

Charge change estimation at short-burst energetic radiation in winter thunderstorm

*Takuma Tsuruda¹, Shusaku Takahashi¹, Masashi Kamogawa¹, David Smith², Gregory Bowers²

1. Department of Physics, Tokyo Gakugei University, 2. University of California, Santa Cruz

The physical mechanism of lightning-induced energetic radiation has been considered to be caused by the relativistic runaway electron avalanche hypothesis proposed by Gurevich and his group. For further comprehensive understanding of the mechanism, we conducted the observation of lightning-induced energetic radiation and atmospheric electric field using field mills at Uchinada, Kanazawa, Japan during 2015-2016 winter. In general, taking into account the lightning position identified by lightning location system, the observed transient electric field changes (normally detected by slow antenna) at two observation points provide charge changes inside the thundercloud at the time of lightning and the charge height. Although field mill might not be suitable for such observation due to signal smoothing, we evaluated these two parameters using four field mills. Our estimation shows that errors of two parameters was within 20 %. In the presentation, we show these parameters at the time of lightning-induced energetic radiation.

Keywords: Energetic radiation, Winter Lightning, Thunderstorm