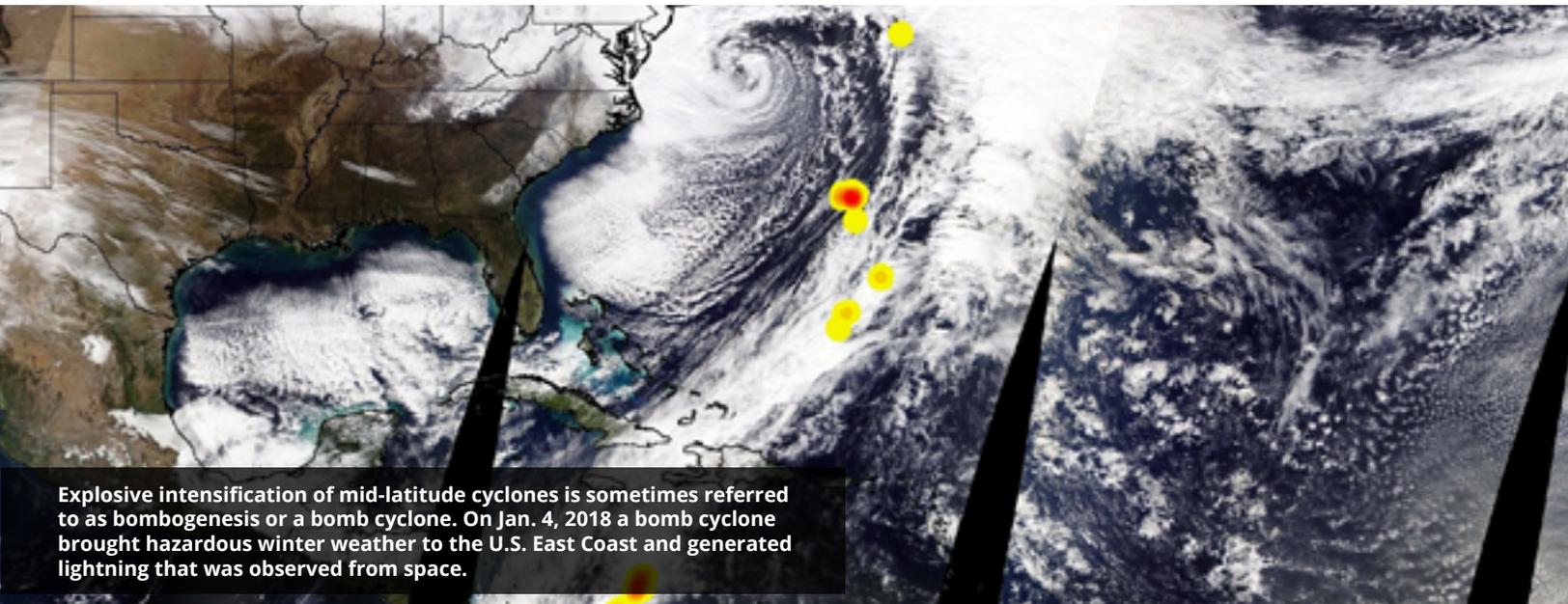# 4.2018 NEWSLETTER

A 6-MONTH UPDATE ON GHRC ACTIVITIES

Explosive intensification of mid-latitude cyclones is sometimes referred to as bombogenesis or a bomb cyclone. On Jan. 4, 2018 a bomb cyclone brought hazardous winter weather to the U.S. East Coast and generated lightning that was observed from space.

