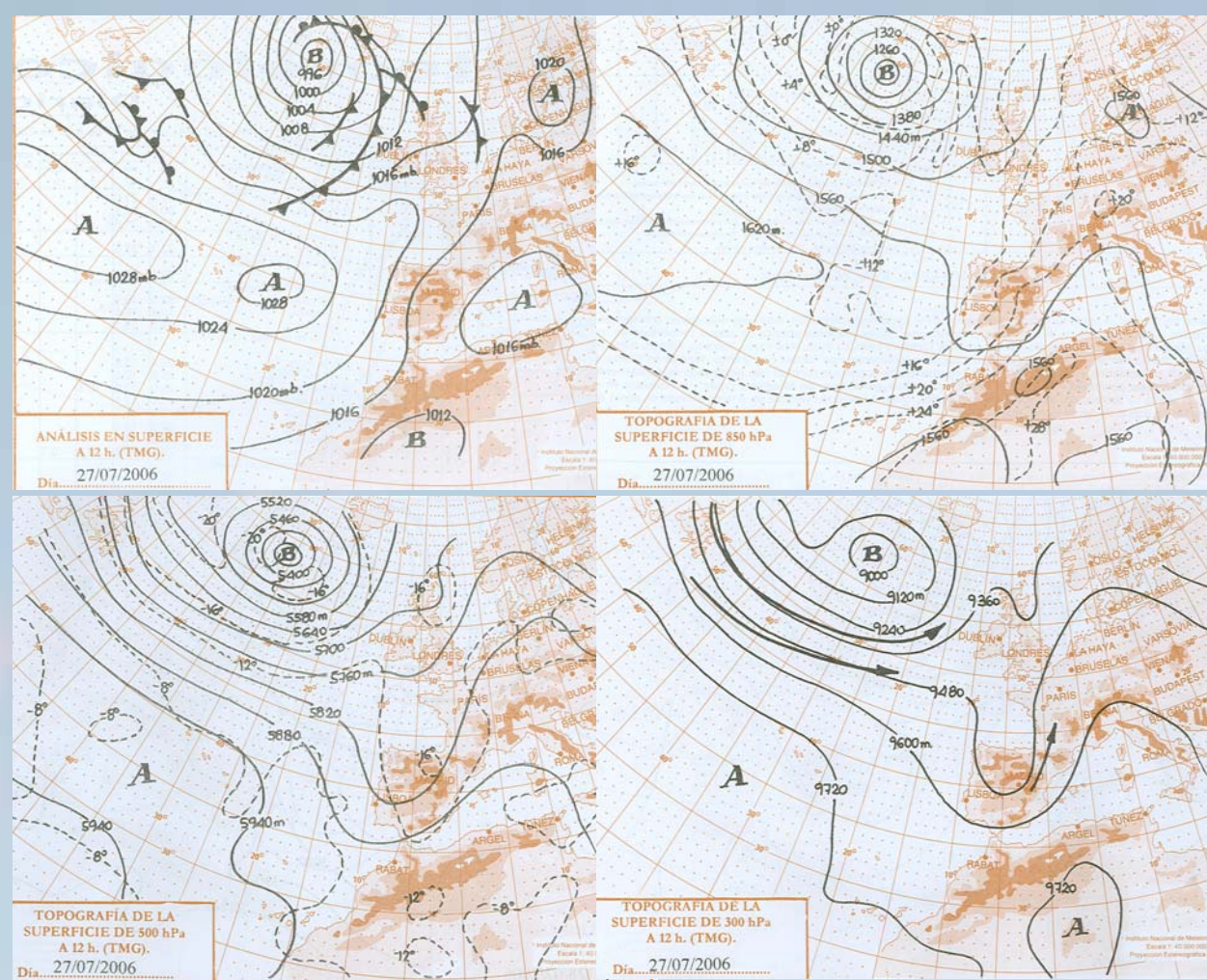
During the morning and early evening on 27th July 2006 a cloudy line, with very strong convective activity, moved along the coastal line of Asturias and Cantabria, in Northern Spain, on the Central Coast. They caused very strong rainfall, with torrential intensity: more than 60 mm/h (in city of Santander 116 mm/h between 13:20Z and 13:50Z: Total: 57,6 l/m²) with a large quantity of lightning discharges and strong winds (more than 90 Km/h). This cloudy system, moved along the coast but, their south side, affected some coastal villages and the city of Santander. No hail occurred. Local flooding happened.



