GHRC Overview and Highlights

Dr. Manil Maskey, DAAC Manager (MSFC ST11)

Dr. Geoffrey Stano, DAAC Scientist

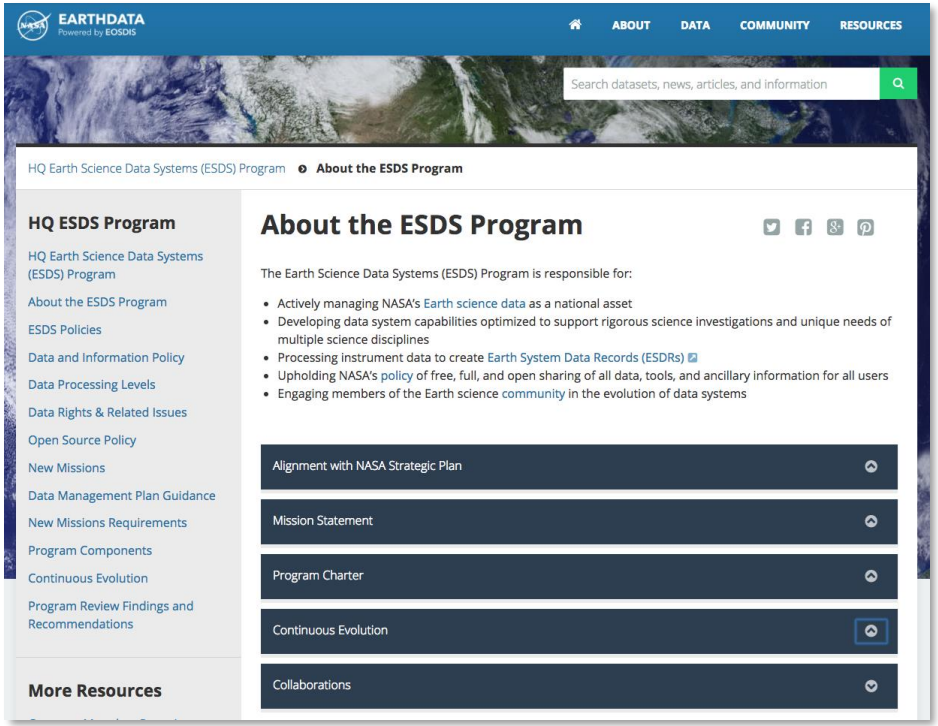
GHRC
Global Hydrometeorology Resource Center

