



Executive Summary

Special Report

Changes in the characteristics of extreme events are particularly important for human safety, infrastructure, agriculture, water quality and quantity, and natural ecosystems. **Heavy rainfall is increasing in intensity and frequency across the United States and globally and is expected to continue to increase.** The largest observed changes in the United States have occurred in the Northeast.

This notion **“Heavy rainfall is increasing in intensity and frequency across the United States and globally and is expected to continue to increase,”** is incorrect, even false.

- The “heavy rain is increasing” comes from improvements in “catch efficiency” of rain gages during the National Weather Service modernization and automation of the 1990s, specifically the adoption of a double shield system, a Tretyakov shield and an 8-foot Alter shield on the All-Weather Precipitation Accumulation Gage of the Automated Surface Observing System, often ASOS.
- Data from England, sectors from all across England and Wales show heavy rain days and heavy rain amounts are NOT increasing.
- The following are from the post, <https://casf.me/recent-downpours-increasing-never-mind-its-another-alarmist-claim-demolished-by-careful-observation/> and the graphics under Special Pages – presentation graphics.

This old Forest Service report shows the problem of undercatchment of precipitation during the snow season at the Priest River Experimental Forest, Idaho, 1951, 1952.

Lower Curve A shows unshielded snow accumulation

Curve B Idaho Type II wind shield

Curve C Modified "Alter Type I" shield

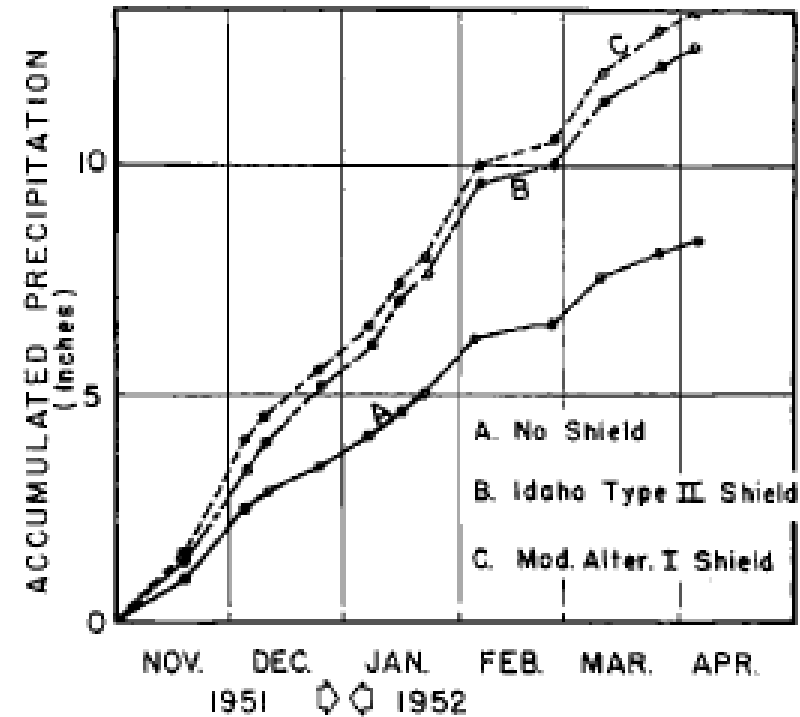


Fig. 12--Comparative winter precipitation catch in experimental U. S. Weather Bureau standard gages at Priest River Experimental Forest, Idaho

Figure 12 gives the comparative performance of three U. S. Weather Bureau standard rain gages located on Gisborne Mountain in the Priest River Experimental Forest. Here is shown the definite value of the windshield. Data on the gage with the modified Alter-I shield indicates the same positive results observed in the wind tunnel. Observations indicate that the Idaho Type II shield becomes frozen up much more quickly than the new shield and probably would cap over on occasions at Gisborne Mountain. Additional field testing is necessary to indicate whether the new shield design will prevent capping over due to formation of rime between the gage and shield.

Numerous intercomparisons were done to achieve improved catch efficiency during R&D.

