



AGILE Observations of Terrestrial Gamma-Ray Flashes above 20 MeV

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Terrestrial Gamma-ray Flashes (TGFs) are very short (up to few milliseconds) energetic bursts of photons and electrons originating from severe thunderstorms mainly in the equatorial and tropical regions. Although their correlation with lightning activity was established shortly after their discovery, there is still debate concerning the type of lightning involved and the mechanism which links lightning to the production of energetic gamma-rays. The AGILE satellite, operating since mid 2007 and primarily devoted to high-energy astrophysics, is one of the only three currently operating space instruments capable of detecting TGFs. Thanks to the AGILE Mini-Calorimeter instrument energy range extended up to 100MeV and its flexible trigger logic on sub-millisecond time scales, AGILE is detecting more than 10 TGFs/month, adding a wealth of observations which pose severe constraints on production models. The main AGILE discoveries in TGF science during two and a half years of observations are the following: 1) the TGF spectrum extends well above 40 MeV, 2) TGFs can be localized from space using high-energy photons detected by the AGILE gamma-ray imaging detector, 3) the high energy tail of the TGF spectrum is harder than expected and cannot be easily explained by previous theoretical models. In this presentation we focus on the recent results concerning the TGF high-energy spectral characteristics and their implications for the link between TGFs and lightning.