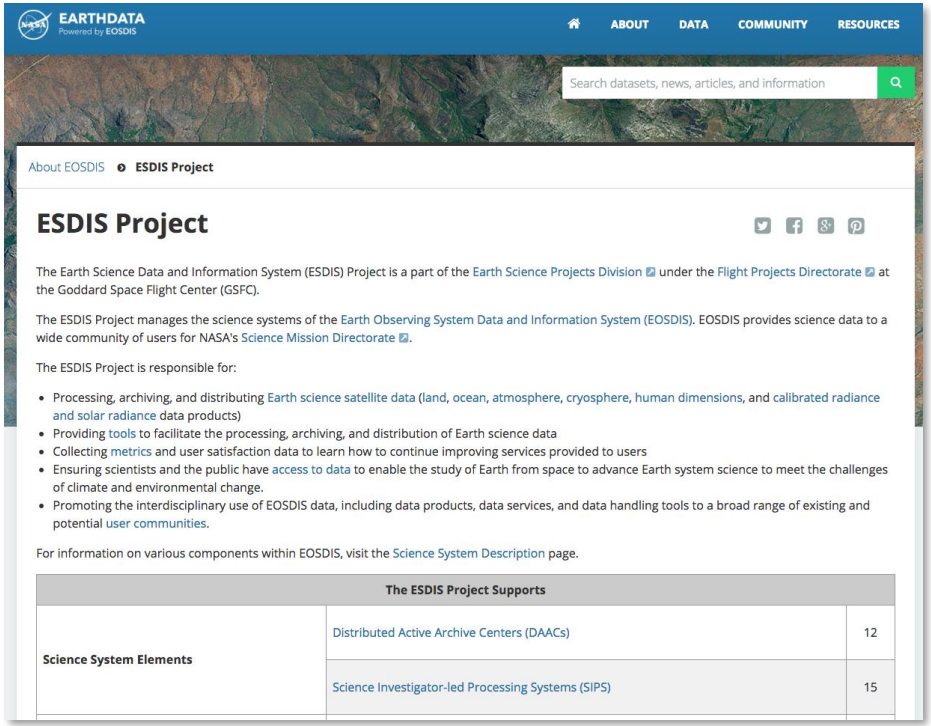
NASA

itsc
INFORMATION TECHNOLOGY AND SYSTEMS CENTER

THE UNIVERSITY OF ALABAMA IN HUNTSVILLE

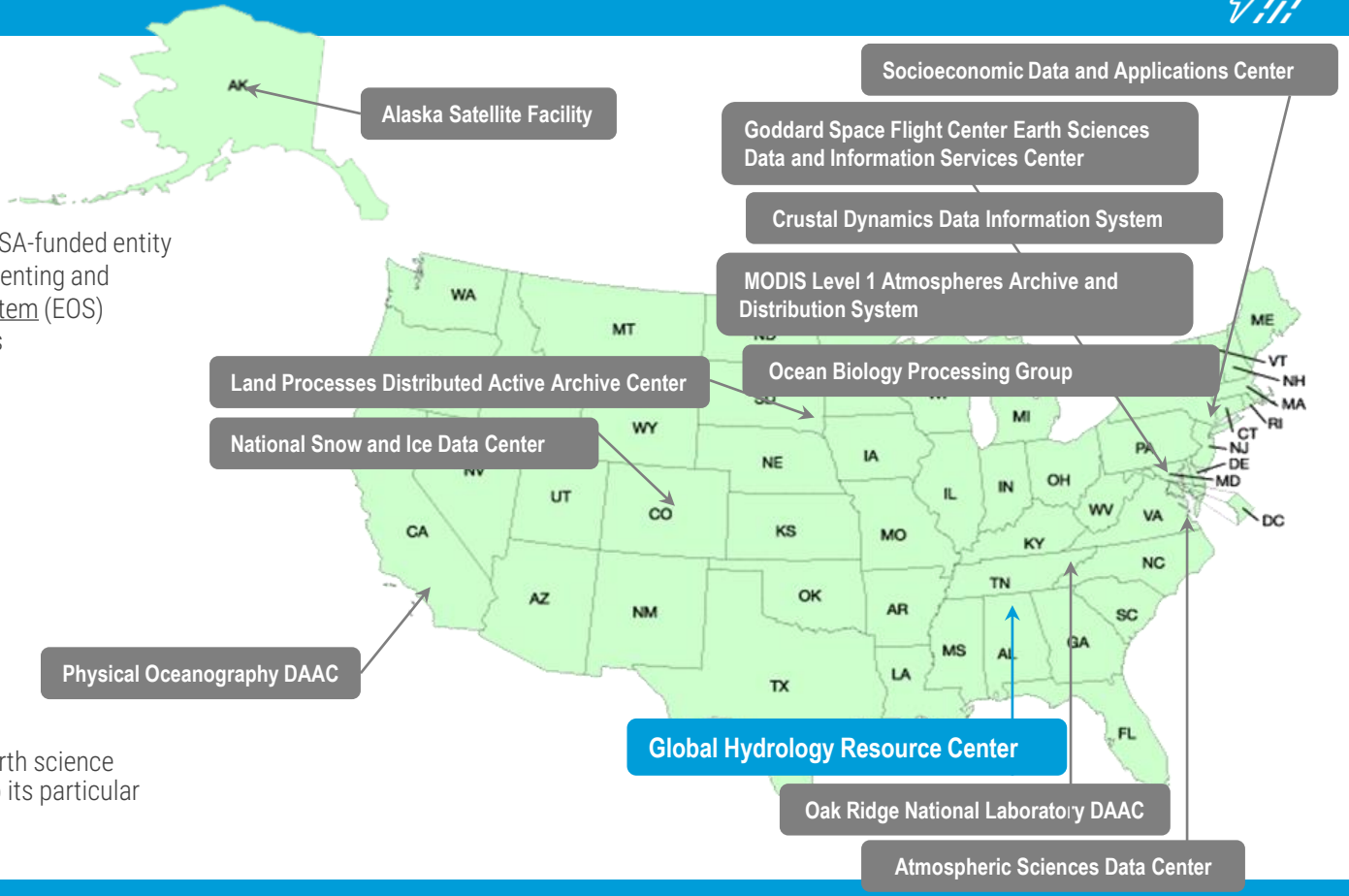
Overall Organization





NASA's Earth Science DAACs

A Distributed Active Archive Center is a NASA-funded entity charged with processing, archiving, documenting and distributing data from Earth Observing System (EOS) satellites and field measurement programs



