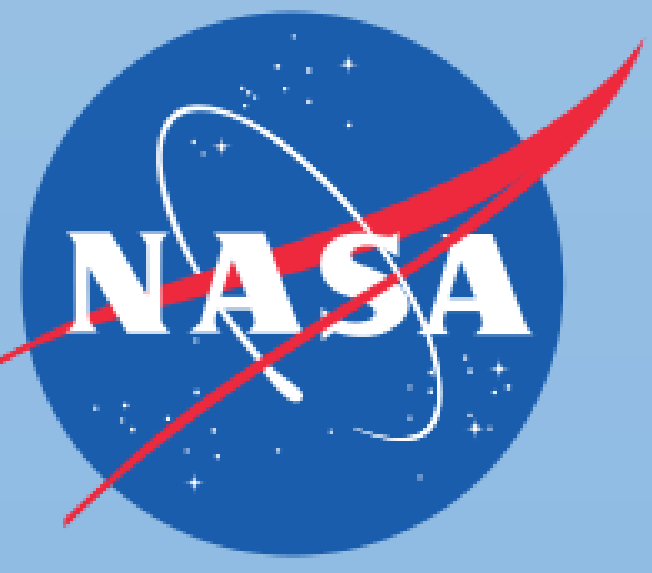


# GPM Precipitation Data for Ecological Applications



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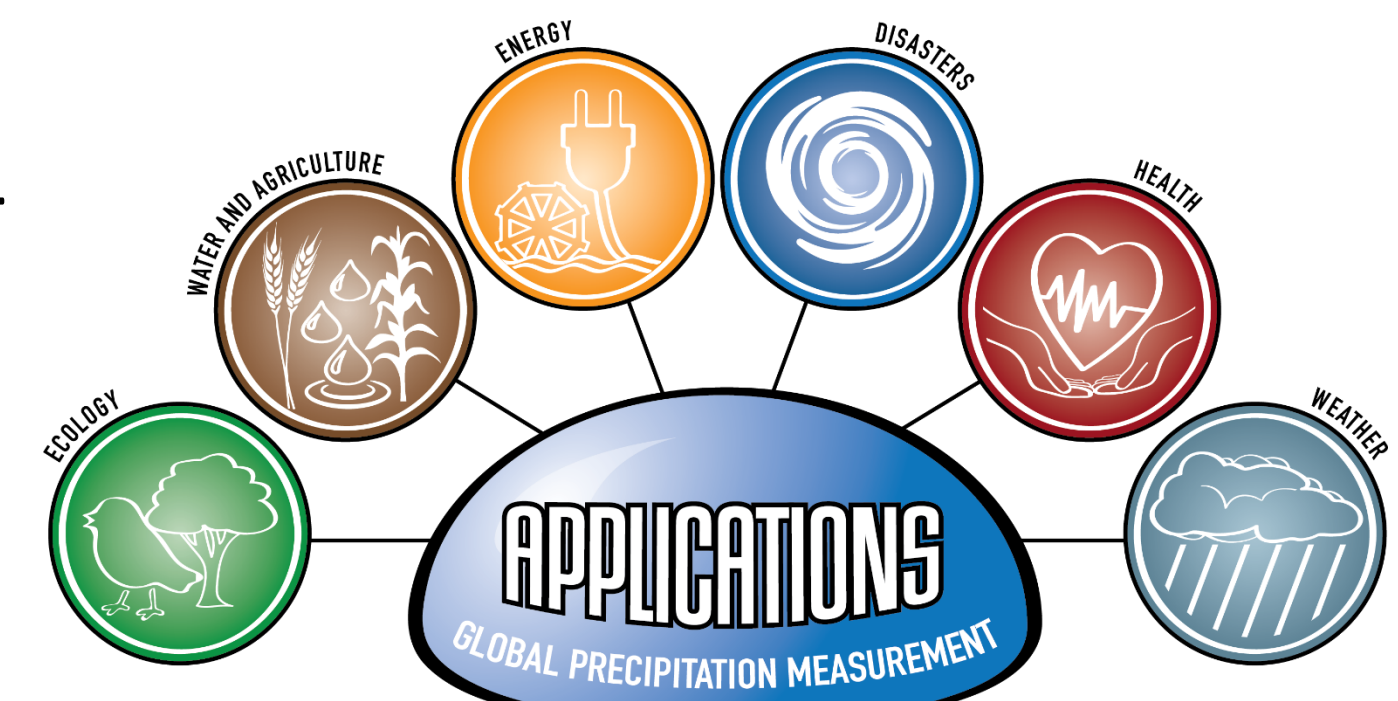


