

Climate in New England

and How It's Changing

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Overview

- New England climate orientation
 - What are some of the drivers of our climate?
- Changing climate
 - Effects on the drivers of our climate
 - Observed changes
 - Expected changes

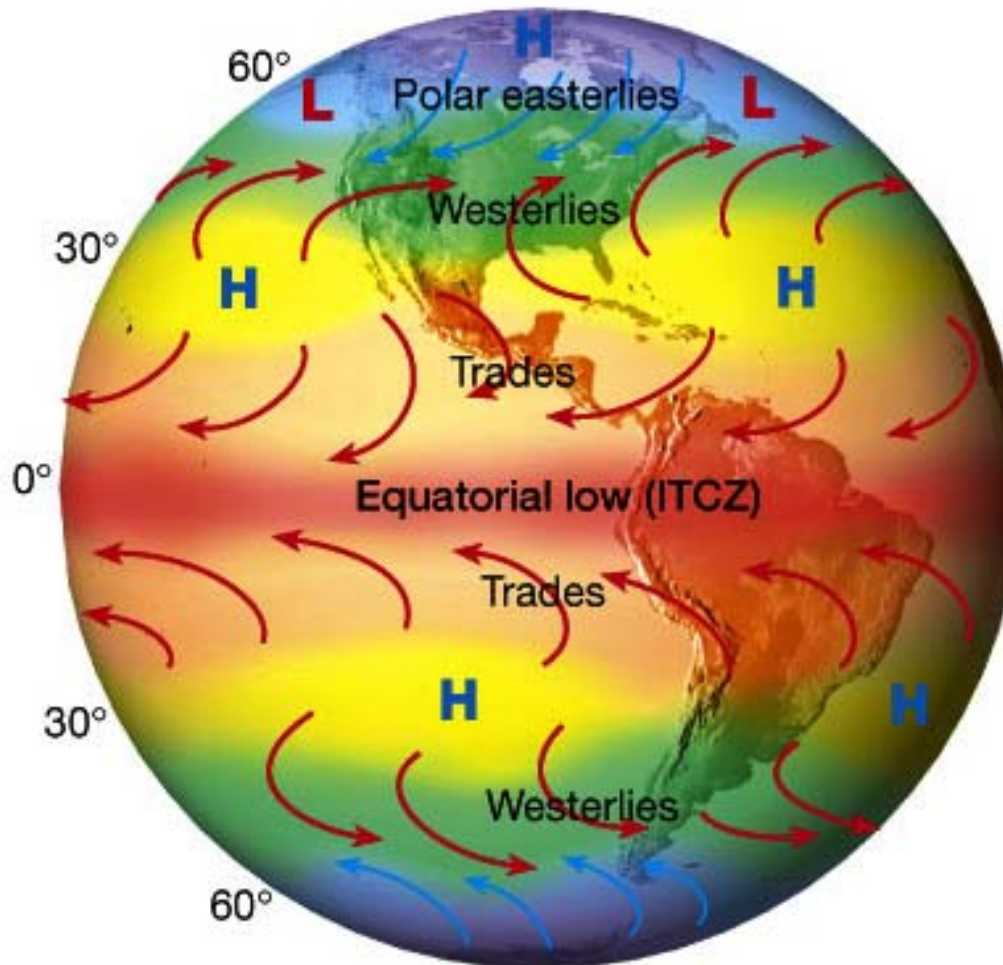
New England Climate Orientation

- Strong seasons
 - Long, cold, snowy winters
 - Cool, damp springs
 - Mild to warm summers
 - Prolonged autumns
- Frequent storms (Nor'easters)
- Generous precipitation throughout the year
- WHY??



The Westerlies

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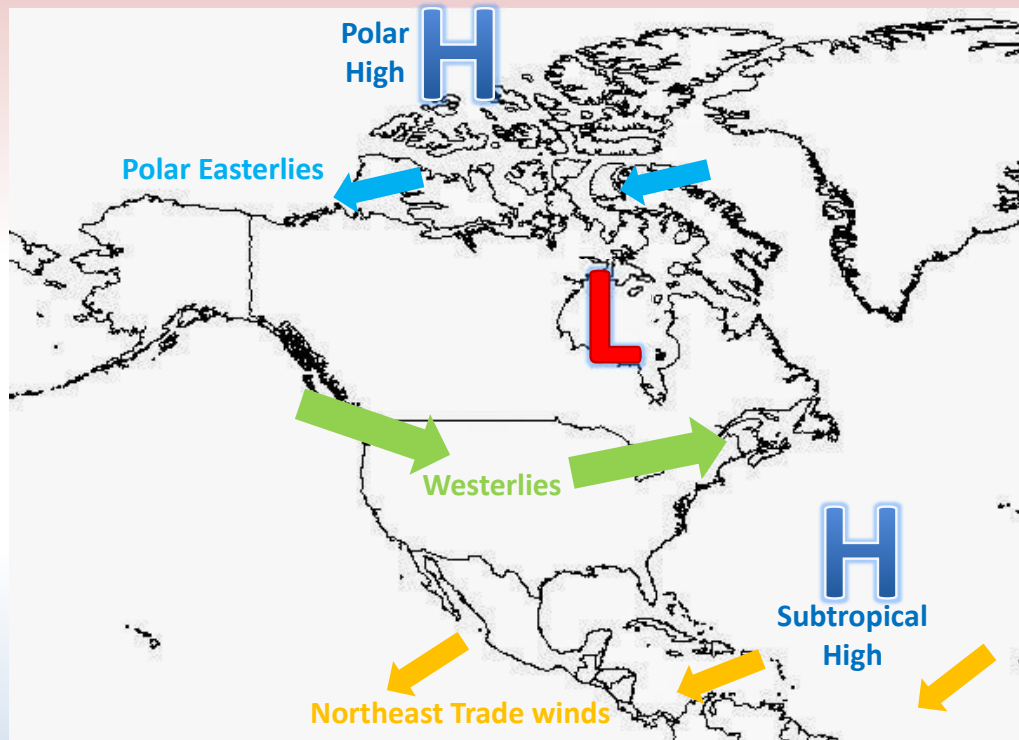
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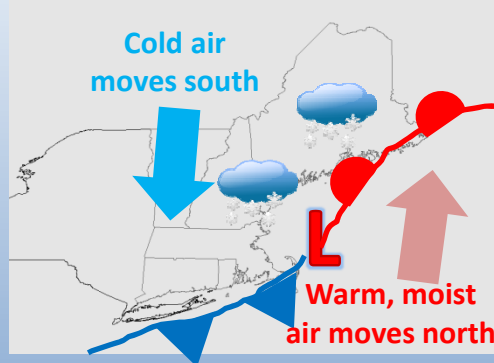
Climate Drivers in New England

