



## **Assessment of the cutoff of a broken power law fitted to RHESSI data**

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Terrestrial gamma-ray flashes (TGFs) are short sub-millisecond bursts of high energy gamma radiation, associated with intracloud positive lightning, bringing negative charge upwards. They were first detected by the Burst and Transient Source Experiment (BATSE) in 1991 and were thought to be a rare phenomena. However with new and improved satellites and more sophisticated data search algorithms, they have been found to be more and more common. However, recent work suggest there might be an intrinsic limit to the number of faint TGFs and so to TGF/lightning flash ration. Therefore, an outstanding question is; how common are TGFs?

We previously used the World Wide Lightning Location Network (WWLLN) in addition to RHESSI to extract 100ms interval of RHESSI data centred at the time of each lightning flash. By superposing the RHESSI intervals of data (excluding already identified TGFs) between August 2002 and December 2015, we find a  $9.39\sigma$  increase in gamma-rays at the time of lightning. This indicates that there exists a population of TGFs that cannot be identified by current RHESSI search algorithms.

Comparing the detected counts at the time of lightning to the background, we find a significant and continuous signal down to 3 counts in the detector. We do not see a clear cutoff in the signal, as has been suggested by others. This could indicate that a potential signal cutoff happens below this level in RHESSI.