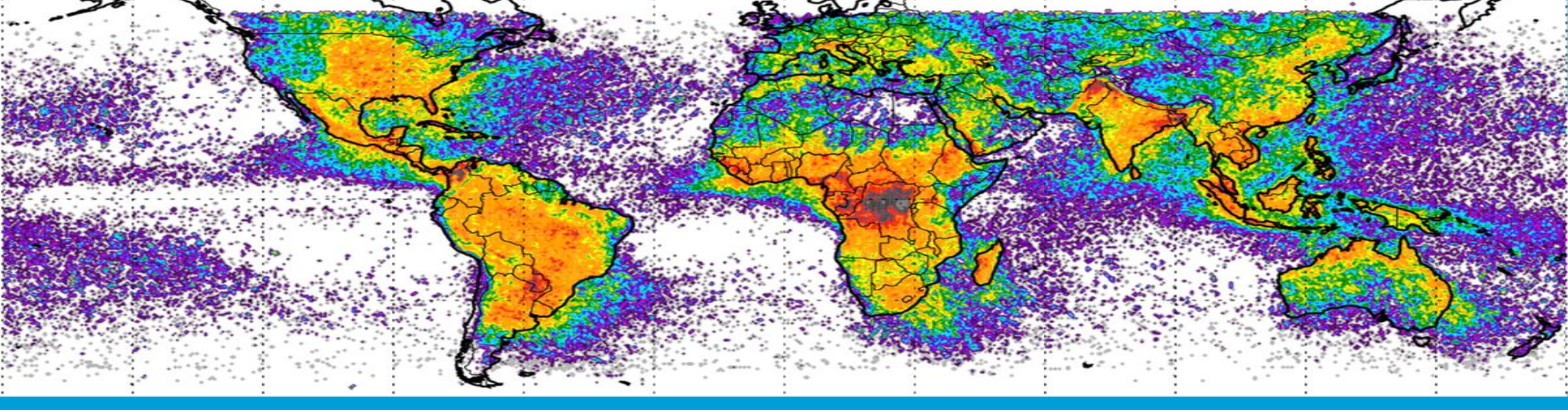


Overview of GHRC Lightning Activities

Geoffrey Stano - GHRC DAAC Scientist

Sherry Harrison – GHRC Lightning Lead

Congratulations to the ISS LIS Team

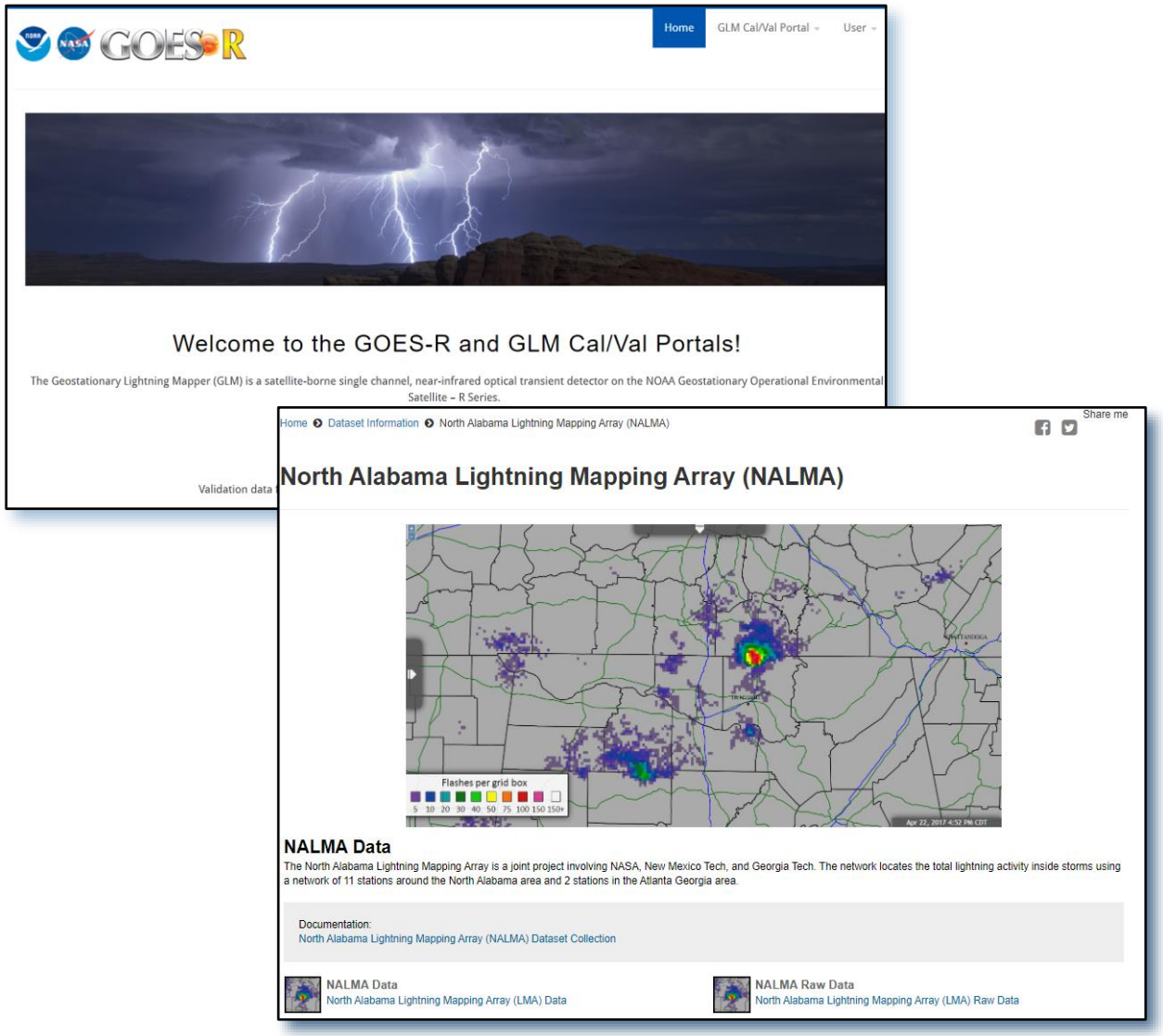
International Space Station Lightning Imaging Sensor team has earned a NASA Group Honor Award

- Combination of multiple individuals
  - Marshall Space Flight Center
  - University of Alabama in Huntsville with GHRC
  - Many others

- Recognition for:
  - 2020 senior review proposal
  - Ultimately led to mission extension for the ISS LIS instrument

