NASA: Mapping Our World

NASA has been helping us understand our home planet, Earth, ever since the agency was formed in 1958.

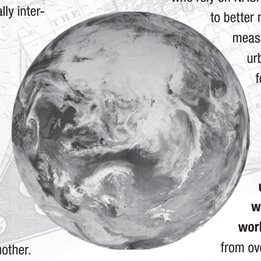
Two basic questions drive NASA's Earth science research:

How is the global Earth system changing now?

How will the Earth system change in the future?

To answer these questions, NASA scientists study the interactions between Earth's air, land, water, ice, and life. Together these interconnected parts make up the Earth system, which is in a constant state of change. NASA scientists are especially interested in Earth's:

- Atmospheric Composition
- Weather
- Carbon Cycle & Ecosystems
- Water & Energy Cycles
- Climate Variability & Change
- Surface & Interior



Maps—graphic representations of geo-referenced data of a given area—are useful for more than just helping you get from one place to another. They are an important tool for NASA Earth scientists to visualize and understand complex phenomena.

Mapping and cartography date back thousands of years and are born from a human desire to better understand our place in space.

NASA technologies have steadily improved our ability to observe, study and map the world. This transformation in how we think of maps started in 1968 with the first photographs of Earth taken by astronauts in orbit. In 1972, NASA launched Landsat, the first satellite devoted to imaging Earth's land areas. More recently, NASA's Operation IceBridge mission deployed sensors on aircraft to map changes in polar ice in unprecedented detail.

NASA Earth science research, observations, computer models and visualization tools often combine months, years, even decades, of data. In fact, the latest technologies allow NASA scientists to map changes in our environment across multiple dimensions, including vertically and over time. These tools communicate vast quantities of information important to researchers, farmers, rescue operators, public policy officials, and others who rely on NASA maps and images to better manage resources, measure biodiversity, track urban growth, prepare for changing climate conditions, and much more.

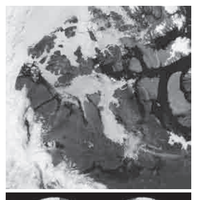
This poster will help you better understand how and why NASA maps the world. It features data from over a dozen NASA Earth observation missions. Read on to learn about them and about how you, too, can become an Earth explorer by creating and interpreting maps and images of your world.

GLOBE IMAGE: NASA ocean scientist Norman Kuring created this composite image of Europe, Asia, North Africa and the Arctic with natural color images taken by the Suomi NPP satellite. CREDIT: Norman Kuring/NASA.

NASA and mapping

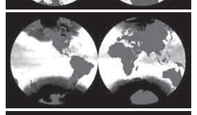
NASA Earth Science Missions

AQUA *(Launched 2002)* ■ A key goal of Aqua's mission is to study the water of Earth—which is how Aqua got its name. The satellite's instruments measure evaporation from the ocean, water vapor and clouds in the atmosphere, precipitation, and water and ice on the land and in the ocean. Aqua scientists study many aspects of the water cycle, as well as other aspects of the Earth system. Through these studies, the Aqua mission is helping to advance the understanding of changes occurring in the global climate and the role of the interactions among the ocean, land, atmosphere, cryosphere, and biosphere.

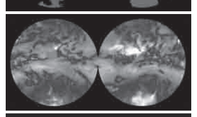


Front Key: C
■ **Aqua/MODIS**
True Color:Northwest Passage • 08/27/09 • *http://bit.ly/esw13-northwest*

Front Key: E
■ **Aqua/AMSR-E***
Sea Surface Temperature Anomaly • 07/14/08 • *http://bit.ly/esw13-surface*



Front Key: G
■ **Aqua/AMSR-E***
Sea Surface Temperature • 07/14/08 • *http://bit.ly/esw13-surface*



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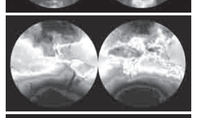
■ **Aqua/CERES**
Outgoing Longwave Radiation • 07/20/06 • *http://bit.ly/esw13-longwave*

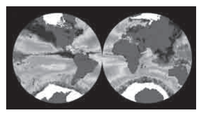


Front Key: P
■ **Aqua/AIRS**
Mid-Tropospheric Temperature • May 2009 • *http://bit.ly/esw13-midtropo*

Front Key: Q
■ **Aqua/MODIS**
Land Surface Temperature Maximum • 2003–2009 • *http://bit.ly/esw13-tempmax*

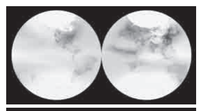
* AMSR-E was provided to the Aqua mission by the Japanese Aerospace Exploration Agency (JAXA).