## GLOBAL PRECIPITATION MEASUREMENT MISSION

**Mission:** The GPM mission, initiated by NASA and JAXA, is an international network of satellites that provide the next-generation global observations of precipitation from space. Building upon the success of TRMM, the GPM concept centers on the deployment of a “Core” satellite carrying an advanced radar/radiometer system to measure precipitation ranging from light rain to heavy rain and snow over the latitude band 65°N–65°S. The GPM Core Observatory serves as a reference standard to unify precipitation measurements from a constellation of satellites and ground systems from partner agencies around the globe. These measurements provide high-quality merged data on rain and snow worldwide every 30 minutes and at 0.1°.

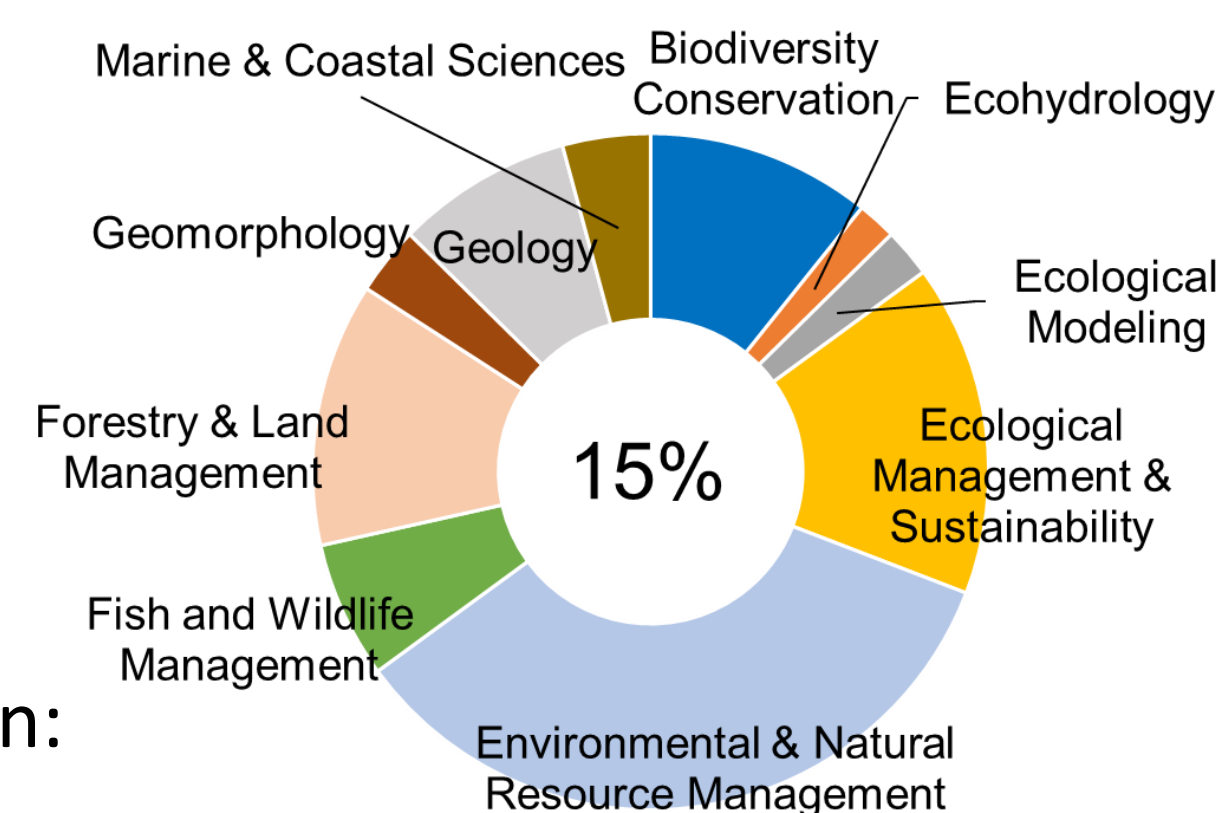
### Applications Objective:

