



Exploring the Science of Climate Change and Agricultural Impacts

February 3, 2014

**2014 Research Center
Administrators Society**



Mesonet
Oklahoma's Weather Network

Weather drives agriculture



Climate Drives Weather



Al Sutherland

Certified Professional Horticulturist

Certified Crop Advisor

OSU Biosystems and Ag Engineering

OSU faculty on the OU campus

Mesonet Agricultural Program Coordinator

New Foreman



The Pacific Coast Breeding Station has a new Farm Foreman—Al Sutherland, a 1976 Oregon State University (Corvallis) graduate. Al

1977
Asgrow
Seed
Co



**Asgrow Vegetable Breeding Farm
San Juan Bautista, California**

Asgrow Seed Filer, Idaho



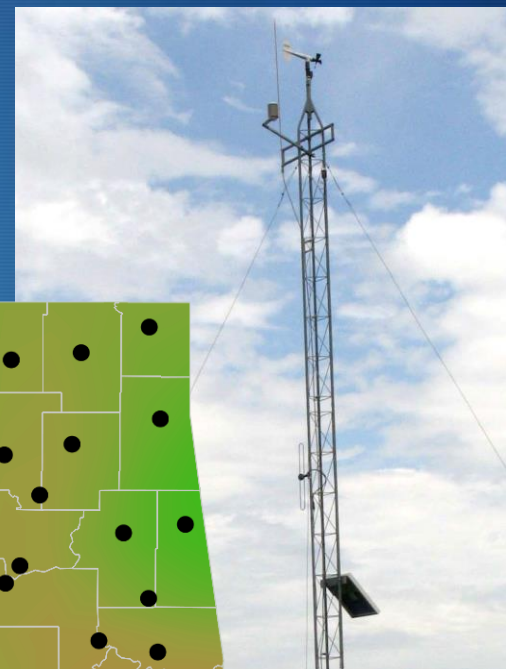
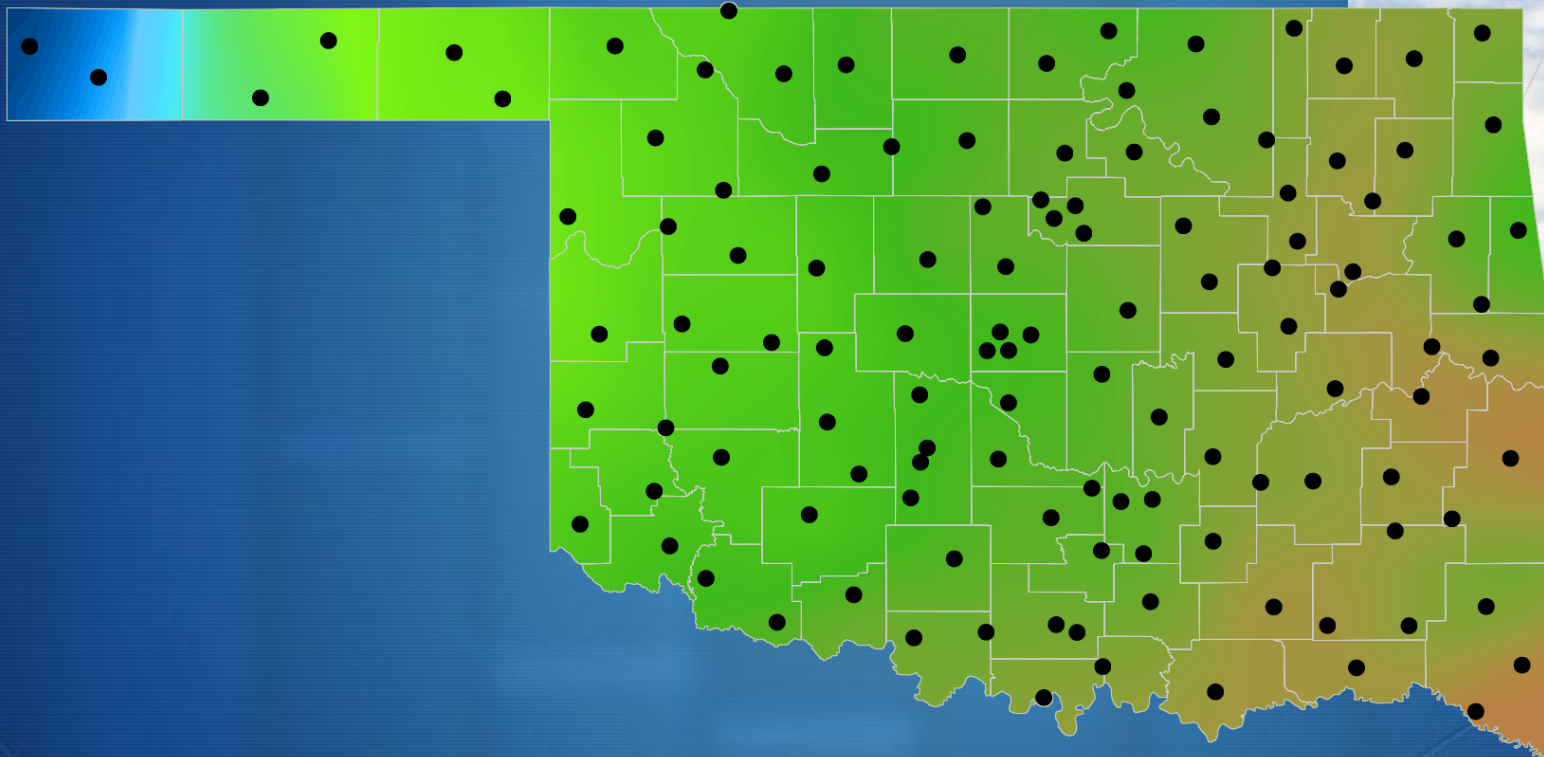
**OARDC
Wooster,
Ohio**



Extension Oklahoma



Oklahoma Mesonet Tower Locations



Mesonet
Oklahoma's Weather Network

National Weather Center



Weather
or
Climate



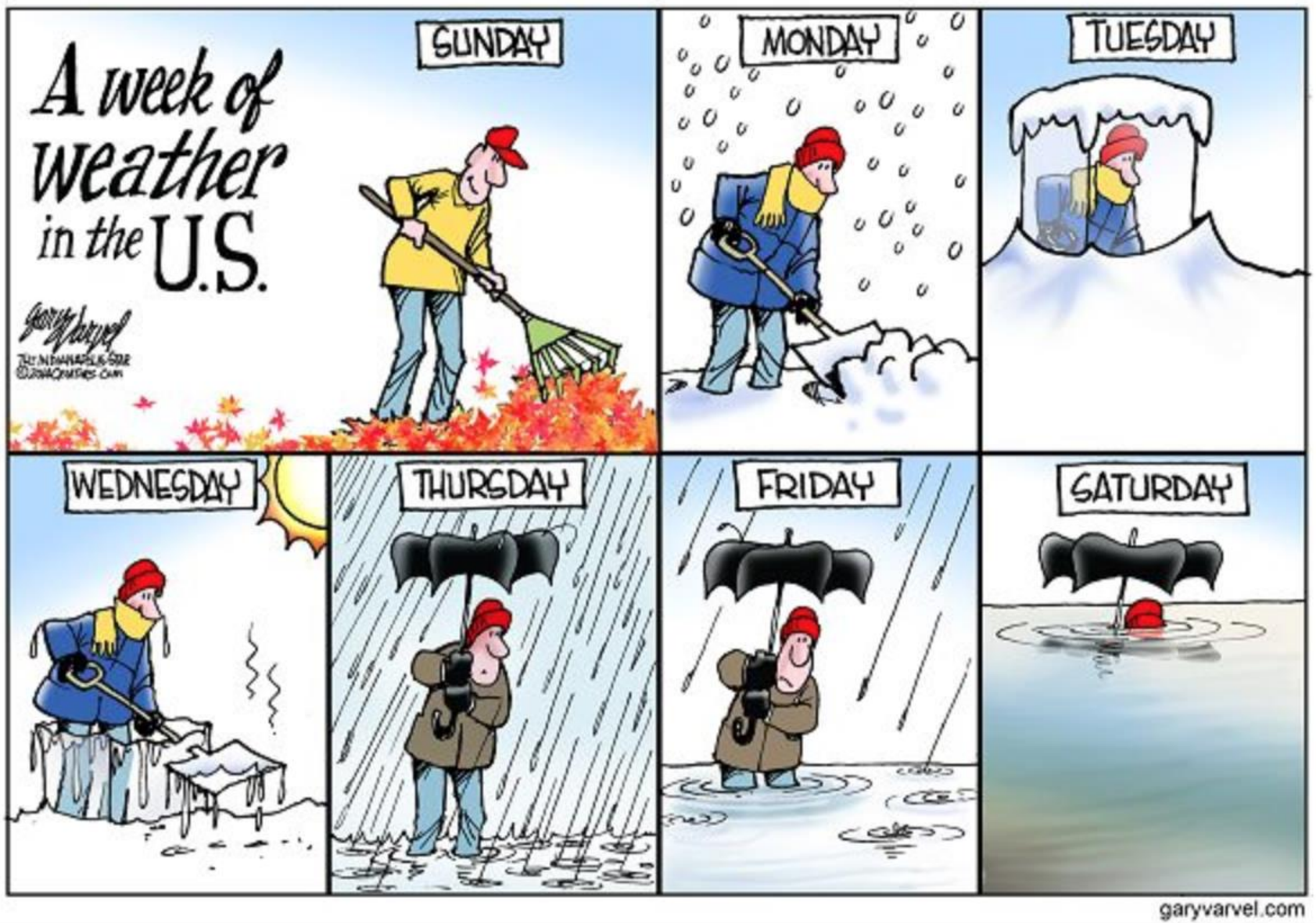
El Reno OK Tornado - EF5 - 2.6 miles wide - May 31, 2013



Oklahoma Panhandle Jan 12, 2014



Lubbock, TX - Oct 17, 2011



Wednesday, January 8, 2014
AAEC Ref Num: 128995

2014

Gary Varvel – The Indianapolis Star



1527



1550

16th Century
Megadrought



1600

1650

**Tracking down
changing
climate**





Soil, Water & Forage Analytical Laboratory

Oklahoma State University Division of Agricultural Sciences and Natural Resources
045 Agricultural Hall
Stillwater, OK 74078
E-mail: soiltesting@okstate.edu
Website: www.soiltesting.okstate.edu

SOIL TEST REPORT

ELLIS CO EXT OFC
BOX 157
COURTHOUSE
ARNETT, OK 73832
(580) 885-7775

Name :
Location :

Lab ID No.: 683005
Customer Code : 23
Sample No. : 5267
Received : 4/1/2013
Report Date : 4/2/2013

- Routine Test -

pH: 6.1
Buffer Index: 7.5
NO3-N (lbs/A):
Surface: 5
Subsoil:
Soil Test P Index: 78 (39 ppm)
Soil Test K Index: 241 (120 ppm)

- Secondary Nutrients -

SO4-S (lbs/A)
Surface: 7
Subsoil:
Ca (lbs/A): 882
Mg (lbs/A): 188

- Micronutrients -

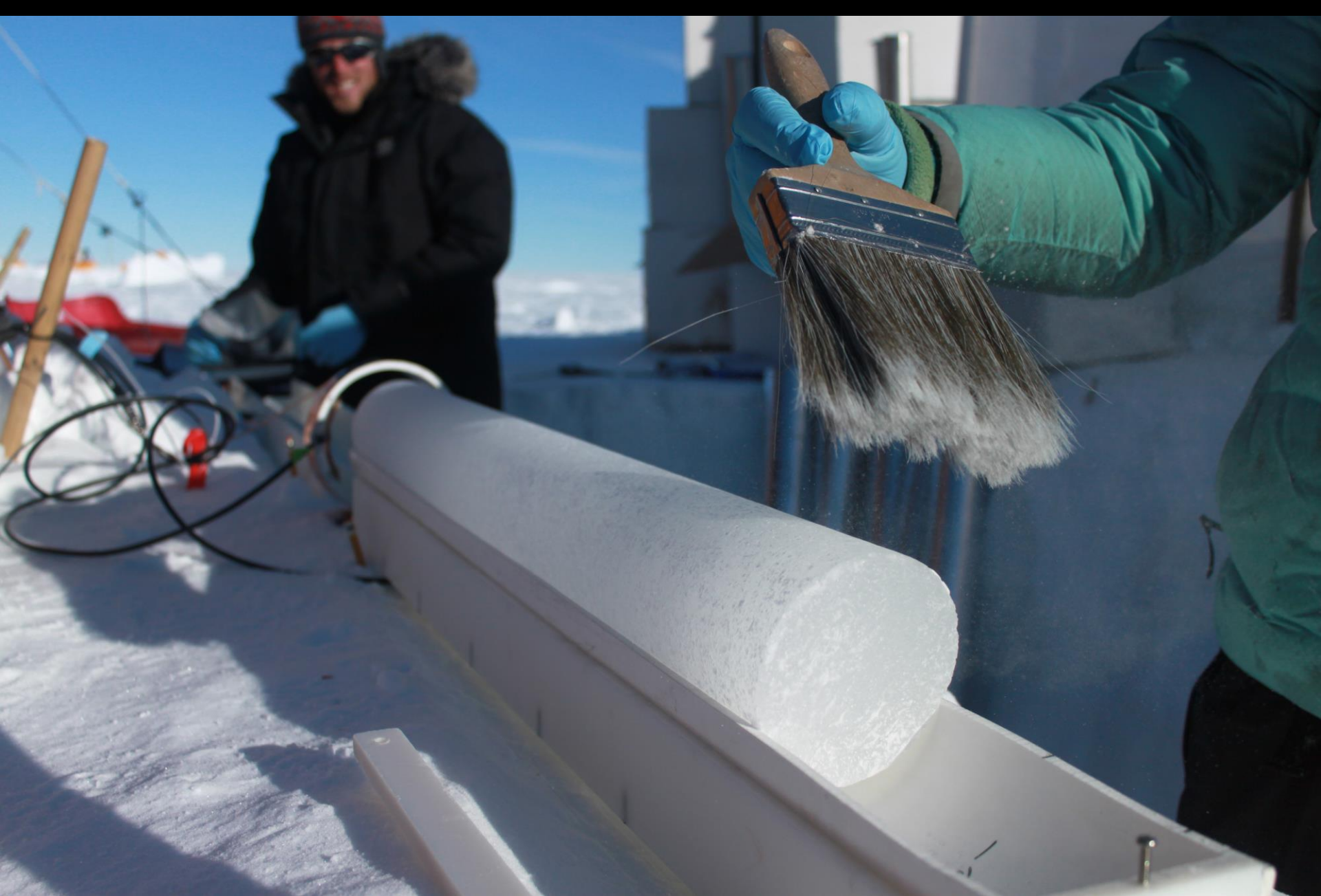
Fe (ppm): 29.8
Zn (ppm): 0.5
B (ppm): 0.1
Cu (ppm): 0.6

- Additional Tests -

INTERPRETATION AND REQUIREMENTS FOR Corn (YIELD GOAL = 80)

- Test -	- Interpretation -	- Requirement -	- Recommendations and Comments -
pH	Adequate	No lime required	
Nitrogen	Deficient	78 lbs/Acre N	
Phosphorus	Adequate	None	
Potassium	98 % Sufficient	6 lbs/Acre K2O annually	
Sulfur	Adequate	None	
Calcium	Adequate	None	
Magneisum	Adequate	None	
Iron	Adequate	None	
Zinc	Adequate	None	
Boron	Adequate	None	