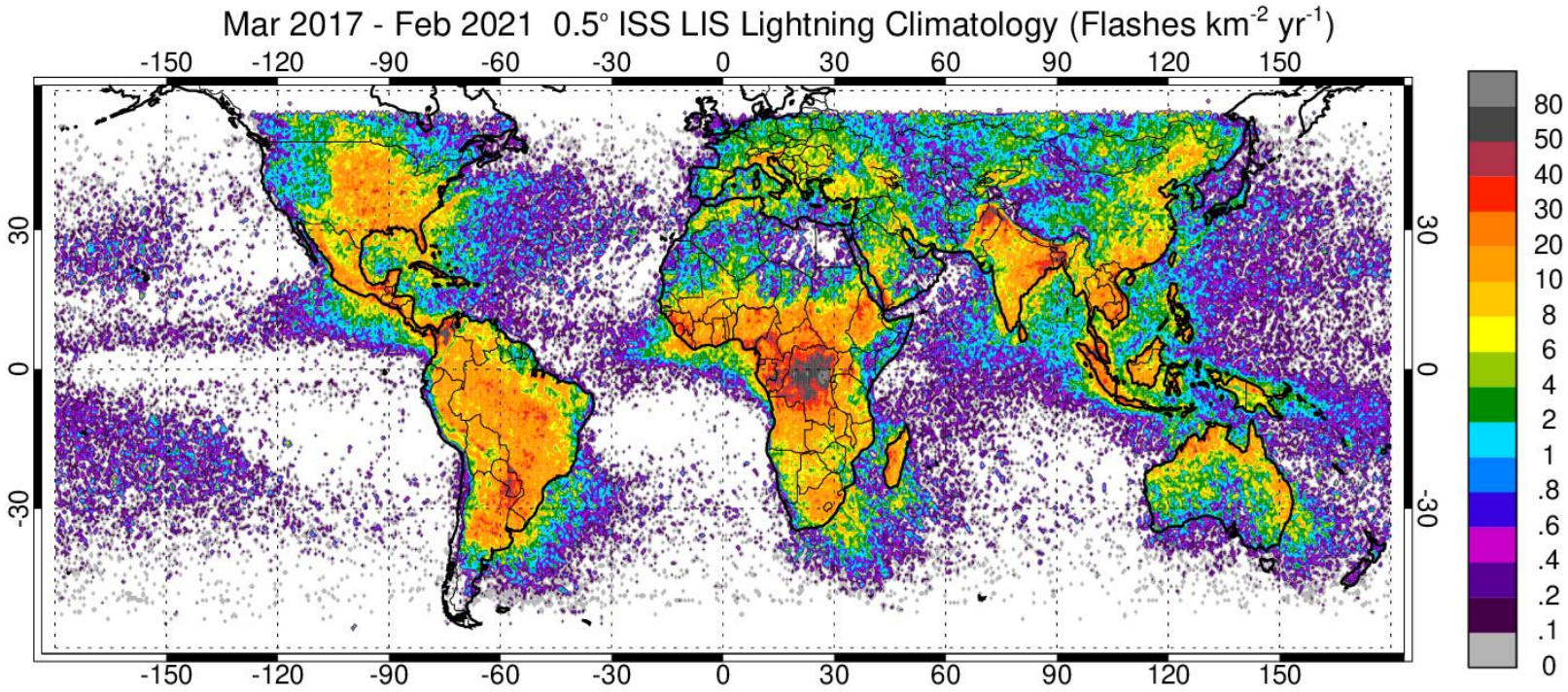
Web Page Updates

- GLM Portal remains supported
- https://goes-r.nsstc.nasa.gov/home/
- Built for GOES-R Post Launch Test (PLT) field campaign
- Contains lightning data cleared for use by the MSFC lightning science team
  - National Lightning Detection Network
  - Earth Networks Total Lightning Network
- GLM Science meeting presentations
- North Alabama Lightning Mapping Array (NALMA) page has been updated to coincide with new publications
- https://ghrc.nsstc.nasa.gov/lightning/data/data_nalma.html



Updates: ISS LIS (part 1)

- 4 years on orbit – extending long-term TRMM LIS climatology
  - Middle and higher latitudes of special interest
    - Have not been sampled (outside of GLM) since the Optical Transient Detector (OTD) from 1995-2000
- ISS LIS being incorporated into the 20+ year combined TRMM LIS / OTD climatology
- Likely relocated on ISS in early 2022 – Continued operations through at least late 2023



ISS LIS climatology March 2017 – February 2021. Image courtesy of Timothy Lang and Dennis Buechler

Updates: ISS LIS (part 2)

