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**Charge distribution in thunderstorm clouds** <boldface, 12pt>

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**Abstract**. Charge distribution in thunderstorm clouds has been studied by the simultaneous electric field measurements ------------------------ . This paper describes ------------------------ . Charge distribution in thunderstorm clouds has been studied by the simultaneous electric field measurements ------------------------ . This paper describes ------------------------ . Charge distribution in thunderstorm clouds has been studied by the simultaneous electric field measurements ------------------------ . This paper describes ------------------------ . <hereafter single space, 11pt>

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**Keywords:** keyword 1, keyword 2, keyword 3, keyword 4

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**1. Introduction**

One of the most fundamental problems in thunderstorm electricity is to determine charge quantities and their positions in the storm clouds. Tanaka (1985) have shown that ------------------------------------------------------------------------------------------------------------------------------------------------------------.

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Figure 1. Model of charge distribution in thunderstorm clouds.

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**2. Measurements and data analysis**

**2.1. Measurements**

The electric fields have been measured at eight stations in Tokyo for active thunderstorms which appeared during the five summer seasons 2015-2018 -----------------------------------------------------------------------------------------. The measurements equipment consists of -----------------------------------------------------------------------------------------.

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**3. Results and discussion**

Obtained observation data are shown in Tab. 1. ----------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------.

Table 1. Observation data.

|  |  |
| --- | --- |
| Data 1 | 123 |
| Data 2 | 456 |
| Data 3 | 789 |
| -------------------------------------- | -------------------------------------- |
| -------------------------------------- | -------------------------------------- |
| -------------------------------------- | -------------------------------------- |
| -------------------------------------- | -------------------------------------- |
| -------------------------------------- | -------------------------------------- |
| -------------------------------------- | -------------------------------------- |
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Figure 2 represents the estimated charge quantities and their positions in clouds. The quantities of charge is estimated by Suzuki et al. (2010) as

…………………………………………………………. (1)

Here, and are aaa and bbb values, respectively (Tanaka 1985; Yamada and Yamakawa 2016). The bbb value is given by

…………………………………………………………. (2)

Substituting the permittivity of free space into the Eq. (2), can be approximated as --------.

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Figure 2. Estimated charge quantities and their positions in clouds.

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**4. Conclusion**

It is concluded that the charge distribution in thunderclouds is -------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------------.

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