



Weather Central forecasts an above-normal Atlantic hurricane season

Weather Central forecasters are predicting that the Atlantic Basin will see more activity than normal during the 2011 hurricane season, which runs from June 1 to November 30. Forecasters are calling for 13-16 named storms (tropical cyclones earn their name when sustained winds reach 39 mph or higher). Of those named storms, 6-9 are expected to reach hurricane status (with winds of 74 mph or higher), and 3-5 are projected to become major hurricanes (with winds of 111 mph or higher). The seasonal average for the Atlantic Basin includes 11 named storms, 6 hurricanes and 2 major hurricanes.

The primary factors that suggest above-normal activity include:

- 1) The continuation of the high activity era which began in 1995
- 2) Above normal sea surface temperatures in the Main Development Region (MDR) for tropical cyclones
- 3) The expected shift from La Niña to nearly El Niño-Southern Oscillation (ENSO)-neutral conditions; however some atmospheric characteristics from the current La Niña episode will likely persist into the hurricane season
- 4) Dynamical models are generally predicting conditions indicative of an active season

Tropical Multi-Decadal Signal

The high activity era in the Atlantic Basin, which began in 1995, is due in part to the tropical multi-decadal signal. The tropical multi-decadal signal features a number of atmospheric conditions that are conducive to tropical cyclone genesis. These conditions include reduced vertical wind shear in the MDR, weak easterly trade winds near Africa, a favorable orientation of the African easterly jet, as well as a number of other atmospheric variables. Since the high activity era began in 1995, the Atlantic Basin has seen a seasonal average of 15 named storms, 8 hurricanes and 4 major hurricanes.

Sea Surface Temperatures

Water temperatures in the MDR - the area between the west coast of Africa and the Caribbean - have been above average during the Spring of 2011. There is a wide swath where temperatures are 0.5 degrees Celsius warmer than the 30-year climatological average. Pockets near the Leeward Islands and the Cape Verde Islands have been as warm as 1.5 degrees Celsius above the 30-year climatological average as late as May 2011.

While these water temperatures are notably above average, the geographical extent and magnitude of the warm anomalies are not quite as extensive as the same time in 2010. At that time, sea surface temperature anomalies exceeded 2.0 degrees Celsius in portions of the MDR.

When considering only sea surface temperature anomalies, the closest analog year is May 1998. Similar anomalies patterns were also observed in 2006 and 2008. Two of those three seasons (1998 and 2008) experienced above average tropical cyclone activity in the Atlantic Basin.

ENSO

The Pacific Ocean, which covers nearly one third of the Earth's total surface area, plays a large role in weather and climate throughout a significant portion of the globe, including much of North America and the adjacent Atlantic Ocean. Surface and sub-surface water temperatures surrounding the equatorial Pacific are particularly important to climate, providing varying amounts of tropical moisture to the atmosphere and significantly affecting jet stream patterns across the Atlantic and Caribbean basins. This climate phenomenon, better known as the El Niño-Southern Oscillation (ENSO), is one factor that contributes significantly to our 2011 hurricane season forecast.

ENSO can be measured in a number of ways, but most indicators showed moderate to strong La Niña conditions during the autumn and winter months of 2010 and early 2011. La Niña is the phase of ENSO associated with anomalously cold water temperatures in the eastern equatorial Pacific and warmer than normal water across western parts of the basin. Such conditions typically lead to low wind shear and correspondingly higher probabilities for tropical cyclone formation, intensification and maintenance across the MDR. Current observations of water temperatures in the Pacific show La Niña quickly fading towards ENSO-neutral conditions in the short-term, and most computer forecast guidance agrees. We must note that the atmosphere often tends to lag behind changing conditions in the ocean. Indeed, the Multivariate ENSO Index (MEI), which is one measure of ENSO that includes both oceanic and atmospheric variables, shows La Niña continuing in a rather potent state. This may indicate that even while the Pacific is returning to neutral conditions, the atmosphere is likely to hold in a pattern more typical of La Niña in the coming months. For this reason, we expect ENSO to contribute to a more active than normal hurricane season across the Atlantic Ocean in 2011.

Other Factors

Dynamical models are generally predicting conditions that indicate above-normal tropical activity this season. One such model indicates that mean sea-level pressure will likely be lower than normal from the MDR through the Caribbean Sea and Gulf of Mexico during the period of August through October, 2011 - the heart of hurricane season. The same model indicates that precipitation will likely be higher than normal across the Caribbean for the same time period, with the possibility for higher-than-normal precipitation extending through most of the Gulf of Mexico and also just east of the Southeast coastline.

Forecast Confidence

The seasonal outlook predicts the overall number and intensity of tropical cyclones throughout the entire Atlantic Basin well in advance; however, it is much more difficult at this point to predict if, when and where individual storms will make landfall. Some work has been done in this area to suggest that a wet winter and spring pattern from the Midwest to the Northeastern portion of the United States often favors re-curving tropical cyclones. Drier-than-average conditions in the same area favor a higher probability of landfall. The weather pattern clearly has been wet in these areas so far this spring, implying a reduced threat of landfall to the United States Eastern Seaboard.

Forecasters are fairly confident in the forecast for above-normal activity this season, but the main source of uncertainty is ENSO, and the difficulty associated with forecasting the state of ENSO months before the peak of hurricane season. We caution that the landfall forecast carries lower confidence than the number of tropical cyclones we are predicting. Remember that it only takes one land falling hurricane to make it a bad season for people impacted along the coast.