Head Slate:

Slug: **Hurricane Resource Reel 2005**

TRT: 1:15:07 GSFC Library # 2005-05B
Super(s): NASA Release Date: 05/31/06
Center Contact: Sarah DeWitt 301-286-0535

For more info: www.nasa.gov/hurricane

Synopsis:

From hot towers to phytoplankton blooms, NASA's cutting-edge hurricane research has been revealing never-before-seen aspects of these giant storms for over a decade. The past three years have seen great progress in the areas of intensity monitoring and 3-D modeling of hurricanes. In 2006, scientists at NASA and other institutions have more tools than ever to study these storms using the very latest in ground, air, and space-based technology.

Clip Slate: Named Storms of 2005
Slug: **Hurricane Resource Reel 2005**

This visualization shows all 27 named storms during the 2005 Atlantic hurricane season, from Arlene to Zeta. Orange and red colors represent ocean temperatures at 82 degrees F or higher - the temperature required for hurricanes to form. Temperature data is from the AMSR-E instrument on the Aqua satellite, while the cloud images were taken by the Imager on the GOES-12 satellite.

TRT: 4:15
Super(s): NASA
For more info: www.nasa.gov/hurricane

Clip Slate: Hurricane Adrian/MODIS
Slug: **Hurricane Resource Reel 2005**

NASA satellites captured this season's first hurricane, Adrian, which formed in the Pacific. Adrian is a very interesting storm in that it moved out of the East Pacific and into the Atlantic/Caribbean unlike most East Pacific storms that move west out into open-ocean and dissipate.

TRT: 06
Super(s): NASA

For more info: www.nasa.gov/hurricane

Clip Slate: Hurricane Dennis/MODIS
Slug: **Hurricane Resource Reel 2005**

The Moderate Resolution Imaging Spectroradiometer (MODIS) on board NASA's Terra and Aqua satellites watched Hurricane Dennis thread its way between Jamaica and Haiti on a direct course for Cuba on July 7, 2005.

TRT: 18
Super(s): NASA
For more info: www.nasa.gov/hurricane

Clip Slate: Hurricane Dennis/TRMM
Slug: **Hurricane Resource Reel 2005**

NASA's Tropical Rainfall Measuring Mission (TRMM) satellite observed the 3-D structure of Hurricane Dennis on July 6, 2005.

TRT: 20
Super(s): NASA/JAXA
For more info: www.nasa.gov/hurricane

Clip Slate: Hurricane Emily/TRMM
Slug: **Hurricane Resource Reel 2005**

NASA's Tropical Rainfall Measuring Mission (TRMM) satellite observed the distribution of rainfall inside Hurricane Emily on July 20, 2005.

TRT: 13
Super(s): NASA/JAXA
For more info: www.nasa.gov/hurricane

TITLE SLATE: HURRICANE KATRINA

Clip Slate: Atlantic sea surface temperature
Slug: **Hurricane Resource Reel 2005**

This visualization shows sea surface temperatures from June 1 through Sept. 18, 2005. Orange and red depict regions that are 82 degrees F and higher, where the ocean is warm enough for hurricanes to form. Hurricane winds are sustained

by the heat energy of the ocean, cooling the ocean as the hurricane extracts energy to power the winds. Several hurricane cold water trails can be seen in this visualization - particularly hurricanes Dennis, Emily, and Katrina. Temperature was measured by the AMSR-E instrument on the Aqua satellite.

TRT: 32
Super(s): NASA
For more info: www.nasa.gov/hurricane

Clip Slate: Hurricane Katrina/GOES
Slug: **Hurricane Resource Reel 2005**

This visualization shows Hurricane Katrina as seen by the GOES-12 satellite from August 23 through 30, 2005.

TRT: 13
Super(s): NASA/NOAA
For more info: www.nasa.gov/hurricane

Clip Slate: Hurricane Katrina/MODIS
Slug: **Hurricane Resource Reel 2005**

Images from the Moderate Resolution Imaging Spectroradiometer (MODIS) instrument on NASA's Terra and Aqua satellites reveal the vast expanse of Hurricane Katrina as it stretched clear from the Gulf Coast to Ohio. Images are from August 24 –31.

