

TORNADOES OVER COMPLEX TERRAIN: AN ANALYSIS OF THE 28th AUGUST 1999 TORNADIC EVENT IN EASTERN SPAIN

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On 28th August 1999, a tornadic storm developed during the afternoon over the Gudar range, near the border between Teruel and Castellón provinces (eastern Spain). The area is dominated by complex terrain with peaks up to 2000 m. At least one tornado developed which attained F3 intensity, producing severe damage in the forest that covers the mountains. The region can be considered as a convective storm nest during the summer months, since most of the days convection is triggered over the complex terrain within a synoptic environment strongly influenced by the Iberian thermal low.

An overview of the meteorological situation on 28th August 1999 shows warm and moist air advection at low levels towards the interior of the Castellón province. Meanwhile, a trough crossed the Iberian Peninsula from west to east at upper levels, with cold air associated with it. Meteosat images reveal that the deep convection developed during the afternoon when the upper level trough reached the area where warm and humid mediterranean air was concentrated. Quasigeostrophic diagnosis, using ECMWF grid data, supports this idea.

In order to study the influence of the orography on the ingredients associated with the tornadic storm development, a numerical simulation of the event has been performed using the non-hydrostatic MM5 model. Very fine grid resolution, up to 2 km in the horizontal, allows us to determine the role of the complex terrain in favoring environmental conditions associated with the onset of severe convection, such as helicity, CAPE and water vapor convergence at low levels.