- Understand and quantify how GPM data products are applied within different communities of end users for decision-making as well as promote and educate potential users about GPM data.
- Engage user communities with trainings and workshops, increase awareness of GPM data products, and improve data access and visualization of core GPM products for rapid ingestion and analysis.
- GPM Ecological Management applications focus area encourages the use of GPM satellite precipitation data to analyze and forecast changes that affect ecosystems and to develop effective resource management strategies.



GPM Applications focus areas

GPM Ecological Management Breakdown:



Example Users
MoveBank
Wildlife Conservation Society
Elephants Without Borders

## GPM DATA PRODUCTS

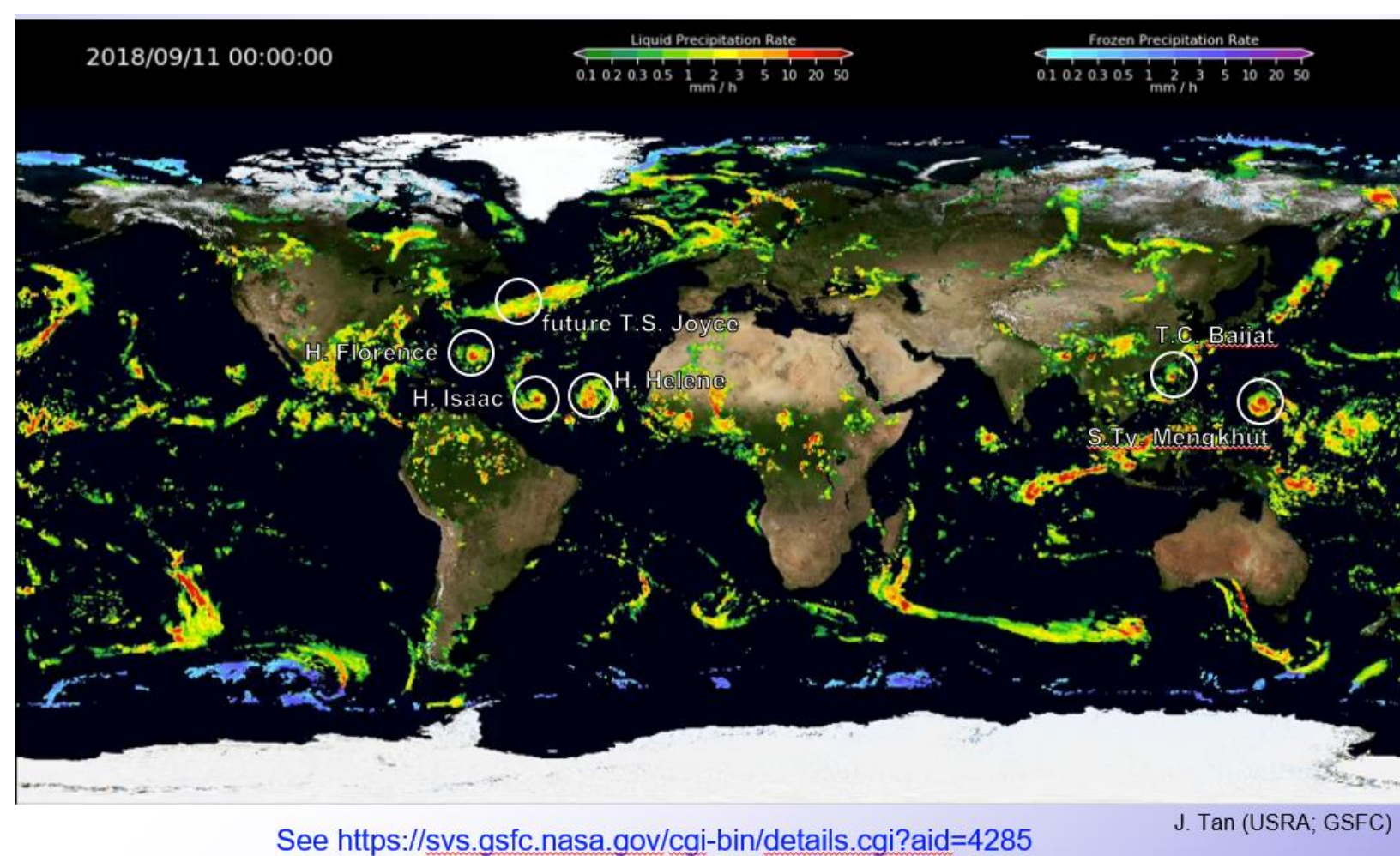
- GPM products are available in near-real-time (NRT) and/or production (prod.) versions.
- Table below shows GPM's most commonly used Level 1-3 products.