TRT: 18
Super(s): NASA
For more info: www.nasa.gov/hurricane

Clip Slate: Hurricane Katrina/SST
Slug: **Hurricane Resource Reel 2005**

A hurricane needs SSTs at 82 degrees or warmer to strengthen. This image shows the sea surface temperatures (SSTs) for the Caribbean Sea and the Atlantic Ocean, from August 23-30. Every area in yellow, orange or red represents 82 degrees Fahrenheit or above. Temperature data is from the AMSR-E instrument on the Aqua satellite, while the cloud images of Hurricane Katrina were taken by the Imager on the GOES-12 satellite.

TRT: 13
Super(s): NASA

For more info: www.nasa.gov/hurricane

Clip Slate: Hurricane Katrina/Hot Towers
Slug: **Hurricane Resource Reel 2005**

TRMM spotted a pair of hot towers inside Hurricane Katrina on August 28. One tower near the eyewall and the other in an outer rainband of the storm reached over 15 km (more than 9 miles) high. The towers were spotted just before Katrina intensified to a Category 5 hurricane. These thunderclouds are like the cylinders of an engine, releasing enormous quantities of heat energy and helping to spin up the winds inside the storm.

TRT: 12
Super(s): NASA/JAXA
For more info: www.nasa.gov/hurricane

Clip Slate: Hurricane Katrina/TRMM
Slug: **Hurricane Resource Reel 2005**

NASA's Tropical Rainfall Measuring Mission (TRMM) satellite observed the distribution of rainfall inside Hurricane Katrina on August 29, 2005. Maximum rainfall, shown in red, equals two or more inches of rain per hour.

TRT: 12
Super(s): NASA/JAXA
For more info: www.nasa.gov/hurricane

Clip Slate: Hurricane Katrina/Rainfall
Slug: **Hurricane Resource Reel 2005**

This animation shows rain accumulation from Hurricane Katrina from August 23 – 30, based on data from the Tropical Rainfall Measuring Mission (TRMM) Multisatellite Precipitation Analysis. Satellite cloud data from NOAA/GOES is overlaid for context. The accumulation is shown in colors ranging from green (less than 30 mm of rain) through red (80 mm or more).

TRT: 13
Super(s): NASA/JAXA
For more info: www.nasa.gov/hurricane

Clip Slate: Hurricane Katrina/Barrier Islands
Slug: **Hurricane Resource Reel 2005**

Hurricane Katrina devastated Dauphin Island, a barrier island approximately 90 miles from where the storm made landfall. Storm surge inundated the island and waves transported sand landward into fan-shaped deposits shifting the entire island landward. These Light Detection and Ranging (LIDAR) maps show Dauphin island before the 2004 hurricane season, post Hurricane Ivan and after Katrina.

TRT: 1:10
Super(s): NASA
For more info: www.nasa.gov/hurricane

Clip Slate: Hurricane Ophelia/MODIS
Slug: **Hurricane Resource Reel 2005**

Images from the Moderate Resolution Imaging Spectroradiometer (MODIS) instrument on NASA's Terra and Aqua satellites show Ophelia's position off the Carolina coast.

TRT: 06
Super(s): NASA
For more info: www.nasa.gov/hurricane

Clip Slate: Hurricane Ophelia/TRMM
Slug: **Hurricane Resource Reel 2005**

Data from the Tropical Rainfall Measuring Mission (TRMM) satellite on September 11 show the heaviest rain developing in the eastern bands of Tropical Storm Ophelia.

TRT: 13
Super(s): NASA/JAXA
For more info: www.nasa.gov/hurricane

TITLE SLATE: HURRICANE RITA

Clip Slate: Hurricane Rita/MODIS
Slug: **Hurricane Resource Reel 2005**

Images from the Moderate Resolution Imaging Spectroradiometer (MODIS) instrument on NASA's Terra and Aqua satellites show Hurricane Rita's path across the Gulf of Mexico. Images are from Sept. 19 – 24.

