

Fermi observations of Terrestrial Gamma-ray Flashes (TGFs)

Michael S. Briggs
(UAHuntsville)
and the GBM Team





**University of
Alabama
in Huntsville**



**NASA
Marshall Space Flight
Center**



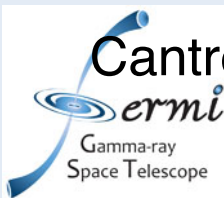
**Max-Planck-Institut für
extraterrestrische Physik**



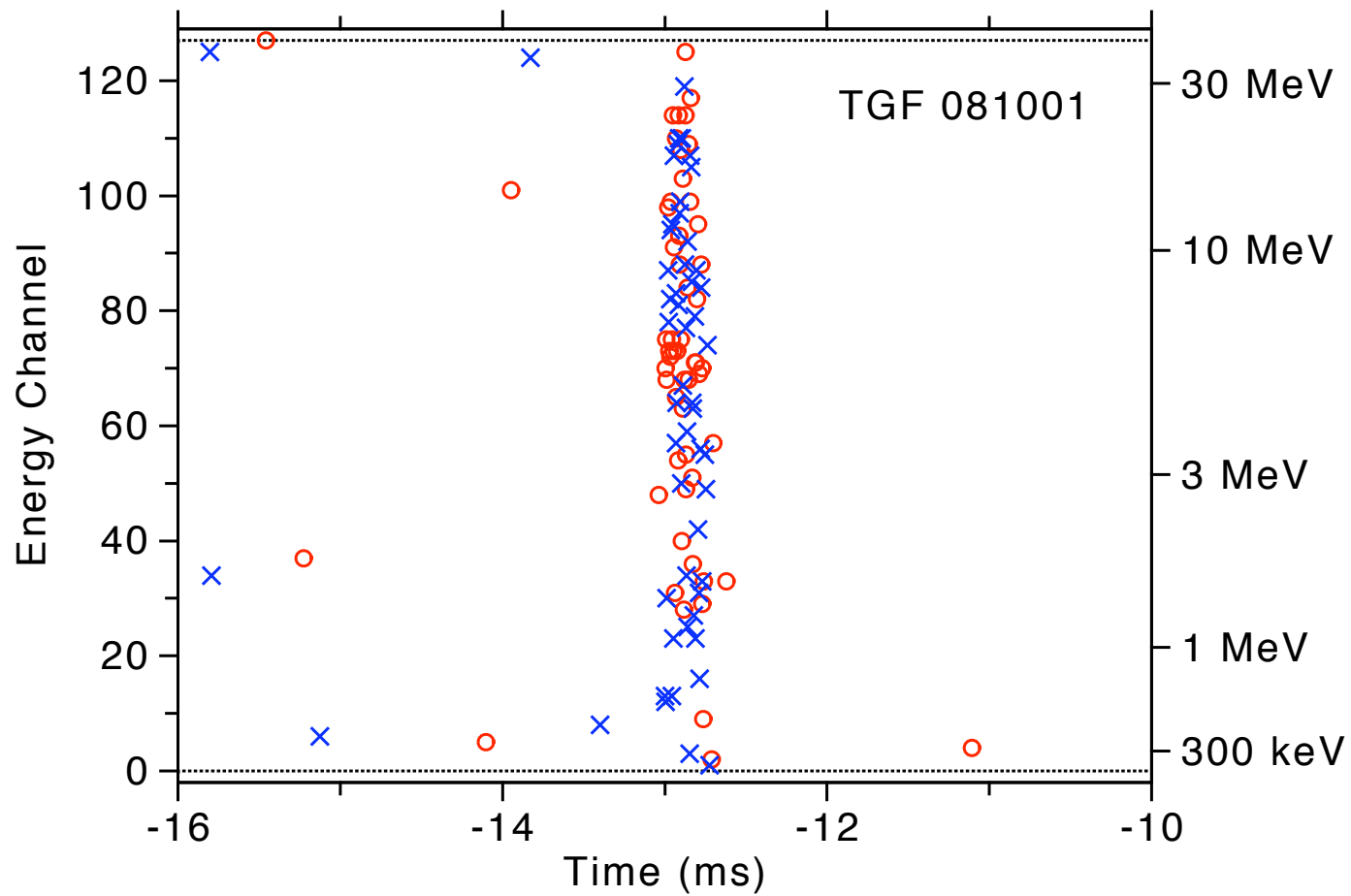
**University
College
Dublin**

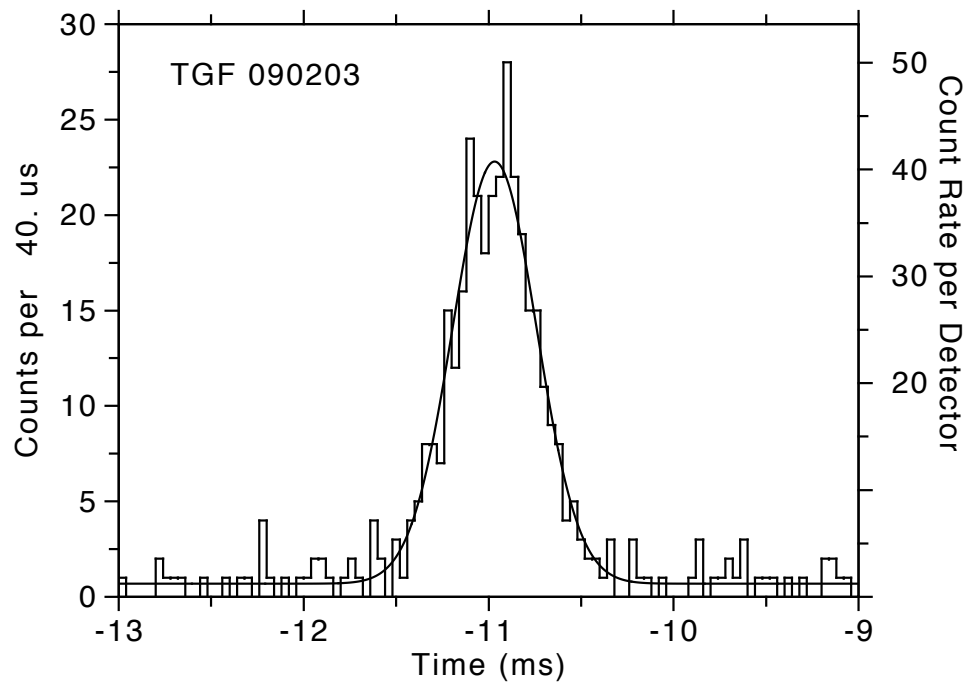
The current GBM Team: Narayana Bhat, Michael Briggs, Michael Burgess, Vandiver Chaplin, Bill Cleveland, Valerie Connaughton, Roland Diehl, Steve Elrod, Mark Finger, Jerry Fishman, Gerard Fitzgerald, Suzanne Foley, Lisa Gibby, Misty Giles, Adam Goldstein, Jochen Greiner, David Gruber, Alexander van der Horst, Andreas von Kienlin, Pete Jenke, Marc Kippen, Chryssa Kouveliotou, Emily Layden, Sheila McBreen, Sinead McGlynn, Chip Meegan, Bill Paciesas, Veronique Pelassa, Rob Preece, Arne Rau, Dave Tierney, Colleen Wilson-Hodge and Shaolin Xiong.