GHRC
Global Hydrology Resource Center

EST 1991

The Global Hydrology Resource Center (GHRC) is one of NASA's Distributed Active Archive Centers (DAACs) and is managed jointly by the Earth Science Department at NASA's Marshall Space Flight Center and the University of Alabama in Huntsville's Information Technology and Systems Center. The NASA GHRC DAAC is a member of national and international data organizations including NASA's Earth Science Data and Information System (ESDIS), the Federation of Earth Science Information Partners (ESIP), and the International Council for Science (ICSU) World Data System (WDS).
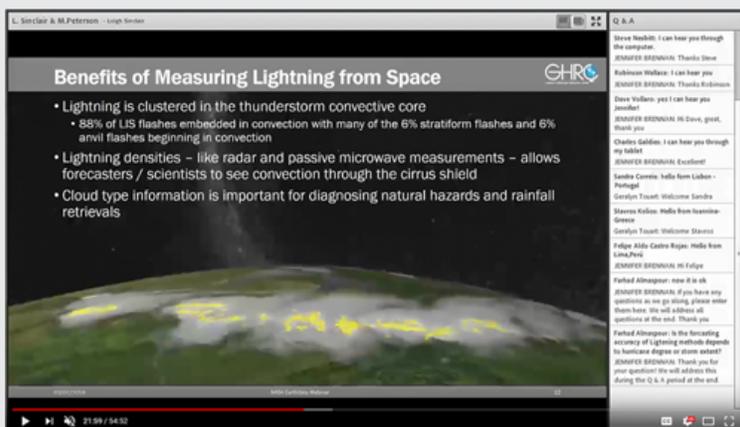
MISSION STATEMENT

"The GHRC provides a comprehensive active archive of both data and knowledge augmentation services with a focus on **hazardous weather, its governing dynamical and physical processes, and associated applications**. Within this broad mandate, GHRC focuses on **lightning, tropical cyclones and storm-induced hazards** through integrated collections of satellite, airborne, and in-situ data sets."

NASA

itsc
INFORMATION TECHNOLOGY AND SYSTEMS CENTER

THE UNIVERSITY OF ALABAMA IN HUNTSVILLE

GHRC PRESENTS NASA WEBINAR

A NASA webinar titled "Striking New Spatial Bounds Using ISS LIS Data" was presented by GHRC on March 7, 2018. This webinar provided an overview of the Lightning Imaging Sensor (LIS) on the International Space Station (ISS), describing data format, availability, and use in research. The ISS LIS Near Real-Time and Science quality data can be used to study lightning in hazardous weather over much of the Earth. Examples of ISS LIS lightning observations during the 2017 Atlantic hurricane season and a short demonstration on how these new ISS LIS data products can be plotted using Python were included in the webinar. GHRC staff scientist, Leigh Sinclair and Dr. Michael Peterson, a Post-Doctoral Associate with the Earth System Science Interdisciplinary Center (ESSC) at the University of Maryland, presented to an international audience of interested and varied data users. This webinar was recorded and can be watched on the NASA Earthdata YouTube channel: https://youtu.be/m83cNoaMXUw ▼

NEW MICRO ARTICLES AND DATA RECIPES RELEASED

The GHRC DAAC has worked on several new micro articles and data recipes so far this year. A micro article is a short, interesting document that brings together data and key science concepts. The third phenomenon micro article was published in March titled **"Hurricanes"**, one of the GHRC key science focus areas. The micro article summarizes what hurricanes are, how they form, where they typically occur, how they are observed by research instruments and what NASA project data at the GHRC DAAC can be used to study hurricane events. Dr. Jonathan Zawislak from Florida International University and former GHRC User Working Group co-chair served as a content reviewer for the Hurricane micro article.[1]

Also in March, a new instrument micro article describing the Two-Dimensional Video Disdrometer (2DVD) instrument was published. A disdrometer is an optical device on the ground that measures precipitation characteristics. 2DVDs were extensively used in the various field campaigns of the Global Precipitation Measurement (GPM) Ground Validation (GV) project. 2DVDs measure properties of different hydrometeor (precipitation) types such as raindrops, snowflakes, and hail. The **2DVD micro article**[2] highlights instrument function and measurment details, points to NASA GHRC datasets, and identifies important publications from which users can learn more about the instrument.

