

Observations by ASIM of Terrestrial Gamma-ray Flashes accompanied by Elves

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Data and objectives

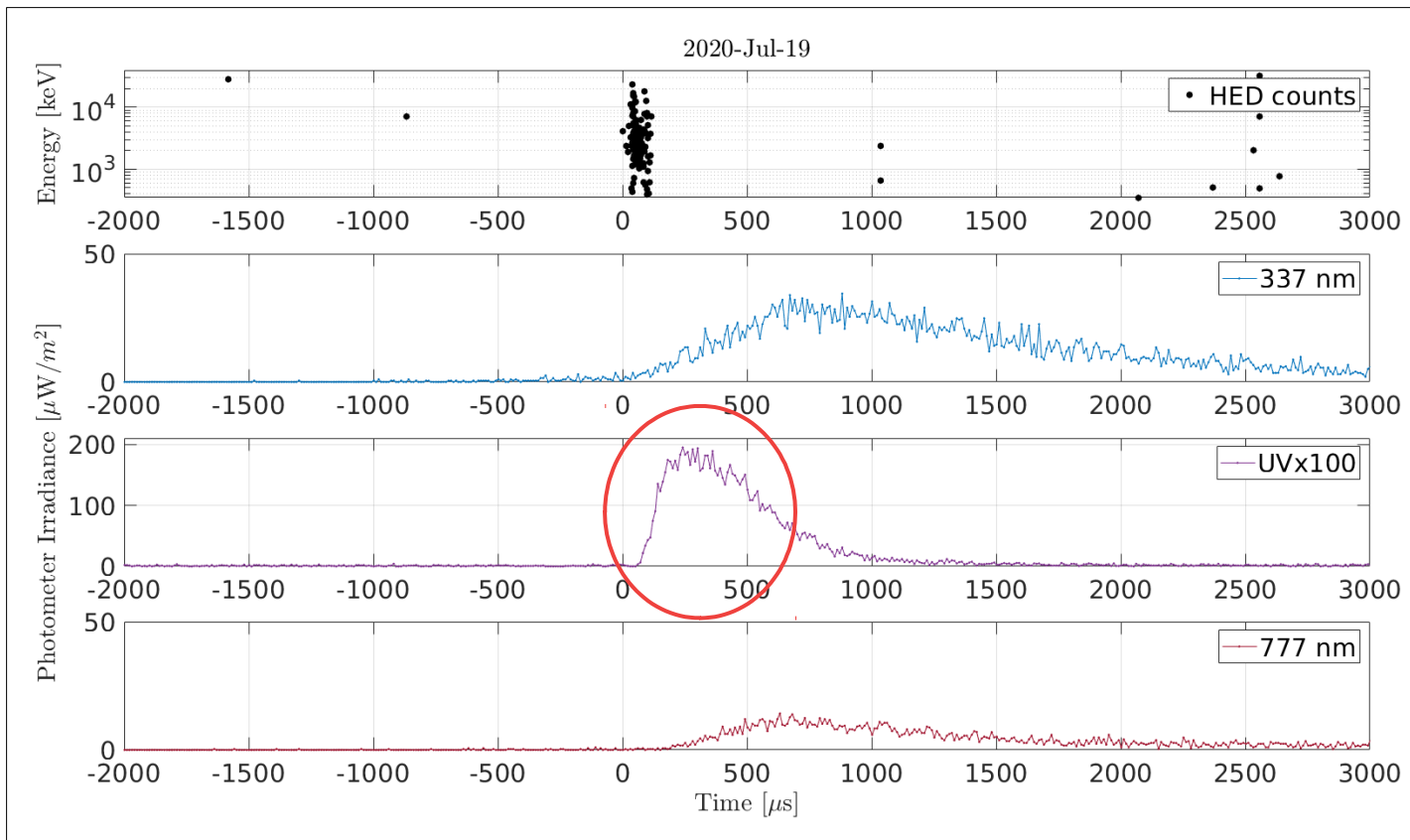
- Atmosphere-Space Interactions Monitor (ASIM)
 - Modular X- and Gamma-ray Sensor (MXGS)
 - Modular Multispectral Imaging Array (MMIA)
 - Photometers: 337, UV and 777.4 nm
 - 777.4 nm is dominated by emissions from the lightning leader
- **Objectives**
 - Find simultaneous detections of TGFs and Elves
 - What information can be obtained about the associated lightning discharges?



