



GHRC Outreach and User Services

Leigh Sinclair

2018 GHRC User Working Group Meeting
November 13-14, 2018



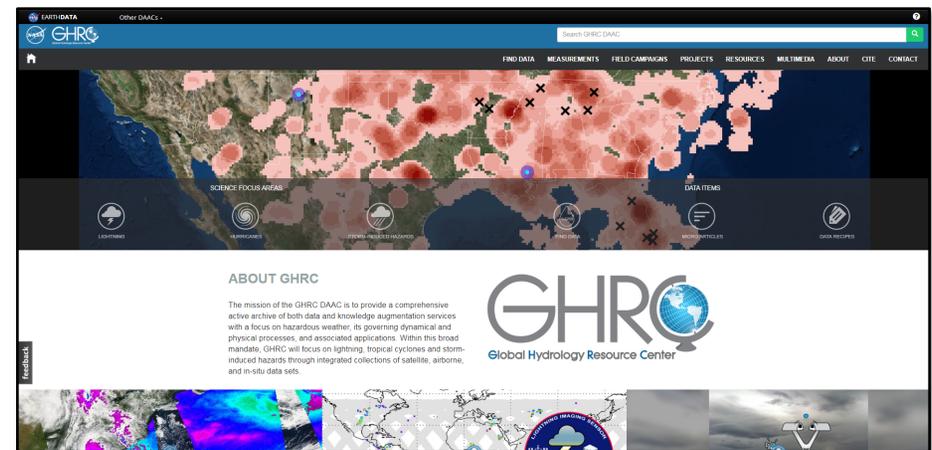
Introduction

GHRC focuses on a series of science and outreach efforts to accomplish the following:

- Make GHRC data and critical resources more discoverable for users
- Enable unfamiliar users to become more informed on GHRC data, instruments, and science focus areas
- Increase the usability of GHRC data to address user needs

Ways we work towards these efforts:

- Micro Articles
- Data Recipes
- Mastheads
- Webinars
- Website changes or improvements
- Attend conferences



Micro Articles

- Short documents that bring together data and key science concepts curated by both Earth and data scientists

2018 Micro Articles

OLYMPEX Field Campaign

Olympic Mountains Experiment (OLYMPEX) Field Campaign

The Olympic Mountains Experiment (OLYMPEX) was a Global Precipitation Measurement (GPM) ground validation field campaign that consisted of a wide variety of ground instrumentation, radars, and multiple aircrafts all which monitored the weather conditions and rainfall dropped by oceanic storm systems as they approached and traversed the Peninsula and the Olympic Mountains. The intensive observing period took place during November 2015 through February 2016.

Scientific Objectives

The primary objectives of OLYMPEX included:

- Verify and validate satellite measurements of precipitation, primarily rain and snow measurements in mid-latitude frontal systems
- Determine how remotely-sensed GPM precipitation measurements can be applied to a range of hydrologic, weather forecasting and climate model data
- Determine changes in precipitation characteristics with elevation change

Instruments Used

Multiple instruments were flown on the UND Citation II, NASA ER-2, and NASA DC-8 aircrafts, as well as

SPATIAL COVERAGE
[N: 48.5, W: -126.0, E: -122.0, S: 46.0] degrees

TIME RANGE
November 10, 2015 - February 16, 2016

PHENOMENA STUDIED

- Atmospheric Rivers
- Snow Microphysics
- Convective Precipitation

Hurricane Phenomenon

Hurricane

Atmospheric Phenomenon

WHAT IS A HURRICANE?

Hurricanes, or tropical cyclones, are large rotating storm systems with low pressure centers and high winds that typically last from several days to slightly more than a week. Only when the maximum sustained wind speed reaches 119 kilometers per hour (74 miles per hour) do we refer to these storms as hurricanes. The term "hurricane" refers to tropical cyclones that forms in the North Atlantic and Eastern Pacific ocean basins, however, in other areas of the world hurricanes are referred to as "typhoons", "tropical cyclones", and "cyclones". Due to the effect of Earth's rotation, hurricanes rotate counterclockwise in the Northern Hemisphere and clockwise in the Southern Hemisphere. The Saffir-Simpson Hurricane Wind Scale is commonly used to categorize hurricane's maximum sustained winds, which are representative of potential structural wind damage. Hurricanes also cause a number of other hazards including heavy rainfall, high waves, rip currents, flooding, storm surge, tornadoes, high winds, landslides and lightning.

Why do hurricanes occur?

Hurricanes occur in the tropics and subtropics where there is warm, moist air and a low pressure disturbance causing air to converge and rise. Near the equator, hurricanes cannot form due to the lack of the Coriolis force needed for storms to rotate. In the Atlantic Ocean, most hurricanes form from easterly waves, or troughs of low pressure that originate over Africa. Through surface evaporation, warm sea surface temperatures serve as the main fuel source for hurricane formation. Easterly waves force warm, moist air to rise, creating clouds and thunderstorms. As the

Image Source: LANCE Terra/MODIS True Color Image of Hurricane Katrina on August 28, 2005

2DVD Instrument

Instrument: 2DVD Disdrometer

INSTRUMENT

In Situ Land-based Platforms → Ground Stations → Two-dimensional Video Disdrometer (2DVD)

Description

A disdrometer is an optical device situated on a stationary ground station platform that measures properties of different hydrometeor (precipitation) types such as raindrops, snowflakes, and hail. The Two-Dimensional Video Disdrometer (2DVD) uses two high speed line scan cameras to provide continuous measurements of size distribution, shape, and fall velocities of all precipitation particles and types.

Two light planes, provided by two internal lamps, cut across the approximate 10x10 cm virtual measurement area and are projected onto two high speed line-scan cameras. Hydrometeors that fall through the light planes cast a shadow that is recorded by the two cameras nested within the instrument. The light planes are separated by a calibrated distance between which the velocity of a falling particle can be measured. The line scan cameras sample each plane every 10 microseconds; therefore, as a hydrometeor falls through the measurement area, several line scans of each image are recorded from two sides and two different heights allowing precise measurements to be made.

Measurements

Data obtained includes drop-size-distribution, rain rate, fall velocity, precipitation type.

