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THE STATE UNIVERSITY OF NEW JERSEY

The State of Climate Change in New Jersey

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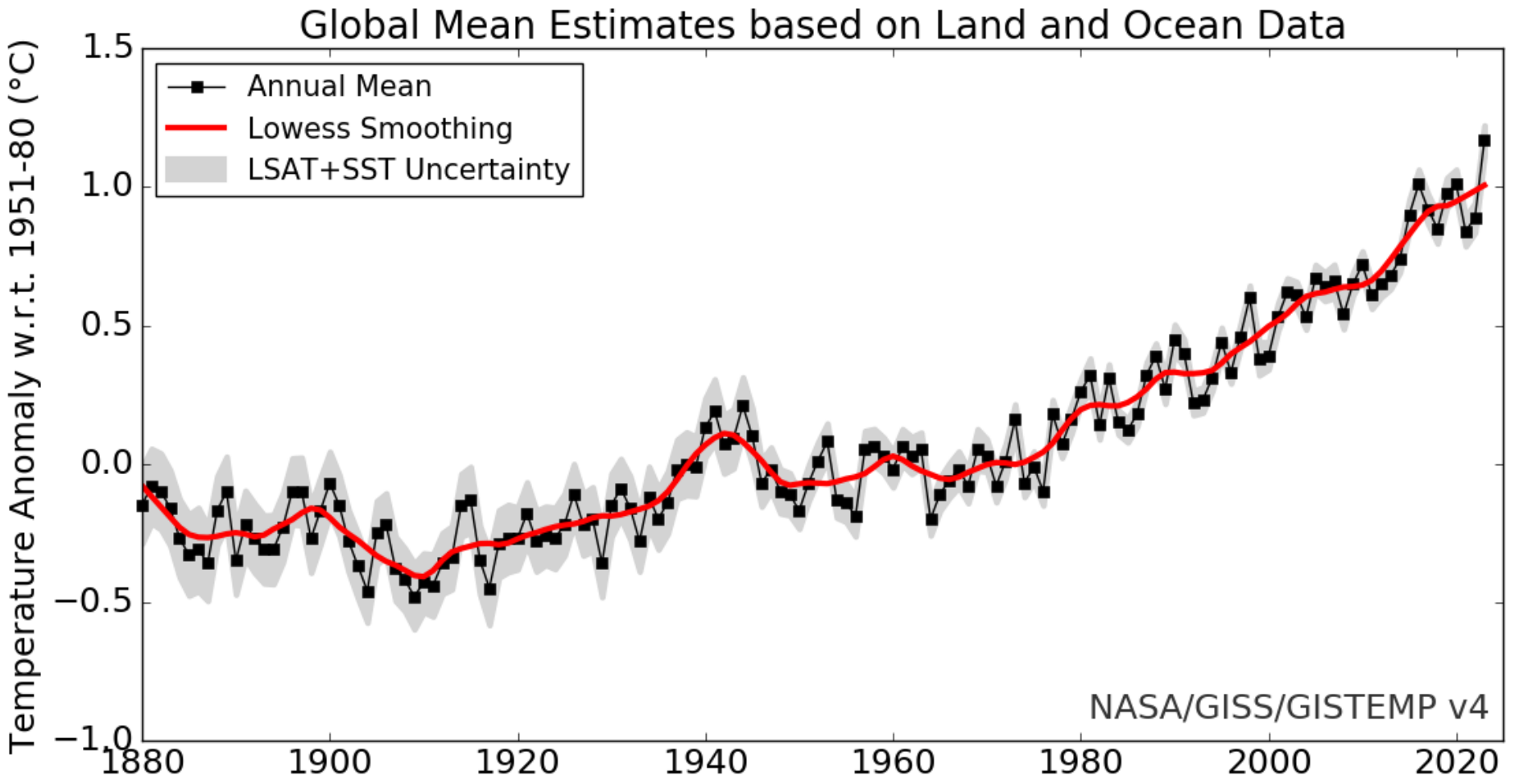
Climate Change 101: The Basics

