

Human Activities Are Boosting Ocean Temperatures in Areas Where Hurricanes Form

September 11 2006

Rising ocean temperatures in key hurricane breeding grounds of the Atlantic and Pacific oceans are due primarily to human-caused increases in greenhouse gas concentrations, according to a study published online in the September 11 issue of the *Proceedings of the National Academy of Sciences*.

Using 22 different computer models of the climate system, Benjamin Santer and six other atmospheric scientists from the Lawrence Livermore National Laboratory, together with Tom Wigley, Gerald Meehl, and Warren Washington from the Boulder-based National Center for Atmospheric Research (NCAR) and scientists from eight other research centers, have shown that the warming sea surface temperatures (SSTs) of the tropical Atlantic and Pacific oceans over the last century is linked to human activities.

"We've used virtually all the world's climate models to study the causes of SST changes in hurricane formation regions," Santer says.

Research published during the past year has uncovered evidence of a link between rising ocean temperatures and increases in hurricane intensity. This has raised concerns about the causes of the rising temperatures, particularly in parts of the Atlantic and Pacific where hurricanes and other tropical cyclones form.

Previous efforts to understand the causes of changes in SSTs have focused on temperature changes averaged over very large ocean areas, such as the entire Atlantic or Pacific basins. The new research specifically targets SST changes in much smaller hurricane formation regions.

For the period 1906-2005, the researchers found an 84 percent probability that human-induced factors--primarily an increase in greenhouse gas emissions--account for most of the observed rise in SSTs in the Atlantic and Pacific hurricane formation regions.

"The important conclusion is that the observed SST increases in these hurricane breeding grounds cannot be explained by natural processes alone," says Wigley. "The best explanation for these changes has to include a large human influence."

Hurricanes are complex phenomena that are influenced by a variety of physical factors, such as SSTs, wind shear, water vapor, and atmospheric stability. The increasing SSTs in the Atlantic and Pacific hurricane formation regions are not the sole determinant of hurricane intensity, but they are likely to be one of the most significant influences.

"It is important to note that we expect global temperatures and SSTs to increase even more rapidly over the next century," Wigley says.

According to Santer, "In a post-Katrina world, we need to do the best job we possibly can to understand the complex influences on hurricane intensity, and how our actions are changing those influences."

Other institutions contributing to the study include the University of California, Merced; Lawrence Berkeley National Laboratory; Scripps Institution of Oceanography; the University of Hamburg; the University of East Anglia; Manchester Metropolitan University; NASA's Goddard

Institute for Space Studies; and NOAA's National Climatic Data Center.

Source: National Center for Atmospheric Research

Citation: Human Activities Are Boosting Ocean Temperatures in Areas Where Hurricanes Form (2006, September 11) retrieved 19 April 2024 from <https://phys.org/news/2006-09-human-boosting-ocean-temperatures-areas.html>

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