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New Jersey's Changing Climate

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"Preparing for the Impacts of Climate Change on Public Health in New Jersey"
Rutgers University
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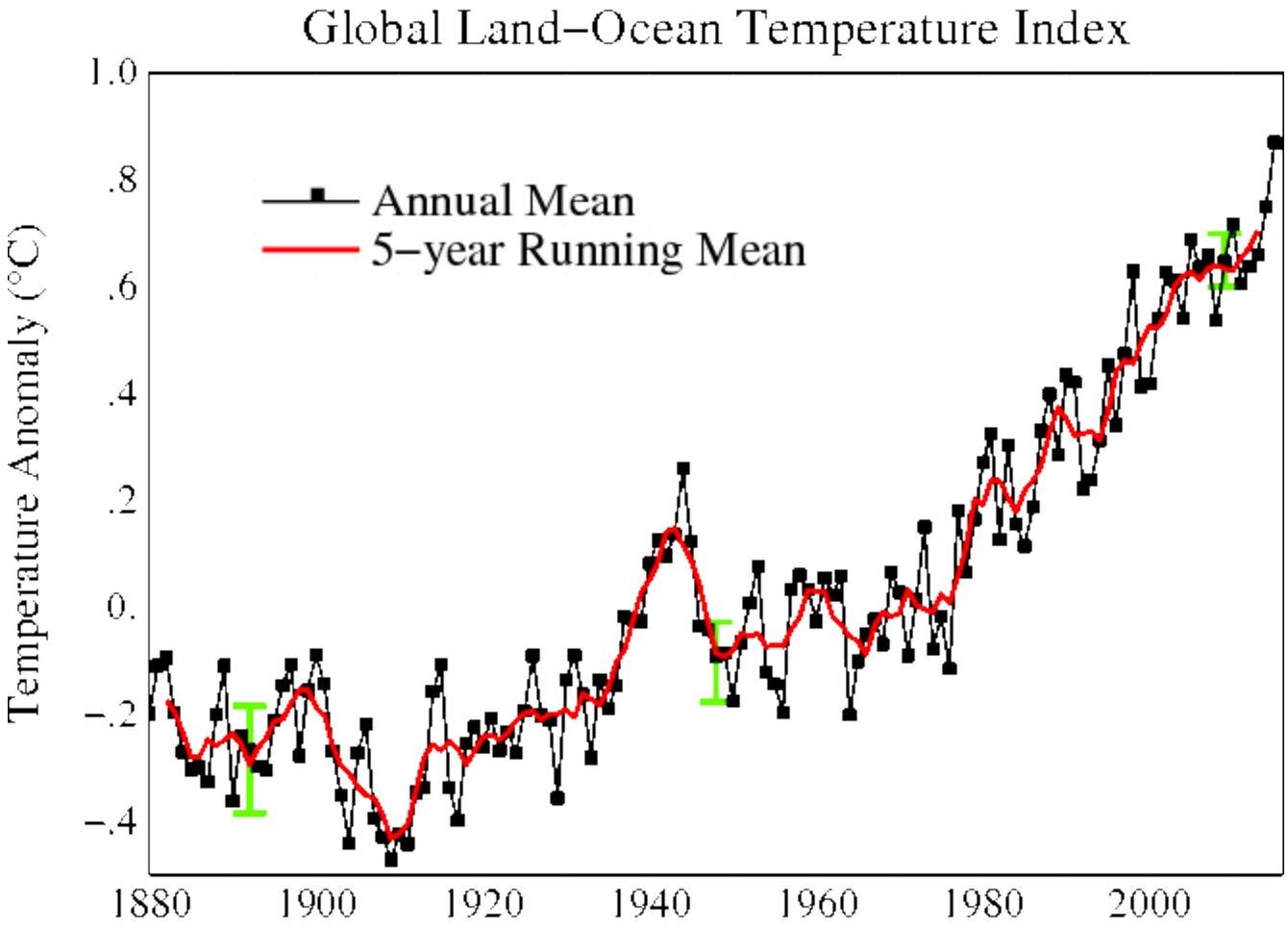
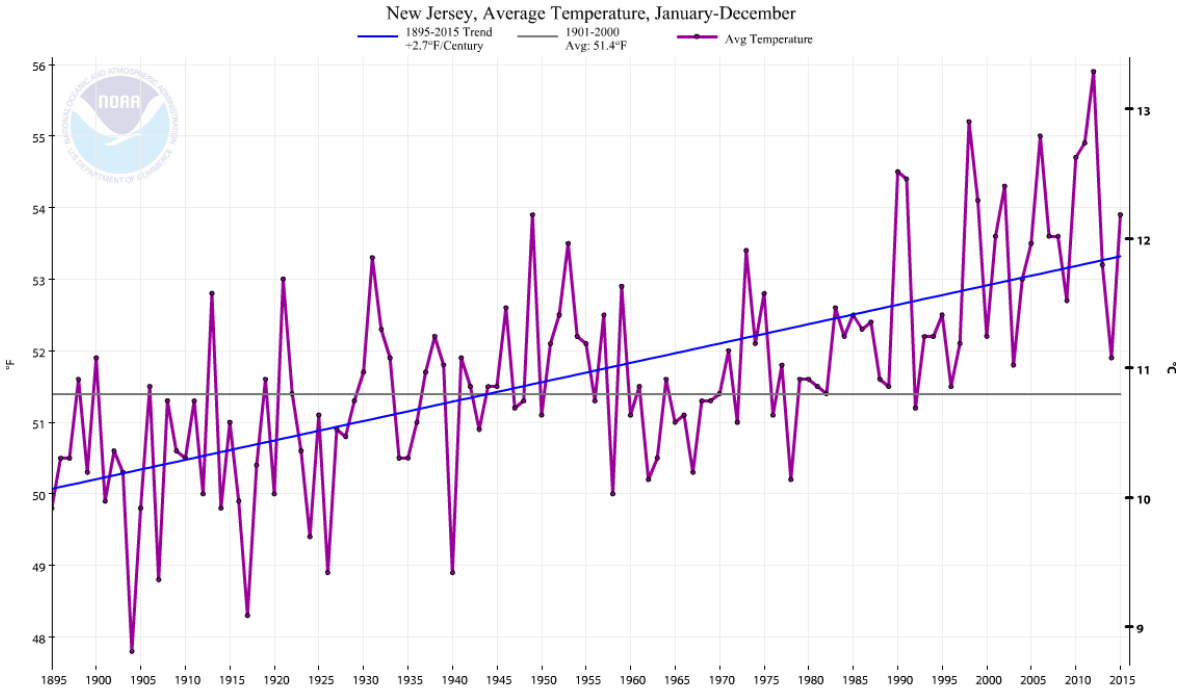
Climate change…it's real, it's happening now, and it's affecting New Jersey.