Level	Name	Description	Resolution		Coverage	Latency
			Space	Time		
GPM Level 1	1B-GMI	GMI T <sub>0</sub>	Varies by channel	16 orbits per day	Latitudes 70°N-70°S, past week (NRT)	1 h (NRT); 6 h (prod.)
GPM Level 2	2A-DPR	DPR Ka and Ku single-orbit rainfall estimates	5km x 5km (at nadir), 125-m vertical resolution	16 orbits per day	Latitudes 67°N-67°S, Mar 2014- present	20-120 min (NRT); 24 h (prod.)
	2B-CMB	Combined GMI + DPR single orbit rainfall estimates	5km x 5km (at nadir), 250-m vertical resolution	16 orbits per day	Orbital 67°N- 67°S	3 h (NRT); 40 h (prod.)
GPM Level 3	IMERG	Integrated Multi-satellite Retrievals for GPM, includes precipitation phase, Quality Index, and other intermediate data fields	0.1° x 0.1°	30 min	Gridded 60°N- 60°S	4-5 h (NRT/Early run) 14-15 h (NRT/Late run)
						3 months (prod./Final run)

### GPM IMERG Latest Product Update:

IMERG upgrades to V06

- Extension back to June 2000
- Due to be finished in July 2019
- Provides more higher-latitude coverage (in snow/ice-free areas)
- New source for morphing vectors
- Improved Quality Index