Credit: ESA

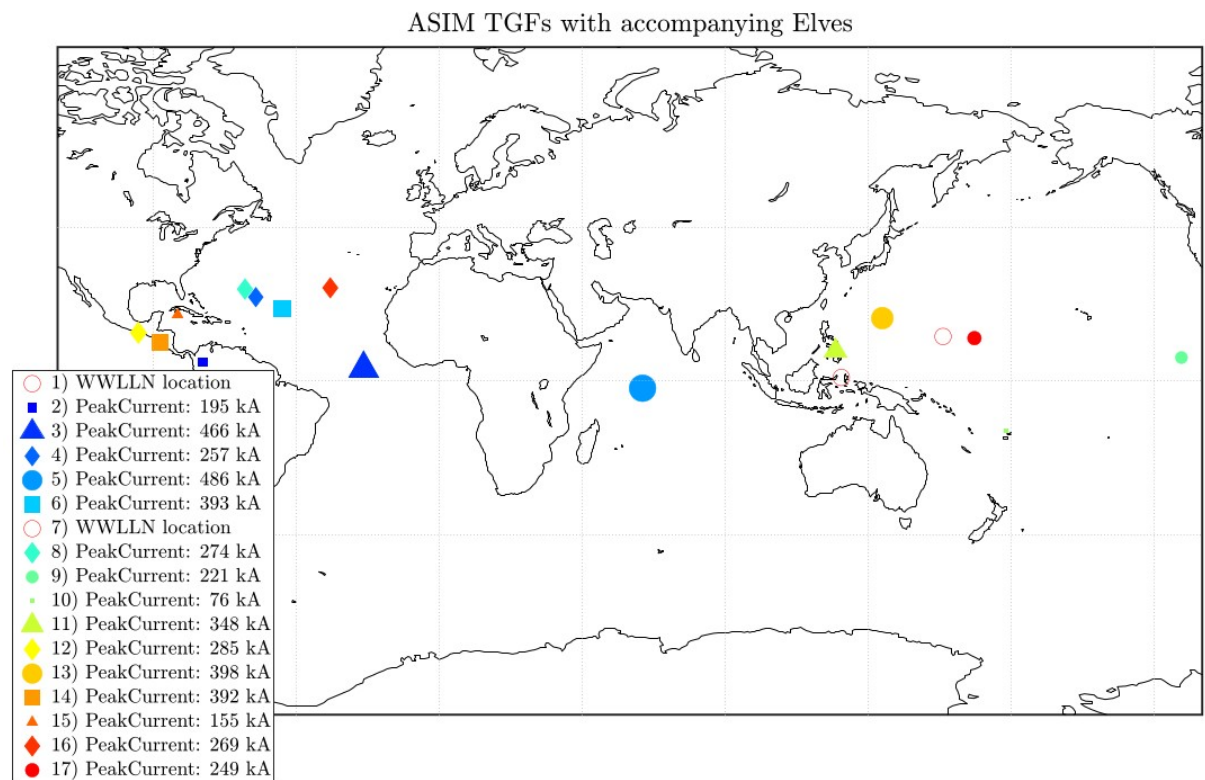
Finding simultaneous detections of TGFs and Elves