The Westerlies



Prevailing Westerly Flow in the Middle Latitudes

- Result of global air circulation patterns
- Storm systems track generally west to east
 - Fronts bring periods of warm, southerly winds or cold, northerly winds
 - Frequent stormy weather
 - “Nor’easters”

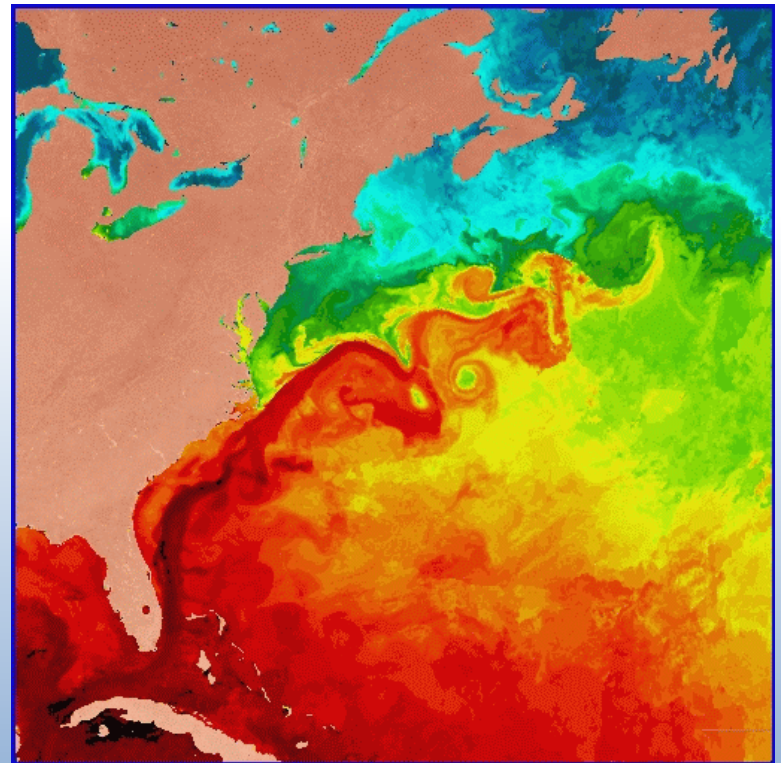


Mid-latitude storms (including Nor’easters)

- Help maintain Earth’s heat balance
 - Warm, moist air surges north from the tropics
 - Cold air moves south from the polar regions
- Provides a large portion of New England’s precipitation

Atlantic Ocean

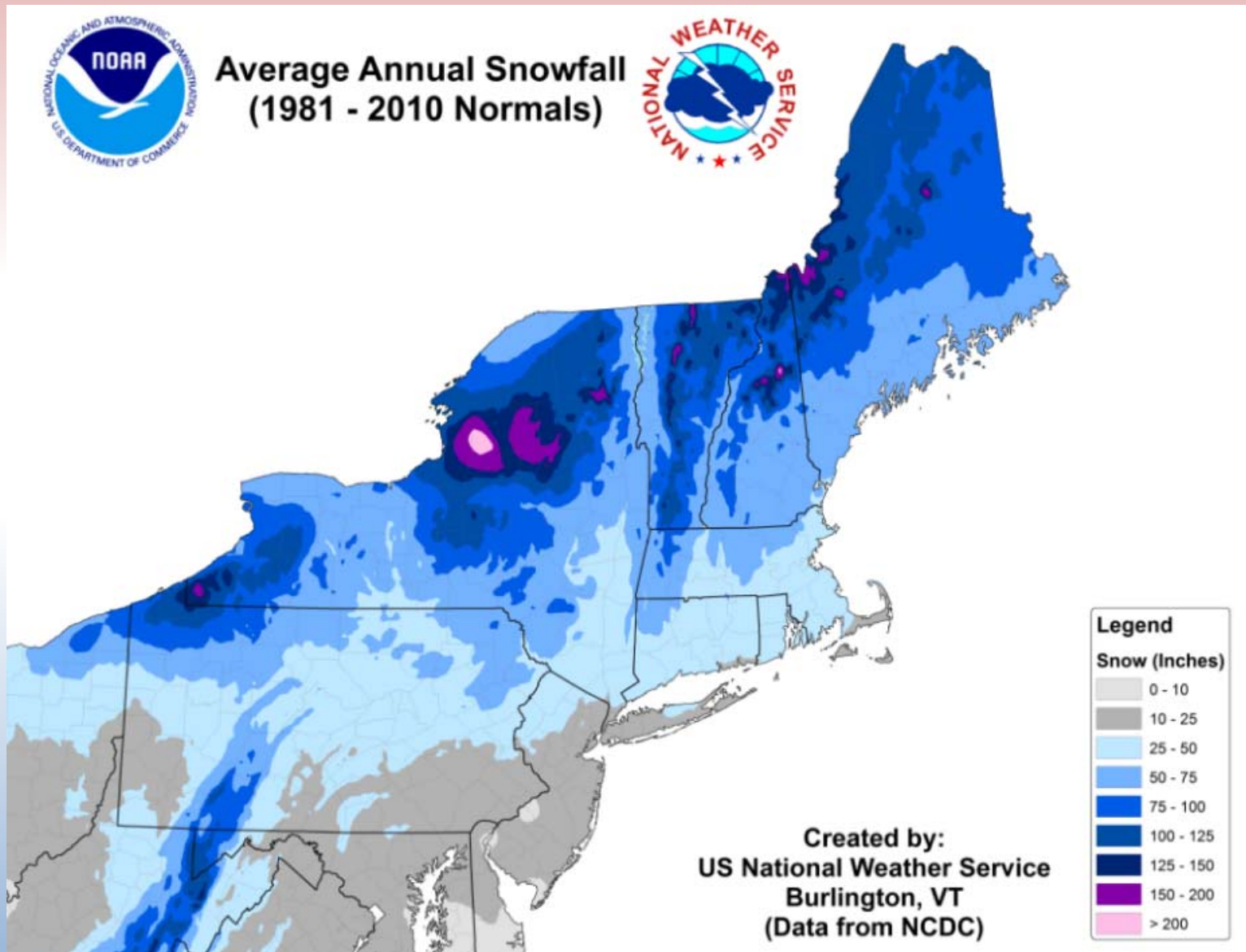
- Large source of nearby moisture
 - Moderates temperature extremes
 - Primary source of moisture for rain and snow
- Gulf Stream
 - Warm ocean current moving northeastward
 - Affects track and intensity of storm systems