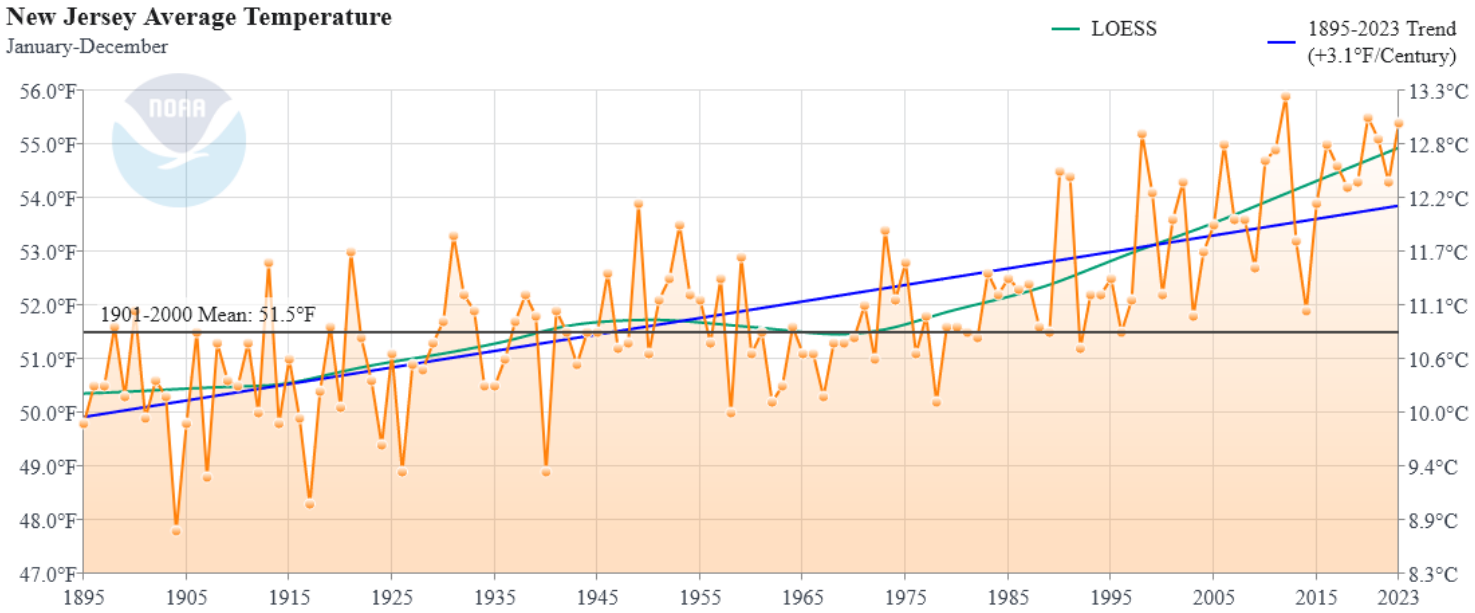
- Combustion of fossil fuels (coal, petroleum, natural gas) emits carbon dioxide into the atmosphere (currently about 10 billion tons of carbon per year)
- Roughly half of the carbon dioxide remains in the atmosphere; the remainder is taken up by vegetation on land or goes into the ocean (causing ocean acidification)
- Increasing carbon dioxide heats the earth; global temperatures have risen by ~2°F during the past century.
- Increasing temperatures also cause other changes in climate and sea level.

