

## Oscillations of atmospheric electric field during snowfall in the Kanto region, Japan, using 95-GHz cloud radar FALCON-I

# Hiroyo Ohya[1]; Kota Nakamori[2]; Masashi Kamogawa[3]; Tomoyuki Suzuki[4]; Toshiaki Takano[5]; Kazuomi Morotomi[6]; Hiroyuki Nakata[7]; Kazuo Shiokawa[8]

[1] Engineering, Chiba Univ.; [2] Electrical and Electronic, Chiba Univ.; [3] Dept. of Phys., Tokyo Gakugei Univ.; [4] Education, Gakugei Univ.; [5] Chiba Univ.; [6] Japan Radio Co. Ltd.; [7] Grad. School of Eng., Chiba Univ.; [8] ISEE, Nagoya Univ.

It is known that cloud-to-ground lightning and precipitations generated from thunderclouds are a generator of global electric circuit (e.g., Williams, 2009). In the fair weather, the atmospheric electric field at the ground is generally 100 V/m and downward (positive). The atmospheric electric field varies during not only lightning/thunderstorms, but also snowfall/blizzard (Minamoto and Kadokura, 2011). In particular, variations in the atmospheric electric field during powder snow in Antarctica have been studied. However, variations in the atmospheric electric field during wet snow in the Kanto area, Japan, have not been revealed yet. In this study, we investigate the variations in the atmospheric electric field during snowfall of 23-24 November, 2016, using a field mill, the 95 GHz cloud radar, FALCON (FMCW Radar for Cloud Observations)-I, and X-band radar (9.4 GHz). We have observed the atmospheric electric field with a Boltek field mill, and cloud reflectivity and the Doppler velocity with the FALCON-I in Chiba University, Japan, (CHB, 35.63N, 140.10E). At 16.2 km southeast from the CHB, a phased array X-band radar operated by Japan Radio Corporation have observed precipitations/cloud. During snowfall of 23-24 November, 2016, periodic oscillations in the atmospheric electric field with periods of 70-90 minutes were observed at four observation sites; CHB, Kakioka (KAK, 36.23N, 140.19E), Tokyo Gakugei University (KGN, Kokubunji, Tokyo, 35.71N, 139.49E), and Seikei High School (MSN, Musashino, Tokyo, 35.72N, 139.57E). The distances of CHB-KAK, CHB-TGU, and CHB-SHS are 64.8 km, 55.9 km, and 49.0 km, respectively. This is the first observations of similar oscillations in the atmospheric electric field at four observation sites located at a long distance of 50-65 km. At the end of snowfall, the periods of the oscillations became shorter to be 20-50 minutes at all sites. Based on the FALCON-I and X-band radar observations, we found that the reflectivities of the snow cloud have the same period of 70 minutes at CHB at 2 km heights during the snowfall. In the presentation, we will discuss the cause of the long oscillations in the atmospheric electric field.