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Burst profile of lightning generated neutrons detected by Gulmarg Lead-free Neutron Monitor

Abstract content

Lead-free Neutron Monitor operating at High Altitude Research Laboratory, Gulmarg has been utilized to detect MeV energy neutron bursts produced in the lightning discharge channels. The experiment provided the first experimental evidence of neutron production in the lightning discharges. The neutrons were recorded in predetermined time interval of 320 microseconds after the detection of the first neutron in successive time bins of 80-microseconds each. The time-delay between the sensing of electric field change associated with lightning discharges and detection of first neutron from the production site would relate to the distance of the neutron production site. However, the system was not capable of recording the profile of the neutron bursts and was not able to identify the specific stroke responsible for the production of these neutrons in a multi-stroke lightning discharge. To overcome these limitations the electronic circuitry of the system was redesigned. The modified system has the provision of recording neutron burst profile in time range of 315 microseconds to 4.41 milliseconds in sixty three sucessive time bins with each bin adjustable from 5 microseconds to 70 microseconds. The new system has sucessfully detected several major neutron burst events after the initiation of the lightnings in the vicinity of the detector. Burst profiles of these neutron will be presented and discussed in relation to the propagation characteristics of these neutrons and their mode of production in the lightning channels.

If this papers is presented for a collaboration, please specify the collaboration

Summary

Reference

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