Winds around the mouth of the standard 8-inch rain gage, below left, resulted in undercatchment.

Below right is an 8-inch rain gage equipped with an Alter Shield.



8-inch unshielded gage in Idaho where some of the intercomparisons were done.



Figure 5 NWS 8-inch Manual Gauge

Figure from SAIC report, "Interim Report For The Winter Test of Production All-Weather Precipitation Accumulation Gauge (AWPAG) Winter 2008-2009"

<http://journals.ametsoc.org/doi/abs/10.1175/15200477%281994%29075%3C0215%3ATAOUSP%3E2.0.CO%3B2>

The Accuracy of United States Precipitation Data

Pavel Ya. Groisman^{*+}
and David R. Legates[@]

Bulletin of the American Meteorology Society, Feb, 1994.

Abstract says that errors go from 5% to 40%, worse in winter and in northern states because of strong winter storms (wind and snow effects)

In the West, stations are in the valleys, but much of the terrain is a lot higher, and much of that is in the mountains, and unsampled.

... the HCN and, to a lesser extent, the CDDB are likely the best available sources of historical precipitation data. The question we address here, however, is: Is the absolute accuracy of these data adequate to meet the diverse needs of scientists who use historical precipitation data? We believe that for many applications, the answer is no.

HCN = United States Historical Climatology Network

CDDB = Climate Division Data Base (Part of National Climate Data Center)

Right: Tretyakov Precipitation Gage
at University of Colorado, Boulder



Left: Tretyakov Precipitation Gage
Almaty, Kazakhstan

The ASOS AWPAG:

Automated Surface Observation System

**All-Weather Precipitation Accumulation
Gage**

with Tretyakov Shield, inside

an 8-foot Alter shield



**All Weather Precipitation Accumulation Gauge (AWPAG)
with Double-Structure Wind Shield**



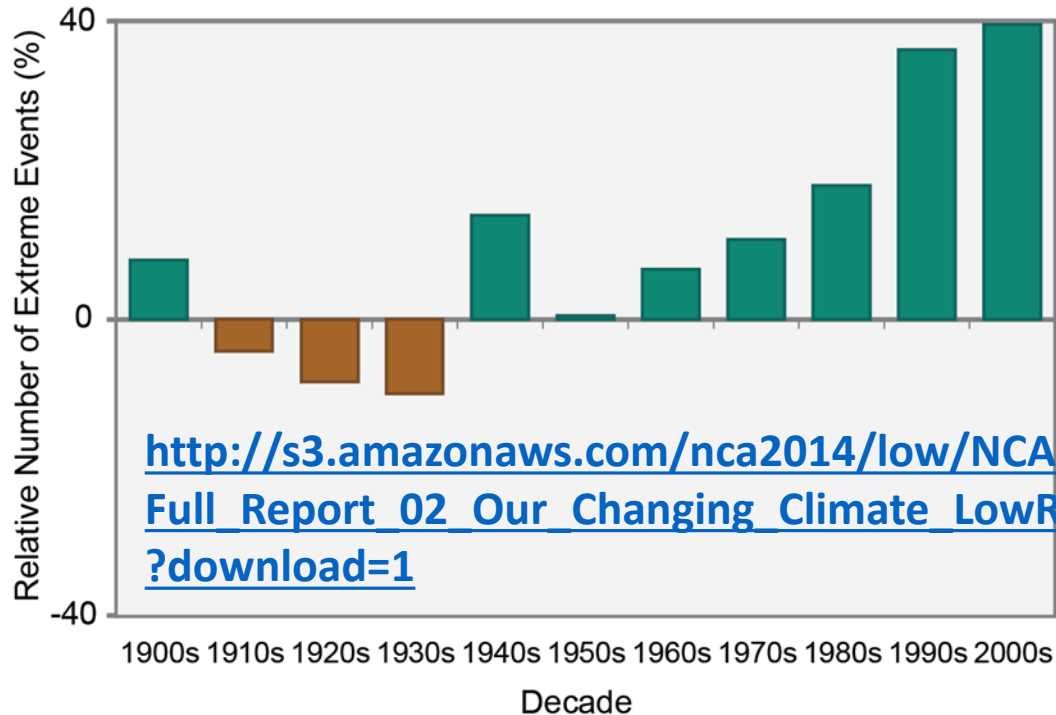
Let's examine the claim

“Heavy rainfall is increasing in intensity and frequency across the United States and globally...”

