WEATHER EXTREMES IN HISTORICAL CONTEXT

Ralph Alexander

The Global Warming Policy Foundation
Report 60

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Contents

About the author

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Dr Alexander has been a researcher at major laboratories in Europe and Australia, a professor at Wayne State University in Detroit, the co-founder of an entrepreneurial materials company, and a market analyst in environmentally friendly materials for a small consulting firm.

Acknowledgements

I would like to thank the many (open) reviewers who made constructive comments and useful suggestions that have helped improve this report, especially in the section titled 'Further back in time.'


DUST STORM APPROAC

Executive summary

This report refutes the popular but mistaken belief that today's weather extremes are more common and more intense because of climate change, by examining the history of extreme weather events over the past century or so. Drawing on newspaper archives, it presents multiple examples of past extremes that match or exceed anything experienced in the present day. That so many people are unaware of this fact shows that collective memories of extreme weather are short-lived.

Heatwaves of the last few decades pale in comparison to those of the 1930s – a period whose importance is frequently downplayed by the media and environmental activists. The evidence shows that the record heat of that time was not confined to the US 'Dust Bowl', but extended throughout much of North America, as well as to other countries, such as France, India and Australia. US heatwaves during July 2023, falsely trumpeted by the mainstream media as the hottest month in history, failed to exceed the scorching heat of 1934.

Major floods today are no more common nor deadly or disruptive than any of the thousands of floods in the past, despite heavier precipitation in a warming world (which *has* increased flash flooding in some regions). Many of the world's countries regularly experience major floods, especially China, India and Pakistan. A significant 1931 flood in China covered a far greater area and affected many more people than the devastating 2022 floods in Pakistan.

Severe droughts have been a continuing feature of the Earth's climate for millennia, despite the brouhaha in the mainstream media over the extended drought in Europe during the summer of 2022. Not only was the European drought *not* unprecedented, but there have been numerous longer and drier droughts throughout history, including during the past century.

Hurricanes overall actually show a decreasing trend around the globe, and the frequency of their landfalling has not changed for at least 50 years. The deadliest US hurricane in recorded history, which killed an estimated 8–12,000 people, struck Galveston, Texas in 1900. As a comparison, the death toll of 2022's Category 5 Hurricane Ian, which deluged much of Florida with a storm surge as high as Galveston's, was just 156.

Likewise, there is no evidence that climate change is causing tornadoes to become more frequent and stronger. The annual number of strong (EF3 or greater) US tornadoes has in fact declined dramatically over the last 72 years, and there are ample examples of past tornadoes just as or more violent and deadly than today's.

Wildfires are not increasing either. On the contrary, the area burned annually is diminishing in most countries. The total number of US fires and the area burned in 2022 were both 20% less than in 2007; data before 1983 that mysteriously disappeared recently from a government website shows an even larger historical decline. Although wildfires can be exacerbated by other weather extremes such as heatwaves and droughts, those extremes are not on the rise, as stated above. And, in spite of popular belief, ignition of wildfires by arson plays a larger role than sustained high temperatures and wind.

In addition to examples of past weather extremes from newspaper archives, the report concludes with a short section on documented extreme weather events dating back centuries and even millennia.

The perception that extreme weather is increasing in frequency and severity is primarily a consequence of modern technology – the Internet and smart phones – which have revolutionised communication and made us much more aware of such disasters than we were 50 or 100 years ago. The misperception has only been amplified by the mainstream media, eager to promote the latest climate scare. And as psychologists know, constant repetition of a false belief can, over time, create the illusion of truth. But history tells a different story.


LINEN
COTTON
SILK
WOOLLEN

1. Introduction

The popular but mistaken belief that today's weather extremes are more common and more intense because of climate change is becoming deeply embedded in the public consciousness, thanks to a steady drumbeat of articles in the mainstream media and pronouncements by world leaders.

Even the Intergovernmental Panel on Climate Change (IPCC), whose reports had until recently served as the authority on climate science and as a voice of restraint on weather extremes, has shifted its stance. The agency now at least partially subscribes to the same belief – claiming, for the first time, that climate change is currently affecting many weather extremes all over the globe.[1]

But the belief is wrong, and more a perception than reality. An abundance of scientific evidence demonstrates that the frequency and severity of heatwaves, floods, droughts, hurricanes, tornadoes and wildfires are not increasing, and may even be declining in some cases. That so many people think otherwise reflects an ignorance of, or an unwillingness to look at, our past climate. Collective memories of extreme weather are short-lived.

This report examines the history of extreme weather events over the past century or so, drawing on newspaper archives to reveal numerous extremes that match or exceed anything we are experiencing today.

2. Heatwaves

Reports of 'heat domes' all over the world in 2023, especially in the US, southern Europe and Asia, have amplified the perception that heatwaves are now more frequent and longer than in the past, due to climate change. But a careful look at the evidence reveals that this is wrong, and that current heatwaves are no more linked to global warming than any of the other weather extremes.

Heatwaves are periods of abnormally hot weather, lasting from days to weeks, and a warming planet is likely to make them more common. Nevertheless, they have been a regular feature of Earth's climate for at least as long as recorded history, and the ones seen in the last few decades pale in comparison to those of the 1930s, a period whose importance is frequently downplayed by the media and environmental activists.

Those who dismiss the 1930s justify their position by claiming that the searing heat was confined to just a handful of the Great Plains states in the US and was caused by Dust Bowl drought. But this simply is not so. The evidence shows that the record heat of the 1930s – when the globe was also warming – extended throughout much of North America, as well as to other countries, such as France, India and Australia.

In the summer of 1930, two record-setting, back-to-back scorchers, each lasting eight days, afflicted Washington, DC in late July and early August.[2] During that time, 11 days in the capital city saw maximum temperatures above 38°C (100°F). Nearby Harrisonburg, Virginia roasted in July and August, experiencing its longest heatwave on record, lasting 23 days, with 10 days of 38°C (100°F) or more.[3]

In April the same year, an historic six-day heatwave enveloped the whole eastern and part of the central US,[4] as depicted in Figure 1. The accompanying newspaper excerpt[5] chronicles a deadly heatwave in New York that July.

The hottest years of the 1930s in the US were 1934 and 1936. Typical newspaper articles from those two extraordinary years are set out in Figure 2. The article on the left, from the *Western Argus*,[6] reports how the Dust Bowl state of Oklahoma in 1934 endured an incredible 36 successive days on which the mercury exceeded 38°C (100°F) in central Oklahoma. On August 7, the temperature climbed to a sizzling 47°C (117°F). And in the Midwest, Chicago and Detroit, both cities for which readings of 32°C (90°F) are normally considered uncomfortably hot, registered over 40°C (104°F) the same day.

It was just as bad in other cities. In the summer of 1934, Fort Smith, Arkansas recorded

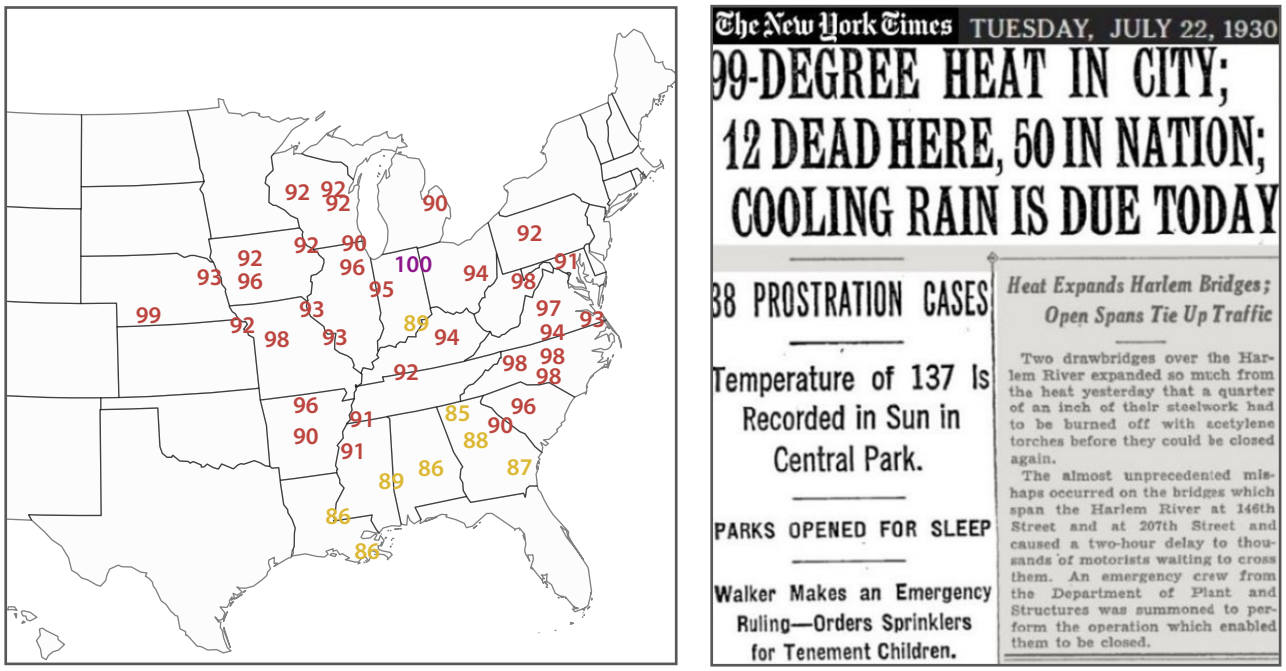
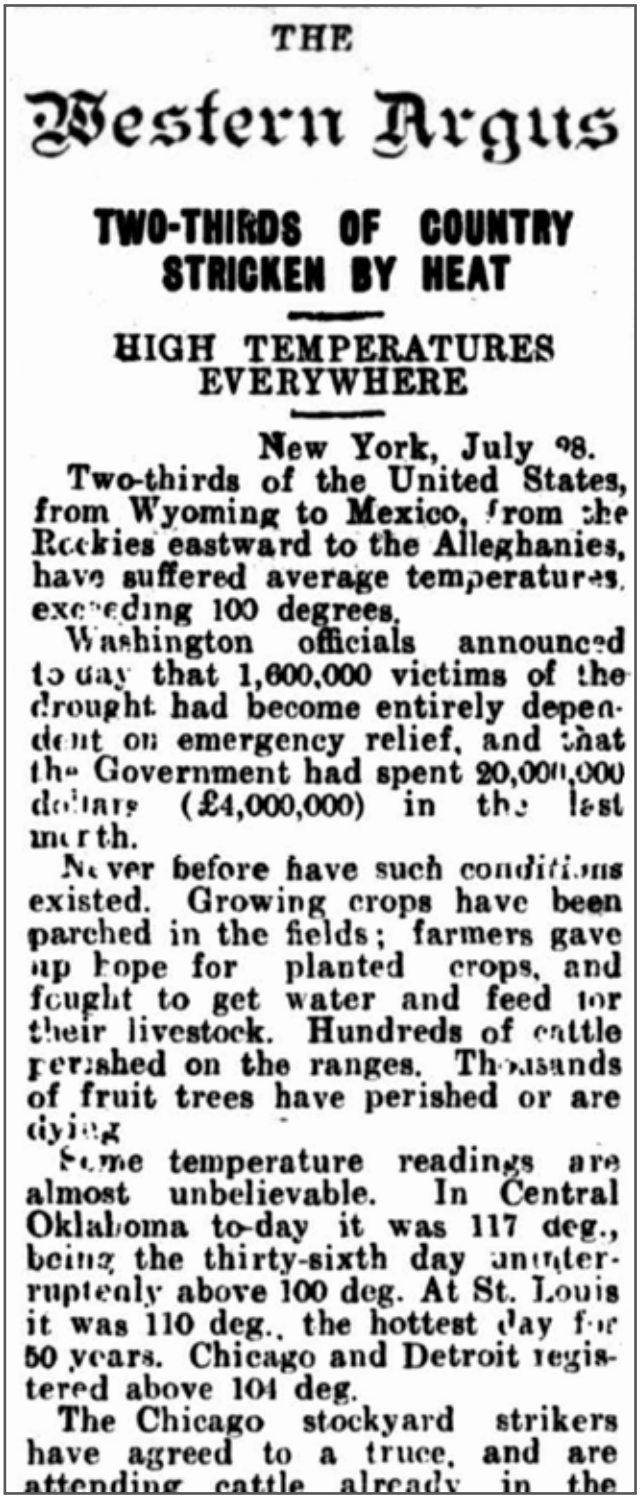


Figure 1: US heatwaves in 1930.

Left: sample maximum temperatures for selected cities in April heatwave; right: exceptionally warm July heatwave in New York city.

an incredible 53 days with maximum temperatures of 38°C (100°F) or higher. Topeka, Kansas, had 47 days, Oklahoma City had 45 days and Columbia, Missouri had 34 days when the mercury reached or passed that level – all examples of data recorded for posterity in a peer-reviewed paper.[7] Approximately 800 deaths were attributed to the widespread heatwave, at a time when the US population was about 60% smaller than today.

In comparison, US heatwaves during July 2023, which was falsely trumpeted by the mainstream media as the hottest month in history, did not outmatch the scorching heat of 1934.



THE

Western Argus

TWO-THIRDS OF COUNTRY STRICKEN BY HEAT

HIGH TEMPERATURES EVERYWHERE

New York, July 98.

