

# NOAA's State Climate Summaries for the National Climate Assessment: State-Level Trends in Temperature and Precipitation

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## About the State Summaries

These NOAA State Summaries were produced in response to a growing demand for state-level information in the context of the National Climate Assessment (NCA). They consist of observed and projected climate change information and focus on aspects that are part of NOAA's mission (mainly characteristics of the physical climate and coastal issues).

- Written by NCA Technical Support Unit
- Input from Regional Climate Centers and State Climatologists
- Extensive review process:
  - Informal internal and external reviews
  - NOAA-required external anonymous review
- Presented in PDF and web format

## Historical Climate Conditions

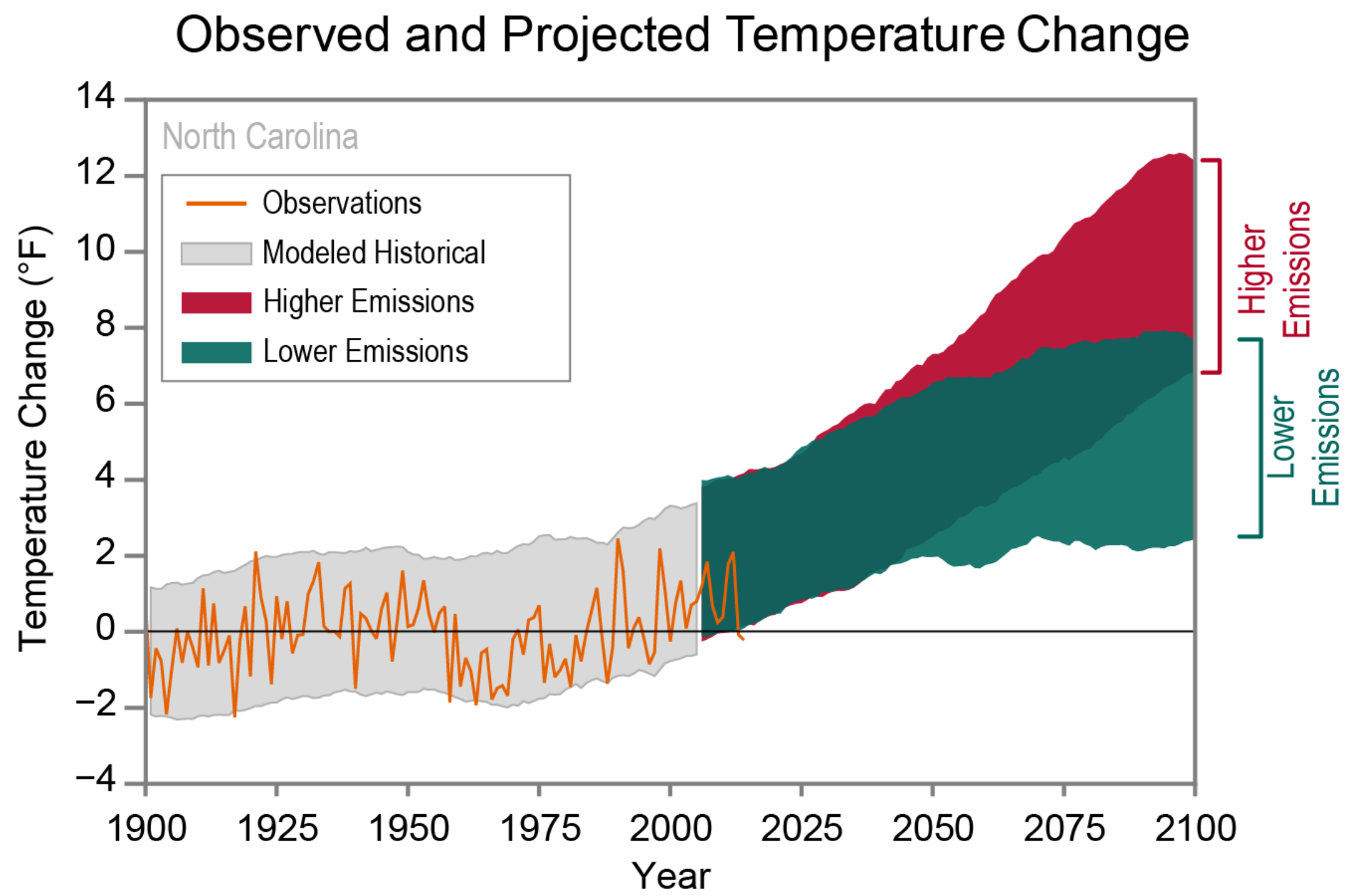
Historical climate conditions are analyzed, primarily using data from NOAA's Climate Divisional Dataset (nClimDiv) and NOAA's Global Historical Climatology Network-Daily (GHCN-D). Including:

- Statewide annual temperature time series (Figure 1)
- Bar graphs of extremes metrics related to temperature and precipitation (Figure 2)
- Additional metrics such as lake levels, ice cover, drought indices (Figures 3–5)

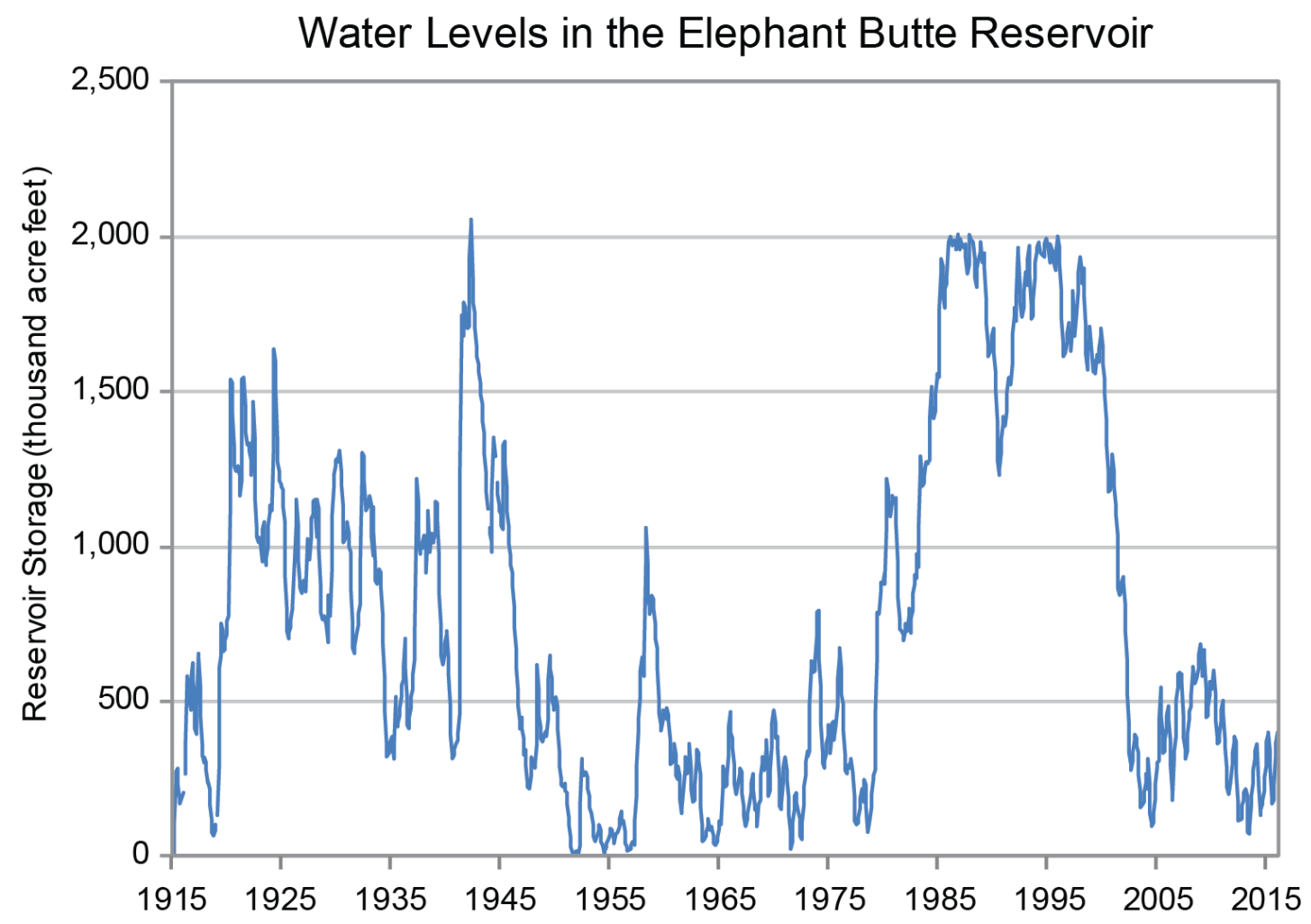
## Future Climate Projections

Projections of future climate are presented using analyses of data from the Coupled Model Intercomparison Project version 5 (CMIP5). Including:

