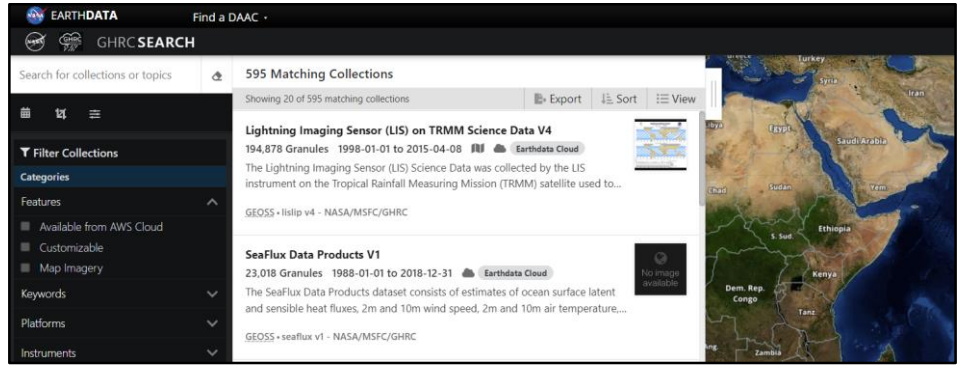
Preparing for the Future

Purpose of Presentation

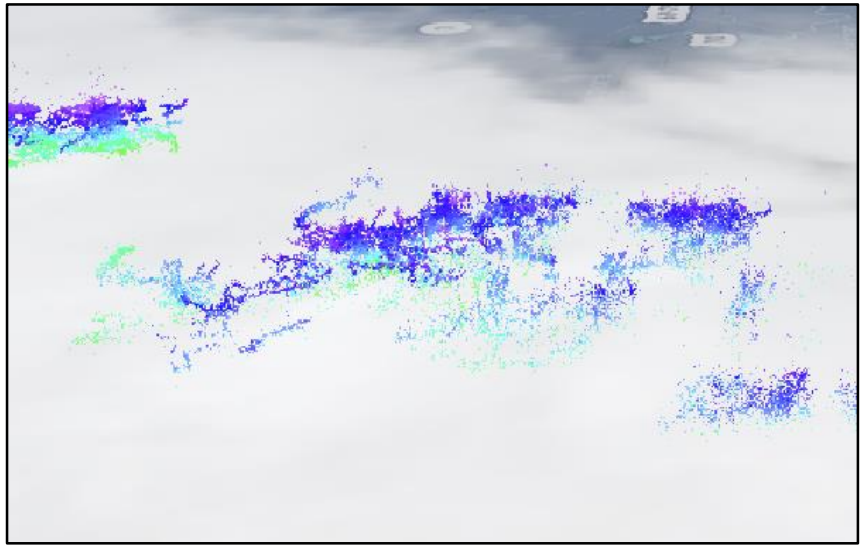
- **Set up topics for the discussion session**
  - Evolving role of GHRC and each NASA DAAC
  - What is GHRC doing?
    - Recap previous talks
    - Highlight items not already shown
  - High level plans for the year ahead

DAAC Evolution: User Services

- **What is changing?**
  - Adopting enterprise-wide for standardized user experience
    - Earthdata Search: Cross-DAAC data access and DAAC-specific portals
    - Earthdata Pub: Common data producer entry point
  - DAACs are shifting to create user-specific services
    - In addition to supporting existing data archival work
  - GHRC activities
    - Focus on strengths
      - Cloud capabilities
      - Lightning observations
      - Airborne data