Source: NASA/Goddard Institute for Space Studies

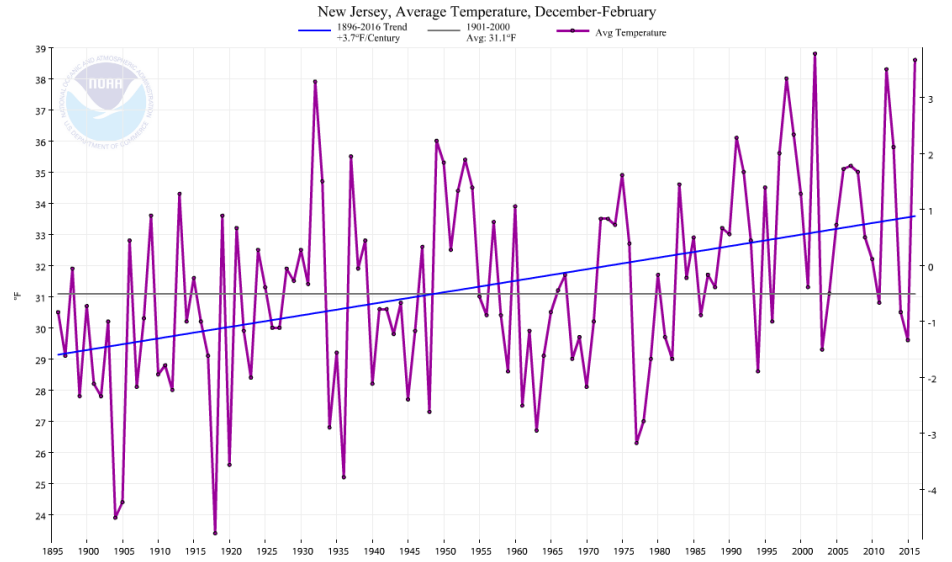
Trends in annual mean New Jersey temperature

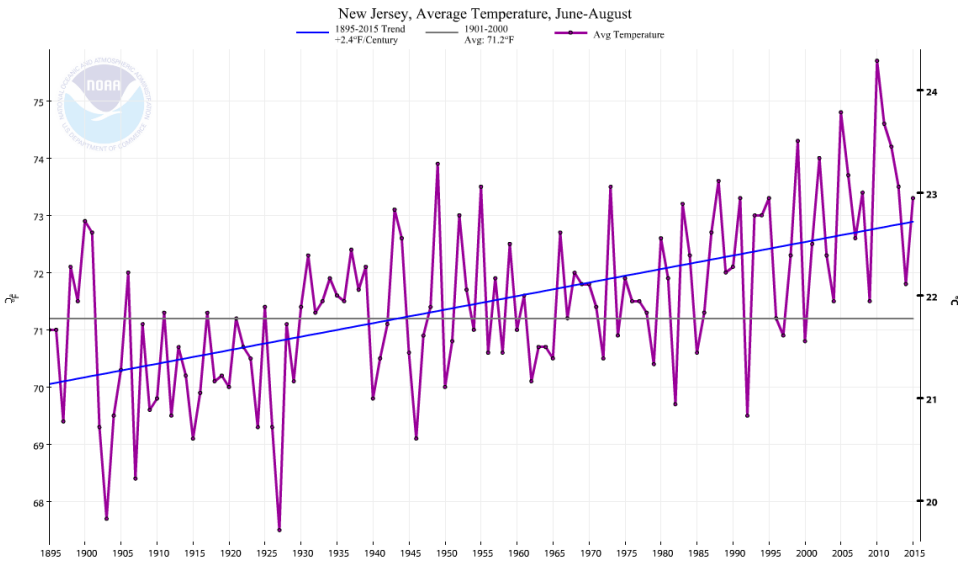


- Long-term upward trend of 2.7°F per 100 years
- More rapid warming since 1980
- The three warmest years have occurred since 1998
- 2012 was the warmest year on record

Source: National Centers for Environmental Information

Trends in winter and summer temperature in N.J.

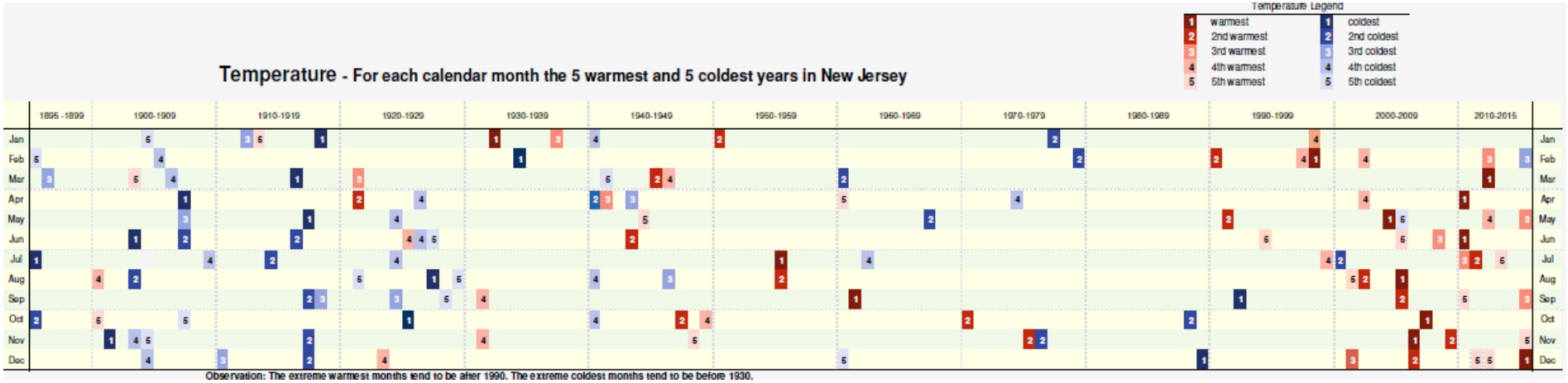




- Larger warming trend in winter (3.7°F/100 yrs) than in summer (2.4°F/100 yrs)
- Year-to-year temperature variability is much larger in winter, which can mask long-term trends
- The three warmest summers have occurred since 2005, and the three warmest winters have occurred since 2001-02.