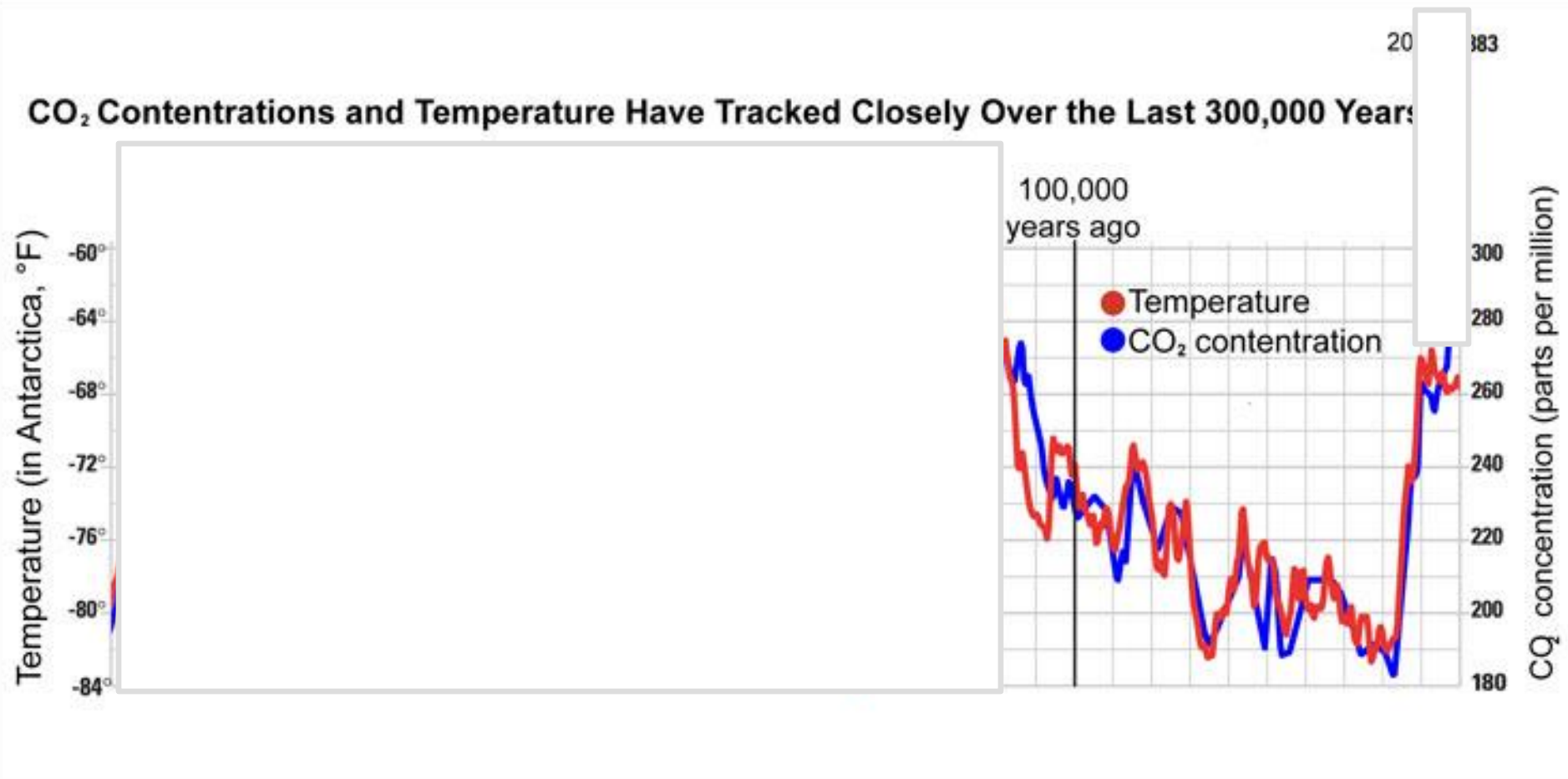
Signature



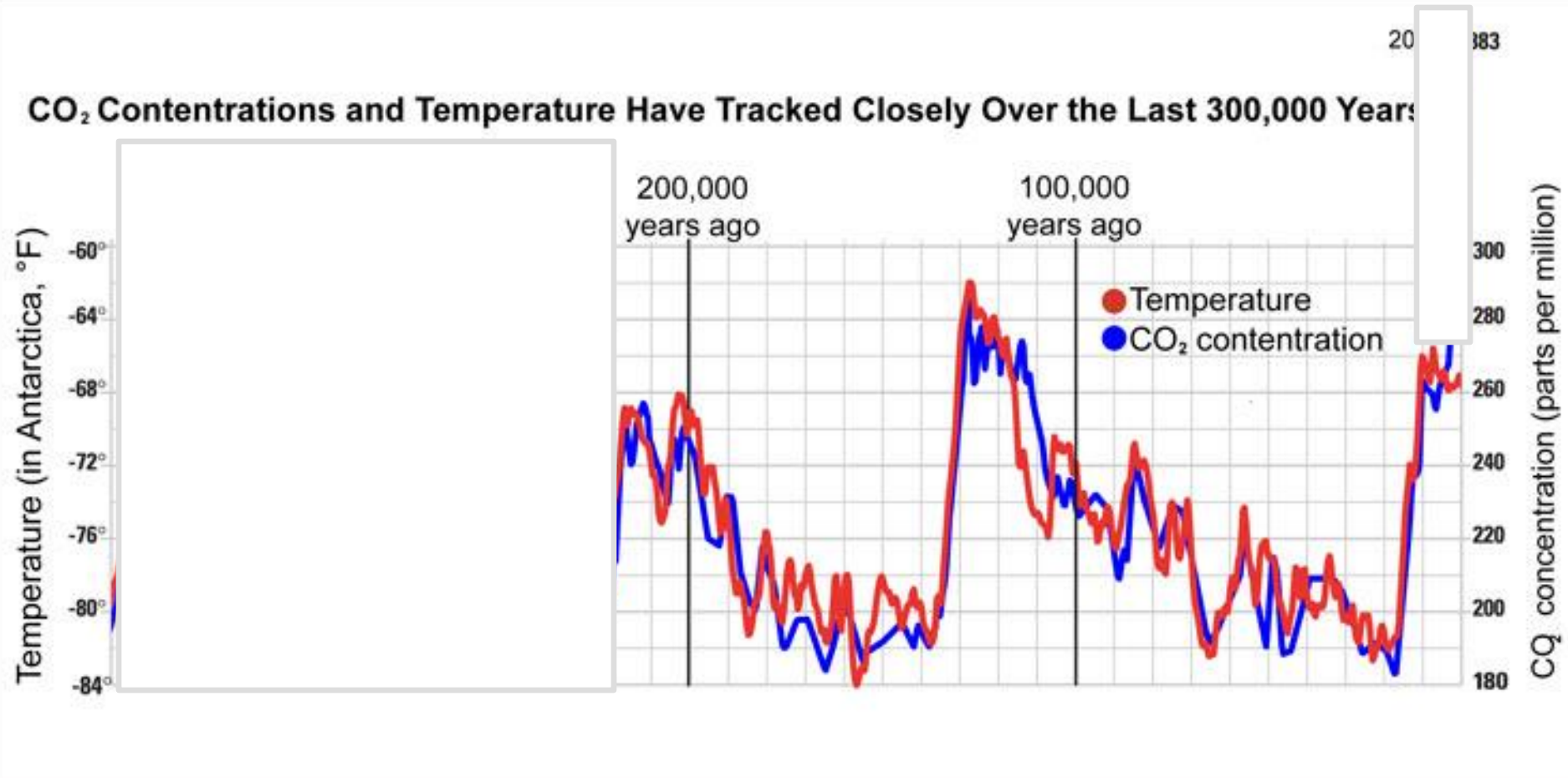




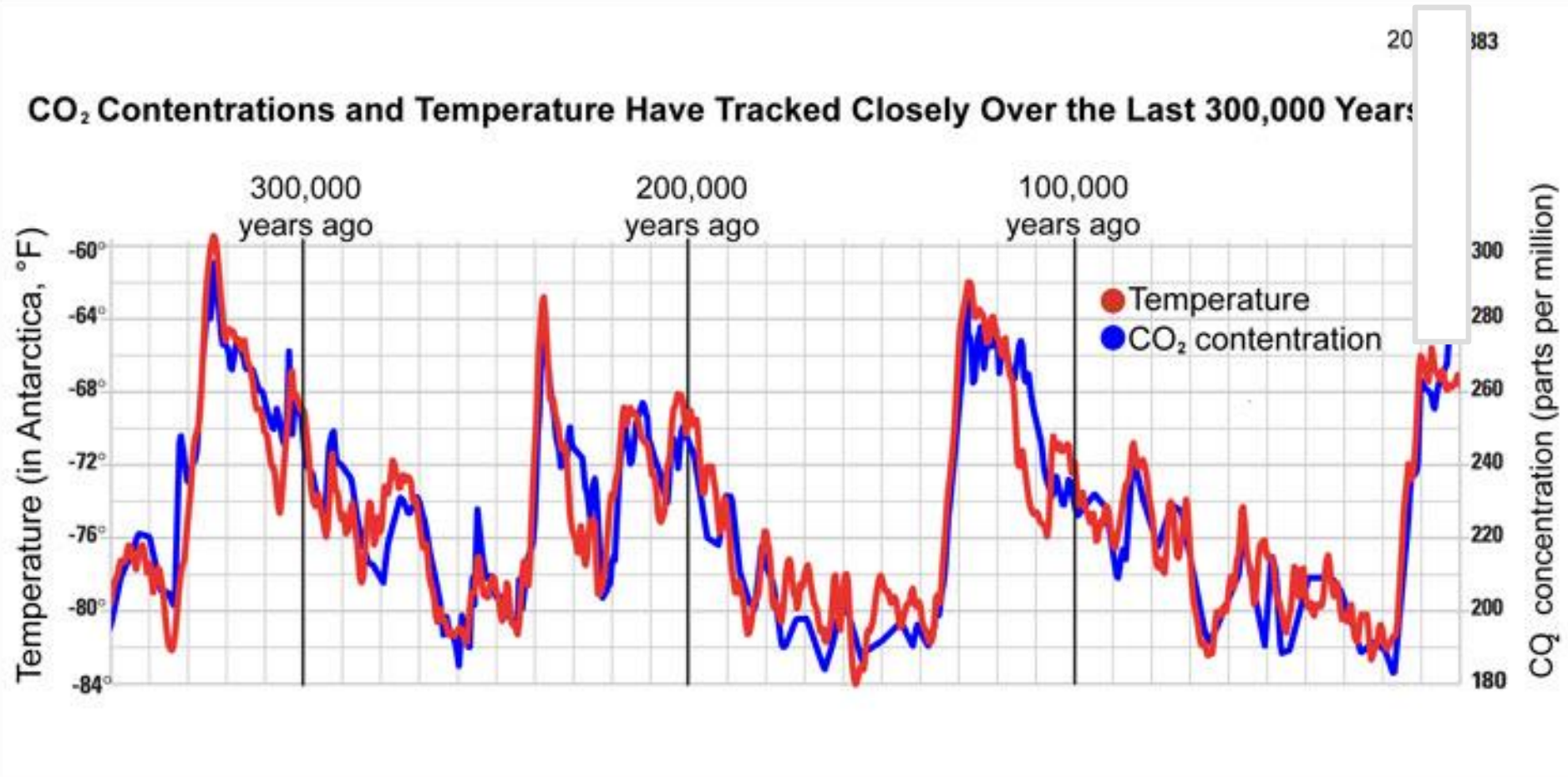
Vostok Ice Core air temperature and carbon dioxide analysis



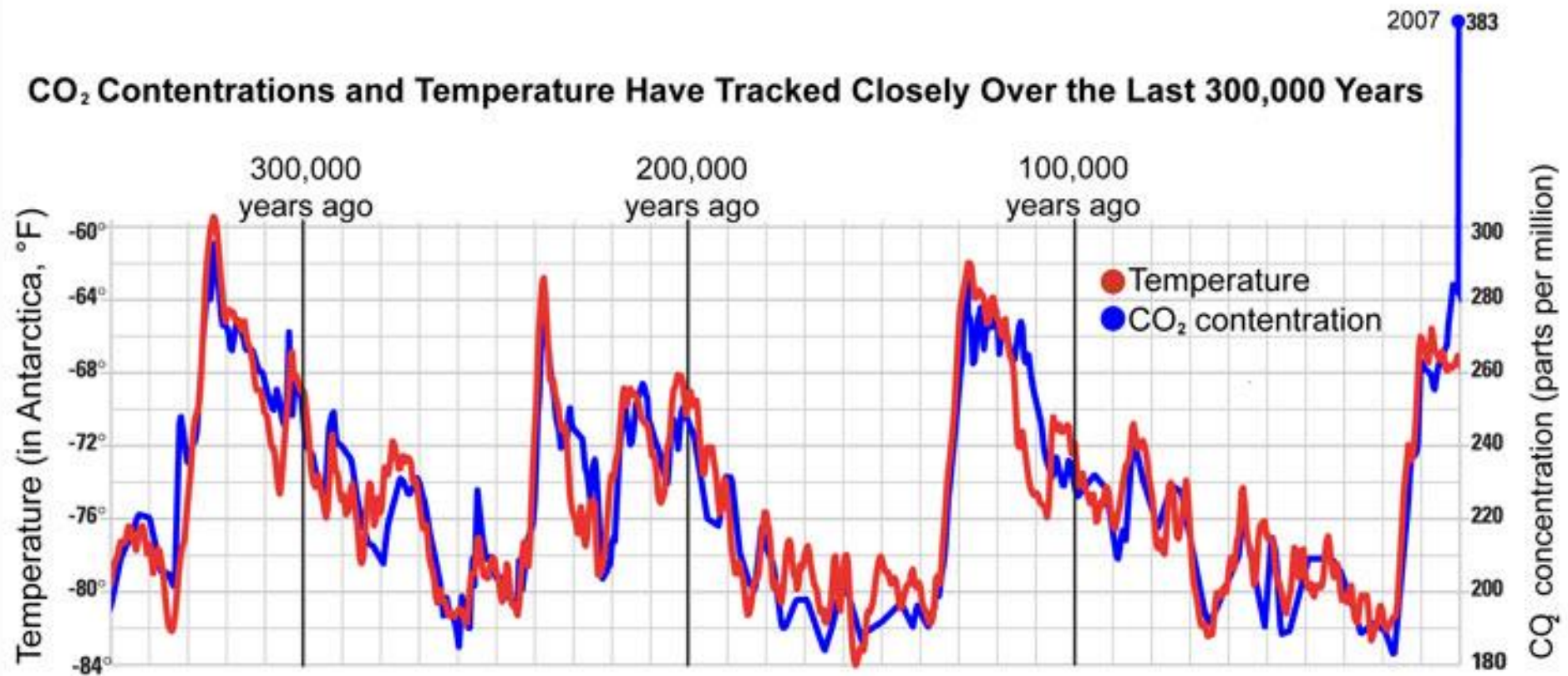
Vostok Ice Core air temperature and carbon dioxide analysis



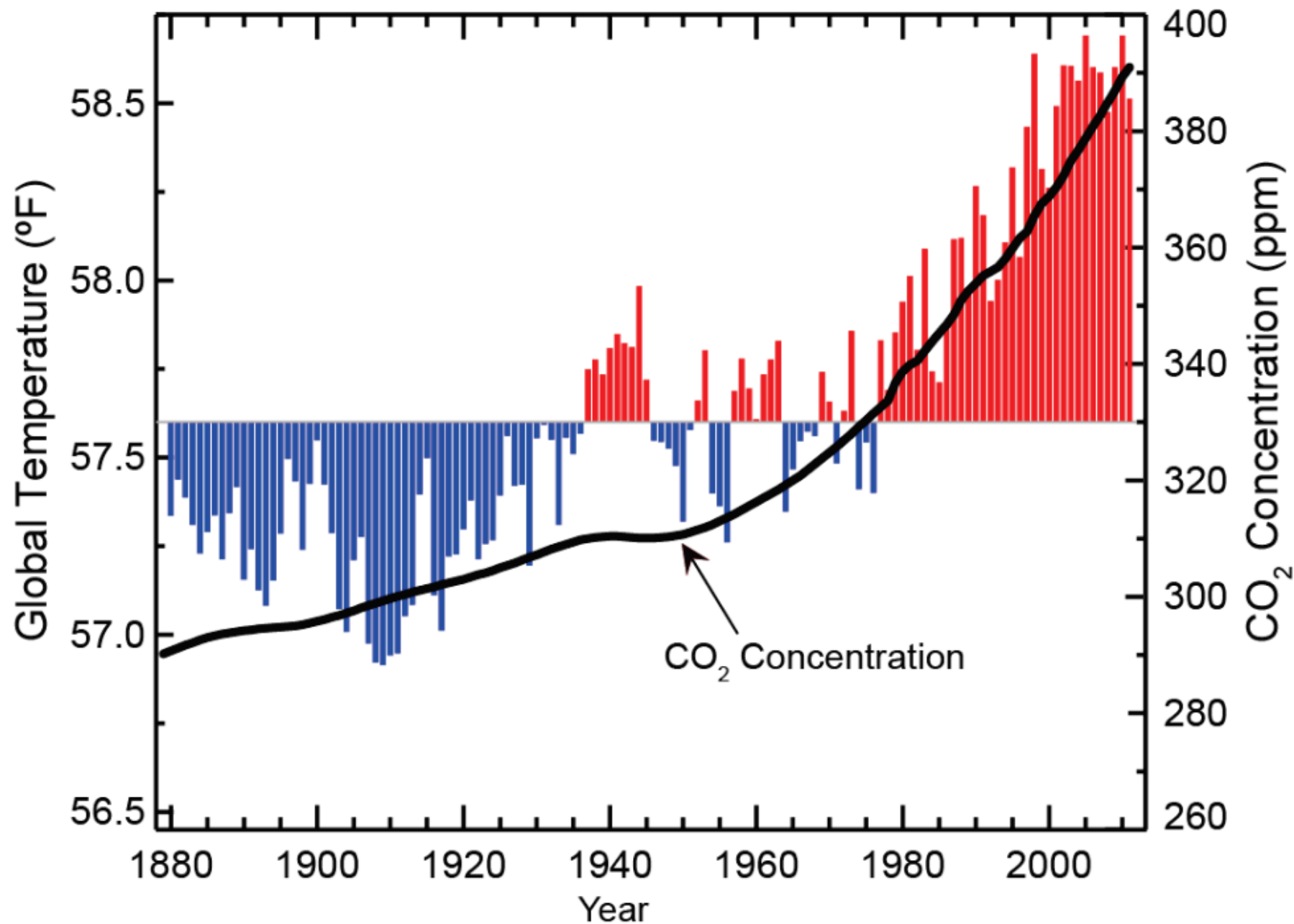
Vostok Ice Core air temperature and carbon dioxide analysis



