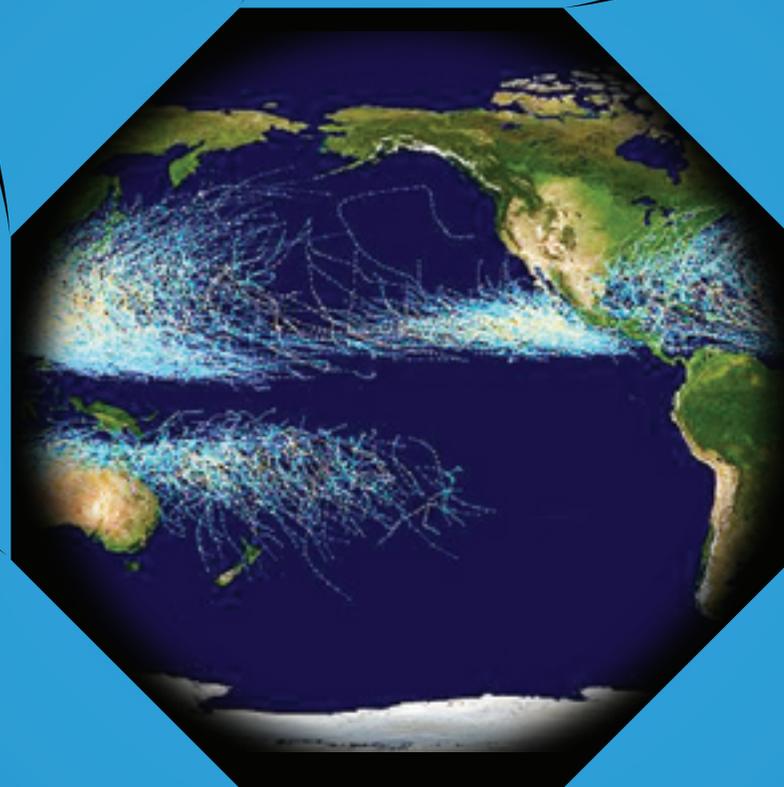


SatMagazine

Earth Observation and Imagery:



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There's Always Something Brewing All Year 'Round

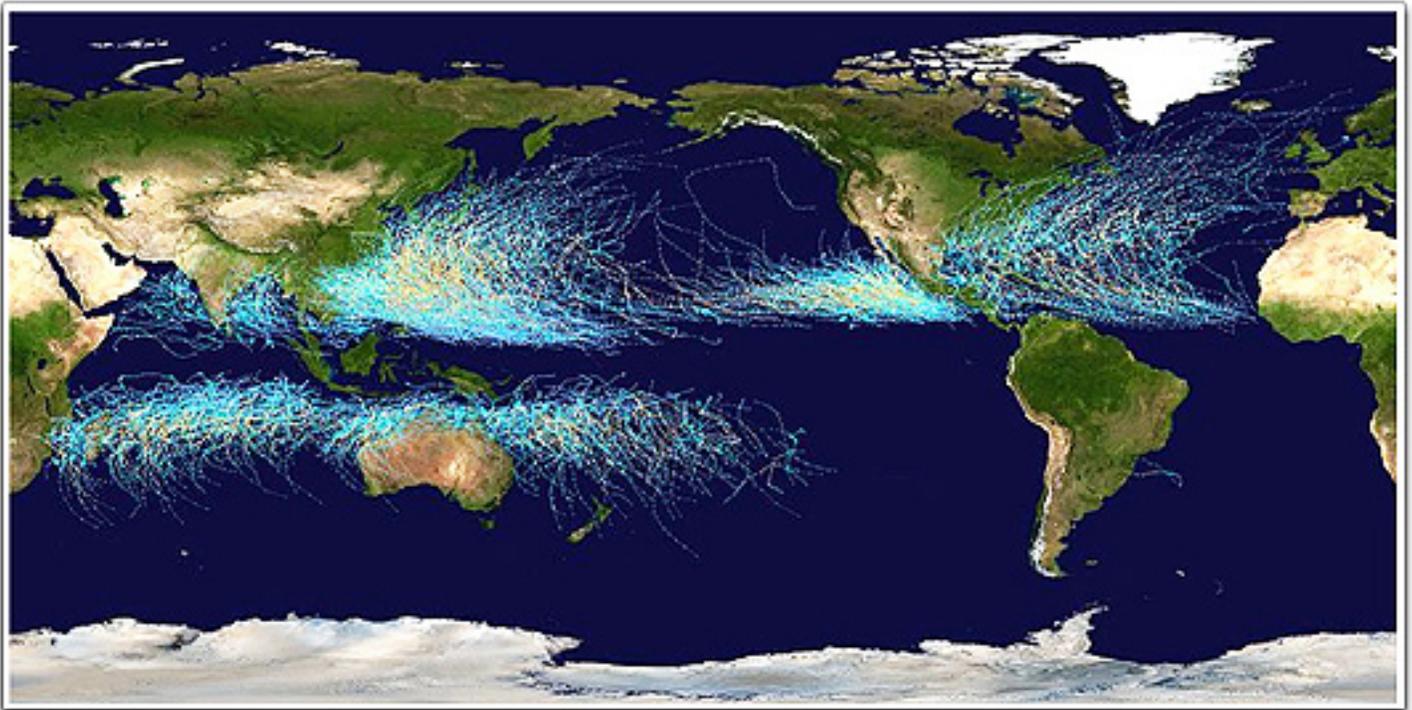
by Rob Gutro, NASA Goddard Space Flight Center

