

Measurement of vertical electric fields from lightning flashes using parallel plate antenna

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ABSTRACT

Lightning is the transfer of significant charge between two charged object, it can occur between cloud to cloud, cloud to air and cloud to ground. Lightning strikes can kill people, knock out radio communication, electrical power devices, and destroy houses, trees as well as animals. The lightning strike hazards may be properly managed by using a lightning detector system. The detection concepts can be based on Electromagnetic Field or Electric field. In this paper, the characteristics of the flat plate antenna in measuring the electric field has been reviewed and analysed. The experiment using parallel plate antenna has been setup to detect the E field during the thunderstorm days. The E-field data has been collected and used for data manipulation or others application.

KEYWORDS:

Electric field; lightning; flat metallic plate antenna; parallel plate antenna

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REFERENCES

1. Kenneth L. Cummins ,History, Martin J. Murphy Techniques, and Data Uses, With an In-Depth Look at the U.S. NLDN. IEEE Transaction on Electromagnetic Compatibility, Vol. 51, August 2009
2. Krider, E.P.; Noggle, R.C.; Uman, M.A. A gated wideband magnetic direction-finder for lightning return strokes. J. Appl. Meteor. 1976, 15, 301-306
3. Lee, A.C.L. Ground truth confirmation and theoretical limits of an experimental VLF arrival time difference lightning flash locating system. Quart. J. Roy. Meteor. Soc. 1989, 115, 1147-1166
4. Cummings, K.L.; Murph, M.J.; Bardo, E.A.; Hiscox, W.L.; Pyle, R.B.; Pifer, A.E. A combined TOA/MDF technology upgrade of the US National Lightning Detection Network. J. Geophys. Res. 1998, 103 D8, 9035-9044.
5. Hayenga, C.O.; Warwick, J.W. Two-dimensional interferometric positions of VHF lightning sources. J. Geophys. Res. 1981, 86, 7451- 7462.