Each DAAC serves one or more specific Earth science disciplines and provides services unique to its particular science

ESDS Vision & GHRC Mission

Accelerate scientific advancement for societal benefit through innovative Earth science data stewardship and technology development.

To provide a comprehensive active archive of data and knowledge augmentation services with a focus on *hazardous weather, its governing dynamical and physical processes, and associated applications*.

Focus on *lightning, tropical cyclones, and storm-induced hazards* through integrated collections of satellite, airborne, and in-situ data sets.

ESDS Goals

Goal 1: Set the standard for efficient production and stewardship of science-quality data

Goal 2: Advance open science data systems for the next generation of missions, data sources, and user needs

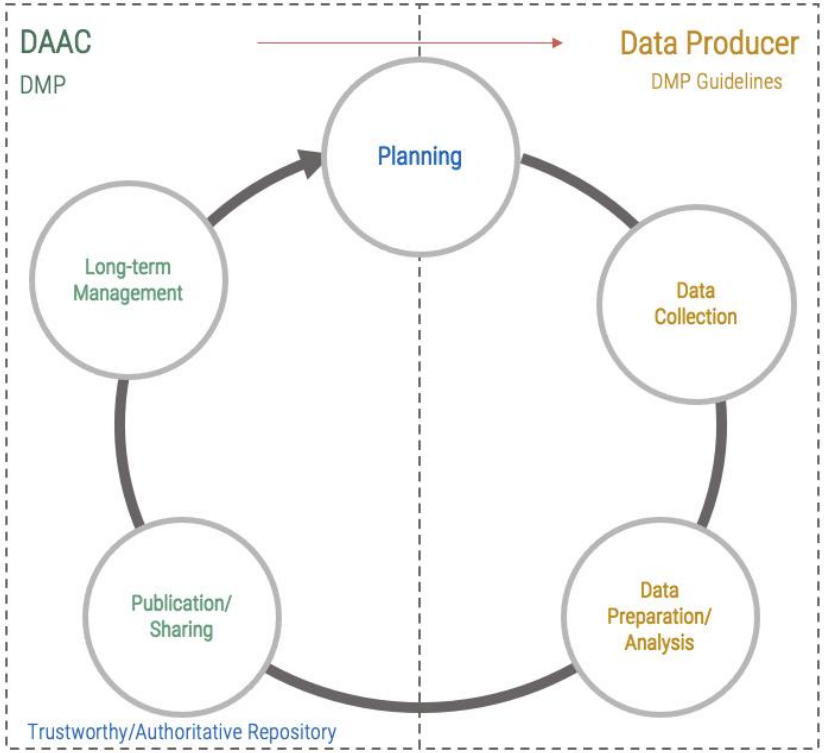
Goal 3: Lead research and development of technology for management and analysis of complex Earth science data

Goal 4: Leverage the diversity of global Earth science communities to advance open science