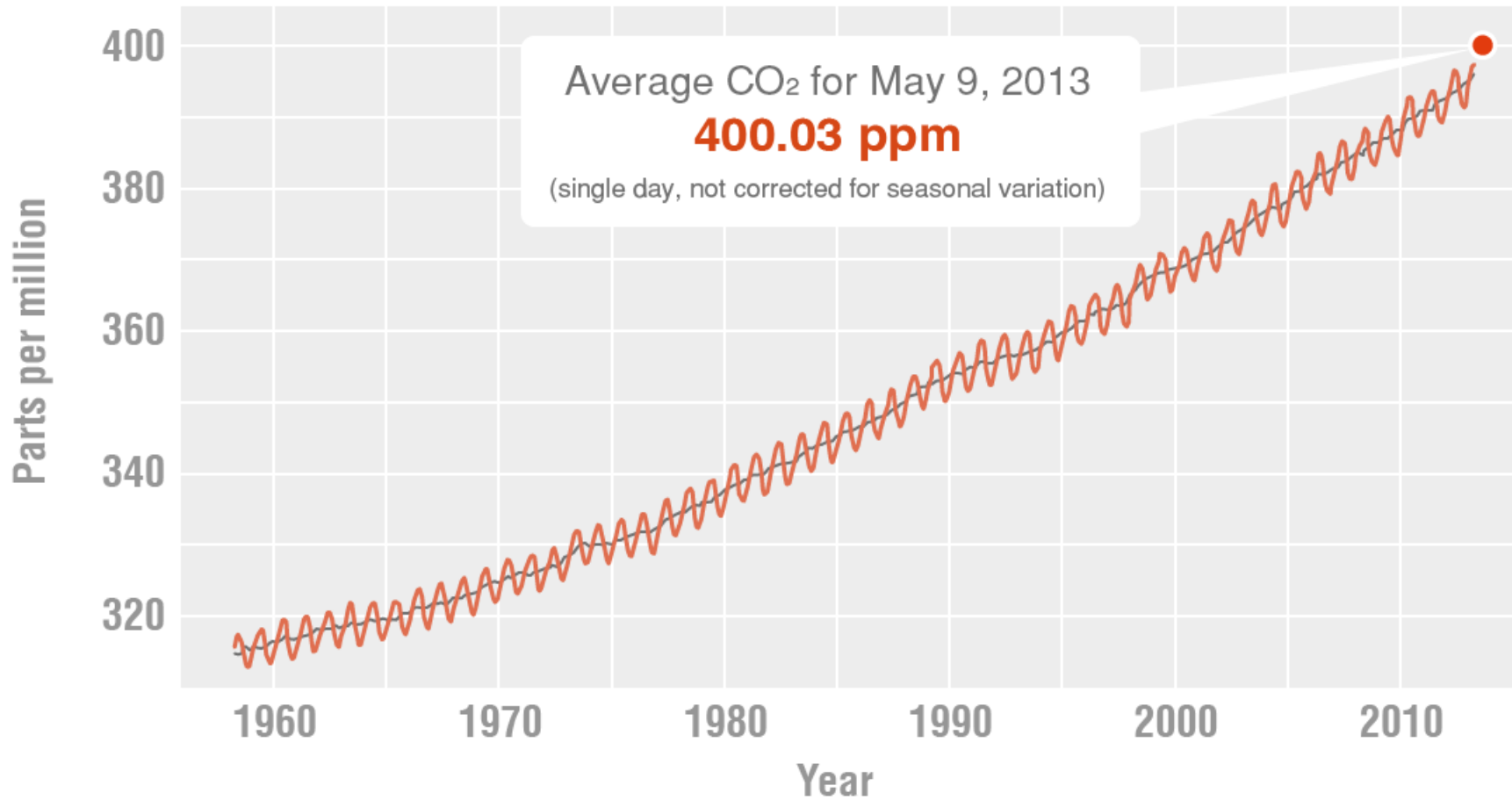
Vostok Ice Core air temperature and carbon dioxide analysis



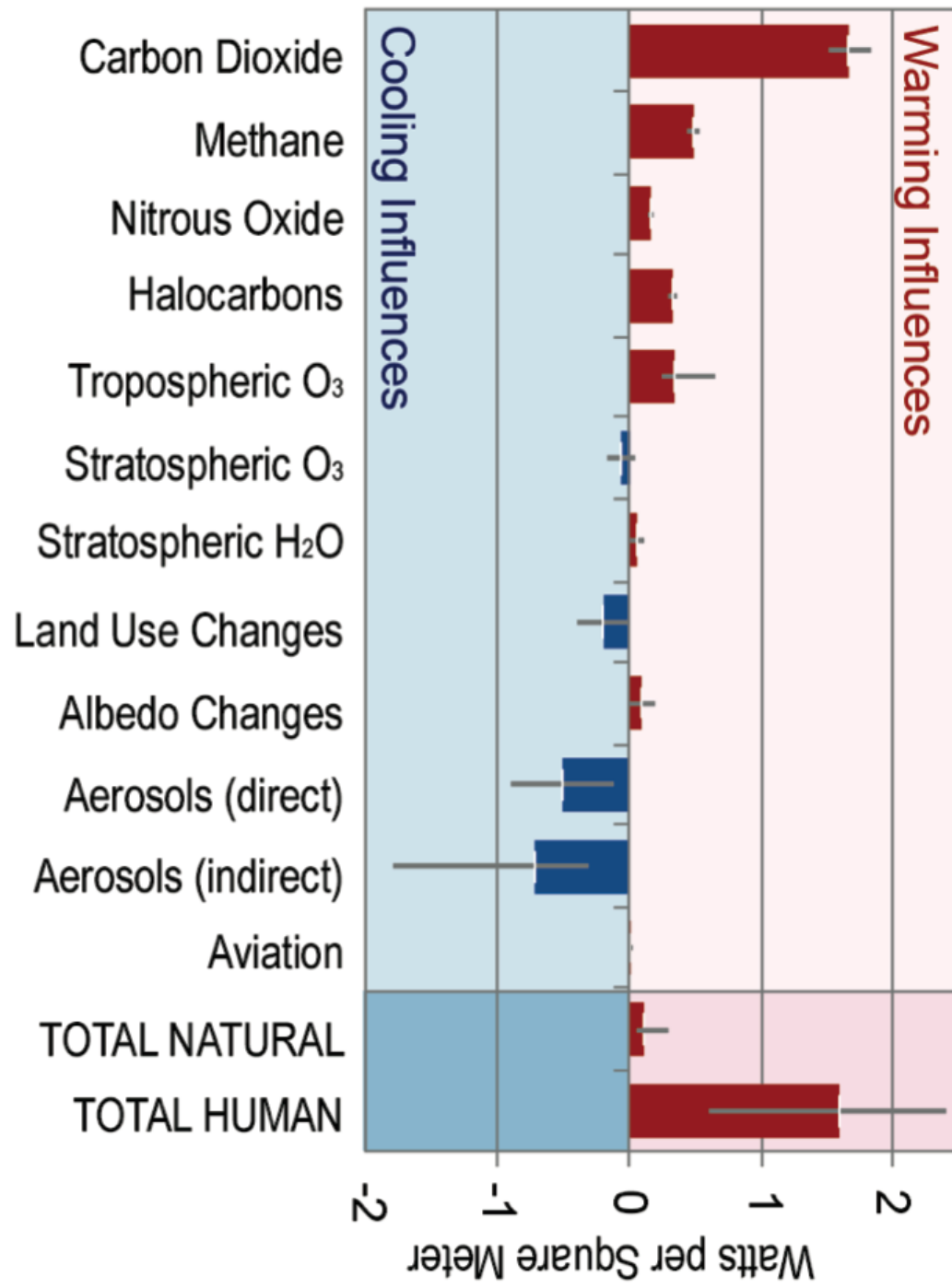
Global Temperature and Carbon Dioxide



Carbon Dioxide Concentration

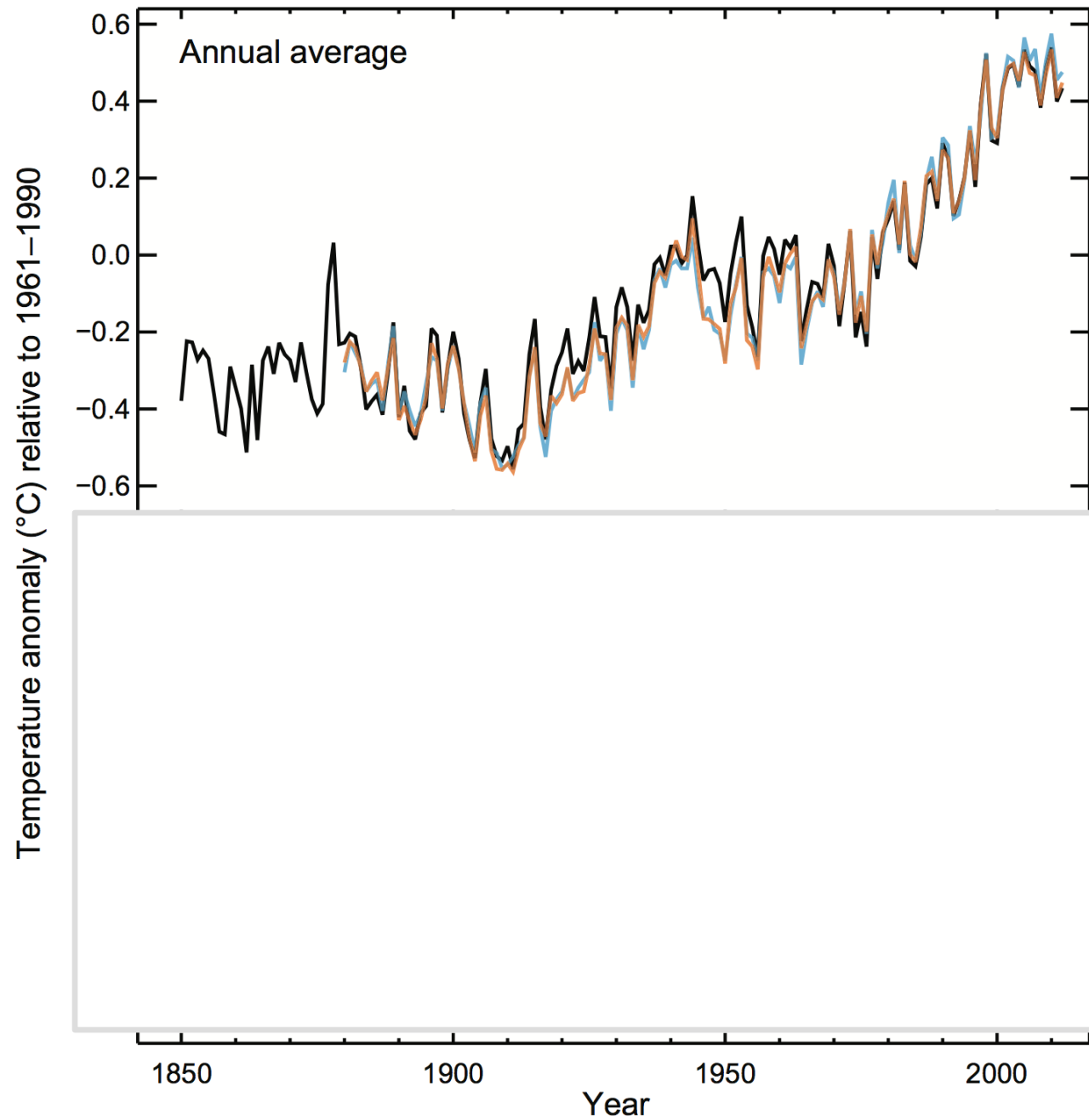


Credit: NOAA/Scripps Institution of Oceanography



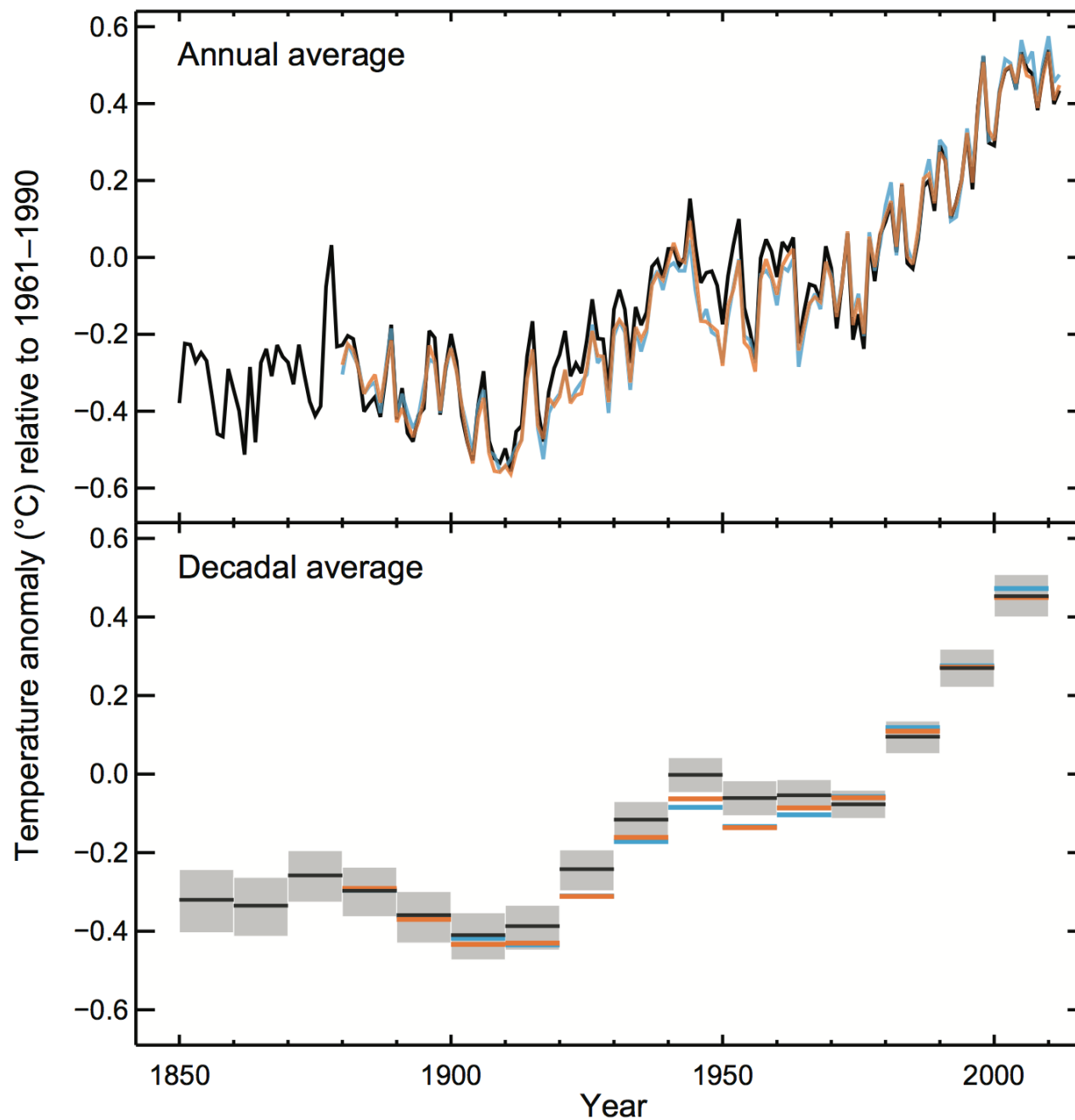
Observed globally averaged combined land and ocean
surface temperature anomaly 1850–2012

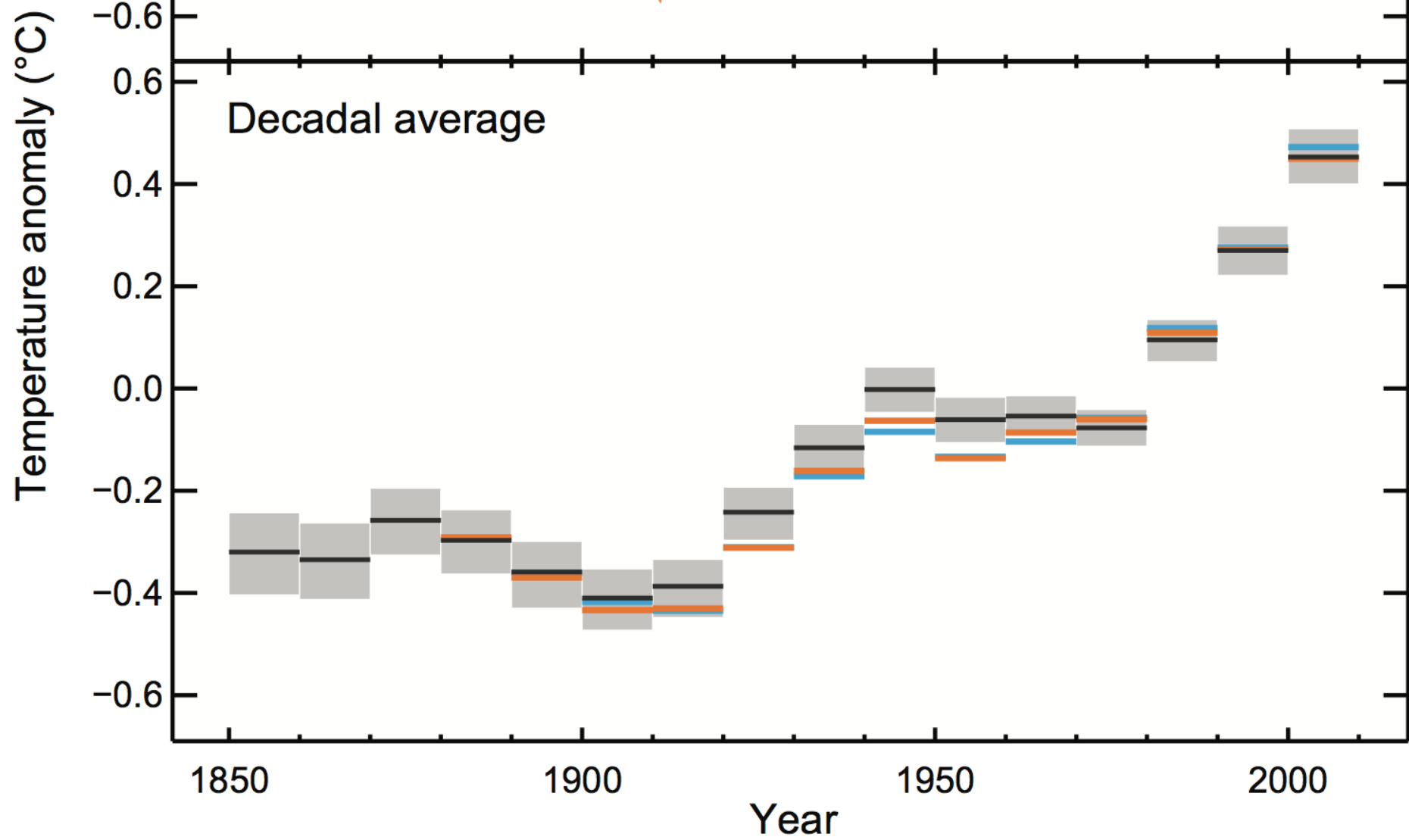
(a)