Hurricanes and tropical cyclones develop in various places around the world all year 'round, and NASA's Hurricane/Tropical Cyclone Webpage covers them. The webpage offers daily storm updates and satellite images, latest research, stunning video animations, educational tools, scientists' profiles and historic storm information, on all storms going back to 2005, including monsters like Katrina.

NASA's hurricane webpage is a one-stop for anyone interested in hurricanes, and highlights NASA Hurricane research and latest storm information.

dian Ocean or southern Pacific Ocean is dealing with a tropical cyclone.

Climatologist *Bill Patzert* from NASA's **Jet Propulsion Laboratory** (JPL), Pasadena, California, is one of many NASA researchers that use data from NASA satellites. *Patzert* said, "Born over the tropical oceans, tropical cyclones impact most of our planet's population. These great storms can devastate entire regions, but also supply precipitation that sustains industry, agriculture and great urban centers of today's civilizations." *Patzert* continued, "Hurricanes can be scary, but we should not forget that they are also an important part of our planet's heat and water balance. We can feel their violence, but they also give our home



Map of the cumulative tracks of all tropical cyclones during the 1985-2005 time period. The Pacific Ocean west of the International Date Line sees more tropical cyclones than any other basin, while there is almost no activity in the Atlantic Ocean south of the Equator. Credit: NASA

Tropical cyclones, the general name for a hurricane, typhoon, cyclone, tropical storm or tropical depression, form in different regions of the world at different times of the year. When the northern hemisphere hurricane season is active, the southern hemisphere is in winter-time, and vice-versa. So, when there's snow on the ground in the U.S., chances are the southern In-

planet relatively stable and warm temperatures worldwide, transporting vast amounts of heat and energy out of the tropics into the northerly latitudes."

NASA has several satellites in orbit around the Earth that are used to study different aspects of these tropical cyclones, and NASA scientists conduct

