



Terrestrial Gamma-ray Flashes (TGFs) pairs associated with World Wide Lightning Location Network (WWLLN)

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We present Terrestrial Gamma-ray Flash (TGF) pairs detected with the Gamma-ray Burst Monitor (GBM) on the Fermi Space Telescope and associated sferics from the World Wide Lightning Network (WWLLN). Several improvements have been made to the GBM TGF detection algorithms since launch in 2008, which have increased the rate of TGFs to ~ 800 a year. The improved TGF detection algorithms have also uncovered more TGFs within 200 s of each other. There are ~ 600 unique TGFs with a wide range of time separations. One question is whether a pair originates from the same thunderstorm or from different storms in a storm system. Detecting multiple TGFs from a single storm and their separation in time provides a measure of the electric charging timescales involved in the production of TGFs within a storm. With only gamma-ray detections, this question is difficult to answer since GBM detects TGFs up to 800 km from the nadir of Fermi. If WWLLN sferics are found for both TGFs of a pair, the improved localization uncertainty (< 25 km) allows us to better answer this question. We present TGF pairs that match this criteria. These pairs are temporally separated by milliseconds to ~ 180 s.