(a)

Observed globally averaged combined land and ocean
surface temperature anomaly 1850–2012





Joe Diffie

Third Rock from the Sun

<http://youtu.be/vIAa0IGXCw>

3:30

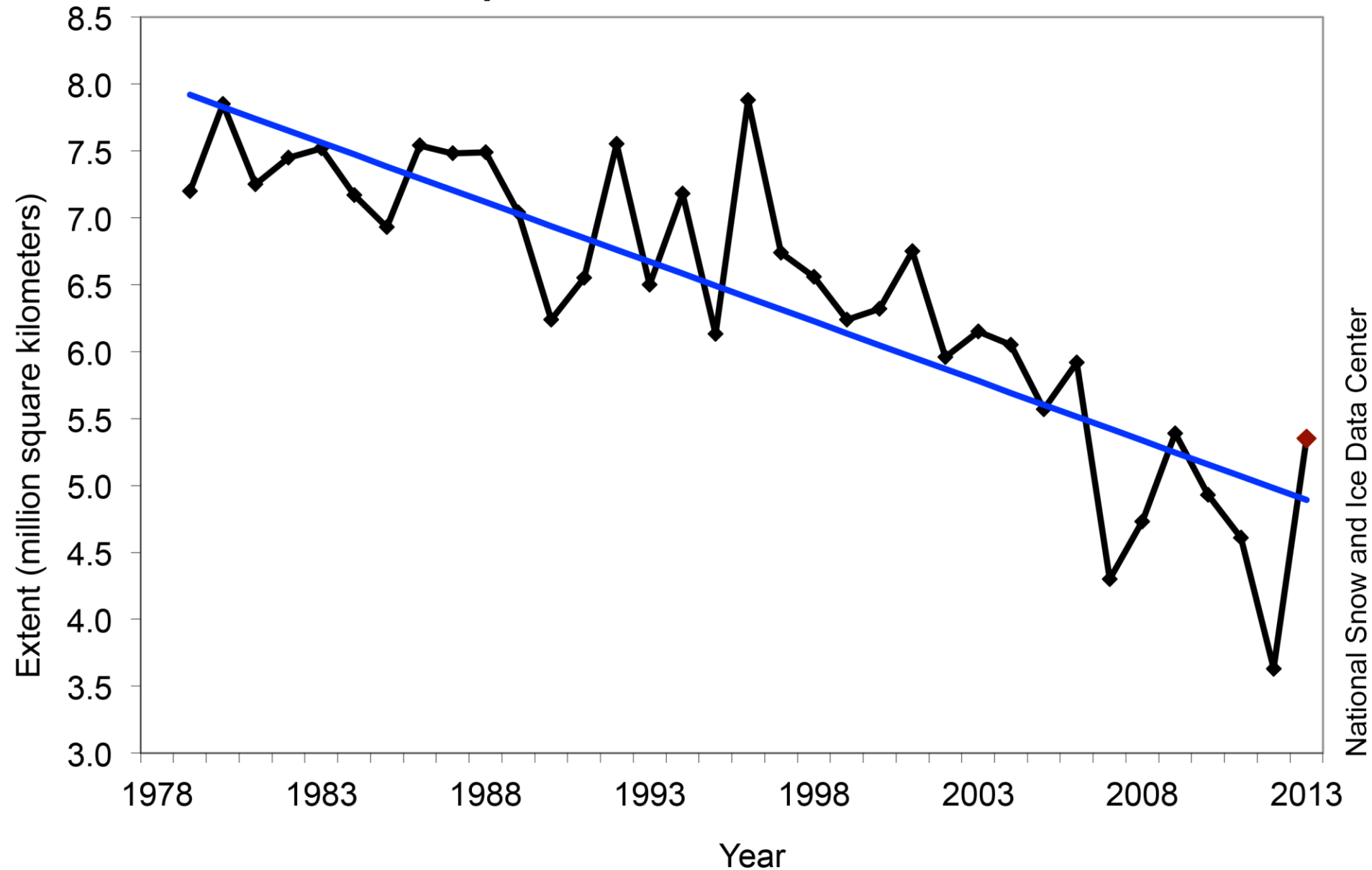
Cause and Effect

Chain of Events

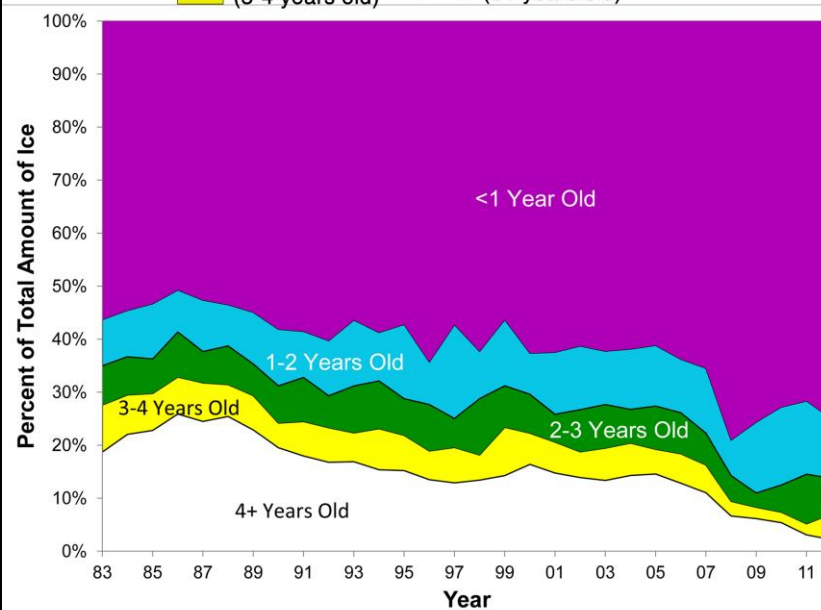
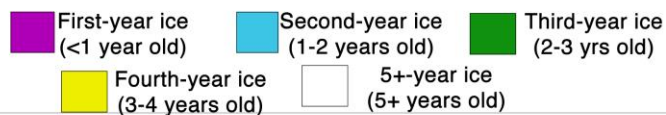
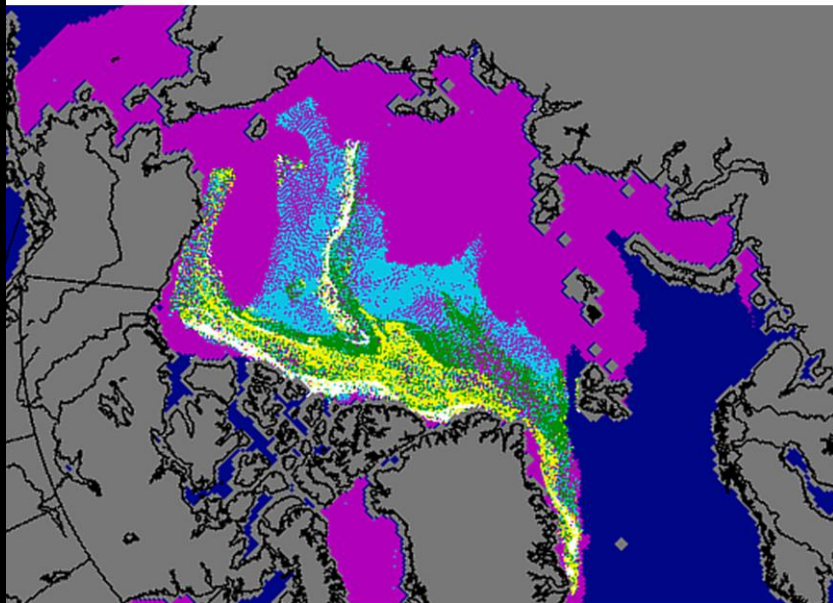
All of the Chaos
Makes Perfect Sense

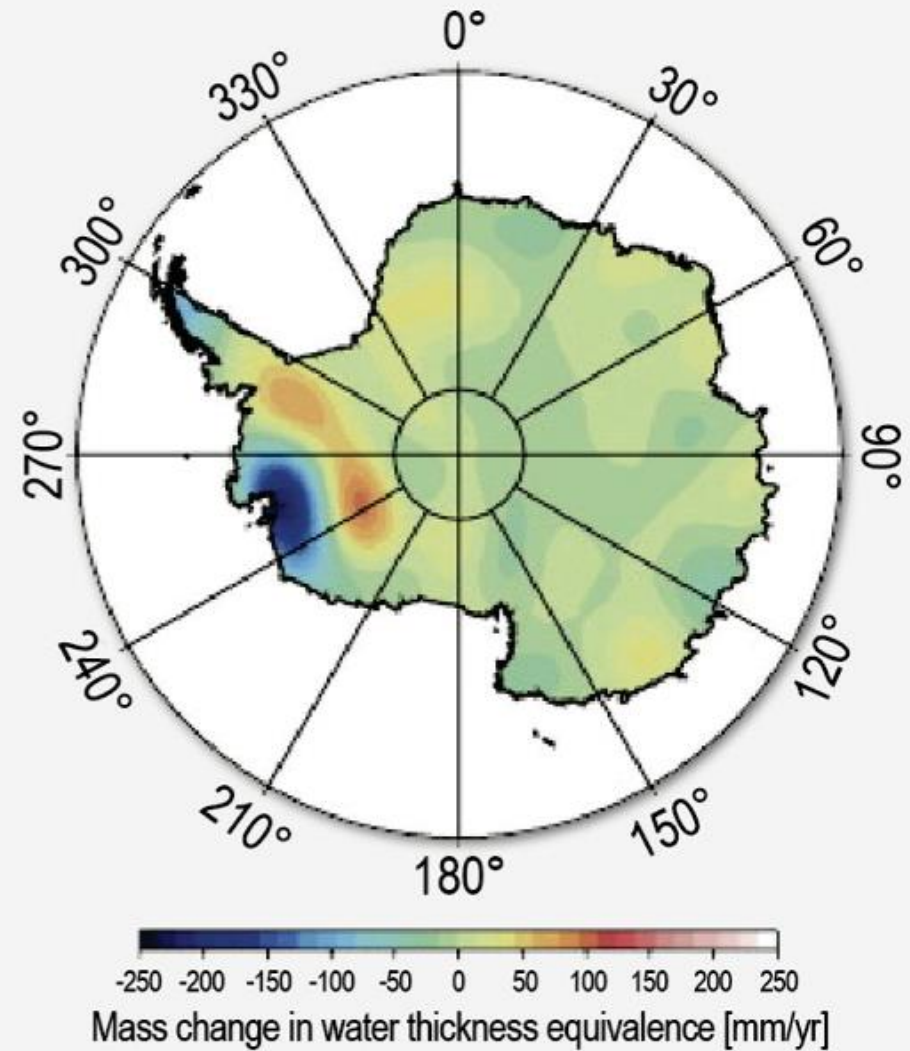
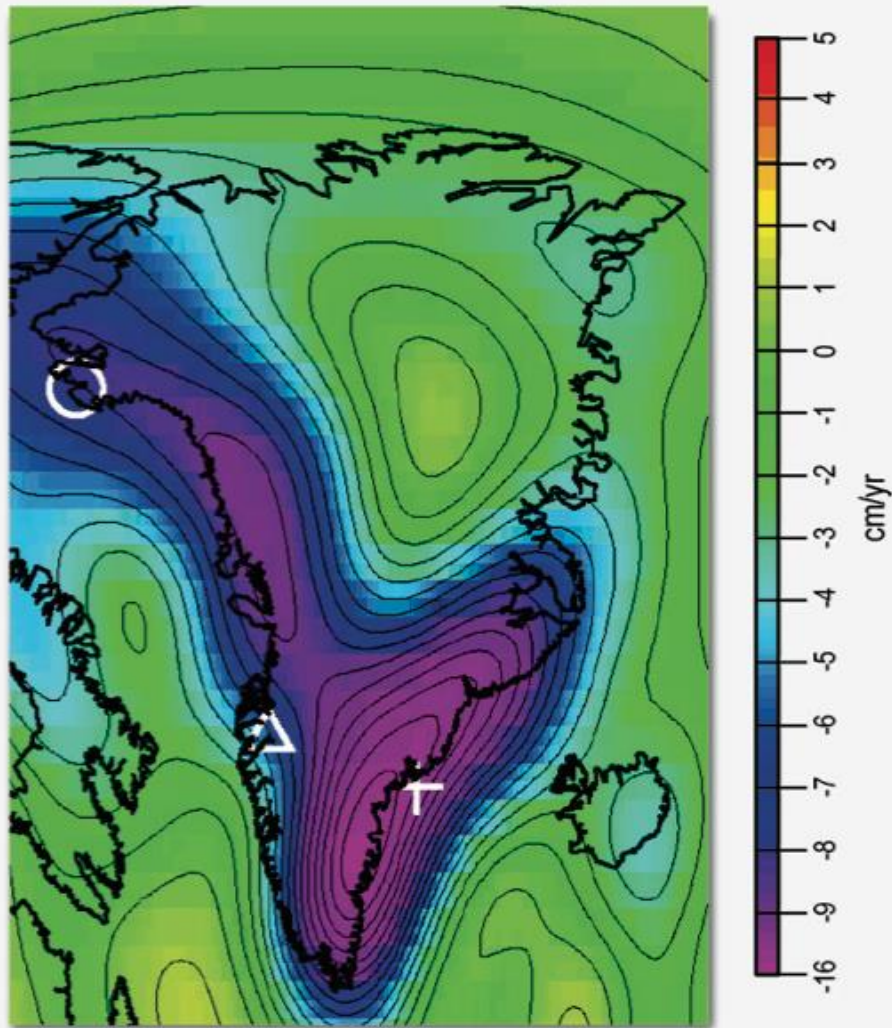