AQUARIUS *(Launched 2011)* ■ Aquarius measures the salinity, or saltiness, of the ocean surface. Throughout the history of Earth, the weathering of rocks has delivered mineral salts into the ocean. Over decades, the amount of salt in ocean basins has been relatively stable. The water cycle operates on much faster time scales, however, causing changes in salinity patterns. Freshwater input from rivers, melting ice, rain and snow makes the ocean less salty. Processes that cause freshwater to exit the ocean—such as evaporation and formation of sea ice—make the ocean saltier. Differences in salinity can play a major role in moving seawater—and the heat it carries—around the globe. Thus salinity is crucial to keeping Earth's climate in balance.

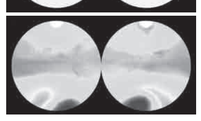


Front Key: N
■ **Aquarius**
Sea Surface Salinity • *http://aquarius.nasa.gov/cgi/ed_activities.htm*

AURA *(Launched 2004)* ■ Instruments onboard the Aura satellite can observe gases in the atmosphere such as ozone and nitrogen dioxide. Ozone plays many different roles in the atmosphere. High in the stratosphere, ozone protects us from the sun's harmful ultraviolet rays. But at lower altitudes it can act as a greenhouse gas and a harmful pollutant. Nitrogen dioxide (NO_2) is an air pollutant and plays a role in the production of ozone in the troposphere. Aura is helping scientists understand how these gases work in both the lower and upper atmosphere.



Front Key: V
■ **Aura/OMI**
Nitrogen Dioxide • 2005–2012 • *http://aura.gsfc.nasa.gov/airquality*



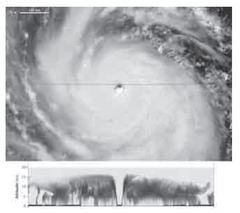
Front Key: Y
■ **Aura/OMI**
Stratospheric Ozone • Oct 2012 • *http://ozonewatch.gsfc.nasa.gov*

earth science missions

CALIPSO *(Launched 2006)* ■ Developed with the Centre Nationale d'Etudes Spatiales (CNES), France's space agency, the Cloud-Aerosol Lidar and Infrared Pathfinder Satellite Observation mission uses lasers to study the atmosphere. Instead of looking at the clouds over a large geographic area, such as the entire United States, CALIPSO looks through the atmosphere at a particular point. Imagine a laser beam traveling from the satellite in space through all the layers of the atmosphere to Earth. The images from CALIPSO allow us to see vertical features of our atmosphere such as clouds and aerosols (smoke, dust, etc.). Scientists use these data to create vertical maps of our atmosphere. This information is helping us understand the role of aerosols and clouds in Earth's climate.

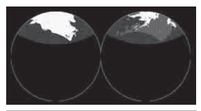
Front Key: W
■ **CALIPSO**
Aerosol and Attenuated Backscatter • 12/23/12 • *http://www-calipso.larc.nasa.gov/outreach*

CLOUDSAT *(Launched 2007)* ■ CloudSat uses radar to see through clouds and measure their vertical structure, thickness, water content, brightness, and other important atmospheric properties. Do certain clouds trap heat and make Earth's surface warmer? Or do their bright surfaces reflect enough sunlight back to space and make up for their heat-trapping effects? How much do clouds actually produce rain? The answers to these kinds of questions are helping scientists better understand clouds' role in weather, climate and the water cycle, and predict how Earth's climate may change in the future.