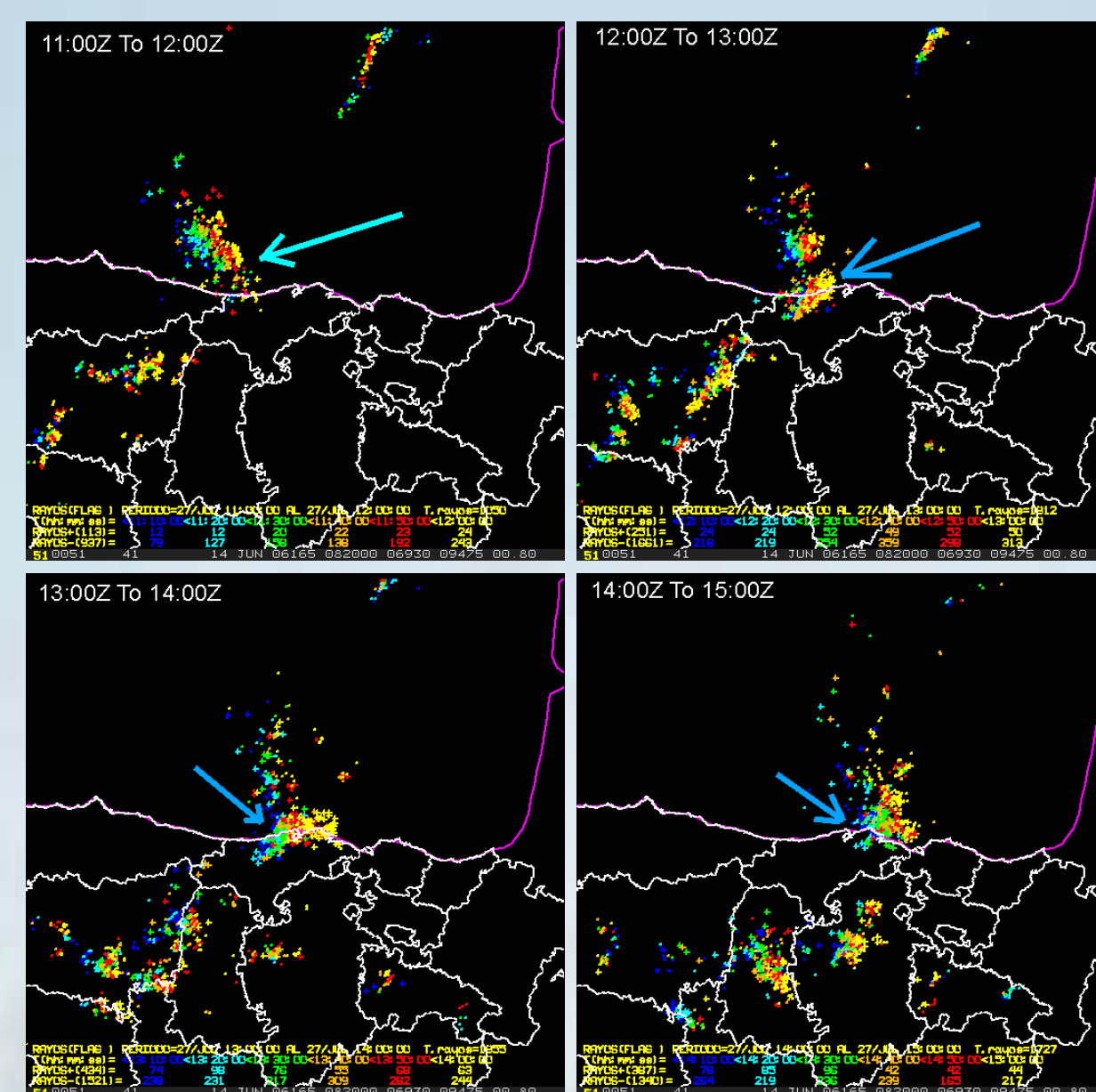
FLASH FLOOD; "A Flood that rises quite rapidly with little or no advance warning, usually as a result of an intense rainfall over a small area or, possibly, an ice jam, a dam failure, etc" (OMM Vocabulary)

"COLD TYPE" CONVECTIVE RAIN : "A type of rain which extends over a large part of the troposphere and has strong echoes (radar images) at high levels. They are supported by strong and deep updraught, so that their balance level is near the tropopause. In the strictest sense, they are clouds in which the majority of the formation of precipitations particles takes place at cold or very cold temperatures: the formation of liquid or solid precipitation occurs, the majority of the time, from ice particles, graupel and supercooled water