TRT: 15
Super(s): NASA
For more info: www.nasa.gov/hurricane

Clip Slate: Hurricane Rita/SST
Slug: **Hurricane Resource Reel 2005**

This visualization shows the sea surface temperature from Sept. 17 to Sept. 21 when temperatures in the Gulf of Mexico remained one to two degrees warmer than the 82 degree minimum needed to sustain a hurricane. Every area in yellow, orange or red represents 82 degrees F or above. Temperature data is from the AMSR-E instrument on the Aqua satellite, while the cloud images of Hurricane Rita were taken by the Imager on the GOES-12 satellite.

TRT: 07
Super(s): NASA
For more info: www.nasa.gov/hurricane

Clip Slate: Hurricane Rita/Hot Towers
Slug: **Hurricane Resource Reel 2005**

NASA's Tropical Rainfall Measuring Mission (TRMM) satellite reveals a remarkable feature in this 3-D cat scan of Hurricane Rita – a pair of gigantic chimney clouds reaching more than 11 miles high. That is equivalent to 60,000 feet, or twice as high as a commercial airplane's cruising altitude. TRMM observed these hot towers in Hurricane Rita on Sept. 19, during a period of brief intensification.

TRT: 11
Super(s): NASA/JAXA
For more info: www.nasa.gov/hurricane

Clip Slate: Hurricane Rita/TRMM
Slug: **Hurricane Resource Reel 2005**

NASA's Tropical Rainfall Measuring Mission (TRMM) satellite observed the distribution of rainfall inside Hurricane Rita on Sept. 22, 2005. At the time of observation, this Category 5 hurricane had a minimum pressure of 898 millibars, sustained winds of 170 mph and a 17-mile wide eye. Maximum rainfall, shown in red, equals two or more inches of rain per hour.

TRT: 13

Super(s): NASA/JAXA
For more info: www.nasa.gov/hurricane

Clip Slate: Hurricane Rita/Rainfall
Slug: **Hurricane Resource Reel 2005**

This animation shows rain accumulation from Hurricane Rita from September 18 through 25, 2005 based on data from the Tropical Rainfall Measuring Mission (TRMM) Multisatellite Precipitation Analysis. Satellite cloud data from NOAA/GOES is overlaid for context. The accumulation is shown in colors ranging from green (less than 30 mm of rain) through red (80 mm or more).

TRT: 11
Super(s): NASA/JAXA
For more info: www.nasa.gov/hurricane

TITLE SLATE: HURRICANE WILMA

Clip Slate: Hurricane Wilma/MODIS
Slug: **Hurricane Resource Reel 2005**

The Moderate Resolution Imaging Spectroradiometer (MODIS) instrument on NASA's Terra and Aqua satellites show Wilma's position from October 19 - 24.

TRT: 16
Super(s): NASA
For more info: www.nasa.gov/hurricane

Clip Slate: Hurricane Wilma/SST
Slug: **Hurricane Resource Reel 2005**
Ocean temperatures surrounding Wilma hovered near 85 degrees Fahrenheit, about three degrees higher than the temperature required to fuel a hurricane. This image shows the sea surface temperatures (SSTs) from October 15 - 20. Every area in yellow, orange or red represents 82 degrees Fahrenheit or above. The data came from the Advanced Microwave Scanning Radiometer (AMSR-E) instrument on NASA's Aqua satellite.

TRT: 09
Super(s): NASA
For more info: www.nasa.gov/hurricane

Clip Slate: Hurricane Wilma/Hot Towers
Slug: **Hurricane Resource Reel 2005**

NASA's Tropical Rainfall Measuring Mission (TRMM) satellite reveals a cluster of 7-mile high thunderclouds in the eyewall of the storm. TRMM observed these hot towers in Hurricane Wilma on October 17, during an unusually rapid period of intensification when pressure dropped from 997 millibars (mb) to a record low 884 mb.

TRT: 12
Super(s): NASA/JAXA
For more info: www.nasa.gov/hurricane

Clip Slate: Hurricane Wilma/MODIS Close-up
Slug: **Hurricane Resource Reel 2005**

The Terra/MODIS and NOAA/GOES instruments captured this view of Hurricane Wilma on October 19. At this time, Hurricane Wilma had a record minimum central pressure of 882 millibars and sustained winds of 150 knots (172 mph). Hurricane Wilma is the strongest, most intense Atlantic hurricane in terms of barometric pressure, and the most rapidly strengthening Atlantic storm on record.