Two new data recipes were also released during the past 6 months. A new **HS3 HIWRAP** data recipe provides step-by-step instructions for generating vertical time-height plots of radar reflectivity measured by the High-Altitude Imaging Wind and Rain Airborne Profiler (HIWRAP) instrument during the Hurricane and Severe Storm Sentinel (HS3) airborne field campaign. This data recipe uses python to read the data files and produce the plot. The code is provided on the GHRC GitHub site.[3]

◄ In addition, the GHRC also released a **Python-based data recipe** enabling users to generate global heat map plots of ISS LIS lightning flash locations extracted from multiple swath files. The data recipe generates a CSV file containing the extracted lightning flash locations coordinates which may be used with other software, such as plotting the lightning flash locations within ArcGIS.[4]

[1] https://ghrc.nsstc.nasa.gov/home/micro-articles/hurricane
[2] https://ghrc.nsstc.nasa.gov/home/micro-articles/instrument-2dvd-disdrometer
[3] https://ghrc.nsstc.nasa.gov/home/data-recipes/hs3-hiwrap-radar-reflectivity-profile-quick-view
[4] https://ghrc.nsstc.nasa.gov/home/data-recipes/iss-lis-lightning-flash-location-quick-view-using-python-and-gis

REDESIGNED AND UPDATED LIGHTNING WEBSITE NOW AVAILABLE

GHRC has worked on updating and re-designing the lightning web site[5] that has been in operation for decades. The new website also contains a new Cesium-powered Lightning Climatology Visualization Tool that allows one to display the GHRC DAAC Lightning Climatology datasets. The TRMM LIS/OTD Gridded Lightning Climatology Datasets[6] and the TRMM LIS Very High Resolution Gridded Lightning Climatology Datasets[7] are available.
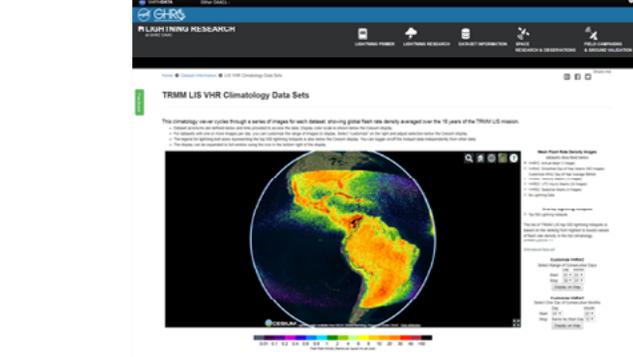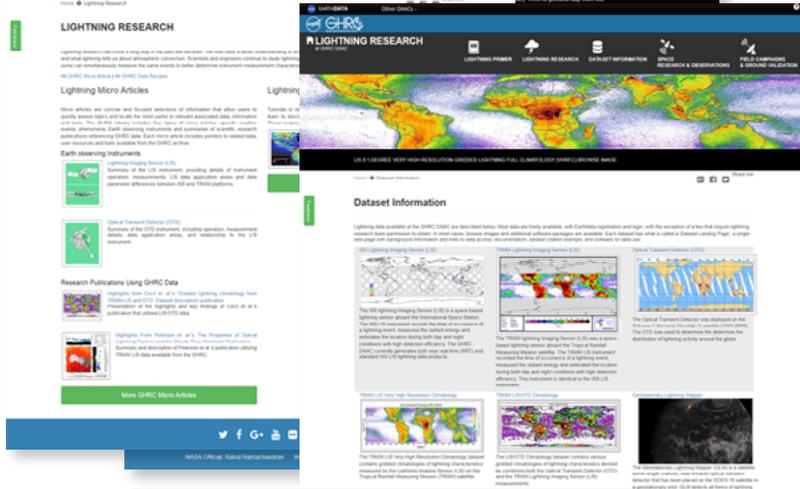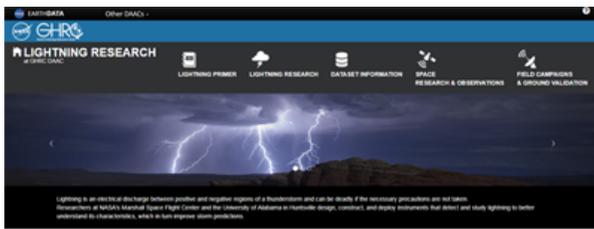
▼ https://ghrc.nsstc.nasa.gov/lightning

