

R005-03

Zoom meeting C : 11/1 AM1 (9:00-10:30)

09:30-09:45

## **Estimation of location and charge amount of lightning discharges using electrostatic field observation network in Metro Manila**

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There are many studies on the relationship between cloud convection activity and the occurrence number of the lightning discharges. Changes in the occurrence number of lightning discharges preceded those in precipitations by approximately 5 min. [Piepgrass et al., 1982]. Variations in the occurrence number of lightning discharges preceded those in maximum wind speed of hurricanes typically by one or two days [Price et al., 2009]. Thus, it is expected that there is a relationship between cloud convection activity and the charge structure in clouds [Sakai, 2014], although that has not been investigated in detail. Based on the network of vertical electrostatic field observations, the charge structure in the cloud can be estimated. Charges of -10 to -40 C were neutralized by cloud-to-ground (CG) discharges at the altitude of 6.0-9.5 km [Jacobson and Krider, 1976]. However, it is difficult to construct a large-scale observation network with field mill sensors because of the cost. The alternative instrument is plate-type capacitive antenna [Blitzer, 2013]. However, the amount of charge could not be estimated with such antenna due to the problem of calibration. In this study, we carried out a model calculation in order to estimate the horizontal location, height, and amount of neutralized charge caused by the CG and intracloud discharges using the electrostatic field observation system P-POTEKA installed in Metro Manila, Philippines under SATREPS/ULAT (Understanding Lightning and Thunderstorm) project. The P-POTEKA consists of a plate-type capacitive antenna installed at 35 sites in Metro Manila with an interval of about 5 km. The result of the model calculation suggested that the amount of neutralized charge and position of lightning can be estimated by correcting the relative sensitivities of the antenna from the changes in the electrostatic field of the CG discharges if the relative sensitivity for each observation site is within  $\pm 50\%$ . In this presentation, we will explain our method to estimate the charge amount and position of lightning discharges and show the results of estimation using observation data in detail.