INSTRUMENT PLATFORM

In Situ Land-Based Ground Station

Two-dimensional Video Disdrometer

Micro Article Metrics

- Most viewed Micro Article:
 - Lightning Imaging Sensor (LIS) Instrument
 - <https://ghrc.nsstc.nasa.gov/home/micro-articles/earth-observations-lightning-imaging-sensor>
 - Lake Effect Snow Phenomenon
 - <https://ghrc.nsstc.nasa.gov/home/micro-articles/lake-effect-snow>
- Longest view time:
 - Highlights from Cecil et. al.'s 'Gridded lightning climatology from TRMM-LIS and OTD: Dataset description' publication
 - <https://ghrc.nsstc.nasa.gov/home/micro-articles/highlights-cecil-et-als-gridded-lightning-climatology-trmm-lis-and-otd-dataset>
 - Optical Transient Detector (OTD) Instrument
 - <https://ghrc.nsstc.nasa.gov/home/micro-articles/earth-observations-optical-transient-detector-otd>

Earth Observations: Lightning Imaging Sensor (LIS)

INSTRUMENT

Passive Remote Sensing → Spectrometers/Radiometers → Imaging Spectrometers/Radiometers → Lightning Imaging Sensor (LIS)

Description

The Lightning Imaging Sensor (LIS) detects total lightning (i.e. cloud-to-cloud, cloud-to-ground, and intra-cloud flashes) from a space-based platform.

The LIS is based on digital imaging technology and built around a 128 x 128 charged coupled device (CCD) array that is used to extract only the optical emissions of lightning through Earth's atmosphere for both day and night backgrounds.

Measurements

Distribution and variability of total lightning. Amount, rate, and radiant energy of total lightning during both day and night.

INSTRUMENT PLATFORMS

Earth Observation Satellites

Tropical Rainfall Measuring Mission (TRMM)

Space Stations/Manned Spacecraft

International Space Station (ISS)

Applications

Severe Storms

Convective precipitation

Latent heat

Thunderstorms

Water & energy cycle

Climate

SPATIAL RESOLUTION	SPATIAL EXTENT	SWATH WIDTH	ACCURACY	WAVELENGTH	SAMPLING DURATION
TRMM LIS: 4 km ISS LIS: 4 - 8 km	TRMM LIS: 38 N - 38 S ISS LIS: 54 N - 54 S	Field of View 80 x 80	Detection efficiency ranges from 69% near noon to 88% at night	777.4 nm	approx. 90 s

- Step-by-step tutorials that instruct users on how to complete a task using data

2018 Data Recipes

HS3 HIWRAP Radar Reflectivity Profile Quick View

[Description](#) | [How to Use](#) | [Dataset Information](#) | [Key Parameters](#)

Description

The Hurricane and Severe Storm Sentinel (HS3) airborne field campaign used the High-Altitude Imaging Wind and Rain Airborne Profiler (HIWRAP) instrument to collect wind and precipitation measurements. This data recipe enables users to generate a time-height plot of the measured HS3 HIWRAP radar reflectivity through a Python plotting routine. The Python routine requires users to define the GHRC OPENDAP path to a data file and measured variable of interest. This data recipe then plots the data to provide a quick visualization of radar reflectivity. To run this Python routine, a pre-installed version of Python and additional Python packages are required. Advanced users may alter the code to plot other HS3 HIWRAP data variables.

This figure depicts a vertical two-panel time-height plot of HS3 HIWRAP radar reflectivity.

Data Recipe Type		Supporting Software Information	
TYPE	ACCESS	TYPE	ACCESS
Visualization	Open Source	Python Script	Open Source

How to use

This data recipe uses the Hurricane and Severe Storm Sentinel (HS3) High-Altitude Imaging Wind and Rain Airborne Profiler (HIWRAP) dataset.

This data recipe is available as a Python script. To run the Python script, please install the following Python packages: matplotlib, NumPy, and Pydap.

ISS LIS Lightning Flash Location Quickview using Python and GIS

[Description](#) | [How to Use](#) | [Dataset Information](#) | [Key Parameters](#)

Description

The Lightning Imaging Sensor (LIS) onboard the International Space Station (ISS) retrieves optical lightning measurements over most of the Earth. This Python-based data recipe steps the user through code that compiles information from a series of ISS LIS datafiles in a directory and generates a gridded heat map plot of lightning flash locations and a CSV file containing the location coordinates. This data recipe enables the visualization of lightning flash locations across several user-selected ISS LIS swath data files, accumulates flashes within a Python plot, and creates a CSV file with locations to enable use with other software. For this data recipe, the CSV file will be used to plot lightning flash locations in ESRI ArcMap.

ISS LIS data capturing lightning from the Jan. 4, 2018 bombogenesis event

Data Recipe Type		Supporting Software Information	
TYPE	ACCESS	TYPE	ACCESS
Visualization	Open Source	Python Script	ArcMap 10.2+

How to use

This data recipe uses the ISS LIS Provisional Science Data, however, this routine may be applied to the other ISS LIS data products offered by GHRC. More information and additional resources about this particular dataset can be accessed [here](#).

This data recipe is available as a Python script. To run the Python script, please install the following Python packages:

Data Recipe Metrics

- Most viewed Data Recipe
 - Using ArcGIS to Convert LIS Very High Resolution Gridded Lightning Climatology NetCDF Data to GeoTIFF Format
 - <https://ghrc.nsstc.nasa.gov/home/data-recipes/using-arcgis-convert-lis-very-high-resolution-gridded-lightning-climatology-netcdf-data>
 - How to Georeference and Convert NRT AMSR2 Snow Water Equivalent Polar EASE-Grid Data to GeoTIFF Format using Python and ArcGIS
 - <https://ghrc.nsstc.nasa.gov/home/data-recipes/how-georeference-and-convert-nrt-amsr2-snow-water-equivalent-polar-ease-grid-data>
- Longest view time
 - Using ArcGIS to Convert LIS Very High Resolution Gridded Lightning Climatology NetCDF Data to GeoTIFF Format
 - <https://ghrc.nsstc.nasa.gov/home/data-recipes/using-arcgis-convert-lis-very-high-resolution-gridded-lightning-climatology-netcdf-data>
 - ISS LIS Lightning Flash Location Quickview using Python and GIS
 - <https://ghrc.nsstc.nasa.gov/home/data-recipes/iss-lis-lightning-flash-location-quickview-using-python-and-gis>

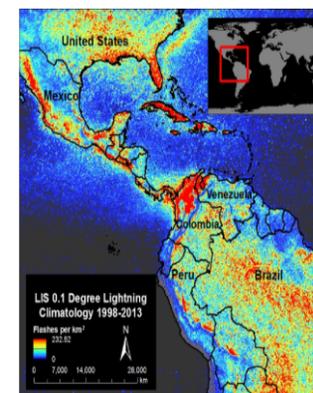
Using ArcGIS to Convert LIS Very High Resolution Gridded Lightning Climatology NetCDF Data to GeoTIFF Format

Description | How to Use | Dataset Information | Key Parameters

Description

The Lightning Imaging Sensor (LIS) aboard the Tropical Rainfall Measuring Mission (TRMM) satellite collected over 17 years of optical lightning observations that were used to generate a Very High Resolution Lightning Climatology dataset available in gridded netCDF format. ArcGIS software does not handle all netCDF data equally due to how the geographic and other information are formatted within datafiles, thus it is best suited for gridded netCDF files. This data recipe provides a step-by-step tutorial on how to bring these gridded netCDF data into ArcMap and create a GeoTIFF file enabling GIS analysis and map making. This data recipe requires a pre-installed version of ArcMap and a downloaded file from the LIS 0.1 Degree Very High Resolution Lightning Climatology Collection available at GHRC.