Others before launch: Giselher Lichti, Fred Berry, Ron
AI English, Fred Kroeger, ...

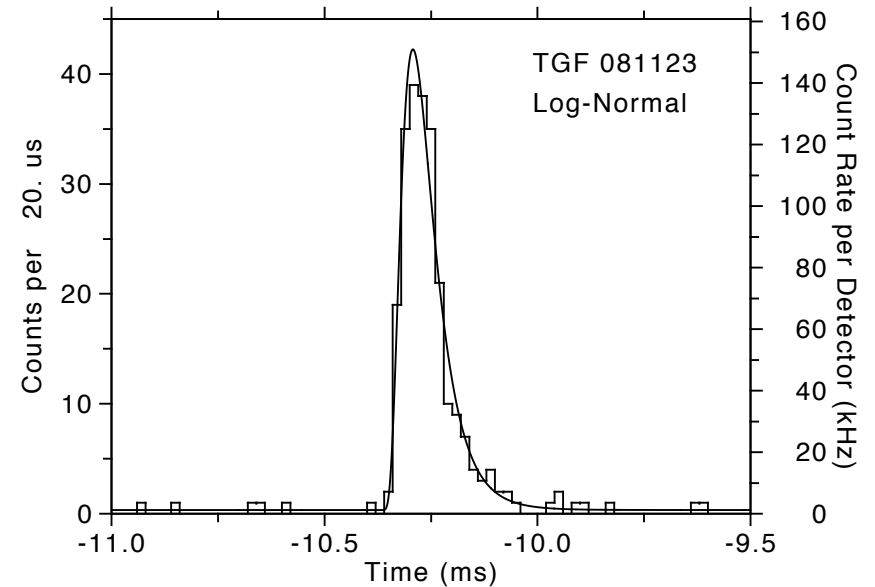






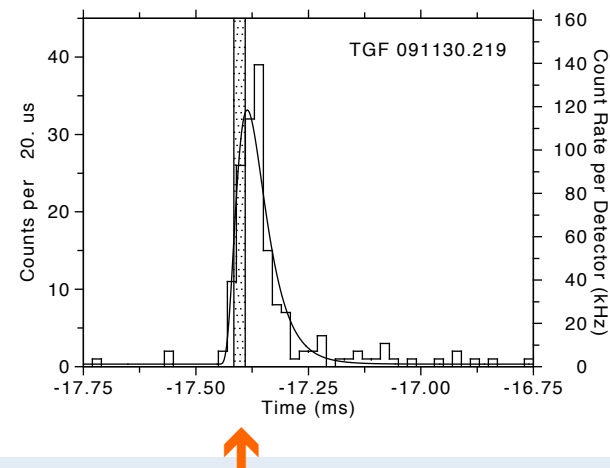
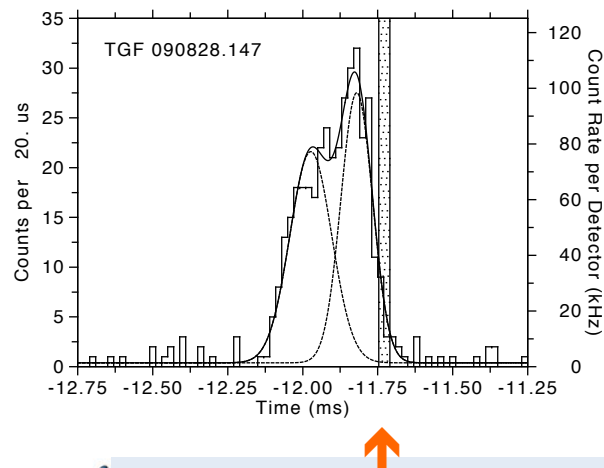
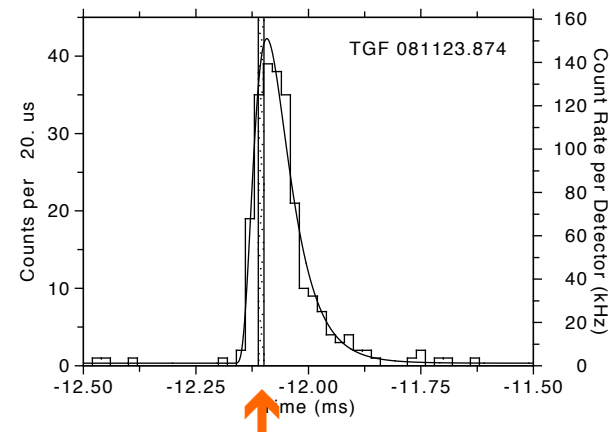
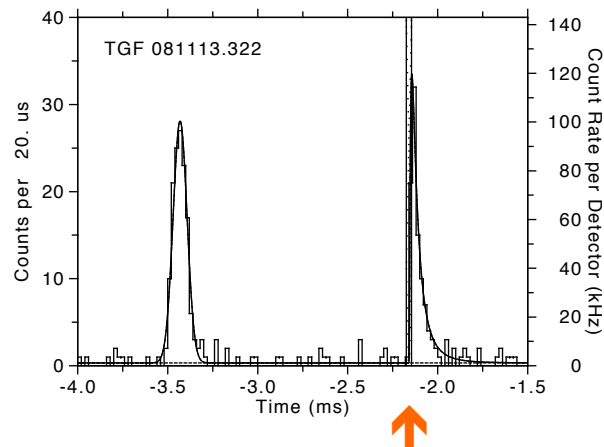