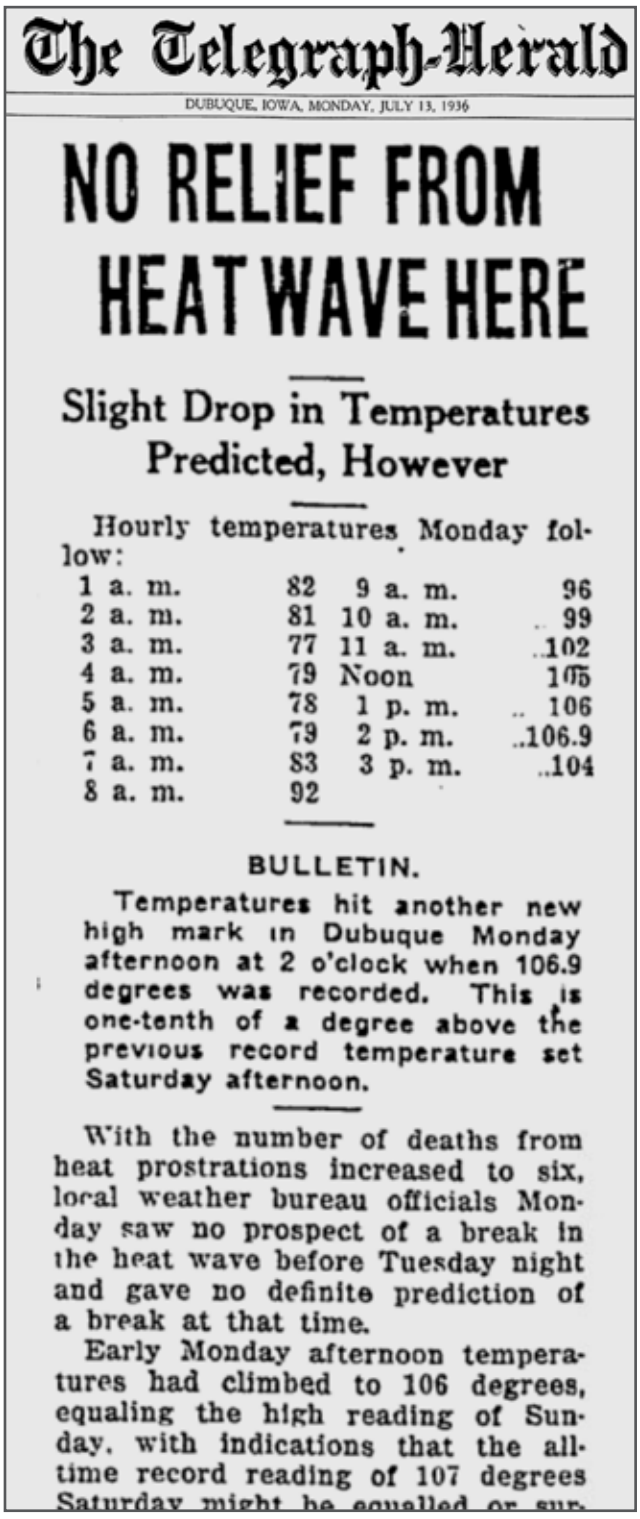
Two-thirds of the United States, from Wyoming to Mexico, from the Rockies eastward to the Alleghanies, have suffered average temperatures exceeding 100 degrees.

Washington officials announced to day that 1,600,000 victims of the drought had become entirely dependent on emergency relief, and that the Government had spent 20,000,000 dollars (£4,000,000) in the last month.

Never before have such conditions existed. Growing crops have been parched in the fields; farmers gave up hope for planted crops, and fought to get water and feed for their livestock. Hundreds of cattle perished on the ranges. Thousands of fruit trees have perished or are dying.

Some temperature readings are almost unbelievable. In Central Oklahoma to-day it was 117 deg., being the thirty-sixth day uninterruptedly above 100 deg. At St. Louis it was 110 deg., the hottest day for 50 years. Chicago and Detroit registered above 104 deg.

The Chicago stockyard strikers have agreed to a truce, and are attending cattle already in the



The Telegraph-Herald

DUBUQUE, IOWA, MONDAY, JULY 13, 1936

NO RELIEF FROM HEAT WAVE HERE

Slight Drop in Temperatures Predicted, However

Hourly temperatures Monday follow:

1 a. m.	82	9 a. m.	96
2 a. m.	81	10 a. m.	99
3 a. m.	77	11 a. m.	102
4 a. m.	79	Noon	105
5 a. m.	78	1 p. m.	106
6 a. m.	79	2 p. m.	106.9
7 a. m.	83	3 p. m.	104
8 a. m.	92		

BULLETIN.

Temperatures hit another new high mark in Dubuque Monday afternoon at 2 o'clock when 106.9 degrees was recorded. This is one-tenth of a degree above the previous record temperature set Saturday afternoon.

With the number of deaths from heat prostrations increased to six, local weather bureau officials Monday saw no prospect of a break in the heat wave before Tuesday night and gave no definite prediction of a break at that time.

Early Monday afternoon temperatures had climbed to 106 degrees, equaling the high reading of Sunday, with indications that the all-time record reading of 107 degrees Saturday might be equalled or sur-

Figure 2: Devastating North American heatwaves in the 1930s.

Left: Oklahoma and the Midwest in 1934; right: Dubuque, Iowa in 1936.

El Paso, Texas did experience 44 consecutive days with maximum temperatures above 38°C (100°F),[8] surpassing central Oklahoma's 36 days in 1934 mentioned above. But Phoenix, Arizona saw the maximum there exceed 43°C (110°F) – a comparable baseline for a city with a hotter climate than El Paso – for only 31 days in a row. And, while Phoenix also registered its all-time warmest minimum temperature of 36°C (97°F) in 2023,[9] modern record high minimum temperatures in cities have been attributed to the urban heat island effect.[10] In a 13-day heatwave in July, 1936, the Canadian province of Ontario – well removed from the Great Plains where the Dust Bowl was concentrated – saw the thermometer soar above 44°C (111°F) during the longest, deadliest Canadian heatwave on record.[11] *The Toronto Daily Star*[12] describes conditions during that heatwave in normally temperate Toronto, Ontario's capital:

> …a great mass of the children of the poverty-stricken districts of Toronto are today experiencing some of the horrors of Dante's Inferno.

and, in a headline,

> Egg[s] Fried on Pavement – Crops Scorched and Highways Bulged

Two scenes from the 1936 US heatwaves[13,14] are portrayed in Figure 3.

Figure 3: 1936 US heatwaves.
Left: children cooling off in New York City in July; right: ice being delivered to a crowd in Kansas City, Missouri in August.

Not only did farmers suffer and infrastructure wilt in the 1936 heatwaves, but thousands died from heatstroke and other hot-weather ailments. By some estimates, over 5,000 excess deaths from the heat occurred that year in the US and another 1,000 or more in Canada, whose population was then over 70% smaller than today; a few details appear in the two newspaper articles on the right in Figure 4, from *The Owosso Argus-Press*[15] and *The Bend Bulletin*,[16] respectively.

The article on the left in Figure 4, from *The Telegraph-Herald*,[17] documents the effect of the July 1936 heatwave on the Midwest state of Iowa, which endured 12 successive days of sweltering heat, suffering 247 deaths. The article remarks that the 1936 heatwave topped the previous one in 1934, when the mercury reached or exceeded 38°C (100°F) for eight consecutive days.

That the US heatwaves of the 1930s were unparalleled can be seen from Figure 5, which shows the frequency and magnitude of heatwaves in the US from 1901 to 2018. The frequency (left panel) is defined as the annual number of calendar days the average US maximum

The Telegraph-Herald

DUBUQUE, IOWA, WEDNESDAY, JULY 15, 1936

JULY HEAT LOOKS LIKE NEW RECORD

Previous Mark Established Two Years Ago

Des Moines, Ia.—(AP)—Iowa weather bureau statisticians today chalked up a heat wave record half again as long as the previous mark, and predicted that unless there is a drastic change for the remainder of the month it will be the hottest July Iowa ever has experienced.

From July 3 through July 14, for 12 consecutive days, temperatures of 100 degrees or more were registered by thermometers at Des Moines and most Iowa weather bureau stations.

The previous record was established in 1934, when the mercury reached or exceeded the 100 mark for eight days from July 18 through July 25.

A study of records of July 2 through July 14 for the last 10 years shows the period this year not only had the longest sustained maximum temperature record but also the highest average temperature mark.

Mean Average

At Des Moines, which was considered typical of the state as a whole, the mean temperature average over the period was 90 degrees. Mean temperature is the half-way mark between each day's high and low point.

THE OWOSSO ARGUS-PRESS

1,000 Perish on 12th Day of Hot Spell in Nation

Temperature in Owosso Drops 51 Degrees in 12 Hours

IS NO RAIN HERE

Property Damaged, 3 Hurt in Storms Which Whip Michigan

Drought at a Glance

(By The Associated Press)

Detroit—Cool breezes and scattered rain storms end seven days of 100-degree heat in Michigan, with more than 540 dead. Seventy-two die in single day in Detroit before mercury slides from 104 to 76.

St. Paul — Rains scattered over Central and Northwestern Minnesota, with a light shower at Minneapolis, reduced record-breaking temperatures blamed for more than 560 deaths in the state.

Chicago — Resettlement Administrator Rexford G. Tugwell, arriving from Washington by plane, boards train for Bismarck, N. D., to coordinate resettlement aid in states hard hit by crop and livestock losses.

Milwaukee—Cool winds sent temperatures down to 76 and local

THE BEND BULLETIN

Heat Wave Toll Over 12,000 in 86 Cities in Week

Washington, July 25 (AP)—The first official figures on the death toll of last week's heat wave indicated today that literally thousands of lives were lost in the temperatures of 100 degrees and higher throughout a large part of the nation.

The census bureau released mortality statistics today for the week ending July 18 showing 3332 more deaths in 86 cities than in the worst heat week of 1934.

For the week ended July 18, the bureau reported 12,183 deaths this year compared with 8,851 deaths in the same 86 cities for the week ended July 28 in 1934. The present drought was blamed for a 65 per cent rise in deaths as compared with the corresponding 1935 week, when 7439 deaths were reported during that week of normal temperatures.

"From the standpoint of mortality, the 1936 heat wave was much more severe than the 1934 wave," the bureau said in giving the first official notice of the death dealing effects of the present heat wave.

The 8,851 deaths for the week in 1934 was an excess of mortality of 19 per cent over the

Figure 4: Deadly US heatwaves in 1936.

Left: Iowa; center: Midwest; right: heatwave deaths.

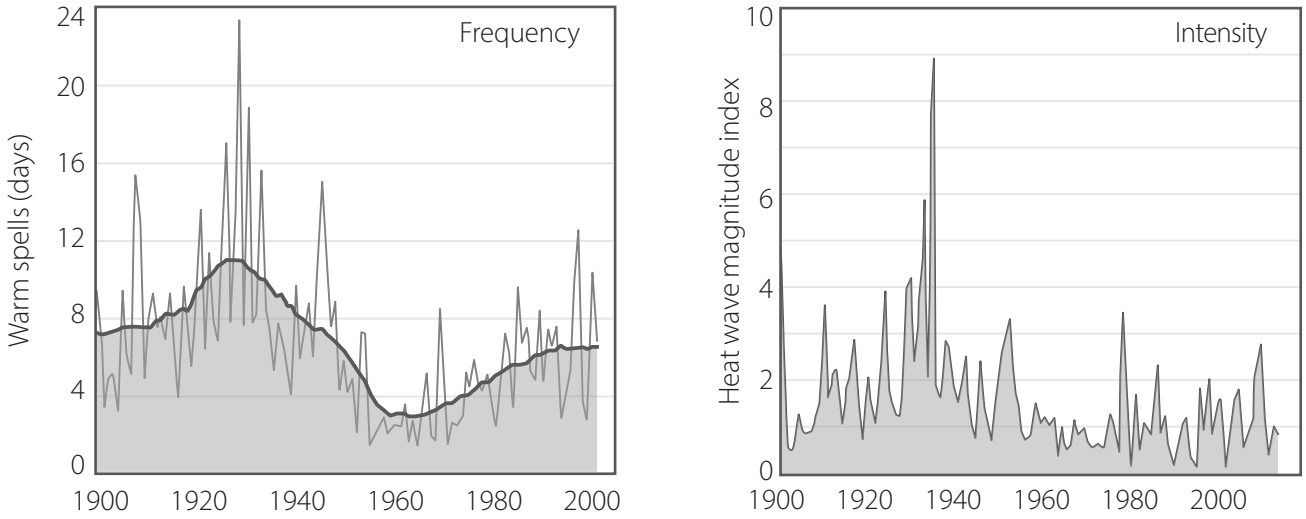


Figure 5: Observed changes in heatwaves in the contiguous US, 1901–2018.
Source: CSSR.[99]

temperature exceeded the 90th percentile for 1961–1990 for at least six consecutive days, in a window centered on that calendar day; it represents the total duration of all heatwaves of six days or longer in that year.

It is clear from Figure 5 that there were far more frequent and/or longer US heatwaves, and they were hotter, in the 1930s than in the present era of global warming. The total annual heatwave or warm spell duration (left panel) is seen to have dropped from 11 days during the 1930s to about 6.5 days during the 2000s. The peak heatwave index (right panel) in 1936 was a full three times higher than in 2012 and up to nine times higher than in many other years. In addition, the average maximum temperature during any particular heatwave has declined from 38°C (101°F) in the 1930s to 37°C (99°F) since the 1980s.

Heatwaves lasting a week or longer in the 1930s were not confined to North America; the Southern Hemisphere baked too. Adelaide, on Australia's south coast, experienced a heatwave at least 11 days long in 1930, and Perth on the west coast saw a 10-day spell in 1933, as described in the articles in Figure 6 from *The Register News-Pictorial*[18] and *The Longreach Leader*,[19] respectively.

Not to be outdone, 1935 saw heatwaves elsewhere in the world. The three excerpts

112 Degrees In Adelaide, Hottest Day For 18 Years

WORST DAY OF LONGEST HEAT WAVE SINCE 1880

118 Degrees In East-West Express

NO CHANGE SAYS OFFICIAL FORECAST

Yesterday the temperature in Adelaide was 112.4 degrees, the highest since 1912 and less than two degrees below the highest on record.

IT was the eleventh day of the heat wave, which is now the longest for 50 years. Adelaide was too hot yesterday even for trippers to go about. Everyone who sought relief at the sea had gone before the full heat of the day and the deserted streets reflected a blast that was almost unbearable.

Every metal fitting in heat or shade was hot to the touch and stone houses built to withstand heat gave shelter but no relief.

Yet there were worse places. When the East-West express passed through Immarna, out among the red sandhills, the temperature was 118.

Last night the acting Divisional Meteorologist (Mr. Newman) said that there was no sign of a cool change.