Source: National Centers for Environmental Information

Unusually warm and cold months in New Jersey

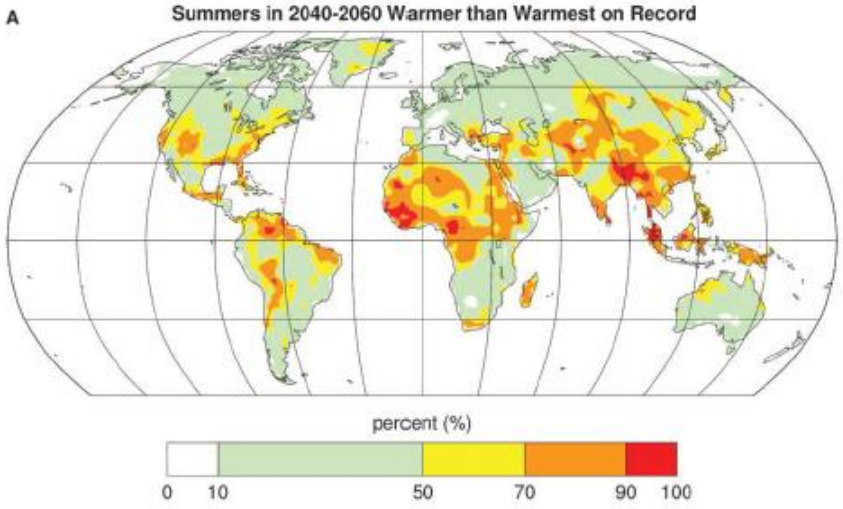


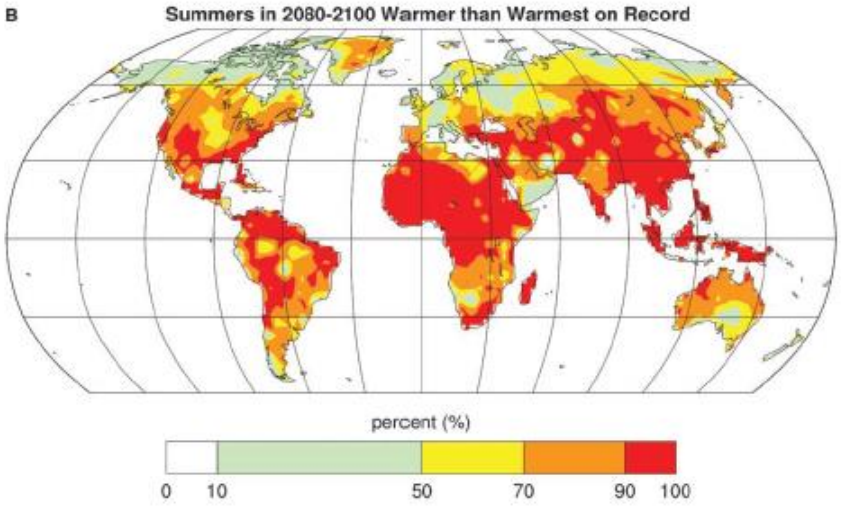
- Unusually warm and cold months are defined as the five warmest and coldest for each calendar month (total of 60 warm and 60 cold plus ties)
- 41 cold months occurred before 1930
- 35 warm months occurred since 1990
- Since 2000, there have been 29 warm months and 3 cold months

Source: David Robinson (NJ State Climatologist) and Jeffrey Hoffman (NJDEP)

Warmer summers ahead

Question: How many summers will be warmer than what would now be the warmest summer on record?