Earthdata Search – GHRC Portal



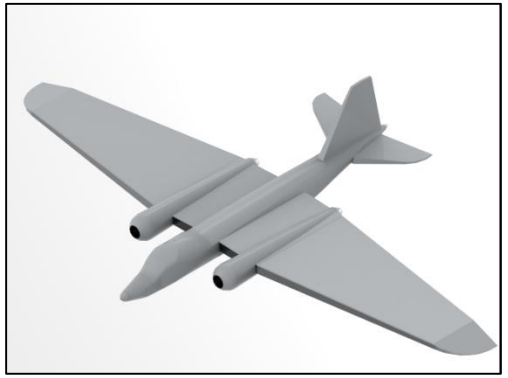
3D Lightning Mapping Array

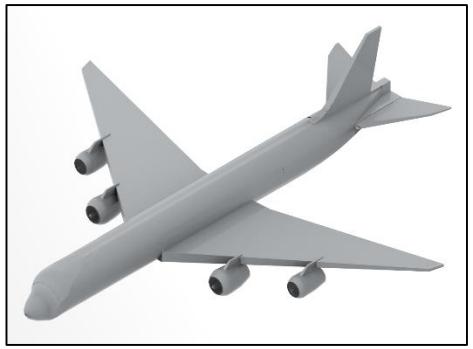
Airborne Services: FCX Actions

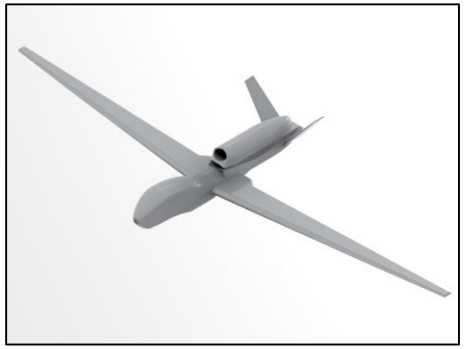
- **Field Campaign Explorer (FCX) – 2022 Accomplishments**
  - Now open source
    - https://github.com/nasa/GHRC-FieldCampaign-eXplorer-UI
    - https://github.com/nasa/GHRC-FieldCampaign-eXplorer-core
  - IMPACTS campaign data added
  - New observations (e.g., HIWRAP)
  - Photo/video viewer
  - Cloud optimized geoTIFFs for NEXRAD and EXRAD radars

Airborne Services: FCX Ongoing

- **Current FCX Work**
  - Incorporating the Hurricane and Severe Storm Sentinel (HS3) campaign
  - Cross-campaign instruments
  - Question to UWG:
    - Focus on one campaign at a time or add cross-campaign instruments
  - OPeNDAP subsetting tool
  - Adding aircraft-specific graphics







IMPACTS in FCX

Airborne Services: FCX Future

- **Upcoming FCX Work**
  - Investigate satellite data
  - Investigate probes and dropsondes
  - Investigate how machine learning can be incorporated
  - Targeting OLYMPEX and CAMEX3

Olympic Mountains Ground Validation Experiment (OLYMPEX)

Hydrologic validation in extreme coastal and topographic gradients. Washington's Olympic Peninsula, Nov 2015-Feb 2016.

Convection And Moisture EXperiment 3 (CAMEX3)

The third in the CAMEX series, collected data for research in tropical cyclone development, tracking, intensification, and landfalling impacts using NASA-funded aircraft and surface remote sensing instrumentation. Patrick Air Force Base, Florida from 6 August - 23 September, 1998.

Year of Open Science

- **Open Science is major objective for NASA**
  - Due to mission, GHRC already enacts some open science
    - Open source software
    - Expanding cloud capabilities
    - Transparency through Core Trust Seal certification
  - GHRC actions
    - DAAC-specific TOPS working group
      - Identify specific actions for DAACs
    - GHRC staff will participate in open science certification
    - ACSI surveys show GHRC has extensive international user base