GHRC PROVIDES NEW LIS NASA MASTHEAD IMAGE FOR THE EARTHDATA WEBSITE

GHRC ISS LIS data captured lightning generated by the January 4th 2018 event that brought hazardous winter weather to the U.S. East coast. The event was caused by the explosive intensification of a mid-latitude cyclone, referred to as bombogenesis in the media. Contrary to popular belief, lightning can be produced during winter events. The image shows lightning measured by the ISS LIS overlaid on MODIS cloud data showing the extent of the storm. ▼
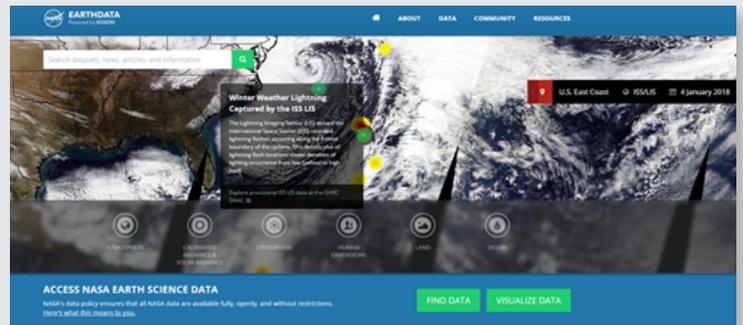
GPM GV FIELD CAMPAIGN COLLECTION DOIs

GHRC has created collection level DOIs that resolve to field campaign landing pages for each of the Global Precipitation Measurement (GPM) Ground Validation (GV) field campaigns. The field campaign collection landing pages contain an introduction to the purpose, location, and time of the field campaign, the collection citation, general characteristics, member dataset links, and primary documentation relevant to the field campaign. We are currently adding the Field Campaign Collection DOI to metadata for each data product. The landing pages are:

The Olympic Mountains Experiment (OLYMPEX):
http://dx.doi.org/10.5067/GPMGV/OLYMPEX/DATA101

The Integrated Precipitation and Hydrology Experiment (IPHEx)
http://dx.doi.org/10.5067/GPMGV/IPHEX/DATA101

The Iowa Flood Studies (IFloodS)
http://dx.doi.org/10.5067/GPMGV/IFLOODS/DATA101

The Midlatitude Continental Convective Clouds Experiment (MC3E)
https://doi.org/10.5067/GPMGV/MC3E/DATA101

The GPM Cold-season Precipitation Experiment (GCPEx)
https://doi.org/10.5067/GPMGV/GCPEX/DATA101

The Light Precipitation Evaluation Experiment (LPVEx)
https://doi.org/10.5067/GPMGV/LPVEX/DATA101

[5] https://ghrc.nsstc.nasa.gov/lightning/
[6] https://ghrc.nsstc.nasa.gov/lightning/data/data_lis_otd-climatology.html
[7] https://ghrc.nsstc.nasa.gov/lightning/data/data_lis_vhr-climatology.html
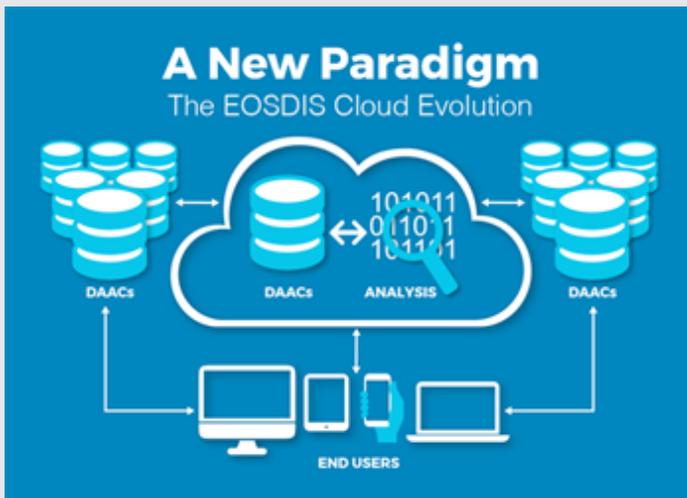
GHRC CLOUD TRANSITION EFFORT

GHRC continues to work towards transitioning our datasets into Amazon Web Services (AWS) through the NASA Compliant General Application Platform (NGAP). NGAP provides an AWS instance that meets NASA IT security requirements and provides storage containers for distributing data to the public.

