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# Constraining spectral models of a terrestrial gamma-ray flash from a terrestrial electron beam observation by the Atmosphere-Space Interactions Monitor

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Terrestrial Gamma-ray Flashes (TGFs) are short flashes of high energy photons, produced by thunderstorms. When interacting with the atmosphere, they produce relativistic electrons and positrons, and a part gets bounded to geomagnetic field lines and travels large distances in space. This phenomenon is called a Terrestrial Electron Beam (TEB). The Atmosphere-Space Interactions Monitor (ASIM) mounted on-board the International Space Station detected a new TEB event on March 24, 2019, originating from a tropical cyclone, Johanina. Using ASIM's low energy detector, the TEB energy spectrum is resolved down to 50 keV. We provide a new method to contrain the TGF source spectrum based on the detected TEB spectrum. Applied to this event, it shows that only fully developed RREA spectrums are compatible with the observation. More specifically, assuming a TGF spectrum proportional to 1/E exp(-E/ε), the compatible models have ε ≥ 6.5 MeV. We could not exclude models with ε of 8 and 10 MeV. This is the first time the source energy spectrum of a TGF is contrained based on the detection of the associated TEB.

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