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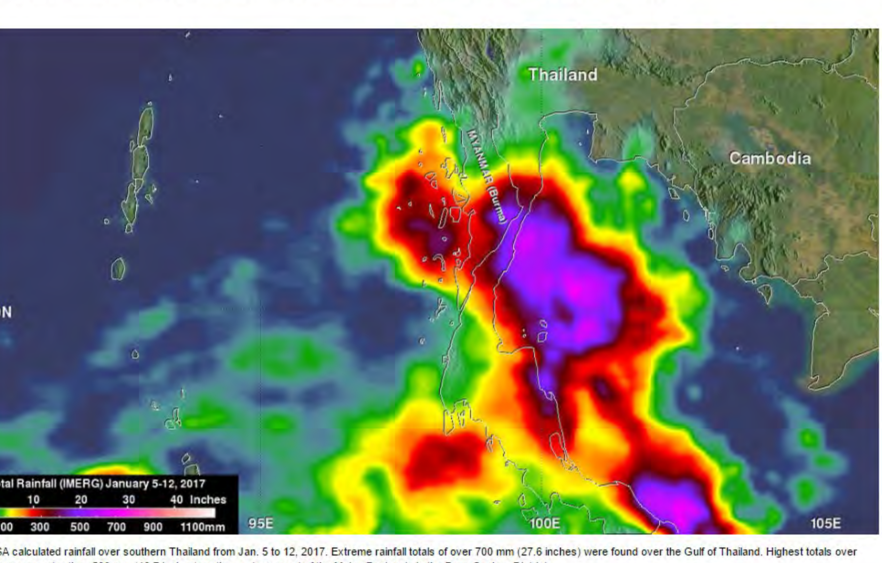
Climate

https://www.nasa.gov/feature/goddard/2016/nasas-imerg-measures-flooding-rainfall-in-pakistan

Jan. 14, 2017

NASA Analyzes Heavy Rainfall Over Southern Thailand

Widespread flooding has recently caused the deaths of dozens of people in southern Thailand. Frequent and persistent downpours have resulted in record rainfall totals and NASA calculated rainfall over the region from January 5 to January 12, 2017.



NASA calculated rainfall over southern Thailand from Jan. 5 to 12, 2017. Extreme rainfall totals of over 700 mm (27.6 inches) were found over the Gulf of Thailand. Highest totals over land were greater than 500 mm (19.7 inches) on the eastern coast of the Malay Peninsula in the Bang Saphan District.
Credits: NASA/JAXA, Hal Pierce

The Global Precipitation Measurement mission or GPM core satellite is part of a constellation of satellites that can measure rainfall from space. GPM is a joint mission between NASA and the Japan Aerospace Exploration Agency and the data is input into NASA's Integrated Multi-satellitE Retrievals for GPM (IMERG) data product.

IMERG was used to estimate the total amount of rain that fell over southern Thailand over the week. Extreme rainfall totals of over 700 mm (27.6 inches) were found over the Gulf of Thailand. The highest rainfall total estimates over land were greater than 500 mm (19.7 inches) on the eastern coast of the Malay Peninsula in the Bang Saphan District.

Rainfall has greatly increased over Thailand during this La Nina year. Very low rainfall totals occurred over Thailand during last year's El Nino event. At NASA's Goddard Space Flight Center in Greenbelt, Maryland, a rainfall anomaly analysis was made by comparing the former Tropical Rainfall Measuring Mission or TRMM calibrated rainfall climatology to "near real-time" Multi-satellite Precipitation Analysis data collected over a thirty day period.