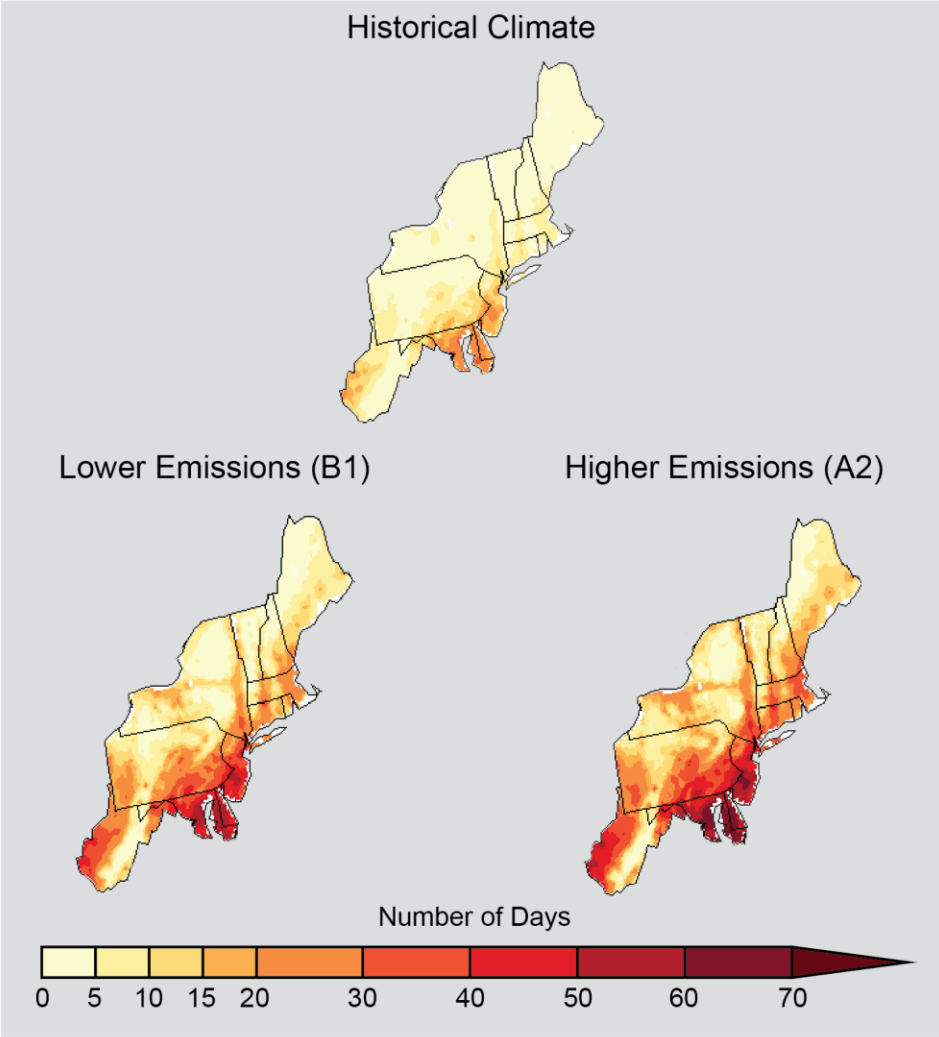


NJ: about 70%

NJ: about 90%

Source: Battisti and Naylor, *Science*, 2009

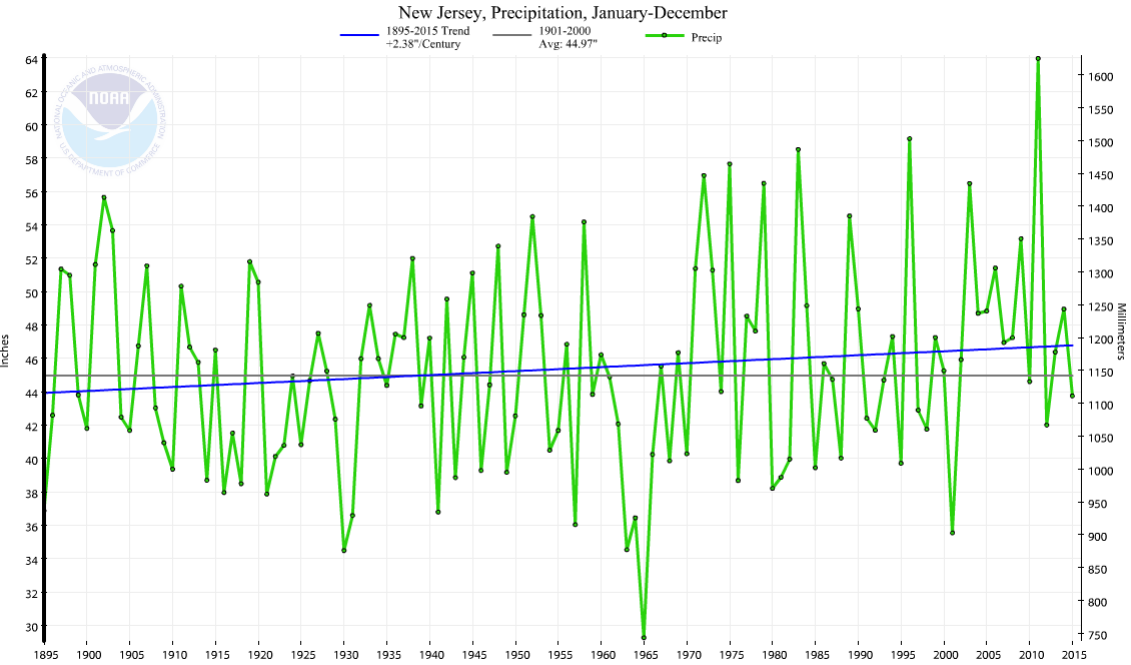
Projected Increases in the Number of Days over 90°F



Source: National Climate Assessment (2014)


STOP
4-WAY

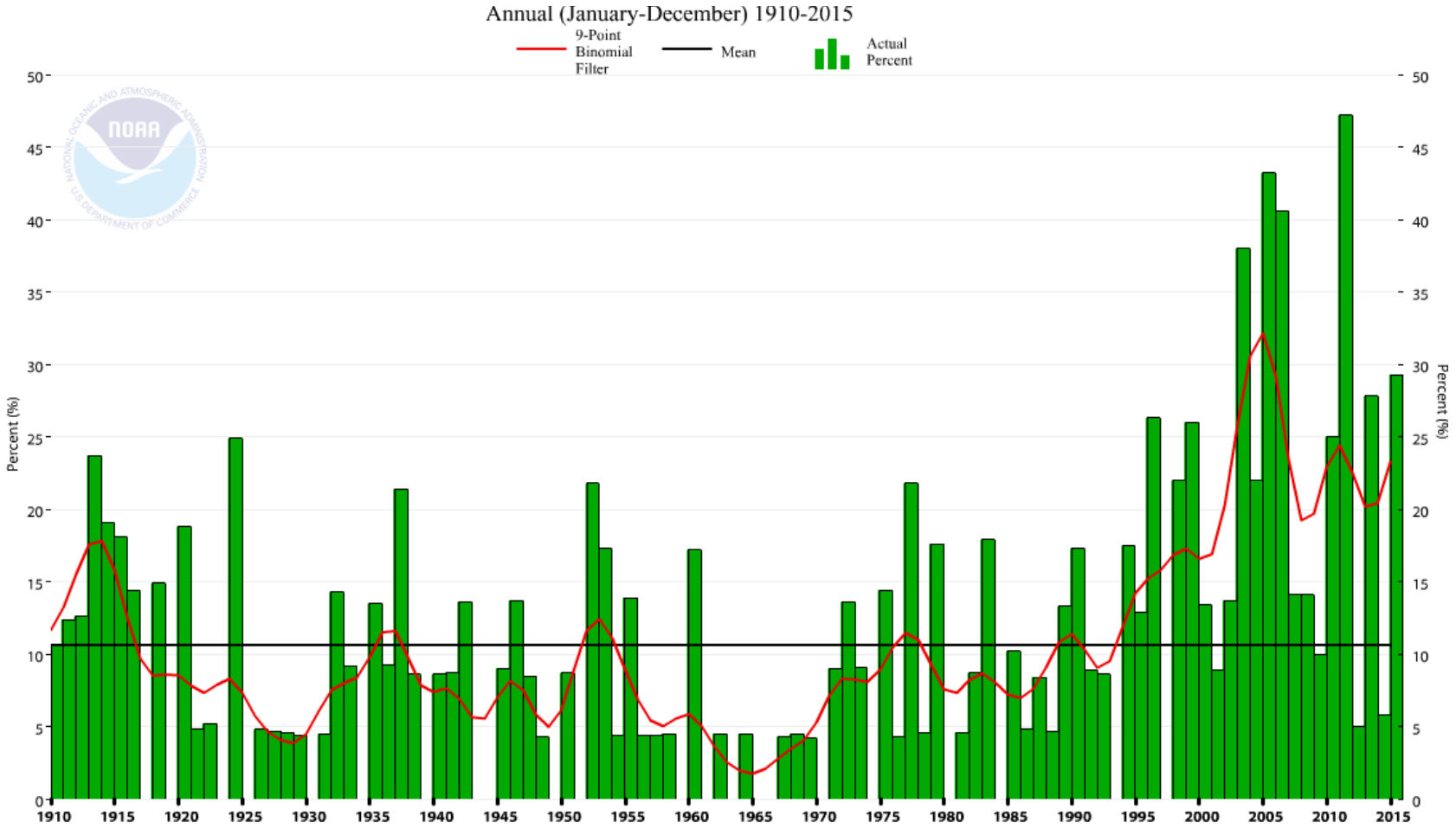
Trends in annual mean New Jersey precipitation