Image created using LIS 0.1 Degree Very High Resolution Gridded Lightning Full Climatology (VHRFC) dataset in ArcMap 10.2



Data Recipe Type



Data Type Conversion

Supporting Software Information

TYPE



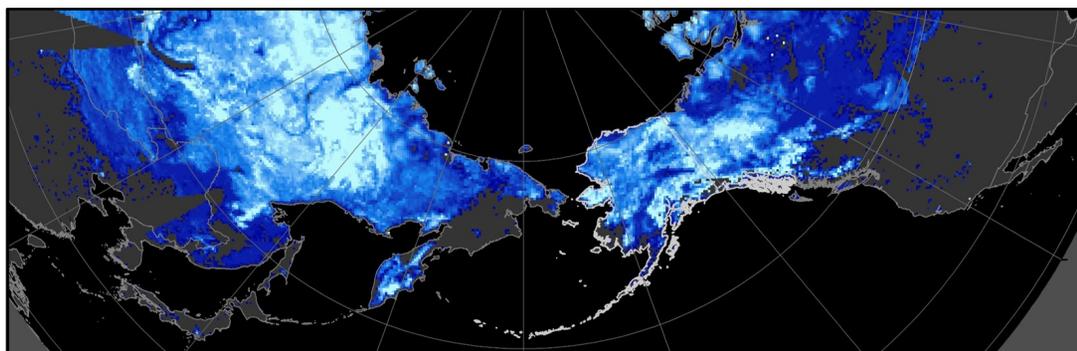
ArcMap 10.2+

ACCESS



Restricted, License Required

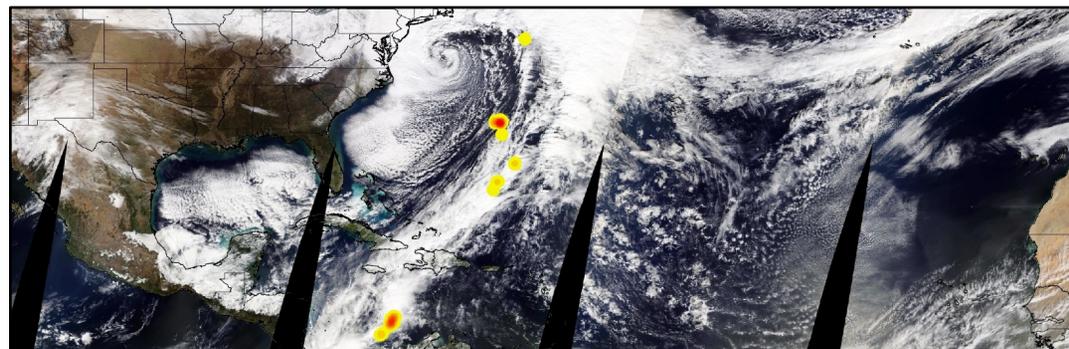
FY2018 Mastheads



November 11, 2017
winter storm in Alaska

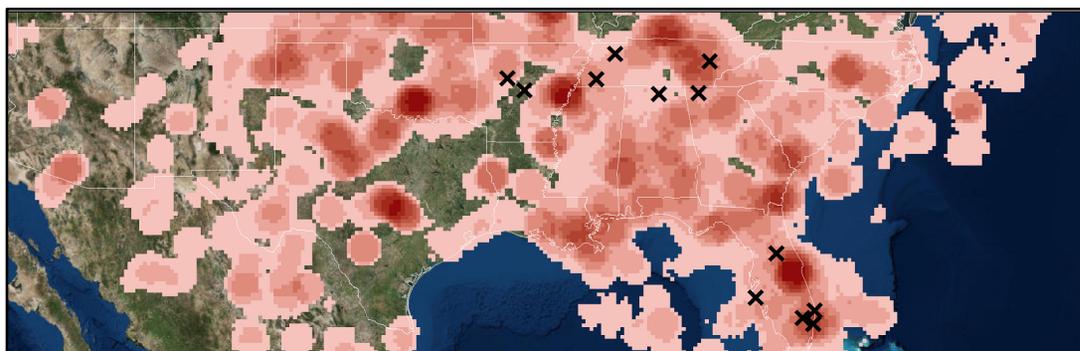
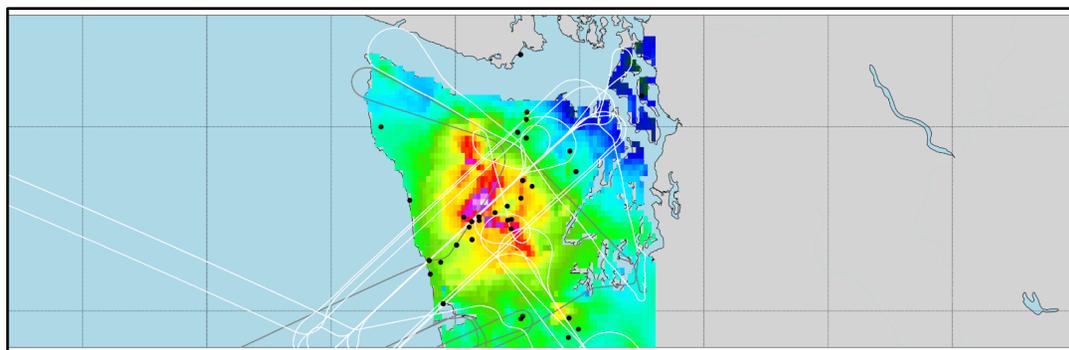


