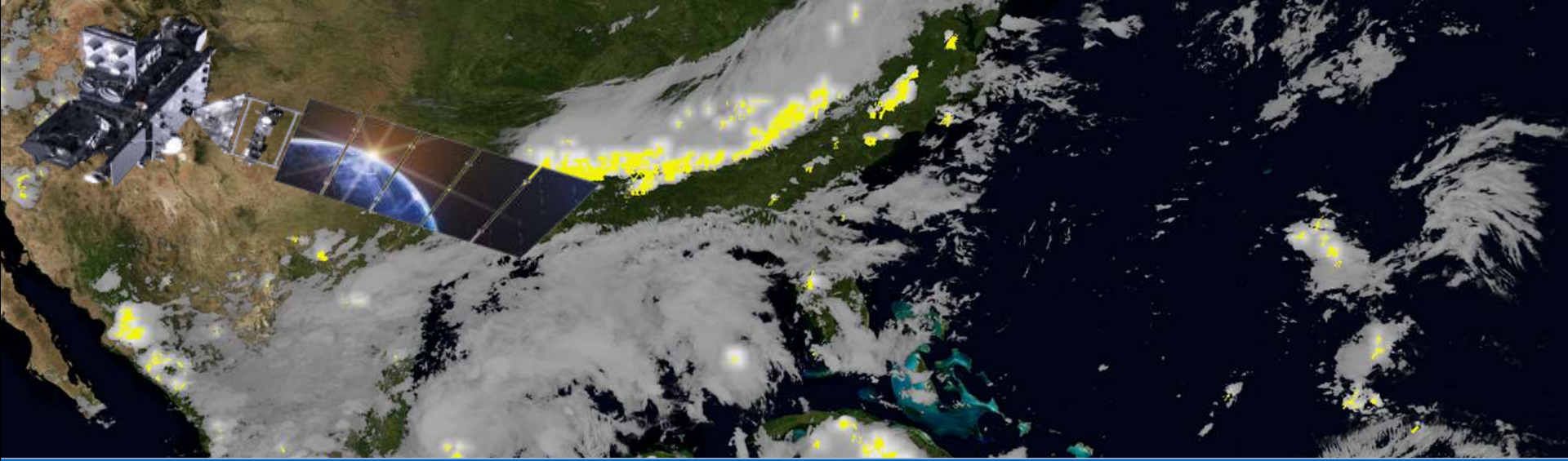


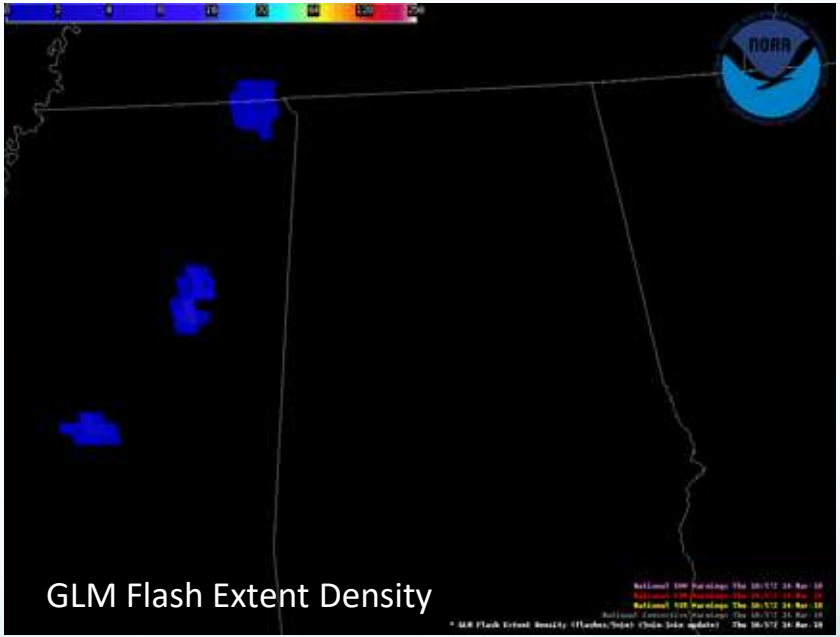
Status of the Geostationary Lightning Mapper Gridded Products

Dr. Jonathan Wynn Smith (UMD/ESSIC/CISESS)
Dr. Scott Rudlosky (NOAA/NESDIS/STAR)

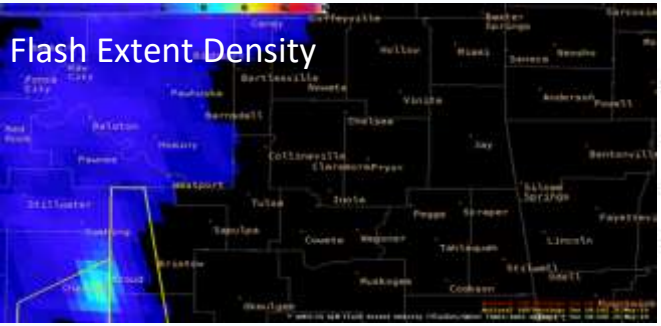
2020 GLM Science Team Meeting
Session on NWS Integration and Operational Uses of GLM
10 September 2020