The characteristic is those stunning increases in the 1990s and 2000s.

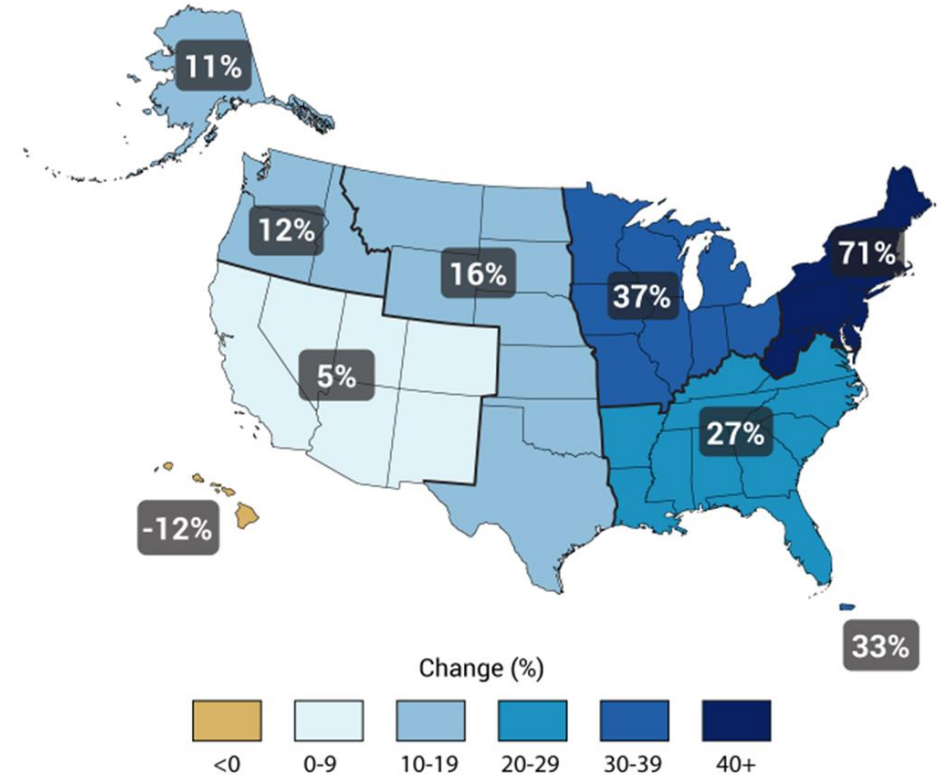
Do other measurements confirm this?

Observed U.S. Trend in Heavy Precipitation



http://s3.amazonaws.com/nca2014/low/NCA3_Full_Report_02_Our_Changing_Climate_LowRes.pdf?download=1

Figure 2.18: Observed Change in Very Heavy Precipitation



Actual Rainfall Records confound the “heavy rainfall is increasing” claim

Right: the record book for extreme precipitation in the US.

There are no recent records set in the Continental US.

The 24-hour record was set in 1979.