“Bomb Cyclone” that
brought winter weather to
the U.S. East Coast



FY2018 Mastheads

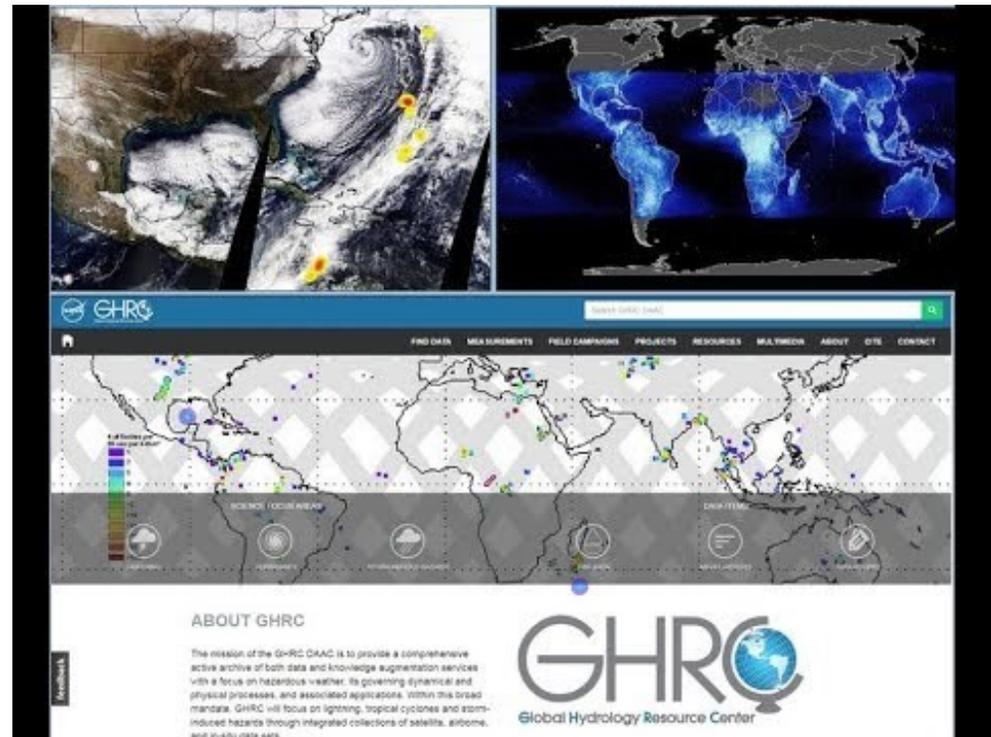
Heavy precipitation
observed during the
OLYMPEX field campaign



Summer lightning
statistics



- Striking New Spatial Bounds Using ISS LIS Data
 - Conducted on March 7th with Dr. Michael Peterson
- Background about ISS LIS data
- Discover, download, plot data
- <https://youtu.be/m83cNoaMXUw>
- Next webinar in April

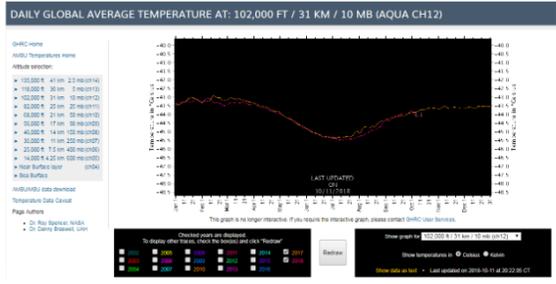


Website Updates: AMSU TEMPS Decommissioned

- Daily Earth Temperatures from Satellites, or AMSU TEMPS, webpage was decommissioned
 - <https://ghrc.nsstc.nasa.gov/amsutemps/>
- Determined by data creator, Roy Spencer, to decommission page due to multiple instrument channels malfunctioning or are no longer working
- Users will be redirected to a page explaining why page was decommissioned

AMSU Daily Average Temperature Trends Web Page Now Retired

GHRC has retired the web page containing the global daily averaged temperature trend plots derived using the Advanced Microwave Sounding Unit (AMSU) on the NASA Aqua satellite.



The content producer, Dr. Roy Spencer, reports that AMSU on Aqua has operated for over 16 years and several channels have failed (Channel 4 in 2008, Channel 5 in 2013, and most recently, Channel 14 shows significant degradation in quality). The data from the remaining channels are of questionable quality. For this reason, and with the content producer's agreement, we have retired this web page graphic image interface.

If you have questions or concerns, please contact [GHRC User Services](#)

Have you used our data? [Register for updates](#)

Website Updates: Retired Datasets Page

- Datasets are occasionally replaced or retired
- Contact [GHRC User Services](#) if want data
- <https://ghrc.nsstc.nasa.gov/home/content/retired-datasets>

[Home](#) » [Content](#) » [Retired Datasets](#)

Retired Datasets

Some datasets that were previously published are occasionally replaced by a more recent version, or retired due to a request by the data provider. In every case, the dataset information is still available for user access on a permanent landing page. The Digital Object Identifier (DOI) for the dataset remains indefinitely and resolves to that landing page with access to original information such as user guides and dataset documentation. In the case of dataset replacement, links to newer versions are available. GHRC maintains the current and most recently superseded published versions of any given dataset. Decisions regarding whether to maintain earlier versions are made on a case-by-case basis depending on data volume, science value, and usage metrics. Only the latest version of a dataset is listed in [HyDRO 2.0](#) and CMR with data available online for quick access.

The list below contains links to retired dataset landing pages. If you need access to the data from one of these datasets for research, please contact [GHRC User Services](#). In some cases, earlier data versions are restricted (not available) by data provider request.

[GPM Ground Validation Advanced Microwave Precipitation Radiometer \(AMPR\) IPHEX Version 1](#)

[GPM Ground Validation Airborne Precipitation Radar 3rd Generation \(APR-3\) OLYMPEX Version 1](#)

[GPM Ground Validation Doppler on Wheels \(DOW\) OLYMPEX Version 1](#)

[GPM Ground Validation Dual-frequency Dual-polarized Doppler Radar \(D3R\) GCPEX Version 1](#)

[GPM Ground Validation Environment Canada \(EC\) Micro Rain Radar \(MRR\) GCPEX Version 1](#)

[GPM Ground Validation Met One Rain Gauge Pairs IFloodS Version 1](#)

[GPM Ground Validation Met One Rain Gauge Pairs MC3E Version 1](#)

[GPM Ground Validation NASA Micro Rain Radar \(MRR\) GCPEX Version 1](#)

[GPM Ground Validation NASA S-Band Dual Polarimetric \(NPOL\) Doppler Radar IFloodS Version 1](#)

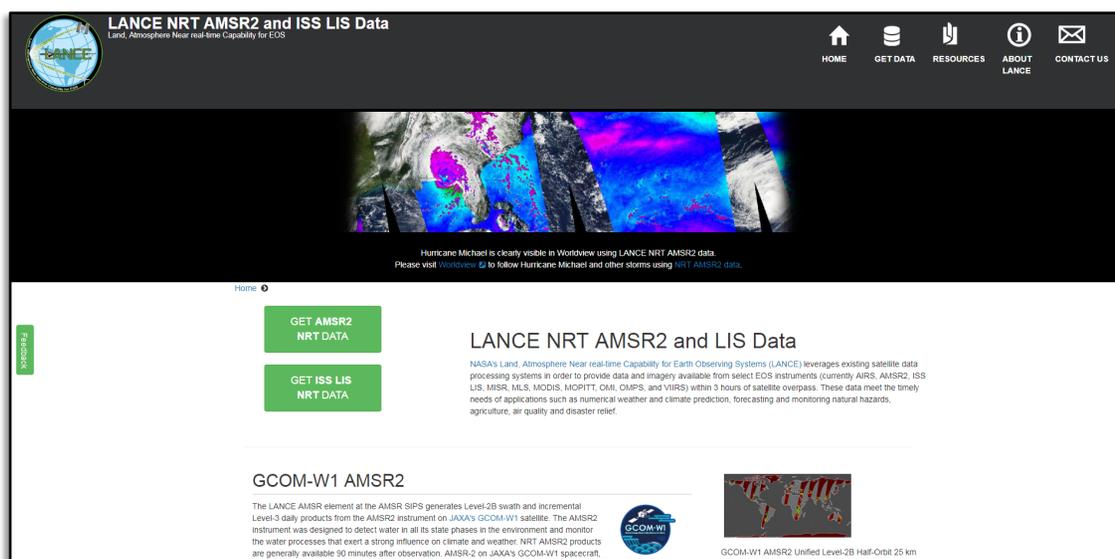
[GPM Ground Validation UND Citation Cloud Microphysics GCPEX Version 1](#)

