

相互相関関数を用いた落雷領域追跡

大西 翔太 [1]; 高橋 幸弘 [1]; 山下 幸三 [2]
[1] 北大・理・宇宙; [2] サレジオ高専・電気

Tracking of lightning area and estimation of the motion vectors

Shota Onishi[1]; Yukihiro Takahashi[1]; Kozo Yamashita[2]
[1] CosmoSciences, Hokkaido Univ.; [2] Dept. EE, Salesian Polytechnic.

Previous studies suggested that there exists a good relationship between frequency of lightning and atmospheric convection or precipitation [e.g. Deierling and Petersen, 2008]. Therefore, lightning data can be used as a proxy for the presence of deep atmospheric convection and precipitation. To monitor time series behavior of lightning activity, it is possible to understand more detailed relationship between the lightning activity and atmospheric convection and it is possible to predict the distributional area of precipitation.

Our purpose of research is to calculate a time variation of the frequency of lightning of cloud to ground lightning (CG) and that of spatial distribution of lightning.

We analyzed 3909 events of CG observed by Japan Lightning Detection Network (JLDN) from 17:30, August 12th 2013 to 19:14, August 12th 2010 (JST) in Kanto region to estimate the frequency and spatial distribution of CG for every minute and with 1km square grid. We calculated the cross correlation function between the CG distribution at a certain time and that of the one minute later in order to estimate the motion vector of CG area and we required the luminance centroid to track CG lightning area, which might be useful to predict the distribution few minutes later. It is possible that we can estimate the motion vector of the one minute later with an accuracy of a few hundred meters and using the luminance centroid, we predict the distribution of lightning area and the time change by fitting.

In this presentation, we will discuss the adequacy of analysis method and our initial result. Also we will consider the relationship between fitting function of the luminance centroid, the distribution and frequency of CG.