



# U.S. Department of Energy Infrastructure Security and Energy Restoration

**1 June 2011**

Today marks the beginning of the six-month 2011 Atlantic hurricane season which officially runs from 1 June to 30 November, with the vast majority of tropical storm and hurricane activity typically occurring during the August-October peak of the hurricane season. The Atlantic hurricane region includes the North Atlantic Ocean, the Caribbean Sea, and the Gulf of Mexico.

Based upon information obtained through March 2011, the National Oceanic and Atmospheric Administration (NOAA) is predicting that the 2011 Atlantic hurricane season will have significantly more activity than the average 1950-2000 season of 11 named storms, 6 hurricanes, and 2 major hurricanes. NOAA is calling for a 65% chance of an above normal season, which occurs when at least two of the following three conditions are met: 13 or more named storms, 7 or more hurricanes, and 3 or more major hurricanes.

**NOAA estimates a 70% probability for each of the following ranges of activity to occur during the 2011 season:**

- **12 - 18 Named Storms (top winds of 39 mph or higher),**
- **6 - 10 Hurricanes (top winds of 74 mph or higher),**
- **3 - 6 Major Hurricanes (Category 3, 4, or 5 with winds of at least 111 mph).**

NOAA cites three climate factors that contribute to above-normal Atlantic hurricane activity:

1. **The expected continuation of the decades-long cycle known as the Atlantic Multi-decadal Oscillation or AMO**, a period of high-activity in the Atlantic basin that began in 1995 and is evidenced by the natural fluctuations in both sea surface temperature and sea level pressure fields that occur in the North Atlantic Ocean.
2. **A continuation of above-average sea surface temperatures (SSTs) in the tropical Atlantic Ocean and Caribbean Sea in the Main Development Region (MDR)** from the Caribbean to the coast of Africa between 10°N and 20°N, an area in the tropical Atlantic where a majority of major hurricanes form. During the month of April, SSTs in the MDR were about 0.5°C above average, the 14th warmest April sea surface temperatures in the past 100 years. Long-range computer forecast models are predicting a continuation of these above-average sea surface temperatures through the peak part of hurricane season, and
3. **The likelihood that El Niño-Southern Oscillation (ENSO)-Neutral conditions will occur during the 2011 Atlantic hurricane season.** An El Niño event, which tends to suppress Atlantic hurricane activity, is not expected this year. Conversely, La Niña events tend to enhance tropical activity. The current 2010-2011 La Niña period is dissipating and based on observations and ENSO forecast models, ENSO-Neutral conditions are likely during the 2011 Atlantic hurricane season. There is a very wide spread in the model guidance for the August through October period, however, with several models calling for either El Niño or La Niña conditions with the remainder of the models calling for neutral conditions.

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In addition, Dr. Phil Klotzbach and Dr. William Gray of Colorado State University's (CSU) Tropical Meteorology Project have issued their 2011 Atlantic hurricane season projections. The CSU team also expects the current La Niña environment to transition to near-neutral conditions during the heart of the hurricane season and overall, predict that conditions will remain conducive for a very active hurricane season.

Drs. Klotzbach and Gray point out that certain years in the historical record have global oceanic and atmospheric trends which are similar to 2011. There have been five hurricane seasons since 1949 with characteristics most similar to those observed in February and March 2011. Four of these years (1955, 1996, 1999, and 2008) had either neutral or La Niña conditions during the hurricane season, and all four of these were active years. Although the February and March conditions in 2006 were similar to February and March 2011, that year experienced an unexpected El Niño which greatly reduced hurricane activity.

Britain's Tropical Storm Risk (TSR), a consortium of experts on insurance, risk management and seasonal climate forecasting, issued their projections for the 2011 Atlantic hurricane season on May 24. TSR's two predictors are the forecast July through September 2011 trade wind speed over the Caribbean and tropical North Atlantic, and the forecast August through September 2011 sea surface temperature in the tropical North Atlantic. Their researchers anticipate that the first predictor, the trade wind speed, will have a moderate enhancing effect while the sea surface temperature effect will be neutral in nature. TSR predicts 14 named tropical storms, 8 hurricanes, and four major hurricanes.