- Long-term upward trend of 2.4” per 100 years
- Large decadal variability (early 1960s drought, wet 1970s, very wet in last decade)

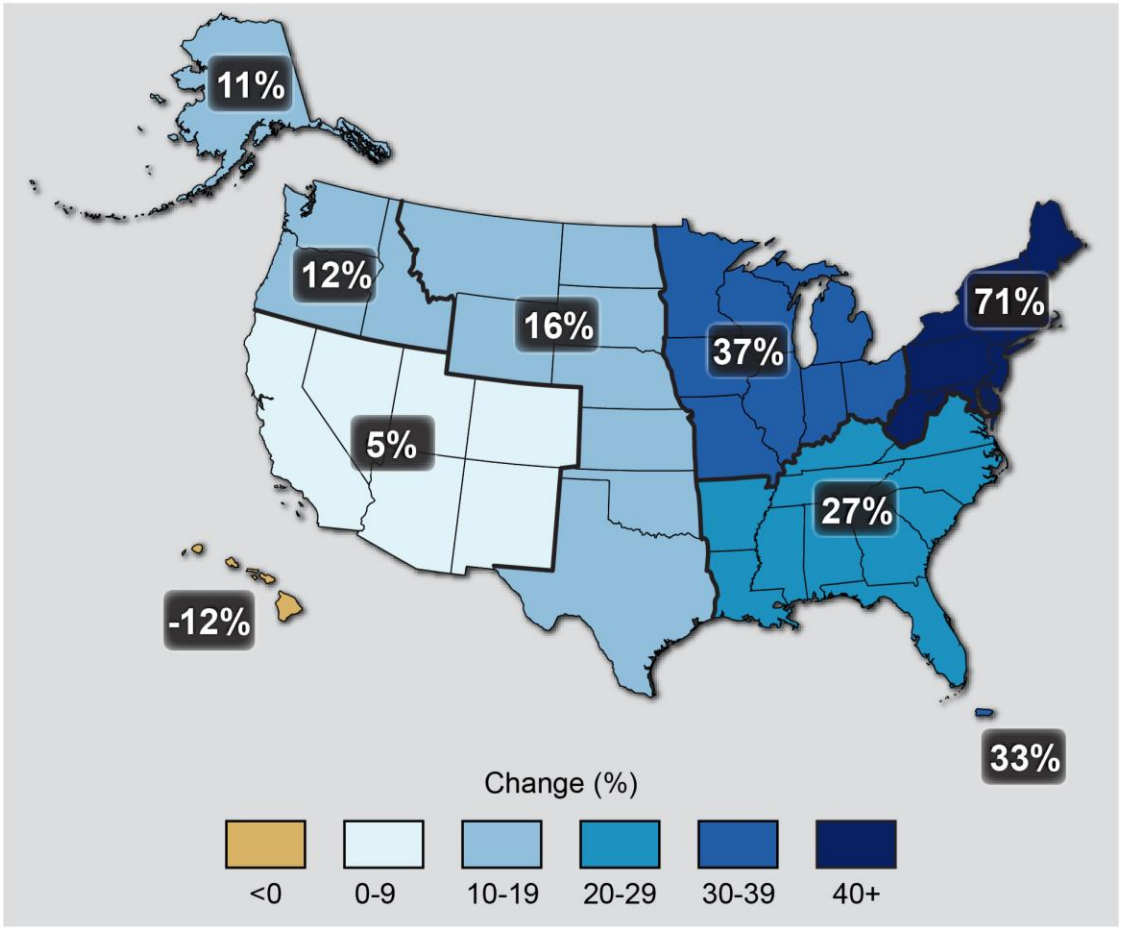
Source: National Centers for Environmental Information

Percentage of area with a much greater than normal fraction of precipitation derived from extreme 1-day precipitation events