Appalachian Mountains

- Mountain ranges can block air flow
 - Cold, dense air piles up against the mountains
 - Blocked air masses can be diverted by the terrain
- “Cold Air Damming”
 - East/Northeast wind traps cold air over the coastal plain
 - Warm/Moist air may move in over the top, causing freezing rain, sleet, or snow
 - Significant factor in high snow totals in Maine

Snowfall

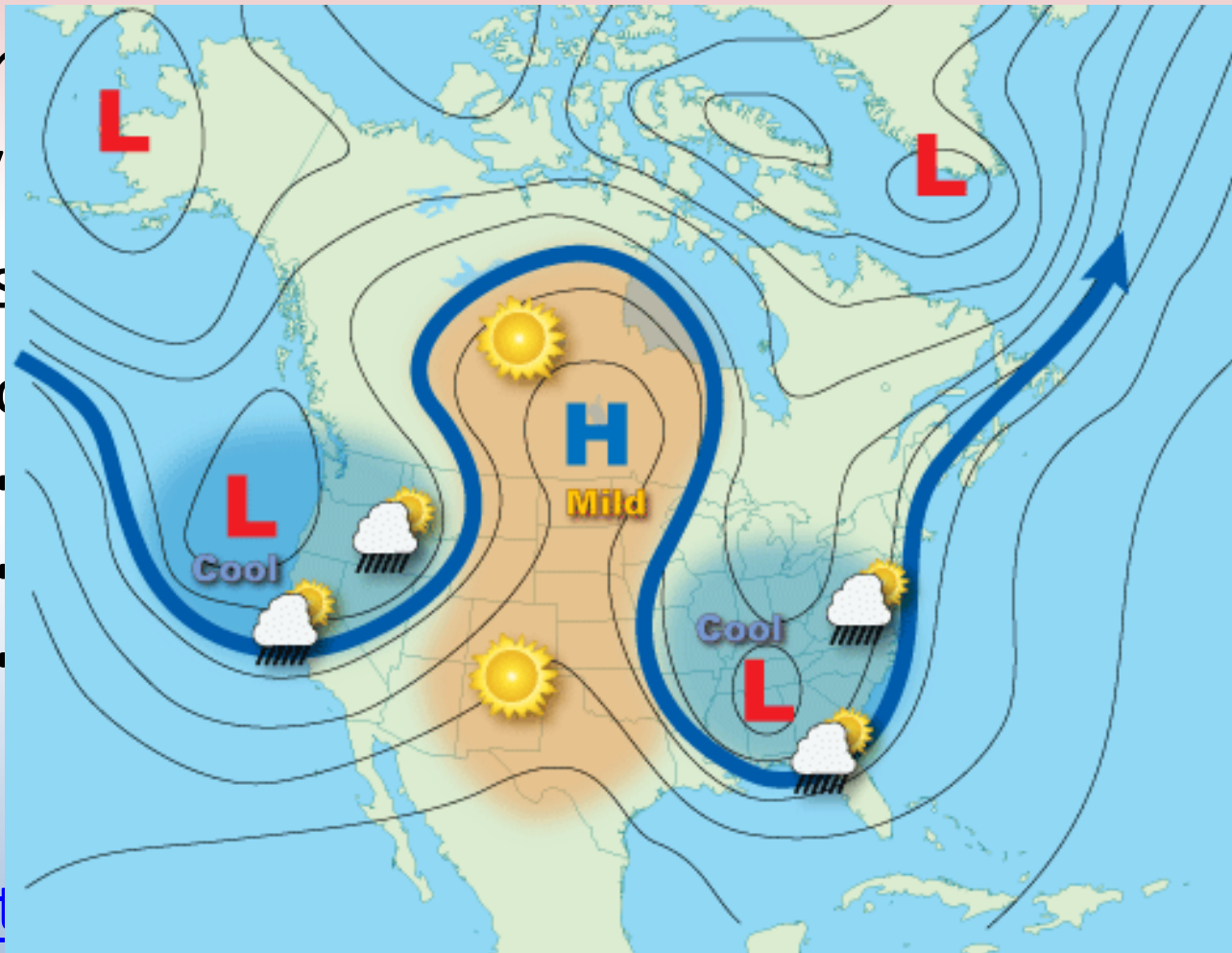


Changing Climate

- Assessment of changes in climate taken from work done at National Centers for Environmental Information (NCEI) and others
 - Detailed state by state analysis available
<https://statesummaries.ncics.org/>