Front Key: K
■ **CloudSat**
Radar Reflectivity • 09/15/09 • *http://bit.ly/esw13-radar*

GCOM-W1 *(Launched 2012)* ■ The Global Change Observations Mission-Water1, or Shizuku, was developed by the Japan Aerospace Exploration Agency, JAXA. It is observing key conditions related to climate change and water circulation mechanisms, including vapor, seawater temperatures and snow depths. It is a part of an international constellation of satellites helping improve global measurements of precipitation.



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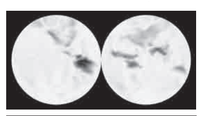
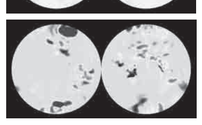
■ **GCOM-W1/AMSR2**
Sea Ice Concentration 2012–2013:
Extent 2013 Maximum • *http://bit.ly/esw13-icemax*
Extent 2013 Minimum • *http://bit.ly/esw13-icemin*

GRACE *(Launched 2002; Follow-on 2017)* ■ The Gravity Recovery and Climate Experiment is a two-spacecraft mission, flying in formation around the planet to measure tiny differences in Earth's gravitational field from one month to the next. From this, we can indirectly track the redistribution of large masses of water below and on Earth's surface. The GRACE Follow-on Mission is planned for launch in 2017.



Front Key: R
■ **GRACE**
Seasonal Variations of Water Storage • *http://grace.jpl.nasa.gov*

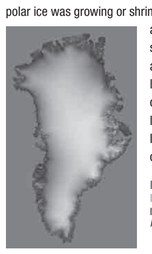


Front Key: S
■ **GRACE**
Total Water Storage • 02/01/13 • *http://bit.ly/esw13-freshwater*

This globe image is a model of the Earth's gravitational anomalies developed with data from NASA's GRACE satellite. CREDIT: NASA/Goddard Space Flight Center Scientific Visualization Studio.

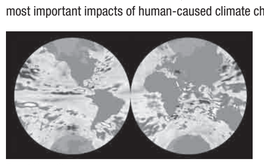
earth science missions

ICESAT *(2003–2009)* and **ICESAT-2** *(2016)* ■ The Ice, Cloud, and land Elevation Satellite studied the ice sheets and sea ice that blanket the North and South Pole regions, as well as global measurements of aerosol, cloud, and vegetation height. Scientists wanted to find out whether the polar ice was growing or shrinking, and how fast, because the amount of land ice affects global sea level. We need to understand and predict how ice sheets and sea level will respond to future climate change. ICESat-2 is scheduled to launch in 2016. Until then, Operation IceBridge will bridge the gap in polar observations.



Front Key: D
■ **ICESat/GLAS**
Ice Elevation in Greenland • 2003–2005 • *http://bit.ly/esw13-greenland*

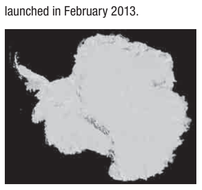
JASON-2 *(Launched 2008)* ■ This international mission uses an altimeter to measure the height of the ocean surface. As the spacecraft flies over the ocean, the altimeter sends microwave signals down to the surface of the water. The signals bounce off the water and back up to the spacecraft. By measuring how long it takes for the signals to bounce back and by precisely measuring the locations of the spacecraft, the altimeter can determine the height of the ocean's surface at that point, to within a few centimeters. Scientists use this information to create very detailed maps of the ocean surfaces around the world, helping us understand how the ocean changes over time and how those changes affect weather and climate. This information is also used to monitor global sea level rise, one of the most important impacts of human-caused climate change.



Front Key: O
■ **Jason-2**
Sea Surface Height Anomaly • 04/16/12 • *http://bit.ly/esw13-height*

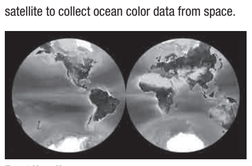
LANDSAT *(Series of satellites first launched in 1972)* ■ A partnership between NASA and the US Geological Survey, the satellites in the Landsat Program have recorded data about Earth's lands and surrounding coastal regions for over four decades. The data allow scientists and others to analyze changes on the Earth's surface, caused by both natural processes (e.g., fires) and human activity.

The latest in the Landsat series is Landsat 8, which launched in February 2013.