Source: National Centers for Environmental Information

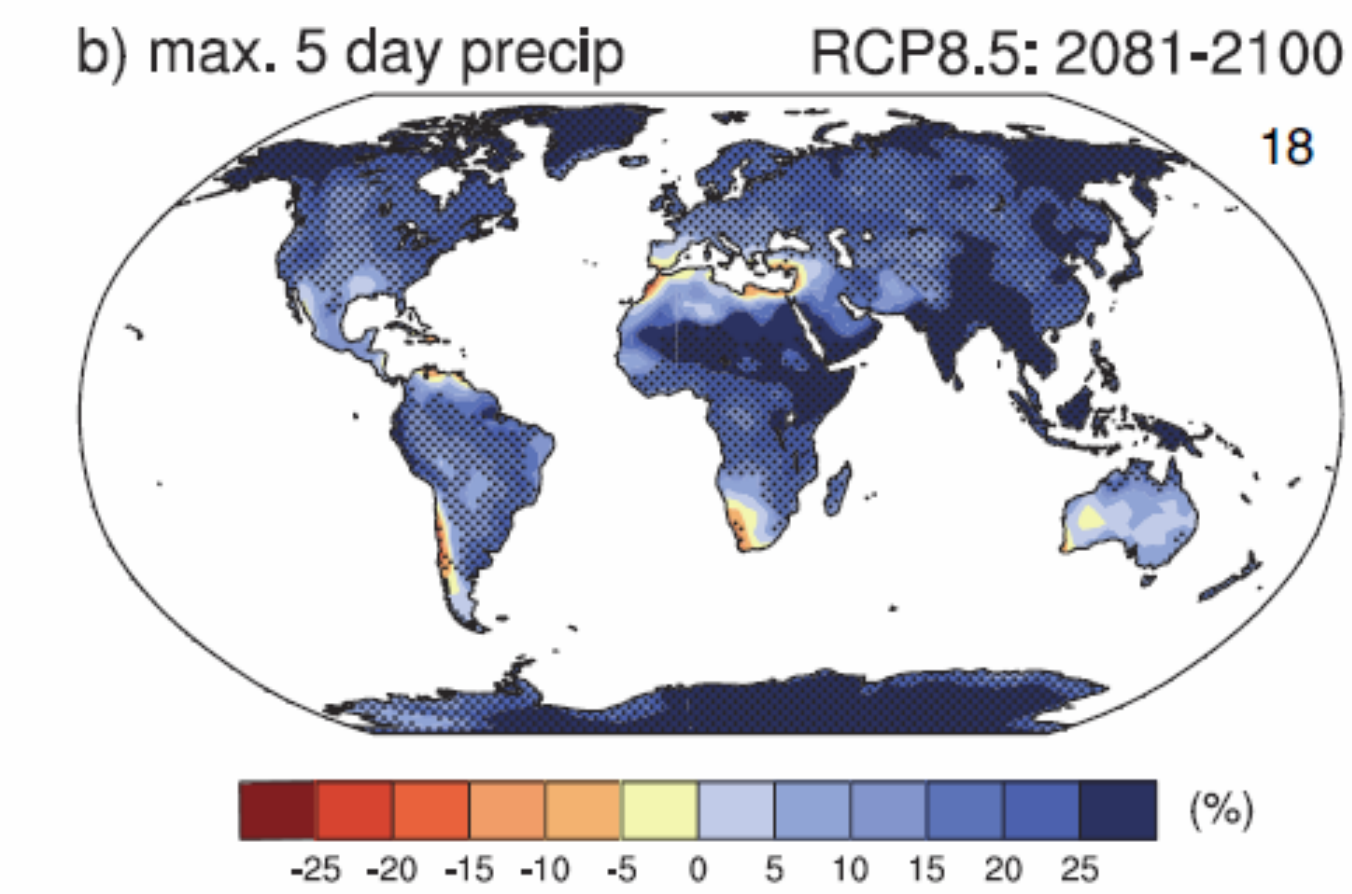
Change in amount of precipitation from very heavy events



- Period: 1958 to 2011
- Very heavy = the heaviest 1% of precipitation events
- A similar analysis indicates that recent decades have are also higher than the first half of the 20th century

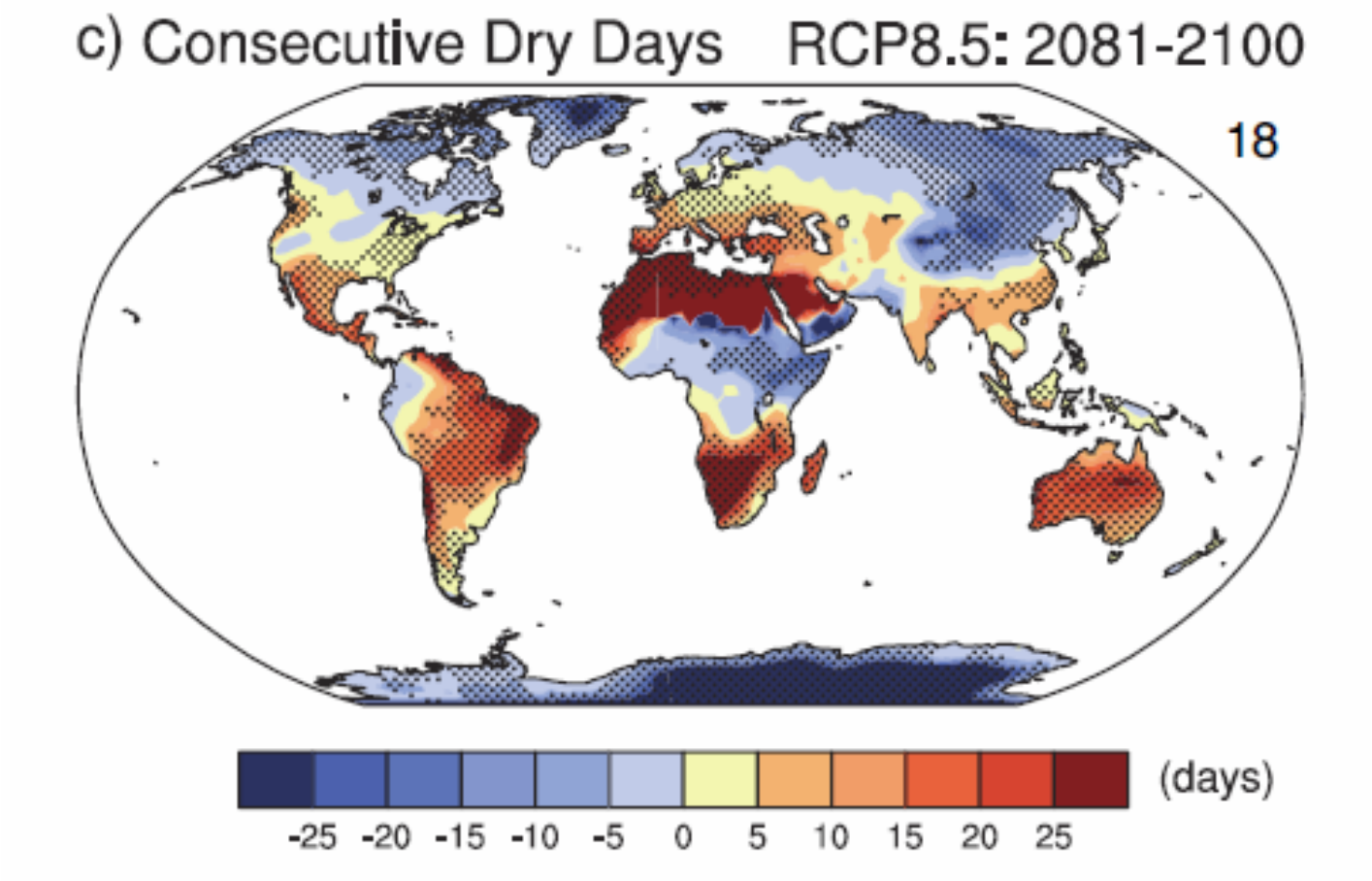
Source: National Climate Assessment (2014)