TRT: 15
Super(s): NASA/NOAA
For more info: www.nasa.gov/hurricane

Clip Slate: Hurricane Wilma/TRMM
Slug: **Hurricane Resource Reel 2005**

NASA's Tropical Rainfall Measuring Mission (TRMM) satellite took this 3-D cat scan of Hurricane Wilma early on October 20, when the storm was still a Category 5 hurricane. TRMM looks underneath of the storm's clouds to reveal the underlying rain structure. Blue represents areas with at least 0.25 inches of rain per hour. Green shows at least 0.5 inches of rain per hour. Yellow is at least 1.0 inches of rain and red is at least 2.0 inches of rain per hour.

TRT: 18
Super(s): NASA/JAXA
For more info: www.nasa.gov/hurricane

Clip Slate: Hurricane Wilma/Rainfall
Slug: **Hurricane Resource Reel 2005**

This animation shows rain accumulation from Hurricane Wilma from October 15 – 25, based on data from the Tropical Rainfall Measuring Mission (TRMM) Multisatellite Precipitation Analysis. Satellite cloud data from NOAA/GOES is overlaid for context. The accumulation is shown in colors ranging from green (less than 30 mm of rain) through red (80 mm or more).

TRT: 13
Super(s): NASA/JAXA
For more info: www.nasa.gov/hurricane

Clip Slate: Looking At Hurricanes
Slug: **Hurricane Resource Reel 2005**

Hurricanes: Satellites and Supercomputers Visualize Giant Storms
8 minute movie

TRT: 8:34
Super(s): NASA
For more info: www.nasa.gov/hurricane

TITLE SLATE: The 2004 Atlantic Hurricane Season

Clip Slate: Hurricane Charley/SeaWiFS
Slug: **Hurricane Resource Reel 2005**

Hurricane Charley was the first strong category storm of the 2004 hurricane season to impact the United States. This visualization shows the track and intensity of the storm from August 9-15. Green denotes Tropical Depression status. Gold denotes Tropical Storm status. Red is Category 1 hurricane status, orange is 3, and purple is 4 on the Saffir Simpson scale.

TRT: 17
Super(s): NASA/ORBIMAGE
For more info: www.nasa.gov/hurricane

Clip Slate: Hurricane Frances
Slug: **Hurricane Resource Reel 2005**

Following Hurricane Charley's devastating trek across Florida, Hurricane Frances left an even bigger impact on the southern state. Three visualizations using different satellite instruments show the size and speed of Hurricane Frances in early September 2004:

GOES (NASA/NOAA)
MODIS (NASA)
SeaWiFS (NASA/ORBIMAGE)

TRT: 1:15
Super(s): NASA/NOAA, NASA, NASA/ORBIMAGE
For more info: www.nasa.gov/hurricane

Clip Slate: Hurricane Frances/TRMM
Slug: **Hurricane Resource Reel 2005**

Instruments on NASA's TRMM satellite (Tropical Rainfall Measuring Mission) can see hurricanes in three dimensions. Here we see Frances depicted two different ways, each showing aspects of the storm's inner structure. Red colors indicate regions of the most significant rainfall. The tall spires or "hot towers" suggest an efficient and powerful heat engine inside the storm, emphasizing to experts just how powerful this particular tropical beast was.

TRT: 50
Super(s): NASA/JAXA
For more info: www.nasa.gov/hurricane

Clip Slate: Hurricane Ivan
Slug: **Hurricane Resource Reel 2005**

Just days after Frances made landfall, scientists turned their eyes back to the Atlantic where Hurricane Ivan was beginning to churn. By September 9th, the storm had reached the Caribbean Sea and began barreling its way towards the US Gulf Coast.

TRT: 18
Super(s): NASA
For more info: www.nasa.gov/hurricane

Clip Slate: Hurricane Ivan/TRMM
Slug: **Hurricane Resource Reel 2005**

TRMM's spaceborne radar, the first and only one of its kind in space, got several different looks at the gigantic Hurricane Ivan before and after landfall. These three CAT-scan visualizations show the rainfall structure inside Ivan on September 13, 15, and 16th, 2004.

