

Earth to Sky Partnership

*connecting the wonders of science
with the power of place*



Welcome to the Global Precipitation Mission/ETS Mini-Grants Webinar!

with



Dorian Janney (NASA)



Leah Eskelin (USFWS)

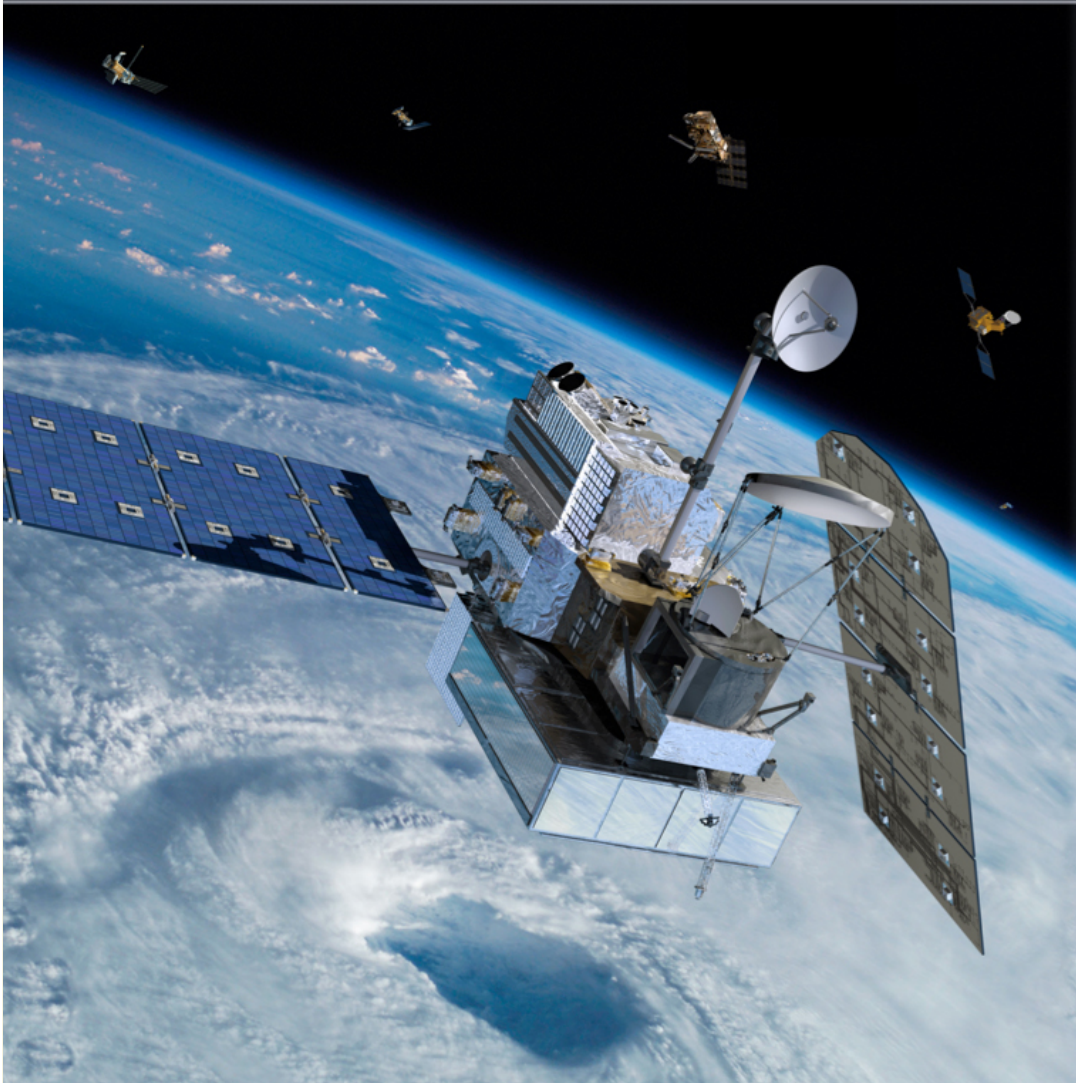


Susan Sachs (NPS)

Tim Taglauer (NPS)



Global Precipitation Measurement (GPM) Mission



Dorian Janney
GPM Education Specialist
Dorian.W.Janney@nasa.gov

ETS-GPM webinar
May 20, 2014

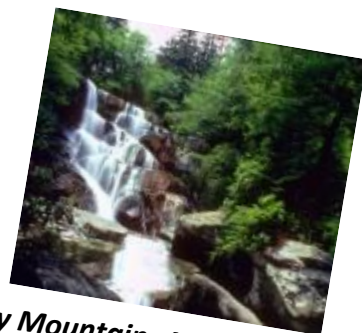
GPM and “Earth to Sky” Team Up with National Park and U.S. Fish and Wildlife Interpreters!