Briggs, et al., JGR, 2010
Foley, et al., in preparation



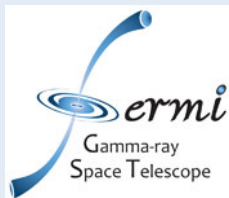
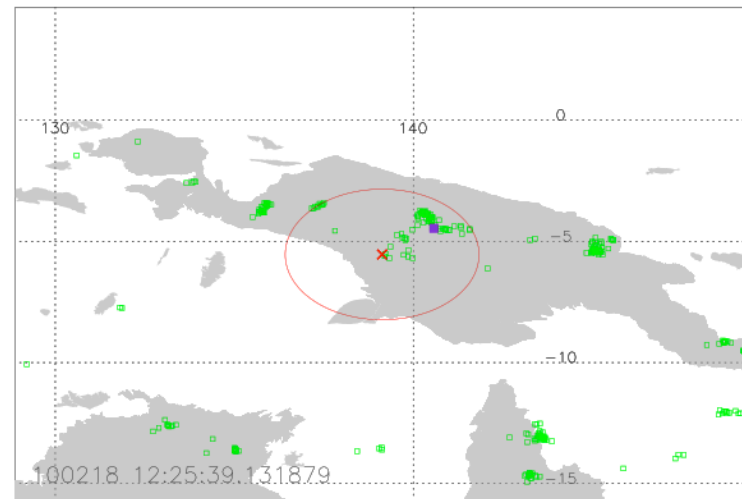
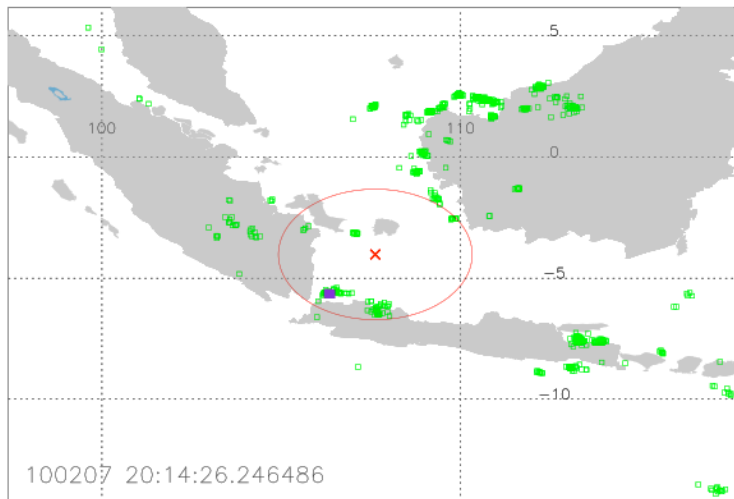
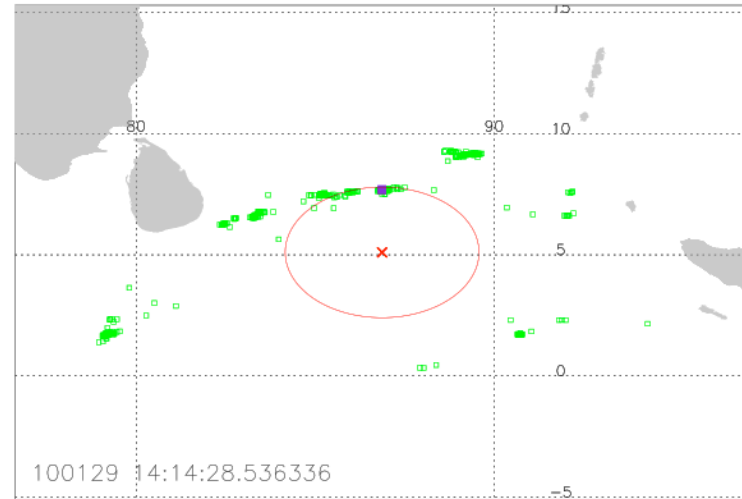
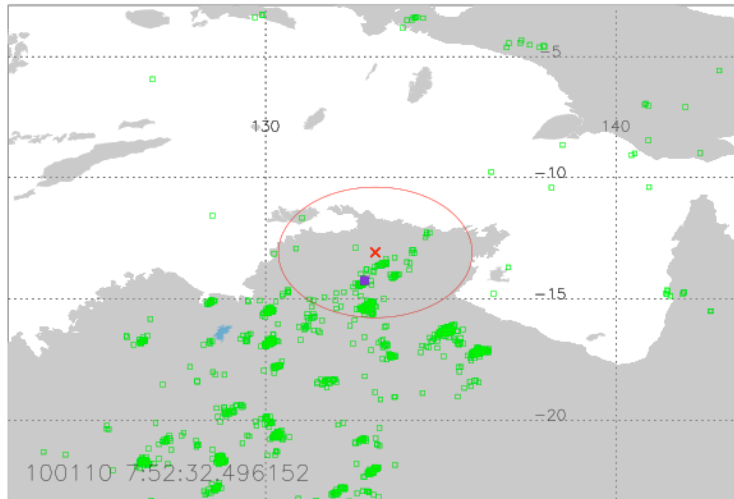
Correlating TGFs in gamma-rays (GBM) with lightning via radio (WWLLN)