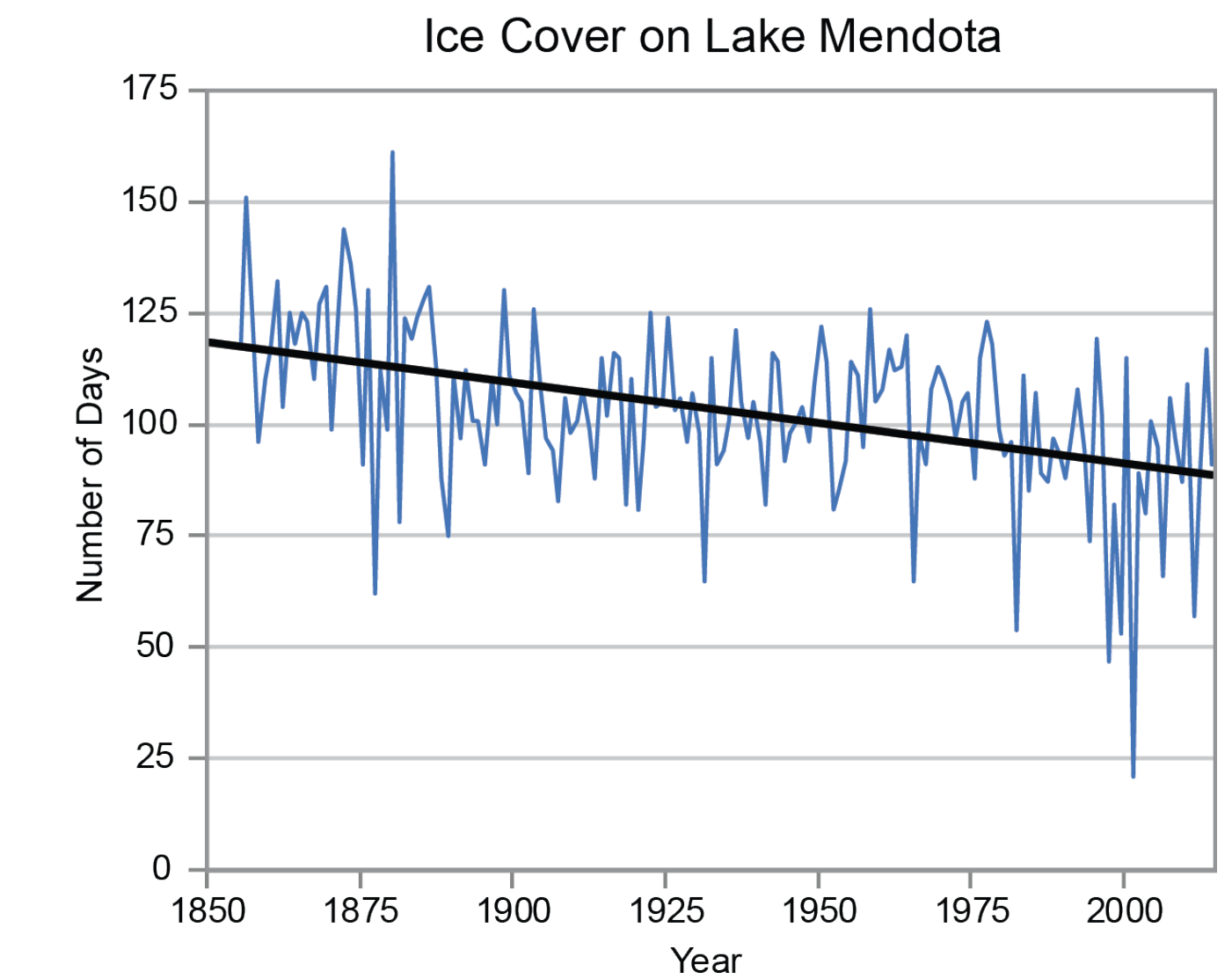
- State-wide temperature time series for both high and low emissions scenarios (Figure 1)
- Maps depicting projected changes in annual or seasonal precipitation under a high emissions scenario (Figure 6)
- Time series of projected annual number of tidal floods for select coastal cities