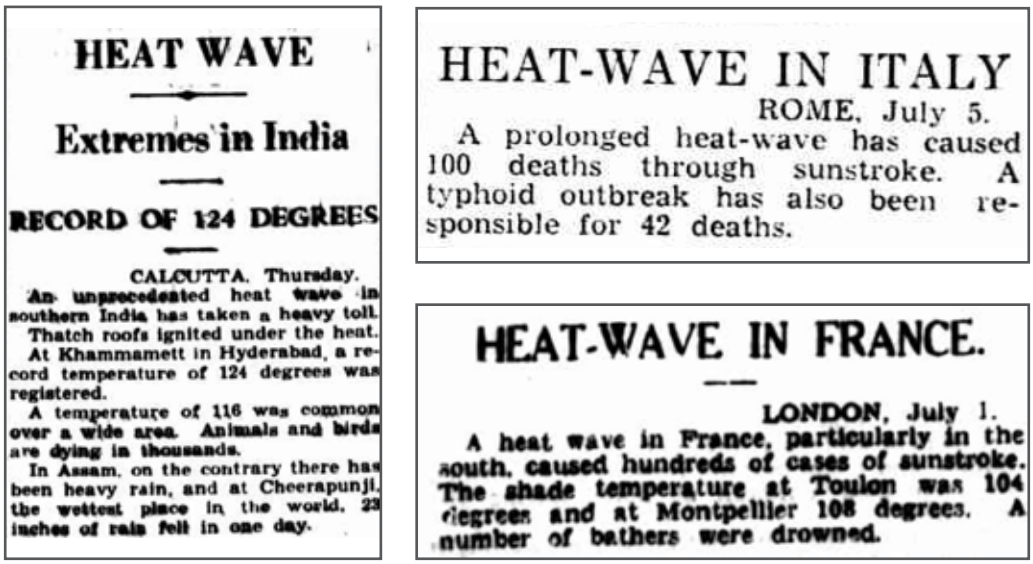
SEVEREST IN HISTORY

WEST AUSTRALIAN HEAT WAVE.

PERTH, Friday

For the tenth day in succession, Perth, yesterday was held in the grip of the severest heat wave in the State's history. The highest temperature yesterday was 108 degrees. Thousands of people sleep on the beaches every night. Others less fortunate, take beds into the gardens, as the houses over-heated. A young boy, aged 5½, collapsed, and a show had to be abandoned.

Figure 6: Debilitating Australian heatwaves in the 1930s.
Left: Adelaide, South Australia in 1930; right: Perth, Western Australia in 1933.



HEAT WAVE

Extremes in India

RECORD OF 124 DEGREES

CALCUTTA, Thursday.
An unprecedented heat wave in southern India has taken a heavy toll. Thatch roofs ignited under the heat. At Khammamett in Hyderabad, a record temperature of 124 degrees was registered.
A temperature of 116 was common over a wide area. Animals and birds are dying in thousands.
In Assam, on the contrary there has been heavy rain, and at Cheerapunji, the wettest place in the world, 23 inches of rain fell in one day.

HEAT-WAVE IN ITALY

ROME, July 5.
A prolonged heat-wave has caused 100 deaths through sunstroke. A typhoid outbreak has also been responsible for 42 deaths.

HEAT-WAVE IN FRANCE.

LONDON, July 1.
A heat wave in France, particularly in the south, caused hundreds of cases of sunstroke. The shade temperature at Toulon was 104 degrees and at Montpellier 108 degrees. A number of bathers were drowned.

Figure 7: Heatwaves around the world in 1935.
Left: India; right top: Italy; right bottom: France.

from Australian newspapers shown in Figure 7 recorded heatwaves that year in India, France and Italy, although there is no information about their duration; the papers were *The Canberra Times*,[20] *The Sydney Morning Herald*[21] and *The Daily News*,[22] respectively. But 1935 wasn't the only 1930s heatwave in France. In August 1930, Australian and New Zealand (and presumably French) newspapers recounted[23] a French heatwave that month, in which the temperature soared to a staggering 50°C (122°F) in the Loire valley – besting a purported record of 46°C (115°F) set in southern France in 2019. Many more examples exist of the exceptionally hot 1930s all over the globe. Even with modern global warming, there's nothing unprecedented about current heatwaves, either in frequency or magnitude.

3. Floods

Devastating 2022 floods in Pakistan, which affected 33 million people; widespread flooding in Europe and western Canada in 2021; and a once-in-a-millennium flood the same year in Zhengzhou, China, which drowned passengers in a subway tunnel – all these were trumpeted by the mainstream media as unmistakable signs that climate change has intensified the hydrological cycle.

However, just as for heatwaves, there is no evidence that major floods are becoming worse or more frequent. They are no more common nor deadly than any of the thousands of floods in the past, despite heavier precipitation in a warming world and the modern covering of natural, water-absorbing countryside with water-repelling concrete and asphalt (which *has* increased flash flooding in some regions).[24] Floods do tend to kill more people than, say, hurricanes or tornadoes, either by drowning or from subsequent famine. Yet many countries regularly experience flooding, especially China, India, Pakistan and Japan.

China has a long history of major floods, going back millennia. One of the worst was the flooding of the Yangtze and other rivers in 1931,[25] which inundated approximately 180,000 square kilometers (69,500 square miles) following rainfall of over 610 mm (24 inches) in a single month. That was a far greater area than the 85,000 square kilometers (33,000 square miles) left underwater in Pakistan's terrible floods in 2022, and affected far more people – as many as 53 million, about 10% of the 1931 population.

The extent of the watery invasion can be seen in Figure 8; the photo[26] on the right displays the havoc wrought in Wuhan. A catastrophic dike

failure near that city left almost 800,000 people homeless, and covered the urban area with several meters of water for months.

Chinese historians estimate the country-wide death toll at 422,000 from drowning alone; an additional 2 million people reportedly died from resulting starvation or disease, and much of the population was reduced to 'eating tree bark, weeds, and earth'. Some sold their children to survive, while others resorted to cannibalism.

The disaster was widely reported. *The Evening Independent* wrote in August 1931:[27]

> Chinese reports…indicate that the flood is the greatest catastrophe the country has ever faced.

The same month, the *Pittsburgh Post-Gazette*,[28] an extract from which is shown in Figure 8, recorded how a United News correspondent witnessed:

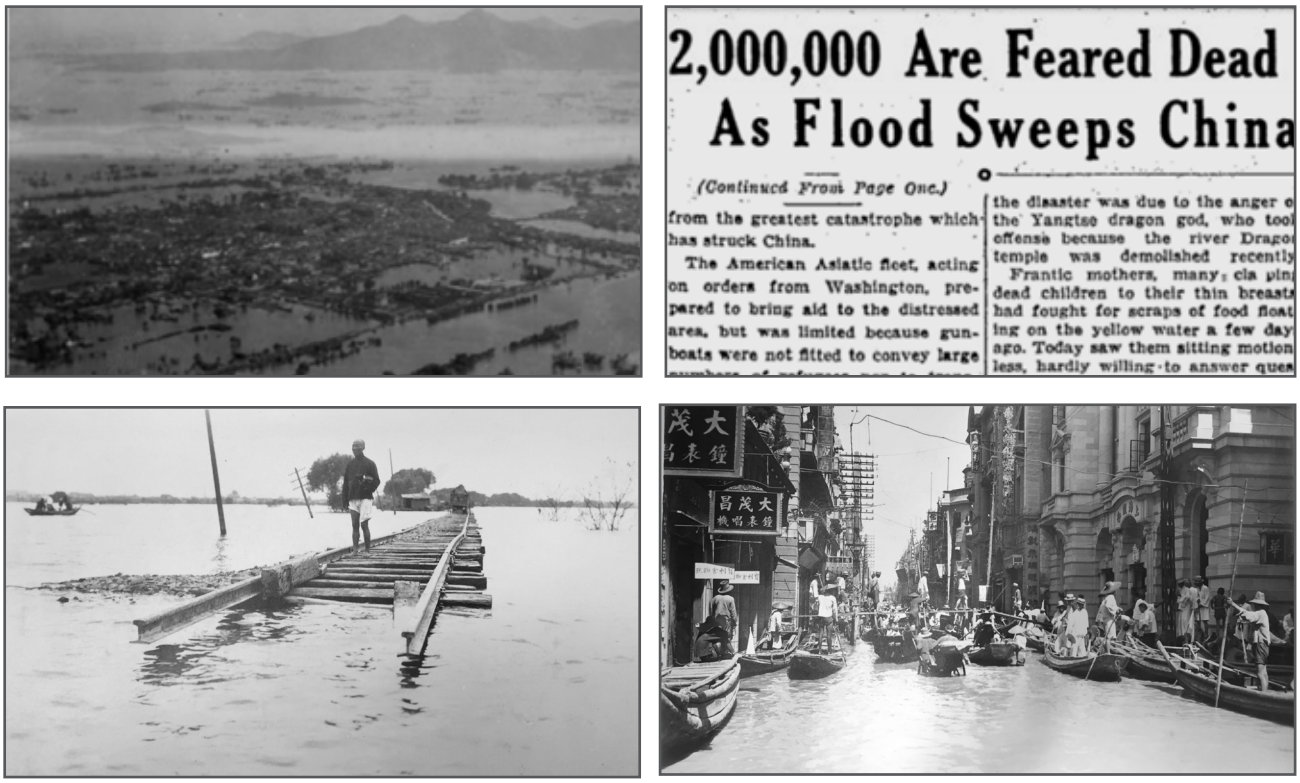
> …thousands of starving and exhausted persons sitting motionless on roofs or in shallow water, calmly awaiting death.

The Yangtze flooded again in 1935, killing 145,000 and leaving 3.6 million homeless, and also in 1954 when 30,000 lost their lives, as well as more recently.[29] Several other Chinese rivers also flood regularly, especially in Sichuan (which can be translated as 'Four Rivers') province.

The Pakistan floods of 2022 were the nation's sixth since 1950 to kill over 1,000 people, although the death toll from the 2022 floods was a comparable 1,739. Major floods which killed as many as 3,100 people afflicted the country in 1950, 1955, 1956, 1957, 1959, throughout the 1970s and in more recent years. Figure 9 shows a report in the New York Times of a major flood in 1973.[30]

Monsoonal rains in 1950 led to flooding that killed an estimated 2,900 people across the country and caused the Ravi River in northeastern Pakistan to burst its banks; 10,000 villages were decimated and 900,000 people made homeless.

In 1973, one of Pakistan's worst-ever floods followed intense rainfall of 325 mm (13 inches) in Punjab (which means 'Five Rivers') province, affecting more than 4.8 million people out of a total population of about 65 million. The Indus



2,000,000 Are Feared Dead As Flood Sweeps China

(Continued From Page One.)

from the greatest catastrophe which has struck China.

The American Asiatic fleet, acting on orders from Washington, prepared to bring aid to the distressed area, but was limited because gunboats were not fitted to convey large

the disaster was due to the anger o the Yangtse dragon god, who too offense because the river Drago temple was demolished recently

Frantic mothers, many cla pin dead children to their thin breasts had fought for scraps of food float ing on the yellow water a few day ago. Today saw them sitting motion less, hardly willing to answer ques

Figure 8: Disastrous Yangtze River flood in China, 1931.

River – of which the Ravi is a tributary – became a swollen, raging torrent, 32 km (20 miles) wide, sweeping 300,000 houses and 70,000 cattle away. Nearly 500 people perished.

In an area heavily dependent on agriculture, 4.3 million bales of the cotton crop and hundreds of millions of dollars worth of stored wheat were lost. Villagers had to venture into floodwaters to cut fodder from the drowned and ruined crops in order to feed their livestock. Another *New York Times* article on the 1973 flood reported the plight of flood refugees:[31]

> In Sind, many farmers, peasants and shopkeepers fled to a hilltop railway station where they climbed onto trains for Karachi.

Flood Situation in Pakistan Is Called 'Extremely Serious'

Special to The New York Times

KARACHI, Pakistan, Aug. 22 —Rising floodwaters have now engulfed the second most populous province of Pakistan.

With the collapse of the last protective embankment on the Indus River in the province of Sind, the situation there has become "extremely serious," according to Pakistan's Finance Minister, Dr. Mubashir Hasan, who is in charge of flood-control measures.

After overflowing an embankment near Sukkur, about 250 miles northeast of Karachi, the river inundated several towns and hundreds of villages. Preliminary reports said that at least 2 million people in the region had been made homeless.

Reports from the previously stricken and most populous province, Punjab, put the death toll there at 2,000, with many more reported missing.

Preliminary official estimates put the damage to ruined crops alone at the equivalent of $250-million, but Dr. Hassan said that these estimates would be revised upward. Among the most badly affected crops are cotton and sugar cane. Official sources said that at least one million tons of grain had been washed away in Punjab Province, with the result that food prices have rocketed.

Railway, road and communication systems have been disrupted by the flooding of hundreds of miles of track and roads and the collapse of telephone lines.

Also in jeopardy is the famous archeological site of Mohenjo-Daro—Hill of the Dead—in the Larkana district of Sind Province. Only recently an international symposium was held in Pakistan to consider ways to protect the 5,000-year-old site, which contains the remains of one of the twin cities of the Indus Valley Civilization.

Six United States helicopters flew here today to help in relief operations, following the arrival of an American transport aircraft. Britain and Iran are also rushing in aid.

The New York Times/Aug. 23, 1973
Rising waters overflowed bank near Sukkur (cross).

Pope Advocates Return To Old Chants in Mass

Special to The New York Times

ROME, Aug. 22 — Pope Paul VI today advocated a return to traditional Latin and Gregorian chants in the Roman Catholic liturgy.

"Many have asked that in all nations the Latin and Gregorian chants of the Gloria, the Credo, the Sanctus and the Agnus Dei be preserved," he said during a general audience at his summer residence near here. "God grant that it be so. We must study how."

The Pontiff's remarks suggested a reversal of church policy since Ecumenical Council Vatican II (1962-65). At that time the use of modern languages was approved in an effort to simplify and modernize the mass.

Figure 9: Devastation from the 1973 flood in Pakistan.

Monsoon rainfall of 580 mm (23 inches), just three years later in July and September of 1976, again mostly in Punjab province, caused a flood that killed 425 and affected another 1.7 million people. It is worth noting here that the 1976 deluge far exceeded the 375 mm (15 inches) of rain preceding the massive 2022 flood in Pakistan, although both inundated approximately the same area. The 1976 flood affected a total of 18,400 villages.

A shorter yet deadly flood struck the coastal metropolis of Karachi the following year in 1977, after 210 mm (8 inches) of rain fell on the city in 12 hours. Despite its brief duration, the flood drowned 848 people and left 20,000 homeless. That same year, the onslaught of floods in the country prompted the establishment of a Federal Flood Commission.

Figure 10 shows the annual number of flood fatalities in Pakistan from 1950 to 2012, which includes flood drownings from cyclones as well as monsoonal rains.