Changing Climate

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– <http://14MokhovKOR.pdf>

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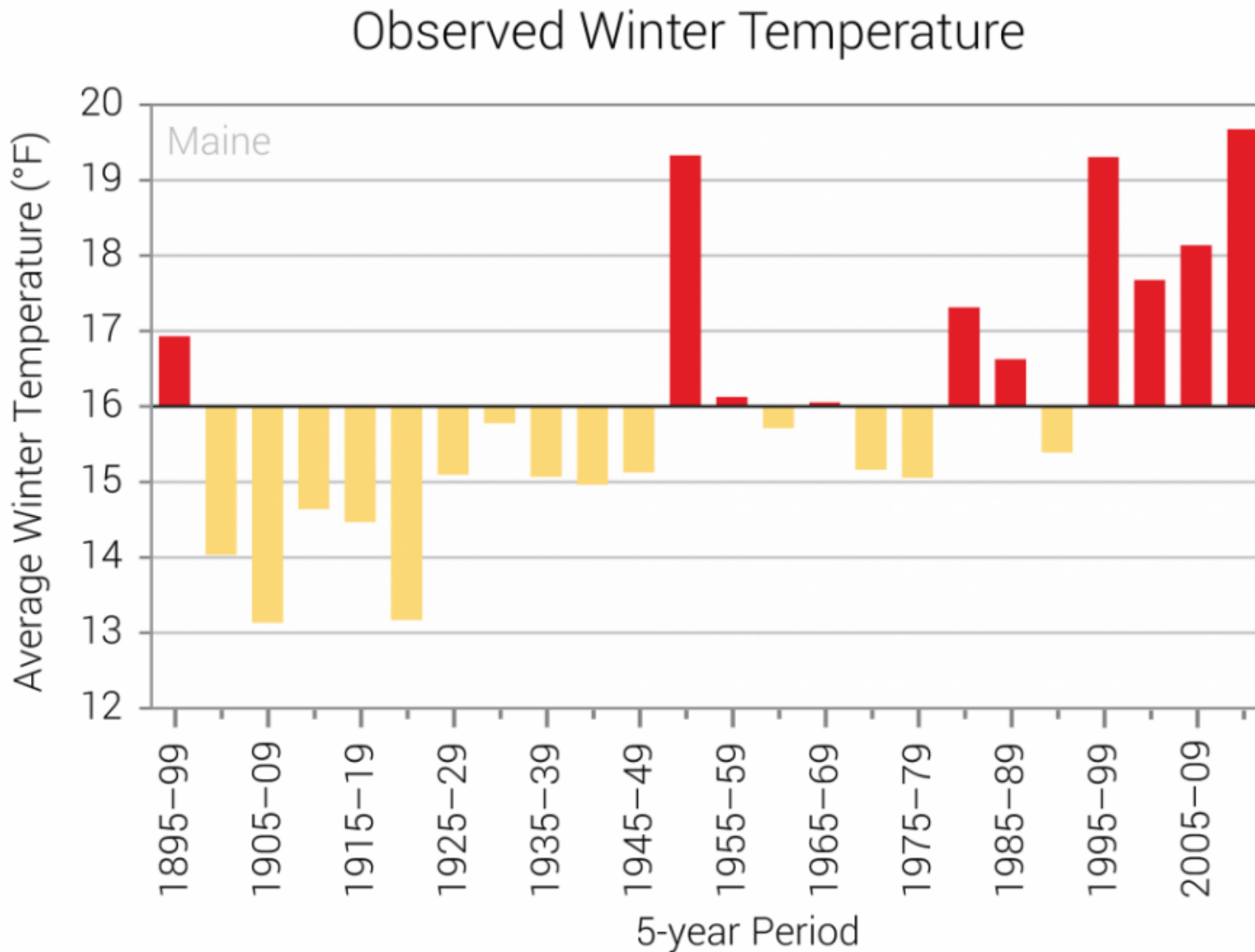
Changing Climate

- Atlantic Ocean
 - Warmer water temperature
 - Increased moisture available for precipitation
 - “Wetter” storms including Nor’easters
 - Heavier rain or snow storms
- Warmer temperatures generally
 - Greater evaporation potential
 - Higher precipitation intensity potential
 - Less snowfall overall, but some intense storms

Observed Changes

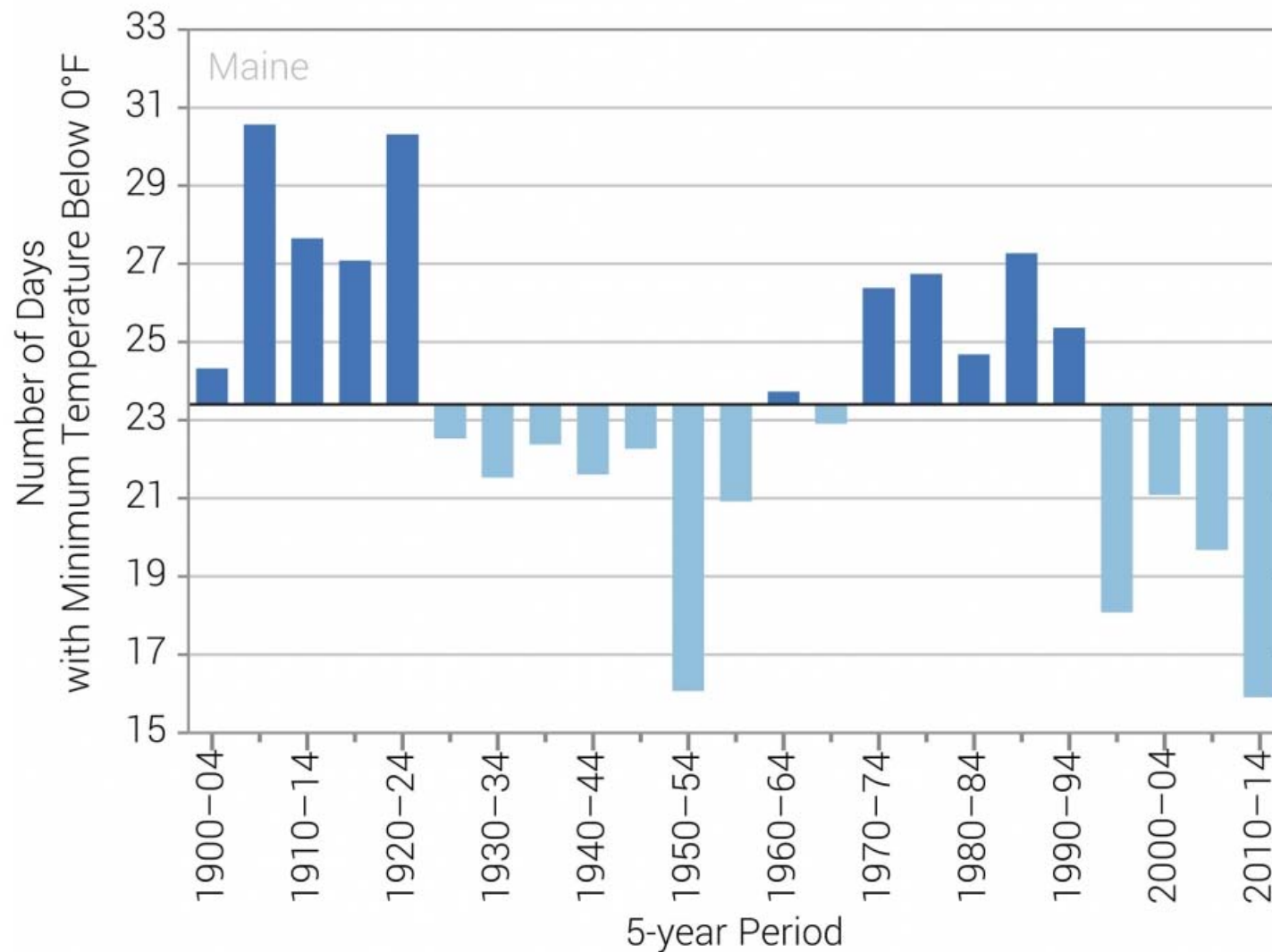
- Changes in average temperature have been driven primarily by less cooling
 - Warmer nighttime temperatures
 - Warmer Arctic region
 - (where cooling is dominant)
- Greater precipitation
 - More extreme precipitation events