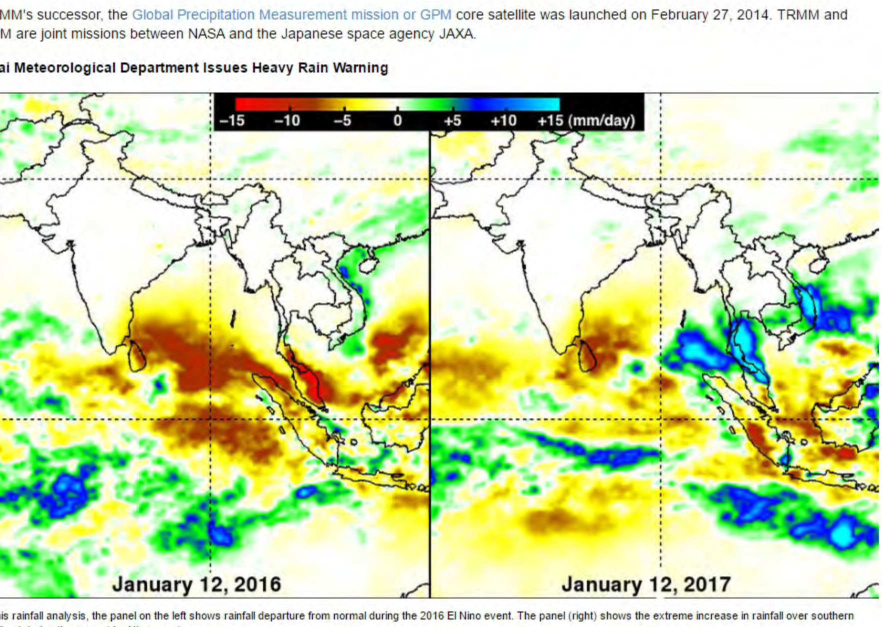
About NASA's TMPA Analysis

The TRMM-based, near-real time Multi-satellite Precipitation Analysis (TMPA) has been used to monitor rainfall over the global Tropics for many years. By subtracting the long-term average rainfall or climatology, rainfall anomalies can be constructed to show deviations from the normal pattern.

TRMM is the Tropical Rainfall Measuring Mission satellite that was in operation from 1997 to April 2015. It was designed to measure rainfall over the global Tropics using both passive and active sensors, including the first and at the time only precipitation radar in space. With its combination of passive microwave and active radar sensors, TRMM was used to calibrate rainfall estimates from other satellites to expand its coverage. The TRMM satellite produced over 17 years of precipitation measurements that were a valuable contribution to global rainfall climatology.

TRMM's successor, the Global Precipitation Measurement mission or GPM core satellite was launched on February 27, 2014. TRMM and GPM are joint missions between NASA and the Japanese space agency JAXA.

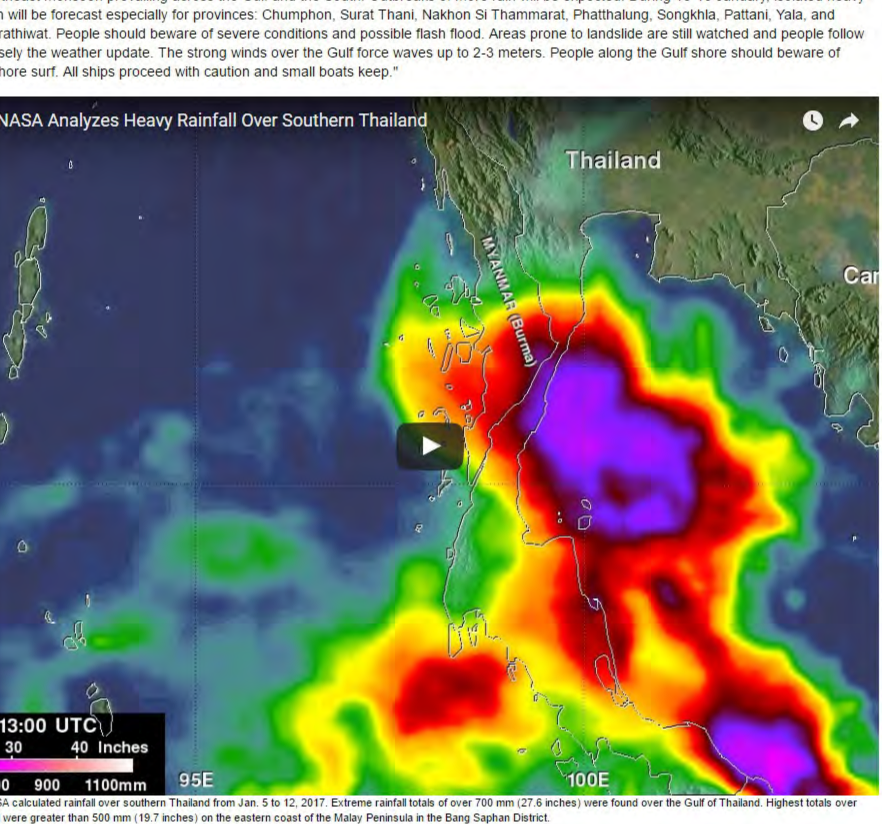
Thai Meteorological Department Issues Heavy Rain Warning