[GPM Ground Validation UND Citation Navigation Data GCPEX Version 1](#)

[GRIP DC-8 Dropsonde V1](#)

[Hurricane and Severe Storm Sentinel \(HS3\) Global Hawk Advanced Vertical Atmospheric Profiling System \(AVAPS\) Dropsonde System](#)

Website Updates: GHRC LANCE Webpages



LANCE NRT AMSR2 and ISS LIS Data
Land, Atmosphere Near real-time Capability for EOS

HOME GET DATA RESOURCES ABOUT LANCE CONTACT US

Hurricane Michael is clearly visible in Worldview using LANCE NRT AMSR2 data. Please visit [Worldview](#) to follow Hurricane Michael and other storms using NRT AMSR2 data.

Home

GET AMSR2 NRT DATA

GET ISS LIS NRT DATA

LANCE NRT AMSR2 and LIS Data

NASA's Land, Atmosphere Near real-time Capability for Earth Observing Systems (LANCE) leverages existing satellite data processing systems in order to provide data and imagery available from select EOS instruments (currently AMSR, AMSR2, ISS LIS, MISR, MLS, MODIS, MOPITT, OMI, OMPFS, and VIIRS) within 3 hours of satellite overpass. These data meet the timely needs of applications such as numerical weather and climate prediction, forecasting and monitoring natural hazards, agriculture, air quality and disaster relief.

GCOM-W1 AMSR2

The LANCE AMSR element at the AMSR SIPS generates Level-2B swath and incremental Level-3 daily products from the AMSR2 instrument on JAXA's GCOM-W1 satellite. The AMSR2 instrument was designed to detect water in all its state phases in the environment and monitor the water processes that exert a strong influence on climate and weather. NRT AMSR2 products are generally available 30 minutes after observation, AMSR2 on JAXA's GCOM-W1 spacecraft.

GCOM-W1 AMSR2 Unified Level-2B Half-Orbit 25 km

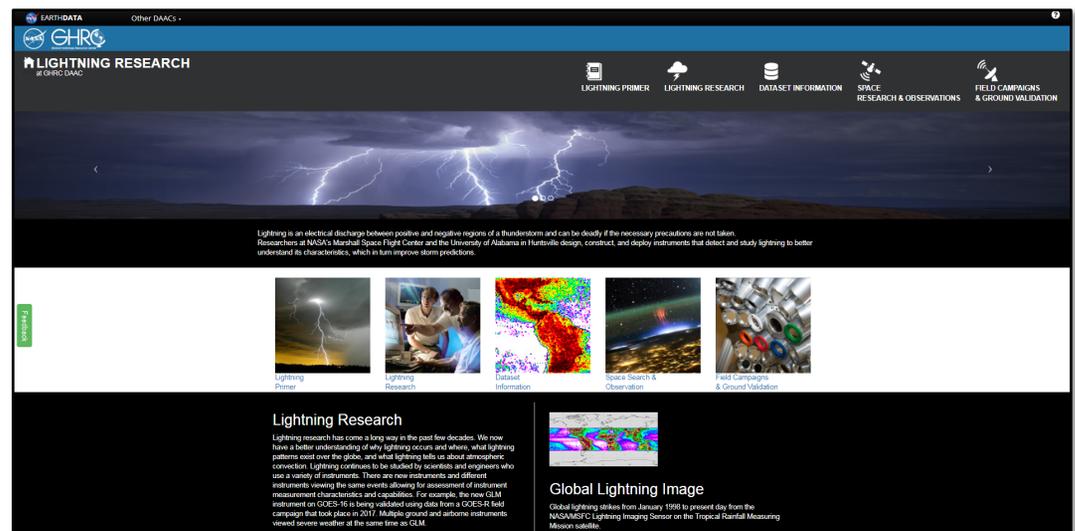
Implemented new GHRC LANCE website which includes the NRT ISS LIS and AMSR2 data

<https://lance.nsstc.nasa.gov/>

Website Updates: Lightning Webpages

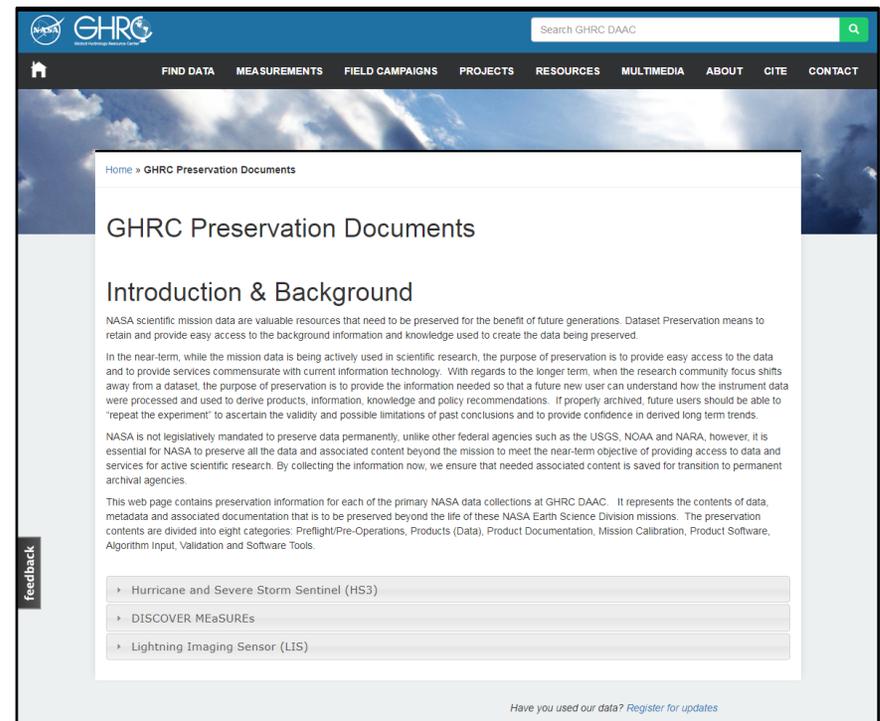
Fully updated lightning webpages where users can find the Lightning Primer, as well as information about lightning research, lightning datasets, space search and observations, and field campaigns

