



Initial breakdown pulses found to be systematically accompanied by VHF pulses during initiation of negative cloud-to-ground lightning flashes

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In this study, we focus on comparison of waveforms recorded by arrays of broadband electric field (E-change) sensors and VHF (LogRF) sensors during the first two milliseconds of the initiation of twenty negative cloud-to-ground lightning flashes. We are using data collected during two thunderstorms occurring in August 2016. Both measuring arrays are located at seven sites around Oxford, Mississippi, USA.

We have found that microsecond-scale pulses characterizing an initial breakdown stage of a lightning flash (IB pulses) measured by E-change sensors are systematically accompanied by VHF pulses in LogRF records. We investigate the evolution of peak amplitudes of IB pulses and their corresponding VHF pulses. We also use both E-change and LogRF waveforms to determine and compare time-of-arrival locations of IB pulses and their accompanying VHF pulses for several cases.