

## Upward lightning observed by Tokyo LMA in Tokyo metropolitan area

\*Namiko Sakurai<sup>1</sup>, Paul R. Krehbiel<sup>2</sup>, William Rison<sup>2</sup>, Ronald J. Thomas<sup>2</sup>, Daniel Rodeheffer<sup>2</sup>, Shingo Shimizu<sup>1</sup>, Takeshi Maesaka<sup>1</sup>, Koyuru Iwanami<sup>1</sup>, Yasushi Uji<sup>1</sup>, Kaori Kieda<sup>1</sup>

1. National Research Institute For Earth Science and Disaster Resilience, 2. New Mexico Tech

Two flashes were observed by Tokyo LMA on January 31, 2019. Both of these flashes are upward-initiated lightning from the Tokyo Skytree Tower (Note that there are large errors in altitude for LMA sources near the ground, but the locations of the first LMA source for each flash are very close to the location of the Skytree Tower and altitudes consistent with the height of the tower.). From the Tokyo LMA data, there is negative charge at about 2 km altitude and positive charge at about 6 km. For both flashes, an upward positive leader is initiated from the top of the Skytree tower. The leaders propagate upward into the negative charge, and then propagate horizontally through the negative charge region. After several hundred milliseconds negative leaders propagate from the negative charge region into the positive charge region at 6 km altitude. The presentation will include the structure and development process of thunderstorm observed by Multi-parameter phased array weather radar (MP-PAWR).

Keywords: upward lightning