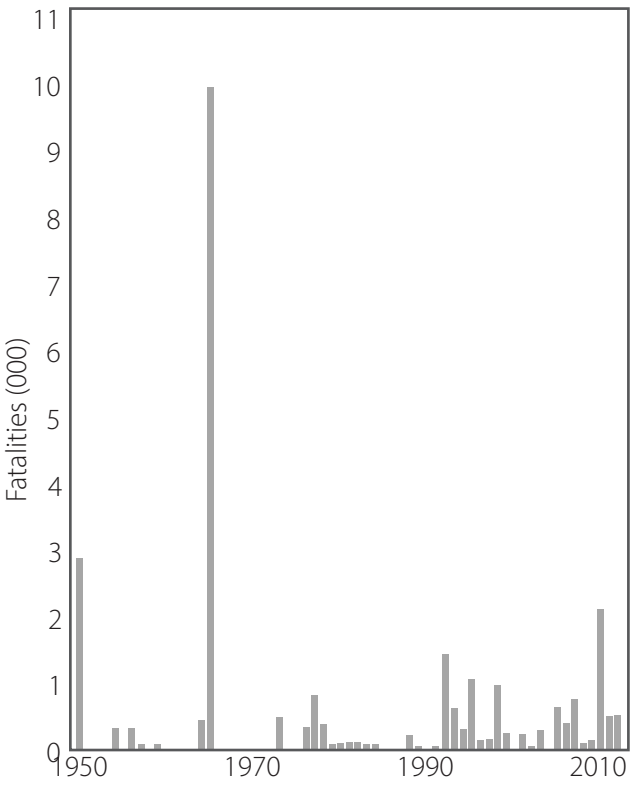


Figure 10: Annual number of deaths from major floods in Pakistan, 1950 to 2012.
Source: M.J. Paulikas and M.K. Rahman.[100]

4. Droughts

Severe droughts have been a continuing feature of the Earth's climate for millennia, despite the brouhaha in the mainstream media over the extended drought in Europe during the summer of 2022. Not only was the European drought *not* unprecedented, but there have been numerous longer and drier examples throughout history, including during the past century.

Because droughts typically last for years, or even decades, their effects are far more catastrophic for human and animal life than those of floods, which usually recede in weeks or months. The consequences of drought include crop failure, starvation and mass migration. As with floods, droughts historically have been most common in Asian countries, such as China and India.

One of most devastating natural disasters in Chinese history was the drought and subsequent famine in northern China from 1928 to 1933.[32] It left 3.7 million hectares (9.2 million acres) of arable land barren, leading to a lengthy famine (exacerbated by civil war). An estimated 3 million people died of starvation, while Manchuria, in the northeast, took in 4 million refugees; China's population in 1933 was approximately 500 million.

Typical scenes from the drought are shown in Figure 11,[33,34] along with a newspaper excerpt from The *New York Times*.[35]

Famine Has Lasted Since 1928.

Shensi Province, known at one time as a fertile wheat-growing region, has been reduced to famine and despair by a drought that has lasted since 1928.

Showers in some localities have enabled the wheat to mature, but the grain harvested has not been enough to meet the needs of the teeming population.

As early as March of this year, the China International Famine Relief Commission reported 2,000,000 persons likely to starve in the near future unless aid was rushed to them. Despite extreme cold in the region at that time, houses were being torn down by their inhabitants in order that the material might be sold for food. Children were being killed to end their suffering and the women of families were being sold to obtain money to buy food for the other members, according to an official report.

Since the beginning of the famine about 3,000,000 persons are said to have starved to death in Shensi.

The New York Times
Published: June 27, 1933

Figure 11: Severe drought in China, 1928–33.

Top photo: three starving boys abandoned by their families in 1928 and fed by the military authorities; bottom photo: famine victims in the city of Lanzhou; right: newspaper report.

The full duration of the drought was extensively covered by *The New York Times*. In 1929, a lengthy article[36] reported that relief funds from an international commission could supply just one meal daily to 'only 175,000 sufferers out of the 20 million now starving or undernourished' and that 'missionaries report that cannibalism has commenced'.

A 1933 article, excerpted in Figure 11, chronicled the continuing misery four years later:

> Children were being killed to end their suffering and the women of families were being sold to obtain money to buy food for the other members, according to an official report.

Drought has frequently afflicted India too. One of the worst episodes was the twin droughts of 1965 and 1966–67, the latter in the eastern state of Bihar. Although just 2,350 Indians died in the latter, it was only unprecedented foreign food aid that prevented mass starvation. Nonetheless, famine and disease ravaged the state, and it was reported by the *Sydney Morning Herald* that as many as 40 million people were affected out of a total population of about 500 million.[37]

Particularly hard hit were Bihar farmers, who struggled to keep their normally sturdy draft oxen alive on a daily ration of 2.7 kilograms (6 pounds) of straw. As reported in an April 1967 *New York Times* article,[38] an American US cow at that time usually consumed over 11 kilograms (25 pounds) of straw a day. A total of 11 million farmers and 5 million laborers were effectively put out of work by the drought. Crops became an issue for starving farmers too, the same article stating that:

> An official in Patna said confidently the other day that 'the Indian farmer would rather die than eat his seed', but in village after village farmers report that they ate their seed many weeks ago.

The Bihar famine, however, pales in comparison with the Bengal famine of 1943, which killed as many as 3 million people, but was not caused by drought; rather, it resulted from British mismanagement of Bengal's rice crop during World War II.[39]

The Sydney Morning Herald

MONDAY, DECEMBER 26, 1966

THE INDIAN FAMINE

Paddy-fields of Bihar bare, dry and cracked

HUNGER is so much the daily accompaniment to the lives of most of India's 500 million population that its horrible evidences soon lose their power to shock. Each year millions die, nameless and unknown victims of disease, doomed from the start to an early death simply because they fail to get

This article from JOHN SLEE, in Delhi, is the result of a week-long tour of villages in the Gaya district of Southern Bihar State, one of the regions most seriously affected by this year's drought in India.

leased by their master and le' to fend for themselves.

The failure of the rains the district meant that Bipti Bhuiyani's husband could find no work with other landowners. After almost three months without work he fell sick, about the time the Government set up relief schemes in the district to provide employment for destitute, landless labourers. He was too weak to work. His death was officially recorded as having

searched in the jungle next to the village for berries and edible roots to add to the

in only 825,000 acres. Out of this less than 200,000 acres were saved by irrigation. Paddy

Bipti Bhuiyani, helped by her daughter, prepares a meal from the leaves of potato plants for her three fatherless children. Her husband, a farm worker, officially died from tuberculosis but the cause was really starvation.

The Gadsden Times

GADSDEN, ALABAMA, MONDAY, AUGUST 28, 1967

(AP Wirephoto)

Famine Food For India's Youngsters

Figure 12: Famine following drought in India, 1966–67.

The US, like most countries, is not immune to drought either, especially in southern and southeastern states. Some of the worst droughts occurred in the Great Plains states and southern Canada during the Dust Bowl years of the 1930s, which saw no less than four major droughts in 1930–31, 1934, 1936 and 1939–40.[40] A 2014 study found that the 1934 drought was the driest and most widespread of the last millennium, extending across 72% of western North America.[41]

But perhaps worse yet was a 7-year uninterrupted drought from 1950 to 1957,[42] concentrated in Texas and Oklahoma but eventually including all the Four Corners states of Arizona, Utah, Colorado and New Mexico, as well as eastward states such as Missouri and Arkansas. For Texas, it was the most severe drought in recorded history. By the time it ended, 244 of Texas' 254 counties had been declared federal disaster areas.

Desperate ranchers resorted to burning cactus, removing the spines, and using it for cattle feed. Because of the lack of adequate rainfall, over 1,000 towns and cities in Texas had to ration the water supply. The city of Dallas opened centers where citizens could buy cartons of water from artesian wells for 50 cents a gallon, which was more than the cost of gasoline at the time.

The photo montage in Figure 13 shows scenes from the Texas drought.[43,44,45] The article is from The Victoria Advocate.[46]

As an illustration that the 1930s and 1950s were not the only decades over the past century in which the US experienced significant droughts, Figure 14 depicts observational data showing the area of the contiguous US in drought from 1895 up until 2015. As can be seen, the long-term pattern in the US is featureless, despite global warming.

Reconstructions of ancient droughts using tree rings or pollen as proxies reveal that historical droughts were even longer and more severe than those described here, many lasting for decades – so-called 'megadroughts'. This can be seen in Figure 15, which shows the pattern of dry and wet periods in drought-prone California over the past 1,200 years. Although the third-driest period in the 1100s and the fifth driest period in the 1200s both occurred during the Mediaeval Warm Period, the driest (1500s) and fourth-driest (800s) periods of drought occurred during relatively cool epochs.

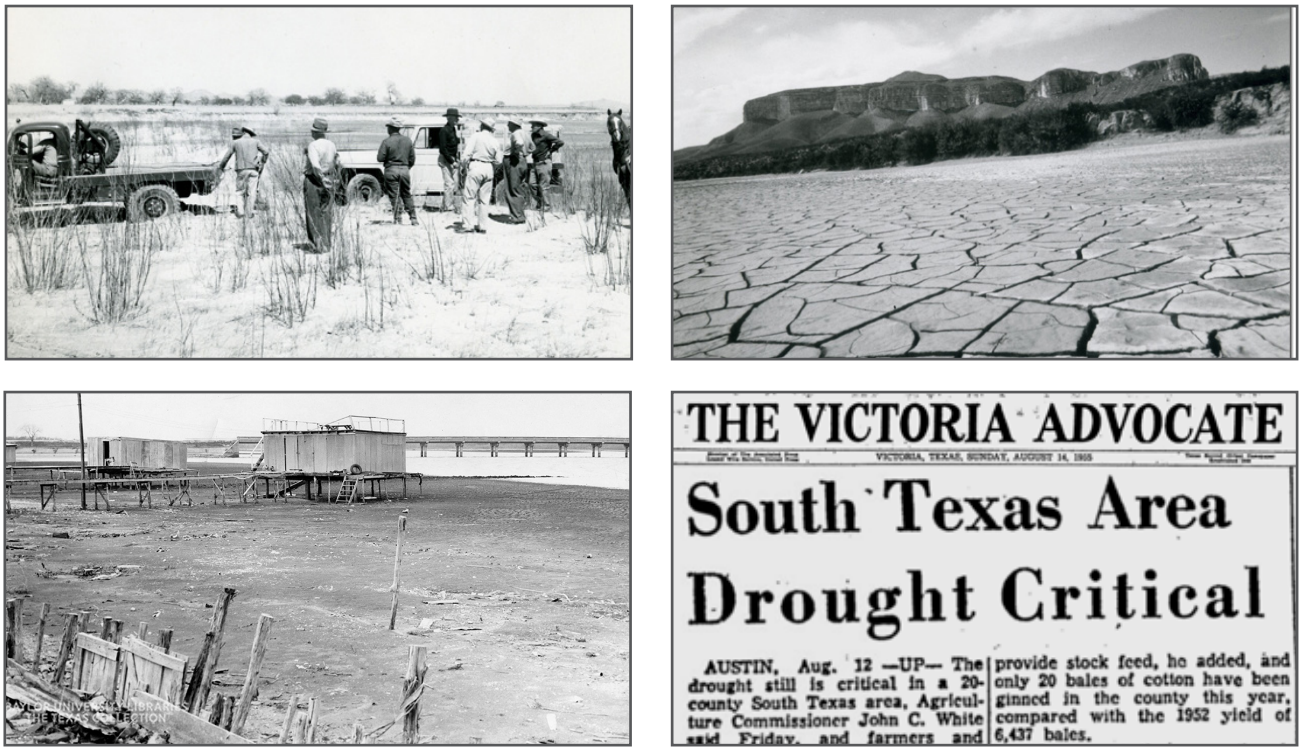


Figure 13: Texas drought, 1950–57.

Left top photo: car being towed after becoming stuck in parched riverbed; left bottom photo: once lakeside cabins on shrinking Lake Waco; right top photo: dry lakebed; right bottom: newspaper excerpt.

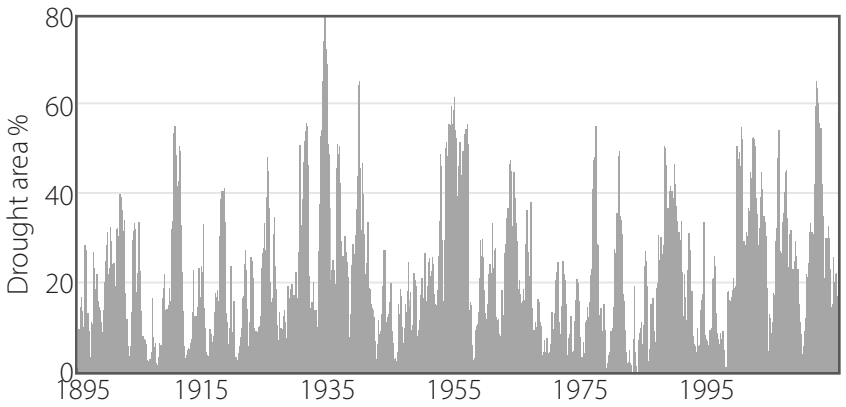


Figure 14: Percentage of the US in drought 1895–2015.
Based on the Palmer Drought Severity Index. Source: NOAA/NCEI.[101]

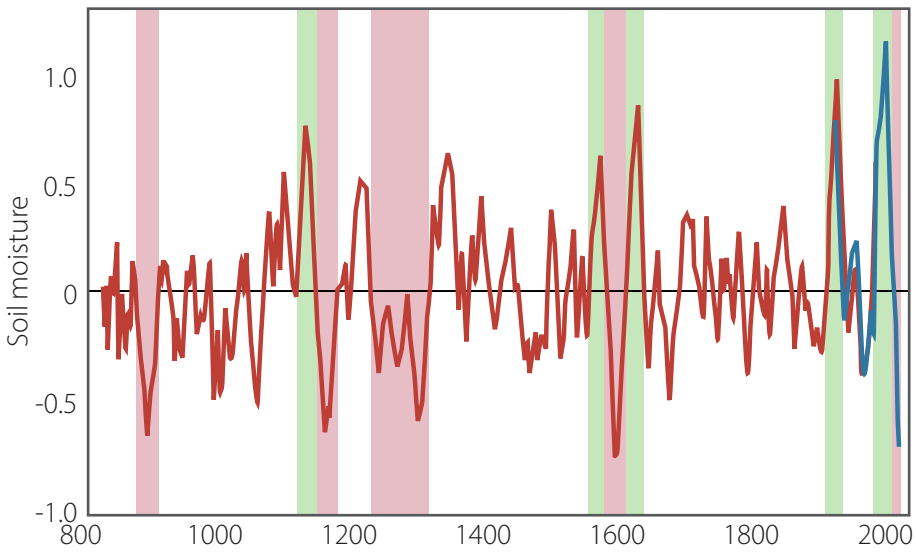


Figure 15: Historical droughts in California, 800 to 2010.
Source: Lamont-Doherty Earth Observatory, Columbia University.[102]

5. Hurricanes

Popular opinion would have one believe that hurricanes are on the rise. But overall, they actually show a decreasing trend around the globe, and the frequency of landfalling has not changed for at least 50 years. So these powerful tropical cyclones, which all too dramatically demonstrate the fury nature is capable of unleashing, cannot be linked to global warming.