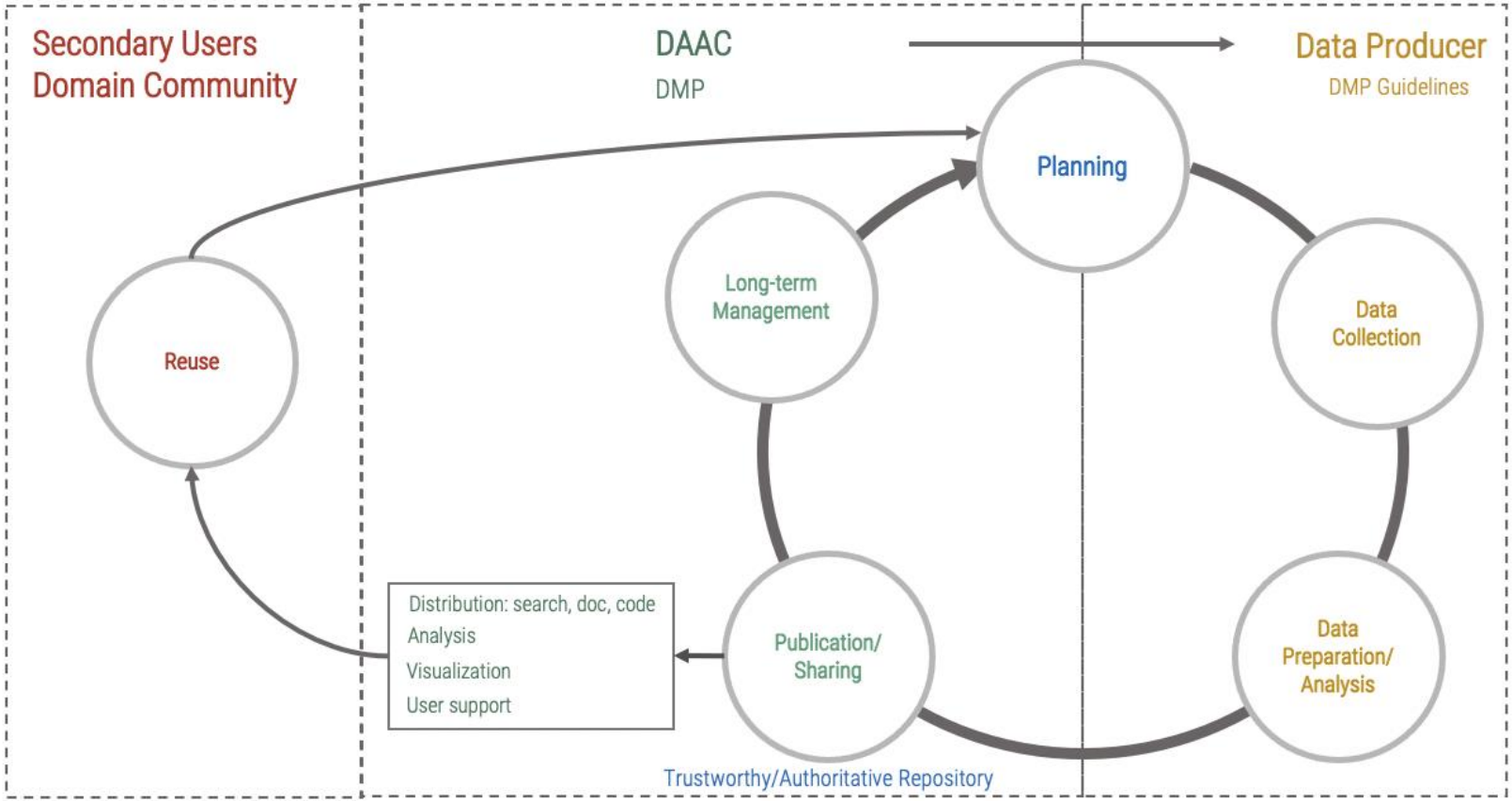
DAAC Role in Supporting Science

Data Stewardship Responsibility

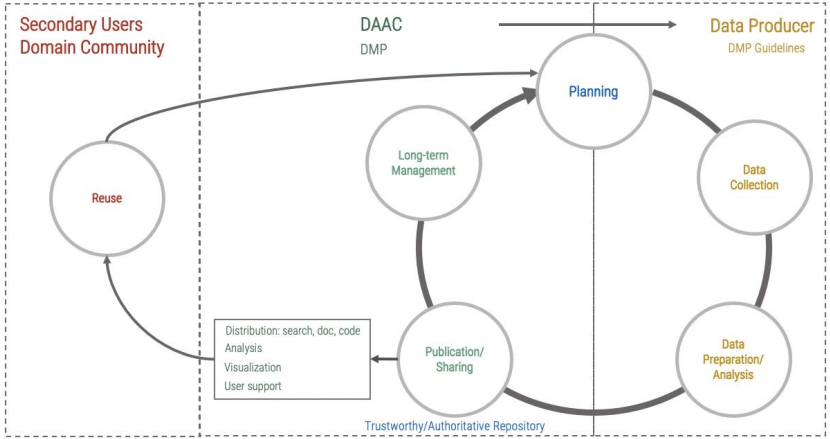
- Assist data producers in developing Data Management Plans (DMPs) to support transparency and openness during research phase
- Use DAAC DMPs to efficiently manage data
- Utilize workflows and policies in accordance with standards to serve as a trustworthy repository



