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Climate Attribution

Climate attribution is a scientific process for identifying the major sources of observed climate and weather patterns. This includes attribution of the causes for observed climate variations that may not be unusual, but for which great public interest exists because they produce profound societal impacts. Attribution can be considered a process for explaining a detected change; whether human-caused climate change, or changes that could be expected from natural variations of the climate system. Climate attribution is envisioned to become a key component of a National Climate Service.

Why Attribution?

Policy-makers, decision-makers, and the public are increasingly interested in explanations of current climate conditions and how they compare with the past. They also want to know why climate is evolving as observed; that is, to provide attribution of the causes for observed climate variations and change.

Of great importance is ensuring that natural variability, when occurring, is not misunderstood to indicate that climate change is either not happening or that it is happening more intensely than the true human influence. For example, learning whether recent drought in the western U.S. is due mainly to natural

factors of climate variability where a return toward previous climate conditions might be anticipated, or if it is instead a longer-term trend toward increasing dryness in the region due to human-caused climate change. Armed with this information, preparations can be made to respond to similar events in the future.

How is Attribution Performed?

ESRL's Physical Sciences Division led creation of a Climate Attribution activity to provide explanations of the observed state of the climate system, specifically: U. S. annual surface temperature and precipitation; U. S. extreme events and major climate anomalies, including drought, cold outbreaks, heat waves, and floods; intensity of the hurricane season; and apparent abrupt regional changes. The group will assess the performance of climate predictions including: explaining the success and failure of U.S. seasonal temperature and precipitation predictions, ocean predictions and drought outlooks.

The scientific methods used can involve both analyzing observations and their past climate relationships, and experimentation with

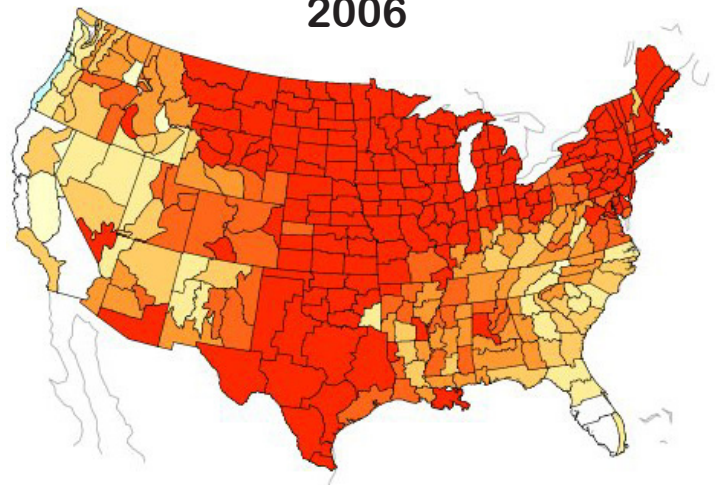
climate models to evaluate climate processes that could force changes.

What are the Benefits?

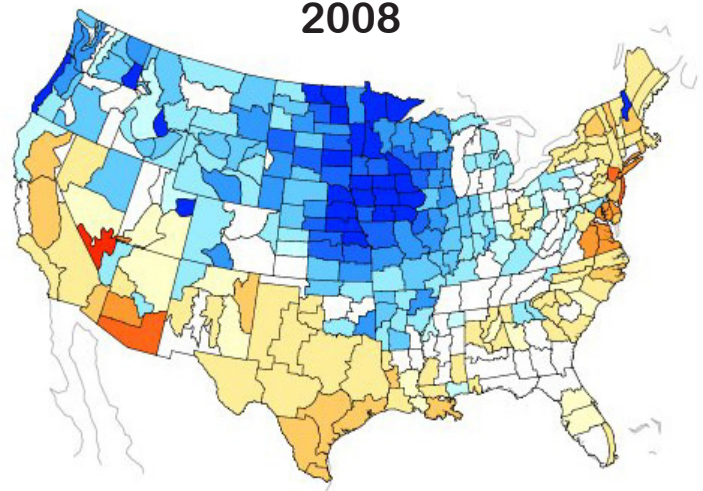
Timely and authoritative explanations of current and evolving climate conditions are required to meet surging public interest and needs for climate information.

Without clear and present knowledge of the state of the climate system, policy and decision makers cannot make informed decisions concerning how society should invest in critical infrastructure in risk-prone areas. The over 1,800 lives lost in Hurricane Katrina alone, the vast devastation of Gulf coastal and related marine resources, the more than 180,000 lost jobs, and the \$100B financial loss during the 2005 hurricane season are striking examples of the need to inform policy and decision makers of the causes of such events and related implications for the future. A more recent case is impacts on the Nation's commerce due to the 2008 Midwest Floods with estimated \$15B in damages to agriculture and infrastructure. Considered a 100-year flood event, but following a comparable flood in 1993, critical questions are whether climate change is now radically altering the probability of such extreme weather events and whether the Nation can adapt to such changes.

2006



2008



Annual temperature departures for the years 2006 and 2008. 2006 was one of the warmer years on record since 1895. 2008 was the coldest year in 14 years. The Climate Attribution Team explained what was the effect of the El Nino cycle vs. greenhouse gases on these conditions.

NOAA Partners for this Project:

Climate Prediction Center
Geophysical Fluid Dynamics Laboratory
National Climatic Data Center

On the Web

<http://www.cdc.noaa.gov/csi>

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