### **Statistics from the 2010 Atlantic Hurricane Season**

- The 2010 Atlantic hurricane season was above average with 19 named storms, 12 hurricanes, and five major hurricanes. Since 1944, only 1995 (19), and 2005 (28) have had as many named storms.
- No hurricanes made landfall along the Florida Peninsula and East Coast--the fifth year in a row with no hurricane landfalls along this portion of the U.S. coastline. This is the first time since reliable U.S. records began in 1878 that no hurricanes have made landfall along the Florida Peninsula and East Coast in a five-year period.
- This is also the first time in recorded history that as many as 12 hurricanes have occurred in the Atlantic basin without a U.S. landfall. Prior to that record, at least two hurricanes made landfall in the United States when a minimum of 10 hurricanes occurred in the Atlantic basin.
- In 2010, no major hurricanes made U.S. landfall. Following seven major hurricane landfalls in 2004 and 2005, the nation has not witnessed a major hurricane landfall in the past five seasons. The five consecutive years between 1901-1905 and 1910-1914 have been the only other consecutive five-year periods with no major U.S. hurricane landfalls.
- Only one tropical storm, Bonnie, made U.S. landfall in 2010. We have not had a hurricane landfall since Hurricane Ike in 2008. The last time that the United States went two years in a row with no hurricane landfalls was 2000-2001.

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- Only three tropical storms have made landfall over the past two years. The last time that three or fewer tropical cyclones made landfall in any consecutive two-year period was 1990-1991.
- Twelve hurricanes occurred in 2010. Since 1944, only two seasons, 1969 (12) and 2005 (15) have had the same or more hurricanes in a single season.
- Five major hurricanes formed during the 2010 hurricane season. Since 1944, only seven seasons (1950, 1955, 1961, 1964, 1996, 2004 and 2005) have had more than five major hurricanes form.
- No Category 5 hurricanes developed in 2010. This is the third consecutive year with no Category 5 hurricanes. The last time that two or more years occurred in a row with no Category 5 hurricanes was 1999-2002.
- Eleven named storms formed between August 22 and Sept. 29. This is the most named storms to form during this period, breaking the old record of nine named storms set in 1933, 1949, 1984 and 2002.
- Five hurricanes formed during the month of October. Only 1870 (six hurricanes) and 1950 (five hurricanes) have had at least five systems reach hurricane strength for the first time during October.
- Both Igor and Julia were at Category 4 status on September 15. The only other time that two storms were both at Category 4 status in the Atlantic was on September 15, 1926.
- Four Category 4 hurricanes (Danielle, Earl, Igor and Julia) formed in the Atlantic during a 20-day period between August 27 and September 15. This is the shortest time span on record for four Category 4 hurricanes to develop, breaking the old record of 24 days set in 1999 (*Statistics from Dr. Phillip Klotzbach, Colorado State University*).

After the 2010 Atlantic hurricane season, Environment Canada successfully petitioned the World Meteorological Organization (WMO) Hurricane Committee to officially retire the name Igor from its rotating list of Atlantic hurricane names. Hurricane Igor hit Newfoundland on September 21, 2010 as a Category One storm causing fatalities and total damage estimated near \$200 million. Canada requested that the name be retired in consideration of the devastating impacts of the storm. WMO agreed to retire the names Igor and Tomas at this year's annual meeting because of the deaths and damage they caused in 2010. Ian and Tobias were chosen as replacement names on the rotating list.

The first named storm of the 2011 Atlantic hurricane season will be Arlene.

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RESOURCES: "Central American/Caribbean Landfall Probability Calculations", Drs. Philip Klotzbach and William Gray, Colorado State University Department of Atmospheric Science.

"Extended Range Forecast of Atlantic Seasonal Hurricane Activity and Landfall Strike Probability for 2011", Drs. Philip Klotzbach and William Gray, Colorado State University Department of Atmospheric Science.

"NOAA 2011 Atlantic Hurricane Season Outlook", National Oceanic and Atmospheric Administration Climate Prediction Center. WeatherUnderground, Dr. Jeff Masters.

"ESSC Scientists Make Prediction for 2011 North Atlantic Hurricane Season", Michael E. Mann, Michael Kozar, Earth System Science Center, Pennsylvania State University.

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