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VHF 3
Three-dimensional distribution of VHF lightning radiation sources

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We have conducted a field observation, "the Shonai area railroad weather project". This project has investigated fine-scale structure of wind gust using two X-band Doppler radars and the network of 26 surface weather stations since 2007, in order to develop an automatic strong gust detection system for railroad. We focus on total lightning (both intra-cloud (IC) and cloud-to-ground (CG) lightning) activity in winter to investigate the mechanism of winter lightning discharge process and the application to strong gust prediction. Thus, we have developed a three-dimensional (3D) lightning mapping system utilizing arrival time differences of VHF broadband pulses radiated by leader progression

We investigate 3D distribution of VHF lightning radiation sources. In particular, the vertical distribution of VHF sources is compared with -10 degree C level. We analyze 3D lightning data observed in the Shonai area on November 30, 2010. The vertical distribution of the number of VHF sources exhibits a single maximum at 2.5-3.0 km altitude. The -10 degree C level retrieved from JMA-MANAL was 2.8 km at the same time. Hence, the vertical distribution of VHF sources is related to the atmospheric temperature level. In this presentation, we will also show the relationship between VHF source distribution and X-band radar reflectivity.

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