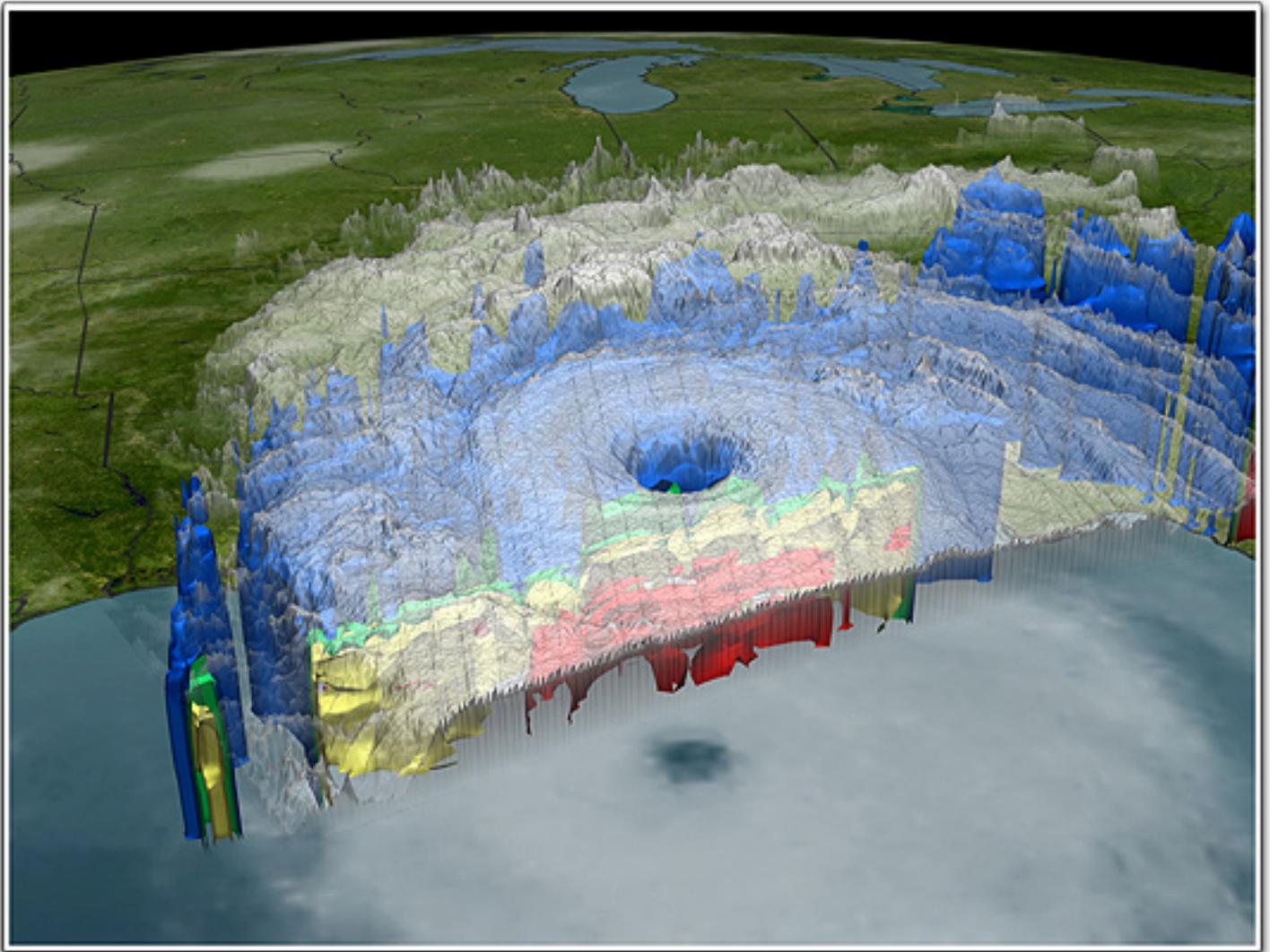
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hurricane research all through the year. Satellites include the **Tropical Rainfall Measuring Mission satellite (TRMM)**, **Aqua**, **QuikScat**, **CloudSat**, the **Geostationary Operational Environmental Satellite (GOES)**, **JASON-1**, **OSTM/Jason-2**, **Landsat**, and **Terra**. Except for GOES, which is managed by the **National Oceanic and Atmospheric Administration**, all missions are managed either out of NASA Goddard or JPL. The GOES Project Office at NASA Goddard generates images and satellite animations.

Aqua and **Terra** have several instruments between them that are often featured on the hurricane page, the **Atmospheric Infrared Sounder (AIRS)**, **Advanced Microwave Scanning Radiometer-E (AMSR-E)** and **Moderate Imaging Spectroradiometer (MODIS)**. TRMM has the first and only precipitation radar in space and can provide stunning three-dimensional pictures of the structure of tropical cyclones.

Using all of these satellites and their instruments, NASA scientists gather data on many factors that determine why a tropical cyclone might have strengthened or weakened. Data includes: storm and surface winds; sea surface heights and temperatures; rainfall intensity and area; lightning; cloud water; water vapor; cloud heights, extent of cloud cover and cloud temperature, humidity, atmospheric pressure; cloud development; and size of the storm.