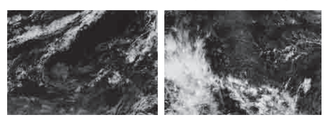
Front Key: X
■ **Landsat 7**
Landsat Image Mosaic of Antarctica (LIMA) • Year 2007 • *http://bit.ly/esw13-lima*

SEAWIFS *(Launched 1997)* ■ Subtle changes in ocean color indicate different types and quantities of marine phytoplankton (microscopic marine plants). Oceanographers measure changes in ocean color data to determine the abundance of ocean biota on a global scale and to study the ocean's role in the global carbon cycle. The SeaWiFS ocean color sensor was launched on the OrbView-2 satellite to collect ocean color data from space.



Front Key: H
■ **OrbView-2/SeaWiFS**
Biosphere • 1998–2010 • *http://bit.ly/esw13-biosphere*

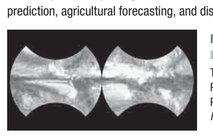
SUOMI NPP *(Launched 2011)* ■ The Suomi National Polar-orbiting Partnership mission was named after a former high school science teacher turned remote sensing scientist named Verner Suomi. The Suomi NPP satellite continues key data records critical for short-term weather forecasting and long-term climate change studies. Suomi NPP was built with funding from NASA, NOAA and DoD, with current satellite operations funded by NOAA.



Front Key: L
■ **Suomi NPP/VIIRS**
True Color • 02/23/13 • *http://npp.gsfc.nasa.gov/education_outreach.html*

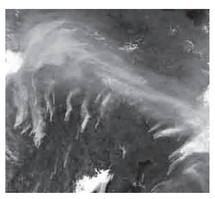
Front Key: T
■ **NPP/VIIRS**
Lights at Night • Apr & Oct 2012 • *http://bit.ly/esw13-lights*

TRMM *(Launched 1997)* ■ The Tropical Rainfall Measuring Mission is a joint NASA mission with the Japan Aerospace Exploration Agency (JAXA) that is designed to measure rainfall for weather and climate research. TRMM covers the Earth's tropical and subtropical regions, which make up about two thirds of the total rainfall on Earth and are important for powering global atmospheric circulation. TRMM provides important precipitation information using several space-borne instruments to increase our understanding of the interactions between water vapor, clouds and precipitation, which are central to regulating Earth's climate. TRMM precipitation measurements have made and continue to provide critical inputs to tropical cyclone forecasting, numerical weather prediction, agricultural forecasting, and disaster management.

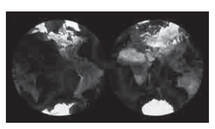


Front Key: M
■ **TRMM MPA**
TRMM/Multi-satellite Precipitation Analysis Product: Total rainfall • *http://bit.ly/esw13-rainfall*

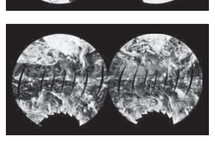
TERRA *(Launched 1999)* ■ Terra carries five advanced instruments that study the atmosphere, land, ocean, and radiant energy (heat and light), and how they all work together. The satellite has instruments from Canada, Japan and the United States. Terra has helped scientists measure how much carbon Earth's plants take out of the atmosphere, the height and movement of clouds, how Earth reflects and absorbs energy from the sun, how many fires burn every day, and how pollution travels around the globe. All this information and other Terra measurements help scientists understand how Earth's climate works and how it is changing.



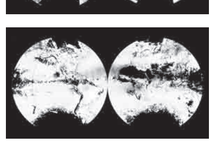
Front Key: A
■ **Terra/MODIS**
True Color: Fires in Siberia, Russia • 07/30/10 • *http://bit.ly/esw13-fire*



Front Key: B
■ **Terra/MODIS**
Blue Marble Next Generation • 12/01/04 • *http://bit.ly/esw13-next*



Front Key: I
■ **Terra/MODIS**
True Color • Dec 2005 • *http://earth-data.nasa.gov/labs/worldview*



Front Key: U
■ **Terra/MODIS**
Aerosols • 01/08/12 • *http://bit.ly/esw13-aerosol*

earth science missions

But wait, there's more!