NPS and FWS interpreters will collaborate with GPM E/PO staff to develop various programs and materials to engage the public in learning about GPM and its impact on increasing our understanding of Earth’s water cycle, weather and climate, and various societal applications.



Everglades National Park will develop an interpretive display that will include NASA and GPM data and information.



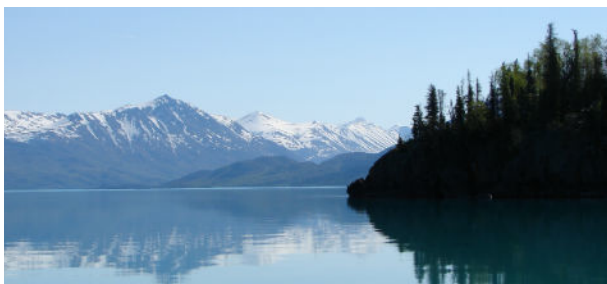
*In the **Great Smoky Mountains NP**, the public will take part in conducting phenology research.*



At **Devil’s Postpile National Monument**, a new program will engage underserved youth in field studies to connect snow depth with freshwater resources.



***Shenandoah National Park** will develop an educational program to help secondary students see the relationship between precipitation and salamander habitats in an effort to determine if climate change is altering the types of species in the park.*



At the **Kenai National Wildlife Refuge**, visitors will interact with a weather station And collect precipitation data in an effort To increase their understanding about the Impact of climate change in their region.

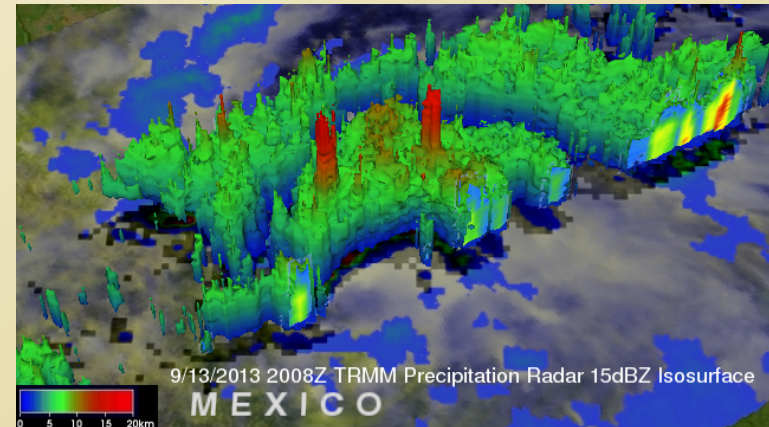
Dorian Janney
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Tropical Rainfall Measuring Mission