Science Enabling Centers

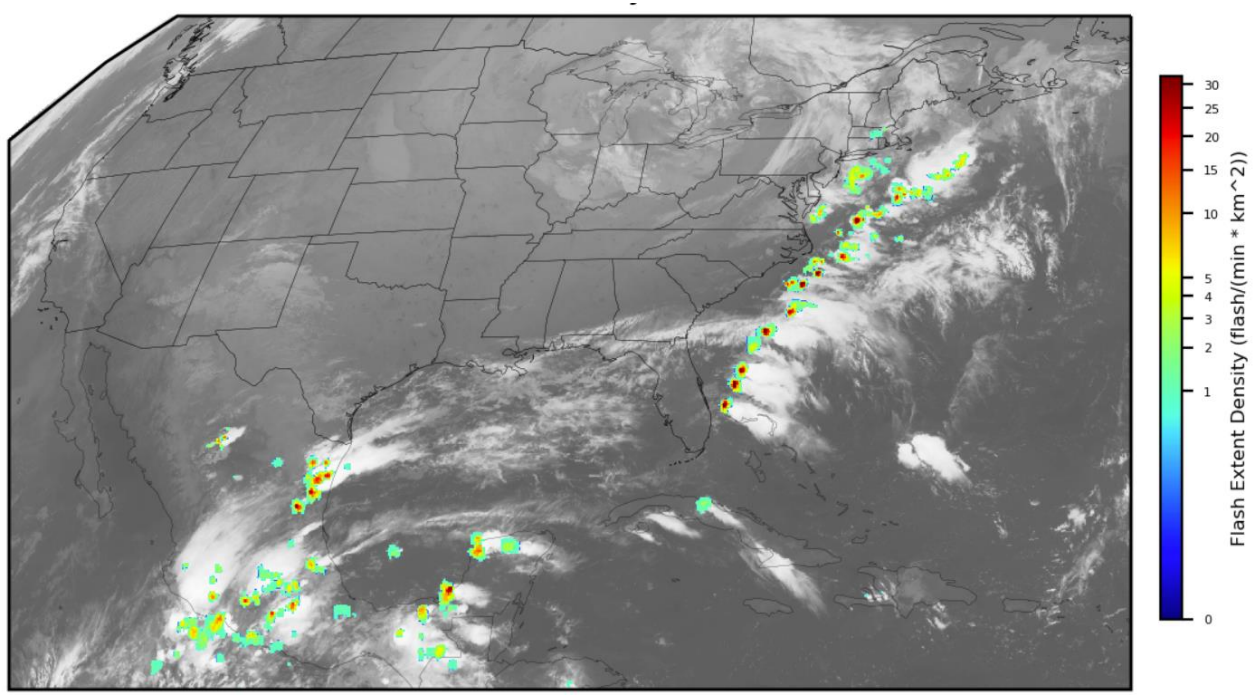
- **Vision for GHRC**
  - Conceptually: How will DAACs further support users?
  - Continue data archival activities
  - Develop dynamic visualization of data
  - Link FCX more closely with GHRC holdings and potentially beyond GHRC
  - Unify effort
    - Coordinate actions
      - Internally: Data display, analysis, user software
      - Externally: Cross-DAAC and cross-agency collaborations
  - GHRC has two broad focus areas
    - Airborne analysis
    - Lightning analysis

Airborne Science Enabling Center

- **Airborne data are major holding**
  - Data can be difficult to use
  - Airborne science enabling center must:
    - Improve data exploration and analysis
    - Coordinate with other entities
  - Field Campaign Explorer
    - Demonstrated abilities
    - Expand data availability and analysis
    - Developing 3D subsetter
  - Use jupyter notebooks to demonstrate how to manipulate various data
  - Other UWG recommendations?