Observed Changes

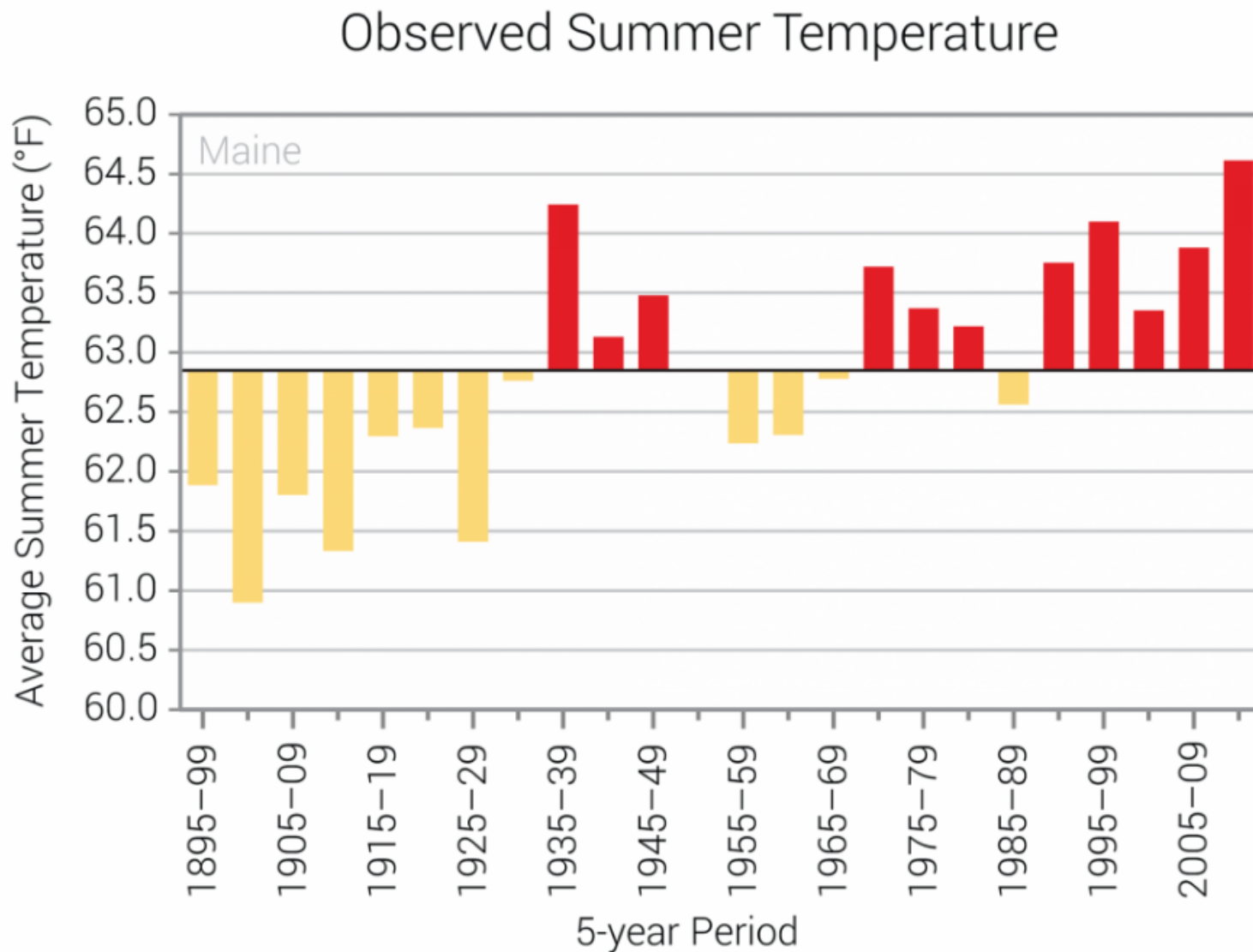


Observed Changes

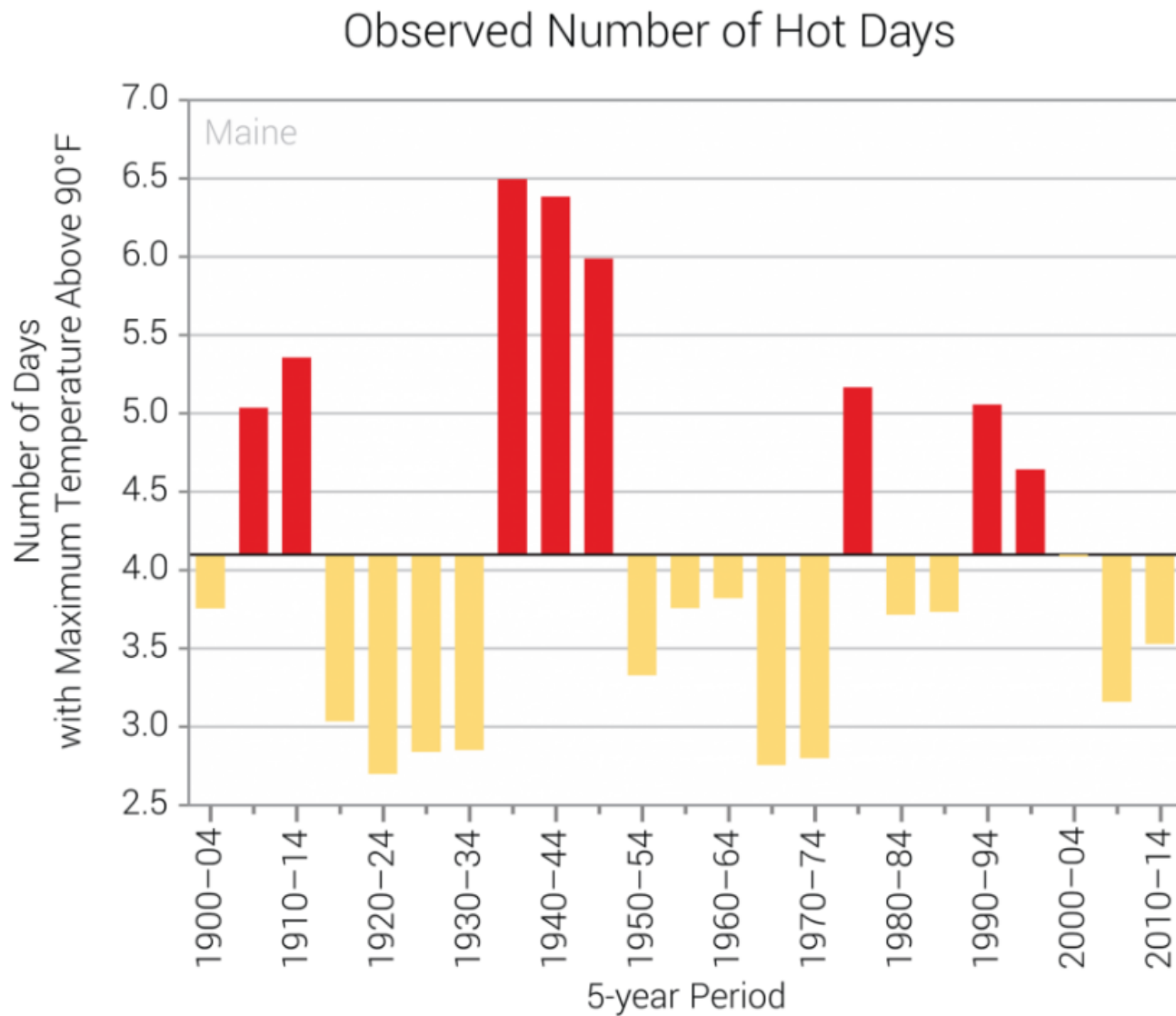
Observed Number of Very Cold Nights



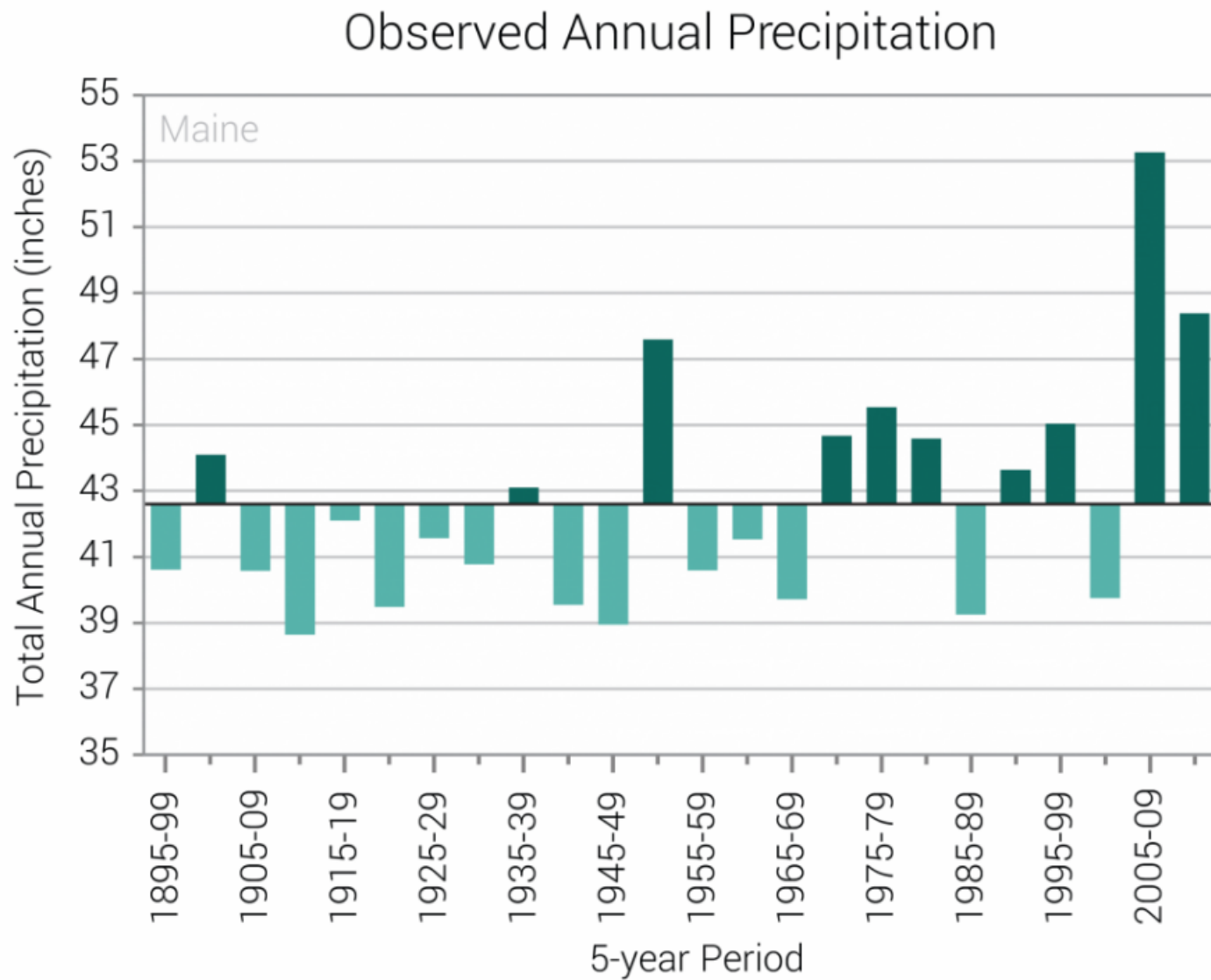
Observed Changes