Trends in global average temperature



Source: NASA/Goddard Institute for Space Studies

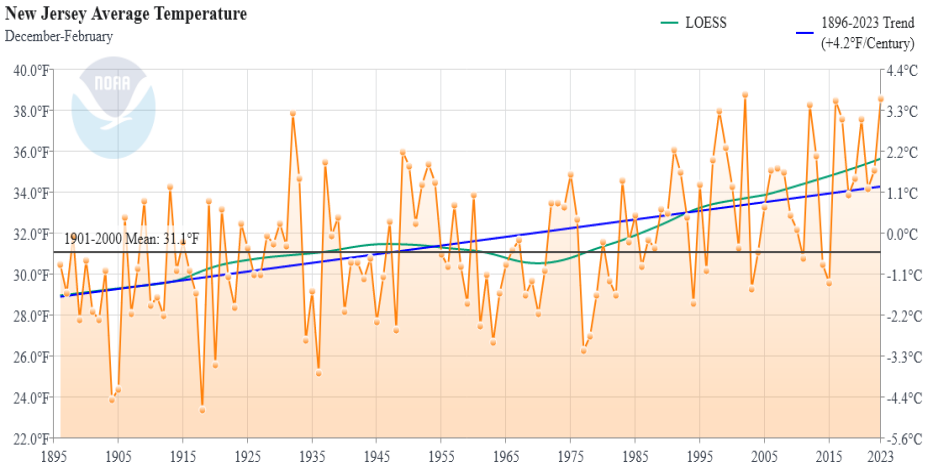
Trends in annual mean New Jersey temperature

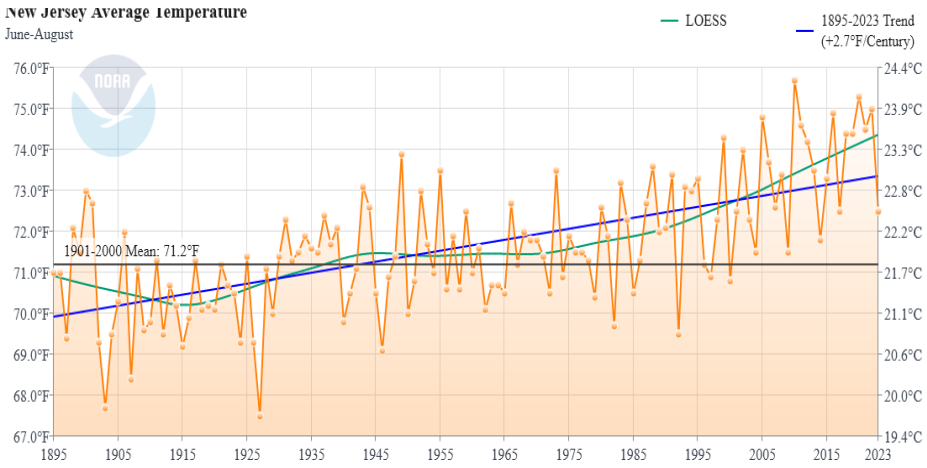


- Long-term upward trend of 3.1°F per 100 years
- More rapid warming since 1970
- The 10 warmest years have occurred since 1998
- 21 of the 22 warmest years have occurred since 1990.
- 2012 was the warmest year on record and 2020 was the second warmest.

Source: National Centers for Environmental Information

Trends in winter and summer temperature in N.J.