Heavy rains may become heavier…



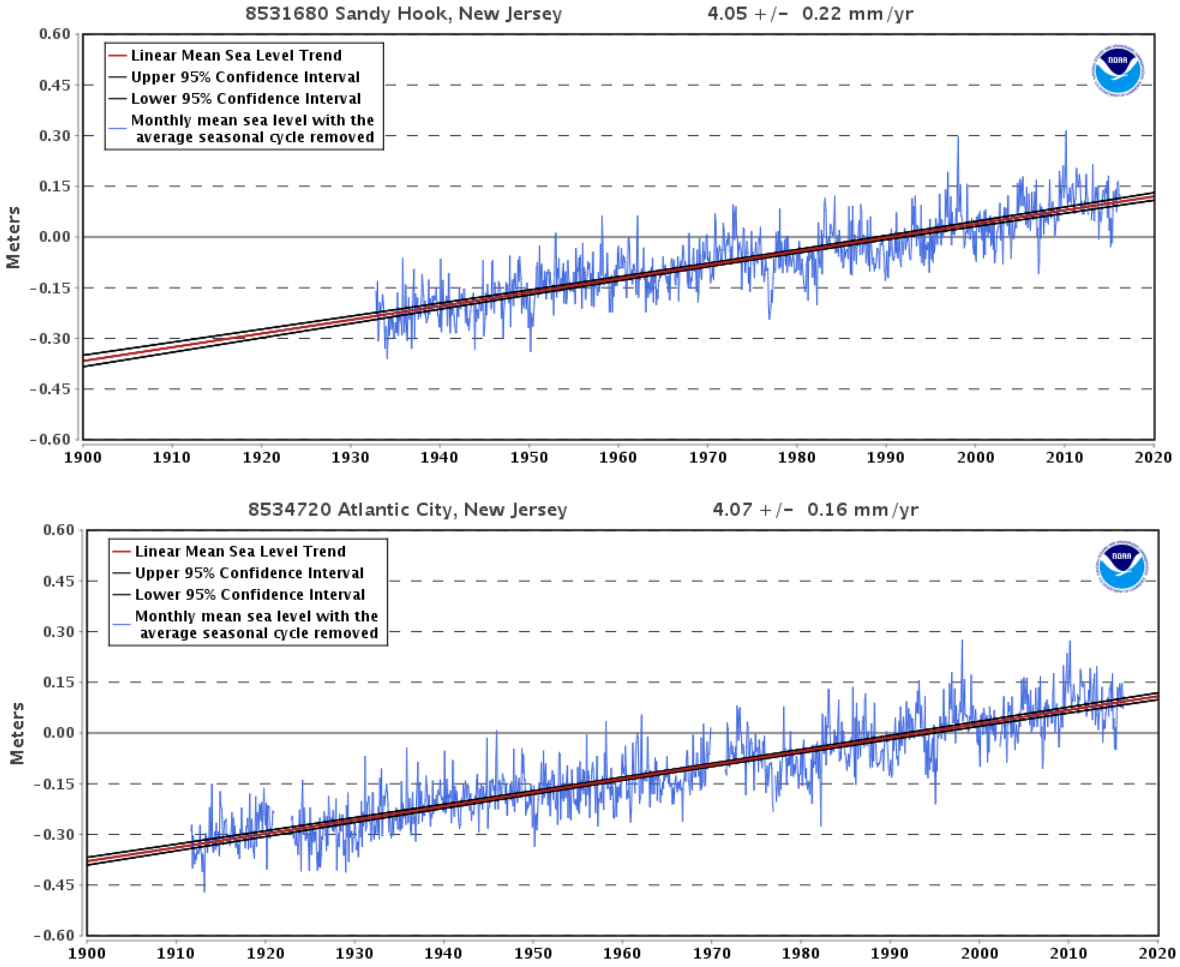
Source: Intergovernmental Panel on Climate Change