Average Monthly Arctic Sea Ice Extent September 1979 - 2013



Arctic Sea Ice Age March 2012

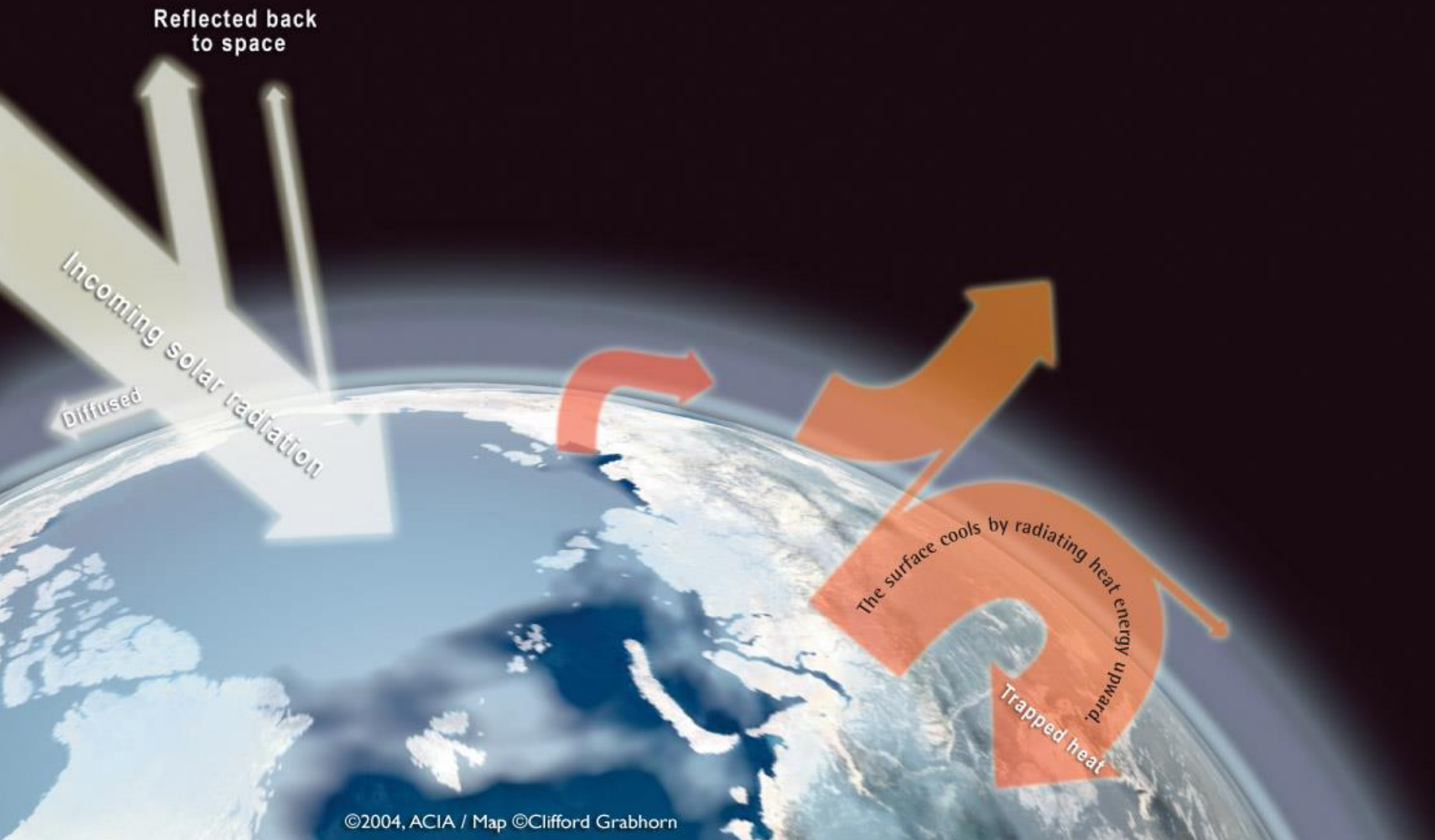




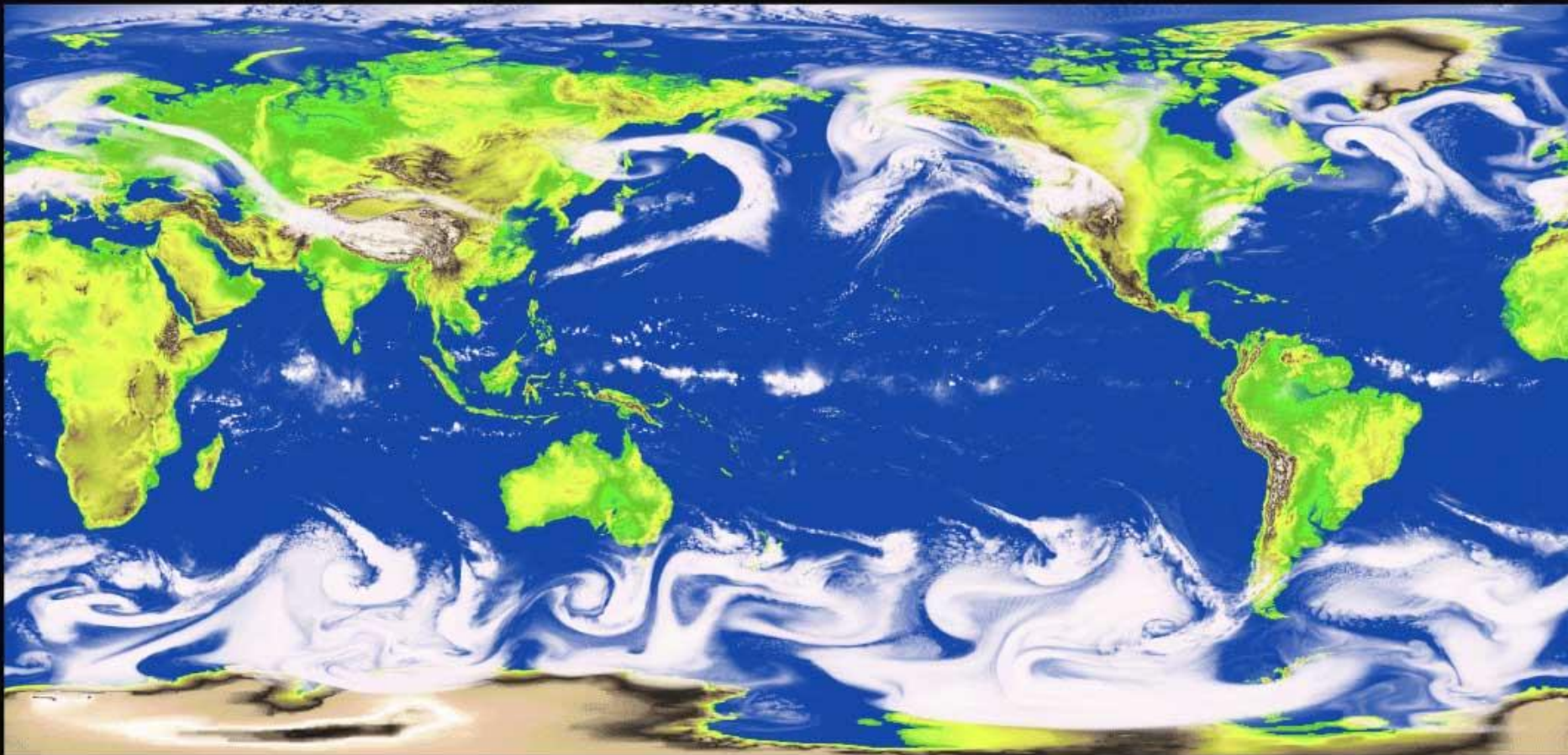
Greenland ice loss, Khan 2010

Antarctic ice loss, Chen 2009

Greenhouse Effect



Global Mesoscale Circulation Model at GFDL



Scientists at the Geophysical Fluid Dynamics Laboratory (GFDL) have recently completed Project TERRA*. Project TERRA was conceived as a 1-day simulation with the cloud-resolving nonhydrostatic ZETAC model. This model is the first Global Mesoscale Circulation Model (GMCM) run at GFDL and perhaps the first global cloud-resolving model run anywhere that uses a grid resolution of 10-12Km.

Cloud distributions are of great importance in weather and climate. The correct distribution of latent heat produced by the moist convection feeds directly into the dynamics that generate weather systems. The vertical distribution of clouds is also of paramount importance in determining the radiative characteristics of the atmosphere, which critically affect climate and climate change.

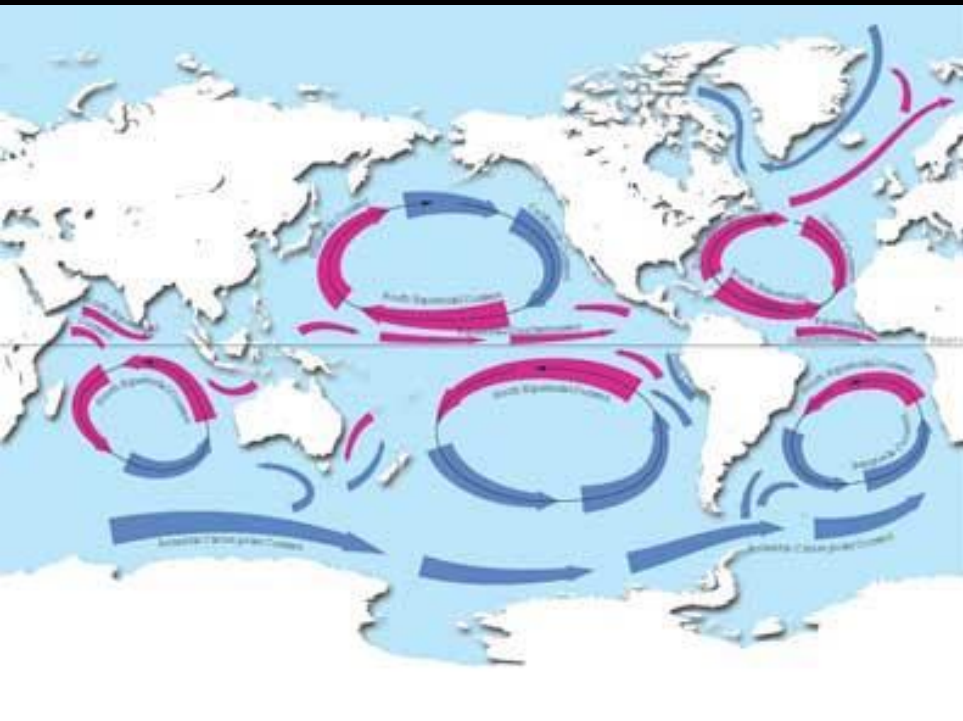
*Conceived and executed by Ildoro Orlanski and Christopher Kerr, GFDL.

U.S. Department of Commerce
National Oceanic and Atmospheric Administration
Geophysical Fluid Dynamics Laboratory
Princeton, New Jersey 08542
<http://www.gfdl.noaa.gov>

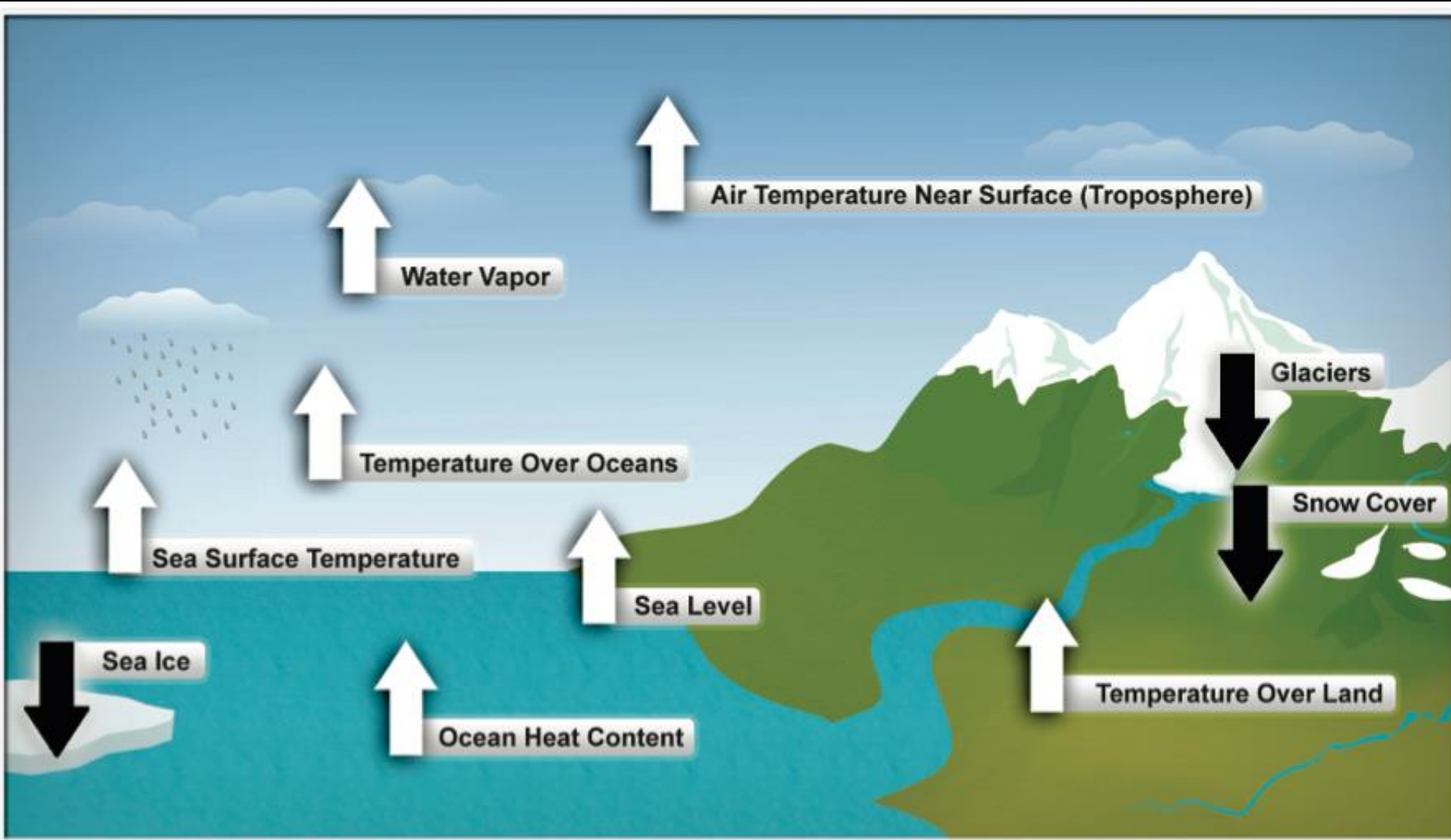




- PDO = Pacific Decadal Oscillation
- ENSO = El Nino – Southern Oscillation
- AO/NAM = Arctic Oscillation/Northern Annular Mode
- NAO = North Atlantic Oscillation
- AMO = Atlantic Multi-Decadal Oscillation
- IOD = Indian Ocean Dipole
- SAM = Southern Annular Mode



Key Climate Indicators





GLOBAL CLIMATE CHANGE

Vital Signs of the Planet

Key Indicators

Evidence

Causes

Effects

Consensus

NASA's Role

Key Websites

CLIMATE RESOURCES

INTERACTIVES

IMAGES AND VIDEO

CLIMATE KIDS

ENERGY INNOVATIONS

SUBSCRIBE TO NEWSLETTER

FOR EDUCATORS

FOR METEOROLOGISTS

GO

KEY INDICATORS

CARBON DIOXIDE | GLOBAL TEMPERATURE | ARCTIC SEA ICE | LAND ICE | SEA LEVEL

3.9k

1,885

165

81

 Recommend

 Tweet

 +1

 reddit

 Share

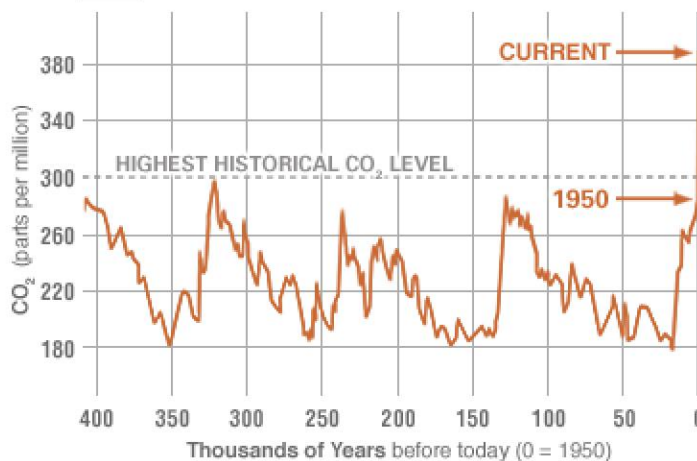
Carbon Dioxide Concentration

[DOWNLOAD DATA](#)

PROXY (INDIRECT) MEASUREMENTS

Data source: Reconstruction from ice cores.

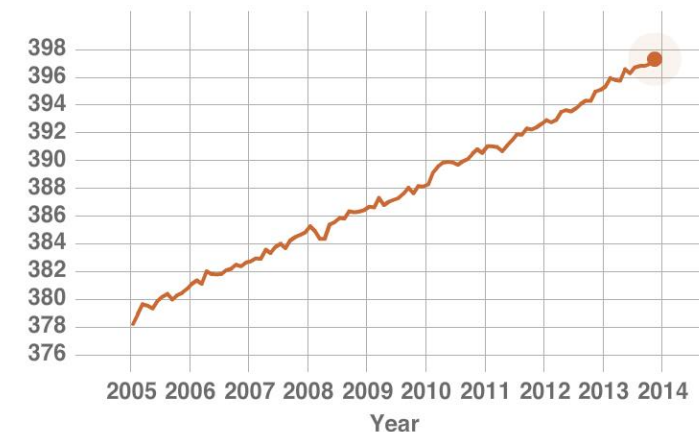
Credit: [NOAA](#)



DIRECT MEASUREMENTS: 2005-PRESENT

Data source: Monthly measurements (corrected for average seasonal cycle).

Credit: [NOAA](#)





ipcc

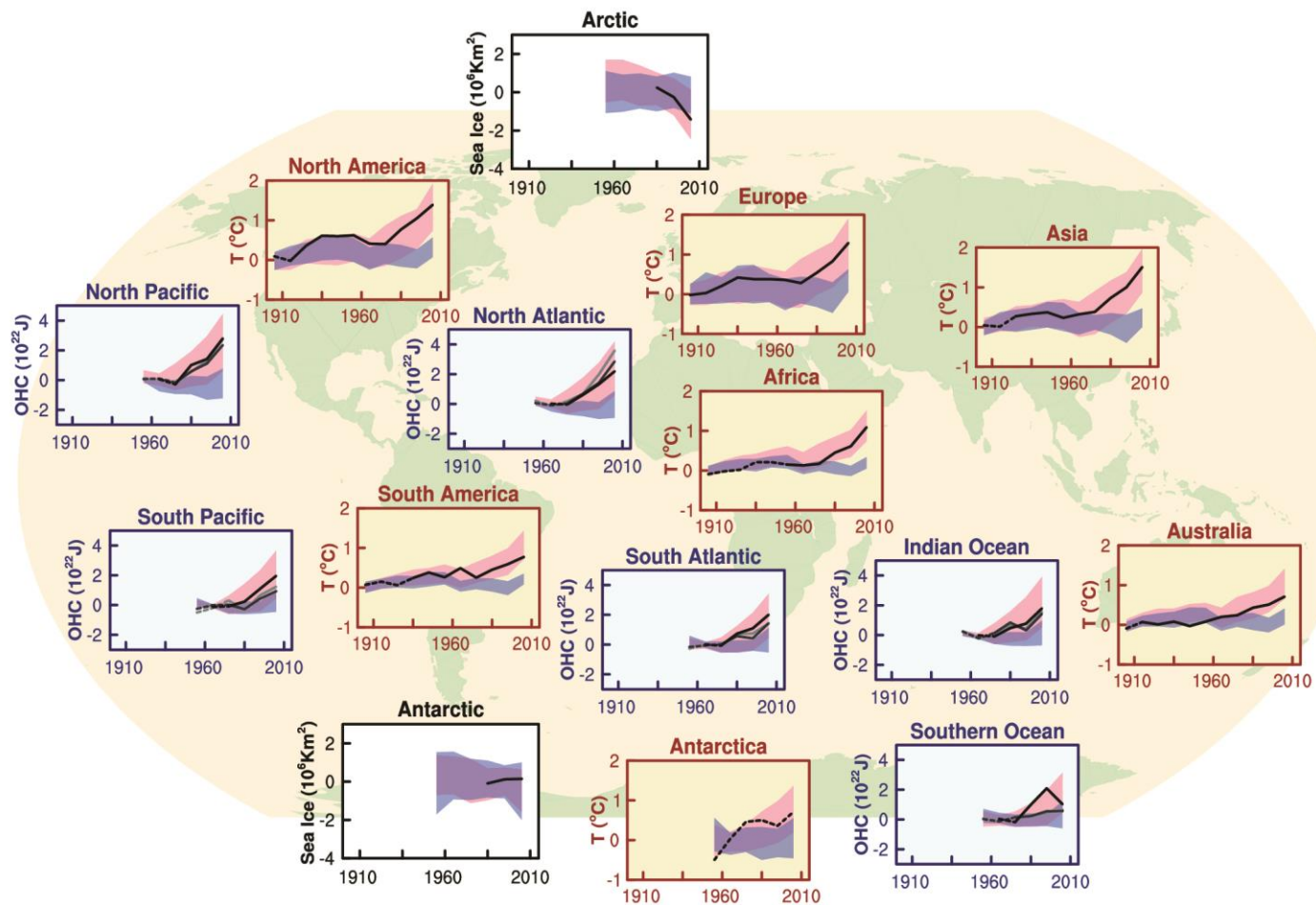
INTERGOVERNMENTAL PANEL ON climate change

CLIMATE CHANGE 2013

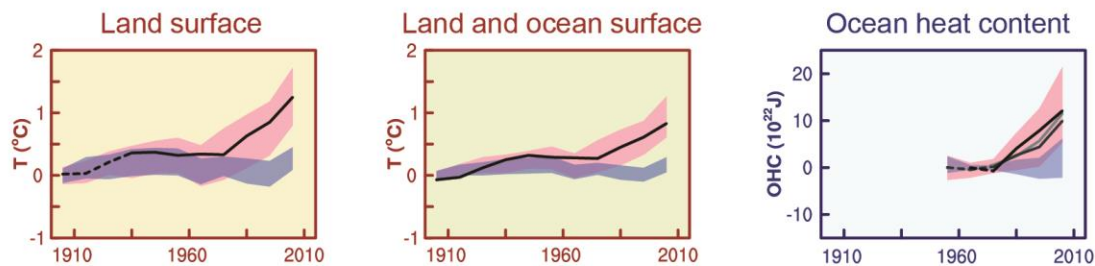
The Physical Science Basis

Summary for Policymakers

5th Assessment



Global averages



≡ Observations

Models using only natural forcings

Models using both natural and anthropogenic forcings

WHAT WE DO

[Study Climate & Global Change](#)[Prepare The Nation For Change](#)[ASSESS THE U.S. CLIMATE](#)[Overview](#)[Background & Process](#)[Opportunities for Engagement](#)[Draft Report Information](#)[Previous Assessments](#)[NCA & Development Advisory Committee](#)[Production Team](#)[Indicators System](#)[Coastal Resilience Resources](#)[Make Our Science Accessible](#)[Link Climate Change & Health](#)[Provide Data and Tools](#)[Coordinate Internationally](#)

Assess the U.S. Climate



What are assessments?