TRMM: Tropical Rainfall Measuring Mission

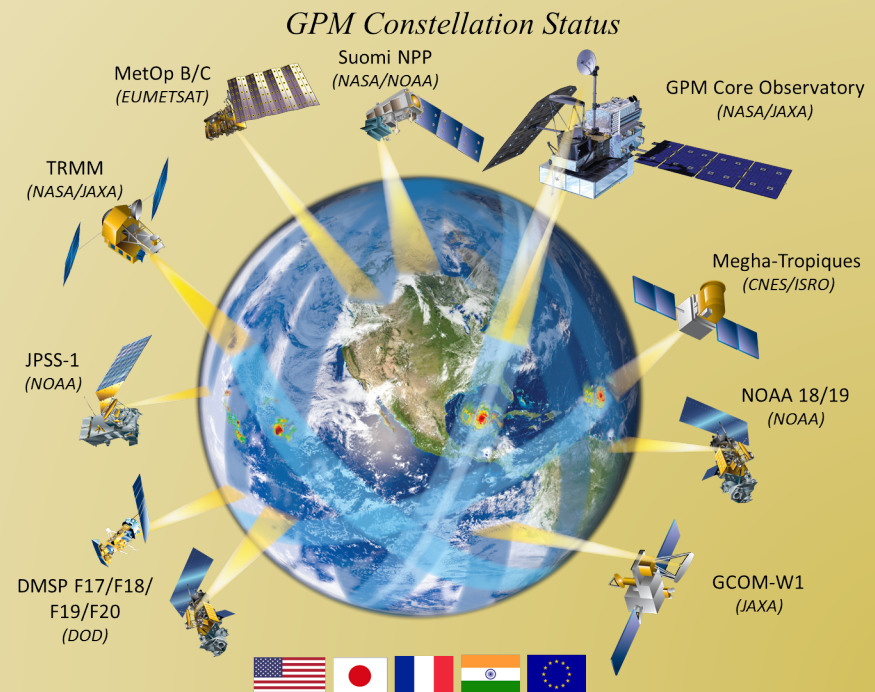
- Launched in 1997 to measure tropical rainfall
- Currently has an nearly 16-year record of precipitation
- Partnership between NASA and the Japan Aerospace Exploration Agency (JAXA)

Tropical Storm Ingrid on Friday, Sept. 13th
TRMM Precipitation Radar recorded “hot towers” (red)
that often signal a tropical cyclone will intensify



GPM: Global Precipitation Measurement

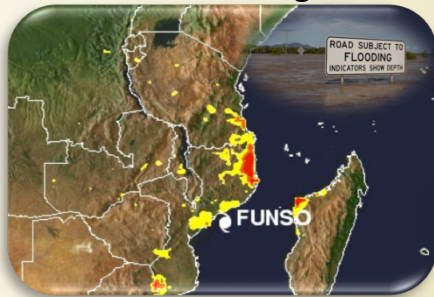
- GPM builds upon TRMM's concept and will look at precipitation with greater accuracy around the world
- GPM will use inputs from an international constellation of satellites to provide improved space and time coverage of precipitation



GPM Societal Applications

- GPM is an international mission that will provide improved satellite observations of rain and snow worldwide every three hours
- The precipitation data from the upcoming GPM mission will extend our capabilities (from TRMM's) to study a wide range of applications for scientific research and societal benefit.

