Long-Range Lightning Products for Short Term Forecasting of Cyclogenesis

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This presentation will describe innovative graphical products derived in real time from long-range lightning data. The products have been designed to aid in short-term forecasting of tropical cyclone development for the Tropical Cyclone Structure Experiment 2010 (TCS10) held over the western Pacific Ocean from 17 August to 17 October 2010 and are available online at http://www.soest.hawaii.edu/cgi-bin/pacnet/tcs10.pl. The long-range lightning data are from Vaisala’s Global Lightning Data 360 (GLD360) network and include time, location, current strength, polarity, and data quality indication. The products currently provided in real time include

i. Infrared satellite imagery overlaid with lightning flash locations, with color indication of current strength and polarity (shades of blue for negative to ground and red for positive to ground).

ii. A 15x15” storm-centered tile of IR imagery overlaid with lightning data as in i).

iii. A pseudo reflectivity product showing estimates of radar reflectivity based on lightning rate – rain rate conversion derived from TRMM and PacNet data.

iv. A lightning history product that plots each hour of lightning flash locations in a different color for a 12-hour period.

v. Graphs of lightning counts within 50 or 300 km radius, respectively, of the storm center vs storm central sea-level pressure.

vi. A 2-D graphic showing storm core lightning density along the storm track.

The first three products above can be looped to gain a better understanding of the evolution of the lightning and storm structure. Examples of the graphics and their utility will be demonstrated and discussed for both tropical and extra-tropical cyclogenesis.
Fig: A concentration of eyewall lightning in Typhoon Megi as it makes landfall on Luzon Island in the Philippines on 18 October 2010. Shades of blue indicate negative charge to ground and red for positive to ground, and the size of the circles reflects the current strength.