In November 2017, GHRC participated in the kick-off of the testing/production phase of the NASA Cumulus effort. Cumulus is a cloud-based framework for data ingest, archive, distribution, and management. During this current phase of work, staff members participated in AWS training using Qwiklabs online resources to improve their cloud related skills. Two datasets (ISS LIS & MSUT2) were chosen to test dataflows through the Cumulus framework. We successfully published MSUT2 and performed initial processing for ISS LIS using Cumulus in the test environment.

GHRC will continue to work on our cloud migration efforts through the remainder of FY18.

EARTHDATA DRIVE IMPLEMENTED AT GHRC

To improve data access, GHRC has implemented Earthdata Drive. Earthdata Drive consists of a WebDAV interface, an extension of the Hypertext Transfer Protocol (HTTP) that **allows users to securely connect to the GHRC public data server as if it were a local drive on their computers.** Users need to login in using a valid Earthdata login in order to access GHRC public data. By providing Earthdata Drive, users have an additional option for downloading larger quantities of data. We would greatly appreciate help from our users to test this service and provide us with any feedback. Instructions and help is provided via the Earthdata Drive access page at **https://fog.nsstc.nasa.gov/.**

GHRC SUBSCRIPTION SERVICE NOW AVAILABLE

Some of the ongoing, near-real time datasets at GHRC, such as ISS LIS lightning data and AMSU atmospheric temperatures, are available via a subscription service in which users can request new data files be sent directly to their computer. Users must sign up for the service by contacting GHRC User Service at

https://ghrc.nsstc.nasa.gov/home/contact-us
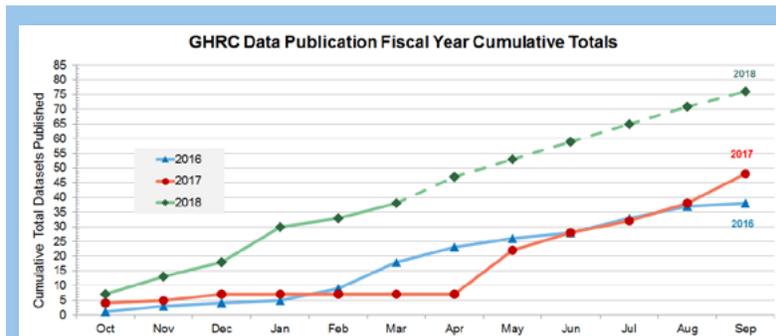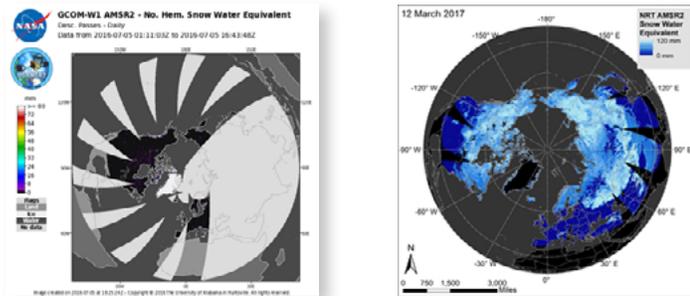

PUBLICATION METRICS

GHRC has been increasing the rate of data publication since the implementation of DAPPeR, our drupal-based data publication tool, in May 2017. This figure shows the increase in dataset publication rate over that of previous years. We are currently on target to have all datasets from the various GPM-GV field campaigns published by September 2018. All HS3 auxiliary and operational support datasets will be published by November 2018.