The deadliest US hurricane[47] in recorded history struck Galveston, Texas in 1900, killing an estimated 8–12,000 people. Lacking a protective seawall, the thriving port was completely flattened by winds of 225 km per hour (140 mph) and a storm surge exceeding 4.6 meters (15 feet). With almost no automobiles, the hapless populace could flee only on foot or by horse and buggy. The extent of the devastation can be seen in the photo[48] in Figure 16, which also shows early headlines about the disaster in *The Nevada Daily Mail*.[49] As the newspaper reported at the time, 'residents [were] crushed to death in crumbling buildings or drowned in the angry waters'.


THE DAILY MAIL

TERRIBLE LOSS OF LIFE.

The Galveston Storm Results Simply Appalling.

The Dead May Number Two Thousand.

The Stricken City Needs Help and an Appeal for Aid Has Been Sent Out.

Figure 16: Galveston Hurricane, 1900.
Left: Early newspaper report; right: men using ropes to remove debris in order to look for bodies.

Hurricanes have been a fact of life for Americans in and around the Gulf of Mexico since Galveston and before. The death toll has fallen over time, with improvements in planning and engineering to safeguard structures, and the development of early warning systems to allow evacuation of threatened communities. Nevertheless, the frequency of North Atlantic hurricanes has been essentially unchanged since 1851, as shown in Figure 17. The apparent heightened hurricane activity over the last 20 years, particularly in 2005 and 2020, simply reflects improvements in observational capabilities since 1970, and is unlikely to be a true climate trend, say a team of hurricane experts.[50] The incidence of *major* North Atlantic hurricanes in recent decades is no higher than that in the 1950s and 1960s, when the Earth was actually cooling, unlike today.

One of the strongest US hurricanes in the active 1950s and 1960s was Diane in 1955, which walloped the North Carolina coast before moving north through Virginia and Pennsylvania, and then ending its life as a tropical storm off the coast of New England. Although its winds had dropped from 190 km per hour (120 mph) to less than 55 km per hour (35 mph) by that stage, it

Figure 17: Annual number of North Atlantic hurricanes, 1851–2022.

Source: NOAA Hurricane Research Division[103] and Paul Homewood.[104]

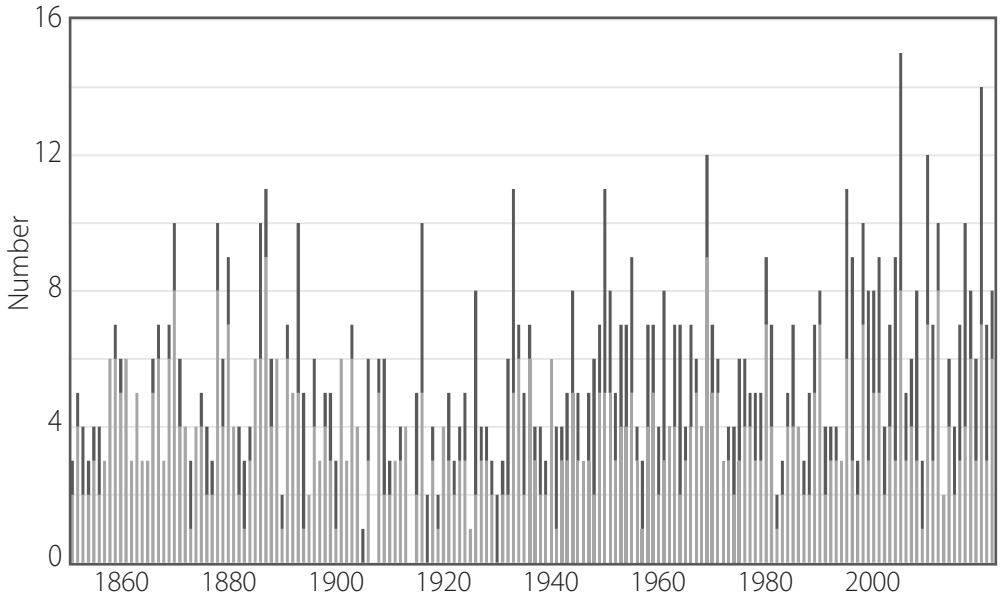


Figure 18: Hurricane Diane, 1955.

spawned rainfall of 500 mm (20 inches) over a two-day period there, causing massive flooding and dam failures (Figure 18).[51] An estimated 200 people died. In North Carolina, Diane was but one of three hurricanes that struck the coast in just two successive months that year.

During those two decades, the deadliest hurricane was 1963's Flora, which cost nearly as many lives as the Galveston Hurricane. It did not strike the US, but made successive landfalls in Tobago, Haiti and Cuba, reaching peak wind speeds of 320 km per hour (200 mph). In Haiti a record 1,450 mm (57 inches) of rain fell – comparable to what Hurricane Harvey dumped on Houston in 2017 – resulting in landslides that buried whole towns and destroyed crops. Even heavier rain, up to 2,550 mm (100 inches), devastated Cuba and 50,000 people were evacuated from the island, according to a newspaper article in *The Trinidad Guardian* (Figure 19).[52]

A few years before, in 1960, less deadly Hurricane Donna had moved through Florida with peak wind speeds of 285 km per hour (175 mph) after pummeling the Bahamas and Puerto Rico. A storm surge of up to 4 meters (13 feet) combined with heavy rainfall caused extensive flooding all across the peninsula (Figure 20).[53] On leaving Florida, Donna struck North Carolina, still as a Category 3 hurricane (top wind speed 208 km per hour or 129 mph), and finally Long Island and New England. The US National Oceanic and Atmospheric Administration (NOAA) calls Donna 'one of the all-time great hurricanes'.[54]

Figure 19: Hurricane Flora, 1963.

Trinidad Guardian

Port-of-Spain, Trinidad and Tobago. 47th Year No. 13985 ★★ Wednesday, October 2, 1963

PRICES

Trinidad & Tobago : 8c.
Other West Indian Territories and British Guiana : 14c.

TIDES

High : 3.18 a.m. 3.35 p.m.
Low : 9.31 a.m. 10.13 p.m.
Sunrise : 5.54 a.m. Sunset: 5.39 p.m.

WEATHER

YESTERDAY — PORT-OF-SPAIN (from Radio Guardian)
Temperature : Max. 86° Min. 69°
Max. Rh Min. 78°
TRINIDAD AND TOBAGO : Fair apart from a few brief scattered moderate showers during the afternoon.

TOBAGO HURRICANE DEATH TOLL 30

Villages Destroyed; Farm Loss Heavy

THOUSANDS HOMELESS

From GERRY HAREWOOD
Guardian Staff Reporter

SCARBOROUGH, Oct 1.—Thirty persons are reported dead in the wake of Hurricane Flora which cut a trail of destruction through Tobago yesterday. However, Police Supt. Kenneth Duff, in charge of the Tobago Division, stated tonight that the police have only been able to confirm 17 deaths.

Several hundred persons are injured and thousands homeless. Hardest hit areas are Mount St. George and Bethesda, where villages were completely demolished, Mason Hall, Moriah, Les Coteaux and Patience Hill.

An aerial survey was carried out by Mr. Basil Pitt, Parliamentary Secretary for Tobago Affairs, and Mr. Joe Crooks, Town Planner, this morning and it is estimated that serious damage was done to approximately 40 per cent of the houses on the island and 75 per cent of the coconut trees were destroyed.

Ad Hoc arrangements for housing the homeless have been made in schools, churches, government buildings, Fire Brigade Headquarters and the General Hospital.

Medical officers state that the immediate need is for food, clothing, shelter and blankets which are to be distributed to-morrow at ten centres throughout the island.

The Government Relief Committee is meeting tonight at the main relief centre, the Government Central School, with Prime Minister Dr. Eric Williams due to attend to coordinate relief measures.

Venezuela Jails Red Congressmen

CARACAS, Oct. 1 (AP)—Eight Communist and leftist Congressmen were jailed and 15 others were sought by police today after Government orders cancelling their parliamentary immunity.

President Romulo Betancourt's regime accused the Congressmen of masterminding bombings, hold-ups and kidnappings by the terrorist Armed Forces for National Liberation (FALN). The FALN has vowed to topple to overthrow the perversion of parliamentary immunity.

The Government was provoked into action by a train ambush Sunday in which five National Guardsmen were killed and eight persons, including women and children, were wounded.

Gunmen followed up the ambush with a U.S. $10,000 robbery yesterday of the Caracas branch of a soldier's office and a U.S. $3,000 hold-up of a U.S.-owned machinery firm.

RED PROPAGANDA

Interior Minister Manuel Mantilla charged that Congressmen of the Communist Party and the Castroite Movement of the Revolutionary Left Movement

Ben Bella Seizes Farms

ALGIERS, Oct. 1 (AP)—Premier Ahmed Ben Bella launched the seizure of farmland in French hands in what observers interpreted to be an effort to rally the masses around him.

He made the announcement at a continual speech before 100,000 Algerians massed to show support for the Government in its struggle against dissension in Kabylie

FLORA'S WORK

Pictures give an idea of the havoc inflicted by Hurricane Flora in Tobago

PM Opens Fund With $1,000

US Gives $3,400

A Relief Fund for the victims of Hurricane Flora in Tobago was launched yesterday with a $1,000 personal contribution by Dr. Eric Williams.

Figure 20: Hurricane Donna, 1960.

Florida has been a favorite target of hurricanes for more than a century. Figure 21 depicts the frequency by decade of all Florida landfalling hurricanes and major hurricanes (Category 3, 4 or 5) since the 1850s. While there is no trend in major hurricanes over 170 years, the overall trend is downward – even in a warming world.

Hurricane Camille in 1969 first made landfall in Cuba, leaving 20,000 people homeless. It then picked up speed, smashing into Mississippi as a Category 5 hurricane with wind speeds of approximately 300 km per hour (185 mph); the exact speed is unknown because the hurricane's impact destroyed all measuring instruments. Camille generated waves in the Gulf of Mexico over 21 meters (70 feet) high, beaching two ships[55] (Figure 22), and caused the Mississippi River to flow backwards. A total of 257 people lost their lives, *The Montreal Gazette* reporting that workers found 'a ton of bodies…in trees, under roofs, in bushes, everywhere'.[56]

One hurricane spawned in the eastern Caribbean during the 1950s and 1960s, initially Category 4 in strength (top wind speed 250 km per hour or 156 mph), made it all the way to Canada as a tropical storm before finally dissipating in Hudson Bay. Hurricane Hazel killed at least 469 people in Haiti, caused 95 fatalities in the US and another 81 in Ontario, Canada. Record rainfall of more than 200 mm (8 inches) in Toronto over 24 hours caused severe flooding and massive damage in an area with little experience of hurricanes.[57]

These are just a handful of hurricanes from our past, all as massive and deadly as Category 5 Hurricane Ian, which in 2022 deluged Florida with a storm surge as high as Galveston's and rainfall up to 685 mm (27 inches); 156 were killed. Hurricanes are not on the rise today.

Figure 21: Number of Florida landfalling hurricanes by decade, 1850–2020.

Source: Joseph D'Aleo.[105]

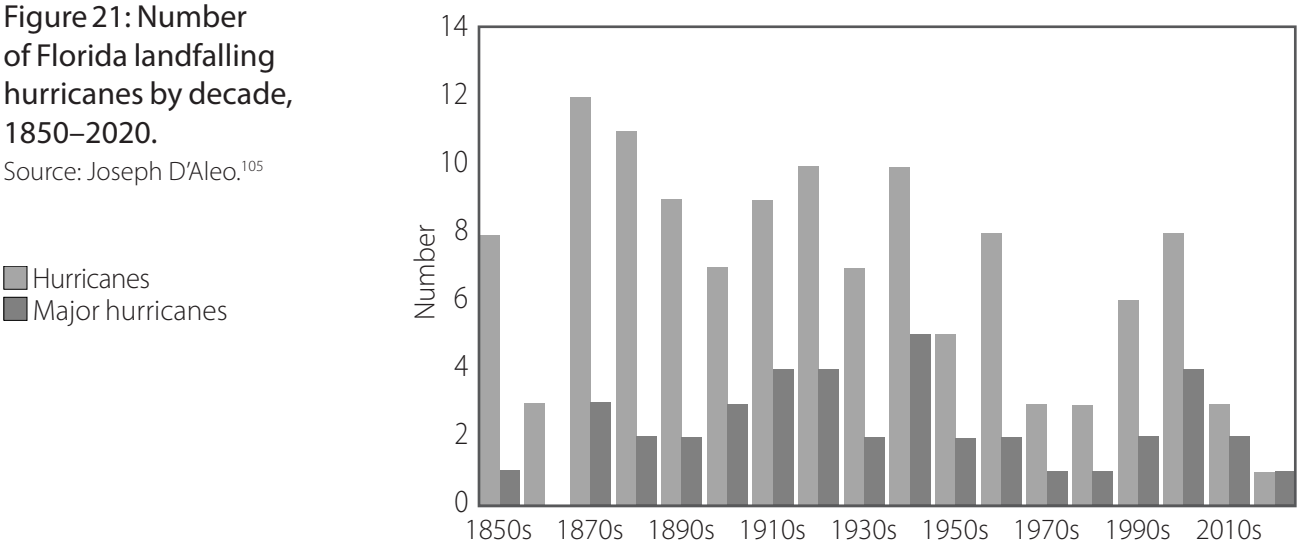
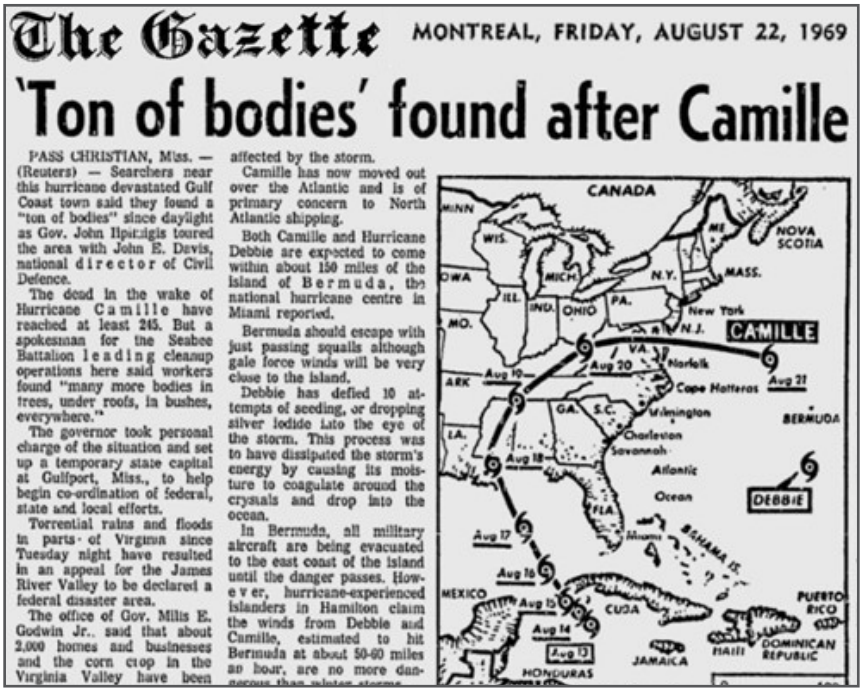


Figure 22: Hurricane Camille, 1969.



