GHRC
Global Hydrometeorology Resource Center

Response to UWG 2021 Feedback

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Recommendation 1

The current strategic plan focuses on the technical actions leading the transition of datasets and tools to the cloud in the next 5 years. It needs to be complemented by a longer-term (10-year) vision that defines the position of the GHRC in the evolving landscape*, as well as the impact of the GHRC on the community of users and partners. It should describe the role of the GHRC in the cloud era that will enable the DAAC to maintain a sustainable niche within the enterprise paradigm enabled by the cloud.* ***As such, the mission statement of the GHRC should be updated and aligned with the new emphasis that will certainly be put on their subject matter expertise****.*

- **Response**
  - GHRC has worked on a 10-year vision internally
    - Task is still open
  - Key considerations
    - ESDIS guidance on the changing role of the DAACs
    - Focus on open science as well as science enabling centers
  - Plan and vision will account for GHRC evolving to support more user services

Recommendation 1 (continued)

Align mission statement with GHRC's future goals. The long-term vision (separate from ESDS vision but should be in alignment) is still under development. We recommend that GHRC:

- *Strongly consider their role as a pathfinder DAAC for the cloud and open-source science*
- *Be attuned to the new NASA mission portfolio (airborne campaigns, EV-S, EVI-I, EV-M, and Decadal Survey missions), and identify those that align with the GHRC areas of expertise*

- **Response**
  - NASA evolving the role of the DAACs
    - Aim to assign DAACs to missions earlier
    - Science enabling centers – GHRC focus: Airborne and lightning data
    - Discussions today will guide the long-term vision
  - GHRC demonstrating agility as cloud pathfinder
    - GHRC to propose serving as NASA's facility instrument archive for campaign videos and images – demonstrated with Field Campaign Explorer
    - GHRC to propose supporting other DAAC transitions as we have done with ASDC
  - GHRC communicating about the AOS and INCUS missions

Recommendation 1 (continued)

- Be familiar with Earth science datasets collected by private sector entities, and identify those that align with the GHRC areas of expertise

- **Response**
  - GHRC will reach out to MSFC Commercial SmallSat Data Acquisition

Recommendation 2

Extend outreach beyond traditional annual conferences *to other types of NASA meetings (i.e., applications workshops, science team meetings). The UWG recommends developing a GHRC presence with a focus on branding and generating new assets for the future. Strongly* ***consider participation in NASA centric HQ, AOS****, or other relevant NASA mission meetings including community meetings, suborbital workshops, applications workshops, and* ***open-source science meetings*** *with a strong leaning toward AOS.*

- **Response**
  - Have participated in multiple science team meetings
    - GLM, IMPACTS, CPEX, and LANCE and well as NASA working groups
  - GHRC has been attending AOS community meetings
    - Reaching out to several AOS applications members here at Marshall
  - Have identified the Investigation of Convective Updrafts (INCUS) mission as another potential GHRC activity
  - Participating in Transform to Open Science (TOPS), including DAAC-centric meetings

Recommendation 2 (continued)

Emphasize the services and capabilities that GHRC can provide around the cloud and analysis-ready datasets demonstrating use cases and examples. Another possibility would be for GHRC and other DAACs to consider hosting their own NASA Earthdata workshop with advertising toward the NASA community.

- **Response**
  - Demonstration to NASA Goddard Institute for Space Studies (GISS) for FCX
  - Involved in multiple NASA working groups
    - Transform to Open Science, UI/UX, User Needs and System Engineering TIMs, Airborne monthly, Airborne workshop review, DOI working group, and more
  - This UWG meeting is shifting presentation style
    - Emphasizing GHRC cloud user services versus individual project presentations
  - Lightning cloud-optimized geoTIFF (COG) tool – Supports cloud analysis
  - GHRC has expressed interest in joining next Openscapes cohort with GHRC data

Recommendation 3

Stay in touch with end users on data formats, needs, emerging formats, and other tools that increase data accessibility and usability *such as Jupyter notebooks or other code bases. Perform a stakeholder survey to guide/prioritize data formats and capability needs to determine what is useful.*

- **Response**
  - GHRC participating in the airborne data workshop review
    - Discussing data formats and requirements from a wide user community
    - Users are interested in multiple formats
      - Standardized like netCDF
      - Interest in GIS – GHRC participating more in NASA's GIS working group
      - Users are interested in cloud computing and formats
        - GHRC has cloud optimized geoTIFF tool
        - Room to develop training for community
    - Will be involved in the next, formal workshop

