HF RADIATION AT 3 MHZ FROM NEGATIVE LIGHTNING DISCHARGES TO THE GROUND

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Simultaneous recordings of the fast electric field and HF radiation at 3 MHz were made in microsecond resolution at times before and after the onset of first and subsequent strokes. Data are presented for several hundred negative ground flashes observed in Colombo within a range of 40 km over the land and sea. It is shown that steps are the source of HF generation at 3 MHz in the leader phase of return strokes. In the return stroke phase, 3 MHz was strongest at the beginning of the first return-stroke and gradually decays to extinction, the mean duration of the 3 MHz contnua of 346 first strokes being 190us with standard deviation 69us. The appearance of 3 MHz and bursts of multitudinous fine oscillatory pulses in the first return-stroke electric field waveforms were inter-related (with correlation coefficient 99.8%). Subsequent strokes, in general had no 3 MHz in their return stroke phases. It is suggested that the tiny sub-branches of the order of 10 to 100 m in length, which are probably created during the formation of the corona sheath, are the source of HF at 3 MHz in the return stroke.

This work was supported by IPPS and IFH,
Uppsala University, Sweden.

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