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Tracking and Now-casting Intense Lightning Activity in the Global Tropics

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Identification and forecasting of tropical storms and monsoons are of major importance to society. These extreme weather conditions are of large scale and complexity and impose great difficulties when aiming to analyze and forecast their real-time spatial and temporal state. Lightning activity, as a good indicator for storm intensity, can be detected and monitored continuously from thousands of kilometers away, and even more important, this information can be obtained and used in near real-time. Therefore lightning data can be very useful in improving forecasts and now-casts of severe thunderstorms and larger scale conditions such as tropical storms.

An experimental lightning detection network, the World Wide Lightning Location Network (WWLLN), was developed to provide real time global coverage with 10 km location accuracy. This system consists now of 40 stations located around the globe and provide continuous monitoring of lightning in different areas of the globe (http://wwlln.net/).

In this work we use data from the WWLLN for the study of several cases of tropical storm conditions. The analysis and now-casting of the lightning activity is done using the Warning Decision Support System – Integrated Information (WDSS-II), which is the second generation of a suite of algorithms and displays for severe weather analysis, warnings and forecasting. The analysis of each tropical storm case is compared with the observed storm activity.

The results show that the WWLLN data, when analyzed using the WDSS-II model, is overall successful in identifying and now-casting the location of the intense lightning activity that are related to the development and movement of tropical storms.

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