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Supplementary information

Flickering gamma-ray flashes, the missing link between gamma glows and TGFs

In the format provided by the authors and unedited

Data and Codes used in the study:

Flickering Gamma-Ray Flashes, the Missing Link between Gamma Glows and TGFs

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Data:

The following Data are uploaded to the ZENODO Repository, doi: 10.5281/zenodo.11930007

Data used in Fig 1
****
Figure_1.zip

Data used in Fig 2
****
Figure_2.zip

Data used in Extended Data Fig 1
****
Ext_Figure_1.zip

Data used in Extended Data Fig 2
****
DukeRadio_FTLF_FGF_SensitivityFigure.txt
DukeRadio_MXLF_FGF_SensitivityFigure.txt

Data used in Extended Data Fig 3
****
KSC_20230729_210320_200ms.cvs

BGO data is the same as for Fig 2

Data used in Extended Data Fig 4
****
Ext_Figure_4.zip

Data used for Extended Data Fig. 5 and Extended Data Table 6
****

response_matrices.zip

contains the response matrix files

- matlab `.mat` format, readable with MATLAB, or Python Scipy
- contains a struct response with self-explanatory fields: name, energy_grid, effective_area (cm2), efficiency, effective_area_unit(='cm2'), energy_unit (=keV), RESP_MATRIX, RESP_MATRIX_BINS(keV)

fig_data.zip

contains the data to build the Extended Data Fig. 5 A) and B) as self-explanatory `.csv` files.

Codes:

Codes used for Extended Data Fig. 5 and Extended Data Table 6
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- Model data is obtained using GEANT4, see (https://geant4.web.cern.ch/) and (https://geant4.web.cern.ch/download/license). A Significant amount of work is required to independently set-up the code, build atmospheric geometry, and suitable particle input and output codes.
- Negative Log-Likelihood between model and observation is calculated following Lindanger et al 2021 "Spectral Analysis of Individual Terrestrial Gamma-Ray Flashes Detected by ASIM" https://agupubs.onlinelibrary.wiley.com/doi/full/10.1029/2021JD035347