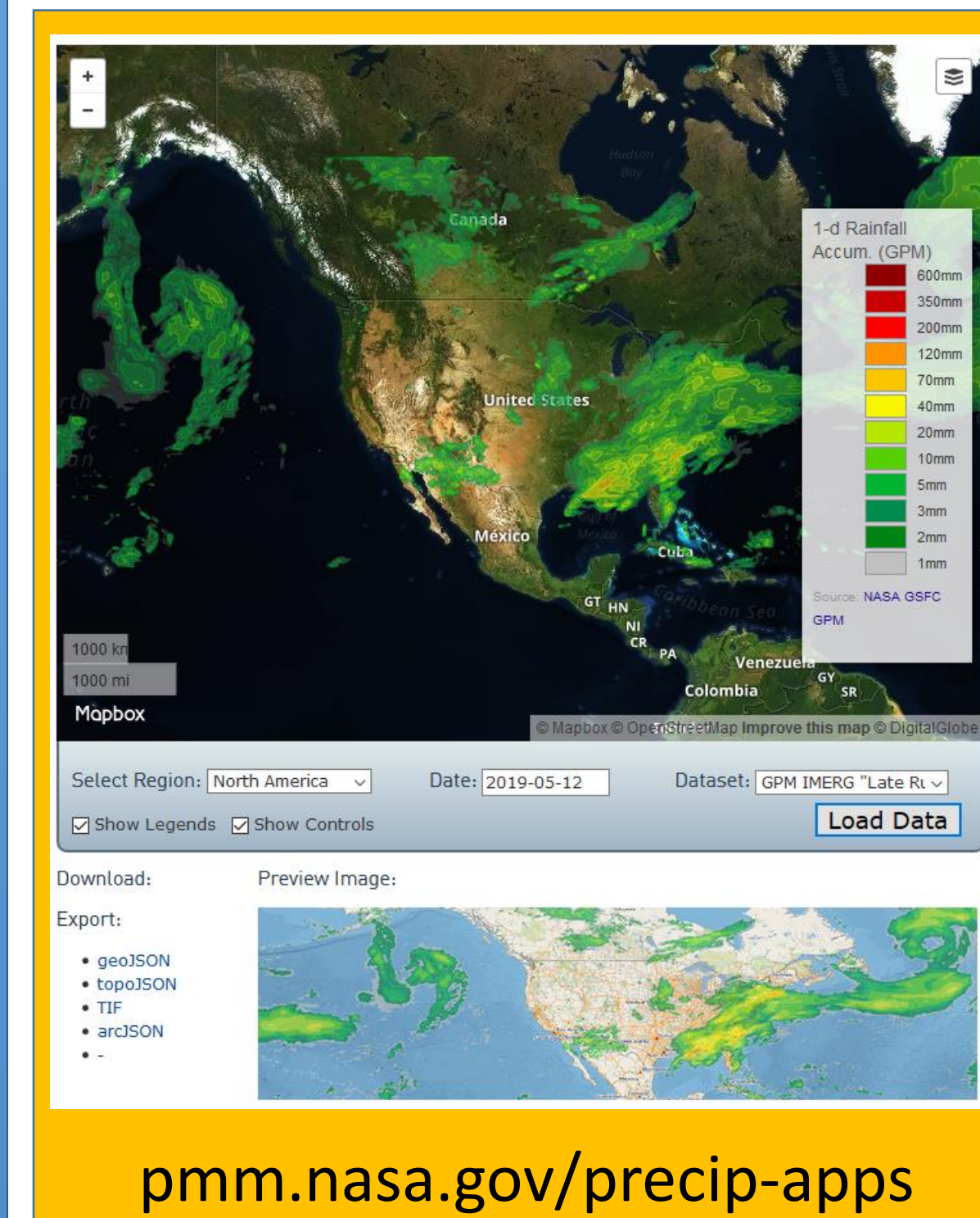


See <https://svs.gsfc.nasa.gov/cgi-bin/details.cgi?aid=4285>

J. Tan (USRA, GSFC)

## DATA VISUALIZATION TOOLS

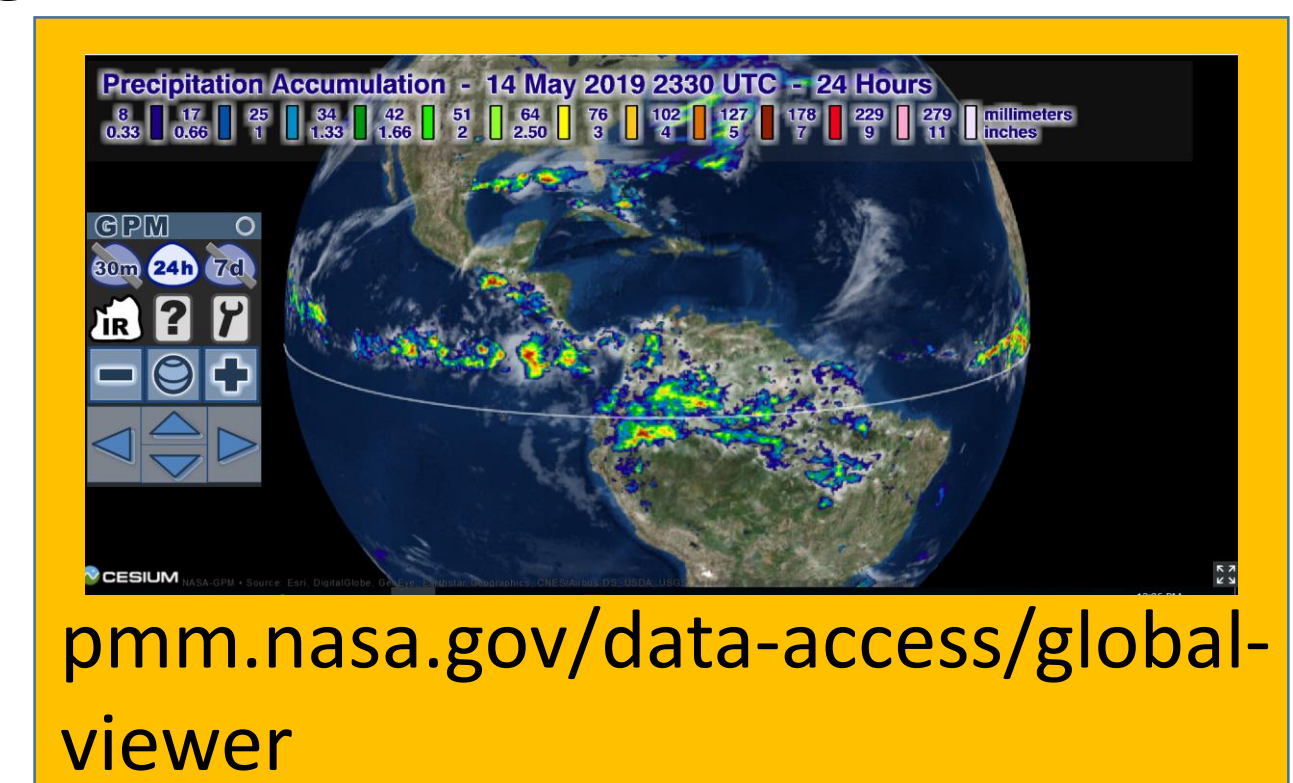
NASA (and GPM) provides multiple visualization tools to view precipitation data including **Giovanni**, **Worldview** and **GPMViz**. Below are a few examples to quickly upload and view GPM data:



