GHRC UWG Report from the Onsite Meeting October 22-23, 2019

National Space Science & Technology Center,
The University of Alabama in Huntsville
Huntsville, Alabama

EXECUTIVE SUMMARY

The User Working Group (UWG) for the Global Hydrology Resource Center (GHRC) Distributed Active Archive Center (DAAC) convened at the University of Alabama in Huntsville for its annual onsite meeting from October 22nd to October 23rd, 2019. The purpose of this meeting was to review the progress that the GHRC has made towards meeting the formal recommendations and non-binding suggestions defined by the UWG during previous onsite meetings, and to provide additional feedback on continuing and planned GHRC programs and activities.

As with previous UWG meetings, the GHRC staff put together a well-organized meeting, and the UWG found that the content presented directly addressed most of the recommendations made by the UWG in 2018. GHRC staff also made it very clear as to their FY19 goals. The UWG acknowledges the progress made during last year to establish the GHRC as the first cloud-based DAAC and is impressed with the development of online visualization tools such as FCX for field campaign data. The UWG is also pleased with the effort to formalize a strategic plan. As for recommendations that came out of this meeting, it is clear that the current plan focuses on the technical actions leading the transition of datasets and tools to the cloud, and needs to be complemented by a longer-term 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 in the next 10 years. This has been recommended in previous UWG reports, and it becomes more urgently needed with current plans to move to the cloud by the end of 2019, the traditional role of the DAAC as a custodian of NASA data may become less visible to the benefit of their subject matter expertise. Accordingly, the mission statement for the GHRC needs to be updated and its brand advertised. It is imperative that the GHRC leadership works with NASA headquarters and consult with the UWG to anticipate how the DAAC mission should change under the cloud paradigm where resources are held by an external centralized entity, and the walls separating the twelve NASA DAACs (and other agencies repositories) are expected to thin as enterprise solutions become the norm. The GHRC leadership needs to establish a vision that will allow the GHRC DAAC to remain relevant as a repository of knowledge and a provider of data services in its focus areas of hazardous weather and the hydrologic cycle, and to maintain its leadership role as an innovator among the NASA DAACs.

The UWG recognizes the value of ongoing collaboration between the GHRC and the UWG throughout the year. Given the scale of the task of creating the strategic plan, the UWG encourages the GHRC to continue engaging the UWG between the annual onsite meetings, as they have done through webinars and micro-articles that were produced in FY18-19. It is also encouraged to maintain the Spring virtual meeting to supplement the annual onsite meeting and provide the UWG an opportunity to respond to feedback gained during the FY20 onsite meetings. It will also allow the UWG to assess the progress of the GHRC towards addressing the recommendations in this report before the FY21 onsite meeting and will enable new UWG members to be spun up before that meeting. During the annual onsite meeting the UWG positively received the changes implemented to facilitate discussion and collaboration with the GHRC.

Interspersed presentations and discussion sessions throughout the meeting streamlined the exchanges between the UWG and the GHRC.

Four UWG member terms are expiring after the FY20 onsite meeting and thus replacements are expected for Steven Goodman, Michael Peterson, Jonathan Zawislak, and Eric Anderson. More expiring terms are anticipated after the FY21 meeting, highlighting the need to renew the UWM membership.

Co-chair Joe Munchak [NASA / GSFC] will succeed Pierre Kirstetter [OU / NSSL] as UWG chair and Emily Berndt [NASA SPoRT] has been selected as co-chair and incoming chair for FY21.