ACRIMSAT *(Launched 1999)* ■ Scientists believe that small increases in the sun's total energy output may play a key role in global warming. The Active Cavity Radiometer Irradiance Monitor Satellite is studying total solar energy from the sun. ACRIMSAT data, when combined with other measurements, helps improve climate predictions.

AirMOSS *(Flights started in 2012)* ■ To improve our understanding of the role of North American ecosystems in the global carbon cycle, the Airborne Microwave Observatory of Subcanopy and Subsurface is providing new continental-scale estimates of periodic changes in the amount of carbon dioxide exchanged between these ecosystems and the atmosphere.

ATTREX *(Flights started in 2011)* ■ Recent studies suggest that even small changes in stratospheric humidity may have significant climate impacts. The Airborne Tropical TRopopause EXperiment uses the long-range NASA Global Hawk uninhabited aircraft systems to understand changes in stratospheric humidity and ozone concentrations to support climate studies.

CARVE *(Flights started in 2011)* ■ The Carbon in Arctic Reservoirs Vulnerability Experiment aircraft mission will collect detailed measurements of important greenhouse gases on local to regional scale in the Alaskan Arctic and demonstrate new capabilities to quantify Arctic carbon changes and carbon cycle-climate processes.

DISCOVER-AQ *(Flights started in 2011)* ■ To understand how to better diagnose air pollution, NASA scientists have planned a series of airborne field campaigns—called DISCOVER-AQ—that fly over selected U.S. cities taking air quality measurements. Scientists are coordinating these measurements with satellite- and ground-based measurements to see where the differences are. One airplane carries remote sensing instruments to make measurements looking down from about 26,000 feet, simulating what a satellite would see, while a second plane flies beneath the first, spiraling up and down at selected points to measure pollution in the different layers of the atmosphere.

GPM *(To be launched in 2014)* ■ The Global Precipitation Measurement Mission is an international satellite mission to provide next-generation observations of rain and snow worldwide every three hours. NASA and the Japan Aerospace Exploration Agency (JAXA) will launch a "Core" satellite carrying advanced instruments that will set a new standard for precipitation measurements from space. The data they provide will be used to unify precipitation measurements made by an international network of partner satellites to quantify when, where, and how much it rains or snows around the world. This will help advance our understanding of Earth's water and energy cycles, improve weather forecasting, and deliver other societal benefits.

HS3 *(Flights started in 2012)* ■ Since 2012, the Hurricane and Severe Storm Sentinel mission has been using two NASA Global Hawk aircraft to help understand and better predict hurricane intensity in the Atlantic Ocean basin.

OPERATION ICEBRIDGE *(Flights started in 2009)* ■ Operation IceBridge aircraft campaigns image Earth's polar ice to better understand processes that connect the polar regions with the global climate system. These data will also help improve predictions for sea level rise. OIB is helping to bridge the gap in polar observations between NASA's two ICESat satellite missions.

QuikSCAT *(1999)* and **SeaWinds on ADEOS II** *(2002)* ■ The Quick Scatterometer mission has been measuring sea surface wind speed and direction under all weather and cloud conditions over Earth's oceans since 1999. SeaWinds, launched on board the Japanese ADEOS II spacecraft, is a twin sister to QuikSCAT, and was intended to provide continuity beyond the earlier mission. Both instruments bounce microwave pulses off the Earth's ocean surface, measuring 90 percent of the ocean surface in one day. This information helps scientists improve on the accuracy of weather forecasting and storm detection.

SAGE *(Launched 1979)* ■ More than 25 years ago, scientists realized there was a problem with Earth's protective layer of ozone in the upper atmosphere. It was thinning. The SAGE family of satellite instruments accurately measures aerosols and the amount of ozone in Earth's upper atmosphere. This means SAGE plays a key role in measuring ozone recovery resulting from the international policy changes agreed upon by many nations in the 1987 Montreal Protocol. NASA scientists are preparing to send the third generation of the instrument into space on board the International Space Station in 2014.

