

## Lightning activity in the Saturnian system

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Since 2004, the Cassini RPWS (Radio and Plasma Wave Science) instrument has recorded nine storms of Saturn Electrostatic Discharges (SEDs), which are the radio signatures of lightning flashes in Saturn's atmosphere. These storms lasted between a few days and several months, and the storm from the end of November 2007 until mid-July 2008 is the longest continuously tracked lightning storm to date. We will show the SED's main physical characteristics like burst duration and rates, the periodicity of episodes, and their polarization. The intensity of SEDs in the frequency range of a few MHz is typically 10,000 times stronger than terrestrial flashes, which made SED detection even possible with terrestrial radio telescopes. The SEDs are a natural tool to probe Saturn's ionosphere, and interesting radio wave propagation effects like the "over-horizon" effect have been found. The storms are usually accompanied by prominent cloud features (~3000 km in diameter), and up to now such giant convective systems were produced only at two specific latitudinal regions in Saturn's atmosphere, one is the "storm alley" at 35° south and the other is the equatorial region. Saturn's water clouds at a pressure level of 8-10 bars are thought to be the source of the SEDs, whereas convective methane clouds in Titan's atmosphere are a possible place for lightning discharges on Saturn's biggest satellite. But, despite numerous close Titan flybys (44 until the end of Cassini's nominal mission), no clear signature of possible Titan lightning has been detected by the RPWS instrument.