Assessments are essential tools for linking science and decision making. They survey, integrate, and synthesize science, within and between scientific disciplines and across sectors and regions.

Why do we need assessments?

Assessments support the critical analysis of issues, highlighting key knowledge that can improve policy choices and identifying significant gaps that can limit effective decision making. Assessment activities also track progress by identifying changes in the condition of the integrated Earth system over time, advances in the underlying science, and changes in human response.

What is the National Climate Assessment (NCA)?

Assessments have been integral components of USGCRP since its inception. Along with its strategic role as coordinator of Federal global change research, USGCRP is required by the Global Change Research Act of 1990 to conduct a National Climate Assessment (NCA). The NCA is an important resource for understanding and communicating climate change science and impacts in the United States. The Assessment:

- Informs the nation about already observed changes, the current status of the climate, and anticipated trends for the future
- Integrates scientific information from multiple sources and sectors to highlight key findings and significant gaps in our knowledge
- Establishes consistent methods for evaluating climate impacts in the U.S. in the context of broader global change
- Provides input to Federal science priorities and are used by U.S. citizens, communities, and businesses as they create more sustainable and environmentally sound plans for the nation's future.

When will the next National Climate Assessment be completed?

The next National Climate Assessment is scheduled to be completed in early 2014. Information about the current assessment can be found on this site by following the links below and in the sidebar.

The [National Climate Assessment and Development Advisory Committee \(NCADAC\)](#) has overseen the development of the draft Third National Climate Assessment report, engaging over 240 authors in its creation. [Access the draft report here.](#)

FEDERAL ADVISORY COMMITTEE DRAFT CLIMATE ASSESSMENT

The public review period is now closed; over 4,000 public comments were received and are being addressed by the authors. The National Academy review is complete and can be read [here](#). The public review draft remains available below while the report is revised by the author teams. Thank you for your interest in the National Climate Assessment.

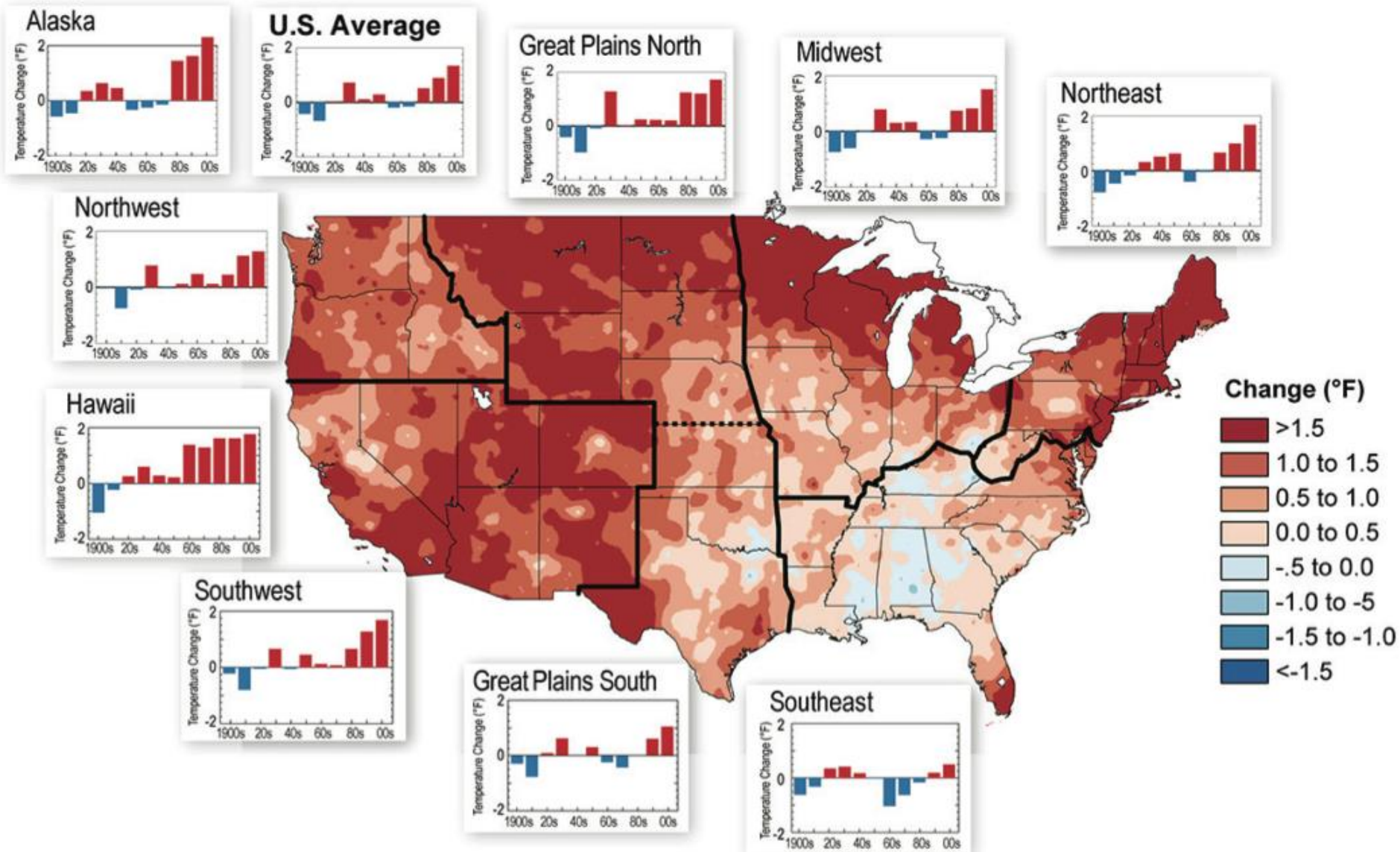
A 60-person Federal Advisory Committee (The "National Climate Assessment and Development Advisory Committee" or NCADAC) has overseen the development of this draft climate report.

The NCADAC, [whose members are available here](#) (and in the report), was established under the Department of Commerce in December 2010 and is supported through the National Oceanic and Atmospheric Administration (NOAA). It is a federal advisory committee established as per the Federal Advisory Committee Act of 1972. The Committee serves to oversee the activities of the National Climate Assessment. Its members are diverse in background, expertise, geography and sector of employment. A formal record of the committee can be found at the [NOAA NCADAC website](#).

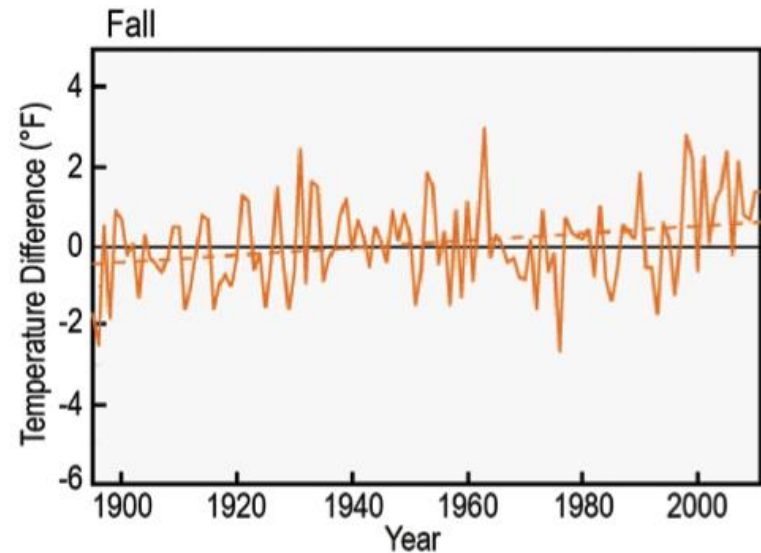
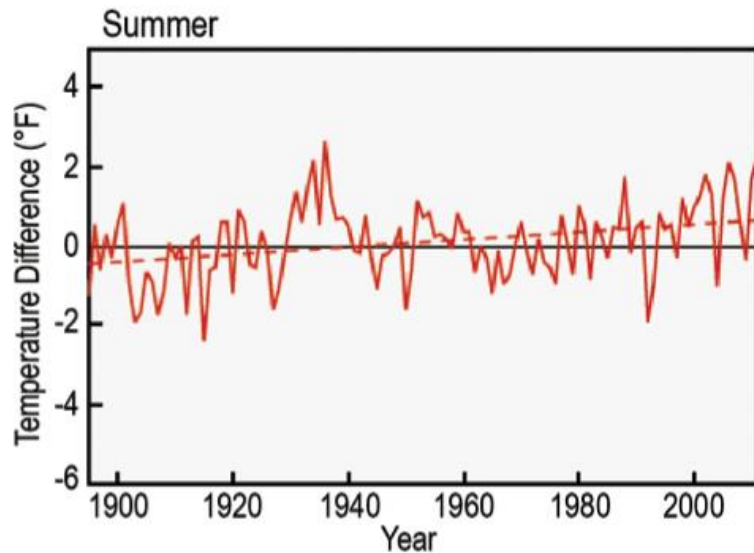
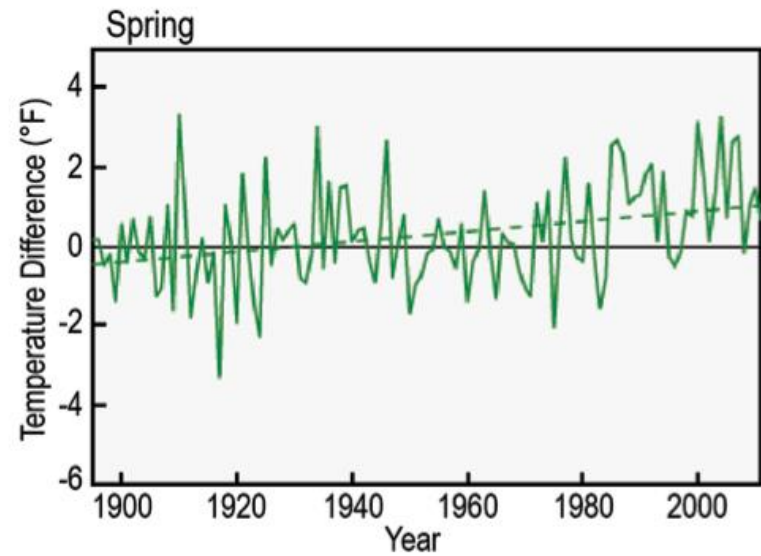
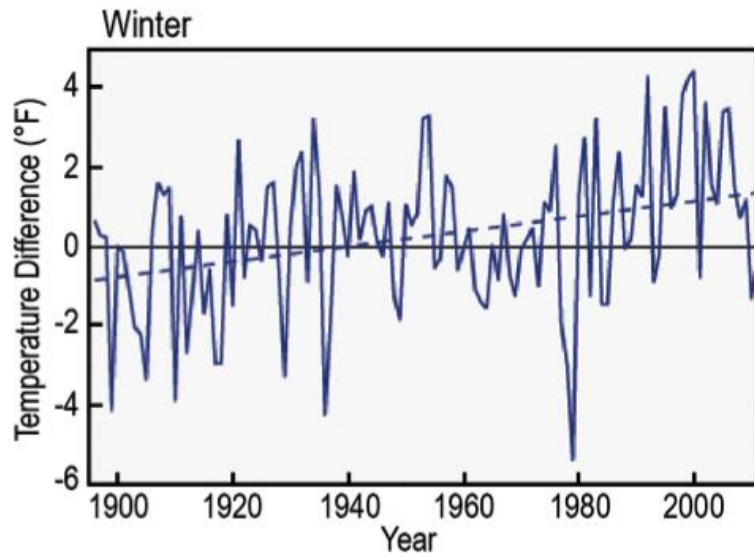
The NCADAC has engaged more than 240 authors in the creation of the report. The authors are acknowledged at the beginning of the chapters they co-authored.

Following extensive review by the National Academies of Sciences and by the public, this report will be revised by the NCADAC and, after additional review, will then be submitted to the Federal Government for consideration in the Third National Climate Assessment (NCA) Report. For more information on the NCA process and background, previous assessments and other NCA information, please [explore the NCA web-pages](#). The NCA is being conducted under the auspices of the Global Change Research Act of 1990 and is being organized and administered by the [Global Change Research Program](#).

