Lightning data obtained from the Los Alamos Sferic Array (LASA) for hurricane Rita will be presented within the following three key topics: 1) The mapping of various lightning types within the hurricane eyewall and the abrupt increase in lightning rate prior and during rapid intensification; 2) the general increase in lightning activity height as demonstrated by a specialized, impulsive intracloud lightning type, during rapid intensification; and 3) the evolution, as indicated by lightning, of select convective elements in the eyewall. The last topic is particularly revealing and suggests that the general increase in height of lightning, highlighted in topic two, is an aggregate consequence of numerous short-lived convective events rapidly rotating around the eyewall.

The second part of this talk focuses on a high-resolution simulation of the electrification and lightning of Rita. The simulation was carried out on 16000-32000 processors on the DOE machines hosted at ORNL. The model is able to capture key structural aspects of Rita, such as eye size, slope, intensity evolution and track. As in the observations, results show individual electrically active convective events rotating along the primary circulation in the eyewall as the storm intensifies. As the storm intensifies and areal coverage expands, the rainband total lightning flash rate increases while the eyewall lightning shows a burst after the period of most rapid rapid deepening.

If time permits, recent results of a cloud-scale (1 km) lightning data assimilation scheme within the WRF model for the case of Tropical Storm Erin (2007) will be briefly presented.