<https://ghrc.nsstc.nasa.gov/lightning/>



Website Updates: Preservation Pages

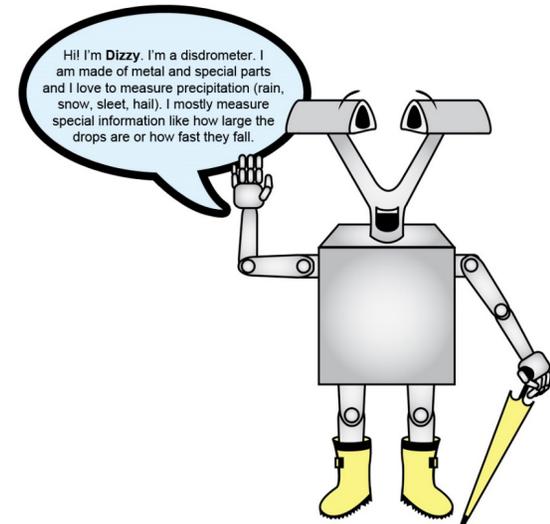
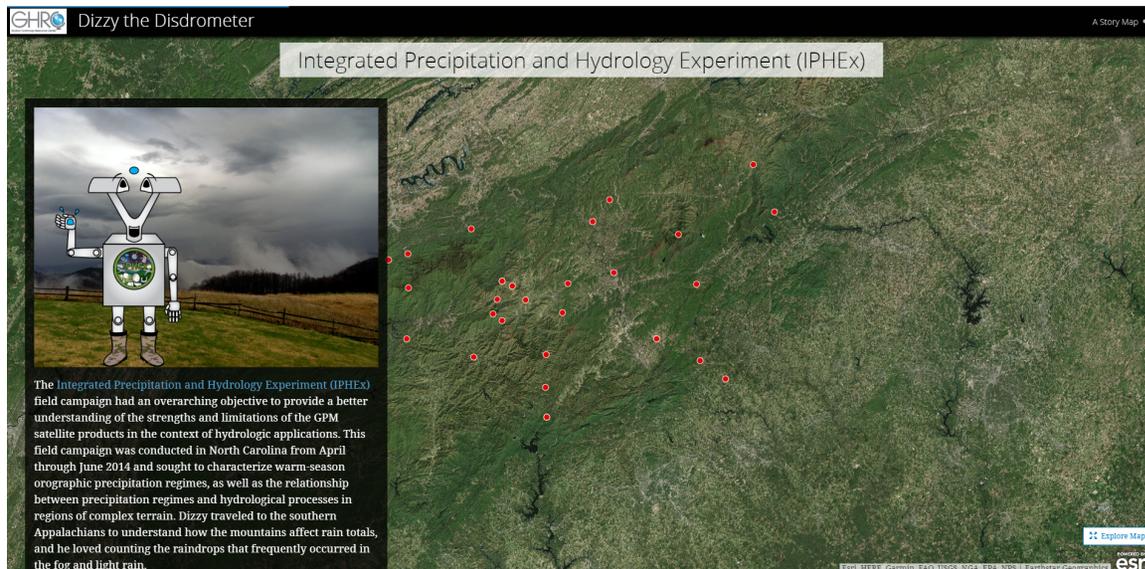
- Contains preservation information for each primary NASA data collections at GHRC
 - Lightning
 - HS3 EVS
 - DISCOVER MEaSUREs
- Represents contents of data, metadata, and associated documentation
- Divided into 8 categories:
 - Preflight/Pre-Operations
 - Data Products
 - Product Documentation
 - Mission Calibration
 - Product Software
 - Algorithm Input
 - Validation
 - Software Tools



<https://ghrc.nsstc.nasa.gov/home/ghrc-preservation-documents>

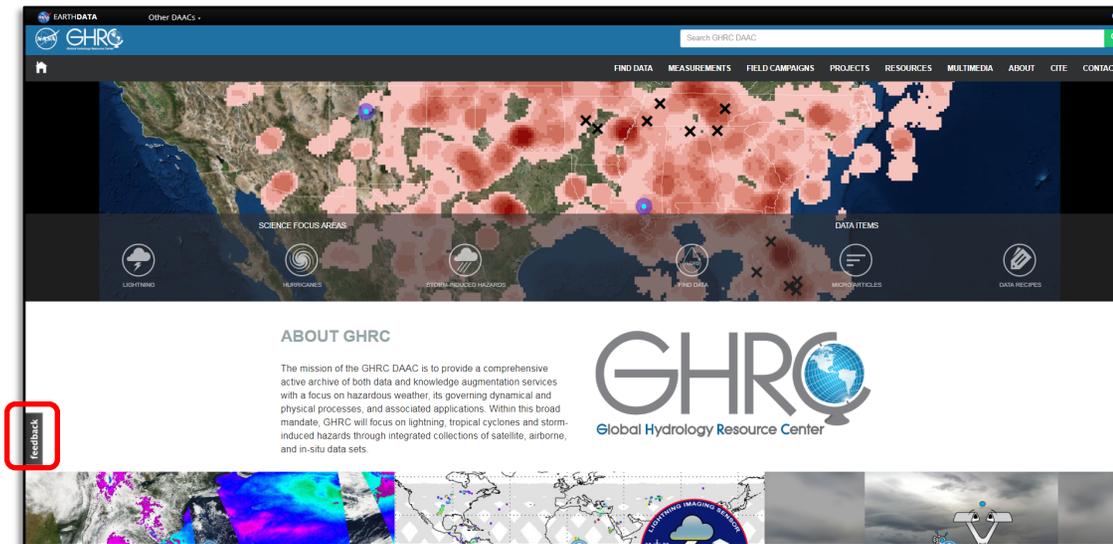
Dizzy the Disdrometer ESRI Story Map

- A story of how Dizzy the Disdrometer participated in the Global Precipitation Measurement (GPM) Ground Validation field campaigns
- <https://arcg.is/100b5e>

