

E1-08: On the accuracy of locating lightning ground flashes using two or more direction finding stations

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This paper deals with calculating the most probable position of the point of strike of a lightning ground flash when the angles to the strike point and the strength of the flash are given by two or more direction finding (DF) stations, whose positions and instrumental uncertainties are known.

In principal, DF station measurements are subject to both random and systematic errors. By assuming that there are no systematic errors and that the random errors can be represented by Gaussian distributions, a Monte Carlo simulation computer program was utilized in finding the optimum algorithm that can lead to the most probable strike position. It is shown that a formula based on an average that is weighted according to the measured angular difference of two station measurements could be used successfully to reconstruct the strike point of lightning ground flashes. The authors also propose a method that can be utilized in improving the reconstructed position based on the relative strength of the signals as recorded by two spatially separated stations. This technique can also be used in finding the possible systematic errors of the DF sites.

The results of the Monte Carlo simulation were applied to reconstruct the lightning strikes recorded during the month of February by the two DF stations installed at Colombo and Ratnapura.

Financial assistance by IPPS, Uppsala University, Sweden for research grant number SRI:01/1, NSF grant number RG/99/P/02 and University of Colombo grant number 99/S/31 are acknowledged.