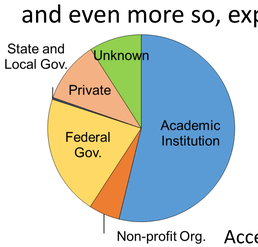
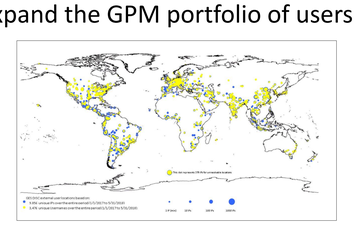
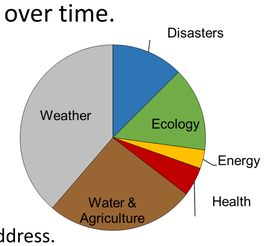
APPLICATIONS
GLOBAL PRECIPITATION MEASUREMENT

The GPM Applications Team is designed to 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 how GPM data can benefit their work and lives. On-going objectives include engaging user communities, increasing awareness of GPM data products, and improving data access and visualization of core GPM products for rapid ingestion and analysis. For the applied science community, focusing on both broad areas and targeted thematically-focused communities, trainings, workshops and case studies are utilized to improve awareness and use of data as well as gain feedback in how GPM data products are used for decision making. By focusing on these objectives, the Applications Team are able to learn and address the needs of end users and their application areas, and even more so, expand the GPM portfolio of users over time.





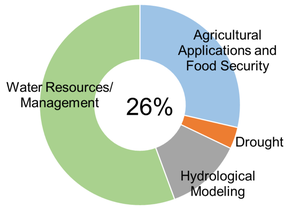
Accessing GPM data products by unique IP address.



Water Resources, Agricultural Forecasting & Food Security

Application: Analyze and forecast the amount, distribution, timing and onset of seasonal rain and snow to prepare for freshwater shortages and forecast crop yields.

Example Users	
USDA FAS	Agvesto
World Food Programme	USAID



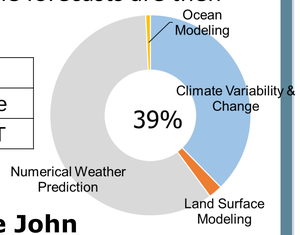
Case Study: USDA uses GPM

GPM IMERG data is used routinely within the USDA Foreign Agricultural Service's global crop production analysis to determine impacts on agricultural yields and vegetation health affecting food security.

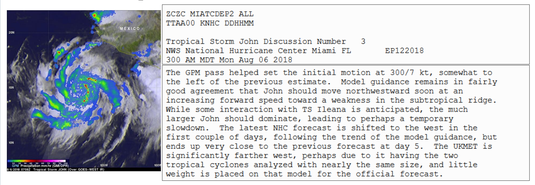
Weather, Climate, & Land Surface Modeling

Application: GPM data are integrated into NWP, climate, and land surface models to improve the observations from which the forecasts are then generated.

Example Users	
NOAA NCEP	UK Met Office
ECMWF	NASA SPoRT



Case Study: Hurricane John

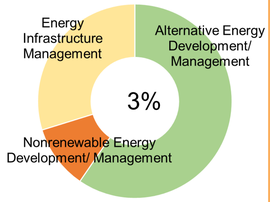


The GPM CO captured the location, intensity, and storm structure of John in the E. Pacific. This data was then used by NHC to help forecast the storms movement.

Energy Infrastructure & Management

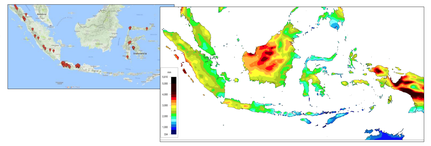
Application: Using GPM data for analyses of climatology data in the prediction of energy demand, development, harvesting, and production of non/renewable energy resources, and load forecasting.

Example Users	
Clean Power Research	Deltares
Manitoba Hydro	Itaipu Binacional



Case Study: Hydropower in Indonesia

Current hydropower projects (left). Average annual rainfall in Indonesia, 2014 – 2017, shown with IMERG (right).

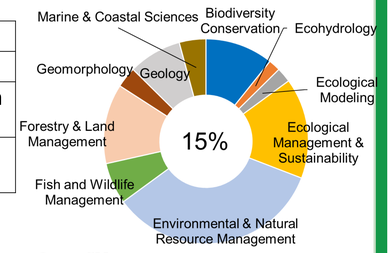


INDONESIA HYDRO™ CONSULT is using TRMM and GPM precipitation data to better understand the potential for hydropower projects throughout Indonesia.