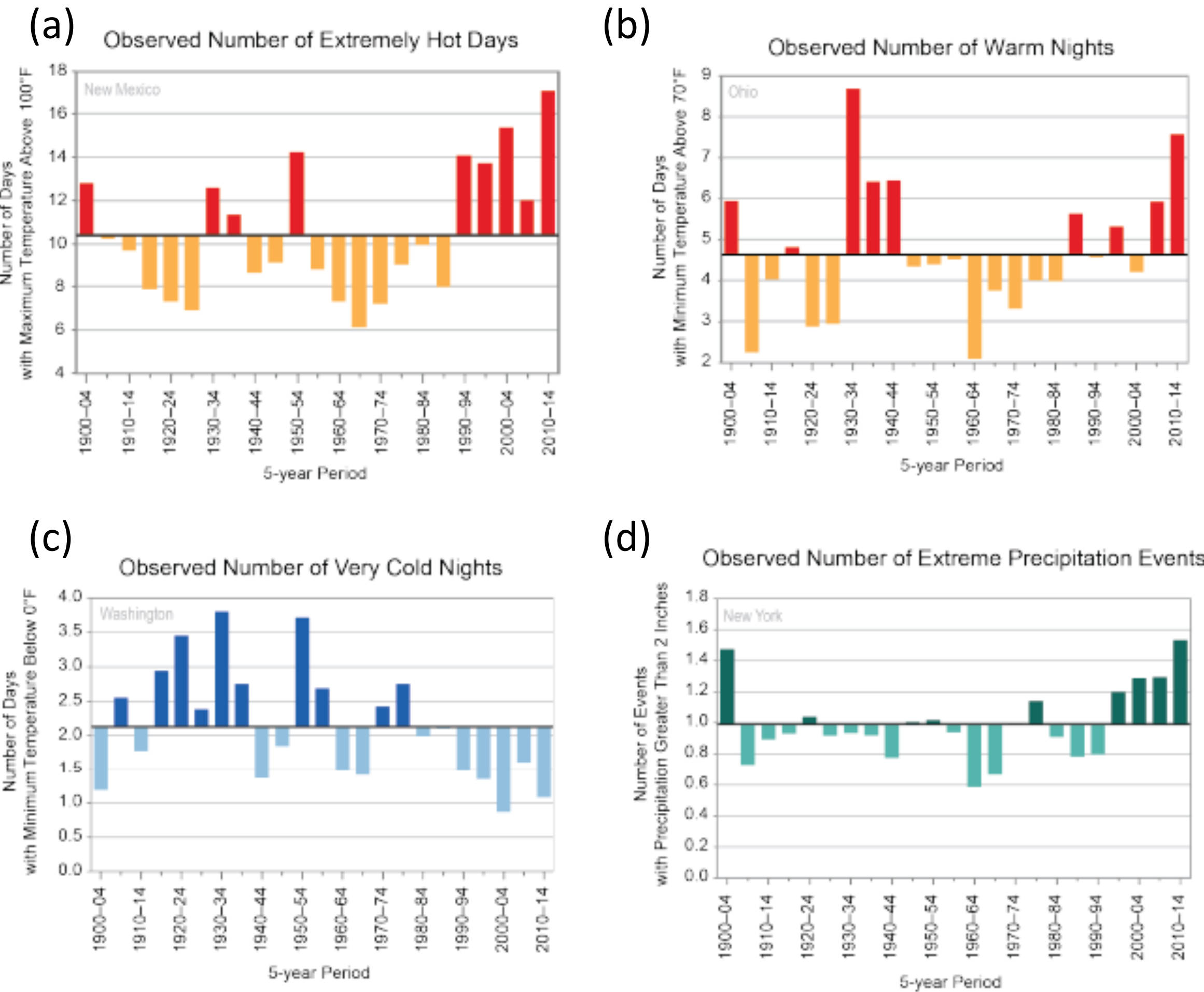
**Figure 1:** Observed and projected changes (compared to the 1901–1960 average) in near-surface air temperature for North Carolina. Observed data are for 1900–2014. Projected changes for 2015–2100 are from global climate models for two possible futures: one in which greenhouse gas emissions continue to increase (higher emissions) and another in which greenhouse gas emissions increase at a slower rate (lower emissions). Temperatures in North Carolina (orange line) have risen almost 1°F since the beginning of the 20th century. Source: CICS-NC, NOAA/NCEI.



