

# GHRC

**Global Hydrology Resource Center**

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## Mission Statement

To serve as NASA's Earth science data stewards for scientific, educational, commercial and governmental communities, with a focus on data for the global hydrologic cycle

**Hydrologic Cycle • Severe Weather Interactions  
Lightning • Atmospheric Convection**

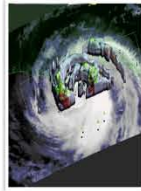
To provide **knowledge augmentation services** encompassing tools, infrastructure, user support, and expertise to our stakeholders



## WHAT WE SERVE

### Lightning Data

- Responsible for the ingest, archive, product generation, reprocessing and distribution of data from the TRMM Lightning Imaging Sensor, plus ancillary lightning data sets utilized by the LS science team, since January 1998. A second LS instrument will fly on the SpaceX rocket to the International Space Station in February 2016.
- Ancillary data -
  - National Lightning Detection Network, electric field mill data from the Kennedy Space Center, global infrared data and ground based radar data.
- Precursor satellite instruments -
  - Optical Transient Detector in operation on Microbl-1 from 1995 to 2000.
  - Operational Linescan Sensor on Defense Meteorological satellites from 1973 to 1995.

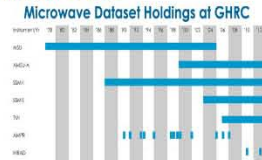


Internal structure of Hurricane Isaac depicting precipitation intensity and lightning from LIS  
Photo courtesy of Owen Kelley

GHRC is recognized as the National Lightning Archive.

### Microwave Data

**Microwave Dataset Holdings at GHRC**



- GHRC and its predecessor programs have been ingesting, processing, archiving and distributing microwave data for over 35 years.
- MSU, AMSU, SSM/I, SSMIS, TMI (satellite); AMPR, HIRAD (airborne)
- This climate sensitive data record extends back to 1978 providing an unbroken inventory of climate information that continues today.

GHRC is also recognized as one of the primary data centers for microwave data.

### Field Campaigns

#### Hurricane Science

Data from successive field campaigns since 1990 are tied together through common procedures, consistent metadata, and discovery and archival systems making it easy to access data from instruments that have been employed across several missions.

#### Global Precipitation Measurement Mission (GPM) Ground Validation (GV)

Ground and airborne precipitation datasets supporting physical validation of satellite-based precipitation retrieval algorithms.

#### Hurricane and Severe Storm Sentinel (HS3)

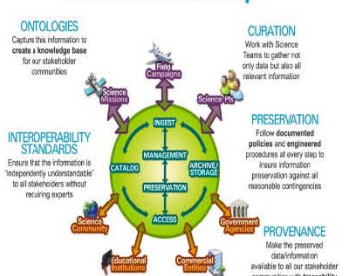
Five-year mission specifically targeted to investigate the processes that underlie hurricane intensity change in the Atlantic Ocean basin, utilizing two unmanned Global Hawks.

GHRC is recognized as one of the main data centers for Hurricane Science data.

GHRC is set up to manage a large number of episodic, heterogeneous datasets and can handle the "long tail" of science data.

## WHAT WE DO

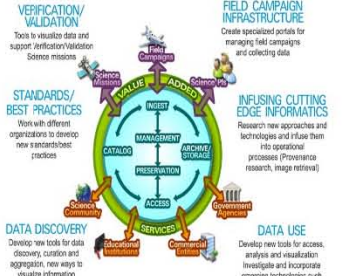
### Data Stewardship



- ONTOLOGIES**  
Capture this information to create a knowledge base for our stakeholder communities
- CURATION**  
Work with Science Teams to gather not only data but also all relevant information
- INTEROPERABILITY STANDARDS**  
Ensure that the information is "interoperably understood" to all stakeholders without recurring experts
- PRESERVATION**  
Follow documented policies and implement procedures at every step to ensure information preservation against all reasonable contingencies
- PROVENANCE**  
Make the preserved data/information available to all our stakeholder communities with traceability to support authenticity

Serve as NASA's Earth science data stewards for scientific, educational, commercial and governmental communities, with a focus on data for the global hydrologic cycle.

### Knowledge Augmentation Services



- VERIFICATION/VALIDATION**  
Tools to visualize data and support verification/validation science missions
- FIELD CAMPAIGN INFRASTRUCTURE**  
Create specialized portals for managing field campaigns and collecting data
- STANDARDS/BEST PRACTICES**  
Work with different organizations to develop new standards/best practices
- INFUSING CUTTING EDGE INFORMATICS**  
Research new approaches and technologies and infuse them into operational processes (Provenance research, image retrieval)
- DATA DISCOVERY**  
Develop new tools for data discovery, curation and aggregation, new ways to visualize information
- DATA USE**  
Develop new tools for access, analysis and visualization. Investigate and incorporate emerging technologies such as Big Data

Provide knowledge augmentation services encompassing tools, infrastructure, user support, and expertise to our stakeholders.


## COMING SOON

### New Website

New tools and technologies at GHRC

The new GHRC web site, currently being built, provides the user many options to get data right away

- Search box at top of page
- Navigation on home page clarifies user choices and emphasizes GHRC is concerned primarily with data
- Top navigation menu supplemented with additional "quick links" to popular destinations in the form of news-related slides and additional buttons



### RASI

The Regional Air-Sea Interactions (RASI) tool allows users to explore a climatology of mountain gap winds over the ocean that can cause Coastal upwelling when warm surface water is pushed away from the coast by wind the jet, and deep cold water and nutrients rise to the surface.

<http://ghrc.nsstc.nasa.gov/rasi>



### Data Impact beyond Science Teams

- New science areas
- Science applications
- Ancillary data used in many, many publications
- Data used to address specific regional needs all over the world



### HS3


The planned HS3 Information System for data from the Hurricane and Severe Storm Sentinel mission will provide a visual, map-based data interface to support:

- Data selection by aircraft flight track or storm track
- Data visualization with image overlays or insets
- Timeline plots showing storm characteristics and availability of aircraft observations



### Data Publication and Citation

- Data Publication at GHRC**
  - Data are ingested, cataloged and archived using standards based engineering processes
  - Accessible via NASA data systems
  - Also indexed by Google and other search engines
- Data Citation and DOIs**
  - Publication credit for the data producer
  - Traceability for where and how data are used
  - Data DOI in a citation provides a link from the scientific article to dataset information and download page



[ghrc.nsstc.nasa.gov](http://ghrc.nsstc.nasa.gov)

### Data Albums

Data Albums automate the tedious and time-consuming process of gathering relevant data and information from a wide variety of distributed resources for case studies, climatology analyses, and end users.

- Aggregated information from reports and websites
- User can customize relevancy threshold
- Different data collections relevant for this event
- Color signifies relevancy. Size is based on # of granules
- Links to data granules