Ecological Management

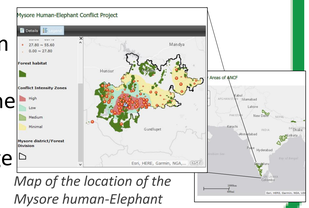
Application: Analyze and forecast changes in precipitation patterns that affect ecosystems and to develop effective resource management strategies.

Example Users
MoveBank
Wildlife Conservation Society
Elephants Without Borders



Case Study: Human-Elephant Conflict

Asian Nature Conservation Foundation (ANCF) and Indian Institute of Science are using TRMM and GPM to determine potential relationships between precipitation, change in forestry, and human-elephant conflict.

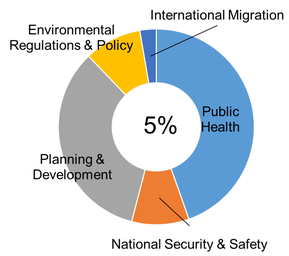


Map of the location of the Mysore human-Elephant Project (ANCF).

Development & Public Health

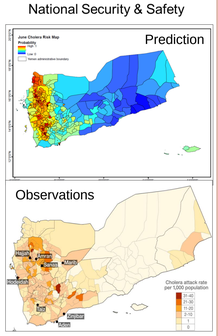
Application: Tracking precipitation anomalies for vector or waterborne diseases and understanding impacts of precipitation extremes that may threaten a country's development.

Example Users	
Academic Researchers	CDC State Department
Institute for Disease Modeling (IDM)	Public Health Agency of Canada
Red Cross	BlueDot



Case Study: Predicting Cholera in Yemen

Scientists are monitoring regional hydroclimatic processes and changes in the aquatic ecosystem with NASA satellite data, including TRMM and GPM, to develop forecasts for the risk of a cholera outbreaks.



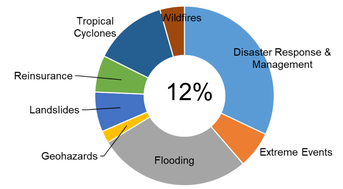
Disease Initiative & Workshop

Workshop initiated by NASA and Wilson Center (May 2018) to showcase how NASA data was being used to inform, predict, and better understand water-related and vector-borne disease. Over 97 attendees were present and included researchers, public health officials, and educators form government agencies, NGOs, and academic institutions.

Disasters & Risk Management

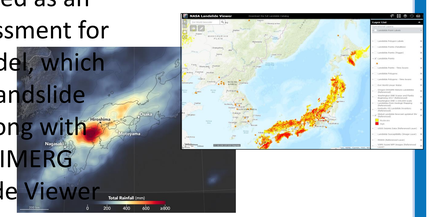
Application: GPM serves as an essential tool to improve forecasting, preparation, response, recovery, mitigation and insurance of natural hazards including tropical cyclones, floods, droughts, wildfires, landslides, and other extreme weather events.

Example Users	
NOAA NHC	Munich Re
JTWC	FEMA
Red Cross	World Bank



Case Studies: Using GPM in Near-Real-Time (NRT)

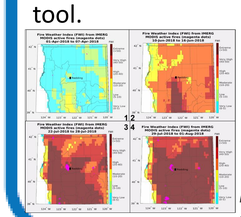
GPM precipitation estimates are used as an input to the Landslide Hazard Assessment for Situational Awareness (LHASA) model, which provides situational awareness of landslide hazards in NRT. LHASA nowcasts along with Global Landslide Catalog data, and IMERG data can be viewed NASA's Landslide Viewer tool.



Total rainfall using IMERG from July 2 to July 9, 2018 in Japan from Typhoon Prapiroon.

NASA Landslide Viewer showing "nowcast" of landslides in Japan as a result of heavy rainfall from Prapiroon. Areas that are highly susceptible to landslides from Prapiroon are seen throughout southern Japan.

Susceptibility is derived from a model that considers susceptibility and GPM rainfall.



NASA's Global Fire WEather Database (GFWED) integrates different weather factors, including TRMM and GPM data, to help track likelihood of a vegetation fire starting and spreading.

Daily evolution of weekly FWI and MODIS active fires over northern California from April 1 to August 1, 2018. Credit: robert.field@columbia.edu