- Search for UV pulses
- UV pulse peak before 337 and 777 nm peaks → Elve

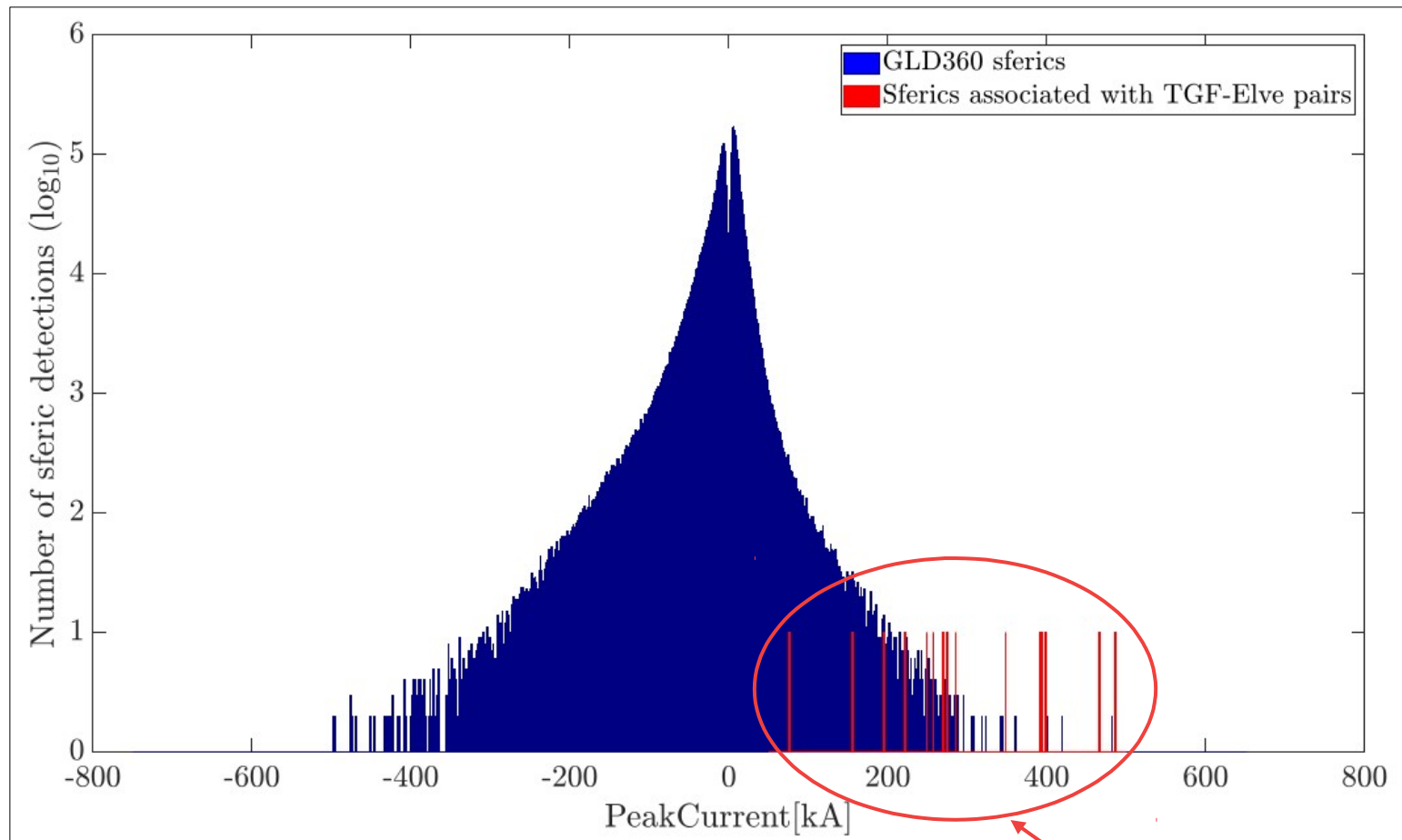


ASIM TGFs with Elves

- 17 observations of TGFs accompanied by Elves
- Short TGF durations
- Associated with very high peak current lightning
- Geographical distribution
 - 11 oceanic
 - 5 coastal
 - 1 over land



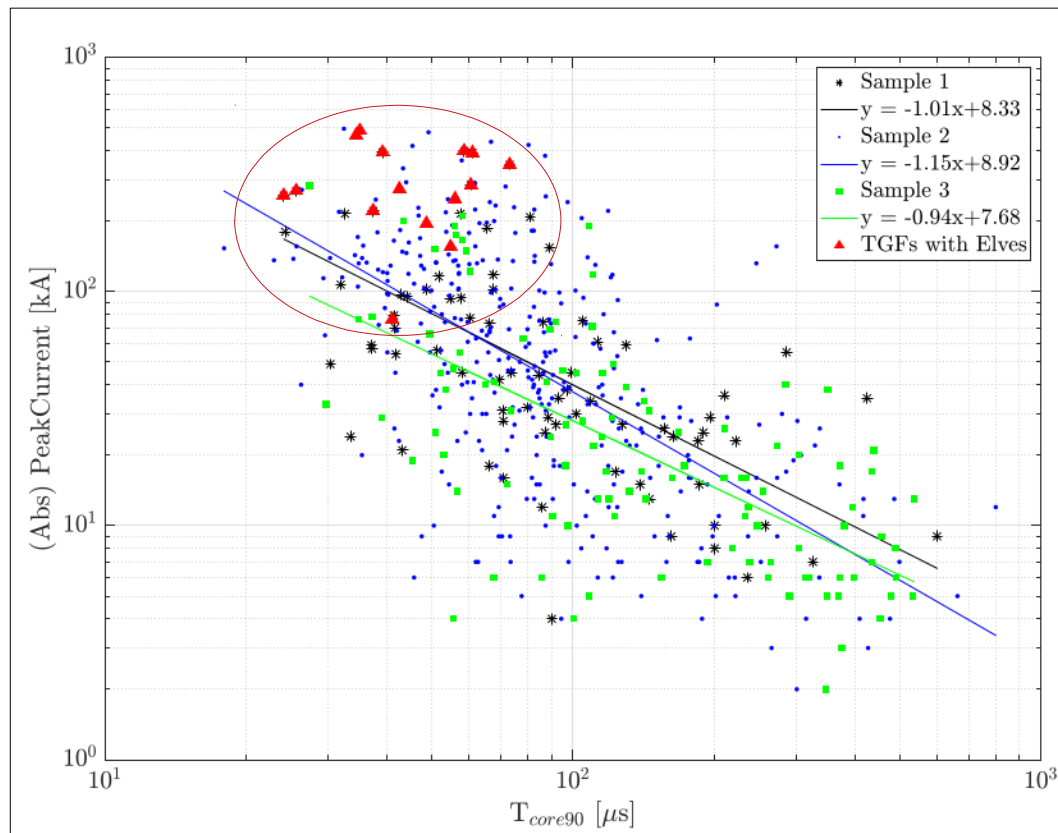
Peak currents from a large sample of GLD360 sferics



TGF-Elve pairs

Peak current vs. TGF duration

- Peak currents associated with other ASIM TGFs
- Consistency check between the TGF detection and the candidate sferic locations
- Sample 1: Most reliable TGF-sferic matches



Summary

- 17 TGF-Elve pairs
- Short TGF durations
- Events are associated with very high peak current lightning
- The peak currents are high compared to both lightning and TGFs in general
- Short duration TGFs tend to be associated with high peak current lightning