SORCE *(Launched 2003)* ■ Without the sun, Earth would be a frozen rock in space. Despite the sun's importance, scientists have only begun to be able to study it with high precision in recent decades. The four instruments on board the Solar Radiation and Climate Experiment are providing state-of-the-art measurements of incoming solar energy: x-ray, ultraviolet, visible, near-infrared, and total energy output from the sun. This information is critical to understanding the role of the sun in Earth's climate system.

earth science missions

USING MAPS: A Case Study

Find out how a team of NASA Earth scientists is using data, images and maps to solve a mystery and to learn more about the environment that sustains us. Visit the Earth Science Week (ESW) website • ***http://climate.nasa.gov/esw2013*** • for more firsthand accounts from NASA Earth scientists describing how NASA maps are helping them solve Earth's mysteries.

The Mystery of the Growing Cities

More than half of all people in the world now live in cities. The Global Land Survey-Impervious Mapping Project (GLS-IMP) is a three-year project that is using Landsat satellite data to map city growth from 2000 to 2010 with an extraordinary amount of detail. Accurately mapping the cities of the world will help us better understand how they interact with the environment at continental to global scales. We are especially interested in the effects of climate change on cities and the people who live in them.

The Global Land Survey (GLS) data set put together by NASA and the US Geological Survey consists of over 8,500 Landsat scenes acquired by mapping instruments with a resolution* of 30 meters. At about 55 million pixels per scene, that's a lot of pixels! Our partner investigators at the University of Maryland have processed the data to remove the effects of the atmosphere and haze, which can obscure the images.

We use other data to help us find the built-up areas or artificial surfaces of cities. For example, the National Geospatial-intelligence Agency (NGA) provides us with unclassified high-resolution imagery from the QuickBird and WorldView-2 commercial satellites. We use these to "teach" our computer programs how to recognize impervious surfaces (artificial, usually paved surfaces that cannot be easily penetrated by water) or built-up cover. We also pull in data that show road networks and nighttime city lights for comparisons as well as to judge how we are doing.

Over the coming year, we hope to work with schools, students, and educators participating in the GLOBE program, as well as citizen scientists all over the world, to make measurements of impervious cover near their schools or homes. This will help us compare our satellite estimates with ground-based data so that we can determine the accuracy of our maps. For example, dirt roads can be confused with built-up areas and produce "false positives." Since every city is unique, we expect to deal with issues like these all over the world—but that is what mapping science is all about! Stay tuned and maybe you too can help a NASA project!

Landsat 7 image of Detroit, Michigan. The team is using Landsat images and data from commercial sources to map the growth of cities around the world. Credit: US Geological Survey.

We are processing our data by continent and are working on the final products for Europe and North America. They look very promising! We hope to have global results by the end of April 2014. We are developing a project website where we will share information, post results, and interact with users.

Follow-up questions

- *How is mapping data used to answer the research question?*
- *Why is it important to collect the field or ground-based data?*
- *Brainstorm potential applications for the team's results.*
- *The team is also interested in the effects of climate change on cities. Review the Earth science mission pages of the poster and consider what other sources of data could be used to study some of these changes.*

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Research Scientist
Universities Space Research Association

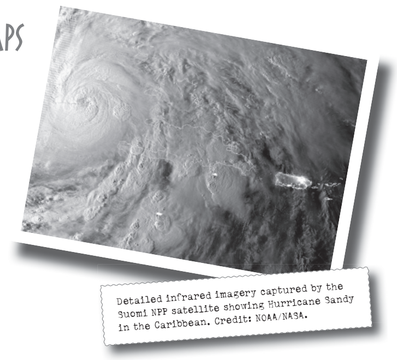
** **What is resolution?** A satellite image's resolution is the size of the smallest individual picture element (pixel) from which the image is created. If an image is 30-meter resolution, it means each pixel or dot in the image represents an area on the Earth's surface 30 meters by 30 meters in size. Objects smaller than that size are not readily or reliably recognizable in the image.*

using maps

MAKING & EXPLORING MAPS

A geographer will tell you that a good map is the result of many small decisions (and several big ones!). These range from selecting and organizing data to designing the style of the map. You would not want to include data that are distracting or misleading. However, you would want to use appropriate symbols and colors to ensure that key information is represented and interpreted accurately.