Flooding



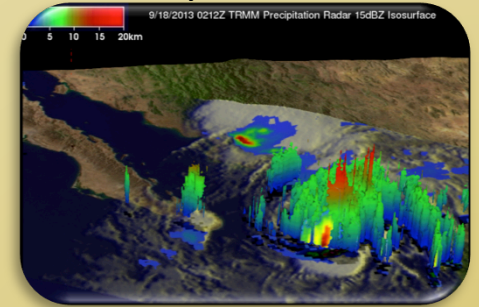
Landslides



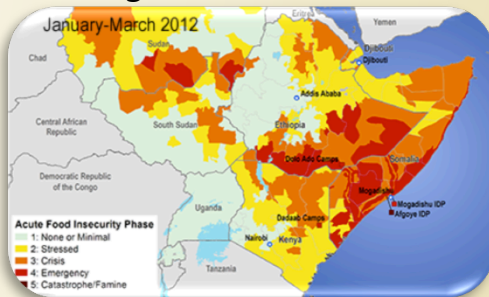
Extreme Events



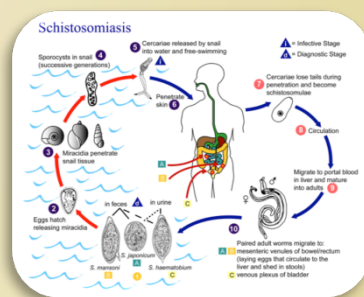
Cyclones



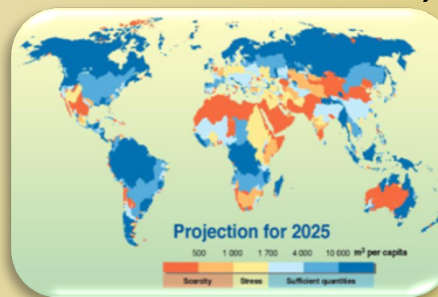
Agriculture/Famine



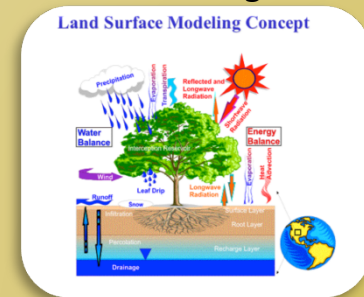
World Health



Freshwater Availability



Modeling



Societal Benefit Areas

Extreme Events and Disasters



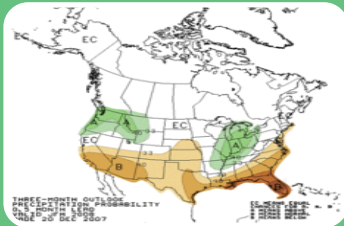
- Landslides (NASA Hazard Mapping)
- Floods (Global Flood Monitoring System-UMD, International Flood Network-IFNet)
- Tropical cyclones (Joint Typhoon Warning Center, National Hurricane Center-NOAA, U.S. Military, Air Force Weather Agency-AFWA)
- Multi-hazard situational awareness (Pacific Disaster Center, International Red Cross, World Bank)
- Re-insurance (Swiss Re)

Water Resources and Agriculture



- Famine Early Warning System (USGS-USDA-FEMA)
- Drought Monitoring (US Drought Monitor-U of Nebraska-Lincoln-NOAA-USDA, NOAA CPC, NCEP)
- Water resource management (USGS, USDA, NOAA)
- Agricultural monitoring (Agricultural Meteorological Modeling System, USDA, AFWA)

NWP, Climate & Land Surface Modeling



- Numerical Weather Prediction (ECMWF, National Weather Service, The Weather Company)
- Land Data Assimilation System Modeling (NASA Land Information System, AFWA, USDA, International Center for Biosaline Agriculture-ICBA, Universities)
- Global Climate Modeling and Assimilation (NASA-GMAO, NOAA)

Public Health and Ecology



- Disease tracking (National Center for Atmospheric Research-NCAR, Universities)
- Animal migration (Universities, MoveBank.Org)
- Food Security (USDA, FAO, World Bank, International Red Cross)

Information on the TRMM and GPM Missions:

<http://gpm.nasa.gov>

www.nasa.gov/gpm

Twitter: NASA_Rain Facebook: NASA.Rain





Changing Landscapes of the Kenai NW Refuge

A GPM-Earth to Sky Collaborative Effort



Kenai NWR, in southcentral Alaska is 2 million acres of diverse habitats supporting over 1000 species of flora and fauna.



Supported by the GPM mission:
<http://pmm.nasa.gov/GPM>

- **Status (3/24/14):** *In progress with expected date of completion: Winter 2014*
- **Product:** interpretive program
- **Audience:** Families, general public visiting Refuge
- **Thematic Statement:** Climate changes are visible on the Kenai Peninsula in southcentral Alaska. Citizen science observations of weather, seasonal change will contribute to hands-on exploration of weather and climate by visitors to the Kenai National Wildlife Refuge.
- **Measurable Objectives:** 100 visitors will participate in weather monitoring interpretive programs in 2015.
- **Technique:** citizen science investigation
- **Brief Description:** Newly installed weather station at the Refuge Visitor Center supports citizen science investigations into weather and climate. Guided walks will incorporate these observations to further explain climatic change and impacts to the ecosystem.
- **Timeline to Complete:** Delays in new Visitor Center construction have pushed the completion date to this winter, but the weather station is installed and data collection software/process is being piloted this summer.
- **NASA Resources Used:** www.gpm.nasa.gov, climate.nasa.gov

For more Information: Leah Eskelin, 907-260-2811, leah_eskelin@fws.gov



Changing Landscapes of the Kenai NW Refuge

A GPM-Earth to Sky Collaborative Effort



- **Measurable Objective(s):** in progress
- **Evidence of Achieving Objectives:** data expected by summer 2015 after Visitor Center is opened to the public
- **Evidence of Impact on Audience:** though not complete, the addition of weather data collection in a pilot this winter was received positively. Use of technology engaged upper-Elementary and Middle School aged participants and they were actively interested in the process.
- **Unintended impacts:** The weather station has been incorporated into the permanent exhibit at the new Visitor Center, with climate change added as a major interpretive topic in the space .
- **Anecdotes (stories) about impact on individuals:** none yet
- **Spinoffs, partnerships, other impacts:** none yet

For more Information: Leah Eskelin, 907-260-2811, leah_eskelin@fws.gov



Expansion of “Adopt-a-Phenology Plot” project in Great Smoky Mountains National Park

A GPM-Earth to Sky Collaborative Effort



Two students collect tree circumference data while monitoring trees during a field trip.