1-minute, 1956

5-minute, 1960

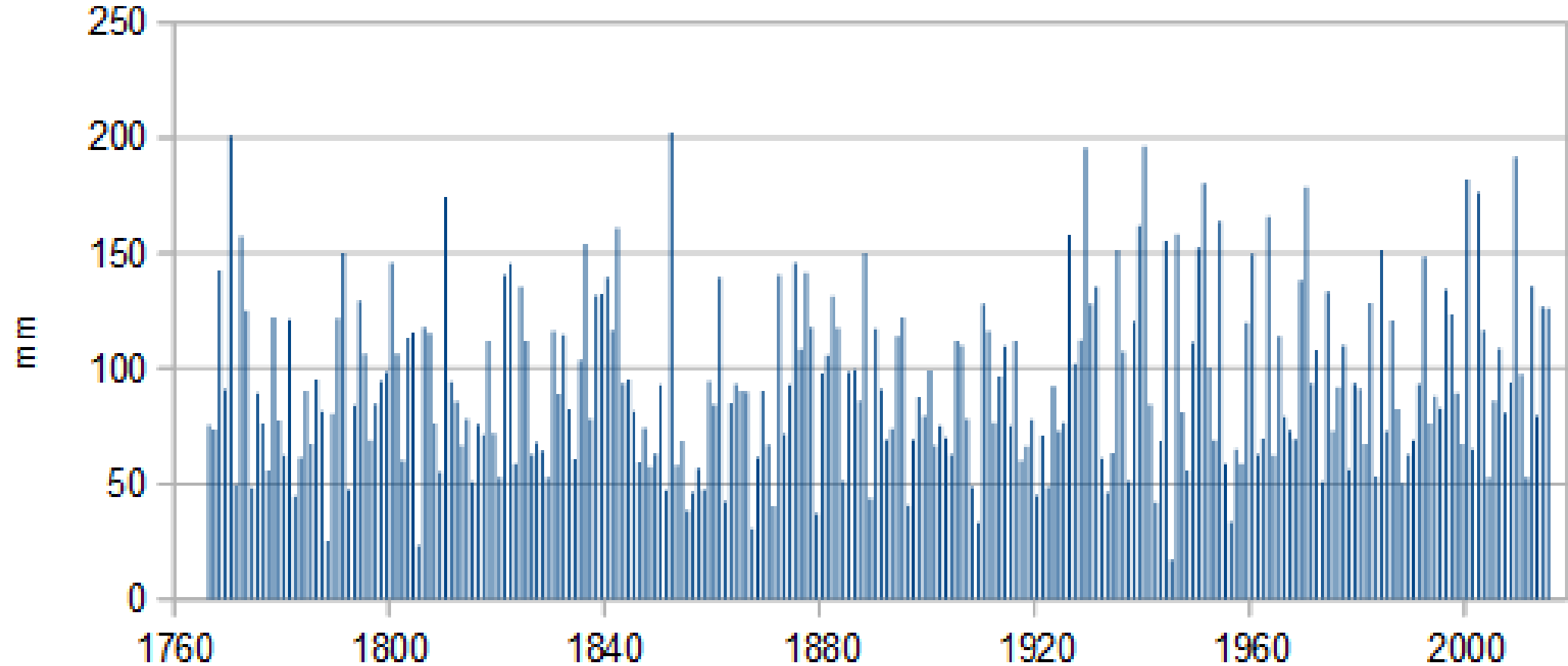
[Extreme Weather: A Guide & Record Book – Christopher C. Burt – Google Books](#)

