

NOAA
Questions and Answers

Hurricanes and Climate Change

Question: The 2005 Atlantic hurricane season was one of the most active on record. Is global climate change responsible for this increased activity?

Answer:

- Available research indicates increased hurricane activity can be explained by natural cycles of hurricane activity driven by the Atlantic Ocean along with the atmosphere above it. There is always natural variability in our planet's climate and we are in a period of heightened hurricane activity, similar to the period we experienced during the 1940s through the 1960s.
- History shows a multi-decadal period of increased Atlantic hurricane activity from the 1940s to the late 1960s, fewer than average major hurricanes for about the next 25 years, and now an increased number since 1995. If the cycle persists, we may very well be in a period of increased hurricane activity for the next 10 to 20 years or more.
- NOAA is currently conducting research to better predict the number and intensity of hurricanes during a hurricane season. NOAA is also working to better understand how climate variability and change may impact hurricane frequency and intensity.
- Additionally, NOAA has commissioned its Science Advisory Board to develop a working group to conduct an independent review of NOAA's hurricane intensity research, development, and transition to operations.

Background:

- The 2005 Atlantic hurricane season was the most active on record in terms of the number of named storms. By other measures of global hurricane, tropical storm, and cyclone activity, 2005 ranks as one of the most active but not as #1.
- Available research indicates that the effect of global climate change on hurricanes, if any, is relatively small, whereas the fluctuations in activity associated with multidecadal changes in oceanic temperatures is very large. The historical multidecadal-scale variability in Atlantic hurricane activity is much greater than what would be expected from a gradual global temperature increase attributed to global climate change, although it is possible that a small fraction of the increase in hurricane activity might be associated with the gradual, long-term sea-surface temperatures increase.

- The current Atlantic hurricane data base, especially pre-satellites, however is not sufficiently reliable over a long enough period to draw a conclusion on any long-term trends in activity.
- Computer analyses at the Geophysical Fluid Dynamics Laboratory in Princeton, NJ predict that by 2080, "seas warmed by rising atmospheric concentrations of heat-trapping greenhouse gases could cause a typical hurricane to intensify about an extra half step on the five-step scale of destructive power."
- The years 1995-2005 have experienced the highest level of Atlantic hurricane activity north of the equator in the reliable record. Compared with the generally low activity of the previous 24 years (1971-94), the last ten years have seen a doubling of overall activity for the whole basin, a 2.5-fold increase in major hurricanes (sustained winds >50 m/s or >111 mph) and a five-fold increase in hurricanes affecting the Caribbean region. As for the increase in major hurricane activity, this is not implying the basin is seeing stronger hurricanes, but rather more of the stronger storms.
- NOAA uses global climate models to test how changes in oceanic and atmospheric conditions influence hurricane formation. For example, by running a model with ocean temperatures set at different degrees, it is possible to begin to understand how changing ocean temperature affects hurricane frequency from season to season. As global climate models improve so will predictions of seasonal hurricane frequency.

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