



Sounding-derived parameters associated to tornadic storms in Catalonia

Oriol Rodriguez (1) and Joan Bech (2)

(1) University of Barcelona, Astronomy and Meteorology, Barcelona, Spain (orballester@gmail.com), (2) University of Barcelona, Astronomy and Meteorology, Barcelona, Spain (joan.bech@ub.edu)

Existing climatologies indicate that Catalonia (NE Spain) is one of the regions with highest tornadic activity in the Iberian Peninsula (Gayà 2011, Gayà et al 2011), typically with 2 to 4 tornado days per year, despite tornadoes are usually weak (mostly EF0 and EF1 and only 11% EF2 in the 2001-2014 period). The purpose of this study is to characterize days with tornadic activity using sounding derived parameters based on similar studies carried out previously studying the pre-convective environment such as those reported by Rasmussen and Blanchard (1998), Monteverdi et al (2003) or Groenemeijer and van Delden (2007).

A dataset has been built considering different types of thunderstorm activity, in total 120 soundings: 23 tornadic days, 17 waterspout days, 40 non tornadic thunderstorm days (days with thunderstorm detected in Barcelona, but without tornadic events) and 40 dry days (no precipitation in a 50 km radius around Barcelona). Sounding parameters included among others CAPE, SWEAT index, SRH (0 to 3 km) and wind shear (0 to 6 km) while sounding station selection was made taking into account the proximity of the tornadic event and the direction and velocity of the air mass of the pre-convective environment.

Results presented are generally consistent with previous studies providing thresholds and ranges of values for each type of storm activity and occurrence. A specific analysis of SWEAT and SRH values has been carried out to try to distinguish between the occurrence of EF0 and stronger tornadoes.

References

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