Connaughton
et al., JGR, 2010



When a
match is
found:

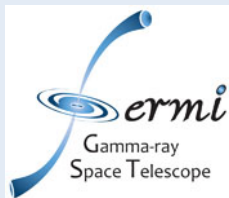
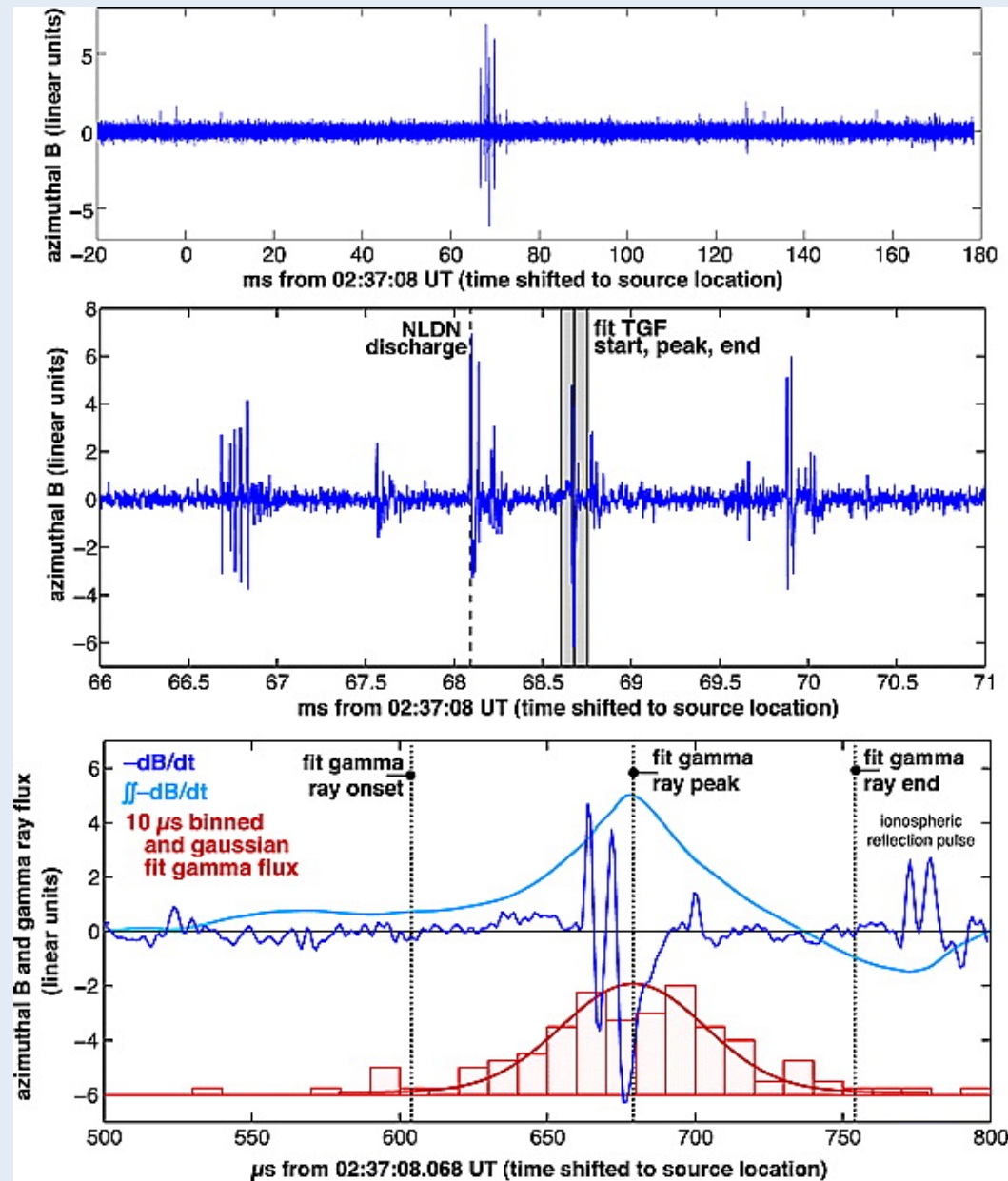
Tens of μs
and
 ≤ 300 km