Two volunteers learn how to monitor tree phenology

- **Status (3/24/14):** *complete* but the project is on-going since it is long-term monitoring
- **Product:** support materials for an on-going citizen science project involving students and community volunteers
- **Audience:** middle & high school students, adults
- **Thematic Statement:** Monitoring phenology is a way to notice subtle changes in our ecosystem due to climate change.
- **Measurable Objectives:** 2,000 students, teachers and volunteers will participate in phenology monitoring in the Smokies in 2013.
- **Technique:** citizen science monitoring of tree phenology, weather measurements in plots & fog monitors
- **Brief Description:** GRSM will expand its phenology monitoring sites in the park used in curriculum based education and “Adopt-a-Phenology Plot” programs. This will include support materials for the new plots and weather monitoring equipment.
- **Timeline to Complete:** Project was completed during the summer of 2013 – materials purchased, 6 new sites set up and equipment distributed to volunteers.
- **NASA Resources Used:** Climate change website, scientist expertise, Earth to Sky website, Landsat images

Supported by the GPM mission:
<http://pmm.nasa.gov/GPM>

For more Information: [Susan Sachs, susan_sachs@nps.gov](mailto:susan_sachs@nps.gov)



Expansion of “Adopt-a-Phenology Plot” project in Great Smoky Mountains National Park.

A GPM-Earth to Sky Collaborative Effort



Two girls measure a salamander during a phenology field trip.



Students collect terrestrial invertebrates as part of a phenology monitoring field trip.

- **Measurable Objective(s)** We had 3,000 students participate in phenology monitoring programs in 2013 and have 86 volunteers who have adopted phenology plots to monitor.
- **Evidence of Achieving Objectives:** Statistics for our school programs and volunteer training workshops.
- **Evidence of Impact on Audience:** We evaluate each education program for its impacts on students via a teacher questionnaire. We consistently receive high ratings for our phenology programs which include trees, salamanders and terrestrial invertebrates.
- **Unintended impacts:** The phenology monitoring project for students and community volunteers has been very popular with other educators who are struggling to connect people directly with climate change in areas where impacts are subtle. We have been interviewed by several national news outlets and have been part of two NPS videos on how to connect the public with the issue of climate change.
- **Anecdotes (stories) about impact on individuals:** We see a light bulb go off for many people (both young and old) when they understand that earlier springs mean more than just flowers blooming but it impacts the entire ecosystem. This may mean that some species lose their synchronicity with one another and that can create layers of impacts.
- **Spinoffs, partnerships, other impacts:** This project is still growing. This summer we are starting a spin-off project with Montreat College to offer 6 one-week phenology monitoring science camps in the park for high school students. Monitoring will occur along the Appalachian Trail in the Smokies and is part of the National Phenology Networks AT Seasons monitoring study.



Shenandoah Salamander: Climate Change Casualty or Survivor?

A GPM-Earth to Sky Collaborative Effort



- **Status (4/10/14):** *Completed*
- **Product:** Ranger-led resource education program
- **Audience:** Middle school to college level science students
- **Thematic Statement:** Climate change and species competition are serious threats to the endangered Shenandoah salamander.
- **Measurable Objectives:** Students will be able to predict the potential impact of climate change and species competition on the survival of the Shenandoah and red-backed salamanders and determine ways people can reduce contributions to climate change.
- **Technique:** Ranger-led program with inquiry-based activities
- **Brief Description:** Students conduct field research on the red-backed salamander to determine if climate change and competition for habitat are impacting the survival of the Shenandoah and red-backed salamanders.
<http://www.nps.gov/shen/forteachers/classrooms/shenandoah-salamander-and-climate-change.htm>
- **Timeline to Complete:** Project began June 2012. Program was field tested with students in spring 2013. Implemented in fall 2013.
- **NASA Resources Used:**
<http://climate.nasa.gov/>
<http://pmm.nasa.gov/science/climate-change>
<http://climatekids.nasa.gov/>

Supported by the GPM mission:
<http://pmm.nasa.gov/GPM>

For more Information: Tim Taglauer tim_taglauer@nps.gov



Shenandoah Salamander: Climate Change Casualty or Survivor?

