



Capabilities of Eulerian based lightning jump algorithm

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In the past decade new approach was developed based on lightning data to investigate hail, severe wind and tornadoes. The method is based on a mathematical model which is detecting sudden increases in lightning activity known as a lightning jump. With help of storm tracking algorithms, lightning jump was successfully used as a proxy for severe weather detection in now-casting since it occurs several minutes to roughly 60 minutes prior to severe weather. Eulerian based lightning jump algorithm is independent of storm tracking since it has fix grid, which observes lightning activity as the storm is passing over. We split our domain in raster of 3x3 km per pixels and each grid point has an independent algorithm which is computing lightning jump as the storm develops. That way we are able to obtain points on the ground over which the most active part of the storm has passed. The method is suited for archive data of lightning activity. It provides 2D outputs and with longer time periods we can obtain even climatological charts of lightning jump. Preliminary results suggest a stable connection between Eulerian lightning jump and hail occurrence both from observations stations and hail pad measurements. We expect to further strengthen that connection by introducing radar assessments of hail. Such method can be a potential source of severe weather information, especially in areas lacking radar coverage and/or direct measurements.