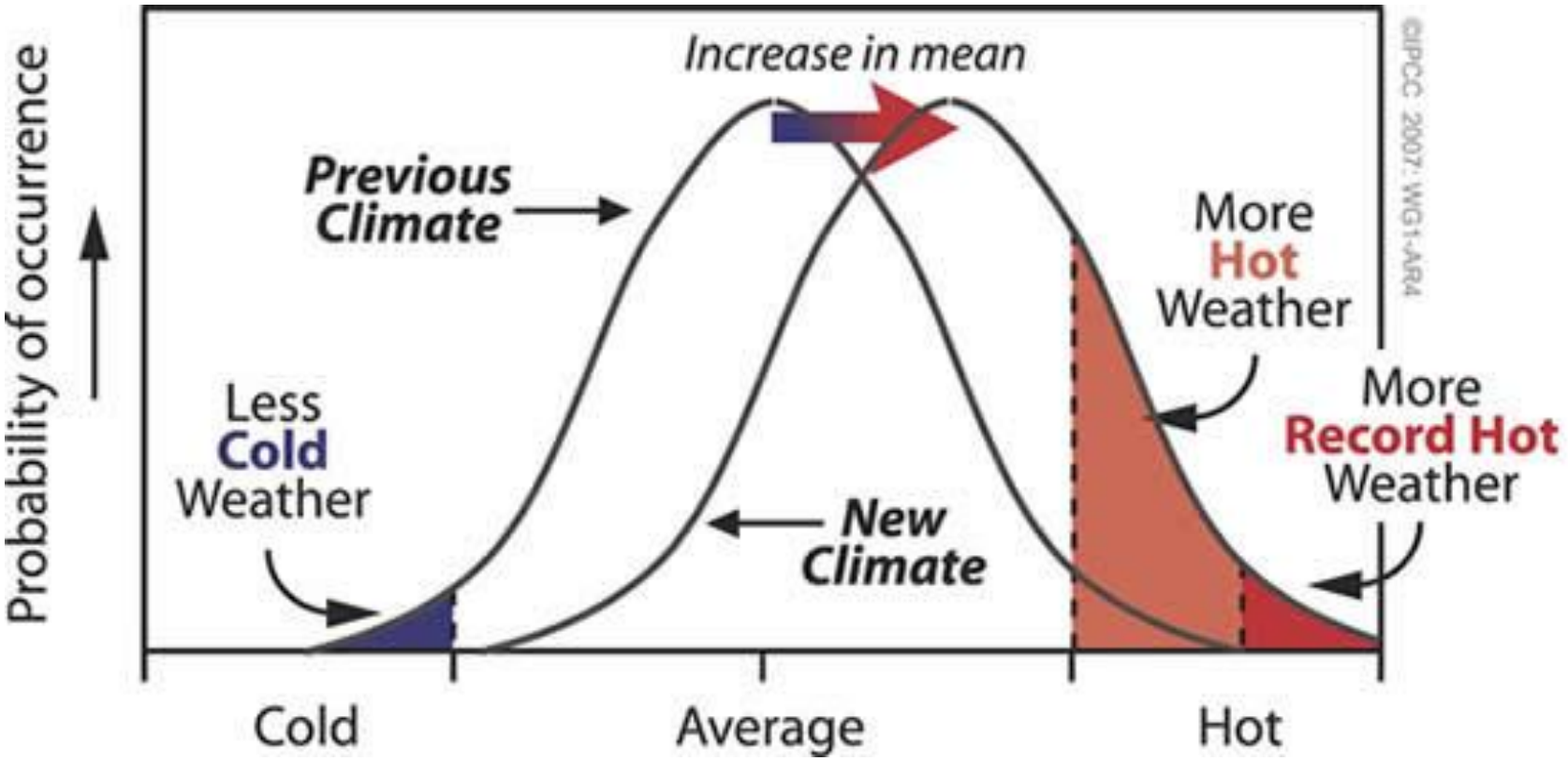




- Larger warming trend in winter (4.2°F/100 yrs) than in summer (2.7°F/100 yrs).
- Year-to-year temperature variability is much larger in winter, which can make it harder to perceive long-term trends.
- 8 of the 9 warmest winters have occurred since 1998.
- The 12 warmest summers have occurred since 1999.

Source: National Centers for Environmental Information

Changes in average temperature lead to changes in extremes



Source: Intergovernmental Panel on Climate Change

Unusually warm and cold months in New Jersey

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Jan																								
Feb																								
Mar																								
Apr																								
May																								
Jun																								
Jul																								
Aug																								
Sep																								
Oct																								
Nov																								
Dec																								