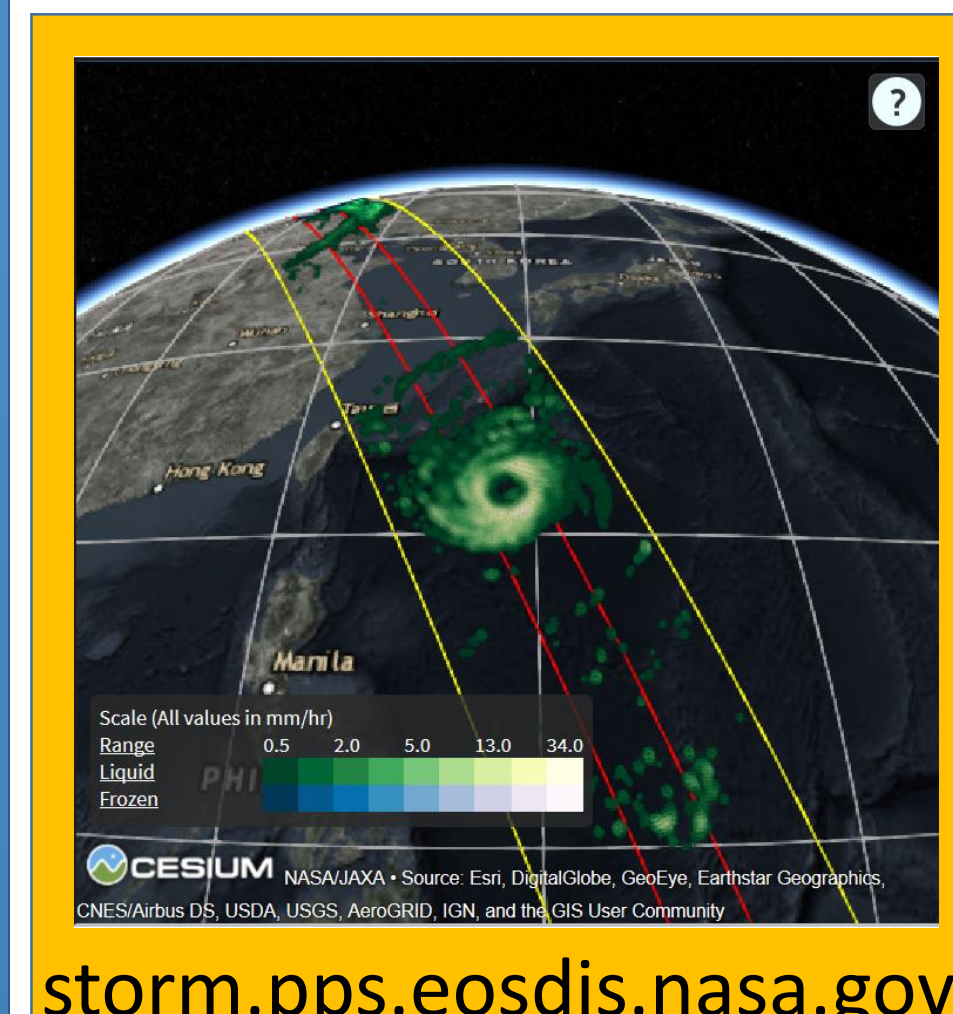
(Left) The **GPM Precipitation & Applications Viewer** allows for quick visualization and download of NRT IMERG datasets and flood and landslide products. A Javascript API allows for automated data retrieval.

