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Atmospheric electric field variation during drifting snow

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Two concentric spherical conducting shells in the earth, i. e., ionosphere and lithosphere, form a global-scale capacitor. The ionosphere has a large electric potential, roughly 250 kV, to the ground surface. The capacitor is charged by global cloud-to-ground lightning and precipitation, while it constantly discharges in the fair weather region through air-earth current. This constructs a global electrical circuit (GEC). The atmospheric electric field (AEF) is affected by slight air pollution. Therefore it is ideal to observe AEF in pole area. However, the electrostatic charge of the ground snowstorm becomes the noise source of the observation in the pole area. The snow in the South Pole Showa station and the study of the AEF are often conducted for a long time and AEF is known to grow big until order of kV/m when the wind velocity becomes big. Because there is not a thundercloud in the Showa station, only ground snowstorm becomes the noise source of the AEF. In this study, we investigate the relationship between the snowstorm and AEF variation.

Keywords: Drifting snow, Atmospheric electric field, Triboelectrification