



Preliminary breakdown and leader characteristics from electric field and high-speed video observations

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The aim of this work is to obtain characteristics of the preliminary breakdown (PB) pulses in cloud-to-ground flashes using a high-speed imaging system and electric field measurements. These two methods combined facilitate the identification of the pulse, which is related to an increase in the luminosity at the region from which the flash is originated. 98 PB pulses from first order strokes were analysed. Correlation analysis between the time from the pulse to the return stroke and its electric field peak (normalized to 100 km) were obtained. In a few cases (7) it was possible to observe the stepped leader in the images generated by the high-speed imaging system. The descending speeds of the leader were also determined for these cases.