Climate extreme events

some definition of weather and climate extremes


EXTREME WEATHER

Some definitions of weather and climate extreme

Climate change is defined by changes in mean climate conditions—that is, the average of hundreds or thou sands events over the span of decades. Over the past 30 years, for example, any single weather event could be omitted or added to the record without altering the long-term trend in weather extremes and the statistical relationship between that trend and the rise in global temperatures. Hence, it is illogical to debate the direct climatological link between a single event and the long term rise in the global average surface temperature

Recent weather extreme

Weather extreme

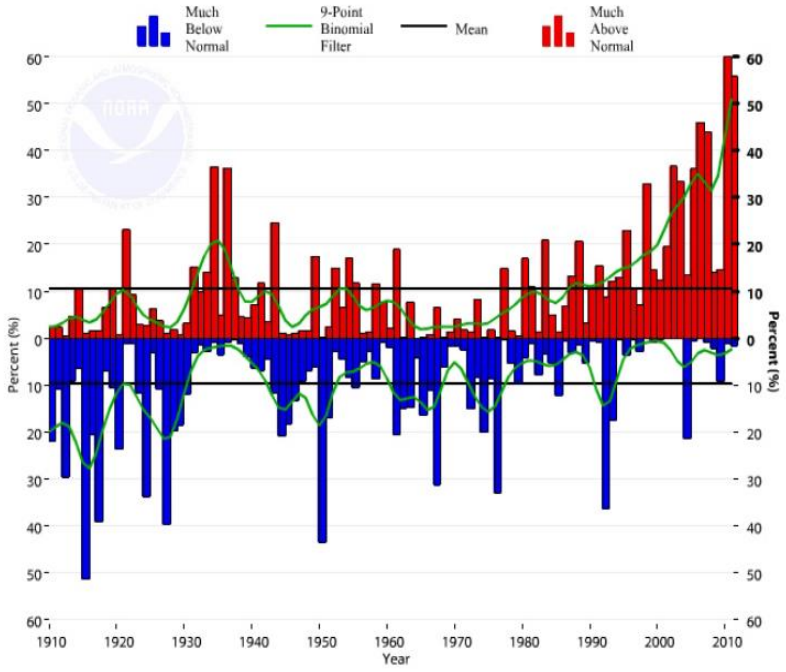
includes unexpected, unusual, severe, or unseasonal weather; weather at the extremes of the historical distribution—the range that has been seen in the past.[1] Often, extreme events are based on a location's recorded weather history and defined as lying in the most unusual ten percent. The main types of extreme weather include heat waves, cold waves and tropical cyclones. The effects of extreme weather events are seen in rising economic costs, loss of human lives, droughts, floods, landslides and changes in ecosystems. There is evidence to suggest that climate change is increasing the periodicity and intensity of some extreme weather events. Confidence in the attribution of extreme weather and other events to anthropogenic climate change is highest in changes in frequency or magnitude of extreme heat and cold events with some confidence in increases in heavy precipitation and increases in the intensity of droughts] Current evidence and climate models show that an increasing global temperature will intensify extreme weather events around the globe, thereby amplifying human loss, damages and economic costs, and ecosystem destruction.

Extreme weather has significant impacts on human society as well as natural ecosystems. For example, a global insurer Munich Re estimates that natural disasters cause more than $90 billion global direct losses in 2015. Some human activities can exacerbate the effects, for example poor urban planning, wetland destruction, and building homes along floodplains.

CLIMATE CHANGE AND THE RISING RISK OF EXTREME WEATHER

When averaged together, changing climate extremes can be traced to rising global temperatures, increases in the amount of water vapor in the atmosphere, and changes in atmospheric circulation. Warmer temperatures directly influence heat waves and increase the moisture available in the atmosphere to supply extreme precipitation events. Expanding sub-tropical deserts swelling out from the equator are creating larger areas of sinking, dry air, thus expanding the area of land that is subject to drought. The expansion of this sub-tropical circulation pattern also is increasing heat transport from the tropics to the Arctic and pushing mid-latitude storm tracks, along with their rainfall, to higher latitudes

Figure 2: Contiguous U.S. Extremes in Minimum Temperature (Step 2) Summer (June-August) 1910-2011.