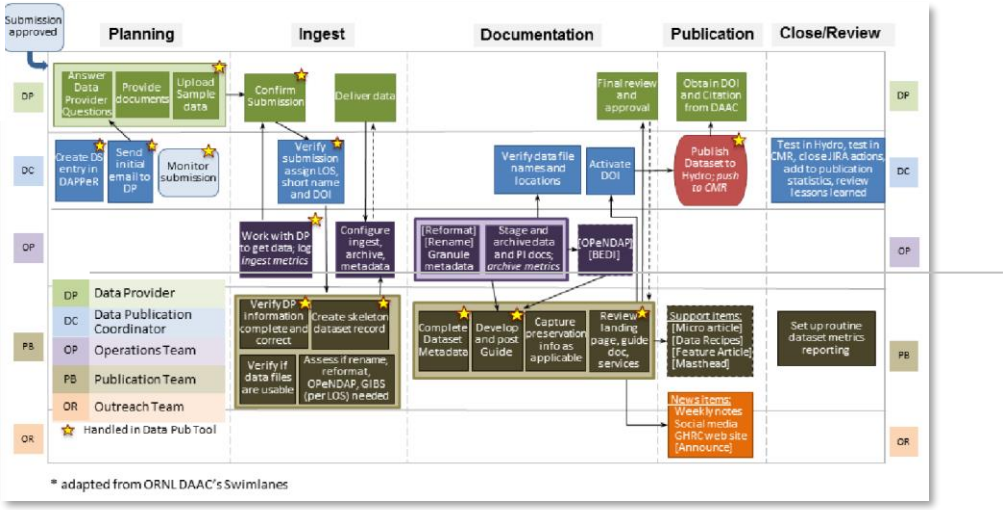
DAAC Role in Supporting Science



Creating a Common Process for Different Data Sources



- Assigned Satellite Mission (LIS)
- Assigned Field Campaign (GPM-GV)
- SIPS/MEaSUREs Program
- Recommendation from the User Community: UWG/ESDIS/HQ Approval



GHRC Organization

Manil Maskey	DAAC Manager
David Hood	Asst DAAC Manager
Sara Graves	ITSC Director
Will Ellett	IT/Ops Manager
Geoffrey Stano	DAAC Scientist
Abdelhak Marouane	Development Lead
Leigh Sinclair	Data Management
Sherry Harrison	AMSR/LANCE/LIS Lead
Taylor Wright	Scrum Master
Jerika Christman	Coordinator

GHRC UWG Board Members

Discipline	*Name*	*Affiliation*	Term end
Lightning	Timothy Lang Wiebke Deierling	NASA MSFC NCAR	2022 2022
Passive Microwave	Joe Munchak Joe Turk	NASA GSFC NASA JPL	2021 2021
Hurricane Science	Derrick Herndon	Univ. Wisconsin / CIMSS	2022
Global Precipitation Mission	Anna Wilson* Patrick Gatlin	SCRIPPS / UC San Diego NASA MSFC	2022 2022
Severe Weather	Emily Berndt**	NASA SPoRT	2020
Applications	Albert Kettner Jordan Bell	University of CO Boulder NASA MSFC	2021 2022
HQ (ex officio)	Kevin Murphy Katie Baynes	ESDS Program Executive Deputy Program Executive	
ESDIS (ex officio)	Jeanne Behnke Drew Kittel Steve Berrick Andy Mitchell	ESDIS Deputy Project Manager-Operations ESDIS Project Science Operations Office Manager DAAC Engineer ESDIS Project Manager	

2021 Chair, *2021 Co-Chair **Red: 2021 is final year on UWG

State of GHRC (FY21)

Metadata Improvements

- Completed Analysis and Review of CMR Fixes

Web Improvements

- Updated the North Alabama Lightning Mapping Array page

Tool Improvements

- Improved FCX with improved performance, visualizations for flight instruments, and started subsetting tool

Cloud Migration

- Finalize cloud only operations
- Improved operations (developed tools to aid operators)
- Improved troubleshooting and metrics gathering capabilities

State of GHRC (FY21)