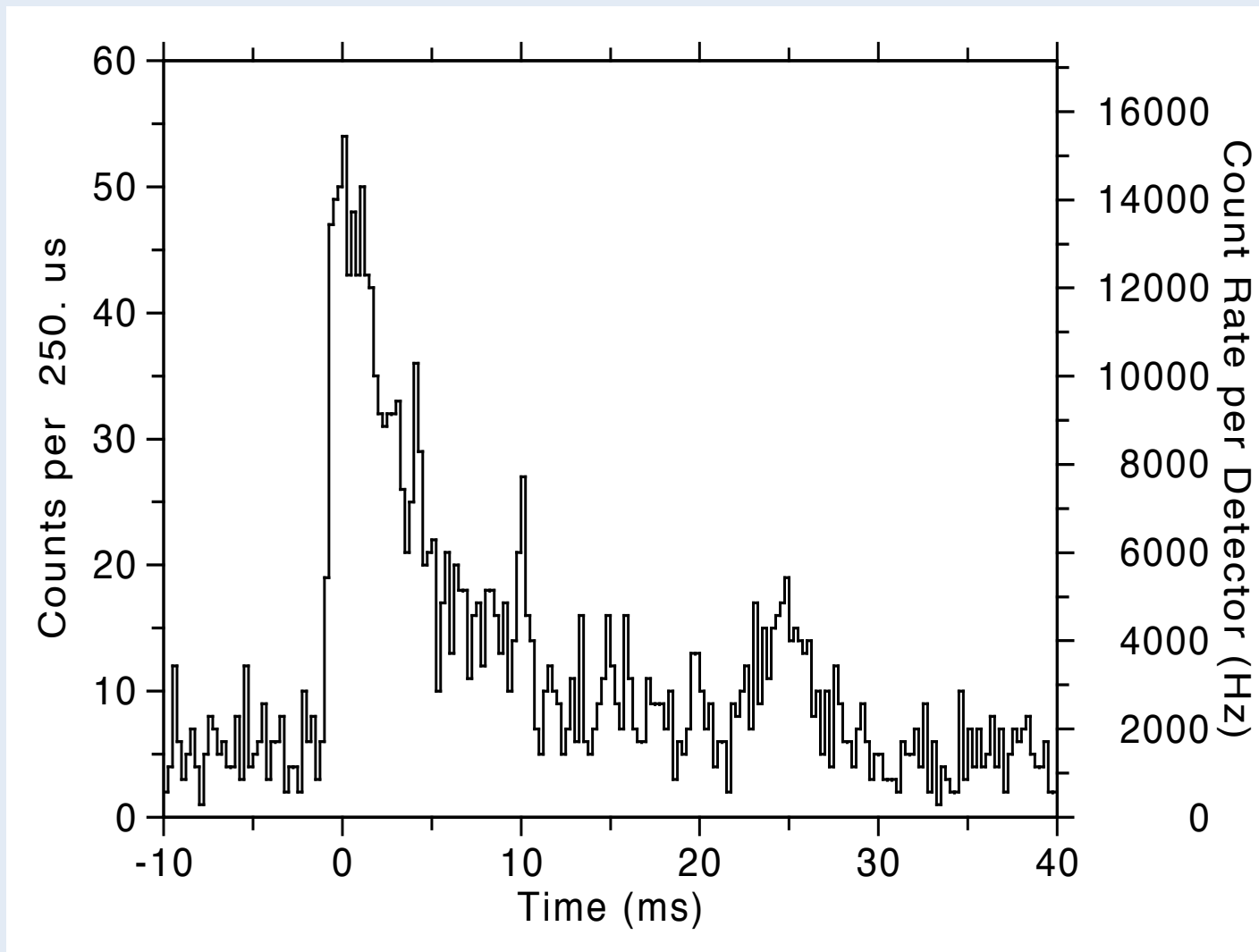


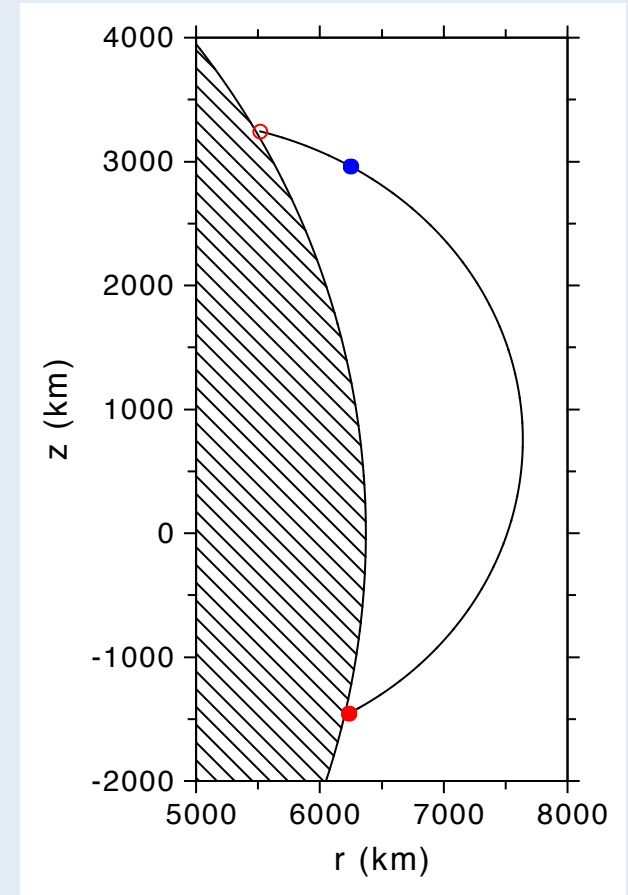