The Gazette MONTREAL, FRIDAY, AUGUST 22, 1969

'Ton of bodies' found after Camille

PASS CHRISTIAN, Miss. — (Reuters) — Searchers near this hurricane devastated Gulf Coast town said they found a "ton of bodies" since daylight as Gov. John Ehrlichgis toured the area with John E. Davis, national director of Civil Defence.

The dead in the wake of Hurricane Camille have reached at least 245. But a spokesman for the Seabee Battalion leading cleanup operations here said workers found "many more bodies in trees, under roofs, in bushes, everywhere."

The governor took personal charge of the situation and set up a temporary state capital at Gulfport, Miss., to help begin co-ordination of federal, state and local efforts.

Torrential rains and floods in parts of Virginia since Tuesday night have resulted in an appeal for the James River Valley to be declared a federal disaster area.

The office of Gov. Mills E. Godwin Jr., said that about 2,000 homes and businesses and the corn crop in the Virginia Valley have been affected by the storm.

Camille has now moved out over the Atlantic and is of primary concern to North Atlantic shipping.

Both Camille and Hurricane Debbie are expected to come within about 150 miles of the island of Bermuda, the national hurricane centre in Miami reported.

Bermuda should escape with just passing squalls although gale force winds will be very close to the island.

Debbie has defied 10 attempts of seeding, or dropping silver iodide into the eye of the storm. This process was to have dissipated the storm's energy by causing its moisture to coagulate around the crystals and drop into the ocean.

In Bermuda, all military aircraft are being evacuated to the east coast of the island until the danger passes. However, hurricane-experienced islanders in Hamilton claim the winds from Debbie and Camille, estimated to hit Bermuda at about 50-60 miles an hour, are no more dangerous than winter storms.

6. Tornadoes

After a flurry of tornadoes swarmed the central US in March 2023, the media quickly fell into the trap of linking the surge to climate change, as often occurs with other forms of extreme weather. But there is no evidence that climate change is causing tornadoes to become more frequent and stronger, any more than hurricanes are increasing in strength and number.

Indeed, there are ample examples of past tornadoes just as, or more violent and deadly, than today's, but conveniently ignored by believers in the narrative that weather extremes are becoming more common.

Like hurricanes, tornadoes are categorised according to wind speed, using the Fujita scale, which goes from EF0 to EF5 (F0 to F5 before 2007);

First in News, Circulation and Advertising

VOL. 48—NO. 326. MUNCIE, INDIANA, FRIDAY, MARCH 20, 1925. PRICE THREE CENTS.

LATEST TORNADO DEATH LIST 848

MATCH LIMBS WITH HEADS TO BURNED TORSOS

Griffin's Toll Now Reaches 41 Dead, With 70 Seriously Injured.

7 PERISH WHEN WIND PICKS UP SCHOOL BUS

Evansville, Ind., March 19.—Forty-one dead, seventy persons given treatment for serious injuries and scores more treated for minor injuries, is the closest possible approximation to the casuality list from the little town of Griffin, Ind., entirely razed by the tornado Wednesday, given out tonight.

Inclusive of this number are five known dead and at least ten seriously injured in the little farming settlement of North Sands, five miles northeast of Griffin, which was also in the path of the storm.

The casuality list was awaited this afternoon at the receiving hospital New Harmony gymnasium, when Red Cross officials instituted a house-to-house survey of every farm house in the vicinity of the storm's path.

STORM CENTER RELIEF GOES ON 'MID DARKNESS

300 Estimated Dead at Murphysboro, 118 at De Soto, 90 at Gorham, Ill.

30 SCHOOL CHILDREN, ENTIRE FAMILY, KILLED

Carbondale, Ill., March 19—(By The Associated Press).—More than 500 persons are known to be dead and conservative estimates tonight place the total loss of life from 900 to 1,000 as the result of the tornado which devastated a score of Illinois and Indiana cities and towns Wednesday.

In addition to the loss of life, between 2,000 and 3,000 persons were injured, scores perhaps fatally. Other thousands were made homeless and enormous property damage was done by the freakish pranks of the elements.

Shelter to the Homeless.

Tonight, twenty-four hours after the catastrophe, the federal government, state, Red Cross and private institutions and individuals combined in the great task of caring for the injured, giving shelter to the homeless and hunting for bodies yet concealed in the tangled debris.

Improvised morgues in a dozen little towns and villages were packed to the doors tonight with long lines of victims of the storm, who perforce had remained uncared for as the essential ministrations of the hard-pressed morticians and physicians were given the injured

Wreckage at Princeton, Ind., Showing C. & E.-I. Tracks

FURY OF STORM LIKE HEIGHT OF WAR IN FRANCE

No Other Comparison, Says Ex-Chaplain — Thunder Loud, Lightning Blinds.

STORY OF DEVASTATION, DEATH, FREAKISHNESS

Chicago, March 19.—(By The Associated Press).—After the light of a full day had cast its searching rays into the debris left by Wednesday's tornado, and relief work had been organized to gather the dead, help the hurt and aid the homeless, the toll of destruction to life and property tonight still remained the greatest ever recorded in similar catastrophies, with 848 reported killed and 2,909 injured in the five states affected.

Towns Virtually Obliterated.

While the casualty lists had been reduced from first estimates in some instances, word came from heretofore unreported places that tended to keep the total casualties almost as high as indicated in first messages from the devastated towns and hamlets.

After a night of terror, dawn revealed that small towns had been

COOLIDGE LEADS RED CROSS AID | ANTI-TETANUS SERUM IN PLANE | WORST IN U. S. HISTORY | LORD CURZON IS DEAD AT LONDON | COOLIDGE TAKES ECONOMY STEP

WORST IN U. S. HISTORY

Chicago, March 19.—(By The Associated Press). — If present reports of casualties stand up, Wednesday's disaster will

Figure 23: Deadly 'tri-state' tornado outbreak, 1925.

Top right: one of 12 or more tornadoes observed in Missouri, Illinois and Indiana approaching a farm; top left: homes shattered to pieces in Murphysboro, Illinois; bottom: Muncie, Indiana newspaper report.

EF5 tornadoes attain wind speeds up to 480 km per hour (300 mph). More terrifying than hurricanes because they often arrive without warning, tornadoes also have the awesome ability to hurl people, animals, structural debris and even cars through the air.

In the US, tornadoes cause about 80 deaths and more than 1,500 injuries per year. The deadliest episode of all time in a single day was the 'tri-state' outbreak in 1925,[58] which killed over 700 people and resulted in the most damage from any tornado outbreak in US history. The photo montage in Figure 23 shows one of the tornadoes observed in Missouri, Illinois and Indiana that day[59] and some of the havoc it caused,[60] together with a contemporaneous newspaper report.[61]

Unlike the narrow path of most tornadoes, the swath of destruction wrought by the main F5 tornado was up to 2.4 km (1.5 miles) wide. Amazingly, the ferocious storm persisted for a distance of 353 km (219 miles) in its 3½-hour lifetime. Together with smaller F2, F3 and F4 tornadoes, the F5 tri-state tornado destroyed or almost destroyed numerous towns. 33 schoolchildren died in De Soto, Illinois when their school collapsed; De Soto's deputy sheriff was sucked into the funnel cloud, never to be seen again.

Newspapers of the day chronicled the devastation. United Press[62] described how:

> a populous, prosperous stretch of farms, villages and towns…suddenly turned into an inferno of destruction, fire, torture and death.

The *Ellensburg Daily Record*[63] reported that bodies were carried as far as a mile by the force of the main tornado.

Over three successive days in May 1953, at least 10 different US states were struck by an outbreak of more than 33 tornadoes,[64] the deadliest reaching F5, and carving a path directly through the downtown area of Waco, Texas[65] (Figure 24). Believing falsely that their city was immune to tornadoes, officials had not insisted on construction of sturdy buildings, many of which collapsed almost immediately and buried their occupants.

TEXAS TORNADO DEATH TOLL 92

WACO (Texas), Wed.—The death roll of the Waco and San Angelo tornadoes rose to 92 today as new "twisters" roared across three Southern States.

About 450 people were injured by the tornadoes, which may have caused as much as 30,000,000 dol. (£13,400,000) damage to property.

In Waco, where 83 were killed, a squad of weary men last night broke through to the basement of what had been a five-storey brick building and reported no bodies.

The littered basement had been believed to be a tomb for up to 30 missing employees of a furniture company.

A tornado ripped through Colkax, a central Louisiana town, last night, killing one and tearing down a Methodist church where 200 people were meeting. However, most of the church congregation got out before the roof collapsed.

The weather in different parts of Texas yesterday produced "twisters," snow, dust storms, cloud-bursts and floods.

An American Associated were killed, to Waco, which he found "a scene of grotesque horror."

"Their situations might easil have been reversed," he said. "They are 200 miles apart. Waco is the centre of the Texas farm country, shielded by green hills and trees.

"San Angelo is the centre of the west Texan sheep country, sprawling on the plains with little protected terrain.

"Kindling Wood"

"But Waco's tornado skipped the hills and struck in the centre of the business district. Now two square miles of solid brick buildings lie in shattered heaps.

"San Angelo's tornado overshot the exposed business area and chopped up two square miles of wooden

Figure 24: Waco and San Angelo tornadoes, 1953.

Left: newspaper report; right: buried automobiles in downtown Waco.

The same day, a powerful F4 tornado hit the Texas city of San Angelo, causing catastrophic damage. As mentioned in *The Mercury* newspaper article in Figure 24, an American Associated Press correspondent reported 'a scene of grotesque horror' in Waco and described how San Angelo's business area was 'strewn with kindling wood.'[66]

June that year saw a sequence of powerful tornadoes wreak havoc across the Midwest and New England, the latter being well outside so-called Tornado Alley. An F5 tornado in Michigan[67] and an F4 tornado in Massachusetts[68] (Figure 25) each caused at least 90 deaths and extensive damage. The accompanying newspaper article in Figure 25, from *The Courier-Mail* in Brisbane, Australia mentions how cars were 'whisked about like toys'.[69]

Nature's wrath was on display again in the most ferocious tornado outbreak ever recorded, the so-called Super Outbreak of April 1974, which spawned a total of 148 tornadoes in 13 states in Tornado Alley and the Canadian province of Ontario over two days, and delivered no fewer than 30 F4 or F5 tornadoes.[70] Figure 26 depicts the tornado paths,[71] as well as the massive F5 tornado[72] – the worst of the 148 – that bore down on Xenia, Ohio and the resulting destruction.[73, 74]

The Xenia tornado was so powerful that it tossed freight trains on their side, and even dropped a school bus onto a stage where students had been practicing just moments before. *The Cincinatti Post* said that half of the city was destroyed.[75]In Alabama, two F5 tornadoes, out of 75 that struck the state, hit the town of Tanner within 30 minutes; numerous homes, both brick and mobile, were splintered or swept away. In Louisville, Kentucky, battered by an F4 tornado, a Navy veteran who lost his home lamented in the Louisville Times[76] that 'only Pearl Harbor was worse'.

In all, the Super Outbreak caused 335 fatalities and over 6,000 injuries.

Figure 27 shows that the annual number of strong tornadoes (EF3 or greater) in the US has declined dramatically over the last 72 years. In fact, the average number of strong tornadoes annually from 1986 to 2017 – a period when the globe warmed by about 0.7°C (1.3°F)[77] – was 40% lower than from 1954 to 1985, when warming was much less. That turns the 'extreme weather caused by climate change' narrative on its head.

BRISBANE'S LARGEST AUDITED DAILY CIRCULATION : Last week 225,275

The Courier-Mail

Telephone FA0111 BRISBANE THURSDAY JUNE 11 1953

216 Die, 1700 injured in battle-like tornado

COURIER-MAIL SPECIAL

NEW YORK, June 10 — Death roll last night in the tornado which swept three U.S. States totalled 216, with 1700 injured and thousands homeless.

The death toll was: Michigan 121; Massachusetts 76; Ohio 18.

Houses were smashed to matchwood and cars were whisked about like toys. A state of emergency was declared and 2000 National Guardsmen helped in rescue work.

Police said housing development areas looked as if they had been under sustained artillery attack.

In Worcester (Mass., population 200,000) a £2,232,100 machine-tool factory was levelled.

In a broadcast last night, Mr. Ray Madden, Democrat Representative, Indiana, asked whether there was any connection between the 249 tornadoes which have struck the U.S. this year and recent atomic explosions.

Weather experts denied any connection. They said a tornado, which can reach a force of 500 miles an hour, was caused by the impact of cold and warm air masses.

Figure 25: Michigan and Massachusetts tornadoes, 1953.

Left: newspaper report; top right photo: overturned automobiles in Flint, Michigan; bottom right photo: storm damage in Worcester, Massachusetts.