SYNOPTIC SITUATION 27-7-2006 12Z

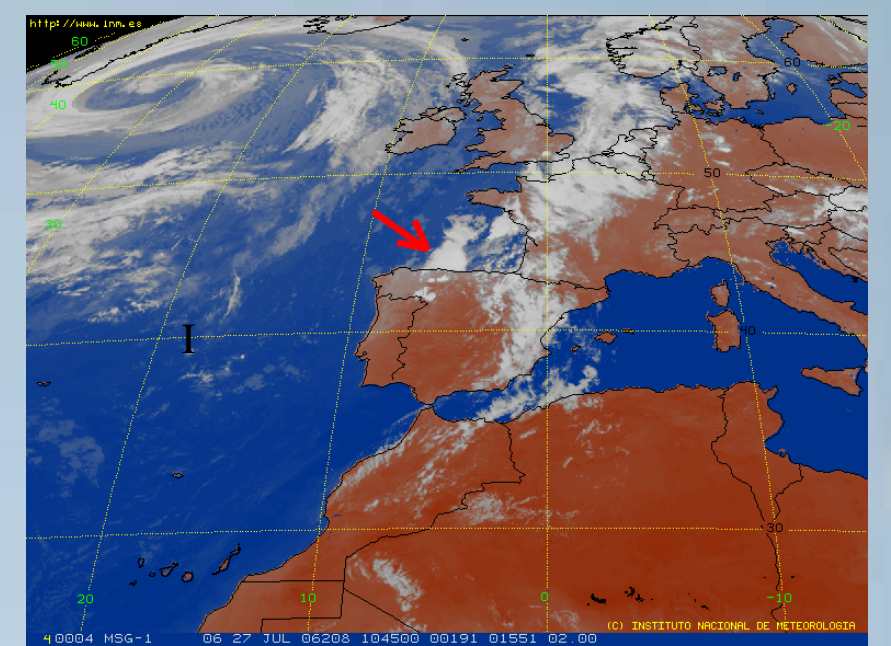


LIGHTNING FROM 11Z TO 15Z

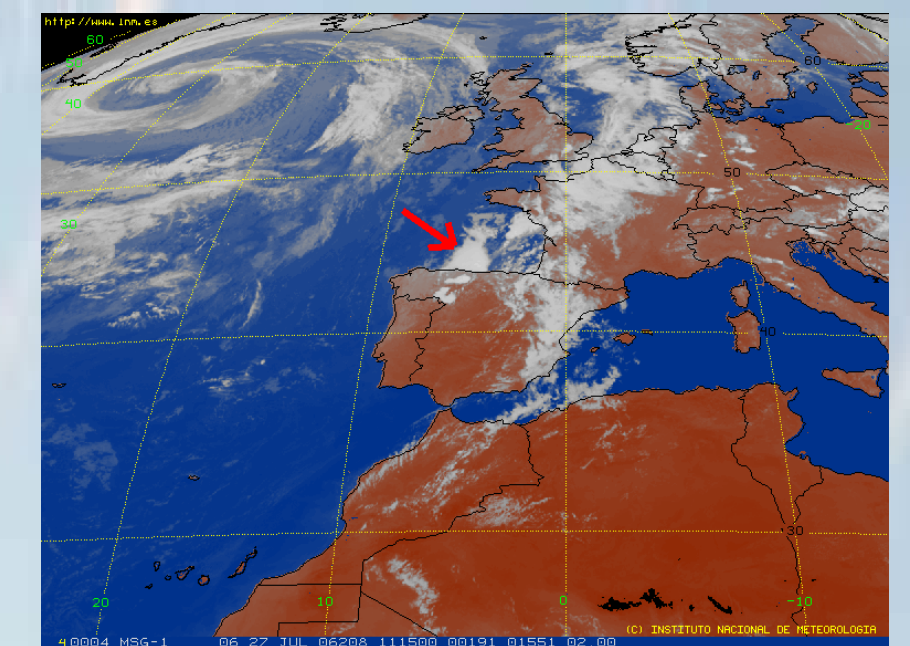


High lightning density and high percentage of positive lightning

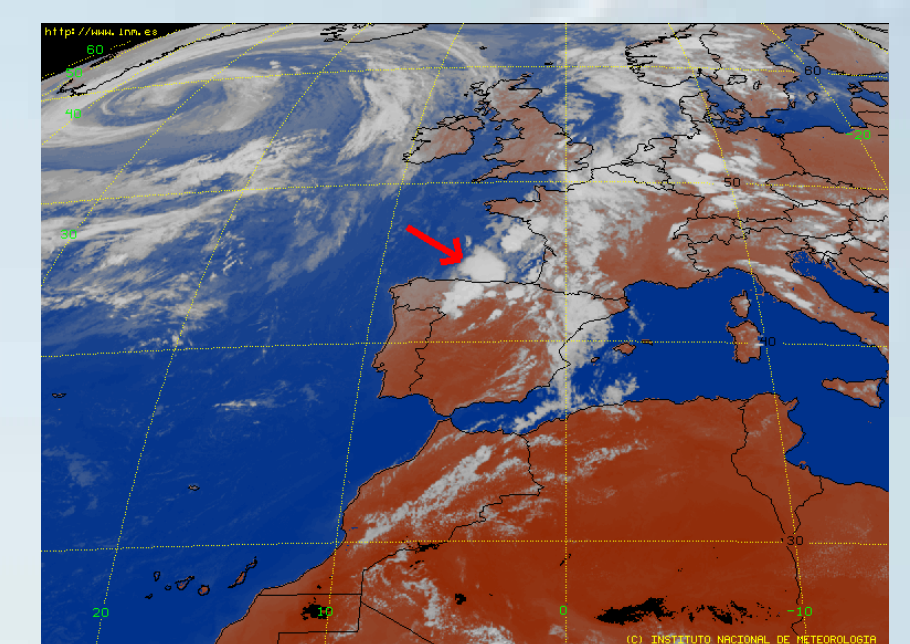
SATELLITE IMAGERY : IR



IR 27-7-2006 10:45Z



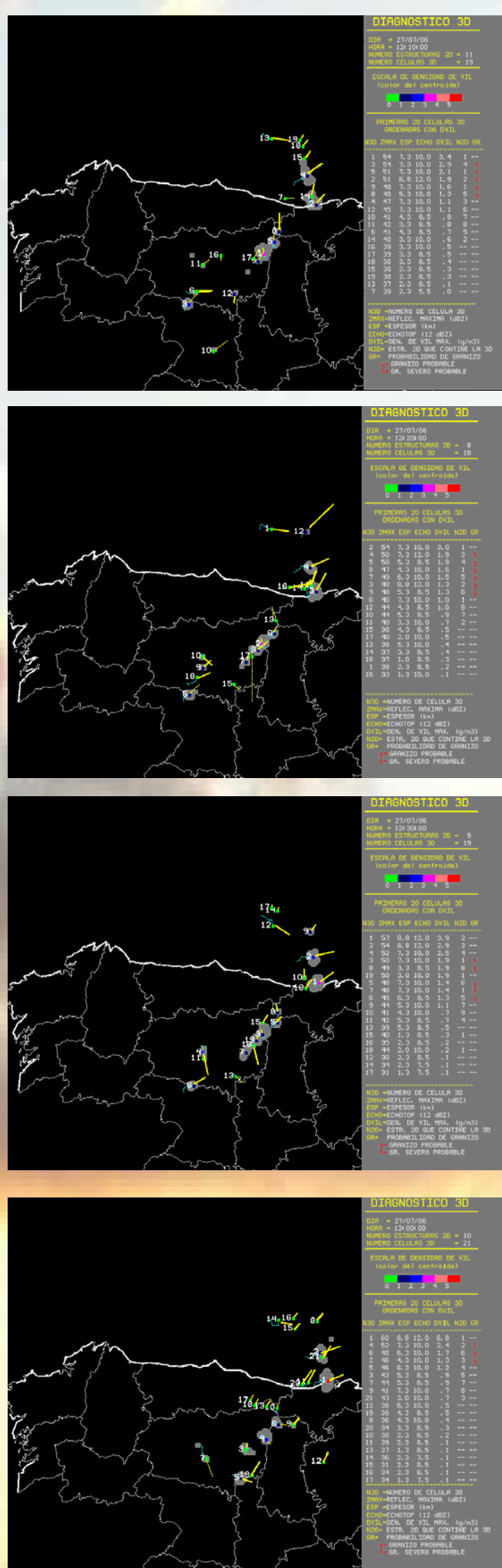
IR 27-7-2006 11:15Z



IR 27-7-2006 13:15Z

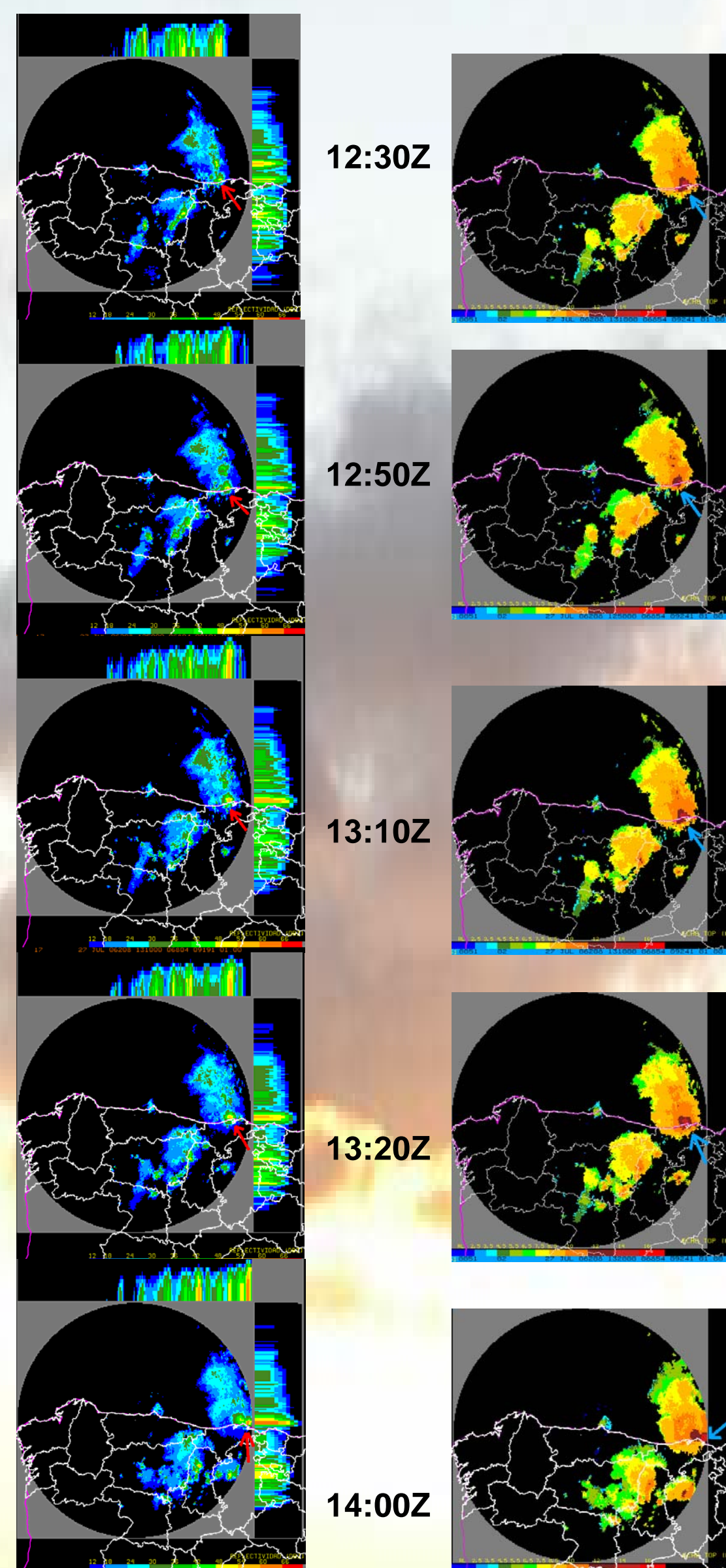
YRADAR

It is a forecasting 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.



12:10Z
 12:20Z
 12:30Z
 13:00Z

VERTICAL PROFILE AND ECHOTOP (RADAR IMAGERY IN NORMAL MODE):



12:30Z
 12:50Z
 13:10Z
 13:20Z
 14:00Z

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 strong 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

CONCLUSION

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 mesoscale characteristics that meteorological models can't resolve nowadays. In this case, a possible favourable side-effect could be the high temperature of the Cantabrian Sea during that summer.

For this reason and, in case of the possibility of 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.-

Radar C- band; beam elevation: 0.5°; Res: 2Kmx2Km; Coverage (normal operational mode): 240 Km in radio; Wave length: 5 cm