Table 1. 2019 GHRC DAAC User Working Group Board Members

Discipline	***Name***	***Affiliation***	***contact***	**Term end**
Lightning	Steve Goodman Michael Peterson *Weixin Xu*	NOAA, retired LANL Colorado State University	steven.j.goodman@noaa.gov michaeljp24@gmail.com wxinxu@atmos.colostate.edu	2019 2019 2021
Passive Microwave	Joe Munchak* *Joe Turk*	NASA GSFC NASA JPL	s.j.munchak@nasa.gov Joseph.Turk@jpl.nasa.gov	 2021
Hurricane Science	Haiyan Jiang Jonathan Zawislak Jason Dunion	FIU U. of Miami/CIMAS,HRD U. of Miami/CIMAS,HRD	hajiang@fiu.edu jonathan.zawislak@noaa.gov jason.dunion@noaa.gov	2020 2019 2020
Global Precipitation Mission	Dan Cecil Ana Barros Pierre Kirstetter**	NASA MSFC Duke University U. of Oklahoma	daniel.j.cecil@nasa.gov barros@duke.edu pierre.kirstetter@noaa.gov	 2020 2020
Severe Weather	Emily Berndt	NASA SPoRT	emily.b.berndt@nasa.gov	2020
Applications	Eric Anderson Dave Jones *Bob Brakenridge*	NASA MSFC StormCenter Comm. U. of CO Boulder	eric.anderson@nasa.gov dave@stormcenter.com robert.brakenridge@colorado.edu	2019 2021
HQ (ex officio)	Gail Skofronick Jackson Kevin Murphy	NASA HQ NASA HQ		
ESDIS (ex officio)	Jeanne Behnke Drew Kittel Steve Berrick	NASA GSFC NASA GSFC NASA GSFC		

**2019 Chair, *2019 Co-Chair; *italic* = members added in 2018

1. MEETING REPORT

The FY20 onsite UWG meeting mainly followed the structure of previous onsite meetings. During the first full day of the meeting, the GHRC documented their accomplishments from the previous year and their progress towards addressing the FY19 recommendations by the UWG. Highlights include advances in their lightning data holdings, cloud migration efforts, cloud native data,

visualization and services (e.g. Field Campaign eXplorer), cloud optimized data publication (the cumulus prototype, and Earthdata Pub).

Interspersed presentations and discussion sessions were established throughout the day. The afternoon session also included a group activity where the UWG was asked to brainstorm ideas for attracting NASA datasets (e.g. A-CCP), to discuss tools for analysis on the cloud, and provide suggestions for new UWG members. The UWG convened for a 1.5h closed-door session on the second half day of the onsite meeting before the GHRC leadership joined in the last 1.5h, to discuss the recommendations that the UWG was settling on and to provide feedback from Day 1, and for the GHRC staff to establish an open dialogue with the UWG on its feedback.

2. DISPOSITION OF PREVIOUS RECOMMENDATIONS

The UWG recognizes the progress that the GHRC has made in addressing the recommendations made during the FY19 onsite meeting. After discussing the current status of these recommendations, the UWG kept the former Recommendation 1 as an open issue with the need to focus on the longer-term vision. The broad question of the hydrology focus of GHRC has been discussed several times in previous meetings. Thus, in the disposition of recommendations from FY19 summarized in Table 2, the UWG moved to propagate a modified FY19 Recommendation 1 and create a new FY20 Recommendation 2.

Table 2. Disposition of recommendations from FY18 GHRC UWG onsite meeting.

Recommendation	***Description***	***Disposition***
1	The imminent migration of the GHRC data holdings to the cloud adds urgency to the need for the GHRC to complement the 5-yr strategic plan with a 10-yr vision.	Open Updated
2	The GHRC should clarify their position with respect to their hydrology focus.	Open New recommendation #2

Table 2 provides a list of the FY2019 UWG recommendations as well as their disposition following the FY20 UWG meeting. Each of these recommendations were either closed, open (with a new recommendation number), merged into a new recommendation, or continued as a suggestion if sufficient progress was noted. The recommendation from FY19 has been updated to continue to guide GHRC in successfully accomplishing previous recommendations, showing the continued progress the GHRC management and staff have made since the FY19 UWG meeting.