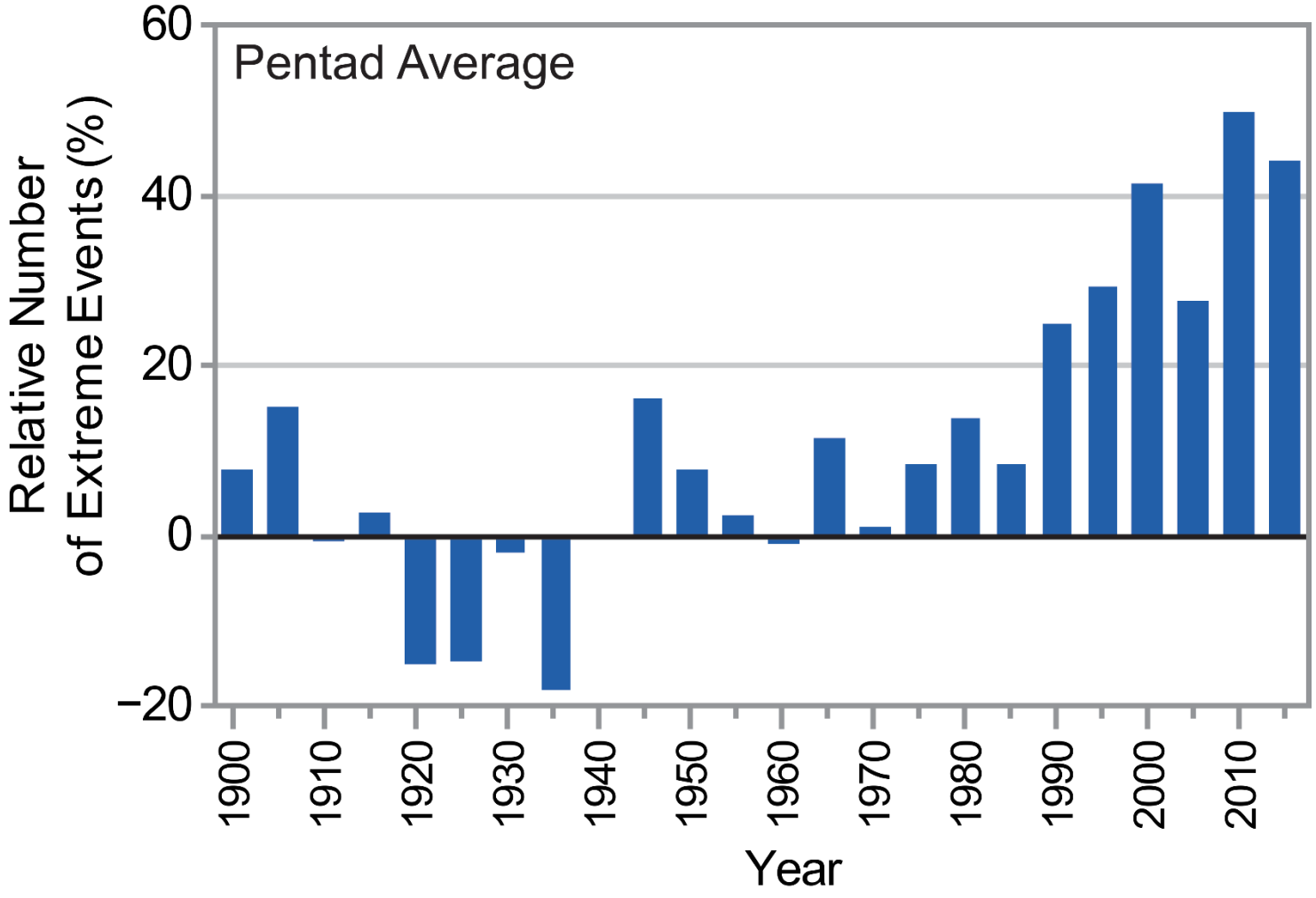
Unusually warm and cold months in New Jersey

	2000	2001	2002	2003	2004	2005	2006	2007	2008	2009	2010	2011	2012	2013	2014	2015	2016	2017	2018	2019	2020	2021	2022	2023
Jan							4																	1
Feb																		1	2		3			3
Mar													1				4							
Apr											2							1		5				3
May					3								5			1			4					
Jun									4		1													
Jul											5	4									1			
Aug						4											2		3			5	1	
Sep						3										2	5		3					
Oct								1										3				2		
Nov							2			3		5				1					3			
Dec		5					2									1						3		3

- Unusually warm and cold months are defined as the five warmest and coldest for each calendar month (total of 60 warm and 60 cold plus ties)
- Since 2000, there have been 43 unusually warm months and 0 unusually cold months