The National Oceanic and Atmospheric Administration's **(NOAA) National Hurricane Center (NHC)** and the **Joint Typhoon Warning Center**, both organizations that forecast hurricanes, also use data from these NASA satellites and instruments in their forecast decisions. The NASA Hurricane Page also has live alerts directly from the NHC — readers can get the latest Atlantic Basin storm information immediately when it is issued.



TRMM and **GOES** satellite composite image of Hurricane Katrina on Sun., Aug. 28, 2005 Tropical Rainfall Measuring Mission and GOES satellite composite image of Hurricane Katrina on Sun., Aug. 28, 2005 at 5:30 PM EDT. Blue areas are at least 0.25 inches of rain/hr.; Green 0.5+ inch/hr; Yellow 1.0+ inch/hr.; Red 2.0+ inch/hr. Credit: NASA TRMM

NASA's Hurricane Webpage also includes news highlighting new scientific findings about tropical cyclones and before and after storm images. There's also an extensive education section including lesson plans. Users can also meet the team of scientists behind NASA's hurricane research from oceanographers to atmospheric scientists.

Hurricane multimedia is also a big part of the webpage. Included are stunning animations created at NASA Goddard's Scientific Visualization Studio with great educational value. They range from "**What is a Hurricane**," and "**A Hurricane's Heat Engine**" to "**Arlene to Zeta: A Look at the 2005 Hurricane Season**." The International Space Station and the space shuttle also provide storm photos.

There are many links to hurricane websites, including the NASA satellites and NASA computer modeling sites; NOAA sites; **U.S. Geological Survey** and **Federal Emergency Management Agency** websites.

Readers can receive breaking news with the new RSS feed or email subscription option for breaking news alerts. Twitter.com subscribers can also get the latest hurricane news on that site under "**NASA Hurricane**."

NASA's Hurricane Webpage will continue to make NASA's unique data sets available to the global community of climate scientists; and hurricane researchers, forecasters and educators. "The intent is to increase the understanding of these powerful storms and to work with educators, climate researchers, and

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research and operational agencies worldwide to save lives, decrease property loss and, thus, improve the economic well being and safety of the billions of people living in the tropics,” Patzert said.

“There’s always a tropical cyclone brewing somewhere and NASA satellites and the NASA Hurricane page always have them in their sights,” Gutro added.

Visit the NASA Hurricane /Tropical Cyclone webpage by selecting the graphic below...



About the author

Rob Gutro is a Deputy News Chief in the office of Public Affairs at NASA’s Goddard Space Flight Center, Greenbelt, Md. He’s



also a meteorologist and manages and writes storm updates for NASA’s Hurricane/Tropical Cyclone webpage. He works with NASA’s News Chief to ensure the quality of news stories on NASA research in Earth science, Astrophysics, Heliophysics and technology done at NASA Goddard.

Rob’s always been fascinated with hurricanes, growing up in

New England. Rob focused on hurricanes during his schooling in meteorology, and was one of several people who developed NASA’s Hurricane Resource Web Page. He continually provides updates on hurricanes and typhoons around the world.

The webpage, located at www.nasa.gov/hurricane has satellite images, NASA research, hurricane videos and animations, scientist biographies, lesson plans, hurricanes in history, hurricane facts and so much more.

Rob enjoys talking about weather and especially hurricanes. He speaks at schools, museums, and social organizations about NASA’s research on hurricanes.

Prior to coming to work for NASA in 2000, Rob worked as a radio broadcast meteorologist at the Weather Channel and was heard on more than 40 radio stations across the U.S. providing forecasts. He also worked for the National Oceanic and Atmospheric Administration (NOAA) as a technical writer, and worked in public affairs for a hurricane season at the National Hurricane Center in 1993.

Rob has almost 20 years of radio experience. He was a weekend on-air talent at country music radio stations in Annapolis and Nashville. He also worked in radio in the Boston area, Manchester, New Hampshire and Baltimore, Maryland. From 1993 to 1994 he broadcast forecasts for Baltimore’s National Weather Service office over NOAA Weather Radio.