



Tornadic storms in the Iberian Mediterranean area and Balearic Islands: study of sounding-derived parameters

Oriol Rodriguez, Joan Bech, and Sergio García
University of Barcelona, Barcelona, Spain (joan.bech@ub.edu)

Spain is affected by tornadoes every year and Balearic Islands and the Iberian Mediterranean area, where regions as Catalonia, Valencia and Murcia and Andalusian provinces of Almeria Granada and Malaga are located, concentrate about 50% of tornadoes (Gayà 2015) in only one fifth of Spain surface. In this area, our region of study, between 2000 and 2012 150 tornadoes have been recorded. Even most of them are weak, 56% of EF0 and 38% EF1 in the Enhanced Fujita Scale, there have been some EF2 cases which have affected important infrastructures and densely populated areas. With the objective of improving our understanding of average upper air conditions for these events and also to support operational forecasting and surveillance tasks an analysis of sounding derived parameters has been performed. Sounding data from Barcelona, Palma, Zaragoza, Murcia and Madrid (Spain), Gibraltar (United Kingdom) and Oran-Senia and Dar-El-Beida (Algeria) radiosonde stations have been used to describe upper air conditions for every tornadic event. The method to assign a sounding to a tornadic event is based on Rasmussen and Blanchard (1998). We have analyzed parameters used in storm forecasting as Surface-Based Convective Available Potential Energy (SBCAPE), Storm-relative Helicity (SRH) and wind-shear (WS), and also several composite parameters which are focused in supercell and tornado forecast as Energy Helicity Index (EHI), Vorticity Generation Parameter (VGP), Significant Tornado Parameter (STP), Supercell Composite Parameter (SCP) and Universal Tornadic Index (UTI). Results for the period and region of analysis are presented and discussed, in comparison with previous studies such as Groenemeijer and van Delden 2007 or Romero et al 2007. This study is performed with partial support from the Water Research Institute of the University of Barcelona and grant CGL2015-65627-C3-2-R (MINECO/FEDER).

Gayà M. 2015. Els Fribolts a Espanya: Climatologia i catàleg de tornados i trombes (Whirlwinds in Spain: Climatology and Catalog of Tornadoes and Waterspouts). Universitat de les Illes Balears: 441 pp.

Groenemeijer PH, van Delden A. 2007. Sounding-derived parameters associated with large hail and tornadoes in the Netherlands. *Atmos. Res.* 83: 473–487.

Rasmussen EN, Blanchard DO. 1998. A baseline climatology of sounding-derived supercell and tornado forecast parameters. *Wea. Forecasting* 13: 1148–1164.

Romero R, Gayà M, Doswell CA. 2007. European climatology of severe convective storm environmental parameters: A test for significant tornado events. *Atmos. Res.* 83: 389–404.