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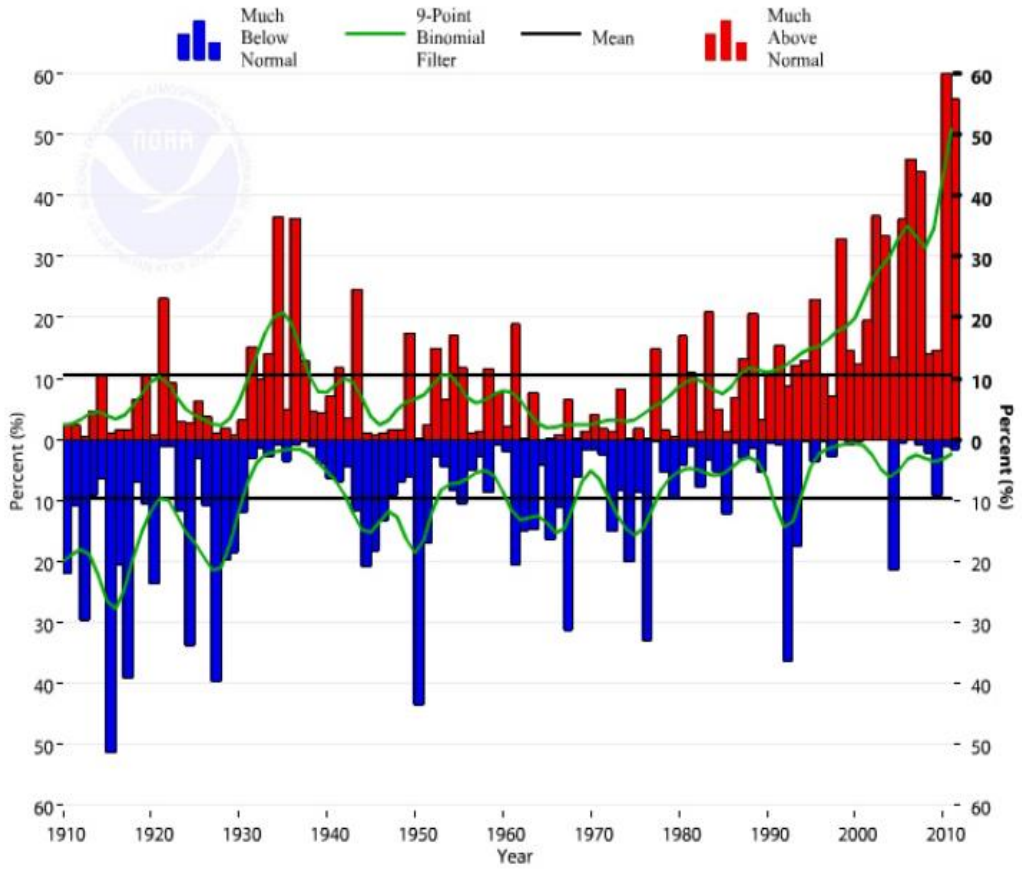
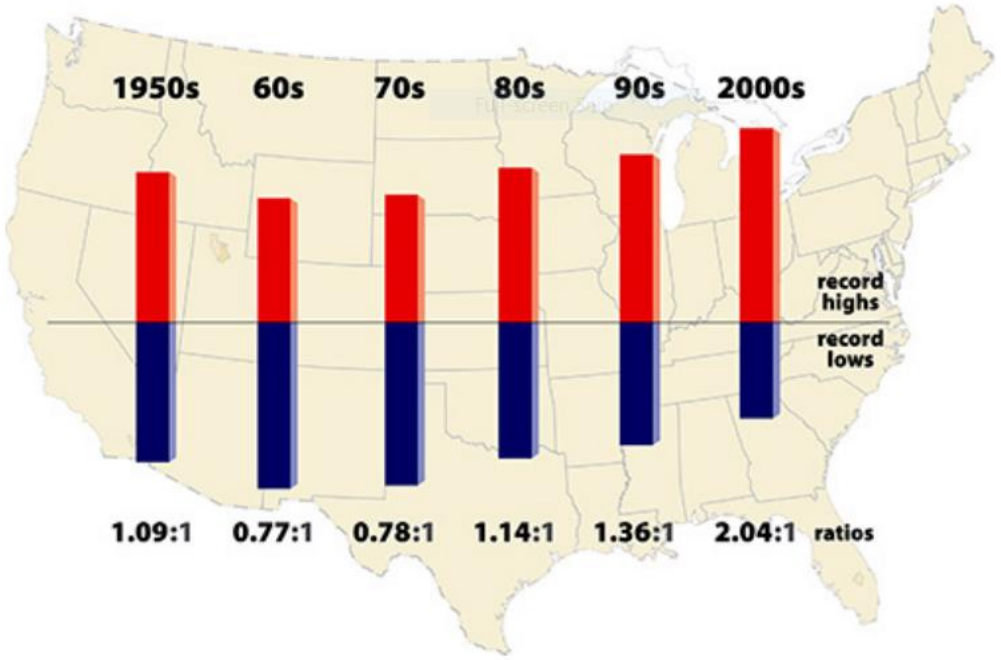


Changes in land area (as percent of total) in the contiguous 48 U.S. states experiencing extreme nightly low temperatures during summer. Extreme is defined as temperatures falling in the upper (red bars) or lower (blue bars) 10th percentile of the local period of record. Green lines represent decade-long averages. The area of land experiencing unusually cold temperatures has decreased over the past century, while the area of land experiencing unusually hot temperatures (red bars) reached record levels during the past decade. During the Dust Bowl period of the 1930s, far less land area experienced unusually hot temperatures.

Ratios of record highs to record lows for successive decades in the United States.



A non-changing climate would have approximately equal numbers of record highs and lows, as observed in the 1950s-1980s. The last decade (2000s) had twice as many record highs as it did record lows.

