The advantages of using intra-cloud data for severe weather warnings

Rigo, T., and C. Farnell
Meteorological Service of Catalonia
tomeur@meteo.cat / cfarnell@meteo.cat

Abstract

A sudden increase of the total lightning (IC plus CG flashes) activity.

The Lightning Jump phenomenon

The number of warnings for each configuration

A test was performed to determine the number of warnings for each configuration. This was done by using a set of data, which was divided into two categories: one with IC flashes only and another with CG flashes only.

The experiment

The lightning detection and allocation

A review of the lightning detection and allocation in Catalonia, as performed by the Meteorological Service of Catalonia (MSC). The MSC uses the LLS detector network, which is composed of several stations throughout the region. The data collected by these stations is then analyzed using a software program that can detect and locate lightning sources.

The lightning jump tool at the SMC

A tool was developed to identify the lightning jumps at the SMC. This tool uses a method that identifies the jumps by analyzing the data collected by the LLS detectors.

The goals

1. Identify the number of warnings for each configuration
2. Detect in which cases CG flashes are enough
3. Consider the evolution of TL for different configurations for specific cases with warnings
4. Evaluate spatially the area of interest
5. Characterize seasonally the region of study

CONCLUSIONS

We have shown that severe weather cannot be forecasted using only CG flashes, because:

- The rates are low, without a continuity of the 14 minutes of flashes activity (necessary for the triggering of alerts)
- The few rates cannot help to a rising of the flashes activity exceeding the double of the standard deviation for the previous twelve minutes (main condition of the LJ, see Farnell et al., 2017)
- The influence of severity is observed in these cases with LWW (however, most of severe weather events occur in areas far from the coast, except waterspouts).

We strongly support the separate identification of IC and CG, considering both types of flashes for the application of the LJ algorithm.

References