Recommendation 3 (continued)

Stay in touch with end users on data formats, needs, emerging formats, and other tools that increase data accessibility and usability ***such as Jupyter notebooks or other code bases. Perform a stakeholder survey to guide/prioritize data formats and capability needs to determine what is useful.***

- **Response**
  - GHRC users provide feedback in the annual American Customer Satisfaction Index (ACSI) survey
    - 338 results for GHRC so far with the 2022 survey
  - Three DAACs are leading funded ArcGIS effort
    - Led by ASDC DAAC and began a few months ago
    - GHRC in the process of discussion involvement
    - GHRC's lightning cloud optimized geoTIFF (COG) tool would be a good collaborative addition
  - The TOPS program is based on jupyter notebooks

Recommendation 3 (continued)

The GHRC could evaluate internal download metrics to target existing user needs. *Evaluate existing communities but also consider what formats/techniques would bring in new users. Evaluation could include cloud-optimized formats and communication with PIs on the requested format.*

- **Response**
  - Although not evaluated from download metrics
    - GHRC is part of the team reviewing feedback via the airborne data requirements workshop
    - Annual ACSI survey providing additional information
  - ACSI survey notes GHRC has an extensive international user base
    - Academia
    - Meteorological organizations
    - Notable that many users are likely non-native English speakers
  - Developing the lightning cloud optimized geoTIFF (COG) tool

Recommendation 3 (continued)

The GHRC should consider how today's formats fit in the data transformation and/or translation to cloud operations and open-source science*. Consider the question, are data formats as important as they used to be and are format agnostic readers more important? It is important to note that needs in this area will continually evolve as the technology improves, and so it is important that* ***this recommendation not be considered "one and done"****, but that there is a framework for regular assessment of provided formats and tools.*

- **Response**
  - These issues are being discussed through NASA's open science initiative and the airborne data workshop review
  - GHRC working with:
    - Previously mentioned Cloud Optimized GeoTiffs
    - Zarr – A cloud native format
  - This will require more work by GHRC
    - Will be part of the 10-year plan discussions

New Recommendation 4

Provide an update to the FY22 UWG on progress on open-source science, cloud operations, and service-oriented processes such as Earthdata Pub, FCX, Openscapes, Juypter notebooks, and analysis-ready datasets or capabilities.

- **Response**
  - FY22 UWG meeting is altering our traditional approach such that Session 2 will be a more integrated "cloud-based users services" approach versus individual project updates
  - Significant progress with:
    - Earthdata Pub: GHRC and ORNL onboarding now, ASDC just started
    - FCX: New data added, capacity for images and videos that can be geolocated with flight tracks and interest by NASA GISS
    - Lightning Dashboard: Small funded project to provide visualization and analysis of lightning data. MVP completed and Marshall lightning science team interested in using this for next generation of visualizations

New Recommendation 4 (continued)

Continue to consider displays correlated with orbit tracks, airborne flights, and preliminary display capabilities to facilitate targeted download of relevant data. Focus development on more generalized tools, working with other DAACs, incorporating UWG and user feedback or surveys to help drive development.

- **Response**
  - Display efforts have focused primarily on airborne flights (i.e., FCX)
  - Developing the 3D sub-setter tool for FCX
    - Allow a user to define a volume in time and space and then download data from this volume
  - GHRC has made all these systems open source (Earthdata Pub, FCX)
  - Expanding data within FCX and more to come this fall
  - Actively coordinating with NASA TOPS in order to embrace open science
  - Receiving user feedback via the annual ACSI surveys

New Recommendation 5

Work with ADMG and the other DAACs to identify airborne and field campaign data relevant to GHRC.

- **Response**
  - Strengthened ties with the Airborne Data Management Group (ADMG)
    - Regular communication with ADMG
    - Aligning with ADMG strategies
      - ADMG coordinating with ESDIS to directly assign campaigns to specific DAACs
      - Demonstrating campaign image and video integration with FCX
  - Coordinate with other DAACs on cross-referencing
    - Example: GHRC-ASDC on CPEX campaigns

New Recommendation 5 (continued)

Provide a detailed flight catalog of Facility Instruments and identify Major Center Instruments relevant to GHRC.