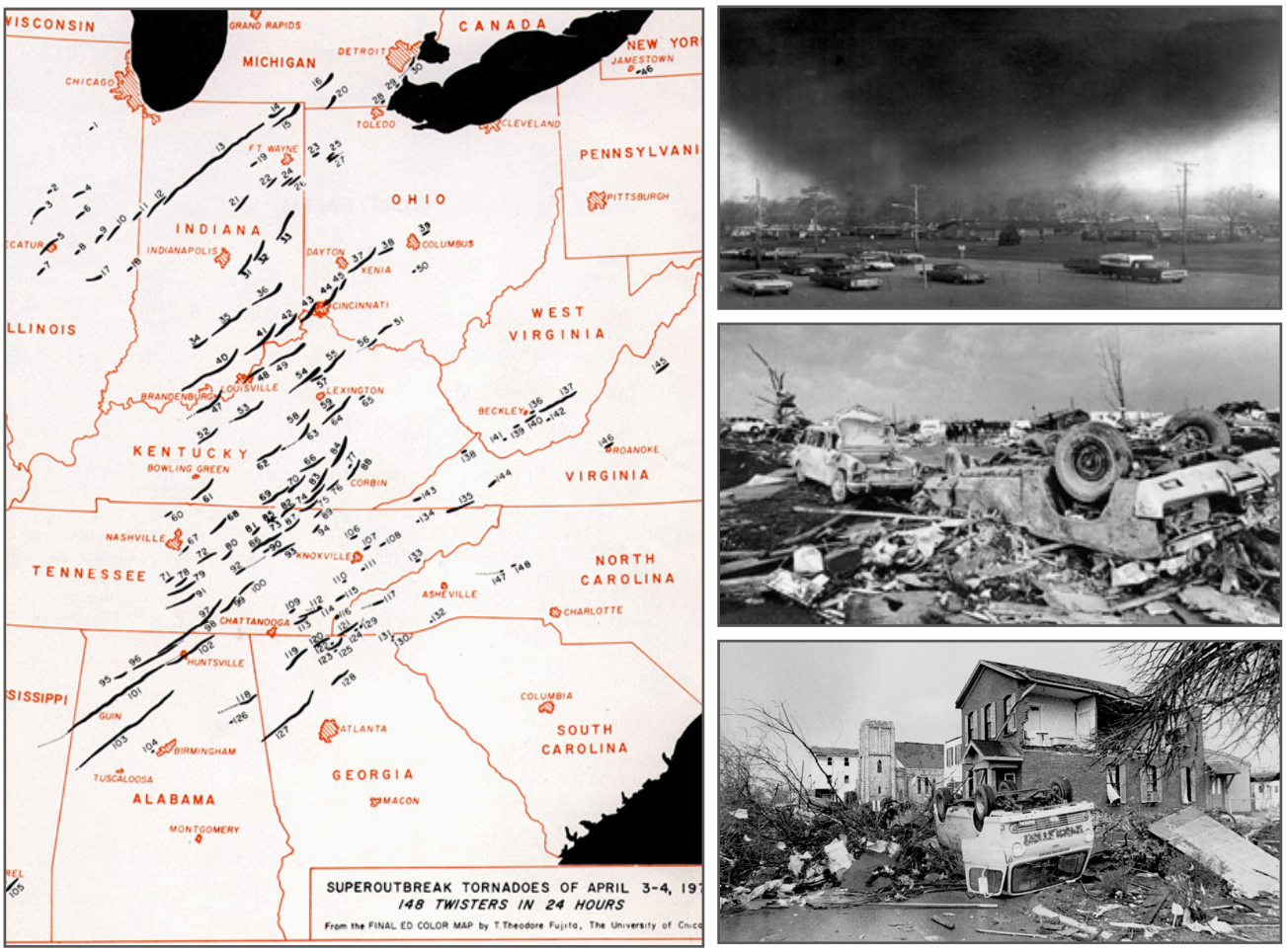
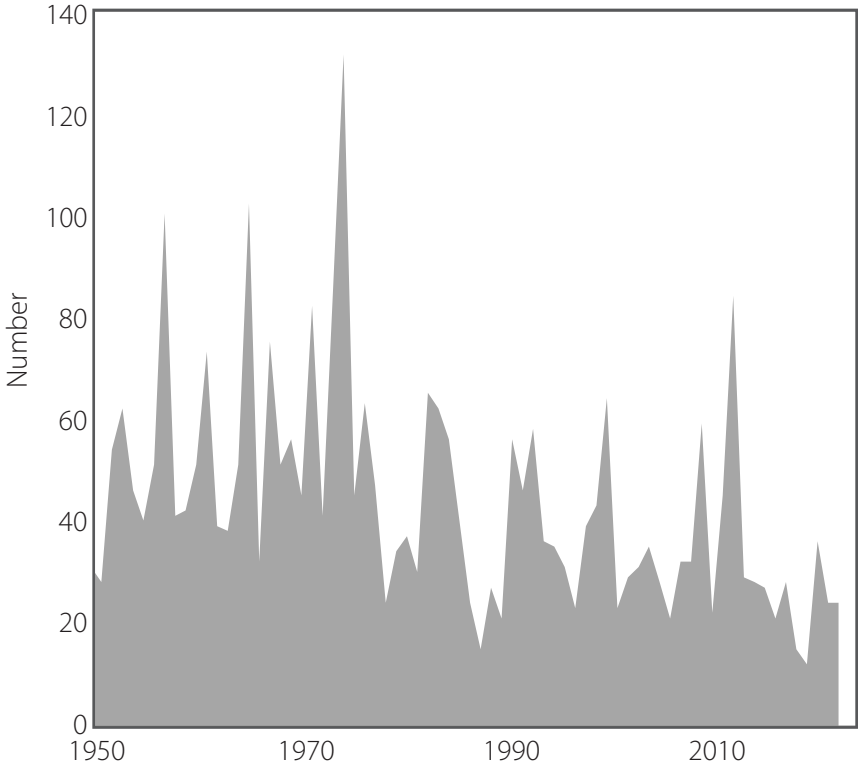


Figure 26: Super Outbreak of tornadoes, 1974.

Left: distribution and approximate path lengths of tornadoes; top right photo: F5 tornado approaching Xenia, Ohio (population 29,000); center right and bottom right photos: consequent wreckage in Xenia.

Figure 27: Annual count of EF3 and above tornadoes in the US, 1950–2021.

Source: Source: NOAA/NCEI.[106, 107]



7. Wildfires

Smoke that wafted over the US from extensive Canadian wildfires in 2023 has given credence to the mistaken belief that wildfires are intensifying because of climate change.

However, just as with all the other examples of extreme weather, there is no scientific evidence that wildfires today are any more frequent or severe than anything experienced in the past. Although they can be exacerbated by weather extremes, such as heatwaves and droughts, we've already seen that those are not on the rise either.

Together with tornadoes, wildfires are probably the most fearsome of natural disasters commonly blamed on global warming. Both can arrive with little or no warning, making it difficult or impossible to flee, are often deadly, and typically destroy hundreds of homes and other structures.

The worst wildfires occur in naturally dry climates such as those in Australia, California or Spain. One of the most devastating fire seasons in Australia was the summer of 1938–39,[78] which saw bushfires (as they are called Down Under) burning all summer, with ash from the fires falling as far away as New Zealand. The Black Friday bushfires of 13 January 1939 engulfed approximately 75% of the southeast state of Victoria, killing over 60 people, as described in an article from *The Telegraph-Herald*,[79] reproduced in Figure 28. The fires destroyed 1,300 buildings, at a time when the state's population was approaching 1.9 million. As it reported:

> In the town of Woodspoint alone, 21 men and two women were burned to death and 500 made destitute.

Just a few days later, equally ferocious bushfires swept through the neighboring state of South Australia. The inferno reached the outskirts of the state capital, Adelaide, as documented

The Telegraph-Herald

DUBUQUE, IOWA, SUNDAY, JANUARY 15, 1939

SCORES BURNED IN BUSH FIRES

Flames Roar Over Wide Area in Australia

Melbourne, Australia—(AP)—Disastrous bush fires roared Saturday through the heat-parched state of Victoria, leaving an estimated 60 deaths, hundreds homeless and property damage running into millions of dollars.

Fires blazed in more than half of Victoria's 88,000 square miles of territory. The state, of which this is the capital, was in the grip of the worst heat wave and drought in its history. Friday already has been named "Victoria's Black Friday."

In the town of Woodspoint alone, 21 men and two women were burned to death and 500 made destitute. A man, his wife and their three children were killed at Noojee.

Four died of the heat at Sydney.

THE ADELAIDE CHRONICLE

ADELAIDE HILLS

WEEK OF BLAZING TERROR

Crafers, Meadows, Echunga, And Upper Sturt Fare Worst

OUTBREAKS AT 30 CENTRES IN ONE DAY

At Least Thirty Homes Destroyed

Just when hills residents were congratulating themselves on last week's fires being brought under control, a fresh disaster, on an even more extensive scale than that of the previous week, overtook them.

Fanned into renewed life by a blistering 30 miles an hour wind on Friday, bushfires again swept through a number of districts throughout the State, causing widespread destruction of

Figure 28: Bushfire devastation in Australia, 1939.
Left: state of Victoria; right: state of South Australia.

in the excerpt from *The Adelaide Chronicle* in Figure 28.[80] Nationally, Australia's most extensive bushfire season was the catastrophic series of fires in 1974–75, which consumed 117 million hectares (290 million acres), around 15% of the land area of the whole continent.[81] Fortunately, because nearly two thirds of the burned area was in remote parts of the Northern Territory and Western Australia, relatively little human loss was incurred – only six people died – though livestock and native animals such as lizards and red kangaroos suffered. An estimated 57,000 farm animals were killed.

The 1974–75 fires were fueled by abnormally heavy growth of lush grasses, following unprecedented rainfall in 1974. The fires began in the Barkly Tablelands region of Queensland. One of the other bushfires in New South Wales had a perimeter of more than 1,000 km (620 miles).

In the US, the present area consumed by wildfires is still only a small fraction of what it was back in the 1930s – just like the duration and magnitude of heatwaves, discussed in Section 2. The western states, especially California, have a long history of disastrous wildfires dating back many centuries.

Typical of California conflagrations in the 1930s are the late-season fires around Los Angeles in November 1938, described in the article from *The New York Times* featured in Figure 29.[82] In one burned area, 4,100 hectares (10,000 acres) in extent, hundreds of mountain and beach cabins were wiped out. Another wildfire burned on a 320-km (200-mile) front in the mountains. As chronicled in the piece, the captain of the local mountain fire patrol lamented that:

> This is a major disaster, the worst forest fire in the history of Los Angeles County. Damage to watersheds is incalculable.

THE NEW YORK TIMES, FRIDAY, NOVEMBER 25, 1938.

2,000 MEN BATTLE WIDE COAST FIRES

Flames Checked in Most of the Santa Monica Area—Spread Near San Bernardino

WILL ROGERS RANCH SAVED

Loss Exceeds $3,000,000 in 5 Counties Around Los Angeles —Watersheds Damage Great

Special to THE NEW YORK TIMES.

LOS ANGELES, Nov. 24.—Although fresh outbreaks were reported on a 100-mile-long mountain front, Southern California's biggest and most costly forest fires in years were virtually under control tonight, after taxing the resources of authorities of five counties and drawing on the services of 2,000 or more CCC and WPA workers.

Many thousands of acres had been burned over in the fires, extending from the eastern fringes of Santa

ZONES OF FOREST FIRES NEAR LOS ANGELES

Shaded portions of map show areas of worst blazes in Santa Monica hills, to northwest, and San Bernardino, to east.

on the eastern edge of Los Angeles County was burning itself out after burning nearly 200 acres. Two hundred CCC men were mopping up this outbreak.

Three brush fires were raging in San Diego County.

In Ventura County the most serious of nearly a dozen separate outbreaks was being brought under control in the Sulphur Mountain area.

The fire burned furously in the Fagan Canyon area north of Santa Paula, threatening livestock and houses. Firemen estimated the flames seared more than 1,000 acres

Bernardino Mountains tonight, as a fire jumped the highway and, entering high timber, threatened Crestline resort, one and one-half miles away.

A north wind was rising, however, blowing against the flames, and the nearly 1,000 men fighting the blaze hoped with this aid to keep it in check.

This fire licked at San Bernardino's city limits last night, destroyed the Arrowhead Springs resort and wiped out several cabins and small buildings at Vale's ranch in Waterman Canyon. It has swept

Figure 29: Multiple wildfires near Los Angeles, southern California, 1938.

Northern California was incinerated too. The newspaper excerpts shown in Figure 30, from the *Middlesboro Daily News*[83] and *The New York Times,*[84] report on wildfires that broke out on a 640-km (400-mile) front in the north of the state in 1936, and near San Francisco in 1945, respectively. The 1945 report documents no less than 6,500 separate blazes in California that year.

Pacific Coast states further north were not spared either. The two newspaper excerpts shown in Figure 31 report the calamitous wildfires in Oregon in 1936 and in Canada's British Columbia in 1938; the articles are from *The Evening Record*[85] and *The Telegraph-Herald*[86] respectively.' The 1936 Oregon fires, which covered an area of 160,000 hectares (400,000 acres),

Daily Middlesboro News
The Home Daily of the Cumberlands

MIDDLESBORO, KENTUCKY, SATURDAY, OCTOBER 17, 1936

Northern California Is Ravaged By Forest Fires

San Francisco.—Forty forest fires raged in northern California over a 400-mile front today, threatening at least six mining communities after destroying thousands of acres of valuable timberland and claiming three lives.

Many fled their homes before the advancing flames. One mother lode town, Westville, already has been destroyed and its 300 residents made homeless. Four persons were trapped by flames 35 miles from Auburn in Placer county when they fled from a fire that spread over 20 square miles and devastated large lumber holdings.

Thousands of men were called to fight blazes extending from Mt. Shasta in the far northern part of the state to the Tehachapis Pass below Yosemite Park. In many regions attempts to battle the fires virtually were abandoned in the face of 60-mile-an-hour gales.

Mining towns, their histories extending back to the gold rush days of 1849, were lying directly in

(Turn to Page 2, Column 5)

The New York Times.

FRIDAY, SEPTEMBER 21, 1945

Forest Fires Rage in California

SAN FRANCISCO, Sept. 20 (AP) —Flames of twenty-five forest fires swept through forest and range lands of northern California today, adding to the estimated $3,000,000 damage done by 6,500 separate blazes in the State this year. All logging operations were ordered shut down and every available man and piece of equipment went to the fire lines. Between 30,000 and 40,000 acres of virgin redwood and fire tracts were reported burned in Mendocino

Figure 30: Wildfires in northern California

Left: near Auburn, Mt. Shasta and Yosemite, 1936; right: in Mendocino County, known for its redwood forests, 1945.

The Evening Record

Fire Danger To Oregon Towns Is Past; Stop Blazes

Dense Fog Aids 5,000 Fighters to Control Holocaust

TWO NEW DEATHS

Several Large Areas Still Flaming, But Spread

The Telegraph-Herald

DUBUQUE, IOWA, FRIDAY, JULY 22, 1938

FOREST BLAZE AT VANCOUVER ISLAND GAINS

Fire, Sweeping Along 20-Mile Front, May Have Been Set

Figure 31: Wildfires in other Pacific Coast states.