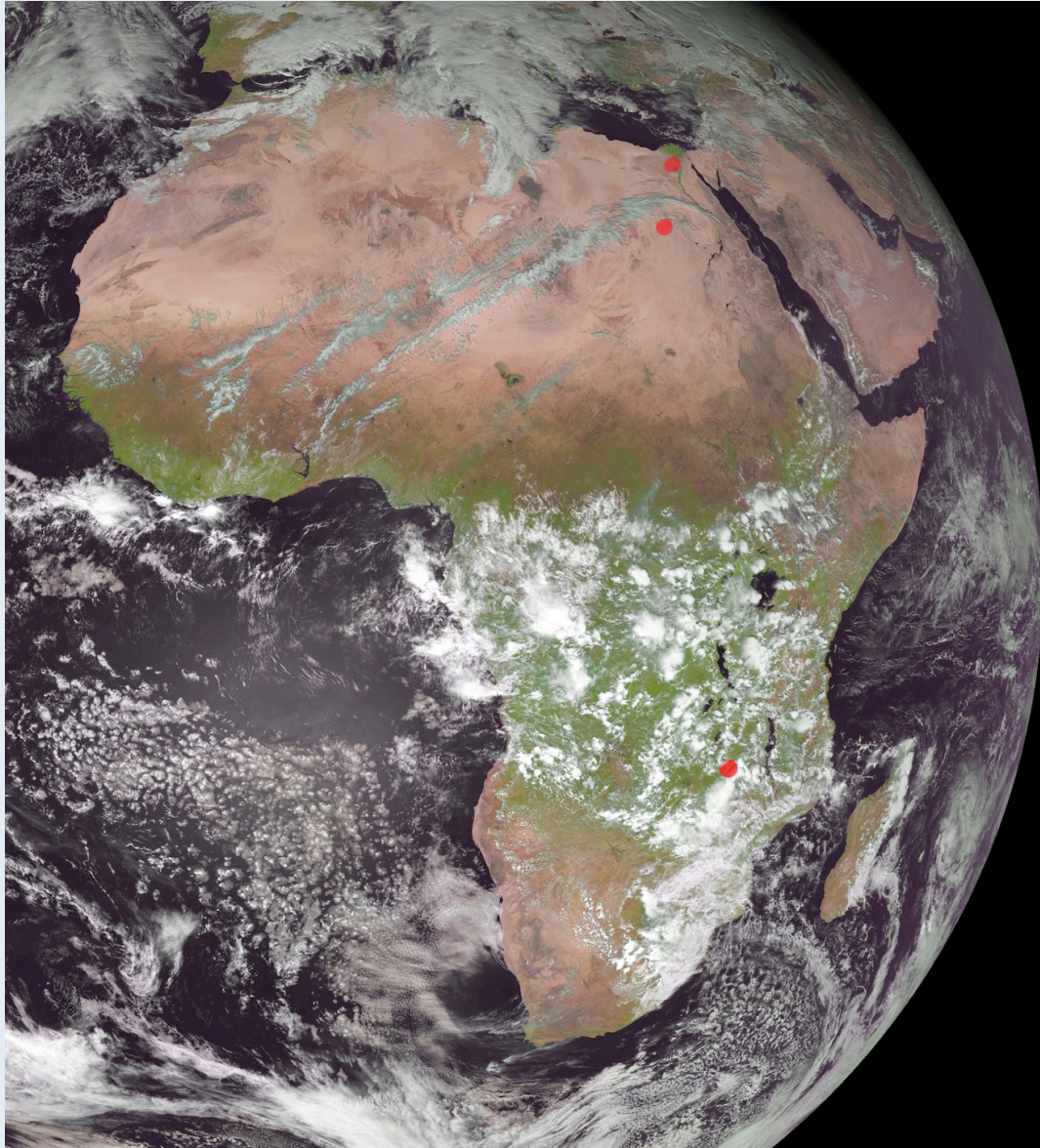
WWLLN lightning locations (Connaughton, et al., JGR, 2010)

