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Total Lightning data in Weather Forecasting: The SPoRT Perspective

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Real-time total lightning data from NASA's North Alabama Lightning Mapping array (NALMA) has been available to forecasters from the Huntsville, Alabama (HUN), Birmingham, AL (BMX) and Nashville, Tennessee (OHX) National Weather Service Offices since 2003. The lightning data has been made to the NWS offices through NASA's Short-term Prediction Research and Transition (SPoRT) Center. The SPoRT center seeks to accelerate the infusion of NASA Earth Science Enterprise (ESE) research and technology into NWS operations. The emphasis is on forecast improvements on a time scale of 0-24 hrs at the regional scale. Grids of total lightning activity are provided every 2 minutes for display on the forecasters' Advanced Weather Interactive Processing System (AWIPS) workstation.

Training sessions have been conducted at each of the NWS offices within the coverage region of the NALMA to discuss how lightning information could be valuable in severe weather nowcasting. The lightning data provides additional information on storm kinematics and updraft evolution that offers the potential to improve severe storm warning lead time and decrease the false alarm rate (for non-tornado producing storms). Cells with higher lightning rates contain stronger updrafts. The lightning data thus helps focus the forecasters' attention on the stronger storms within the area. In addition, prior studies suggest a rapid increase in the "in-cloud" lightning frequency is associated with the invigoration of the storm updraft followed by a rapid decrease in lightning activity associated with the weakening of the storm updraft and descent of the storm angular momentum from aloft.

Interaction with the forecasters is a very important component in the evaluation of the usefulness of lightning data in forecasting. An online survey has been developed to enable forecasters to provide this feedback. The survey mostly uses one-click questions to try to estimate the added value of the lightning data. There is also a text box for additional comments/observations from the forecaster.

Enhanced lightning products are planned to be introduced in the future. One of these will be a cell-based, time-trend of lightning activity. This will enable the forecaster to easily monitor the evolution of cell updraft strength. Combining the total lightning with cloud-to-ground lightning rates may also prove useful in some cases. Work is also being done in using the lightning data to initialize mesoscale models. The output from these will also be made available to the forecasters.