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Ring Current Electron Precipitation During Storm Events

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The particle flux in the near-Earth environment can increase by orders of magnitude during geomagnetically active periods. This leads to intensification of particle precipitation into Earth's atmosphere. The process potentially further affects atmospheric chemistry and temperature.

In this research, we concentrate on ring current electrons and investigate precipitation mechanisms on a short time scale using a numerical model based on the Fokker-Planck equation. We focus on understanding which kind of geomagnetic storm leads to stronger electron precipitation. For that, we considered two storms, corotating interaction region (CIR) and coronal mass ejection (CME) driven, and quantified impact on ring current. We validated results using observations made by POES satellite mission, low Earth orbiting meteorological satellites, and Van Allen Probes, and produced a dataset of precipitated fluxes that covers energy range from 1 keV to 1 MeV.