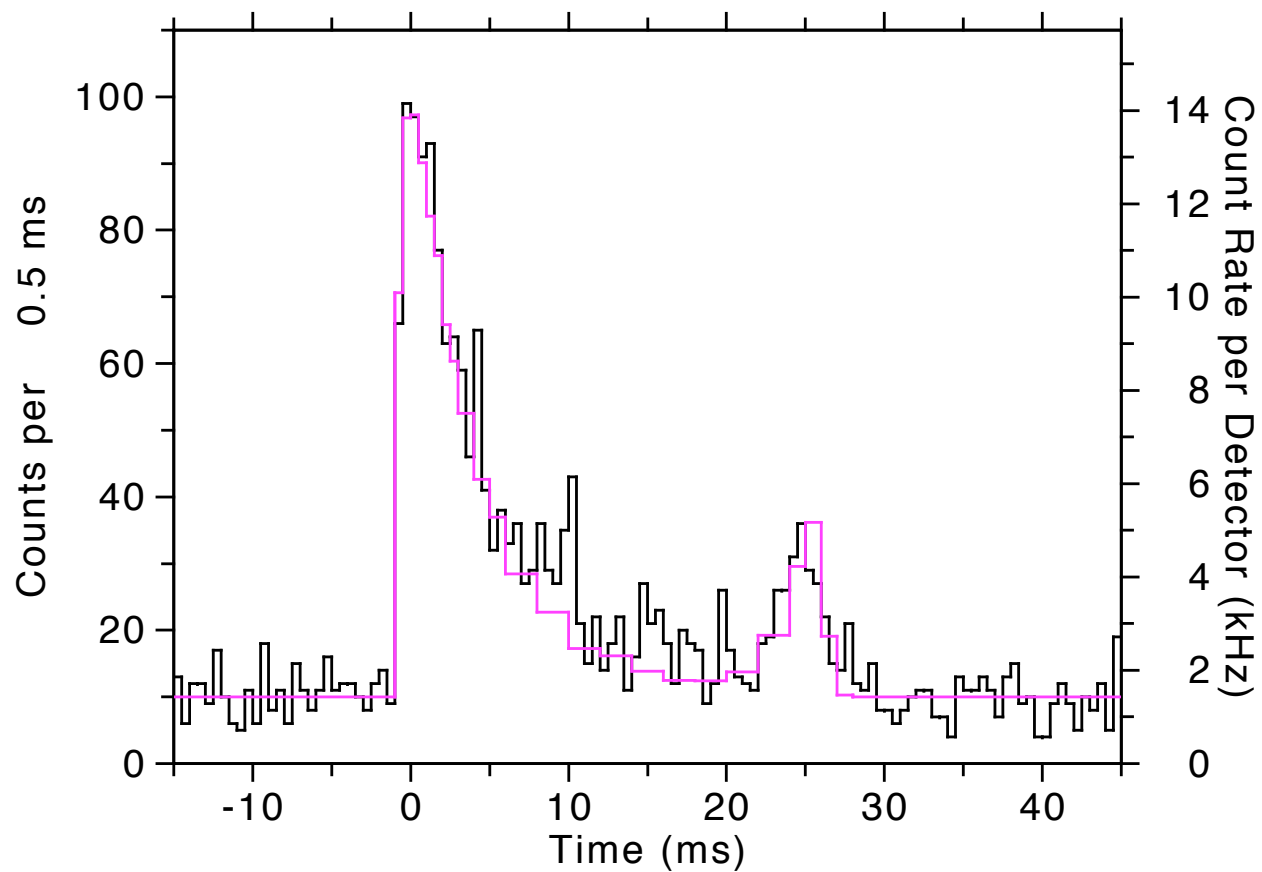
10th AGILE Workshop

Cummer et al.,
GRL, 2011





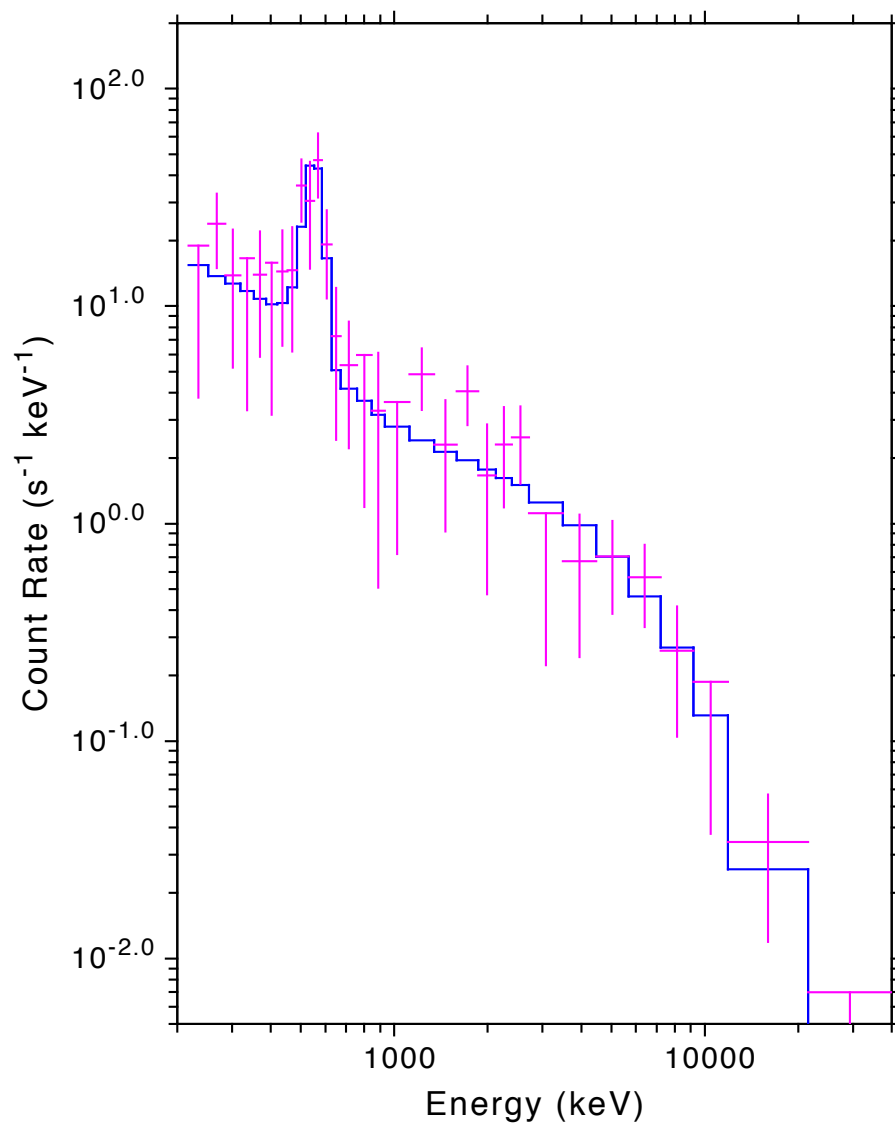




Magenta: simulation by J. Dwyer

10th AGILE Workshop

Briggs, et al, GRL, 2011

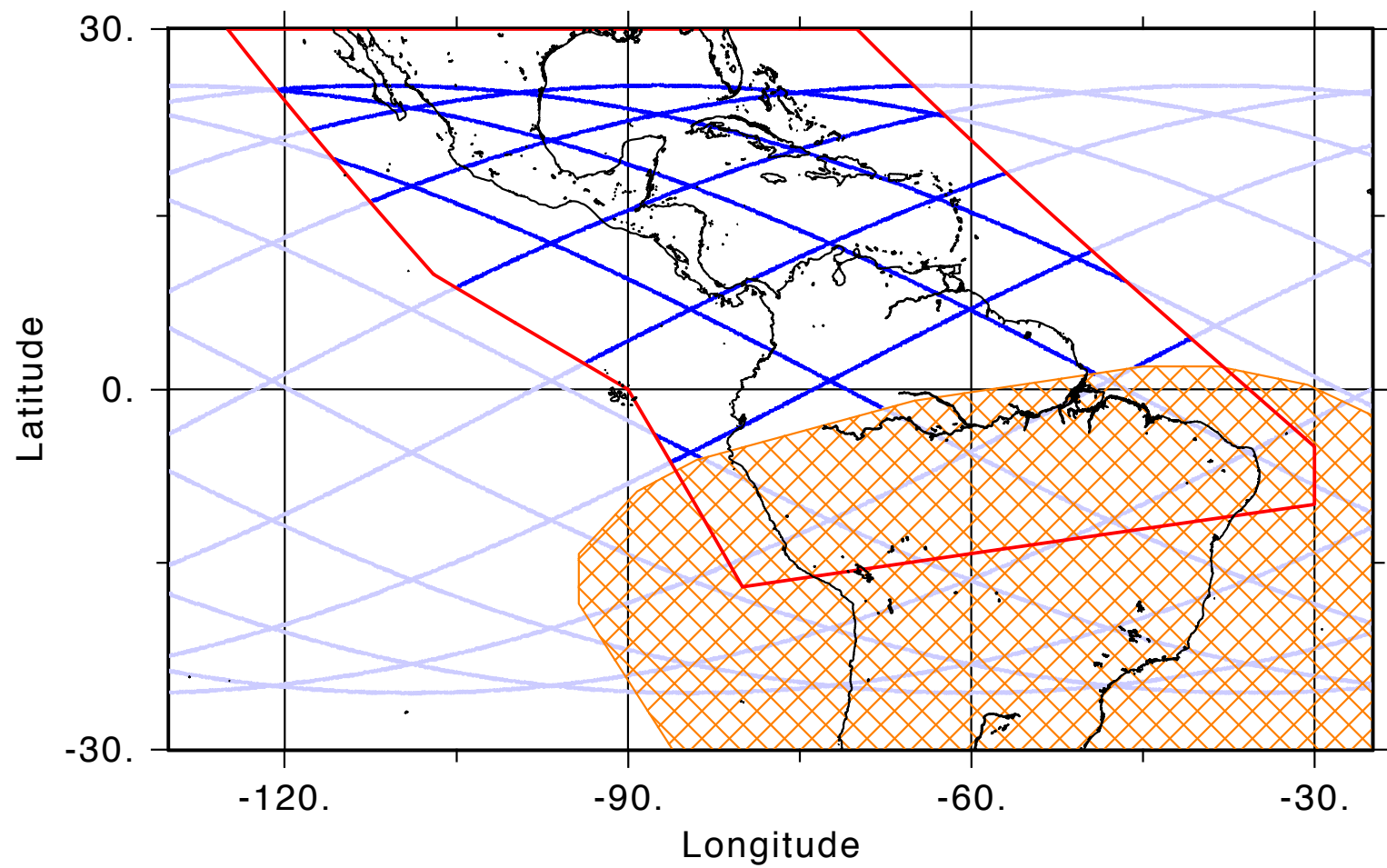


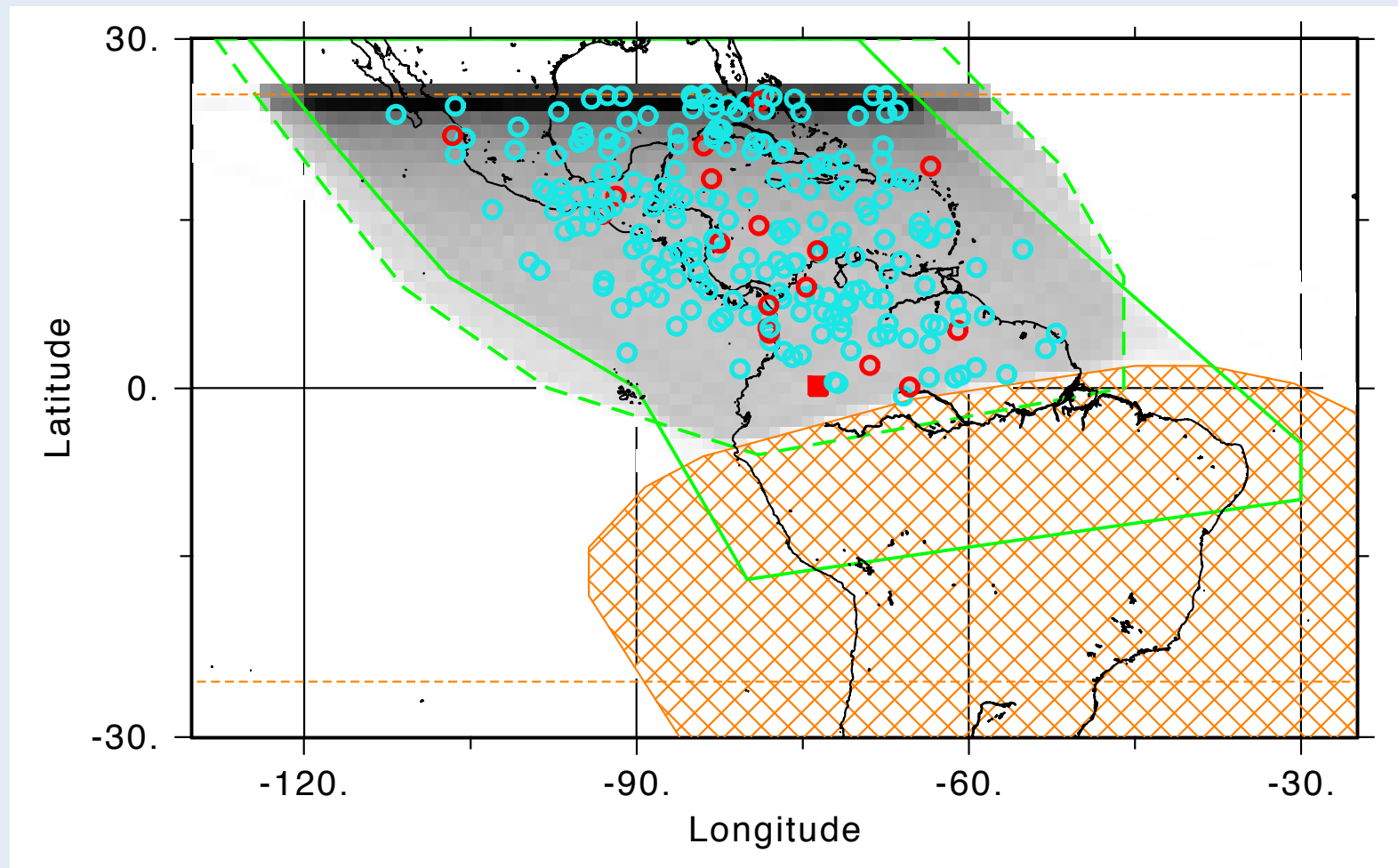
Currently 236 (triggered) TGFs

The TGF rate since the Flight Software was improved (2009 Nov 10): one per 4.0 days.

But as Oliver Twist said, “Please sir, I want some more.”







Currently ~ 700 TGFs.

“Please sir, I want some more.”

Fermi and GBM have permission to
produce GBM TTE data all the time!
We predict ≈ 800 TGFs per year.

[http://gammaray.nsstc.nasa.gov/publications/
tgf_journal.html](http://gammaray.nsstc.nasa.gov/publications/tgf_journal.html)