**Global Viewer** allows users to view the latest NRT GPM IMERG

datasets on an interactive 3D globe in your web browser.

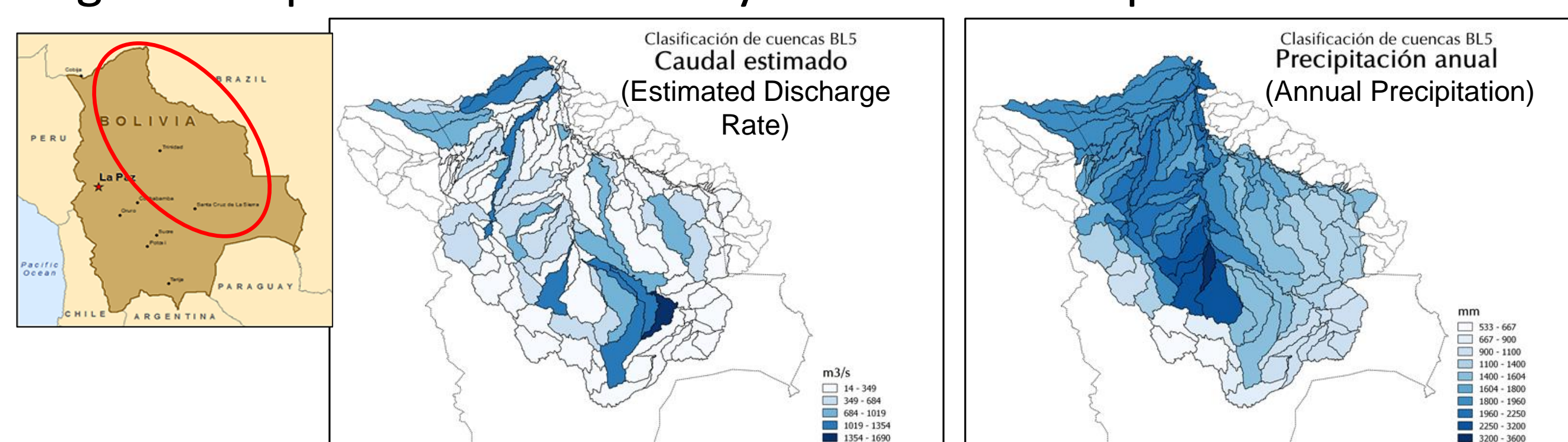


(Left) **STORM Virtual Globe**, developed by the **NASA Precipitation Processing System** augments the STORM data download service and allows for rapid in-browser visualization of GPM datasets on a 3D globe. Tutorial: [pmm.nasa.gov/data-access/tutorials](http://pmm.nasa.gov/data-access/tutorials).