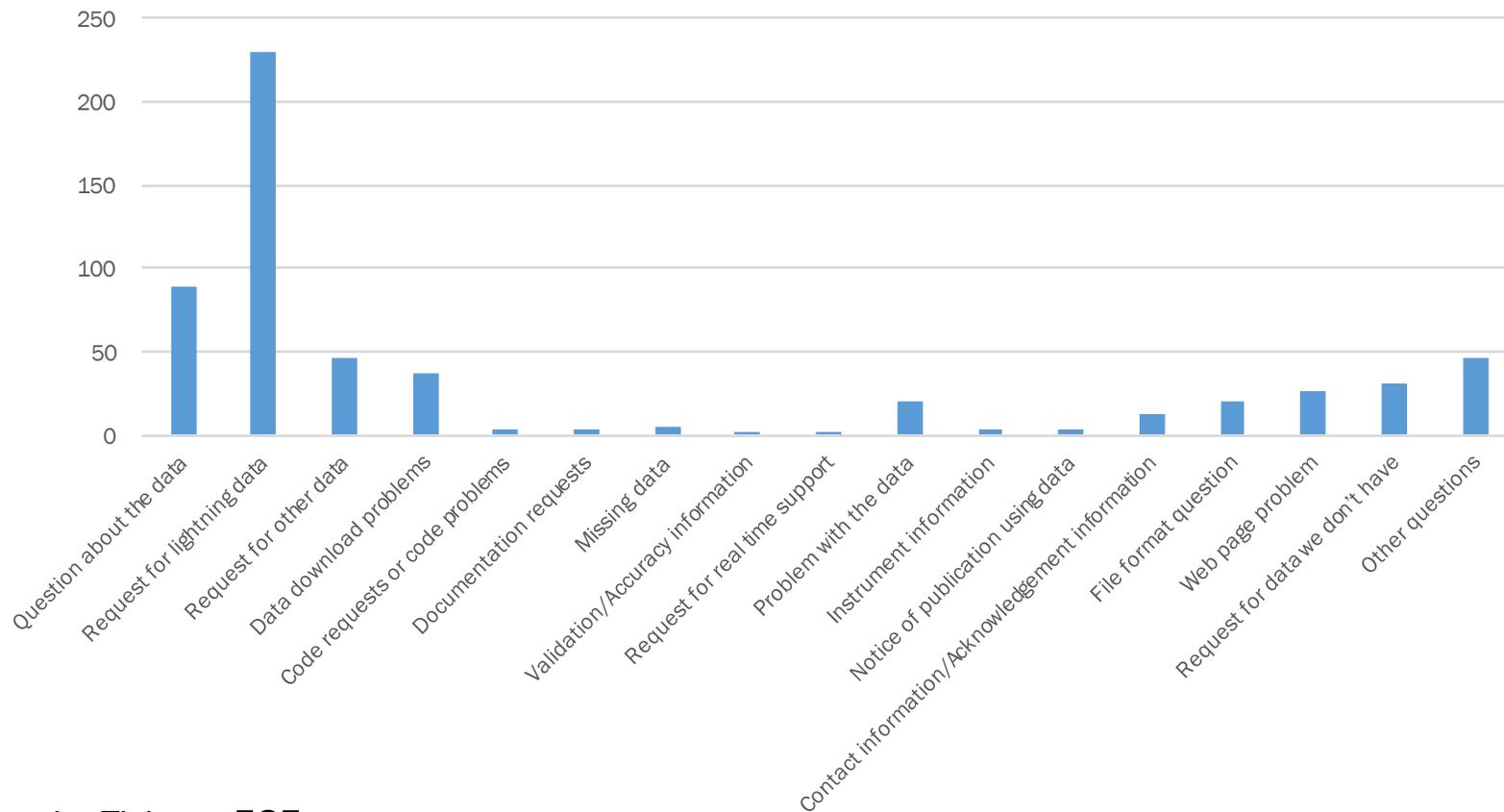


User Feedback

- Find out about issues a user is experiencing through the 'Feedback' button on the GHRC webpage or thru the GHRC User Services email (support-ghrc@earthdata.nasa.gov)
 - Sent to us through Kayako
- Kayako is a customer service ticket portal that helps user services organize issues tickets and properly communicate with users



Kayako Metrics



Total Kayako Tickets: **585**

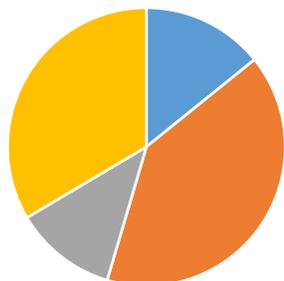
■ Kayako tickets since August 2013

Questions Lead to an Action

Summary of Question Types	Recommended Actions
Question about the data	Make a FAQ
Request for lightning data	Guide user to data or contact lightning team
Request for other data	Guide user to data
Data download problems	Make a FAQ, add to HyDRO 2.0 Help Page
Code requests or code problems	Fix code issue
Documentation requests	Provide documentation, improve user guide, improve web content
Missing data	Alert DMG
Validation/Accuracy information	Provide information, alert DMG if error
Request for real time support	Notify leadership
Problem with the data	Alert DMG, contact PI, fix problem
Instrument information	Provide information, improve user guide, improve web content
Notice of publication using data	Add to publication list
Contact information/Acknowledgement information	Provide information, update content
File format question	Make a FAQ, create a Data Recipe
Web page problem	Contact web team
Request for data we don't have	Point to alternative
Other questions	Create FAQ if needed

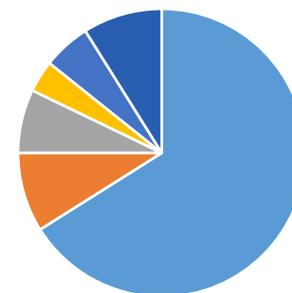
User Characterization

User Organization



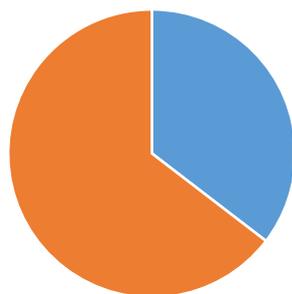
■ Government ■ Academia ■ Commercial ■ Unknown

Within Government Organization



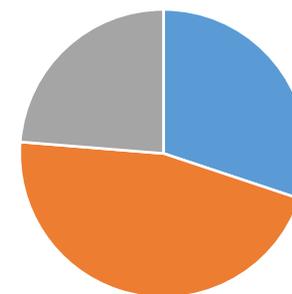
■ NASA ■ Military ■ NOAA ■ UCAR ■ State ■ Other