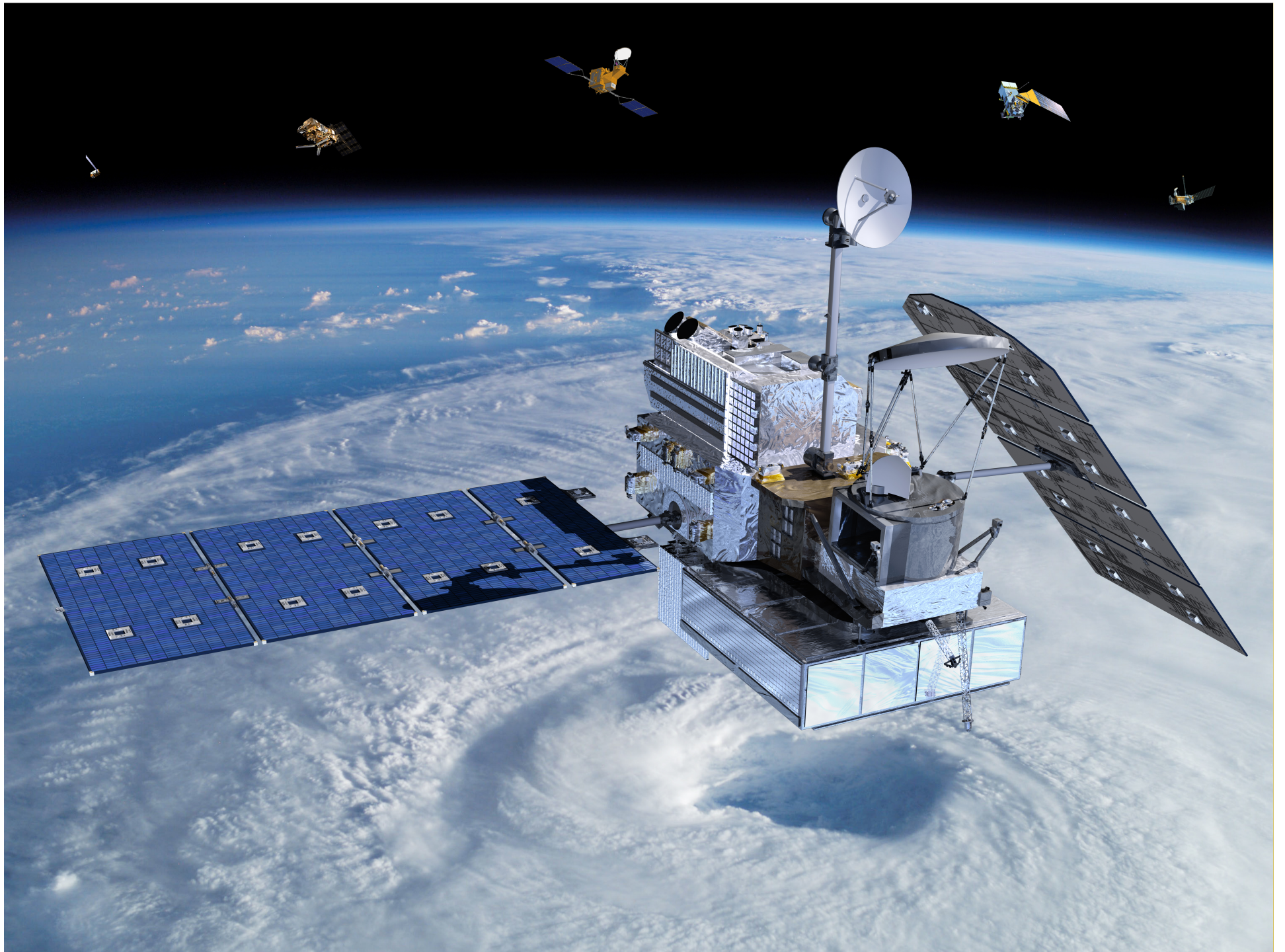
A GPM-Earth to Sky Collaborative Effort



- **Measurable Objective(s):** 120 students participated in the program in the first year.
- **Evidence of Achieving Objectives:** Teacher Feedback: “The program aligned with all science levels (6th-10th) as it relates to the environment and collective action for caring for natural resources.”
- **Evidence of Impact on Audience:** Teacher Feedback: “Upon arrival back at school the students were buzzing about how cool [the program] was and what it might be like to become a ranger someday.”
- **Unintended impacts:** The original intended audience was middle and high school environmental science students. We discovered the program was also effective for students with learning disabilities and college level students.
- **Anecdotes (stories) about impact on individuals:** In the concluding discussions at the end of the programs, students analyzed their personal choices of energy use and then recognized that they could help reduce climate change by changing individual behaviors.
- **Spinoffs, partnerships, other impacts:** Presented sessions at Virginia Environmental Education Conferences. The Shenandoah National Park Trust funded the creation of a companion climate change/salamander classroom outreach program for 4th grade.

Supported by the GPM mission:
<http://pmm.nasa.gov/GPM>

For more Information: [Tim Taglauer tim_taglauer@nps.gov](mailto:tim_taglauer@nps.gov)



Looking for a new cohort of ETS-GPM Interpreters!



- Apply to GPM for one of the mini-grants (up to \$2,500) to develop and implement a project that is related to one or more of GPM's key science themes: Water Cycle, Weather and Climate, Technology and Instrumentation, and Societal Applications.
- Application form posted at www.earthtosky.gov and at <http://pmm.nasa.gov/education/earthtosky>
- E-mail your application to dorian.w.janney@nasa.gov
- All applications must be **received by COB on June 13th, 2014**. We will use a competitive process to select the mini-grant awardees, and will notify you either way by July 5, 2014.
- Questions: dorian.w.janney@nasa.gov

MINI-GRANT APPLICATION PLAN

Use this resource to apply to GPM for one of their mini-grants (up to \$2,500) to develop and implement a project that is related to one or more of GPM's key science themes: Water Cycle, Weather and Climate, Technology and Instrumentation, and Societal Applications.