Data Publication

62 total datasets published
Key datasets:

- IMPACTS Field Campaign
- Lightning – ISS LIS Validation
- GPM-GV

Community Engagement

- Science Teams
- Micro Articles
- Data Recipes
- Webinars
- Conferences/Meetings
- IMPACTS mission data support
- Journal publications

Looking to FY22

Cloud Migration
Migrate GHRC website to cloud
Prepare for cloud-only operations

Tools
Field Campaign Explorer
- *Adding subsetting capability*
- *Adding more campaigns*

Lightning Dashboard

Cross DAAC Collaborations
Earthdata Pub Technical Team: GHRC, ORNL, GES DISC
ESDIS activities: Cumulus, OPeNDAP, User Needs, Cloud Primer, ORCA Backup
Supporting ASDC for cloud transition

Data Stewardship
Strategic acquisition of data based on portfolio gaps
Support airborne data & information

GHRC User Working Group Mandate

Primary objectives include but are not limited to:

Suggesting i**mprovements to enhance overall user experience** including discovery, access, and usability of data

Suggesting new **research and development ideas** relevant to GHRC to support product/tool prototyping and generation

Facilitating **communications with the general user community** and interested members of other communities

Assisting GHRC in **prioritization and pursuit of new data holdings** within the bounds of budget and ESDIS mission constraints

Provide guidance on strategic initiatives to align with ESDS goals

Impacts of COVID-19

Work from home began March 18, 2020 and lasted through June 1, 2021.

Pain Points

- Less collaboration with limited face-to-face discussions
  - Hardest with external partners
- Remote conferences required additional work
- Cancellation of Year 2 IMPACTS flights
- Child care issues
  - UAH resumed in-person work June 1
    - Not all child care facilities open
  - In-person school started August 4
    - Children going on 10 day quarantines for close contact

Successes

- Implemented plans and work flows early in 2020
- GHRC has emphasized communication
  - Internally and with ESDIS
- Utilized work from home options after June 1
  - Provide flexibility to team
  - Supported productivity in spite of rapid scheduling changes
- UAH provided hardware to make work from home viable
- EOSDIS went to agency Slack - Helped with Earthdata Pub

Response to UWG Feedback Item #1

1. Current Strategic Plan needs to be complemented by a 10-year vision

Completed

- Draft of Strategic Plan and 10-year vision

Ongoing

- Revisions to the Strategic Plan and 10-year vision
  - GHRC is at a transition point of technology, capabilities, and emphasis on cloud capabilities
  - Focus on NASA's Decadal Survey, cross-DAAC collaborations, alignment with ESDS goals

Future

- Prepare manuscripts for review by UWG
- Integrate cloud capabilities and functionality
- Reinforce GHRC's expertise with lightning and airborne data
- Tie-in with new campaigns: Atmospheric Observation System (AOS) and lightning Essential Climate Variable

Response to UWG Feedback Item #2

2. Consider a broader GHRC brand to enhance leadership in value-added data services

Completed

- Now the Global Hydrometeorology Resource Center as of April 2021
- Public facing source have been rebranded

Ongoing

- Continue to outreach on new name
- Upcoming journal publications will reflect the change

Future

- No further actions required

Response to UWG Feedback Item #3 (new)

3. Extend outreach efforts beyond meteorological meetings

Completed

- Participated in numerous science team meetings (IMPACTS, GLM, ISS LIS, LANCE, WDS)
- Two data recipes use jupyter notebook
- Participated in Earthdata Forum
- Presented at the ESDS Technology Spotlight: Tools for Airborne Data
- UWG co-chair Dr. Anna Wilson selected for user spotlight article

Ongoing

- Identify existing data recipes that can be converted to jupyter notebook

Future

- Convert old and create new data recipes using jupyter notebook
- Explore a lightning dataset dashboard
- Develop material for Field Campaign eXplorer use cases

Response to UWG Feedback Item #4 (new)

4. Provide data in GIS-compatible outputs and services following best practices

Completed

- Four data recipes available to provide GIS-compatible output
- Attended NASA Earthdata GIS webinars and presentations

Ongoing

- Identify best datasets to focus efforts to generate GIS output
- Coordinate with NASA Earthdata to implement best practices and guidelines
    - Share cloud-based lessons learned with NASA Earthdata