GLM Gridded Products

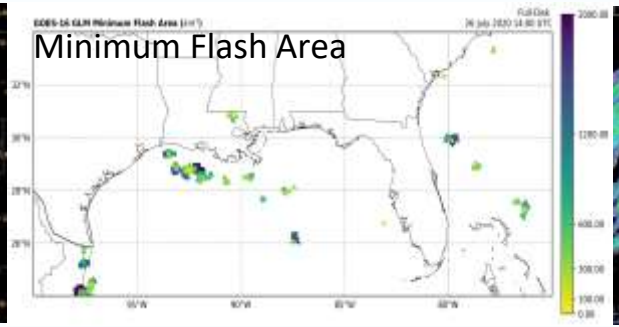
- GLM Level 2 data (events, groups, and flashes) are produced as points, resulting in a loss of information concerning the spatial extent
- Gridded GLM products restore and disseminate the spatial footprint information while reducing file size
- Gridded GLM products involve re-navigating the GLM event latitude / longitude to the 2×2 km Advanced Baseline Imager (ABI) fixed grid
- The broad spatial coverage and rapid temporal updates suggest the gridded GLM products will provide great value to forecasters



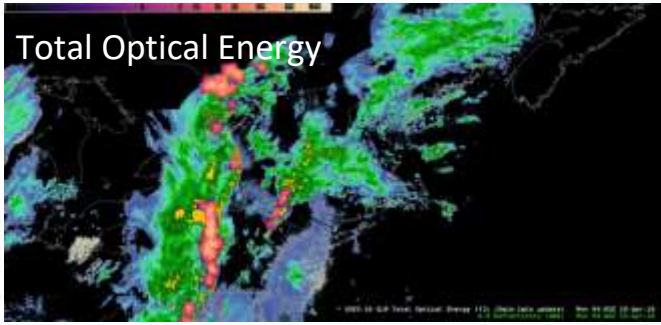
Gridded Products in Operations



- Number of flashes that occur within a grid cell over a specified time period
- The preferred total lightning product by operational meteorologists
- FED portrays GLM flash quantity and extent of GLM events
- Frequent lightning indicates robust thunderstorm charging which occurs with strong and persistent updrafts



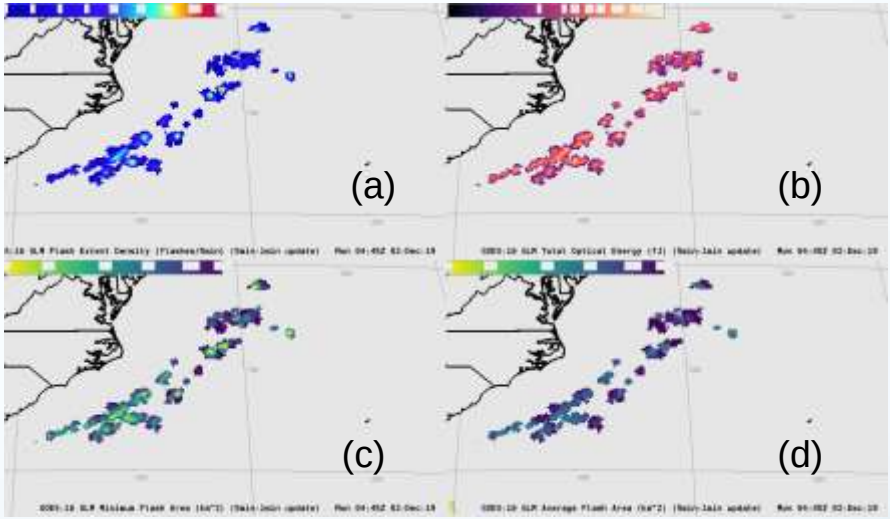
- Minimum area of all GLM flashes spatially coincident with each 2x2 km grid cell over a specified time period
- Improved identification of smaller flashes
- Forecasters use it to determine convective initiation



- Sum of all optical energy (fJ -> 10^{-15} J) observed within each grid cell over a specified time period
- Fundamental measurement from an optical sensor, portrays an intuitive relationship between lightning optical emissions, frequency, and intensity
- Detects most energetic convective cores and their propagation along/through convective lines
- Depicts lightning channels within extensive anvil/stratiform flashes

