

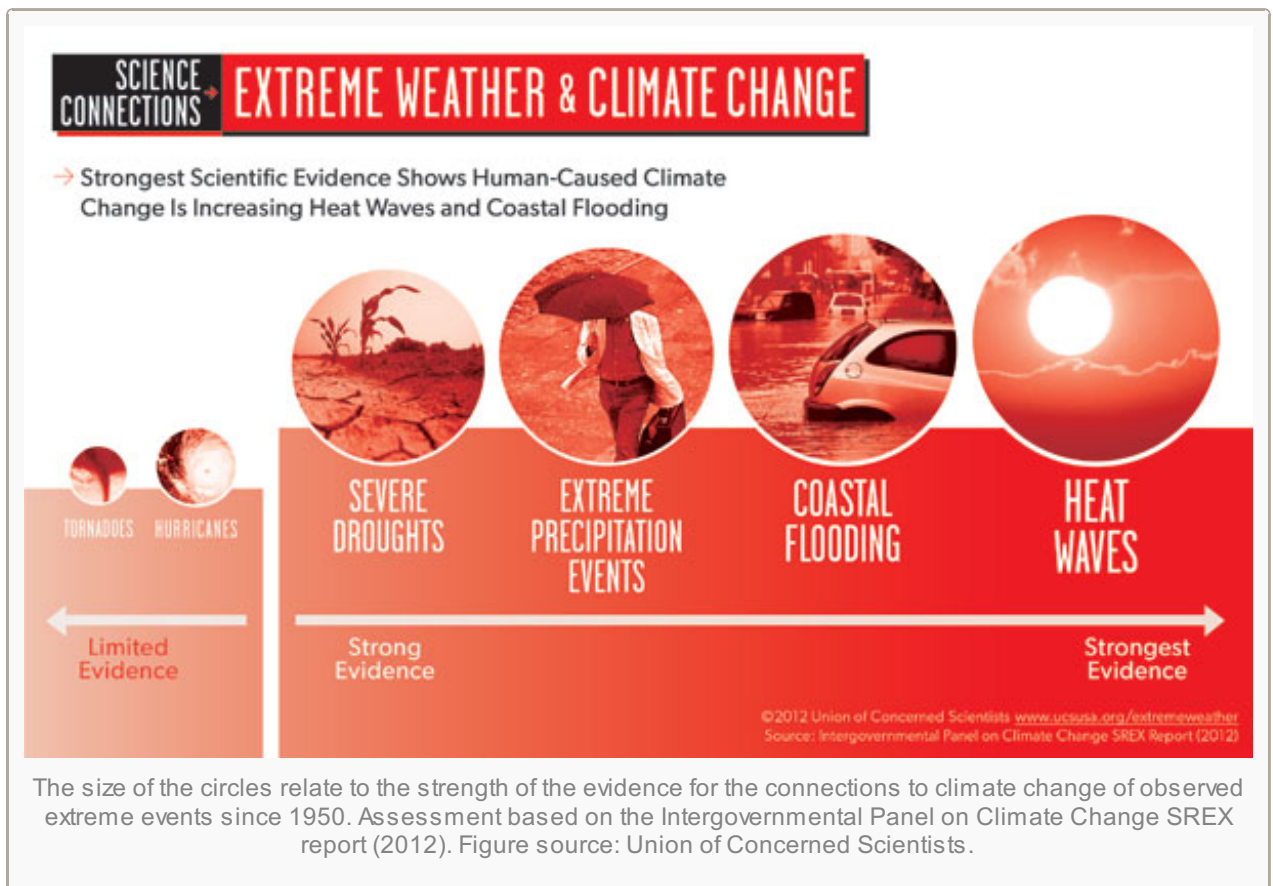
# Evidence Check: Which Extreme Weather Events Are More Linked with Climate Change – Heat Waves or Hurricanes?

The heat gripping the [United States this month has been relentless](#). And if that weren't enough, hurricane season is upon us. How does the scientific evidence stack up over the past decades regarding how these extreme events are changing? And how much influence does human-caused climate change have on these events? We created an [infographic](#) to serve as a quick reference of the [current state of scientific understanding](#).