Future

- Create new data recipes based on lessons learned that generate GIS output
    - Lightning datasets are very likely with Geostationary Lightning Mapper and Essential Climate Variable
    - Demonstrate an airborne dataset

Response to UWG Suggestion #1

1. Data citations seem low and/or difficult to track. Identify potential solutions

Completed

- Identified errors in metrics reporting

Ongoing

- Implement collaborative fixes to metrics reporting errors

Future

- Enable data citation metrics in FY 2022

Response to UWG Suggestion #2

2. FCX feedback: High quality renderings, engage with PIs to ensure data compatibility, use cases to prepare for future missions, ingest model data, capability for uses to add WMS layers

Completed

- GHRC metadata standards ensure dataset compatibility with FCX

Ongoing

- Expand to other campaigns to emphasize broad spectrum of GHRC data (OLYMPEX, HS3, IMPACTS)
- Develop support tools, such as a 3D subsetter, to improve data accessibility

Future

- Test with model data currently published at GHRC
- Identify and implement ways to integrate FCX into the web site refresh for dynamic dataset browsing
- Shift focus to use cases after open source approval

Response to UWG Suggestion #3 (new)

3. Leverage “popular summary” or similar material aimed at a general audience. Look at the Earth Science Division reporting website and new journal articles

Completed

- No progress, although GHRC is in full agreement

Ongoing

- Coordinate with IMPACTS PIs to demonstrate concept

Future

- Implement with updated dataset landing pages
  - IMPACTS data will be first
  - Emphasize in production publications
  - Backfill published datasets in order of age (newest to oldest)

Response to UWG Suggestion #4 (new)

4. Consider sensor-driven data recipes

Completed

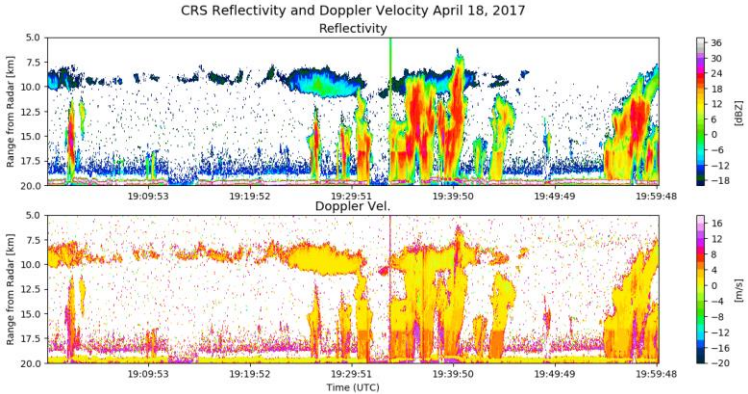
- GOAL: Establish data recipes that function on all instances of a dataset being published at GHRC
- Published the Cloud Radar System (CRS) as first example
  - https://ghrc.nsstc.nasa.gov/home/data-recipes/cloud-radar-system-crs-reflectivity-and-doppler-velocity-quick-view

Ongoing

- Developing code for radiosondes / dropsondes

Future

- Publish radiosonde / dropsonde data recipe
- Develop plan for new data recipes
  - Tie in with GIS and jupyter notebook work



Example output from the CRS data recipe.

Response to UWG Suggestion #5

5. Consider coordinating with other other DAACs to mitigate the apparent dispersion of long-term sensor datasets across multiple DAACs.

- Cross-DAAC referencing of instruments is an excellent suggestion
  - GHRC is investigating more dynamic dataset landing pages and user guides as part of the web page redesign
  - Allow for more flexibility in adding additional information once a dataset is published
  - Dynamic updates likely to focus on internal holdings at first
  - Cross-DAAC referencing will likely require more manual updates
- Dispersion of long-term datasets across multiple DAACs is a NASA ESDIS issue
  - ESDIS makes the final determination as to where data are archived
  - Several DAACs have raised issue to NASA ESDIS
  - Action for DAAC scientist to coordinate with counterparts at other DAACs to identify split datasets

THANK YOU!

QUESTIONS?

GHRC Global Hydrometeorology Resource Center

NASA

itsc INFORMATION TECHNOLOGY AND SYSTEMS CENTER

THE UNIVERSITY OF ALABAMA IN HUNTSVILLE