TRT: 56

Super(s): NASA/JAXA
For more info: www.nasa.gov/hurricane

Clip Slate: Hurricane Ivan/Intensity Loop
Slug: **Hurricane Resource Reel 2005**

As Hurricane Ivan made its way to the US coast, it changed in intensity several times and, along with Charley and Frances and its successor Jeanne, left extreme amounts of rainfall in its wake.
Hurricane Ivan's Intensity Loop (red = Cat 5, orange = Cat 4, yellow = Cat 3)
Charley, Frances, and Ivan tracks
Rainfall Accumulation from Frances, Ivan, and Jeanne: September 2-28, 2004 (red = 3 or more inches rain)

TRT: 52
Super(s): NASA/JAXA
For more info: www.nasa.gov/hurricane

Clip Slate: Hurricane Jeanne/TRMM
Slug: **Hurricane Resource Reel 2005**

Hurricane Jeanne, while smaller than some of the earlier storms in 2004, still dropped significant amounts of rainfall over the southeastern US. The TRMM satellite revealed the rainfall structure inside Hurricane Jeanne just before and after landfall on September 25th, 2004.

TRT: 32
Super(s): NASA/JAXA
For more info: www.nasa.gov/hurricane

Clip Slate: Hurricane Model/Isabel
Slug: **Hurricane Resource Reel 2005**

A recent development in hurricane modeling techniques that just started to emerge from NASA in 2004 is promising great strides in understanding these giant storms. In this sequence showing five days in the life of 2003's Hurricane Isabel, you can see how closely the artificial storm (in green) matches the real world observations (in yellow) as it actually happened.

TRT: 34
Super(s): NASA
For more info: www.nasa.gov/hurricane

Clip Slate: Global Hurricane Model
Slug: **Hurricane Resource Reel 2005**

NASA's Finite Volume General Circulation Model (fvGCM) is significant because it is a global-scale model used to resolve regional events like hurricanes. The following visualization illustrates how a model of this capacity can show multiple storms on opposite sides of the earth at the same time.

TRT: 24
Super(s): NASA
For more info: www.nasa.gov/hurricane

Clip Slate: Astronaut Photography of 2004 Hurricanes
Slug: **Hurricane Resource Reel 2005**

While NASA astronaut Mike Fincke was onboard the International Space Station for Expedition 9 in 2004, there were 14 Atlantic hurricanes. Of these, Fincke managed to photograph six including the following spectacular images of Hurricanes Charley, Frances, Ivan, and Jeanne.

TRT: 1:30
Super(s): NASA
For more info: www.nasa.gov/hurricane

TITLE SLATE: Looking Back At Hurricane Isabel

Clip Slate: Hurricane Isabel Reporter's Package
Slug: **Hurricane Resource Reel 2005**

In September of 2004, NASA revealed new information about Hurricane Isabel one year after its historic arrival in the Mid-Atlantic States. This narrated reporter's package explores the exciting and surprising birth of Hurricane Isabel, 2003's most powerful storm.

TRT: 2:38
Super(s): NASA
For more info: www.nasa.gov/hurricane

Clip Slate: Hurricane Isabel Genesis and Landfall
Slug: **Hurricane Resource Reel 2005**

The first visualization follows 2003's Hurricane Isabel from its birthplace in the Ethiopian Highlands of East Africa, across the Atlantic Ocean, and to the United States. Note how Isabel gains size and speed over the warm waters of the Atlantic. The second visualization focuses on Isabel as it approaches landfall.

TRT: 1:01
Super(s): NASA, NASA/NOAA
For more info: www.nasa.gov/hurricane

Clip Slate: Hurricane Isabel Moving Cat-Scan
Slug: **Hurricane Resource Reel 2005**

As Isabel cruises across the Atlantic and changes in intensity, the distribution of rainfall and heat inside the storm is fluctuating dramatically. The "warm core" of the hurricane (inset window) lowers the surface pressure and spins up the winds. This helps to draw in energy in the form of heat and water vapor off the ocean surface.