U.S. Record Point Rainfalls

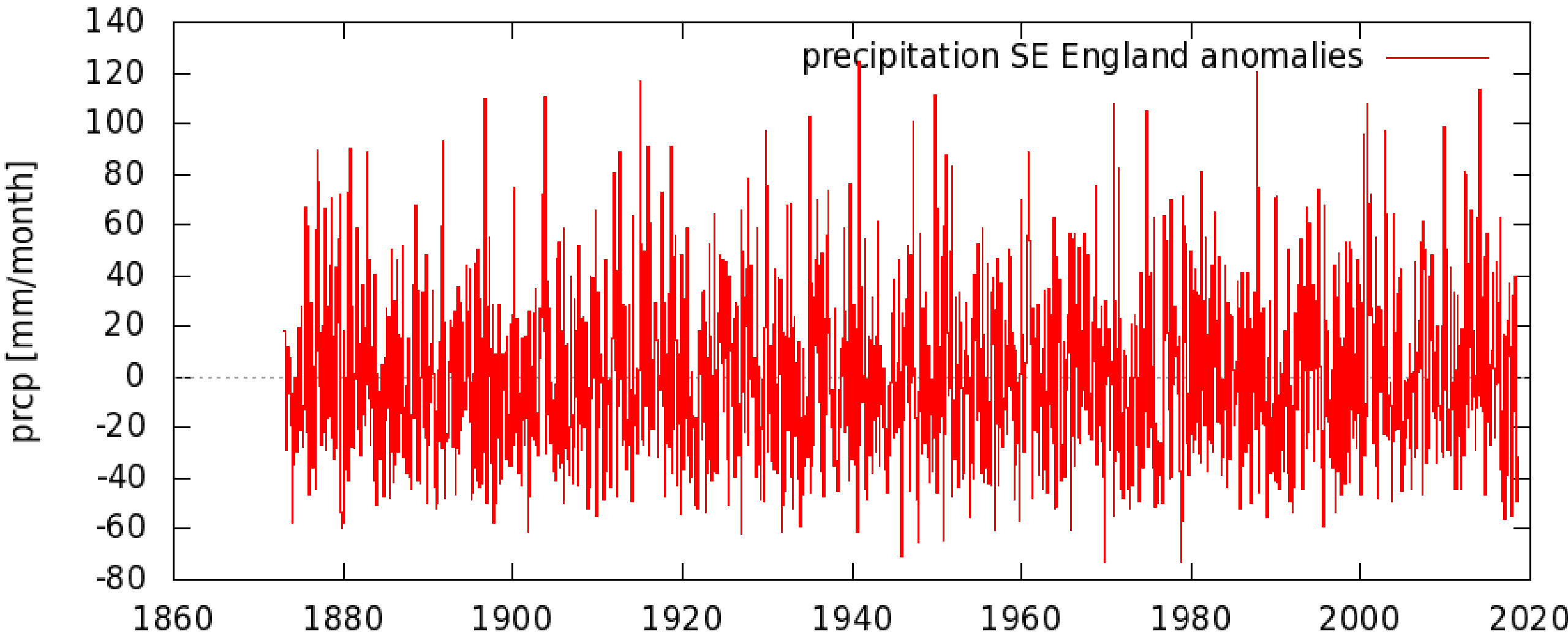
<i>Time</i>	<i>Rainfall</i>	<i>Location</i>	<i>Date</i>
1 minute	1.23"	Unionville, MD	7/4/1956
5 minutes	2.03"	Alamogordo Creek, NM	6/5/1960
12 minutes	2.30"	Embarrass, WI	5/28/1881
15 minutes	3.95"	Galveston, TX	6/4/1871
30 minutes	7.00"	Cambridge, OH	7/16/1914
40 minutes	9.25"	Guinea, VA	8/24/1906
42 minutes	12.00"	Holt, MO	6/22/1947*
1 hour	13.80"	Central WV	5/4-5/1943
1 hour 30 minutes	14.60"	Central WV	5/4-5/1943
2 hours	15.00"	Woodward Ranch, (D'Hanis) TX	5/31/1935
2 hours 30 minutes	19.00"	Rockport, WV	7/18/1889
2 hours 45 minutes	22.00"	Woodward Ranch, (D'Hanis) TX	5/31/1935*
3 hours	28.50*est.	Smethport, PA	7/18/42*
4 hours 30 minutes	30.70"	Smethport, PA	7/18/42*
12 hours	34.30"	Smethport, PA	7/17-18/1942
18 hours	36.40"	Thrall, TX	9/9/1921
24 hours	43.00"	Alvin, TX	7/25-26/1979
4 days	62.00"	Kukaiau, Hamakua, HI	2/27-3/2/1902
8 days	82.00"	Kukaiau, Hamakua, HI	2/27-3/6/1902
1 month	148.83"	Mt. Waialeale, Kauai, HI	3/1982
1 month (mainland)	71.54"	Helen Mine, CA	1/1909
1 year	704.83"	Kukui, Kauai, HI	1982
1 year	332.29"	MacLeeod Harbor, AK	1976