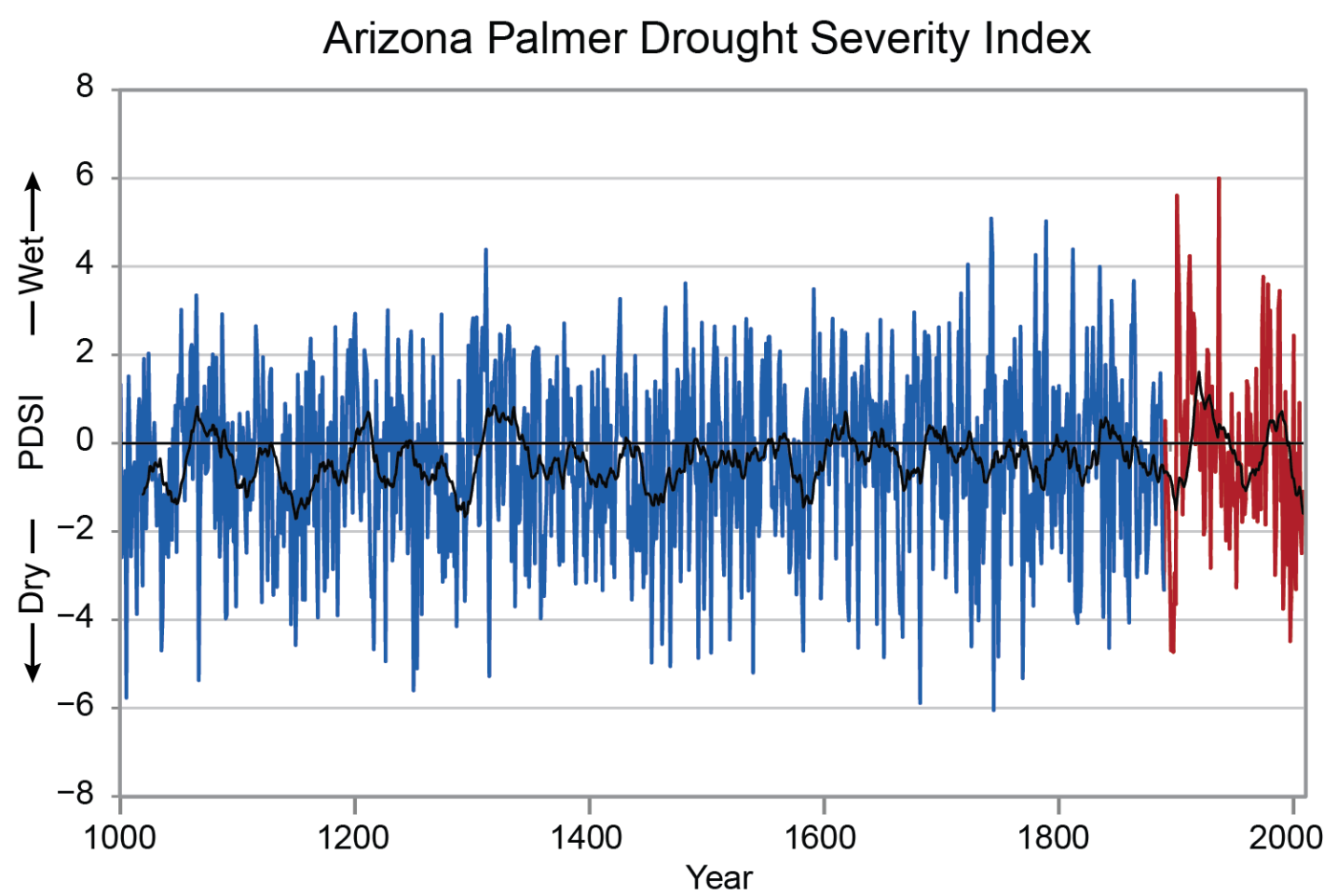
**Figure 3:** Monthly time series of the average water levels in the Elephant Butte Reservoir, New Mexico. Water levels have varied widely over the years, with recent years approaching record lows due to the extended drought. Source: USBR.