IMPROVEMENTS TO EXISTING GHRC DATA HOLDINGS UNDERWAY

As part of DAAC-wide ARC improvements, GHRC has spent several months assigning or improving metadata for granule data files of already published datasets. Through this work we have identified datasets that contain corrupted or incorrect data files. We have contacted data providers to either resupply data files or make suggestions on appropriate actions for fixing these files. This activity has primarily focused on early GPM Ground Validation field campaign datasets such as the Conical Scanning Millimeter-wave Imaging Radiometer (CoSMIR) data for the Mid-latitude Continental Convective Clouds Experiment (MC3E), the GPM Cold-season Precipitation Experiment (GCPEx), and the Integrated Precipitation and Hydrology EXperiment (IPHEx) field campaigns. The data providers have been very helpful in working with us on this important effort.

WINTER SNOW IMAGE DISPLAYED ON NASA EARTHDATA WEBSITE

Snow from a winter storm that hit Alaska on November 11th, 2017 was captured in NRT AMSR2 Snow Water Equivalent data[8] produced by GHRC. The image was displayed as the masthead on the NASA Earthdata website in December. A data recipe was created to show users how to access the AMSR2 SWE data in a GIS environment.[9]

[8] https://http://dx.doi.org/10.5067/AMSR2/A2_DySno_NRT
[9] https://ghrc.nsstc.nasa.gov/home/data-recipes/how-georeference-and-convert-nrt-amsr2-snow-water-equivalent-polar-ease-grid-data

GHRC User Working Group (UWG) Member Changes

We welcome three new members to the GHRC UWG: Jason Dunion, Bob Brakenridge, and Weixin Xu. GHRC thanks the following members who ended their service term after the 2017 meeting: Eric Brunning, Chris Kummerow, Dave Wolff, Walt Petersen.

We thank our GHRC UWG who gave valuable feedback during the September 2017 meeting to successfully kick off fiscal year 2018. We look forward to seeing our UWG members November 6-7, 2018 at the UAH campus!

GHRC PARTICIPATION AT AGU AND AMS CONFERENCES

GHRC science staff members Leigh Sinclair and Amanda Weigel attended the **Fall 2017 American Geophysical Meeting (AGU)** in New Orleans, December 11 -15, 2017. They chaired a very successful new e-Lightning poster session on "Developing Innovative Tools and Services to Enable Data Use Across Broad User Communities". In addition, Leigh Sinclair presented a Flash Talk at the NASA Hyperwall titled "Striking Near Real-Time Lightning Data from the ISS". AGU Posters were presented in both Science and Education sessions during the week.

- A. Weigel, PA13B-0236 **"Drowning in Data: Going Beyond Traditional Data Archival to Educate Data Users"**
- L. Sinclair, IN21B-0043 **"Using GHRC's Data Publication Workflow Portal to Improve Data Discovery"**
- L. Sinclair, ED21B-0276 **"Using Satellite Lightning Data as a Hands-On Activity for a Broad Audience"**
- A. Weigel, H21E-1510 **"Supporting the Use of GPM-GV Field Campaign Data Beyond Project Scientists"**

Deborah Smith and Amanda Weigel attended the **Annual American Meteorological Society (AMS) Meeting** which took place in Austin, TX during January 7 - 12, 2018. Both Deborah and Amanda presented posters and presentations describing GHRC efforts to reach a broad community of users.

- D. Smith, **"Coloring as a Means to Lightning Data Exploration"**, poster #153 27EDUCATION
- D. Smith **"Meeting the Needs of a Variety of GHRC Data Users by Asking 'Who is the Audience?' First"**, poster #726 13SOCIETY
- A. Weigel, **"Enabling Visualization and Geospatial Analysis of Atmospheric Science Data through Python"**, presentation #7.3 8PYTHON
- A. Weigel, **"Building Satellite Data Awareness One Meteorological Dataset at a Time"**, presentation #11B.2 14GOESRJPSS