TRT: 22
Super(s): NASA
For more info: www.nasa.gov/hurricane

Clip Slate: Hurricane Isabel Rain Accumulation
Slug: **Hurricane Resource Reel 2005**

This visualization shows rain accumulation from Hurricane Isabel from September 6 through 20, 2003 based on data from the TRMM Multisatellite Precipitation Analysis. The accumulation is shown in colors ranging from green (less than 50 mm of rain) through red (200 mm or more).

TRT: 15
Super(s): NASA/JAXA
For more info: www.nasa.gov/hurricane

Clip Slate: Hurricane Fabian's Cold Water Trail
Slug: **Hurricane Resource Reel 2005**

Before Isabel hit her stride, she had to follow on the heels of an earlier storm, Fabian. In this visualization, Hurricane Fabian runs through a large patch of warm water and churns up a trail of cold water (blue colors). Cold trails can sometimes weaken tropical storms, but Isabel took a different path fueling up on warm water next to Fabian's cold trail, and leaving another cold trail behind.

TRT: 12
Super(s): NASA/JAXA
For more info: www.nasa.gov/hurricane

TITLE SLATE: The Science Of Hurricanes

Clip Slate: Sea Surface Temperature
Slug: **Hurricane Resource Reel 2005**

Sensible heat and evaporation from warm water fuels hurricanes. Several weeks after the Sun shines brightest on the tropics in late June in the northern hemisphere, the waters reach their warmest temperatures. Water that is 82-degrees or warmer, indicated here in orange, is needed to fuel a hurricane. Sea surface temperatures (SSTs) are measured by the Advanced Microwave Scanning Radiometer-EOS (AMSR/E) aboard the Aqua satellite, even when clouds are present unlike previous infrared or heat-based techniques.

TRT: 25
Super(s): NASA
For more info: www.nasa.gov/hurricane

Clip Slate: Rotating Winds
Slug: **Hurricane Resource Reel 2005**

Easterly waves off of Africa create a disturbance in the atmosphere and gain energy when passing through the hot Sahara Desert and cooler Gulf Of Guinea. These waves provide the initial energy and spin required for a hurricane to develop, as imaged by the Geostationary Operational Environmental Satellite (GOES, operated by NOAA).

TRT: 25
Super(s): NASA/NOAA
For more info: www.nasa.gov/hurricane

Clip Slate: Converging Winds
Slug: **Hurricane Resource Reel 2005**

With the right mix of winds and ocean temperature, an ordinary cluster of tropical thunderstorms can explode into a tropical storm. Winds converge, forming the familiar circular pattern of clouds. Warm, rising air in the storms draws water vapor up from the ocean. The vapor condenses in clouds and releases heat, warming the eye. This warming lowers the surface pressure, which increases

the surface winds, which then help to evaporate more water vapor, continuing the cycle.

TRT: 48
Super(s): NASA
For more info: www.nasa.gov/hurricane

Clip Slate: Hot Towers
Slug: **Hurricane Resource Reel 2005**

Scientists define a hot tower as a rain cloud that reaches at least to the top of the troposphere, the lowest layer of the atmosphere that extends about 9 miles high in the Tropics. New research indicates a tropical cyclone with a hot tower in its eyewall is twice as likely to intensify in the next six hours than a cyclone that lacked a tower. TRMM measured a (cumulonimbus) storm cloud inside Hurricane Bonnie (1998), towering like a skyscraper 59,000 feet (18 kilometers) above the eyewall. Red color indicates rain rates in excess of 2 inches per hour.

TRT: 34
Super(s): NASA/JAXA
For more info: www.nasa.gov/hurricane

Clip Slate: Hurricane Heat Engine
Slug: **Hurricane Resource Reel 2005**

Hurricanes act as heat engines, using strong winds to facilitate the transfer of heat and moisture from the warm ocean surface. Water vapor from the surface evaporates and is forced up into towering convective clouds that surround the eye wall and rainband regions of the storm. As the water vapor cools and condenses from a gas back to a liquid state, it releases latent heat. The release of heat warms the surrounding air, making it lighter, which promotes more clouds.