- **Response**
  - ADMG has identified field campaign images and videos that could serve as a Facility Instrument
  - Per ADMG request to DAACs, GHRC has demonstrated image capabilities that are geolocated in FCX
    - Will continue to develop this capability to refine it moving forward

New Recommendation 5

Set a precedent and standard for instrument stewardship *(e.g., presentations of instruments, data availability, field campaigns, data holdings). Use AMPR as an example to test and prove the concept and develop a prototype process. Then prioritize future instruments to work on, with a focus on collaboration with the PI to reprocess old data.* ***Some of the more willing PIs and relevant instruments may be associated with GPM and future AOS capabilities****.*

- **Response**
  - GHRC involved with airborne data workshop and reviewing results
    - Discussing data formats, cloud approaches, etc.
  - The annual ACSI surveys provide insight for what users are looking for and what GHRC can prioritize
    - Previous ACSI has noted GHRC has an extensive international user base
  - More work is needed to address this recommendation

New Recommendation 5

Also, make sure GHRC's holdings are well advertised with other DAACs. Are there potentially other field campaigns the instrument was part of that are held at NOAA or NCAR that could be pointed toward or other agencies that can point toward GHRC data?

- **Response**
  - Collaborations with other DAACs to ensure cross-referencing
    - Example: GHRC-ASDC with the CPEX campaigns
  - GHRC has two opportunities to work with NSF and NOAA on cross-agency work
    - National Science Foundation Lake Effect Electrification
    - Lightning essential climate variable with NOAA and World Meteorological Organization, pending approval

Suggestion 1

Data citations seem low and/or difficult to track. ***The UWG suggests spending some time analyzing the citation problem and exploring / trying possible solutions****. This is an issue that cuts across DAACs, so it should be coordinated with publishers at a higher level to identify best practices for DAACs and journals. Consider making various citation format options (Bibtex, text, Endnote, etc.) additionally available.*

- **Response**
  - This have been elevated to an enterprise level issue with NASA as they are taking responsibility for this effort for consistent, cross-DAAC results
    - Citations are still a work in progress
    - The metrics have significantly improved, as we can now provide details on dataset downloads, access, etc.
    - Journals: work in progress due to application programming interface (API) issues
  - Citation format option is a good suggestion, but has not yet been implemented

Suggestion 2

Leverage "Popular summary" *or similar material aimed at a general audience during the publication process to assist in generating Micro-articles. The new Earth Science Division reporting website may assist with this, as well as the plain language summaries available in many new journal articles.*

- **Response**
  - Campaign PIs have been engaged. Interest among PIs and will coordinate with PIs after campaigns conclude deployments (i.e., CPEX-CV and IMPACTS).
  - Conclusion of CPEX-CV will enable coordination with previous CPEX data
  - Given instruments are used across multiple campaigns, a popular summary for one can be used to fill other campaigns
  - Will discuss similar information for lightning datasets

Suggestion 3

Consider sensor- or product-driven (rather than event-specific) data recipes. *Focus on advantages/limitations of the data and proper data usage (e.g., try to ensure that QC and other flags are handled with examples (don't just focus on cases with perfect data).* ***Keep open communication with PI for a few years after publication***. *Possible use of intern program to work with PI to provide incremental updates to old datasets with new processing. This aligns with identifying Facility and Multi-Center instruments.*

- **Response**
  - Process has begun – Demonstrated with the Cloud Radar System instrument
    - Works across multiple deployments
    - Radiosonde and dropsonde datasets are next
  - Latest Field Campaign Explorer work can be used for data recipes

New Suggestion 4

Regarding the private sector and commercial data-buy program, the GHRC should continue thinking about how to obtain relevant commercial data or create analysis-ready capabilities to leverage the data. Continue to follow the legal, licensing, and technical hurdles and opportunities to archive the data and derived products relevant to GHRC. Relevant data, including microwave sounders and radar datasets, could be coming in the next few years from the NASA commercial data-buy or private companies not in the existing agreement. Consider in the strategic plan or 10-year vision how to prepare GHRC to archive the data, derived products, or leverage the cloud for user services and analysis relevant to GHRC thematic areas. Be ready to position GHRC to have a role in relevant datasets as they transition from evaluation to experimental.

- **Response**
  - Given GHRC's co-location, will reach out to NASA Marshall's Commercial SmallSat Data Acquisition program

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THANK YOU!

QUESTIONS?

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