Upon completing this form, please email it to Dorian.W.Janney@nasa.gov. All applications must be **received by COB on June 13th, 2014**. We will use a competitive process to select the mini-grant awardees, and will notify you either way by July 5, 2014. If you have any questions, please direct them to the email above.

Please be as specific as possible in describing these various aspects of your project.

Name: **E-mail:** **Location:**

Project Title:

What is your project? *Please offer a one paragraph description that gives us a sense of what you want to do, how you will accomplish it, and how you will integrate one or more of GPM's key science themes.*

Who are your primary audiences and what are their needs relative to this interpretive/educational product? *Is the audience staff, visitors, children, association members, etc? Be specific. What is the breadth of the audience that this may reach? Are there any characteristics of the audience that makes them unique/different?*

What are tentative project goals? *What do you hope to accomplish with this project? What kinds of outcomes do you hope to see? What needs to happen to consider your project a success?*

In one paragraph, articulate the GPM key message, idea, or concept that you will develop for the audience to experience through this product. *What is the relevant idea you wish to convey to your audiences? Consider why they might care about the science behind GPM's mission. How might they feel personally connected to the science behind GPM and the GPM mission data?*

What is the timeline for the project? *Define a target date for each of your project goals. Please include any major milestones including development, gathering content, production, when the product will go 'live', etc.*

Start-----|-----|-----|-----**End**

Please list the most appropriate interpretive technique(s) or education method(s) you plan to use.

In what ways do you anticipate using both GPM and NASA science resources in this project? *What type of collaboration might we have? What types of resources might you need to develop and implement your project?*

How do you anticipate using the funding to develop and implement this project? *Include all possible expenditures and an estimate of what they would cost—specifically, resources beyond those present at your site (eg., funds for publication of a brochure or site bulletin, props, design or fabrication of an exhibit, etc. that support GPM objectives).*