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First observations of Gigantic Jets from Monsoon Thunderstorms over India

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Gigantic Jets are electric discharges from thunderstorm cloud tops to the bottom of the ionosphere at ∼80 km altitude. After their first discovery in 2001, relatively few observations have been reported. Most of these are from satellites at large distances and a few tens from the ground at higher spatial resolution. Here we report the first Gigantic Jets observed in India from two thunderstorm systems that developed over the land surface from monsoon activity, each storm producing two Gigantic Jets. The jets were recorded by a video camera system at standard video rate (20 ms exposure) at a few hundred km distance. ELF measurements suggest that the jets are of the usual negative polarity and that they develop in less than 40 ms, which is faster than most jets reported in the past. The jets originate from the leading edge of a slowly drifting convective cloud complex close to the highest regions of the clouds and carry ∼25 Coulomb of charge to the ionosphere. One jet has a markedly horizontal displacement that we suggest is caused by a combination of close-range cloud electric fields at inception, and longer-range cloud fields at larger distances during full development. The Gigantic Jets are amongst the few that have been observed over land.