

TERRESTRIAL GAMMA-RAY FLASHES: STATUS AND PROSPECTS

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Overview: Terrestrial Gamma-ray Flashes (TGFs) are millisecond flashes of gamma rays observed by satellites over thunderstorms. Their relation to lightning, VLF emissions, and transient luminous events is a rapidly evolving field of study at the moment. I will review the status of our knowledge of TGFs with emphasis on data from the RHESSI satellite.

Background: TGFs are bremsstrahlung from the highest-energy electrons accelerated by any natural process on Earth or in near-Earth space. They may play a role in atmospheric chemistry, the global electrical circuit, the evolution of charging in thunderclouds, and the population of particles in Earth's radiation belts. They were initially discovered with NASA's Compton Gamma-Ray Observatory, which de-orbited in 2000 (Fishman et al. 1994, *Science* 264, 1313).

Specifics of the presentation: Over 500 TGFs have been found in data from the Reuven Ramaty High Energy Solar Spectroscopic Imager (RHESSI) since its launch in February 2002. Each flash contains on the order of 30 photon counts, usually ranging from 20 keV to 20 MeV, lasts on the order of a millisecond, and is localized to approximately 1000 km. I will report on correlations (or lack thereof) between the intrinsic properties of the flashes (spectrum, duration, intensity) and contextual properties such as geographic latitude, magnetic latitude, local time, distance from the spacecraft (where accurate positions can be obtained from radio atmospherics), and terrain (inland, coastal, or deep ocean). A new exposure-corrected map will be presented and compared with lightning data. Unusual or extreme cases of TGF activity will be individually examined.

Abstract Submission Form

2006 National Radio Science Meeting

Abstract: smith7414

Date Received: September 21, 2005

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4. I - Invited Paper, Program chair:
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5. Please schedule late in the day if possible