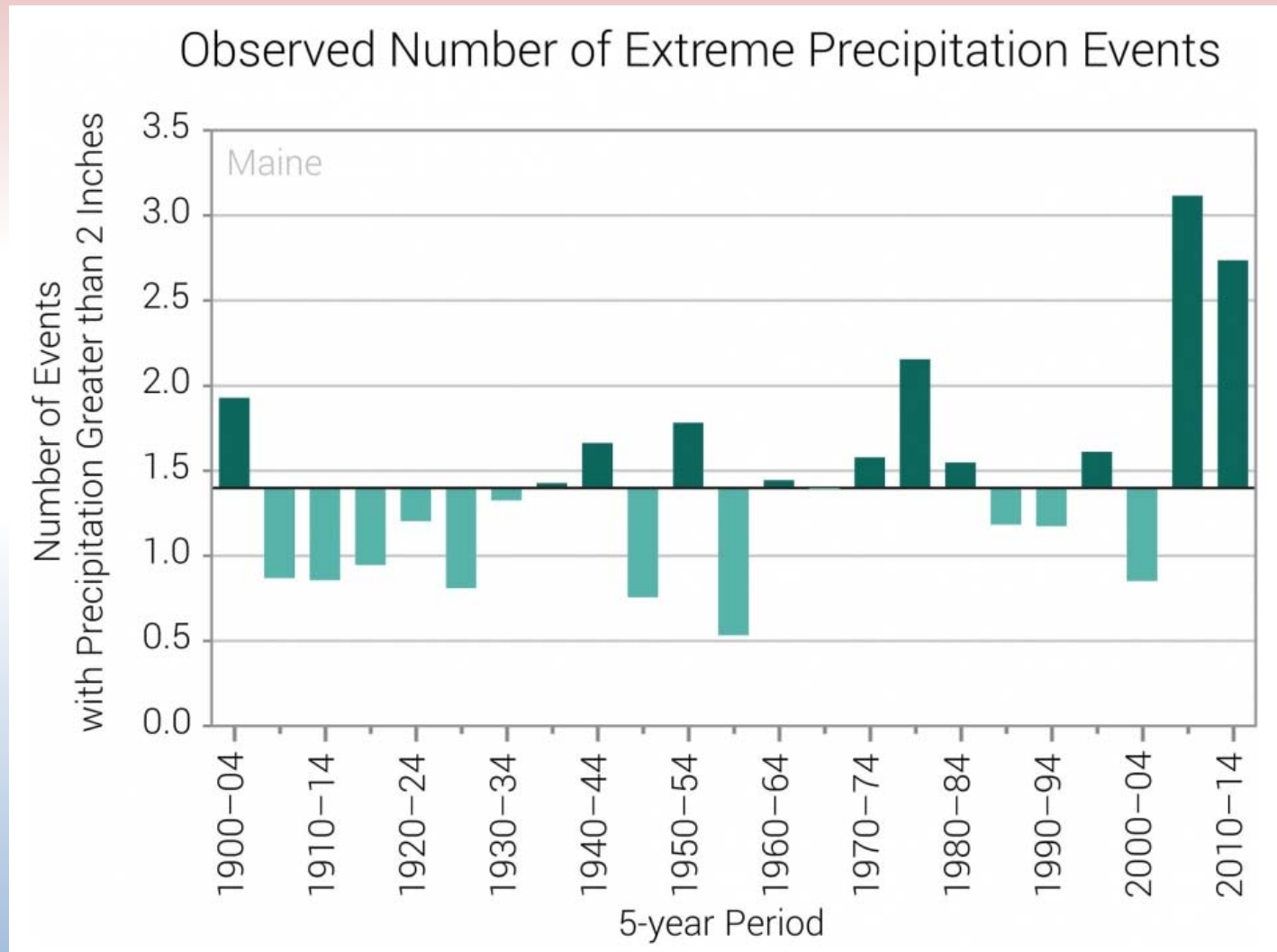
Observed Changes



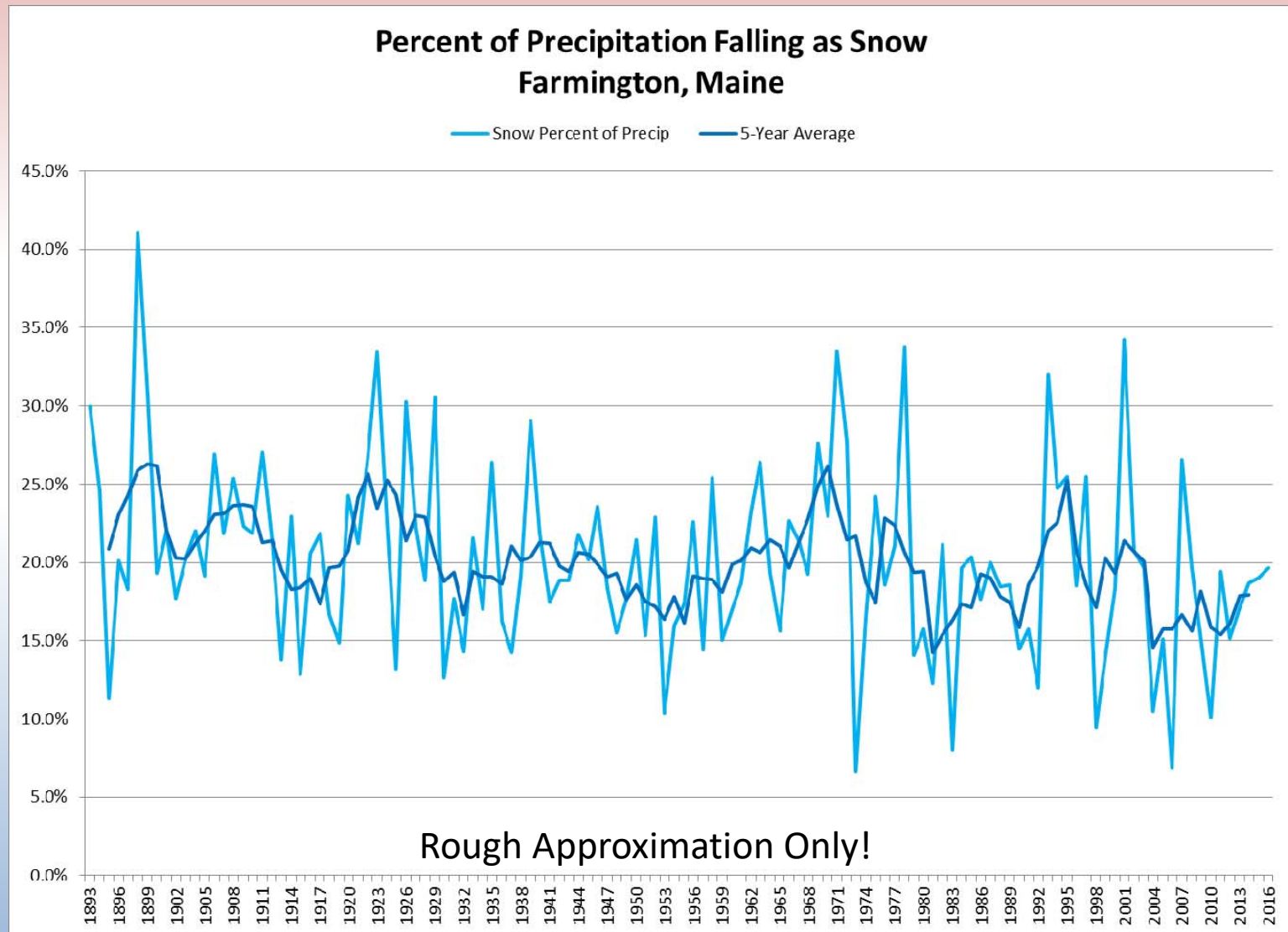
Observed Changes



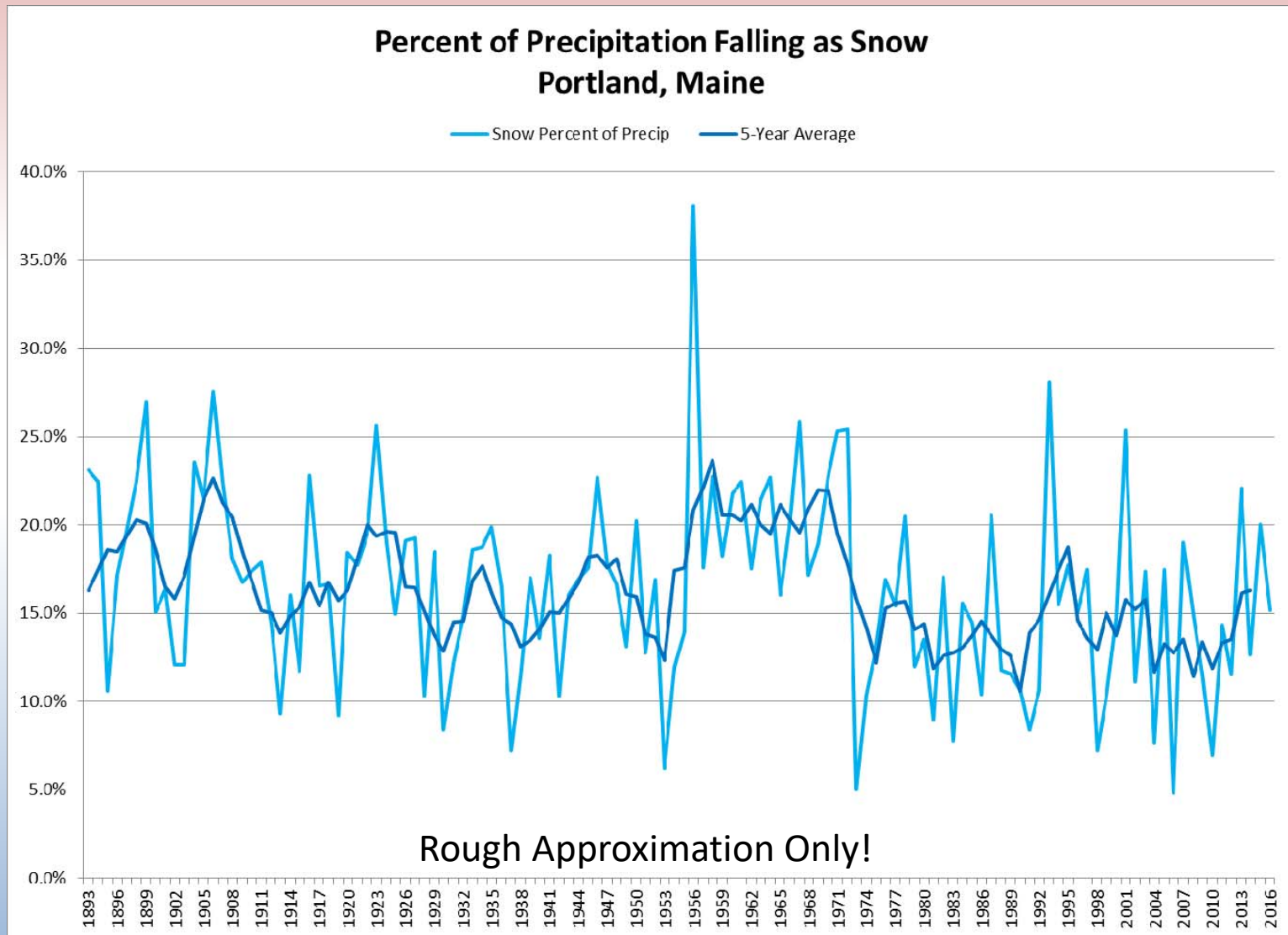
Observed Changes



Observed Changes



Observed Changes



Climate Future

- Observed changes generally expected to continue or intensify
 - Greater frequency of heavy rainfall and floods
 - “Feast or Famine” with drought and flood
 - Inconsistent snowfall, but generally decreasing
 - Some extreme events
 - More frequent heat waves
 - Greater evaporation can exacerbate drought

Climate Resources

- www.climate.gov
- <https://statesummaries.ncics.org/me>