Left: Oregon, 1936; right: British Columbia, 1938.

obliterated the village of Bandon in southwestern Oregon, while the 1938 fire near Vancouver torched an estimated 40,000 hectares (100,000 acres). As a policeman said in the aftermath of the Bandon inferno:

> If the wind changes, God help Coquille and Myrtle Point. They'll go like Bandon did.[87]

As further evidence that modern-day wildfires are no worse than those of the past, Figures 32 and 33 show the annual area burned globally by wildfires since 1900, and in Australia since 1905. Clearly, the area burned annually is in fact declining, despite hysterical claims to the contrary by the mainstream media.

The data in Figure 32 shows that the global burned area declined steadily at a rate of approximately 7% per decade over the century from 1915 to 2015. A recent study attributes this trend to the dominance over higher temperatures of heavier precipitation and increased population density: while warming enhances wildfires by drying out vegetation, population increases lead to a reduction in vegetation through clearing of land.[88] In arid climates such as California and Australia, not only does warming dry out the land, but the dry land results in warmer temperatures, in a feedback effect.

Recently in the US, the National Interagency Fire Center (NIFC), which had tracked wildfires for decades, mysteriously scrubbed its website of all historical data before 1983. The agency claims that wildfire data from 1926 to 1982 previously documented on its site was unreliable, as it included intentional burning of underbrush, which did not lead to wildfires, and some fires were reported more than once. It is suspicious, however, that the earlier data disappeared during a US administration that links wildfire intensity to climate change.

Nonetheless, the NIFC reports that the total number of US fires in 2007 was 85,705, and the area burned was 3.78 million hectares (9.33 million acres); 15 years later, in 2022, there were

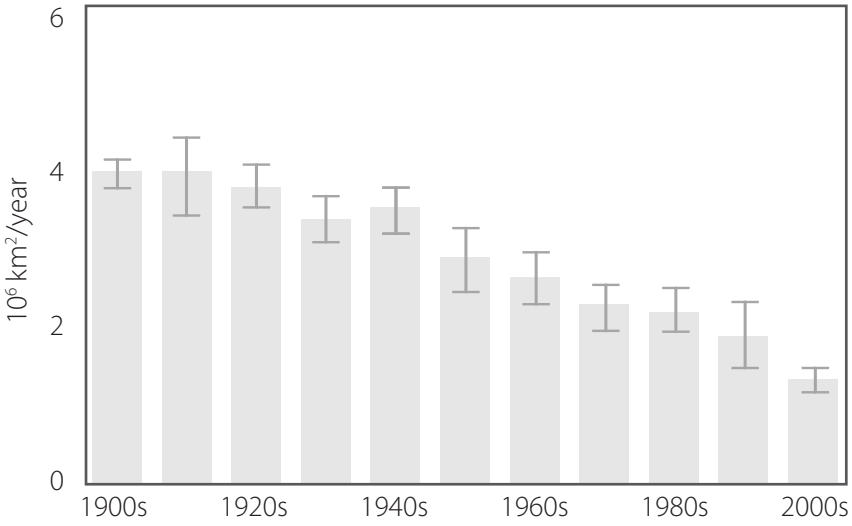


Figure 32: Global forest area burned by wildfires, 1900–2010
Source: Jia Yang et al.[108]

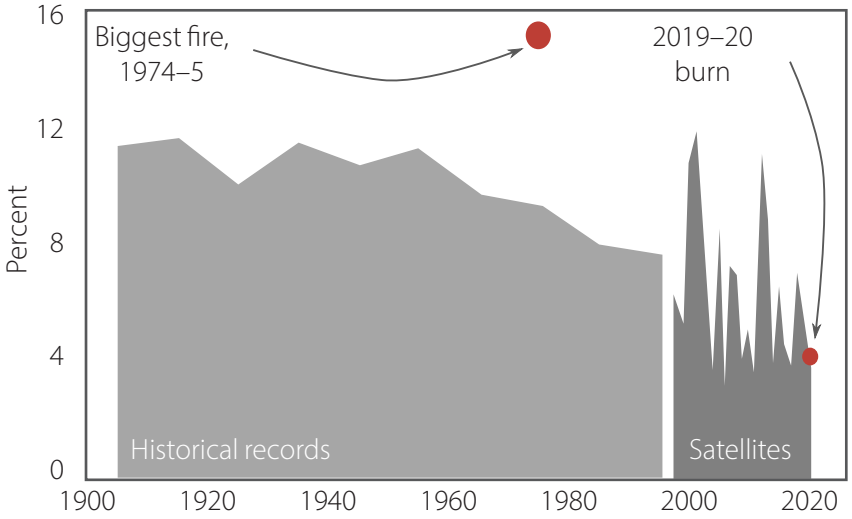


Figure 33: Australian area burned by wildfires, 1905–2020.
Percentage of total land area of 769 million hectares; estimates by decade 1905–1995, satellite measurements 1997–2020.
Source: Bjørn Lomborg.[109]

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68,988 fires which burned 3.07 million hectares (7.58 million acres), a reduction of 20% in both markers.[89] The same declining trend is true of other countries around the world.

It should be noted here that wildfires require a source of ignition, in addition to drying out of vegetation, plus sustained high temperatures and wind. A common natural form of ignition is lightning strikes during dry thunderstorms, but by far the largest ignition source currently is arson. Of hundreds of deadly wildfires that ravaged Greece in August 2023, many were started by arsonists, 79 being arrested.[90] However, the prevalence of arson in the historical wildfires documented in this section is unknown.

8. Further back in time

Most of the historical weather extremes described so far cover the period only from about 1850, when modern scientific instrumentation was first developed and newspapers began to report extreme weather events more extensively. But there is plenty of evidence of weather extremes comparable to today's dating back centuries and even millennia. Some of that evidence is based on proxies such as tree rings, sediment cores and leaf fossils, while some is anecdotal. A few examples are presented in this section.

As mentioned in Section 4, megadroughts have afflicted the earth's climate for millennia. An ancient example is the 7-year drought in Egypt approximately 4,700 years ago, which resulted in a widespread famine, known as Famine Stela. The water level in the Nile dropped so low that the river failed to flood adjacent farmlands as it normally does each year, resulting in drastically reduced crop yields. The event is recorded in a hieroglyphic inscription on a granite block located on an island in the Nile.[91]

Megadroughts that far exceeded the extended drought experienced in Europe in 2022 have occurred at least as far back as the year 1000. Figure 34 presents a 2021 reconstruction from tree ring proxies of the drought pattern in central Europe from 1000 to 2012, with observational data from 1901 to 2018 superimposed. Dryness is denoted by negative values, wetness by positive values. The authors of the study point out that the droughts from 1400 to 1480 and from 1770 to 1840 were much longer and more severe than those of the 21st century. Megadroughts in California back to 800 were depicted in Figure 15.

Reconstruction of historical hurricane patterns confirms what was noted in Section 5, namely that past hurricanes were more frequent and stronger than today's. Figure 35 shows a proxy measurement for hurricane strength of landfalling tropical cyclones that struck the Chillagoe limestone region in northeastern Queensland, Australia between 1228 and 2003. The proxy was the ratio of ^{18}O to ^{16}O isotopic levels in carbonate cave stalagmites, a ratio which is highly depleted in tropical cyclone rain.

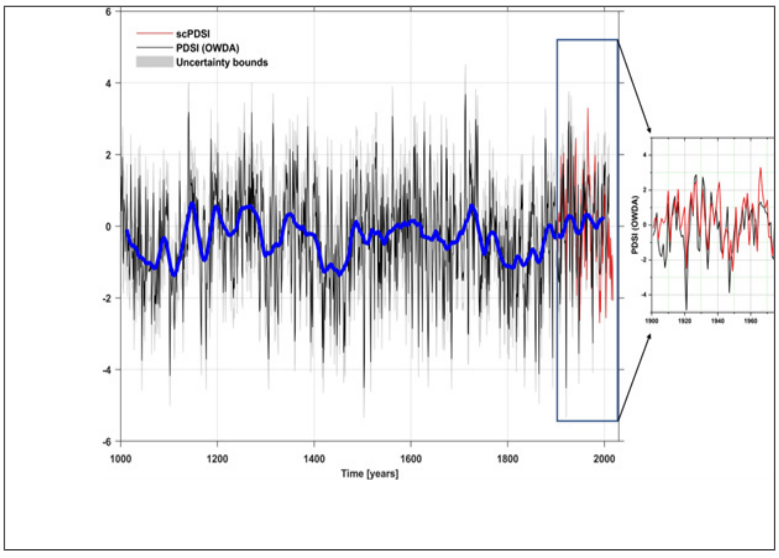

Figure 34: Drought in central Europe, 1000–2018.

Black: Palmer Drought Severity Index (PDSI); red: self-calibrated PDSI (scPDSI); blue: 31-year mean. Source: M. Ionita et al.[110]

It is clear from Figure 35 that far more (seven) major tropical cyclones impacted the Chillagoe region in the period from 1600 to 1800 than in any period since, at least until 2003. The strongest cyclone in the whole record occurred during the 1600 to 1800 period, and only one major cyclone was recorded from 1800 to 2003. As stated previously, hurricanes overall show a decreasing trend globally, and the frequency of landfalling hurricanes has not changed for more than 50 years (170 years in Florida).

Although most tornadoes occur in the US, they have been documented in the UK and other countries for centuries. In 1577, North Yorkshire

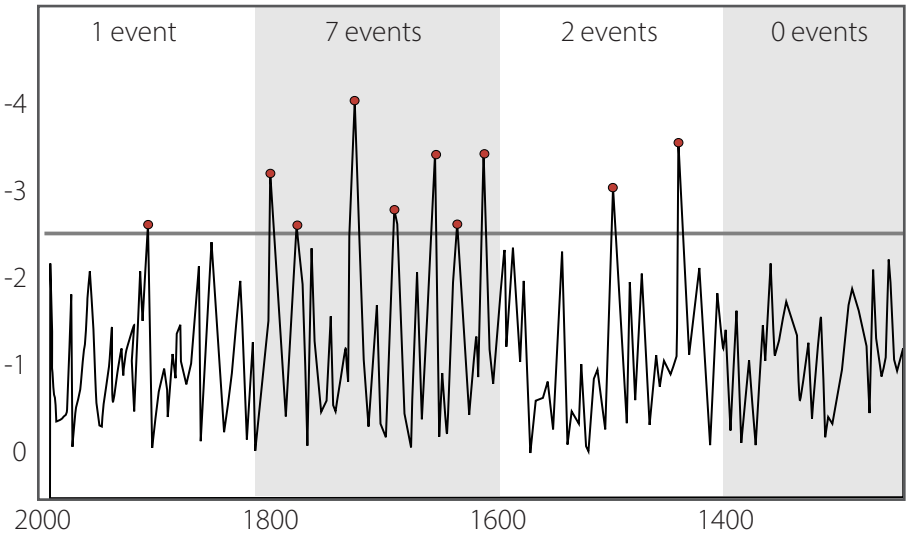

Figure 35: Strength of tropical cyclones in northeastern Queensland, Australia, 1228–2003.
$^{18}O/^{16}O$ depletion curve, in parts per thousand (‰); thick horizontal line at -2.50‰ denotes Category 3 or above events. Note that the time scale is reversed compared to earlier figures. Source: Jonathan Nott et al.[111]

in England experienced a tornado of intensity T6 on the TORRO scale, which corresponds approximately to EF4 on the Fujita scale, with wind speeds of 259–299 km per hour (161–186 mph). The tornado destroyed cottages, trees, barns, hayricks and most of a church.[92]

Violent thunderstorms that spawn tornadoes have also been reported throughout history. An associated hailstorm, which struck the Dutch town of Dordrecht in 1552 (Figure 36), was so violent, that residents 'thought the Day of Judgement was coming'. A mediaeval depiction of the event is shown in Figure 36. Such historical storms make a mockery of the 2023 claim by a climate reporter that, 'Recent violent storms in Italy appear to be unprecedented for intensity, geographical extensions and damages to the community'.[93] The thunderstorms in question produced hailstones the size of tennis balls, merely comparable to those that fell on Dordrecht centuries earlier. And the storms hardly compare with a hailstorm in India in 1888, which actually killed 246 people.[94] Other references to the past climate and historical weather extremes can be found in two books by renowned English climatologist H.H. Lamb.[95,96]

Figure 36: Mediaeval painting of Dordrecht hailstorm, 1552.
Source: The Book of Miracles.[112]

9. Conclusions

The historical examples presented in this report should put to rest once and for all the notion that global warming is exacerbating weather extremes.

The perception that extreme weather events are increasing in frequency and severity is primarily a consequence of modern technology – the Internet and smart phones – which have revolutionised communication and made us much more aware of such disasters than we were 50 or 100 years ago. Before 21st-century electronics arrived, many weather extremes went unrecorded, especially in then more sparsely populated areas of the globe.

Hurricanes are a good example. Prior to about 1950, most data on hurricane frequency in the US were based on eyewitness accounts, thus excluding most hurricanes that never made landfall. And even the recording of non-landfalling hurricanes relied on observations made by ships at sea, which almost certainly resulted in an undercount. So it is hardly surprising that the public sees today's more complete coverage enabled by satellite technology as an uptick in hurricane occurrence.

The same is true of tornadoes, wildfires and possibly floods, although heatwaves and droughts were probably fully reported in the past because of their duration. A century ago, the US population was only a third of what it is now, which means there was a much greater chance of tornadoes and wildfires in remote areas not being recorded.

Population gain has also enhanced the perception of worsening extremes in other ways. The increasingly popular habit of building homes near water, either along rivers or on the sea coast, has greatly increased the property damage caused by major floods and hurricanes. Population expansion beyond urban areas has elevated the death toll and property damage from tornadoes and wildfires, although the latter have also been intensified by poor forest management.

Much of the fault for the widespread belief that weather extremes are becoming worse can be attributed to the mainstream media, eager to promote the latest climate scare. Constant repetition of a false belief can, over time, create the illusion of truth – a phenomenon well known to psychologists and one exploited by propagandists. The falsehood can even become a 'noble lie' when exploited for political purposes. The failure by climate reporters to put today's extreme weather events in a true historical perspective is contributing to the belief that weather extremes are on the rise when they are not.

This misconception has been further amplified by attribution studies that claim to be able to assign specific extremes to either natural variability or human causes. However, such studies, while currently fashionable, use highly questionable methodology that has several shortcomings.[97,98]

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