In this rainfall analysis, the panel on the left shows rainfall departure from normal during the 2016 El Nino event. The panel (right) shows the extreme increase in rainfall over southern Thailand during the current La Nina event.
Credits: NASA/JAXA, Hal Pierce

On January 13, 2017 the Thai Meteorological Department (TMD) issued a Weather Warning for Heavy Rains in Lower South and Strong Wind in Gulf [of Thailand]. The Gulf borders southwestern Thailand, Cambodia, and southern Vietnam. It is up to 350 miles (563 km) wide and 450 miles (724 km) long.

The TMD warning stated "By 15 January, the moderate high pressure from China will extend to upper Thailand inducing the stronger northeast monsoon prevailing across the Gulf and the South. Outbreaks of more rain will be expected. During 16-18 January, isolated heavy rain will be forecast especially for provinces: Chumphon, Surat Thani, Nakhon Si Thammarat, Phatthalung, Songkhla, Pattani, Yala, and Narathiwat. People should beware of severe conditions and possible flash flood. Areas prone to landslide are still watched and people follow closely the weather update. The strong winds over the Gulf force waves up to 2-3 meters. People along the Gulf shore should beware of inshore surf. All ships proceed with caution and small boats keep."



NASA calculated rainfall over southern Thailand from Jan. 5 to 12, 2017. Extreme rainfall totals of over 700 mm (27.6 inches) were found over the Gulf of Thailand. Highest totals over land were greater than 500 mm (19.7 inches) on the eastern coast of the Malay Peninsula in the Bang Saphan District.
Credits: NASA/JAXA, Hal Pierce

For updated forecasts from the Thai Meteorological Department, visit: https://www.tmd.go.th/en/.

Hal Pierce/Rob Gutro
NASA's Goddard Space Flight Center

Last Updated: Jan. 14, 2017
Editor: Lynn Jenner

Tags: Climate, Goddard Space Flight Center, GPM (Global Precipitation Measurement), Hazards

Earth

Jan. 11, 2017

NASA Sees Pineapple Express Deliver Heavy Rains, Flooding to California

California which has long been suffering through a strong, multi-year drought, is finally beginning to see some much needed relief as a result of a recent series of storms that are part of a weather pattern known as the "Pineapple Express."

Tags: Climate, Earth, Goddard Space Flight Center, GPM (Global Precipitation Measurement), Hazards

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Global Precipitation

Jan. 4, 2017

NASA Adds up Heavy Rainfall from Southeastern US Severe Weather

Severe thunderstorms spawned tornadoes and generated flooding rainfall over the Southeast on Monday evening, Jan. 2, 2017. Using satellite data, NASA analyzed the rainfall from the outbreak and found up to a foot of rain had fallen over a five-day period.

At least 12 tornadoes were reported with twisters spotted in Mississippi, Alabama and Georgia. Four deaths in Alabama and one in Florida have been blamed on this violent weather.

Tags: Goddard Space Flight Center, GPM (Global Precipitation Measurement), Hazards

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Earth

Dec. 30, 2016

Satellite View of Big Snowstorm for the Northeastern U.S.

The National Weather Service has forecast a significant winter storm to impact the Interior Northeastern U.S. today, Thursday, Dec. 29 and Friday, Dec. 30. Imagery and animations from NOAA's GOES-East satellite show the clouds associated with this powerful storm were already over New England.

Tags: Climate, Earth, Goddard Space Flight Center, GOES (Geostationary Environmental Operational Satellites), Hazards

Read Full Article

Global Precipitation

Dec. 7, 2016

NASA Measures Altitudes of Hawaii's Rain, Snow

NASA recently calculated the rate in which snow fell in Hawaii's peaks and analyzed the freezing level.

