

Convective modes associated with Lightning Jumps

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Lightning “jumps” (LJ) are sudden increases of electrical activity (mainly of the intra-cloud fraction) and are directly related to the strength of the main updraft of the thunderstorm. Lightning jumps are likely to be precursors to severe weather on the ground, being this feature a key indicator of the severity potential. A recent analysis has confirmed this hypothesis, obtaining that LJ are a good forecast tool for the region, as how it was observed in other studies for the United States or Central Europe. This previous work confirmed that in many severe weather events, LJ occur 25 minutes prior to the phenomenon. Near 50 events from the period 2007-2015 have been selected, being most of them hail episodes (75% of cases). In more than 70% of the episodes a lightning jump associated with severe weather has detected. In the present paper, the convective mode, associated with the type of thunderstorm, has been analyzed for the previous dataset of severe weather cases in Catalonia, in which lightning jumps were generally detected, in order to find the most common modes associated with each type of severe weather (large hail, strong wind gusts, or tornado) in the region. The study has been made by means of the interpretation of the radar imagery during the 2 hours period where lightning jump occurred. For each period, a sequence of 20 radar volumes has been studied considering shape of reflectivity at surface, vertical development, wind Doppler, and other radar parameters. The purposes of the present study are, firstly, to show which modes present higher (and lower) electrical activity in those cases of severe phenomena, and, moreover, to develop a relationship between the radar structures and the electrical activity.