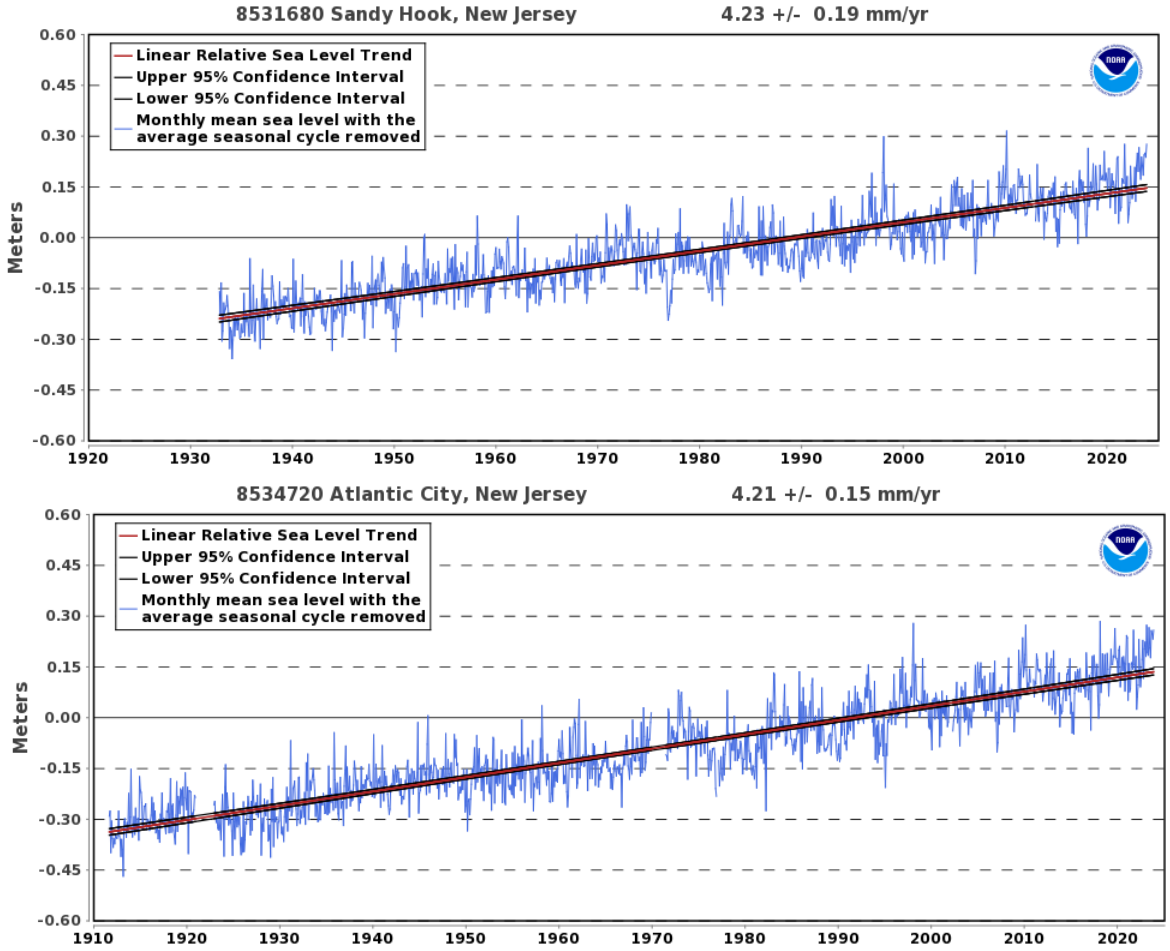
Source: National Centers for Environmental Information

2-Day Precipitation Events Exceeding 5-Year Recurrence Interval



Source: National Climate Assessment (2017)

New Jersey sea level trends



- The rate of global sea level rise has nearly doubled in the past two decades.
- Sea level in New Jersey is rising more rapidly than the global average because land is also subsiding.

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Will hurricanes and nor'easters affecting New Jersey become more intense or more frequent?

We don't yet know the answer to this question, but…

Rising sea level will raise the baseline for coastal flooding, increasing the risk of floods comparable to those caused by Hurricane Sandy.

New Jersey's climate future

- More warm extremes and fewer cold extremes
- Heavy rains become more intense
- More frequent dry spells
- Rising sea level with increased frequency and intensity of coastal flooding