

## Monitoring for lightning activities and thunder cloud development over the Tokyo metropolitan area during the 2018 summer

\*浜田 純一<sup>1</sup>、松本 淳<sup>1</sup>、山下 幸三<sup>2</sup>、鴨川 仁<sup>3</sup>、高橋 幸弘<sup>4</sup>

\*Jun-Ichi Hamada<sup>1</sup>, Jun Matsumoto<sup>1</sup>, Kozo Yamashita<sup>2</sup>, Masashi Kamogawa<sup>3</sup>, Yukihiro Takahashi<sup>4</sup>

1. 首都大学東京都市環境学部、2. 足利大学工学部、3. 東京学芸大学教育学部物理学科、4. 北海道大学大学院理学院宇宙理学専攻

1. Faculty of Urban Environmental Sciences, Tokyo Metropolitan University, 2. Department of Engineering, Ashikaga University, 3. Department of Physics, Tokyo Gakugei University, 4. Department of CosmoSciences, Graduate School of Science, Hokkaido University

In order to monitor lightning activities and development of thunder cloud, we have established an observational network with electromagnetic and electrostatic field measurements over the Tokyo metropolitan area since 2016. In the summer season of 2018, we observed atmospheric electrostatic field with the electric field monitor (BOLTEK ELF-100) at Hachioji campus of Tokyo Metropolitan University and the surrounding area. Lightning activities were measured with ELV-VLF band radio observation system at a few sites in the area. We also used the worldwide lightning location network (WWLLN) data to indicate temporal and spatial variations of lightning and the climatological characteristics over the area. Lightning observations showed clear intra-seasonal variations of lightning activities over the area during the summer. Significant lightning events at around Hachioji were observed in 6th, 13th, and 27th of August as a synoptic frontal system located in the north from Kanto area. The electrostatic field measurement at Hachioji detected frequent lightning events and developing/approaching of thunder cloud near the site in these days. At the presentation, we will introduce more detail observation results on thunder cloud developments based on the XRAIN (eXtended RAdar Information Network) observation data.

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