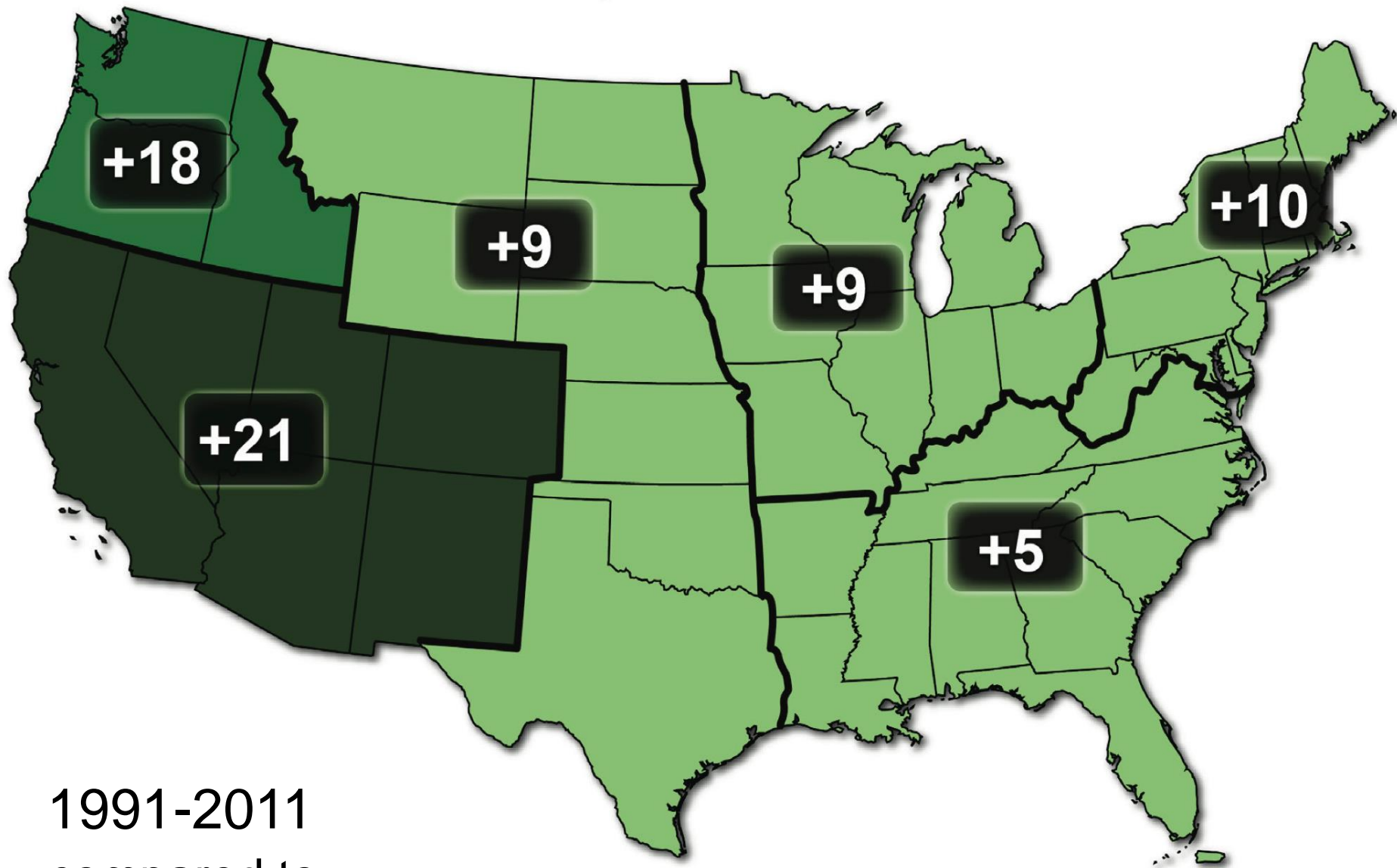
Temp 1991-2011 vs 1901-1960



Seasonal Temp - 1895-2010

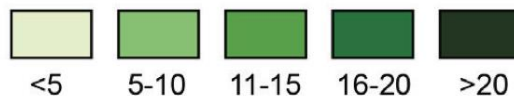


Observed Changes in Frost-Free Season

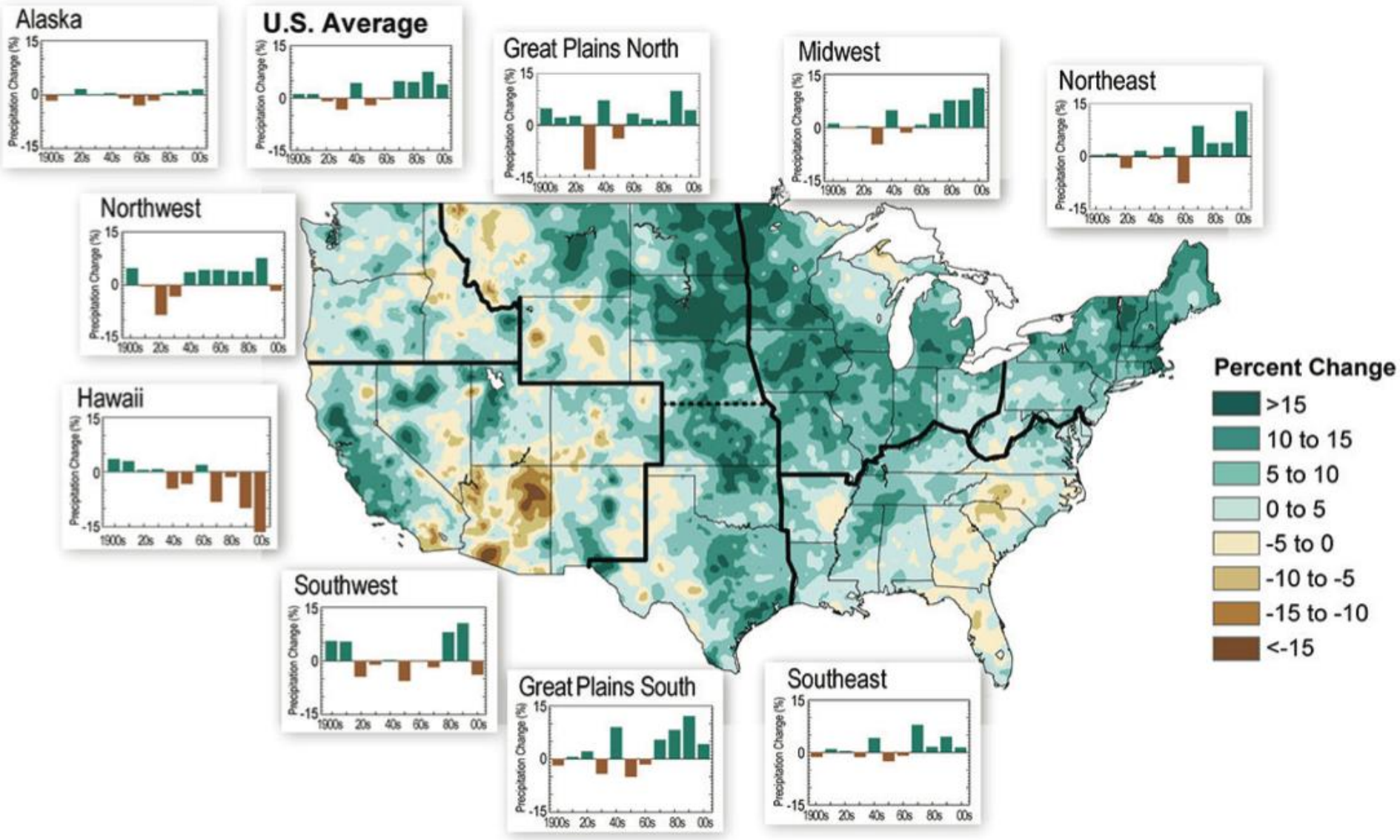


1991-2011
compared to
1901-1960

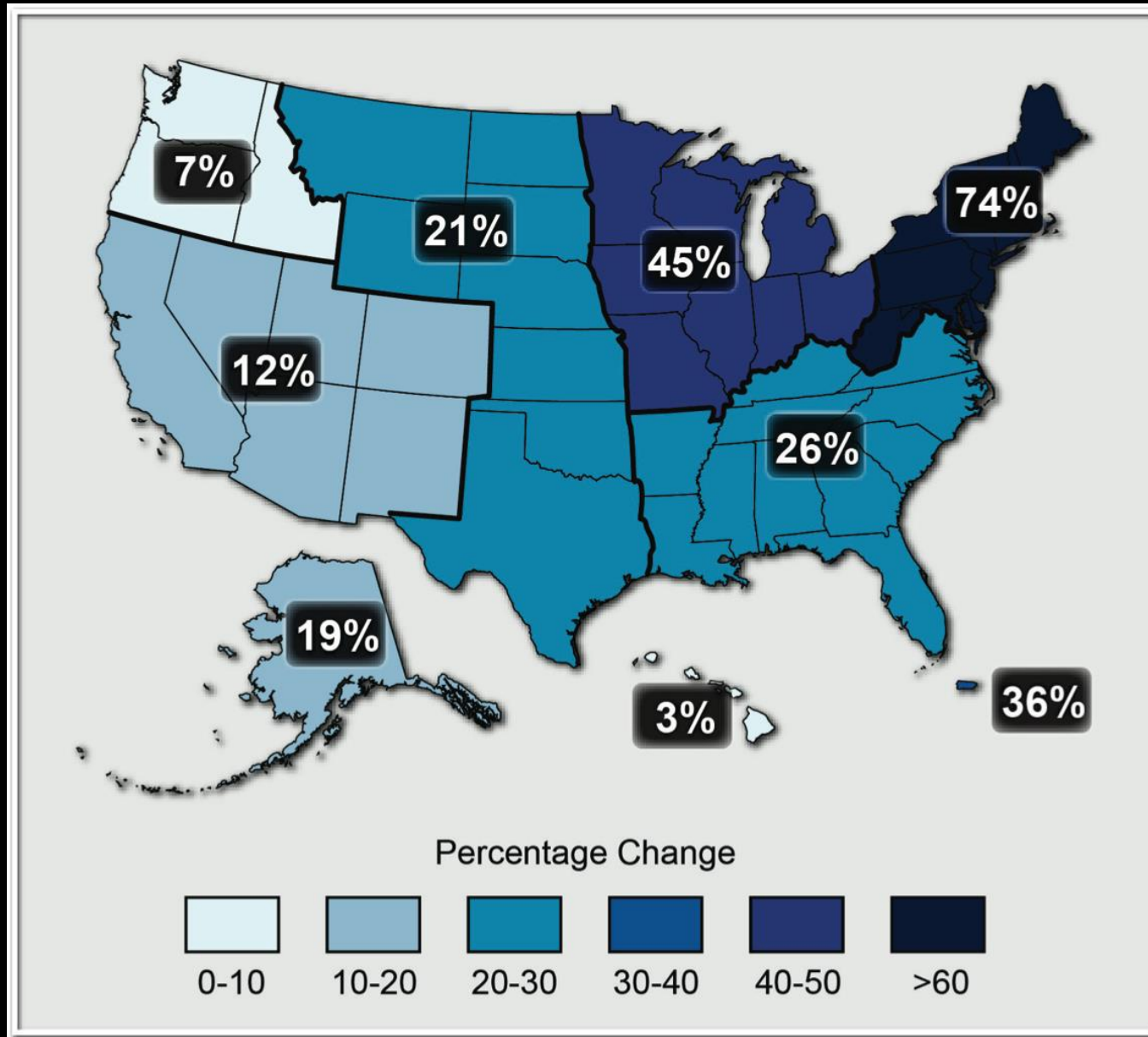
Increases in Annual Number of Days



Precip 1991-2011 vs 1901-1960



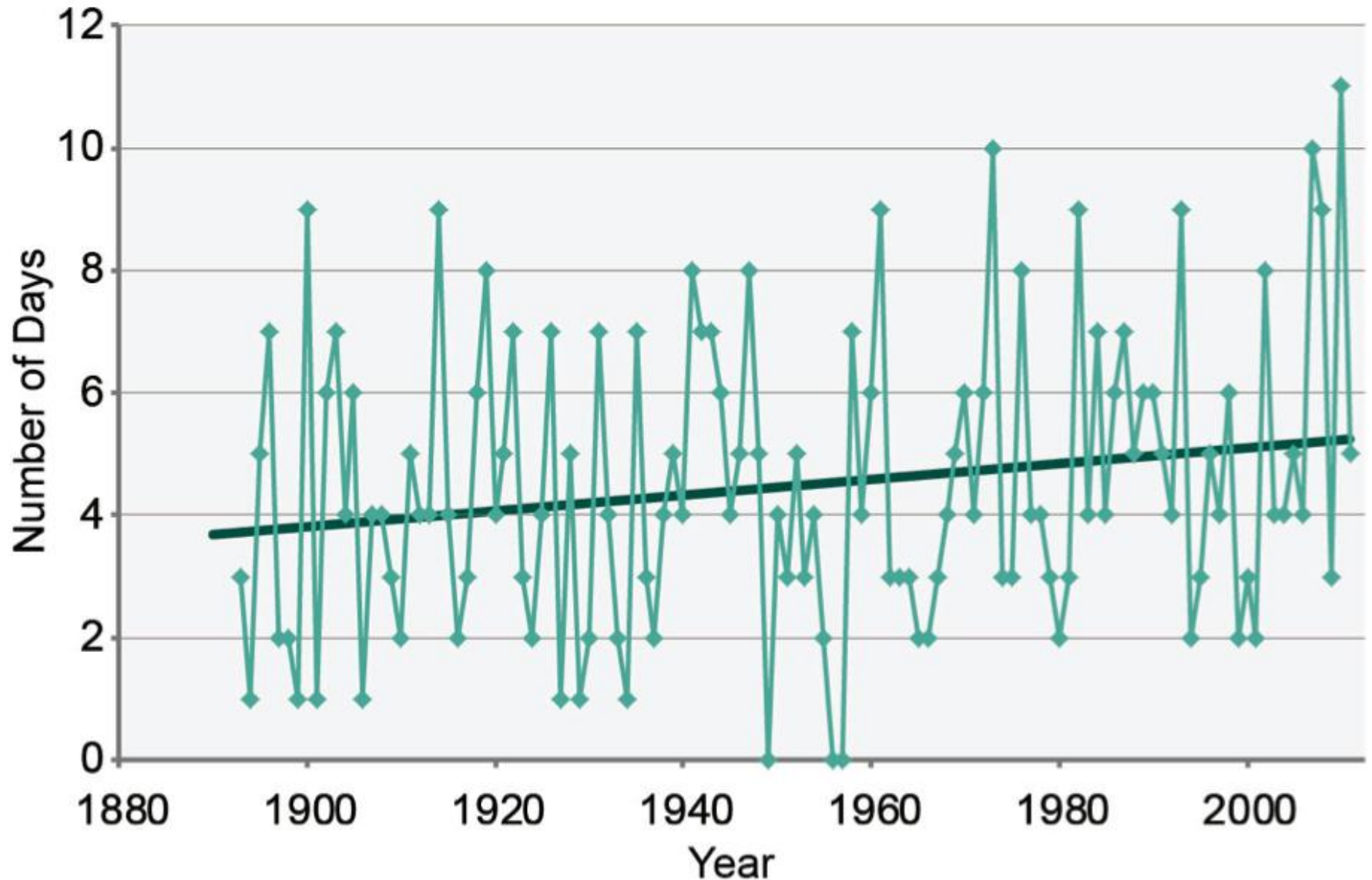
Heavy Rain Events 1958 to 2011



Amount of
rain in top
1% of all
rain events

More rain in
heavy
events,
but fewer
events

Iowa - # Rain days 1.25" or more





Shift Happens

January 23, 2014
2014 OCES Conference



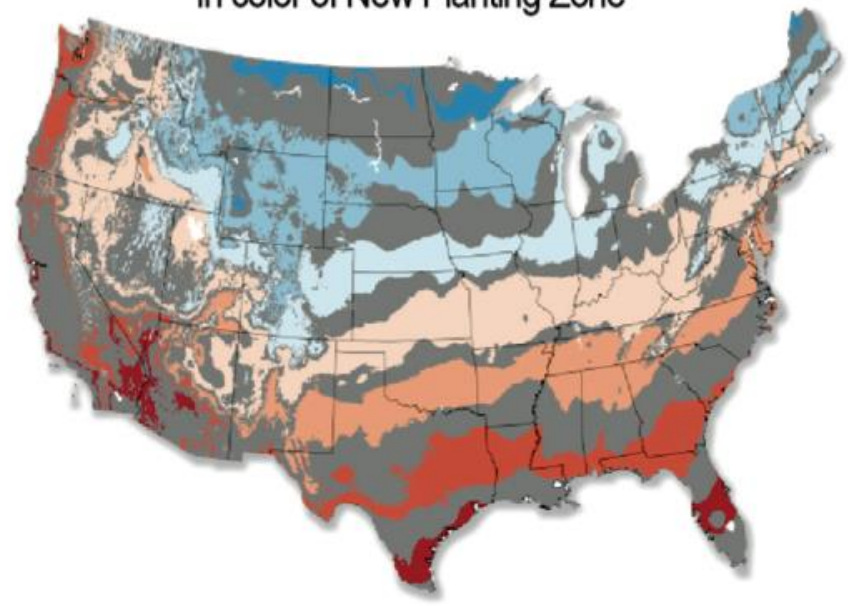
Mesonet
Oklahoma's Weather Network

Plant Hardiness Zone Shift

Zone Changes in Past 10 Years
In color of New Planting Zone



Zone Changes in Next 30 Years
In color of New Planting Zone



Average Annual Minimum Temperature by Climate-Related Planting Zone



Arctic tundra shift – sedges to alder





Willow and Alder - near Lake Selawik, Alaska



Willow and Alder - Near Lake Selawik, Alaska



Mountain Pine Beetle crossed Colorado Continental Divide in 2009

Biological Shift

- Mountain Pine Beetle at higher elevations and attacking new species
- Bird overwintering locations have shifted north (107 species of 305 since 1966)
- Ornamental species shift north
- Loss of bentgrass greens in southern Oklahoma

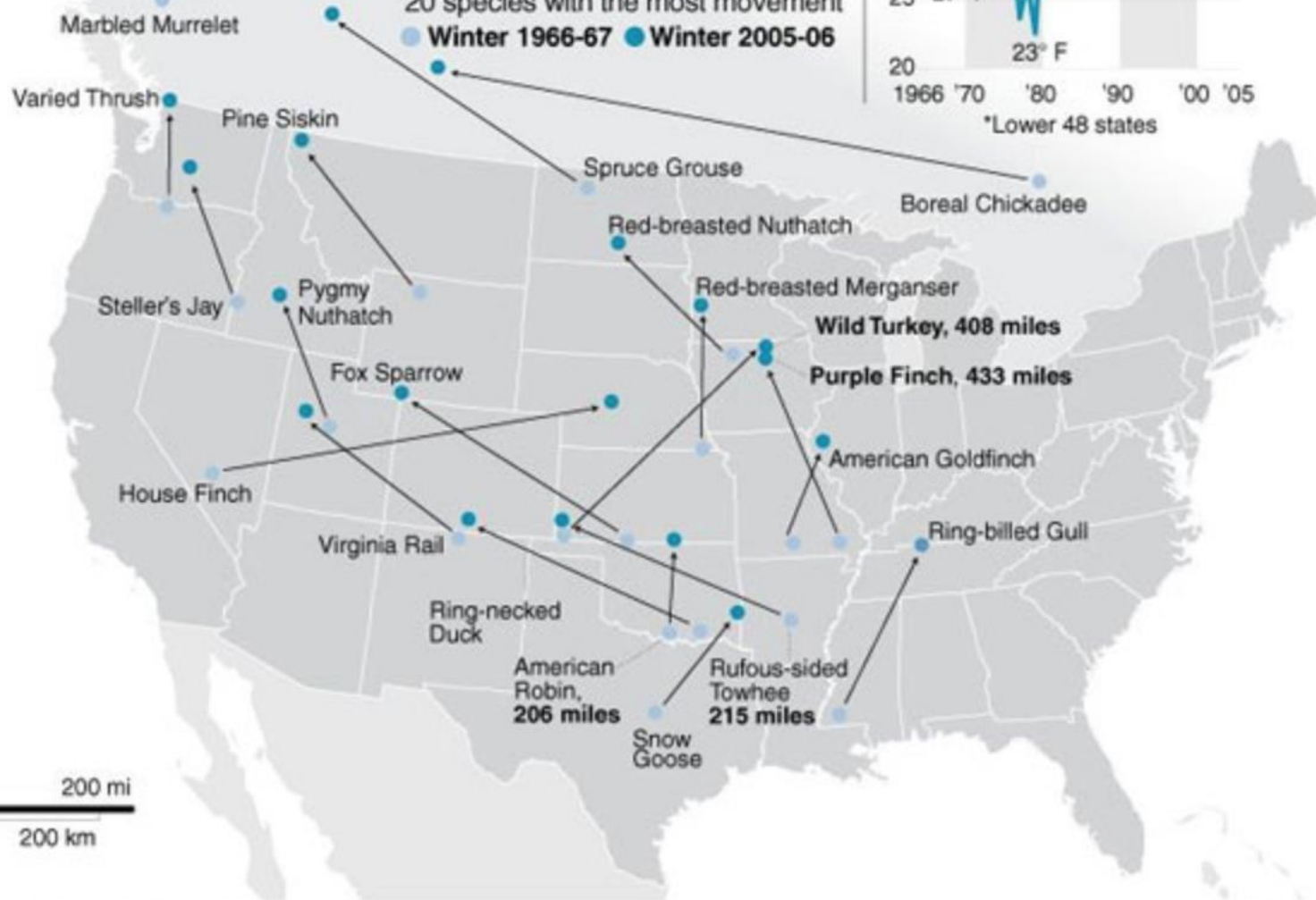
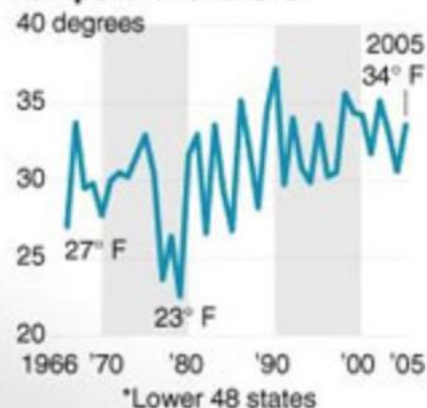
Spending winter farther north

As the temperature across the U.S. has gotten warmer from 1966 to 2005, many bird species are spending their winters farther north.

