

### **Absolute Pulse Amplitudes of Isolated Cloud Flashes**

Chandima Gomes and Vernon Cooray

*Institute of high Voltage Research, Uppsala University, Sweden*

Sixty isolated cloud flashes pertinent to two Swedish thunder storms of which 30 flashes were distance located with time-to-thunder measurements, have been analysed. The main objectives of this analysis were to estimate the temporal pulse characteristics, to determine the absolute pulse amplitudes and to investigate the time of occurrence of the most active region of the pulse train. The long duration of the cloud flashes, mainly distinguish them from other known pulse trains. In pulse characteristics, they are considerably different from the preliminary breakdown pulse trains of negative return strokes and somewhat similar to those pulse trains of positive return strokes, observed in Sweden. There are two types of pulses, multiple peaked pulses, with less pronounced positive overshoot, and single peaked pulses, with pronounced positive overshoot. The mean pulse characteristics, width of the initial half cycle, width of the second half cycle, full width of the pulses and the pulse separation, have values of 21 ms, 23 ms, 43 ms, and 147 ms, respectively. The mean pulse train duration is 55 ms. The pulse amplitude, during the first 10 ms, is 3 times greater than that of pulses occur, during the following 30 ms. The pulse occurrence density, during the first 10 ms, is about 4 times greater than that of the following 30 ms. The emission of the 3 MHz radiation starts with the onset of the pulse train and the strongest emission is observed during the first 10 ms. The mean amplitude of the largest pulse, normalised to 15 km, is 20.3 V/m, thus, similar to that of subsequent strokes.