England & Wales Rainfall Series - November Precipitation

1766 to 2015



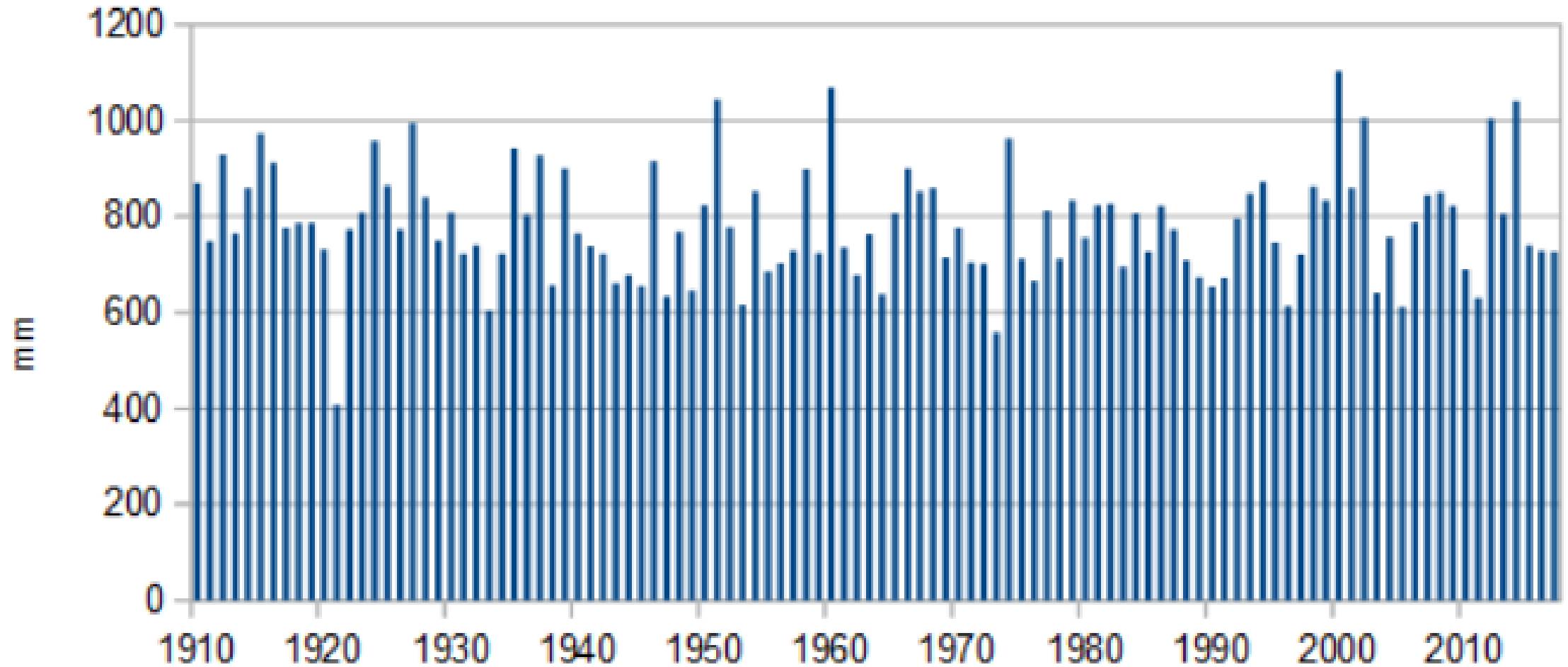
No signature of increasing precipitation in England and Wales, 1990s and beyond, at least not for November



No dramatic increases in precipitation anomalies for SE England or the other charts in this series.