Current Status of GLM Gridded Products

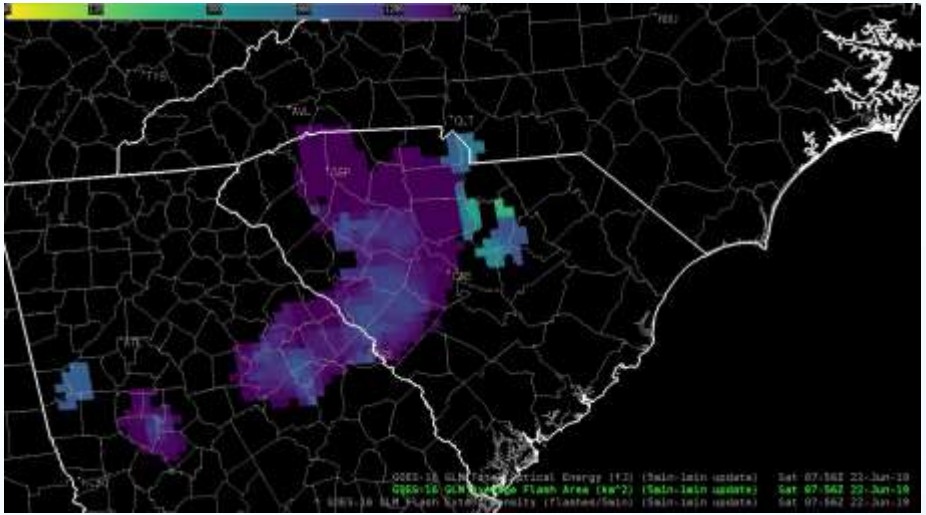
- **Initial project funded by Weather Program Office Joint Technology Transfer Initiative (JTTI) "Optimizing GLM for use in AWIPS"**
- **Implemented glmtools package within the IDP Satellite Subsystem (ISatSS) software**
- **Most NWS Weather Forecast Offices (WFOs) now have access to GLM gridded products**
- **Full disk grids now running on GOES-R cloud AWIPS instance (with Minimum Flash Area) Product to ISatSS and glmtools**
- **Post-processing and archiving of gridded products ongoing (UMD, TTU, GHRC)**
- **Targeted training materials under development**



Above: a. Flash extent density, b. total optical energy, **c. minimum flash area**, d. average flash area

GLM Gridded Products Transition to Operations

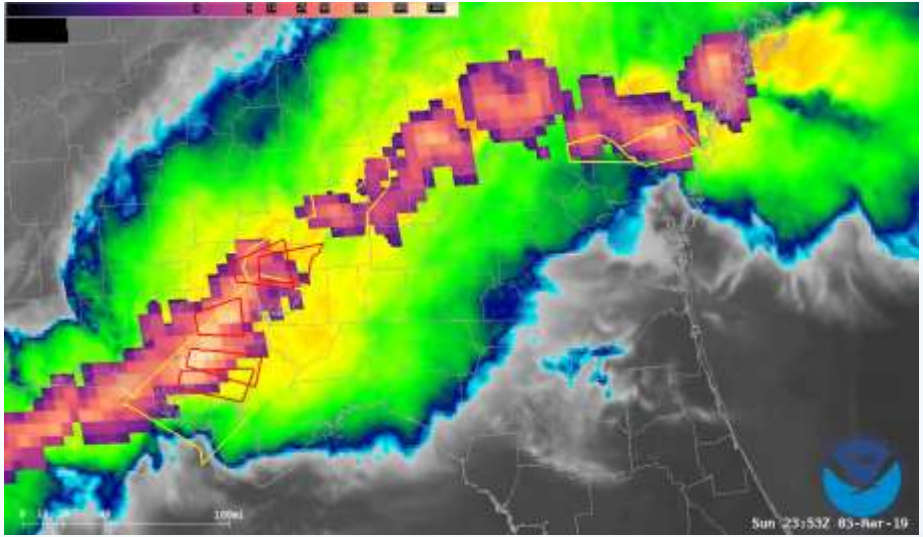
- **NESDIS is planning to begin generating and distributing the gridded products**
- **Interim step will be integrating glmtools into CSPP-Geo to provide access to GRB users**
- **Developers and trainers are using virtual (cloud) AWIPS instance to**
  - **Ensure that data is displayed properly compared to the 2 km CONUS and PACUS grids**
  - **Test GLM flash location overlay on GLM gridded products with a readout of number of flashes**
- **NWS TOWR-S Team preparing for Redhat Package Manager Release 20 (RPM-20) in the October/November 2020 time frame**



Above: Average Flash Area (AFA) leading line trailing stratiform

NESDIS Role in Transition

- **Accelerate hardening of this product path to encourage forecaster use and best advise deliberations on next generation architecture**
- **Proposed path forward (Phase Three):**
  - **Integrate glmtools into CSPP-GEO to compute official GLM gridded products at each GRB site**
  - **Submit proposal (conduct project) responding to formal user request for GLM flash extent density and data quality information**
  - **Migrate to NESDIS generation and distribution of the GLM gridded products**



- **Maintain and improve the Level 2 GLM products that feed the gridding codes (e.g., GLM L2 Data Quality Product and GLM Full-Parallax Compensation)**