**Figure 4:** Long-term change in ice-cover duration for Lake Mendota, Wisconsin. The total duration of ice cover exhibits a consistent downward trend, decreasing from about 120 days in the late 19th century to less than 100 days in most years since 1990. Source: Wisconsin State Climatology Office.



**Figure 2:** The observed number of (a) extremely hot days for New Mexico, (b) warm nights for Ohio, (c) very cold nights for Washington, and (d) extreme precipitation events for New York, averaged over 5-year periods. These values are averages from all available long-term reporting stations. The dark horizontal lines represent the long-term averages. Source: CICS-NC, NOAA/NCEI.

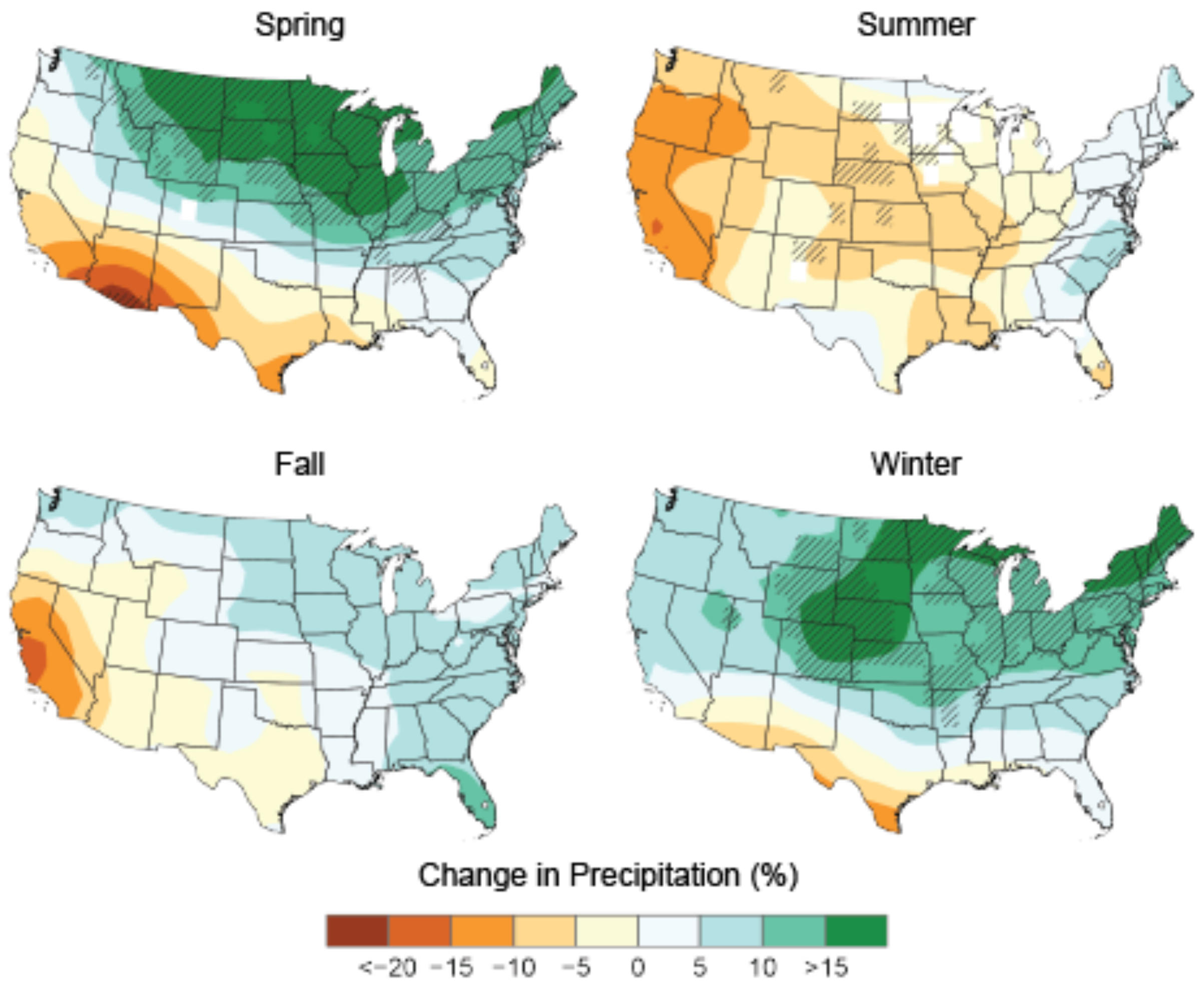


**Figure 5:** Time series of the Palmer Drought Severity Index from the year 1000 to 2014 for Arizona. Values for 1895–2014 (red) are based on measured temperature and precipitation. Values prior to 1895 (blue) are estimated from indirect measures such as tree rings. The thick black line is a running 20-year average. In the modern era, the wet periods of the early 1900s and the 1980s to 1990s and the dry period of the 1950s are evident. Source: CICS-NC, NOAA/NCEI.

## Content

Each summary consists of a description of the historical climate conditions based on the analysis of core climate data, as well as future climate scenarios intended to provide an internally consistent set of climate conditions that can inform analyses of potential impacts of climate change. This includes:

- Geographical and climatological overview
- Description of historical physical climate and coastal issues, noteworthy past events
- Temperature and precipitation projections
- General information about potential future impacts of climate change
- Selected state-specific data and graphics



**Figure 6:** Projected change in seasonal precipitation (%) for the middle of the 21st century relative to the late 20th century under a higher emissions pathway. Hatching represents regions where the majority of climate models indicate a statistically significant change. Source: CICS-NC, NOAA/NCEI, and NEMAC.

<http://stateclimatesummaries.globalchange.gov>