

Chain connection global-circuit model for the explanation of phase difference of atmospheric electric field

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In early 20th century, global circuit (GC) model was proposed. After the observation of Carnegie research ship, the concept of the global electrical circuit was established. Although many applied models have been proposed, the initial GC model has been practically used to understand global atmospheric electric field (AEF) variations. However, it is very difficult to extract the global component of AEF, because AEF is highly affected by ion-aerosol variation in fair weather especially in the continent.

Therefore, most of extracting the global component is operated by taking the average of AEF time-series in the fair weather condition. Meanwhile, some cases of the AEF phase difference between two stations in the different longitude even in fair weather condition and less ion-aerosol condition existed.

Thus, we would like to propose alternative global circuit model to explain this difference by using chain connection model of two port electric circuit.