Countries Most Affected in 2018

Japan, the Philippines and **Germany** were the most affected countries in 2018 followed by **Madagascar, India** and **Sri Lanka**. Table 1 shows the ten most affected countries (Bottom 10) in 2018, with their average weighted ranking (CRI score) and the specific results relating to the four indicators analysed.

Table 1: The 10 most affected countries in 2018

Ranking 2018 (2017)	Country	CRI score	Death toll	Deaths per 100 000 inhabitants	Absolute losses (in million US$ PPP)	Losses per unit GDP in %	Human Development Index 2018 Ranking[12]
1 (36)	Japan	5.50	1 282	1.01	35 839.34	0.64	19
2 (20)	Philippines	11.17	455	0.43	4 547.27	0.48	113
3 (40)	Germany	13.83	1 246	1.50	5 038.62	0.12	5
4 (7)	Madagascar	15.83	72	0.27	568.10	1.32	161
5 (14)	India	18.17	2 081	0.16	37 807.82	0.36	130
6 (2)	Sri Lanka	19.00	38	0.18	3 626.72	1.24	76
7 (45)	Kenya	19.67	113	0.24	708.39	0.40	142
8 (87)	Rwanda	21.17	88	0.73	93.21	0.34	158
9 (42)	Canada	21.83	103	0.28	2 282.17	0.12	12
10 (96)	Fiji	22.50	8	0.90	118.61	1.14	92

PPP = Purchasing Power Parities. GDP = Gross Domestic Product.

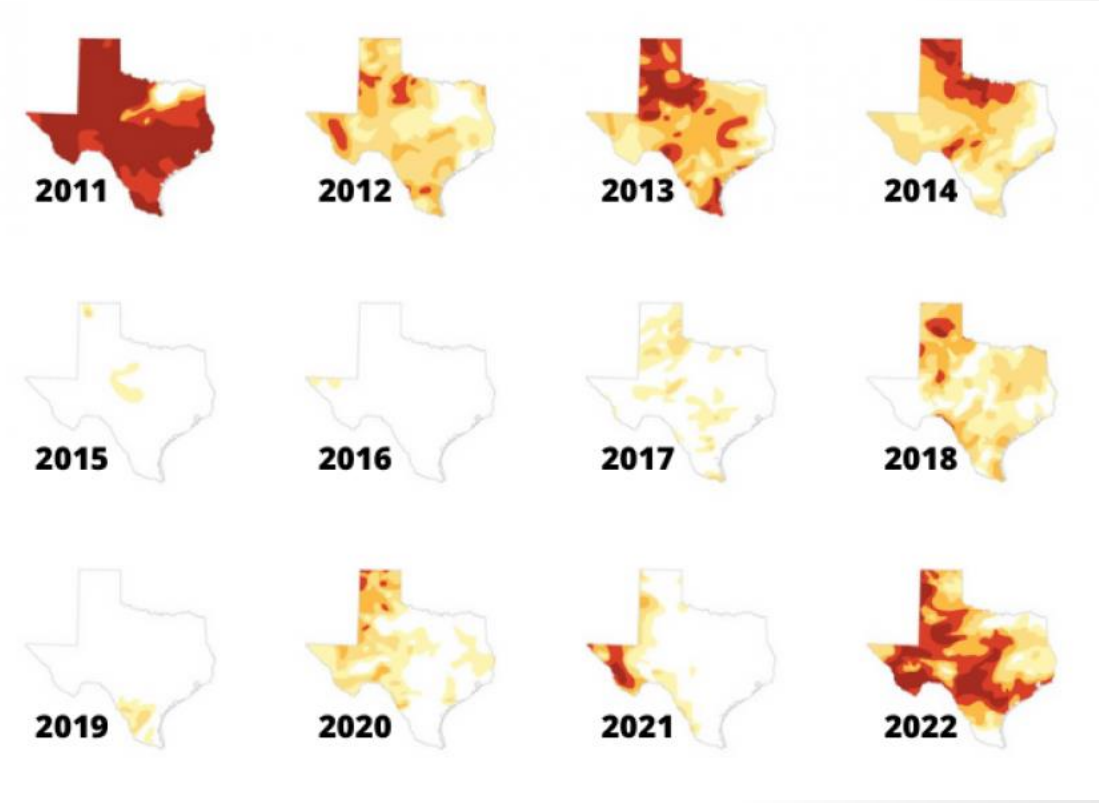
The 2011 Texas drought: A case study in multiple risk factors

Over the past years, Texas has experienced its most intense single-year drought in recorded history. Texas State Climatologist John Nielsen-Gammon estimated the three sources of climate variability – two natural cycles plus global warming – that contributed to the drought's unprecedented intensity:

: • La Nina, 79%

• Atlantic Multidecadal Oscilation, 4%

• Global Warming, 17% Although information about uncertainty is lacking in this analysis, it clearly identifies global warming as one of the risk factors.



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Thank you
for listening