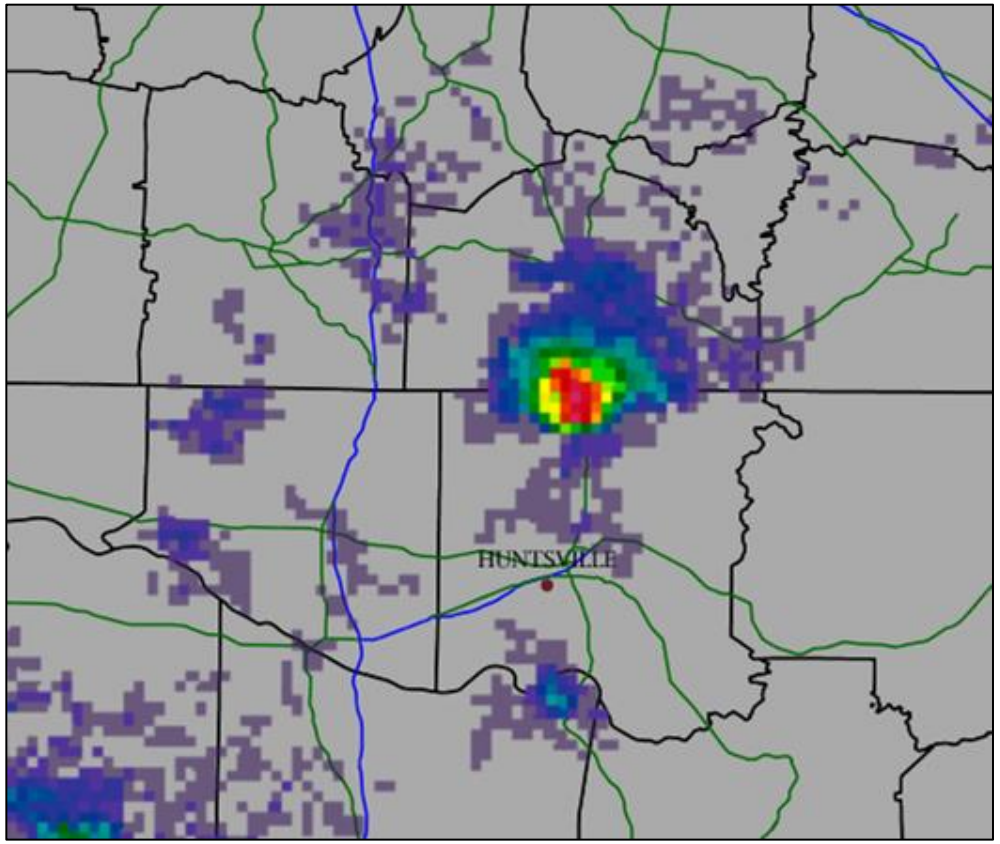
- ISS-LIS Code for Version 2.0 now operational
  - Viewtime correction for solar panels
  - Viewtime correction for 1 second dropout
  - Corrected initialized event alert summary variable
  - Improved the way data at the end of the 24 hour period is handled
  - Changed the orbit designation from simple increasing index to one based on the day/time of orbit
  - 15 March to 9 May 2021: Timing anomaly that changed offset from reference datasets
    - Normally < 1 ms with < 1 ms standard error – Increased to ~32 and 10 ms, respectively
    - V2 data subtracted off a 32 ms offset, but standard error not corrected
    - Issue resolved May 9 and remains under investigation

North Alabama Lightning Mapping Array (NALMA)

- Operations have resumed, including earlier data
  - Start date: December 17, 2018
  - Number of stations: 12
- Processing transitioned to Huntsville
  - Local processing is a collaboration between GHRC and the Marshall Space Flight Center Lightning Team
- GHRC will host full-rate and raw NALMA data
  - Full rate:

    http://dx.doi.org/10.5067/NALMA/DATA101
  - Raw:

