

TGF location, flux and fluence distribution with off-axis angle derived from FERMI data and WWLLN locations

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The FERMI science support centre has published an online catalogue of 3356 TGFs, along with a subset of 1049 TGFs with a WWLLN temporal association.

We have used these tables to create scatter plots and the angular distribution of TGF angles in the FERMI nadir FOV - originally to see what the ASIM/MXGS gamma-ray imager could expect to observe in its FOV.

We have also used photon counts from the two FERMI BGO detectors to derive an estimate of TGF flux distribution and fluence with nadir angle.

One interesting result is the observation of TGFs out to 50 degrees off-axis, but even more interesting is an angular flux distribution which seems to indicate that a TGF has either a very wide beam angle or that TGFs are narrow beams whose axis has a very wide angular distribution from the earth radial.

Whether this indicates TGFs originate by acceleration in macro scale electric fields in storm clouds, or in the micro scale electric fields in lightning leaders, is not clear but the results do call for a more detailed analysis taking FERMI orientation into account.

We have not seen any publication of this TGF off-axis angle analysis and show our results for the interest of the TGF research community.