TRT: 51
Super(s): NASA
For more info: www.nasa.gov/hurricane

Clip Slate: Cold Water Upwelling
Slug: **Hurricane Resource Reel 2005**

As a hurricane passes over the tropical waters of the Atlantic, the eyewall winds churn the upper ocean, which mixes up cold water from below. The cold water trail left behind by one storm can sometimes weaken and deflect the path of a

second storm. As this cool water rises, it brings with it phytoplankton and nutrients necessary for life. These microscopic plants then bloom in higher than average amounts. Bigger storms cause larger plankton blooms and more plankton absorb a greater amount of carbon from our atmosphere.

TRT: 1:16
Super(s): NASA
For more info: www.nasa.gov/hurricane

Clip Slate: The Hurricane – El Nino Connection
Slug: **Hurricane Resource Reel 2005**

Large-scale Pacific Ocean events like La Nina and El Nino can affect the formation of Atlantic hurricanes. El Nino tends to suppress the formation of hurricanes by steering the subtropical jet stream into the hurricanes' path and shearing off the tops of the storms before they develop into full intensity. During La Nina, the jet stream moves north, and hurricanes tend to more easily evolve without interference.

TRT: 23
Super(s): NASA
For more info: www.nasa.gov/hurricane

TITLE SLATE: NASA's Greatest Hurricane Views

Clip Slate: Hurricanes In HIstory
Slug: **Hurricane Resource Reel 2005**

Hurricane Andrew (1992): NASA/NOAA
Bonnie leaves behind cold waters for Danielle (1998): NASA/JAXA/NOAA
Hurricane Mitch (1998): NASA/NOAA
Miracle Swath – Four Storms in One Pass (1998): NASA/JAXA
Hurricane Floyd (1999): NASA/NOAA
Rainfall and Warm Core Inside Hurricane Erin (2001): NASA/JAXA
TRMM scans Hurricane Isidore (2002): NASA/JAXA

TRT: 3:55
Super(s): NASA
For more info: www.nasa.gov/hurricane

Clip Slate: Earth Observing Fleet
Slug: **Hurricane Resource Reel 2005**

NASA's latest insight into hurricane formation and structure would not be possible without a dedicated fleet of space-based observatories. By combining the unique assets of several distinct federal agencies, scientists have been able to extract information and insight into the structure and processes of hurricane behavior that otherwise would have been impossible prior to a space faring era. Animations: Earth Observing System (EOS) fleet, TRMM, GOES, Terra, Aqua, SeaWiFS, QuikSCAT.

TRT: 3:14
Super(s): NASA
For more info: www.nasa.gov/hurricane

Clip Slate: Aircraft
Slug: **Hurricane Resource Reel 2005**

In an effort to better understand the mechanics of hurricanes, researchers employ specialized aircraft to study the storms. Sometimes they have even taken airplanes directly into hurricanes. In these two segments we see the ER-2 and DC-8 aircraft that are specially outfitted to fly into active hurricane areas to take precise measurements from the air.

TRT: 2:02
Super(s): NASA
For more info: www.nasa.gov/hurricane

Clip Slate: Dropsondes
Slug: **Hurricane Resource Reel 2005**

Described by a researcher as "Pringles cans with parachutes", scientists drop sensors outfitted with GPS and microprocessors called "dropsondes" into a hurricane to gain temperature, pressure, moisture and wind readings throughout different locations in the storm. An ER-2 allows for 16 dropsondes deliveries, while the fully staffed DC-8 plane drops as many as 30-40 dropsondes within the hurricane.

TRT: 26
Super(s): NASA
For more info: www.nasa.gov/hurricane

Clip Slate: B-roll of scientists
Slug: **Hurricane Resource Reel 2005**

B-roll video of NASA scientists at work

TRT: :52
Super(s): NASA
For more info: www.nasa.gov/hurricane

Clip Slate: B-roll of hurricanes
Slug: **Hurricane Resource Reel 2005**

B-roll video of hurricanes

TRT: 2:28
Super(s): NASA
For more info: www.nasa.gov/hurricane

Clip Slate: Interviews
Slug: **Hurricane Resource Reel 2005**

Selected Soundbytes – Dr. Jeff Halverson, NASA Research Scientist
Dr. Marshall Shepherd, NASA Research Scientist

TRT: 1:31
Super(s): NASA
For more info: www.nasa.gov/hurricane