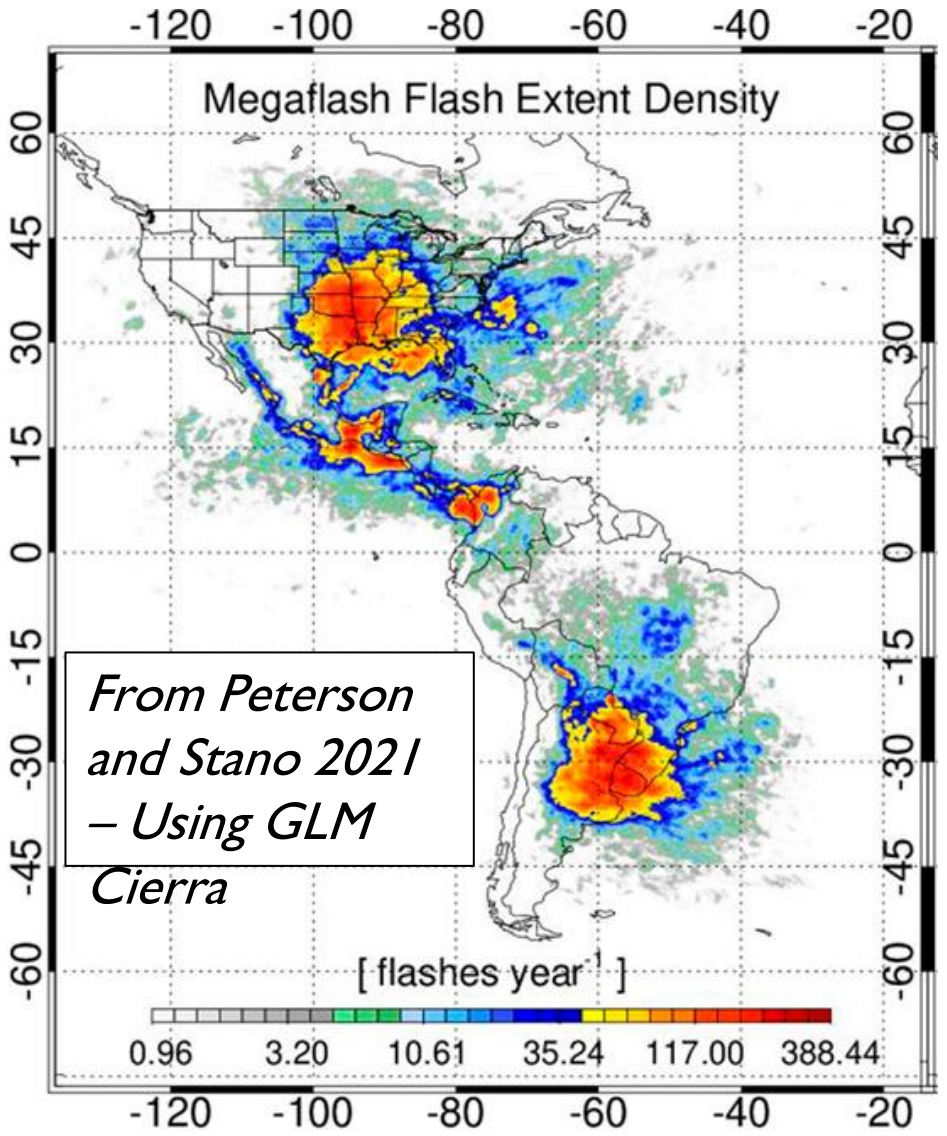
    http://dx.doi.org/10.5067/NALMA/DATA301
- Preparing for the near real-time NALMA data
- Future plans include publishing the entire period of record back to 2002



NALMA Flash Extent Density example

Geostationary Lightning Mapper

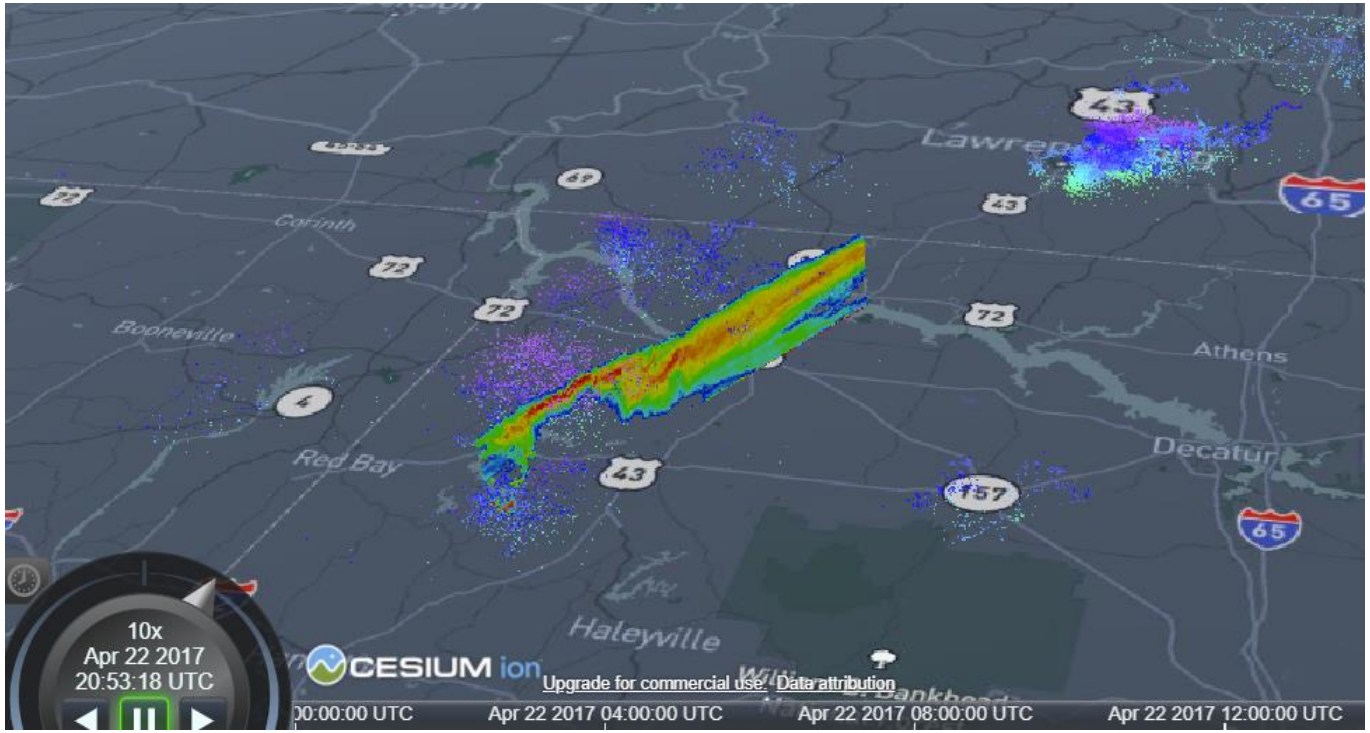
- Two GLM products in preparation for publication in FY2022
  - Full disk, gridded GLM products
    - http://dx.doi.org/10.5067/GLM/GOES/DATA101
  - GLM-CIERRA – Cluster Integrity
    - http://dx.doi.org/10.5067/GLM/CIERRA/DATA101
- Primary delay was with GHRC's cloud transition
  - "Ongoing" datasets (i.e., those with regular observations) needed a cloud-based processing solution
  - GHRC is working with the PIs to begin publishing
    - GLM CIERRA has provided two years of data to start
- Journal Publication
  - The Hazards Posed by Mesoscale Lightning Megaflashes
  - https://doi.org/10.1175/EI-D-20-0016.1