Within Academia



■ Staff ■ Student

International or Domestic Users

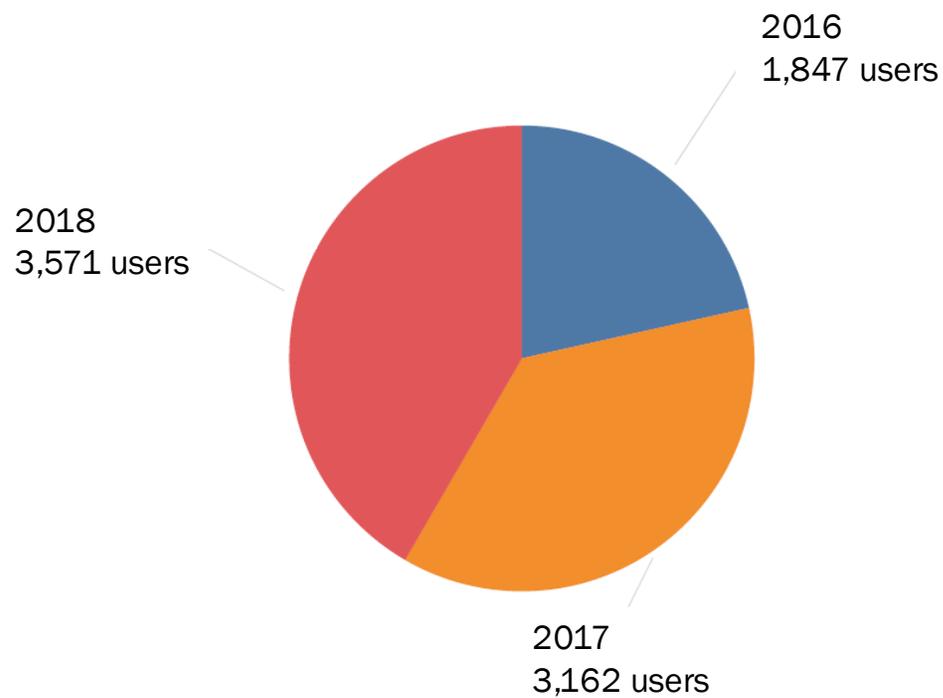


■ International ■ Domestic ■ Unknown

Since August 2013

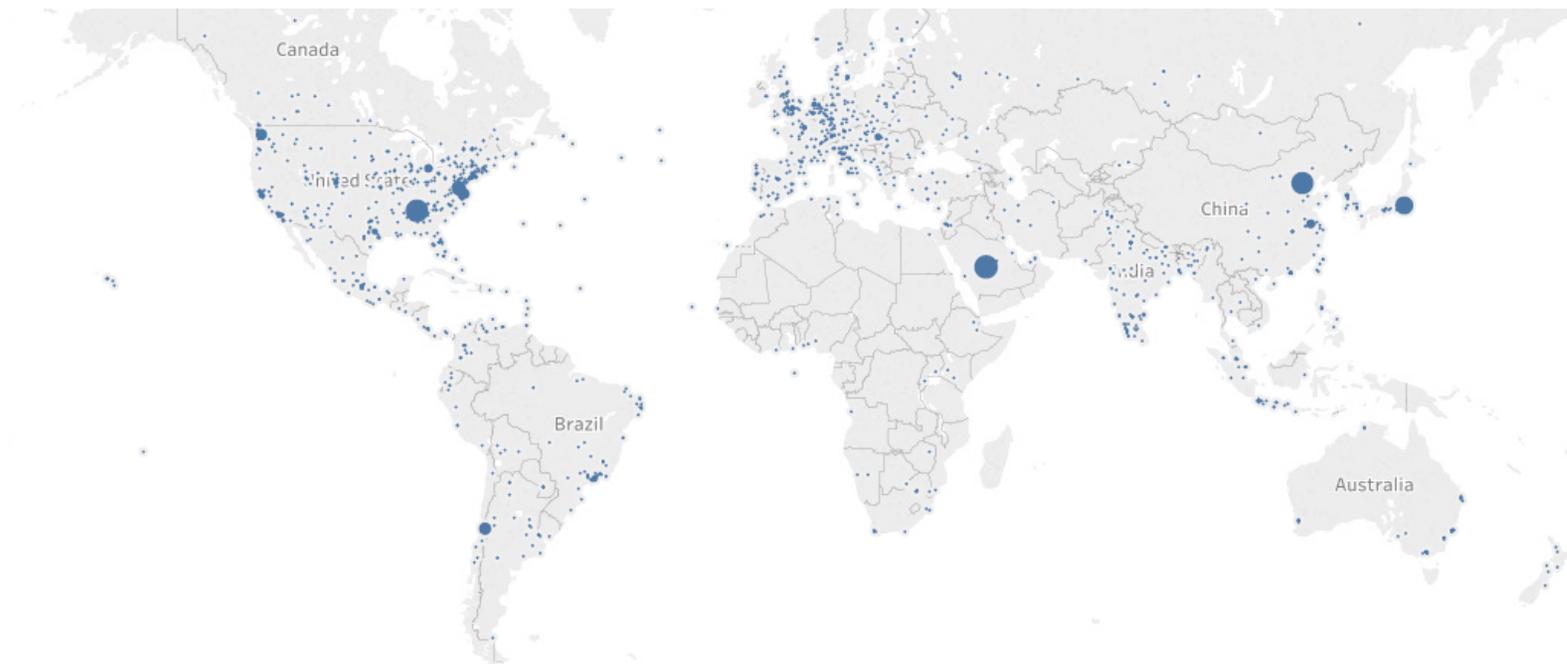
Earthdata User Log Metrics

Distinct User/Year



Since August 2013

Earthdata User Log Metrics



Possible Future User Journey Study

- Possible future web usability study thru ESDIS to learn user journey rather than user characterization
- GHRC is interested in this as it will help us better understand what our user needs



FY2019 Planned Activities

- Planned Conferences/Meetings
 - AGU
 - AMS
 - GLM Science Meeting
 - UN TIM Meeting
- Create more Data Recipes and Micro Articles
- Continue collaboration with DEVELOP
- Improve web content and consistency
- Improve preservation pages
- Create more mastheads
- Event-based data search and distribution
- NASA Webinar
 - Suggestions on topics to cover?



AGU Talks and Sessions



- **Tuesday, December 12th**
 - Flash Talk
 - Application of ISS Lightning Data to Improve Hazardous Weather Preparation
- **Thursday, December 13th**
 - Posters
 - Using GHRC's Data Publication Workflow Portal to Improve Data Management, Metadata Quality, and Documentation (8:00-12:20)
 - Patterns in Snowfall: Finding the Unexpected in Nature (13:40-18:00)
 - Near Real-Time Distribution of ISS LIS Lightning Data (13:40-18:00)
 - Dizzy the Disdrometer: Illustrating Field Campaign Data Using an ESRI Story Map (13:40-18:00)
- **Friday, December 14th**
 - Oral Session
 - Developing Innovative Tools and Services to Enable Data Discovery and Use of Big Data Variety Across Broad Users (8:00-10:00)
 - Poster Session
 - Developing Innovative Tools and Services to Enable Data Discovery and Use of Big Data Variety Across Broad Users (13:40-18:00)



FALL MEETING
Washington, D.C. | 10-14 Dec 2018



THANK YOU!

Discussion

2018 GHRC User Working Group Meeting
November 13-14, 2018