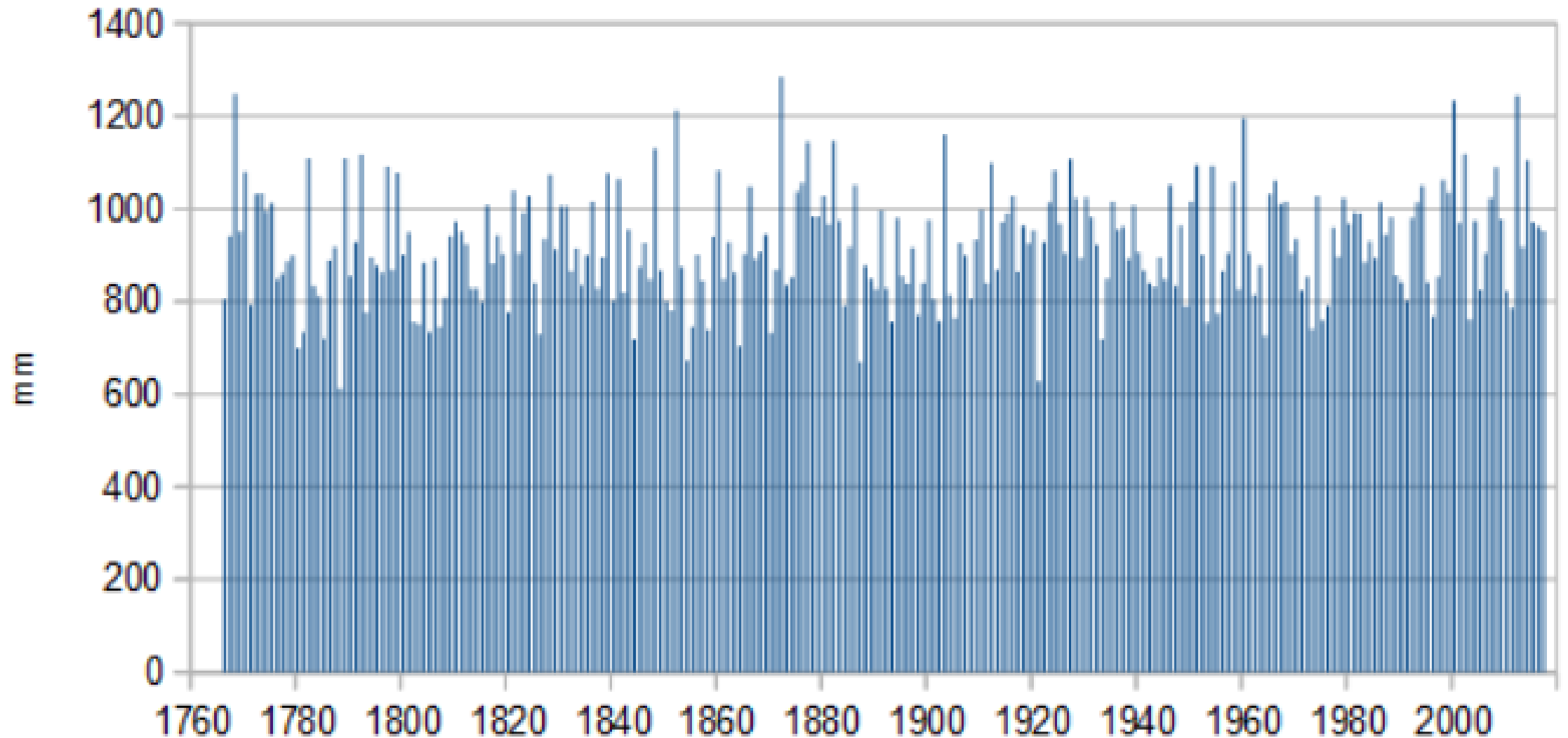
Annual Precipitation - England SE & Central S