Integrating Lightning Data

https://ghrc.earthdata.nasa.gov/fcx/index.html

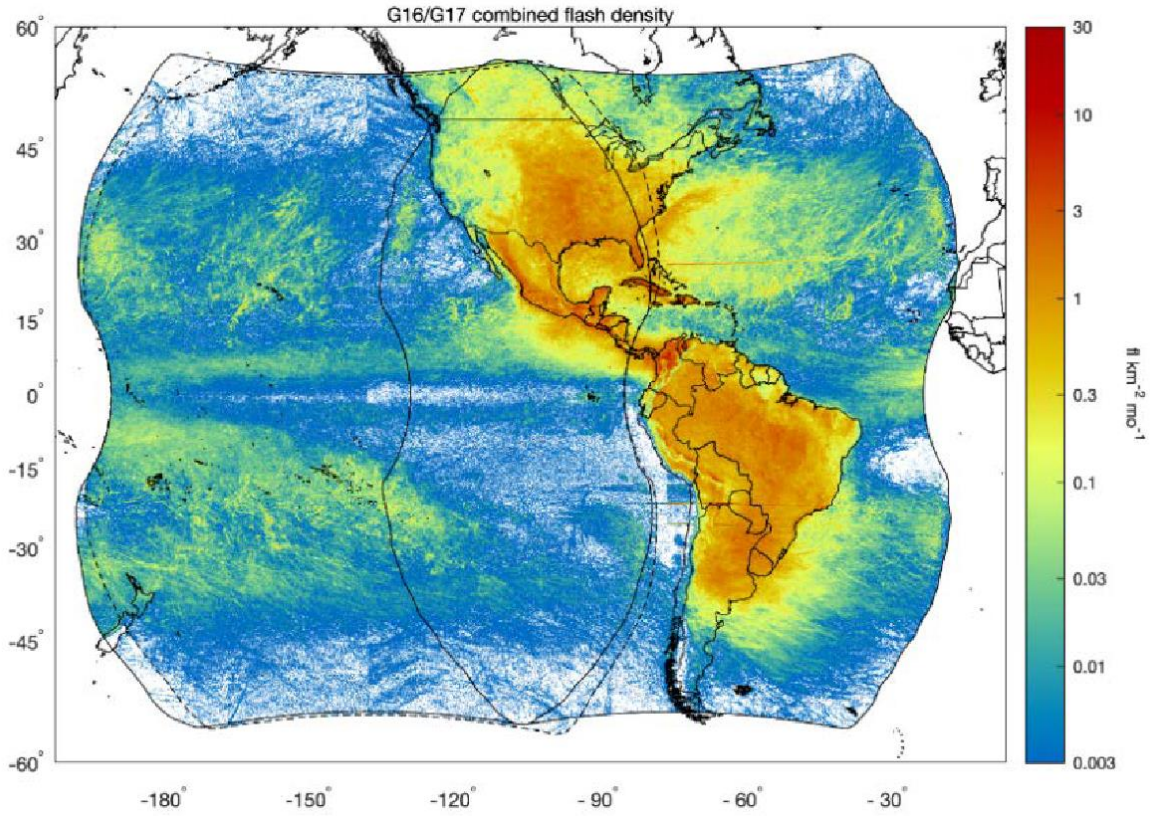
- Basic 3D viewing of Lightning Mapping Array "sources" available in FCX
- Basic plot of ISS LIS and GLM "events" available in FCX
- Goal: Update displays to use more familiar products, such as flash density
  - Soon to be published GLM gridded data offer a number of products
- Goal: Use this for dynamic browsing of GHRC holdings as part of the website refresh