The mountains of Mauna Kea and Mauna Loa in the Hawaiian Islands have recently received heavy snowfall. Hawaii's balmy temperatures normally reach above 80 degrees Fahrenheit (27 Celsius) at sea level on beaches such as Oahu's Waikiki but temperatures fall below freezing at the altitudes of tall mountain peaks on the Big Island. At 13,802 feet (4.2 kilometers) Mauna Kea is Hawaii's tallest mountain. Snowfall

Tags: Goddard Space Flight Center, GPM (Global Precipitation Measurement), Hazards

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Global Precipitation

Dec. 1, 2016

GPM Sees Deadly Tornadic Storms Moving Through U.S. Southeast

The Global Precipitation Measurement mission or GPM core satellite gathered rainfall data on the severe storms that impacted the southeastern U.S. over two days. From Tuesday evening, Nov. 29 through Wednesday morning, Nov. 30, 2016 tornadoes formed along a squall line in advance of a cold front that moved through the Southeast. Over three dozen tornadoes were reported with sightings occurring in Louisiana, Alabama, Mississippi, Tennessee and Alabama.

Tags: Earth, Goddard Space Flight Center, GPM (Global Precipitation Measurement), Hazards

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Earth

Nov. 18, 2016

NASA Analyzes Heavy Rainfall over Hispaniola

Slow moving frontal systems draped over Hispaniola and a tropical wave recently caused heavy rainfall that led to wide spread flooding over the northern Dominican Republic. NASA analyzed that heavy rainfall using data from satellites.

Scattered to numerous showers and scattered thunderstorms have occurred over Hispaniola during the week of Nov. 14. Hispaniola includes the Dominican Republic and Haiti.



Tags: Earth, Goddard Space Flight Center, GPM (Global Precipitation Measurement), Hazards

Read Full Article

Hurricanes

Oct. 12, 2016

Matthew (Atlantic Ocean)

NASA Adds Up Deadly Hurricane Matthew's Total Rainfall

A NASA rainfall analysis estimated the amount of rainfall generated by Hurricane Matthew when it moved over the Carolinas.

Tags: Earth, Goddard Space Flight Center, GPM (Global Precipitation Measurement), Hazards, Hurricanes, Wallops Flight Facility

Read Full Article

Hurricanes

Sept. 8, 2016

Hermine - (Formerly Tropical Depression 09 - Atlantic Ocean)

NASA Takes Parting Look at Hermine

Satellite imagery showed that Post-Tropical Cyclone Hermine was just a swirl of clouds with no rainfall off the coast of southeastern Massachusetts on Thursday, Sept. 8. Just two days earlier, the GPM satellite saw that Hermine was still generating some rainfall.

A 3-D Look at Post-Tropical Cyclone Hermine

Tags: Earth, Goddard Space Flight Center, GOES (Geostationary Environmental Operational Satellites), GPM (Global Precipitation Measurement), Hazards, Hurricanes

Read Full Article

Hazards

Aug. 16, 2016

NASA Analyzes Deadly Louisiana Flooding

Record-setting rainfall and flooding in southern Louisiana have been calculated at NASA with data from satellites.

An extremely severe rainfall event hit the states of Louisiana and southern Mississippi when a very slow moving low pressure system continuously pulled tropical moisture from the Gulf of Mexico.

Total Rainfall (IMERG) August 6-15, 2016

Tags: Climate, Earth, Goddard Space Flight Center, GPM (Global Precipitation Measurement), Hazards, Water

Read Full Article

Hazards

Aug. 2, 2016

NASA Looks at Historic Flooding from Slow-Moving Maryland Storms

NASA analyzed rainfall data from slow-moving storms that triggered flash floods over parts of central Maryland and caused devastating flooding in historic Ellicott City, Maryland.

A slow-moving line of heavy thunderstorms dumped as much as 6 to 7 inches of rain in about two hours' time during the evening of Saturday, July 30, over parts of Howard County in central Maryland, resulting in severe local flash flooding.

Tags: Goddard Space Flight Center, GPM (Global Precipitation Measurement), Hazards

Read Full Article

Hurricanes

July 27, 2016

Darby (Eastern Pacific)

NASA's IMERG Shows Darby's Rainfall Over The Hawaiian Islands

Most of the Hawaiian Islands were spared serious damage from Tropical Storm Darby. NASA estimated the rainfall left behind from the storm and found more than a foot and half fell north of Oahu.

The location of Darby's track through the Hawaiian Islands resulted in the islands of Hawaii and Oahu being the most affected. Flash flooding was common on Oahu due to a reported 177.8 mm (7 inches) of rain drenching the island. Interstate H-1 was flooded in some locations.