…and dry spells may lengthen



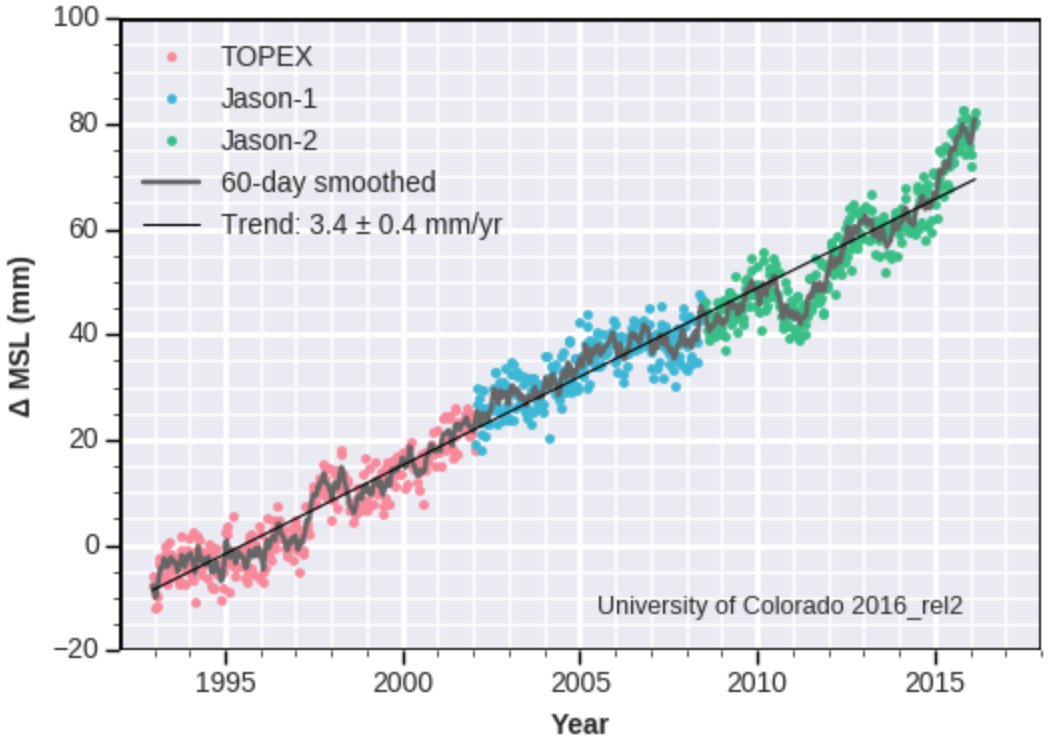
Source: Intergovernmental Panel on Climate Change

New Jersey sea level trends



- Century-scale global sea level rise has been 1.7±0.3 mm/yr
- Local sea level rise along the NJ coast has been more rapid than the global rise due to land subsidence (combination of post-glacial movement of earth's crust and compaction of coastal plain sediments)

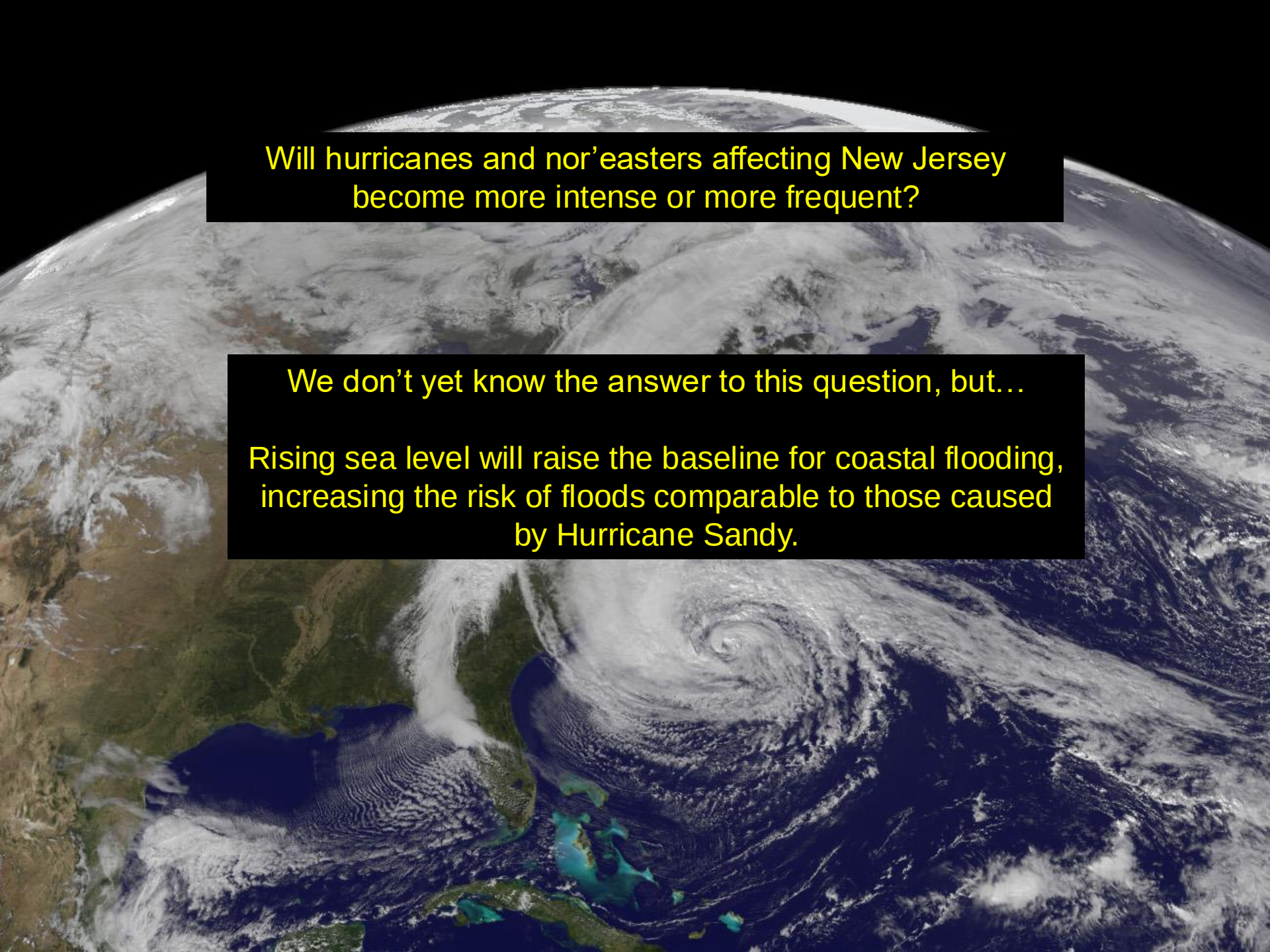
Acceleration of global sea level rise



- Global trend during past two decades (satellite-derived) has been 3.4±0.4 mm/yr
- Miller et al. (2013) project the following sea level rise on the NJ coastal plain (relative to 2000)

  2050: 18″ (range 13-28″)

  2100: 42″ (range 30-71″)
- Projected ranges are relatively wide because we don't know what future emissions will be or how rapidly ice sheets will respond.



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.

Climate Change in New Jersey

- 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