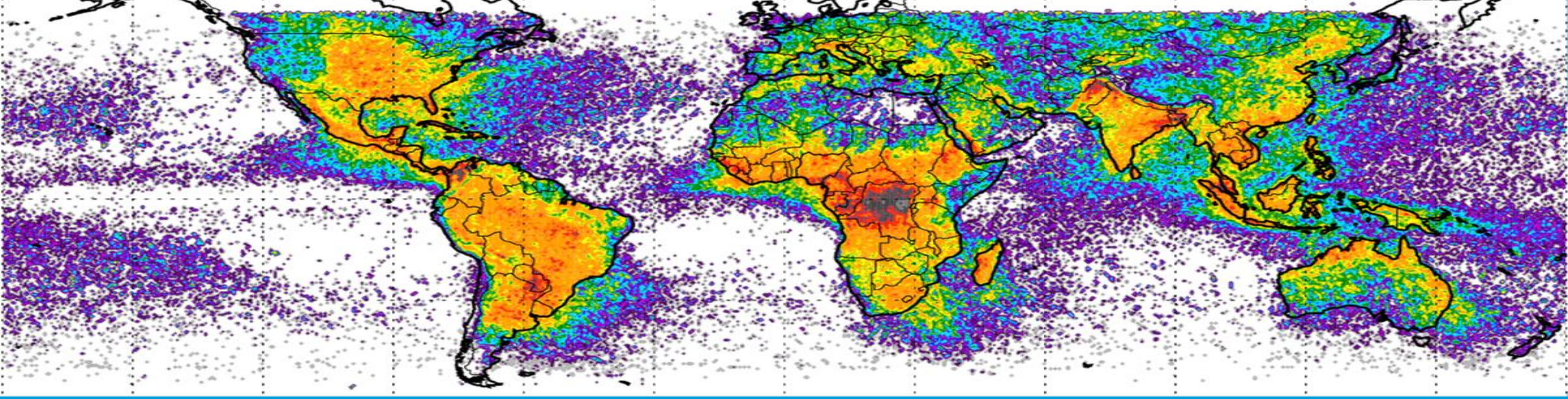
NALMA raw source observations along with the Cloud Radar System on the ER-2 during the GOES-R Post Launch Test field campaign. (April 22, 2017 at 2053 UTC)

Looking Ahead for FY2022

- Primary focus is to complete dataset publications
  - GLM gridded, GLM CIERRA, and NALMA
- Expand Field Campaign Explorer tie-ins
- Incorporate other LMA networks
  - Focus will shift to the DC and Wallops networks
- WMO global dataset
  - More details this fall
  - Incorporate all available lightning data into a gridded, global dataset
- Several potential field campaigns in the next 1-3 years that could come to GHRC
- Explore a lightning dashboard
- Provide ISS LIS data to Aviation Weather Center



Flash densities of both GOES-16 and GOES-17 from December 1, 2018 – May 31, 2020 (GLM full disk gridded products quick guide)



THANK YOU!

QUESTIONS?