3. DISPOSITION OF PREVIOUS SUGGESTIONS

In addition to providing actionable recommendations for the GHRC, the UWG defined “suggestions” at the FY19 annual onsite meeting to recognize GHRC efforts that were met but require periodic updates due to their ongoing nature. Suggestions thus carry less weight than recommendations where there was an expectation of a significant deliverable for the FY20 meeting.

Four suggestions were put forward by the UWG at the FY19 meeting, which are summarized in Table 3. The UWG challenged the GHRC in Suggestion 1 to extend outreach efforts beyond

the primary annual meetings for its focus area – AMS and AGU – and to consider non-traditional outreach opportunities such as short courses and online courses. The GHRC is clearly making progress on this suggestion. The UWG wishes to remain informed of GHRC efforts in this area, and thus move to keep the suggestion open for the FY21 meeting.

Table 3. Disposition of suggestions from FY18 GHRC UWG onsite meeting.

Suggestion	***Description***	***Disposition***
1	Extend outreach efforts beyond meteorological meetings. Carefully consider, survey, select and focus on topical professional meetings. Focus on more than just presentations and consider exhibitor booths.	Open
2	Explore adding advanced, impact-based user metrics that are more informative as to the end-to-end user activity.	Open
3	Provide an update at the FY19 UWG meeting on the progress and usage of DAPPeR.	Merged
4	Continue to provide updates on VISAGE and the development of FCX tools.	Merged

Regarding Suggestion 1, the UWG proposed outreach options such as short courses often organized by conferences and online courses to reach out to a community of student users and the private sector. In early 2020, a One-NOAA Science Webinar on a demonstration of FCX with GOES-R Post-Launch Test can be coordinated with NESDIS to introduce FCX to the wider NOAA science and cloud community. The UWG acknowledge that such efforts may be demanding and suggests assessing their impact (e.g., monitoring what data have been published according to the dataset DOI in order to optimize time management) and strategic hiring or contracting with the private sector (e.g., RTI). Per Suggestion 2, the UWG encourages the GHRC to advance user metrics as it remains to be seen to what level the user experience is captured. The UWG encourages the GHRC to continue working on the end-to-end aspect of tracking the user experience. The UWG would like to see a survey that queries users on tools that might be beneficial for future migration of analyses to the cloud alongside the data.

Understanding user workflows would help to avoid excessive downloading of data and could also benefit the selection of topics for data recipes, micro articles, and other services. Suggestions 3 and 4 request updates on the development of the GHRC tools for data publishing and the FCX tools for data visualization. The development of these software products is important to maintain and develop the GHRC subject matter expertise in the context of the cloud migration. It is a multi-year project that may face hurdles as well as growth opportunities as the GHRC migrates its data holdings to the cloud. The UWG moved to merge Suggestions 3 – 4 to monitor the progress of these initiatives over the coming year.

4. NEW UWG RECOMMENDATIONS FOR FY 2020

Recommendation 1 (updated from previous 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.

- **the soon to be completed migration of the GHRC data holdings to the cloud makes more urgent the need for the GHRC to create such a vision statement. The UWG encourages the GHRC to seek advice from NASA Headquarters, the Weather Focus Area of the Earth Sciences Division, Applied Sciences Division, and the GHRC UWG to ensure that this vision aligns with the future direction of NASA data (i.e., Earthdata search) and NASA research (i.e., the ongoing Decadal Survey), and also resonate with the needs of the current and future user communities of the GHRC.**
- **the GHRC strategic plan should seek continued improvements in the link between the mission of the GHRC, its data holdings and unique position in the broader scientific community (i.e., airborne science, ground validation precipitation), and potential applications (e.g. in A-CCP). As such the science focus on hydrometeorology should be clarified by the GHRC in order to identify and fill critical missing data elements in their holdings and potential gaps in their subject matter expertise.**