## GPM CASE STUDIES IN ECOLOGY

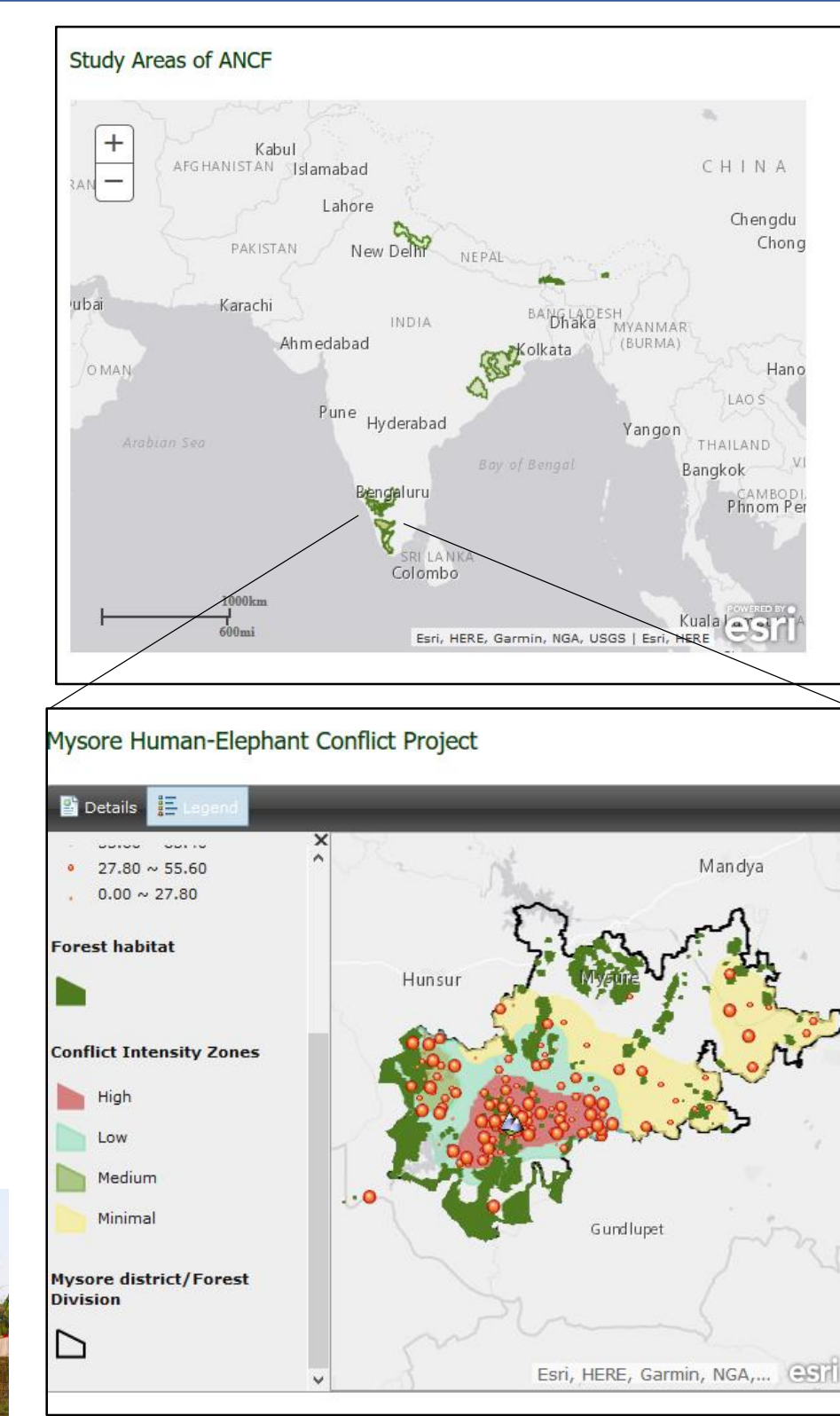
To address large-scale development in the Amazon, the Wildlife Conservation Society (WCS) are using over 17 years of TRMM and GPM data to collect rainfall totals and estimate potential discharge rates throughout the Bolivian Amazon. This information will enable WCS to identify endangered river basins, which will then provide decision makers a useful guide to limit negative impacts on biodiversity such as dam implementation.



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Changes in temperature and rainfall can impact the degree of forest fragmentation and loss of habitat, which has led to increasing conflicts between humans and Asian elephants. Asian Nature Conservation Foundation (ANCF) and Indian Institute of Science are using TRMM and GPM data to determine potential relationships between precipitation, change in forestry, and human-elephant conflict. Understanding these relationships could help local authorities to devise management action plans to mitigate this hazard in districts of southwest India.



Credit: ANCF



GET INVOLVED?  
HAVE IDEAS?

The GPM Applications team is always looking for case studies to expand our portfolio and provide examples of how GPM data are supporting decision making. Please contact us at [gpm.nasa.gov/contact](http://gpm.nasa.gov/contact).