

The impact of two assimilation techniques in two tornadoes cases

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The improvement of relative humidity, precipitation patterns and the quantitative precipitation forecast (QPF) in short-range forecast is one of the main priorities of mesoscale model researches. Several studies have been carried out at Meteorological Service of Catalonia (Meteocat) in order to optimize the ingestion of radar and satellite data, as well as automatic weather station data, in the operational mesoscale models (MASS and MM5). In this way, two different techniques are tested: the Local Analysis and Prediction System (LAPS) developed by NOAA and the Incremental Analysis Updating (IAU) developed by NASA.

The IAU was implemented at Meteocat in 2003, and LAPS during this year. As a part of the verification process these techniques are also applied to two tornadoes events (autumn of 2006). In both cases, there was precipitation associated with the pass of a squall line. However, the interaction between the frontal gust of the storms and local winds, determined by topography and synoptic conditions, might have played an important role in the initial state of development of the tornadic storms. Consequently, the main features at low levels (wind, temperature and humidity fields) are analysed to verify if there is any improvement in the forecasted variables with these two techniques such as it has already been observed in the QPF.

In both cases, the operational models are initialized with data from global models and observational data. A coarse and nested domain of 36 and 12 km of horizontal resolution respectively have been used. Concerning to the assimilation techniques, LAPS has been applied in MM5 model and IAU in MASS model, both run twelve hours before the event occurs.