**Whats New (and What Isn't) in the IPCCs Report on Extreme Weather**

**The world's leading science panel studied the link between man-made warming and wild weather for the first time. InsideClimate News examines its results.**

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Record heat waves, drought, floods, thunderstorms, tornado outbreaks—extreme weather battered much of the United States and parts of the world in recent years, causing an unprecedented number of deaths and economic losses.  
  
What role has global warming played, if any?  
  
The answer has implications that go beyond the ideological debate in U.S. politics over climate change. It affects, among other things, the future direction of the 19-year-old U.N. [Framework Convention on Climate Change](http://unfccc.int/) (UNFCCC), the main forum for the global fight to limit warming. To date its priority has been emissions cuts, or "mitigation," to keep climate change in check. But is it too late for that, as [some scientists now say](http://www.washingtonpost.com/national/national-security/greenhouse-gases-soar-scientists-see-little-chance-of-arresting-global-warming-this-century/2011/11/21/gIQAOgltiN_story.html)? Is it time for "adaptation" (finding ways to live with heat waves, rising seas and flooded coastlines and scarcer water and food supplies) to finally share focus and UNFCCC resources?

Figure 1 Rajenda Pachauri, chair of the Intergovernmental Panel on Climate Change (IPCC), presents a talk at PopTech 2011 in Camden, Maine, Oct. 2011

Growing scientific evidence indicates that the answer to that question is yes.

Severe weather in the United States and elsewhere has grown [more frequent](http://www.ncdc.noaa.gov/special-reports/2011-spring-extremes/) since 1980. Contributing to the shift is the accumulation of heat-trapping carbon dioxide in the air from human activities—though teasing out the exact contribution is tricky.

As usual with climate science, there are uncertainties and complexities in the data on climate extremes, and skeptics have pounced on the unknowns to exaggerate doubts about the consensus on climate change and to make the case for inaction. To counter those charges, the [UN Intergovernmental Panel on Climate Change](http://www.google.com/url?sa=t&rct=j&q=&esrc=s&source=web&cd=1&ved=0CCcQFjAA&url=http%3A%2F%2Fwww.ipcc.ch%2F&ei=cj7KToXPHYiTswaSrI3oBg&usg=AFQjCNFAawLD3GWiyGx0HC9l_uj-MVOiXQ) (IPCC), the world's leading scientific body on global warming, has produced a new report designed especially for the world's politicians that tries for the first time to clarify the link between wild weather and global warming.

Specifically, the authors of the [Special Report for Managing the Risks of Extreme Events and Disasters to Advance Climate Change Adaptation](http://ipcc-wg2.gov/SREX/images/uploads/SREX-SPM_Approved-HiRes_opt.pdf) (SREX) wanted to know what the research says about whether greenhouse gas emissions cause extreme weather; who is, and will be, hardest hit by these disasters; and how can governments and organizations lessen the impacts.  
  
In this primer InsideClimate News takes a look at what the IPCC gleaned from its two years of research into these questions.

**Has "anthropogenic," or human-caused, climate change already altered the frequency of extreme weather events?**

Simply put, yes.

Using observations from papers published in peer-reviewed journals, data from long-term monitoring projects and climate models dating back to 1950, IPCC scientists concluded there has been an overall global increase in the number of warm days and nights, as well as in the length and frequency of heat waves, because of global warming.

Droughts are more frequent and longe**r**, particularly in southern Europe and West Africa, it found. As well, the frequency of days with heavy precipitation is up in some regions (warmer air holds more moisture). Tropical cyclones, the generic term for typhoons and hurricanes, have shifted poleward in recent years; and, as a result, storms have made landfall in areas that previously didn't lie in the tracks of cyclones.

The IPCC said it is "likely"—a 66 percent to 100 percent probability—that the temperature and precipitation trends mentioned above are caused by a rise in greenhouse gas emissions from human activities like burning fossil fuels and deforestation. They are less certain about cyclones because of spotty historical records.

**Who has been most affected by these extremes so far?**

During the past half century, developed countries were the hardest hit economically from weather- and climate-related disasters, with damages of as much as $200 billion annually, up from a few billion in 1980. The number of deaths linked to these calamities is up, too. More than 95 percent of the deaths recorded occurred in developing countries. The IPCC authors predict these trends will continue throughout the 21st century.

**What, specifically, does the IPCC say about what's in the store for the future?**

In short, the extreme weather the world experienced in recent years is likely to become the norm.

**Temperatures:** It's no secret the planet is heating up. Last month, [a two-year review of world temperature data](http://insideclimatenews.org/news/20111020/berkeley-earth-project-global-warming-climate-change-science-skeptics-temperature-record) by a former climate skeptic at the University of California, Berkeley, confirmed the consensus that the Earth has warmed by roughly 1.6 degrees Fahrenheit over the past 50 years.

The IPCC authors note it is "virtually certain"—a 99-100 percent probability—that daily temperatures will continue to rise worldwide throughout the 21st century. Heat waves will increase in length, frequency and intensity. Extreme hot days that happened once every 20 years will now happen once every two years. These record-breaking warm periods could be as much as 5.4 degrees Fahrenheit higher by 2050 than they are today, and as much as 9 degrees Fahrenheit higher by the late end of the century. The higher temperatures could alter landscapes and put enormous pressure on people's livelihoods.

**Droughts:** Droughts, along with all the problems they cause, including food and water shortages and resulting conflicts over the scarce resources, will continue to intensify in the 21st century. Regions of southern and central Europe, the Mediterranean, southern Africa and parts of North, Central and South America will be the hardest hit, due to "reduced precipitation"in those areas and more evaporation, which dries up bodies of water and soils.

**Storms**: Hurricanes are powered by the release of moisture and heat from warm oceans. So, naturally, as sea temperatures rise due to greenhouse gas increases, these storms are expected to become stronger—though not necessarily more frequent.

Warmer temperatures can trigger a shift toward weak El Nino-like conditions, which reduce hurricane activity. The ones that do form, however, will be much more intense, with higher wind speeds and more rain, the IPCC said, as increasing sea temperatures fuel the intensity of the cyclones. Hurricanes and other storms will also continue to shift poleward, exposing areas that historically have only rarely seen the effects of hurricanes, like northern New England states, to more damage. Heavy precipitation in the form of snow and rain will increase in some areas, particularly in the tropics and in high latitudes. Massive downpours that happened only once every 20 years could happen once every five years, the IPCC said, contributing to more frequent flooding and landslides.

The scientists said they are unable to predict what will happen to small-scale storms like tornadoes, due to limitations in today's climate models to forecast them and to conflicting predictions in the literature. Some researchers say climate changes could limit tornadoes; others say they would fuel them.

**The IPCC boasts 194 member countries and 2,000-plus contributing scientists and reviewers. Who contributed to this particular report, and how did it come about?**