The migration of the GHRC data holdings to the cloud places the GHRC in a position of leadership among the NASA DAACs for the development of cloud-based and enterprise software solutions that can be run coincident with the data. It is clear that this migration calls into question the traditional role of a NASA DAAC as simply a custodian of program data. As more DAACs follow the GHRC into the cloud, the walls between their data holdings will thin to the benefit of improved interoperability for the users. It will become a challenge to maintain the sense of identity between the topic-based DAACs if their visions do not evolve to thrive in this cloud environment. Now the data is becoming more secure, it is timely that the GHRC updates its mission statement to reflect their expertise in data usage and steps up in public outreach to advertise their brand and leadership. The issue of branding also includes data recipes, micro-articles, webinars, and other value-added data knowledge products that are distributed by the GHRC. In order to further position the GHRC as a pathfinder for other DAACS, GHRC should consider what users will recognize the GHRC for once the data are physically hosted and queried by external centralized systems. Improved synergy with the user's workflow can be sought through a use case approach (knowing who gets the data, what are the data impact, what is needed to accomplish, etc.). The GHRC should define impact metrics such as DOIs. Besides attending conferences, the GHRC can be involved in panel discussions, and set up short courses and online training material on how to use data on the cloud. As outreach become a significant task, the GHRC may consider a strategic hire or outsourcing this endeavor.

To update their mission statement, the UWG recommends that the GHRC works with the other DAACs and NASA Headquarters to define what a DAAC should be and how would users' services be defined in the cloud era. The GHRC should maintain attention to large NASA projects such as the Decadal Survey and curate data within its focus areas that could support such missions. The Decadal Survey 2017 emphasizes science as a driver of observation design, and in this context the GHRC is well positioned with their field campaign holdings and their AIST project. The GHRC can get inputs from the UWG to attend community meetings/forums for future missions. The GHRC may develop and maintain relationships with NASA Headquarters and by showcasing their tools and strengths w.r.t. missions such as A-CCP and IMPACTS, learn if/how

A-CCP can be assigned to the DAAC, or investigate what type of role the DAAC can get in A-CCP or IMPACTS.

Recommendation 2 (new): The GHRC has positioned itself well to become a leader in value-added data services, but the GHRC leadership should consider the future of the broader GHRC brand and the severe weather (including severe local storms) user community. The issue of GHRC branding revisits the discussion during the FY18 UWG meeting where it was suggested that the term "Hydrology" in GHRC may not fully encapsulate the severe weather phenomena that the GHRC is known for. This discussion is worthwhile in the context of planning the 5 to 10-year vision of the GHRC. In order to move forward with this question and given the urgency to define a brand once the GHRC has moved its data holdings to the cloud, the UWG moved this question as a recommendation.

"Hydrometeorology" was suggested as a possible alternate term that would not change the GHRC acronym, as even lightning is ultimately the result of hydrometeorological processes. Opportunities for collaboration with other institutions that host data related to water issues should be explored, particularly the NASA JPL Western Water Applications Office and the NOAA National Water Center. It is suggested that the GHRC brings a hydrologist to the UWG (e.g. from the National Water Center, through SPoRT and the LIS) to clarify this question. It was also suggested that the GHRC could be exposed to other users than science-based users (e.g. decision makers in the context of extreme events). Water-related data bundles and virtual collections would not only tie the GHRC to hydrology, but also round out its lightning-heavy data holdings. While maintaining its leadership role in lightning, it was also suggested that the GHRC builds on the success of the lightning virtual collection to extend the concept to other focus areas such as precipitation, and also to new types of central topics such as a given instrument type (i.e., passive microwave) or aircraft (i.e., the NASA ER-2), or for specific events such as a major hurricane.

The GHRC has prototyped the FCX cloud-based tool to become an event-driven repository for major hydrometeorological events. The UWG recommends that the GHRC continues to support the development of the FCX tool. With additional development, the UWG anticipates that FCX could be a GHRC product that diffuses over to other DAACs, and facilitate search for major weather event data across DAACs. The UWG recommends that the GHRC identifies high-impact events (i.e., named storms). Allowing users to crowd source "event" designations - either from personal experience or from the data - (i.e., local severe weather event with widespread flooding) would be a powerful capability.