Lightning Science Enabling Center

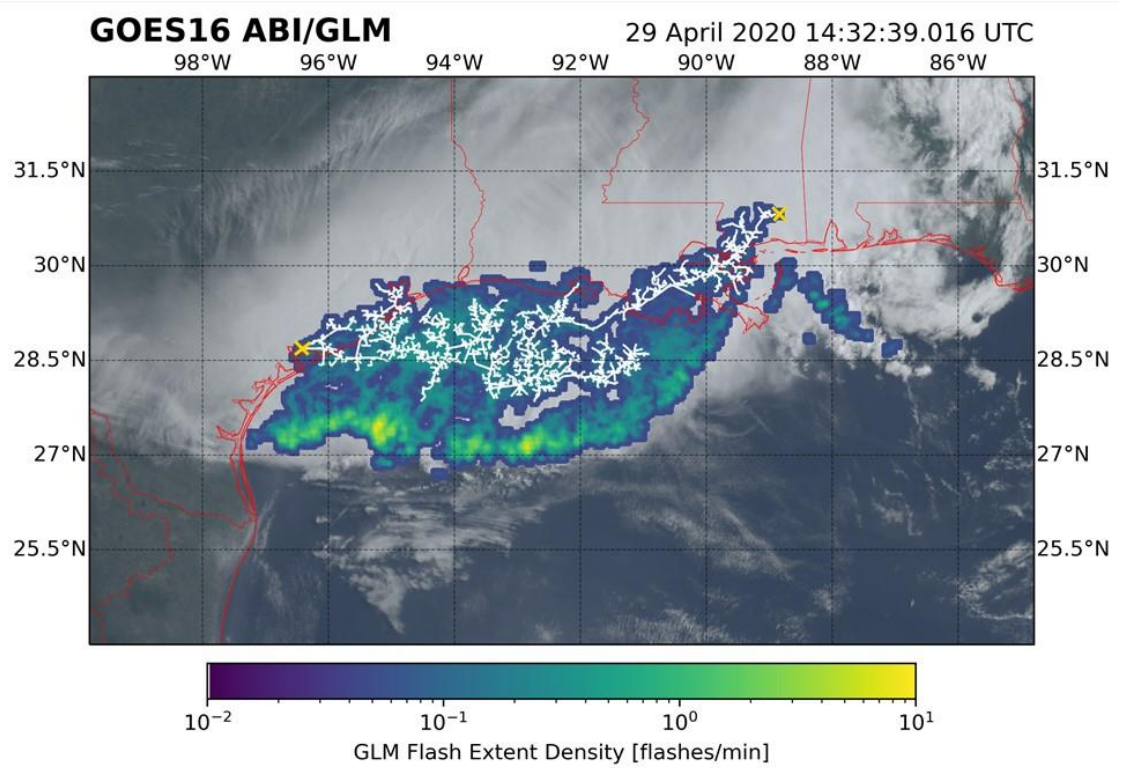
- **Lightning data are most popular of GHRC holdings**
  - Popularity continues to grow
    - Extensive period of record with LIS
    - Incoming Geostationary Lightning Mapper (GLM) data
    - Likely World Meteorological Organization (WMO) global, gridded dataset
    - Potential expansion to lightning beyond the troposphere



CONUS view of GOES-16 gridded, Level 2 flash extent density

Lightning Science Enabling Center

- **Build On GHRC Abilities**
  - Lightning Dashboard
    - Lightning hotspots
    - Megaflash events
    - Significant event highlights
  - Integrate science education
    - GHRC has internal expertise
    - Collaborations with MSFC lightning team
    - Coordination with NOAA
    - Marshall is involved with the next generation weather satellite
  - Other UWG recommendations



768 km megaflash: April 29, 2020

The Year Ahead

- **Cloud Transition**
  - Complete shift to cloud-only DAAC
- **Expanding Software Systems**
  - Earthdata Pub workflows
  - FCX (more data), Lightning Dashboard (capabilities from feedback)
- **Collaborations**
  - ASDC cloud transition
  - Support onboarding of other DAACs to Earthdata Pub
  - Continue coordination with Airborne Data Management Group
  - Opportunity to discuss with National Science Foundation and NOAA how to coordinate cross-referencing of similar data
  - Open science
  - Work with ESDIS on developing science enabling centers

The Year Ahead: New Data

- **Data Archival Remains Core Activity At GHRC**
  - Anticipating receiving upwards of 100 datasets (extensions to existing campaigns)
    - Focus to continue to improve publication rate with cloud-only transition
  - Data to come from variety of sources
    - Campaigns
      - IMPACTS Year 3, CPEX-CV, ALOFT
    - Lightning
      - GLM CIERRA, new LIS version, MALMA, Marshall science team data
    - Other: HIWAT
  - GHRC will increase participation with mission science teams
    - Atmosphere Observing System (AOS)
    - Investigation of Convective Updrafts (INCUS)
    - Other UWG recommendations?
  - Open science activities

The Year Ahead: Additional Efforts

- **Focus On Evolving Role Of DAACs**
  - 5- and 10-year strategic plans
  - 2023 work plan
  - Update older data recipes to jupyter notebooks
  - New micro articles
    - Supporting campaigns that do not have one
    - Expand instrument support
    - Generate articles for data analysis
  - Continue development of plans as role of DAACs evolve
    - Key discussion topic for attendees today
  - Open science question
    - How do we engage the international community, particularly non-English speakers

GHRC
Global Hydrometeorology Resource Center

THANK YOU!

QUESTIONS?

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