Tags: Earth, Goddard Space Flight Center, GPM (Global Precipitation Measurement), Hazards, Hurricanes

Read Full Article

Hazards



June 27, 2016

NASA's IMERG Measures Deadly West Virginia Flooding Rainfall

Since June 23, 2016 over two dozen people have been reported killed and hundreds of homes have been destroyed by flooding in West Virginia. Using satellite data, NASA calculated the heavy rainfall that occurred over the state.

NASA's IMERG Measures Deadly West Virginia Flooding Rainfall

Tags: Climate, Goddard Space Flight Center, GPM (Global Precipitation Measurement), Hazards, Water

Read Full Article

Hurricanes

June 22, 2016

Danielle (N. Atlantic Ocean)

NASA Sees Tropical Storm Danielle Ending Over Mexico

Tropical Storm Danielle started weakening after making landfall north of Tuxpan, Mexico on Monday evening at 7 p.m. CDT. As Danielle weakened the low level circulation quickly became disorganized. The Global Precipitation Measurement or GPM mission core satellite looked at the quickly weakening storm's rainfall.

Tags: Goddard Space Flight Center, GPM (Global Precipitation Measurement), Hazards, Hurricanes

Read Full Article

Hurricanes

June 9, 2016

Colin (was TD3) - North Atlantic Ocean/Gulf of Mexico

NASA Examined Tropical Storm Colin's Heavy Rainfall from Space

Data from NASA's Integrated Multi-satellitE Retrievals for GPM (IMERG) were used to estimate rainfall from Tropical Storm Colin over a two day period before it dissipated.

Total Rainfall (IMERG) June 6-8, 2016

Tags: Goddard Space Flight Center, GPM (Global Precipitation Measurement), Hazards, Hurricanes

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Land

May 11, 2016

GPM Measures Deadly Flooding Rainfall in Haiti and the Dominican Republic

In 2015, the website Reliefweb.int, which is a service provided by the United Nations Office for the Coordination of Humanitarian Affairs, provided this information about the drought in the Caribbean (which includes Haiti and the Domnican Republic):

"In **Haiti**, about 200,000 families (1 million people) have been affected by drought conditions since the beginning of 2015, especially in Sud-Est, Nord-Ouest and Artibonite regions. These prolonged conditions are aggravating the situation of 3.8 million food-insecure people in the country. (ACAPS, 21 Jul 2015)

The important crop losses resulted from severe drought affecting the country plunges the poorest population in a highly vulnerable situation

Tags: Goddard Space Flight Center, GPM (Global Precipitation Measurement), Hazards, Land

Read Full Article

Hazards

May 3, 2016

NASA's IMERG Analyzes Severe Weather in Tornado Alley and Eastward

Severe spring thunderstorms frequently spawned tornadoes from the Gulf Coast north and eastward during the past seven days. NASA's IMERG data were used to estimate the amount of rain that fell from April 25 to May 2, 2016.

Tags: Climate, Earth, Goddard Space Flight Center, Hazards, Land

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NASA Goddard

April 20, 2016

NASA's GPM Looks at Texas Heavy Rainfall

A slow-moving frontal system associated with a stagnant upper-air pattern set the stage for heavy rains and flooding early this week from East Texas all the way up through the Central and Northern Plains. NASA estimated the heavy rainfall using satellite data that showed the hardest hit region was in and around the Houston area.

Tags: Earth, Goddard Space Flight Center, GPM (Global Precipitation Measurement), Hazards, Land

Read Full Article

Hazards

April 5, 2016

NASA's IMERG Measures Flooding Rainfall in Pakistan

NASA used satellite data and added up heavy rainfall that has been occurring in northwestern Pakistan that caused flooding that killed more than 50 people.

Heavy pre-monsoon rainfall moved through the area resulting in extensive damage in the Swat Valley northwest of Islamabad the capital of Pakistan.

Tags: Climate, Earth, Goddard Space Flight Center, GPM (Global Precipitation Measurement), Hazards

Read Full Article

Global Precipitation

March 14, 2016

NASA Measures U.S. South Heavy Rainfall from Space

Extremely heavy rain fell over the southern United States during the past week and data from the Global Precipitation Measurement (GPM) mission core satellite and others in the GPM constellation provided a look at areas with heaviest rainfall. The data showed the largest amounts of rain fell from north central Louisiana to southern Arkansas.

Tags: Earth, Goddard Space Flight Center, GPM (Global Precipitation Measurement), Hazards

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