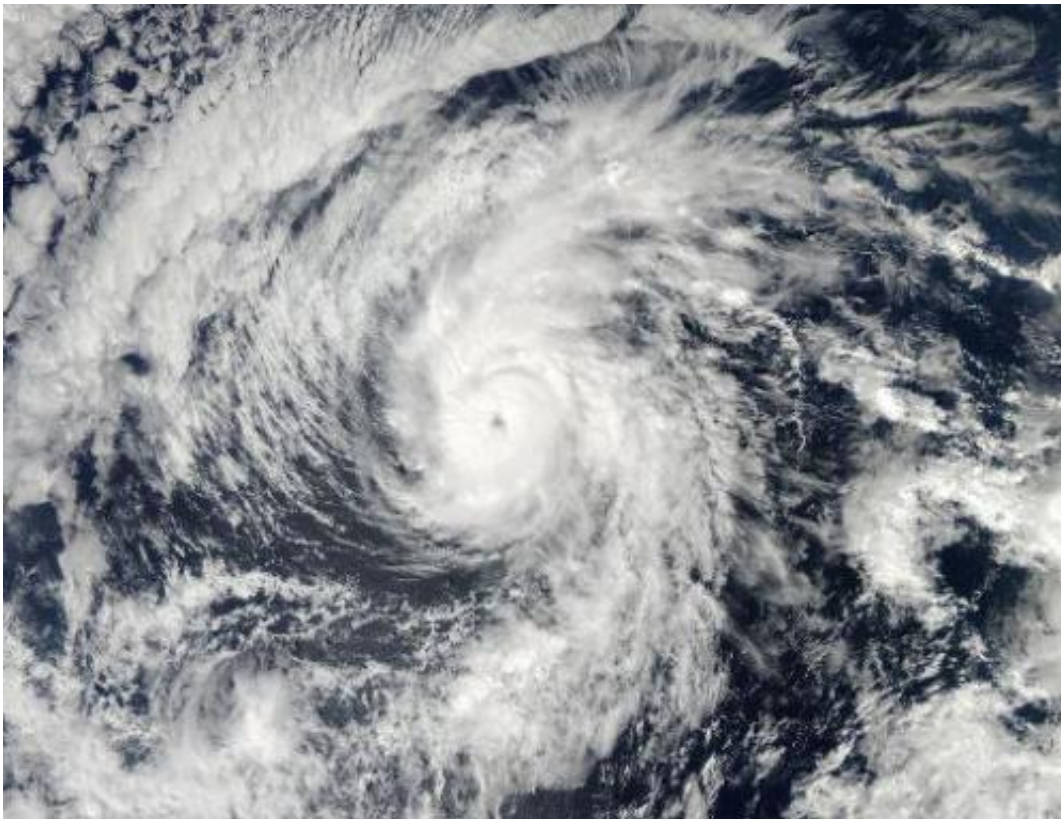


# Weaker than expected Atlantic hurricane season ends

December 1 2013

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This October 27, 2013 NASA satellite image shows Hurricane Raymond churning in the Pacific Ocean off Mexico.

The 2013 Atlantic hurricane season officially ended on Saturday as the quietest since 1982 and the sixth least active since 1950, the US National Oceanographic and Atmospheric Administration said.

Thirteen tropical storms formed since early June in the Atlantic but only two, Ingrid and Humberto, reached hurricane strength.

While the number of named storms topped the historical average of 12, the number of hurricanes was well below the historic average of six medium-strength category one or two storms and three major category three storms and above.

Category three hurricanes have wind speeds of at least 110 miles (178 kilometers) per hour, while a category four storm can pack winds of 130 miles (210 kilometers) per hour or more. The most damaging are category five storms with winds of at least 155 miles (250 kilometers) per hour.

NOAA had predicted in May that 2013 would be more active than usual, with 13 to 20 tropical storms, and three to six hurricanes.

"This unexpectedly low activity is linked to an unpredictable atmospheric pattern that prevented the growth of storms by producing exceptionally dry, sinking air and strong [vertical wind shear](#) in much of the main hurricane formation region, which spans the tropical Atlantic Ocean and Caribbean Sea," said Gerry Bell, NOAA's lead hurricane forecaster.

"Also detrimental to some [tropical cyclones](#) this year were several strong outbreaks of dry and stable air that originated over Africa."

A study published in June in the British journal Nature Geoscience, found that a drop in the frequency of tropical storms in the north Atlantic during the 20th century may have resulted from human activity through the production of aerosols, tiny chemical particles suspended in the atmosphere.

Aerosols may affect the formation of clouds and more importantly act as a screen to reduce the ocean's surface temperatures, thereby reducing the heat that fuels tropical storms.

The work of Nick Dunstone of Britain's Met Office showed that storms and hurricanes were less frequent in the north Atlantic during periods of high concentration of aerosols over the region.

Conversely, the study found that measures since the 1980s to tackle pollution and improve air quality reduced levels of aerosols—and in turn ramped up hurricane activity.

And they anticipate that Earth-warming greenhouse gases will exert more influence on the frequency of tropical storms than aerosols.

Other studies have linked climate warming to an increase in intensity of tropical storms.

While the United States emerged largely unscathed from the [hurricane](#) season this year, Mexico was hit by five [tropical storms](#) and three hurricanes. Three of the storms originated in the Atlantic and the other five in the northeast Pacific, NOAA said.

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Citation: Weaker than expected Atlantic hurricane season ends (2013, December 1) retrieved 13 May 2024 from <https://phys.org/news/2013-12-weaker-atlantic-hurricane-season.html>

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