1910 to 2017



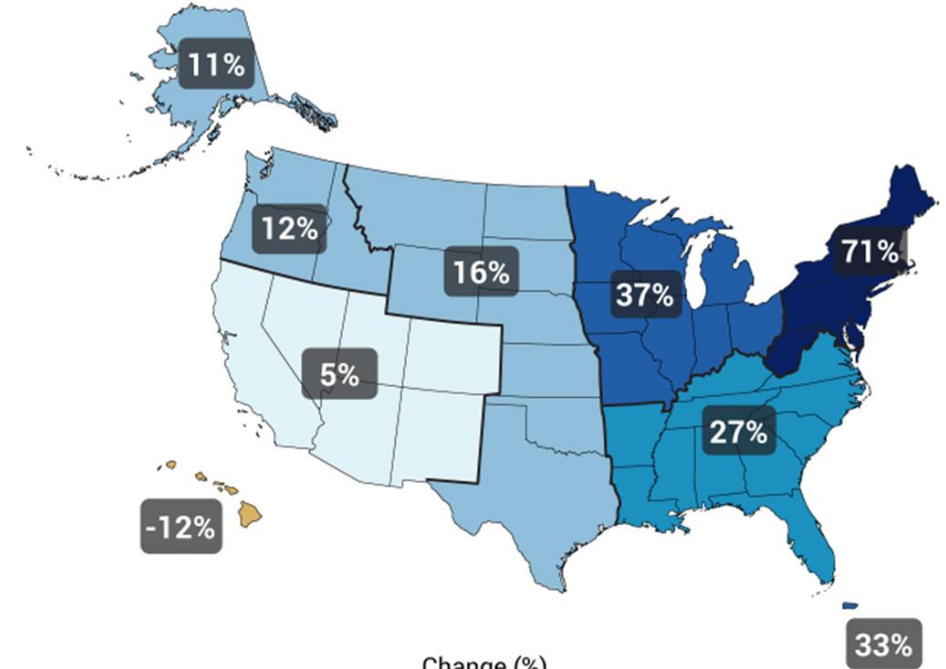
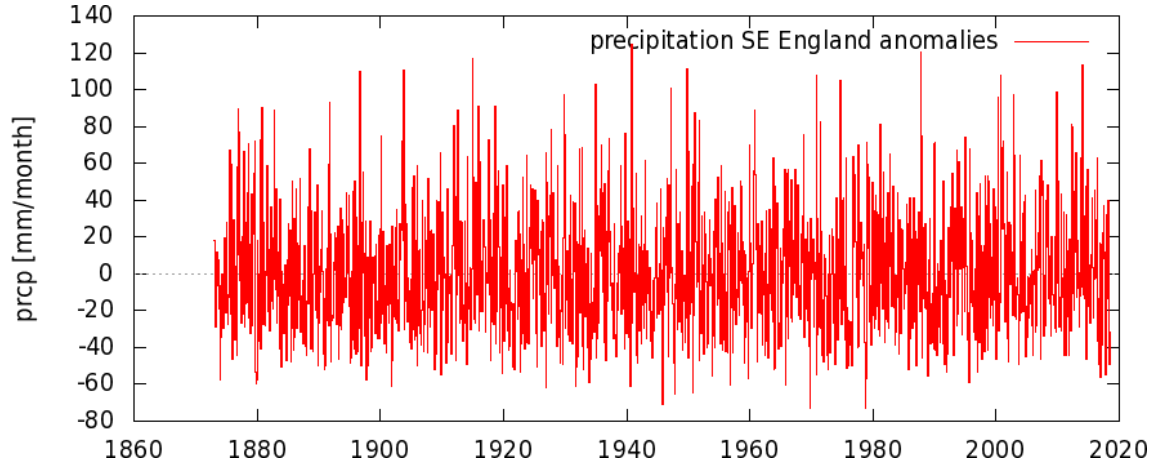
No dramatic precipitation increases in SE and S Central England (or others in this series)

England & Wales Annual Rainfall 1766 - 2017



No dramatic precipitation increases in England and Wales; this time series goes back to 1766.

The graphic, top right, is the “poster child” for purported human caused CO2-fueled increases in heavy precipitation. This claim is false. It is an artifact of improved “catch efficiency” of shielded precipitation gages.



Precipitation measurements since 1766 from the UK show there is no modern increases in heavy precipitation.

England & Wales Annual Rainfall 1766 - 2017