**UPDATE July 18th** (see at bottom of post)

It is the question so many have asked climate scientists over the years, usually right after devastating loss of life or property from an extreme weather event: Are there any connections with climate change? This infographic hopefully can help answer these questions.

The infographic was based on careful evaluation of the latest



authoritative assessment by the Intergovernmental Panel on Climate Change (IPCC) known as the Special Report on Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation (SREX). I worked with UCS communications staff Matt Heid, Aaron Huertas, and Colleen MacDonald to distill into a graphic what the SREX report stated about historical observations of extreme events and their relationship to human-caused climate change over an entire report.

The SREX report uses different ways of [conveying scientific evidence, agreement and confidence](#) regarding different weather phenomena, including how those phenomena have been changing over the past 50 years and attributing if human-caused climate change has played a nonexistent, minor, or major role in driving those changes.

There were traditional likelihood terms defined by the IPCC such as “likely” (66 to 100 percent probability) or “very likely” (90 to 100 percent probability) to describe these relationships as well as expressions of scientists’ overall confidence in their findings, which ranged from low to medium to high.

We decided to depict six phenomena for which we get the most questions or have the strongest evidence. For example, we chose to depict the circle size for the IPCC’s assessment of overall effect on tropical cyclones (we call them hurricanes to use a term most audiences are more familiar with) rather than its separate assessments for tropical cyclone wind speed or tropical cyclone frequency in different ocean basins.

For example, here are the terms used in the SREX report for the following extremes:

<b>Extreme</b>	<b>Observed Changes since 1950</b>	<b>Attribution of Observed Changes to Human-Caused Climate Change</b>
Heat	very likely	likely
Coastal high water	likely	likely
Precipitation, some regions	likely	medium confidence
Droughts, some regions	medium confidence	medium confidence
Tropical Cyclone wind speed	likely	low confidence
Tropical Cyclone overall	low confidence	low confidence
Tornadoes	low confidence	Not Given

In order to make the circles in the infographic relate to the list of combined terms we created a “score” based on the lower range of IPCC likelihood findings. So **likely** connections were given a score of 66 and **very likely** connections a score of 90. The report does not give any such guidance for the confidence terms, so we created another scoring system also based on a 100 point scale to at least get us in the ballpark. We assigned **medium confidence** a score of 50 out of 100 and **low confidence** a score of 10. If there was no term assessed (such as with tornadoes attribution) that was assigned a score of zero. Hence tornadoes have the smallest size circle on the infographic while heat waves have the largest.

Note this is the evidence to date regarding extreme events since 1950. In many cases we are hampered by changes in historical data gathering techniques and other factors. For future projections of heat waves, coastal high water, drought and other phenomena, the SREX report typically uses much higher confidence language, in large part because scientists are very confident that temperatures are continuing to increase and the underlying physics point to growing incidences of weather extremes under climate change.

Reducing heat-trapping emissions, of course, would decrease the amount and rate of warming we will experience and subsequently lessen the consequences climate change could have for various weather extremes compared to an unabated emissions trajectory.

**UPDATE** July 18th:

We updated our infographic to clarify that human-caused climate change is **increasing** heat waves and coastal flooding, not the sole source **driving** them. Heat waves and coastal flooding would continue, of course, even in the absence of global warming. But in a warming world, both are increasingly frequent and severe.

For example, the heat (and drought) that Texas experienced in the summer 2011 was made more likely by changes in water temperature in the tropical Pacific associated with [La Niña](#). Recent research suggested that climate change made [extreme heat in Texas some twenty times more likely](#) than in equivalent La Niña years in the mid-20th century. Thanks to Peter Frumhoff (UCS) and Andrew Revkin (New York Times) for suggesting the language change.

Posted in: [Global Warming](#) Tags: [Attribution](#), [climate-change](#), [Extreme Weather](#), [IPCC SREX Report](#)

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