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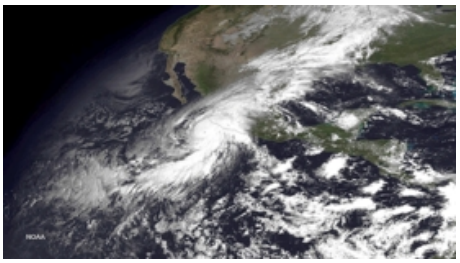
# How Hurricane Patricia Quickly Became a Monster Storm

The ideal combination of high ocean temperature, soaring humidity and slow prevailing winds created the record-breaking beast

By Erik Vance | October 23, 2015 | Véalo en español | 0

Hurricane Patricia, the strongest hurricane ever recorded in the Western Hemisphere, is plowing toward Mexico's west coast. The Category 5 storm was a modest hurricane just two days ago but has quickly become a monster, seemingly out of nowhere.



*Courtesy of NOAA*

As the Mexican government in three states scrambles to evacuate thousands of people, meteorologists are watching nervously to see what the storm will do next. Patricia, they say, is shaping up to be not only the most powerful but the fastest-growing on record. Twenty-four hours ago, the winds were an impressive 130 miles per hour. Now, at 200 miles per hour, the winds are comparable to the strongest tornadoes.

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"The wind damage is going to be something extraordinary," says Jeff Masters, a meteorologist at the Weather Underground. "We're talking like a high end EF4, low end EF5 tornado that's 15 miles wide hitting the coast, if it stays at this strength." (An EF5 tornado is extremely damaging, and tornadoes are rarely more than a mile wide.)

How did a seemingly moderate hurricane turn into such a beast? Three factors affect the creation of a hurricane. First, and most important, is the temperature of the ocean's surface water. Right now the water in the Eastern Pacific is more than 30 degrees Celsius, roughly a full degree higher than it normally is this time of year, according to David Adams, a scientist at the National Autonomous University of Mexico, in Mexico City. "Just the difference of a degree or two" can really pump up the energetics of a hurricane, he says.

Second, the speed of atmospheric winds (not part of the hurricane) moving across the upper reaches of the storm formation is low. If the wind there is high, it can divert a hurricane or shear it apart. But over the past few days, the winds along Mexico's west coast have been unusually calm.

Finally, there is the humidity. A powerful hurricane needs moist air to feed it. "The relative humidity was 80 percent there," Masters says. "We're used to seeing relative humidities lower, like in the 60 and 70 percent range."

Over the last 24 hours, these factors have combined perfectly to build a truly frightening hurricane that the Mexican National Weather Service is calling "the most dangerous storm in history."

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Meteorologists say it is not a surprise that this storm comes during a time when El Nino, a set of atmospheric and oceanic conditions over the Pacific, is especially strong. Generally, a period of significant El Nino conditions will bolster Pacific hurricanes while sapping strength from those in the Atlantic. What is unusual is that such a huge storm comes this late in the hurricane season, when ocean temperatures and humidity tend to drop off.

In September 2013, Hurricane Manuel rocked a similar segment of Mexico's coastline, which includes the cities of Manzanillo and Acapulco. Although weaker than Patricia, that hurricane caused massive flooding, which resulted in prolonged looting and lawlessness in Acapulco. Patricia could repeat that, though with much stronger winds.

"The forecasts are that it will move in pretty quickly and dissipate, because it's going to hit head-on with the really high mountains that are around Jalisco and Michoacán. That tends to destroy the structure of the hurricane. But of course that's going to lead to really hideous amounts of rainfall," Adams says.

In that case, the storm could cause damage as far away as the inland city of Guadalajara and be felt as far away as South Texas. Adams says that would actually be a preferable scenario to the alternative, which would be if the storm simply stays just off the coast, wreaking havoc on the cities there for many hours.

It's still not clear exactly how Patricia grew so quickly. Like Hurricane Katrina that drowned New Orleans, it could have hit an especially warm patch of water at just the wrong time, Masters notes. But because Patricia has not been as closely monitored as Katrina was, he adds, scientists may never know for sure.

Nor can they say what role climate change could have had on a single weather event like a hurricane. But Adams says Patricia might be a glimpse at the kinds of storms a warmer climate might produces. "This may be a preview of what could happen if you increase, summarily, sea surface temperatures on the order of a degree or so."

*Additional reporting by Sally Rios Kuri*

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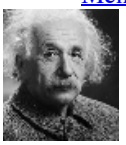
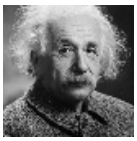

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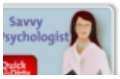
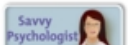


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