Try your hand at creating your own NASA maps using MY NASA DATA. You can experience firsthand the processes that cartographers, Earth scientists and visualization experts use to select, map and analyze data, and communicate scientific information.



Detailed infrared imagery captured by the Suomi NPP satellite showing Hurricane Sandy in the Caribbean. Credit: NOAA/NASA.

■ **Circle the Earth: Explore Surface Types on a Journey around Earth**
http://bit.ly/esw13-journey
Use a world map to locate a series of points labeled by latitude and longitude. Determine if each point is covered by land or water, and then compare your findings with those from NASA's CERES (Clouds and the Earth's Radiant Energy System) satellite instrument. CERES gathers data on the surface coverage of Earth.

■ **Hurricanes as Heat Engines**
http://bit.ly/esw13-hurricane
Explore the link between hurricanes and sea-surface temperature changes.

■ **Identifying Ozone Variations over Different Locations**
http://bit.ly/esw13-ozone
Investigate ozone trends for different locations: the high Southern latitudes, your hometown, and a city near the North Pole.

EXPLORE INTERACTIVE MAPS

■ **Climate Time Machine**
http://climate.nasa.gov/interactives/climate_time_machine
Track changes in global conditions over time: average temperature, carbon emissions, sea ice, and sea level.

■ **Sea-Level Viewer**
http://climate.nasa.gov/interactives/sea_level_viewer
Explore the latest global sea level from space as well as sea level changes during El Niño and La Niña years, Hurricane Katrina, and the 2004 Indian tsunami.

■ **NASA Earth Observatory Global Maps**
http://bit.ly/esw13-global
Explore how key parts of the climate system of Earth change from month to month.

making maps

STANDARDS & CREDITS

Suggested Education Standards

NASA resources and content on this poster can be used to support teaching and learning related to the following educational standards.

NATIONAL GEOGRAPHY STANDARDS

- **Standard 1:** How to use maps and other geographic representations, geospatial technologies, and spatial thinking to understand and communicate information.
- **Standard 3:** How to analyze the spatial organization of people, places, and environments on Earth's surface.
- **Standard 17:** How to apply geography to interpret the past.
- **Standard 18:** How to apply geography to interpret the present and plan for the future.

NEXT GENERATION SCIENCE STANDARDS

MS-ESS2 Earth's Systems

■ **MS-ESS2-4.**
Develop a model to describe the cycling of water through Earth's systems driven by energy from the sun and the force of gravity.

■ **MS-ESS2-5.**
Collect data to provide evidence for how the motions and complex interactions of air masses result in changes in weather conditions.

■ **MS-ESS2-6.**
Develop and use a model to describe how unequal heating and rotation of the Earth cause patterns of atmospheric and oceanic circulation that determine regional climates.

MS-ESS3 Earth and Human Activity

■ **MS-ESS3-2.**
Analyze and interpret data on natural hazards to forecast future catastrophic events and inform the development of technologies to mitigate their effects.

■ **MS-ESS3-5.**
Ask questions to clarify evidence of the factors that have caused the rise in global temperatures over the past century.

Visit nasawavelength.org to access a reviewed collection of nearly 2,000 Earth and space science education resources, and find more mapping-related educational activities at – • **http://bit.ly/eswI3nasamapping**

About the Poster Front

The artwork on the front of the poster features data from over a dozen NASA Earth observation missions. These data were projected as a stereographic pair and interesting features selected from each data set to form a unique mosaic-like pattern of our world.

The artwork was created by Ginger Butcher, Aura mission education and public outreach lead, and Jesse Allen, visualization specialist for NASA's Earth Observatory, both with Sigma Space Corporation at NASA's Goddard Space Flight Center. Visit the Earth Science Week (ESW) website for a firsthand account from the designers about how they solved the challenge of putting it together, and for an interactive version of the poster.

Celebrate Earth Science Week 2013 with NASA!

For an interactive version of the poster with additional content – and to learn more about NASA resources and events planned for ESW and beyond, visit –
http://climate.nasa.gov/esw2013

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for teachers