**Change in winter destination,
20 species with the most movement**

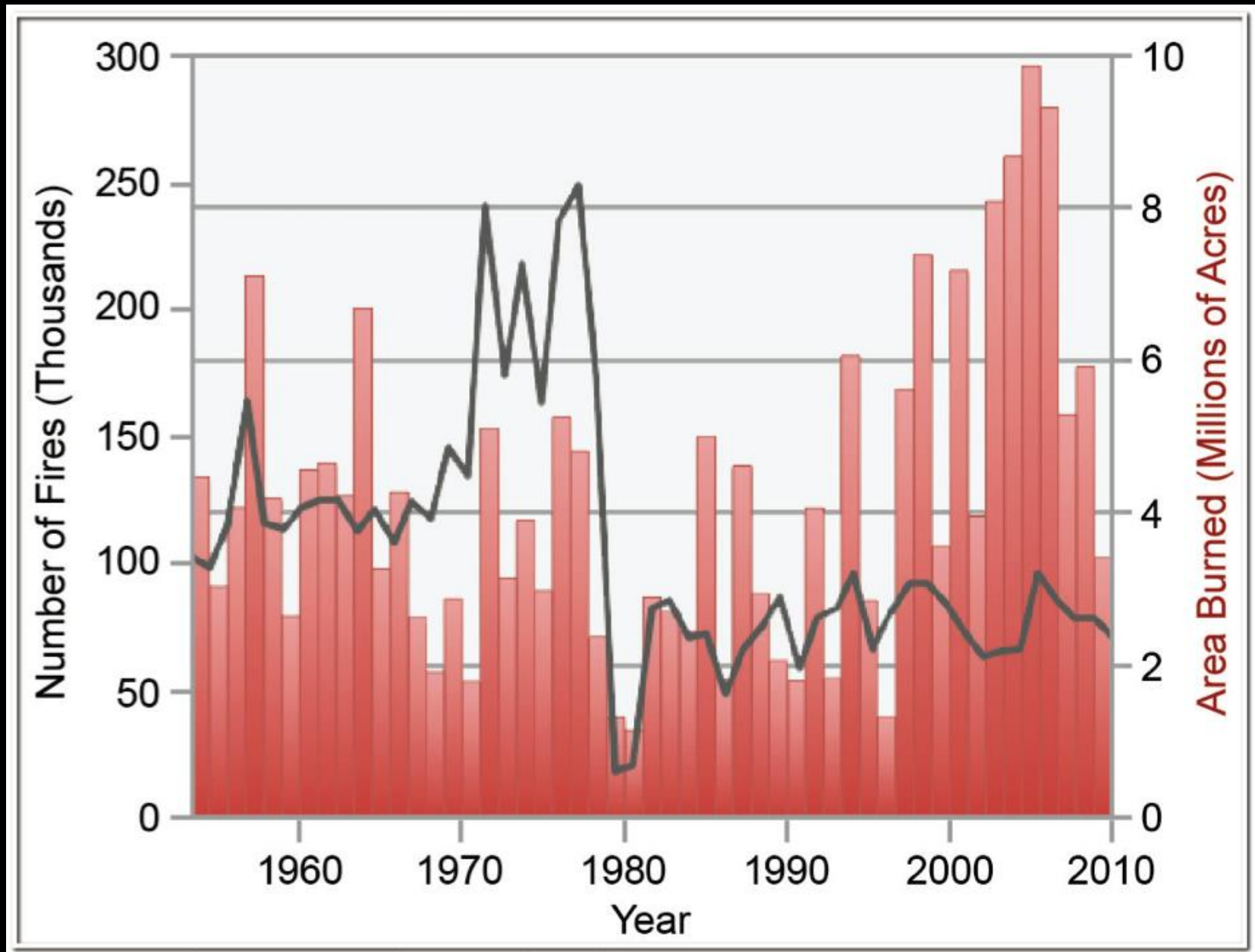
● Winter 1966-67 ● Winter 2005-06

**Average January
temperature in U.S.***

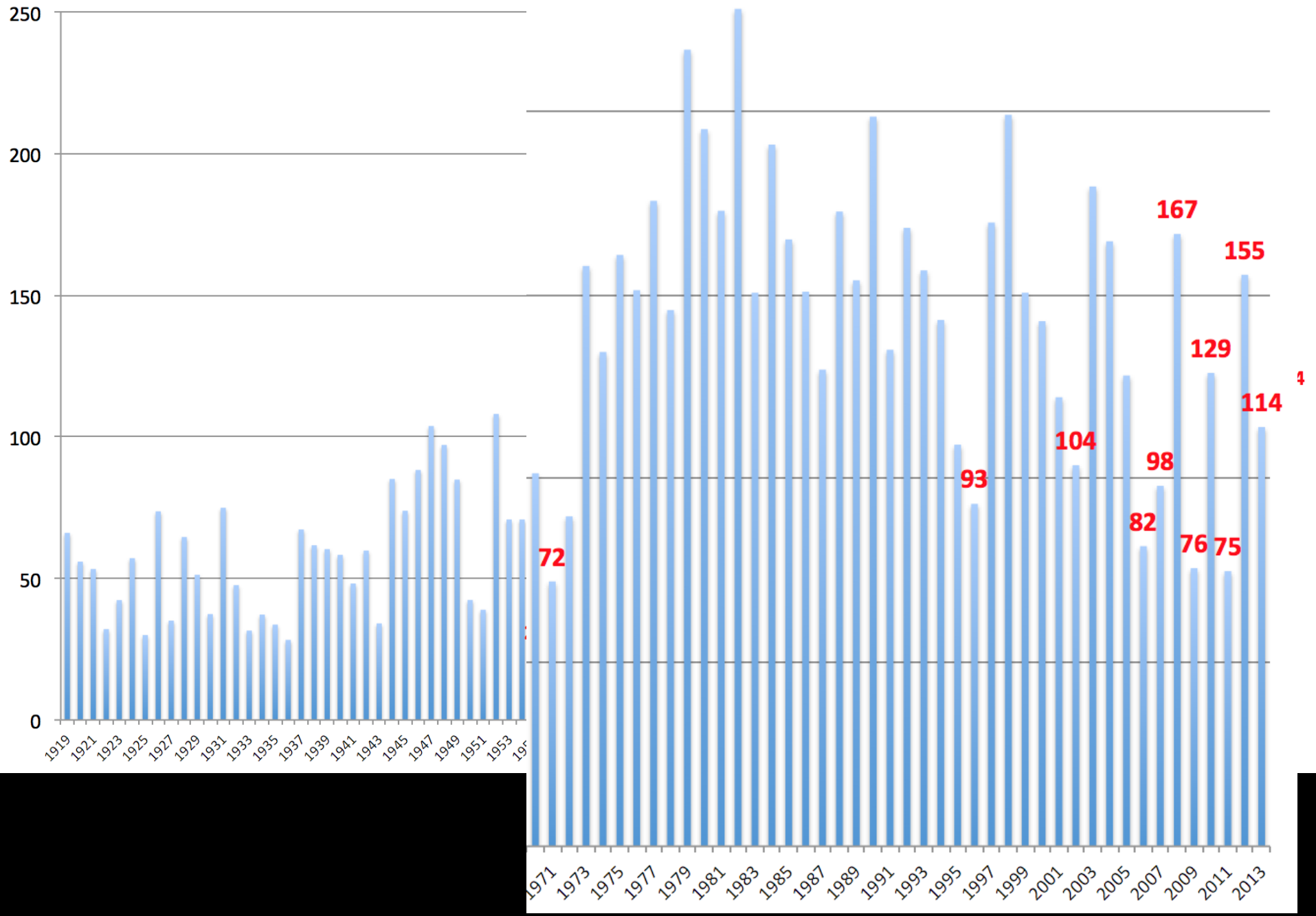


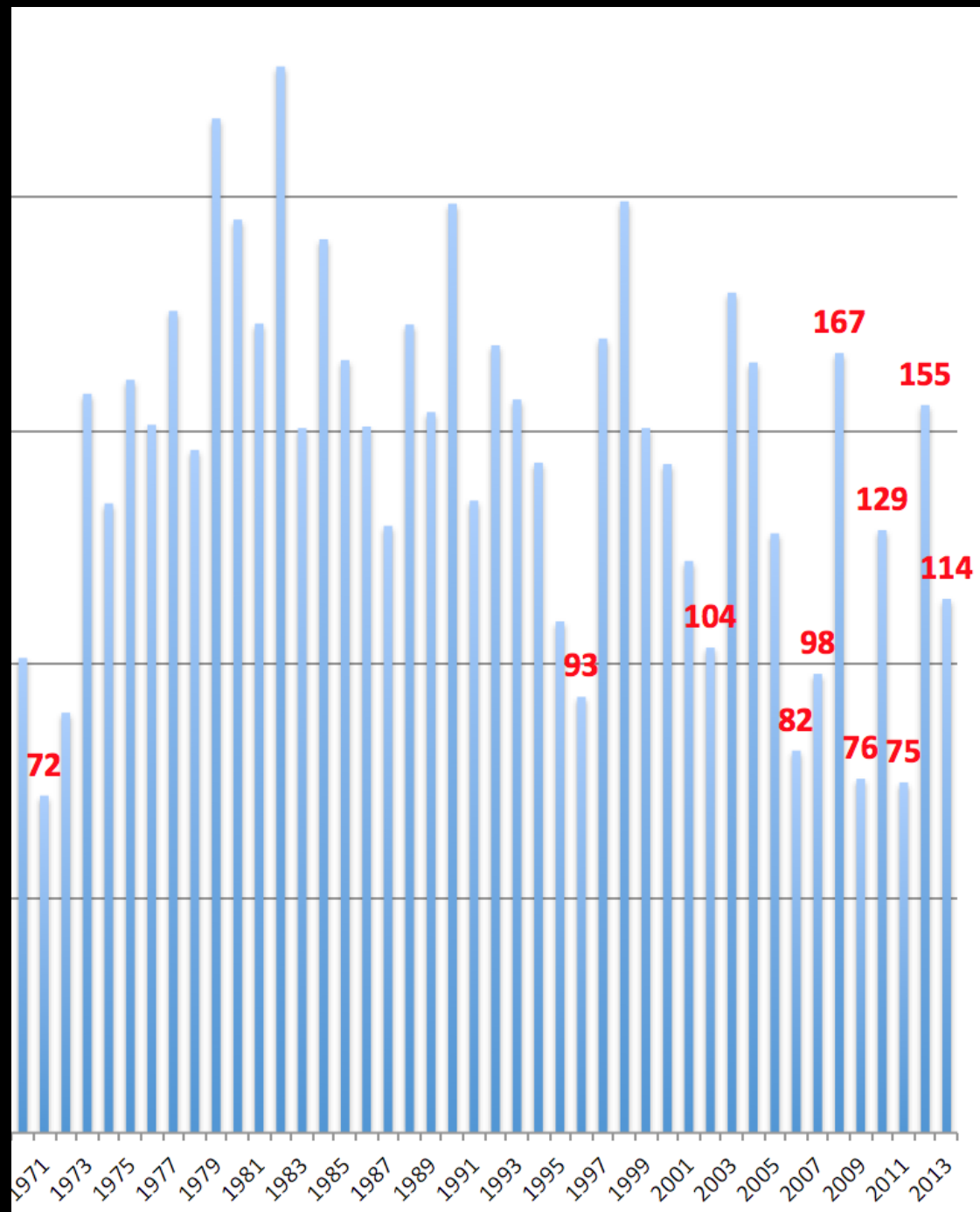
0 200 mi
0 200 km

of Fires & Acres Burned



Oklahoma Wheat Production in Bushels (Millions)





33 crops (1973 to 2005)
***one below 100 million

8 crops (2006-2013)
***four below 100 million

2006 – drought

2007 – late freeze
& rain at harvest

2009 – late freeze

2011 – drought

Precipitation history - Annual, Statewide

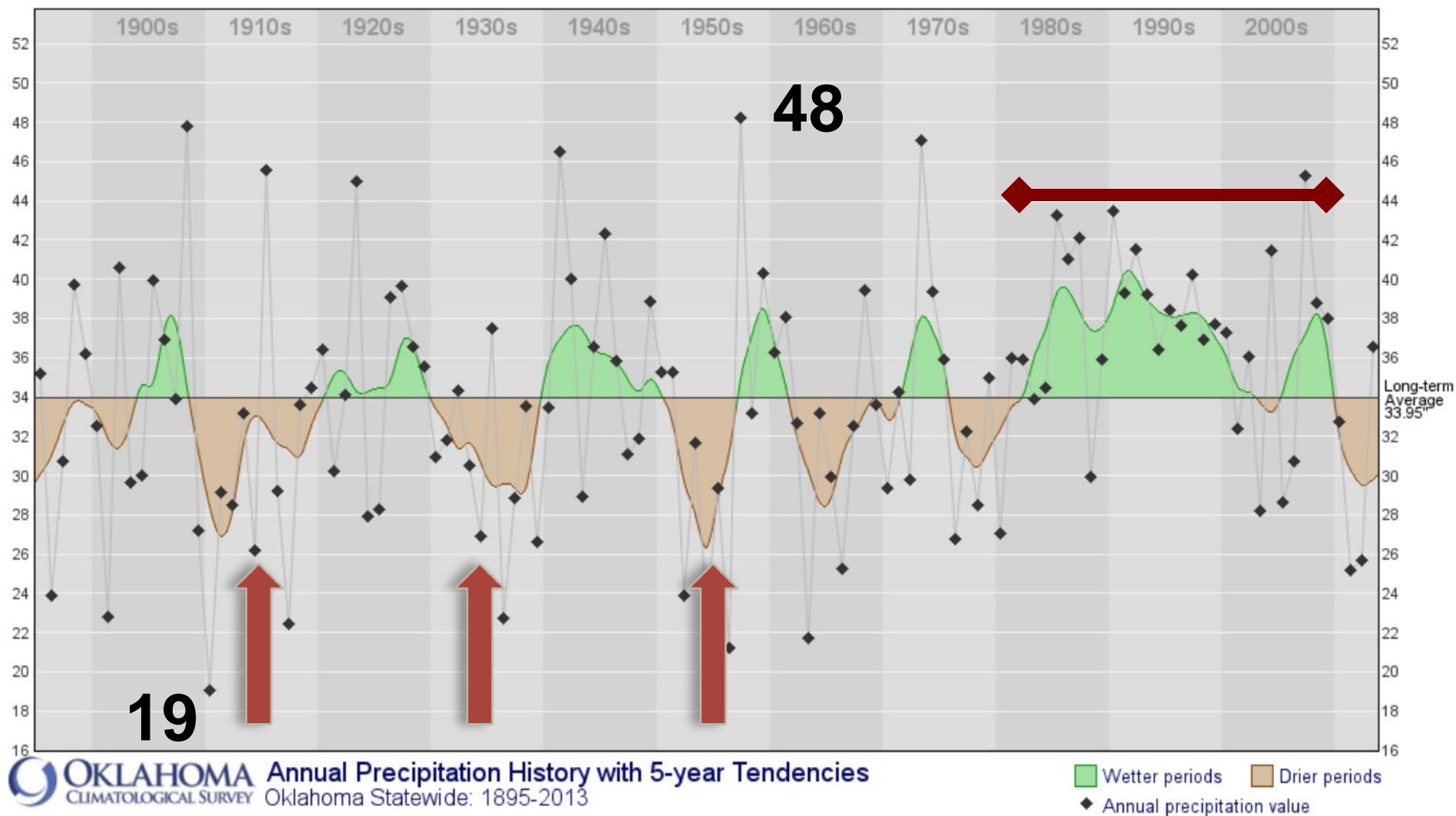
[f Share](#) [t Tweet](#)

Statewide

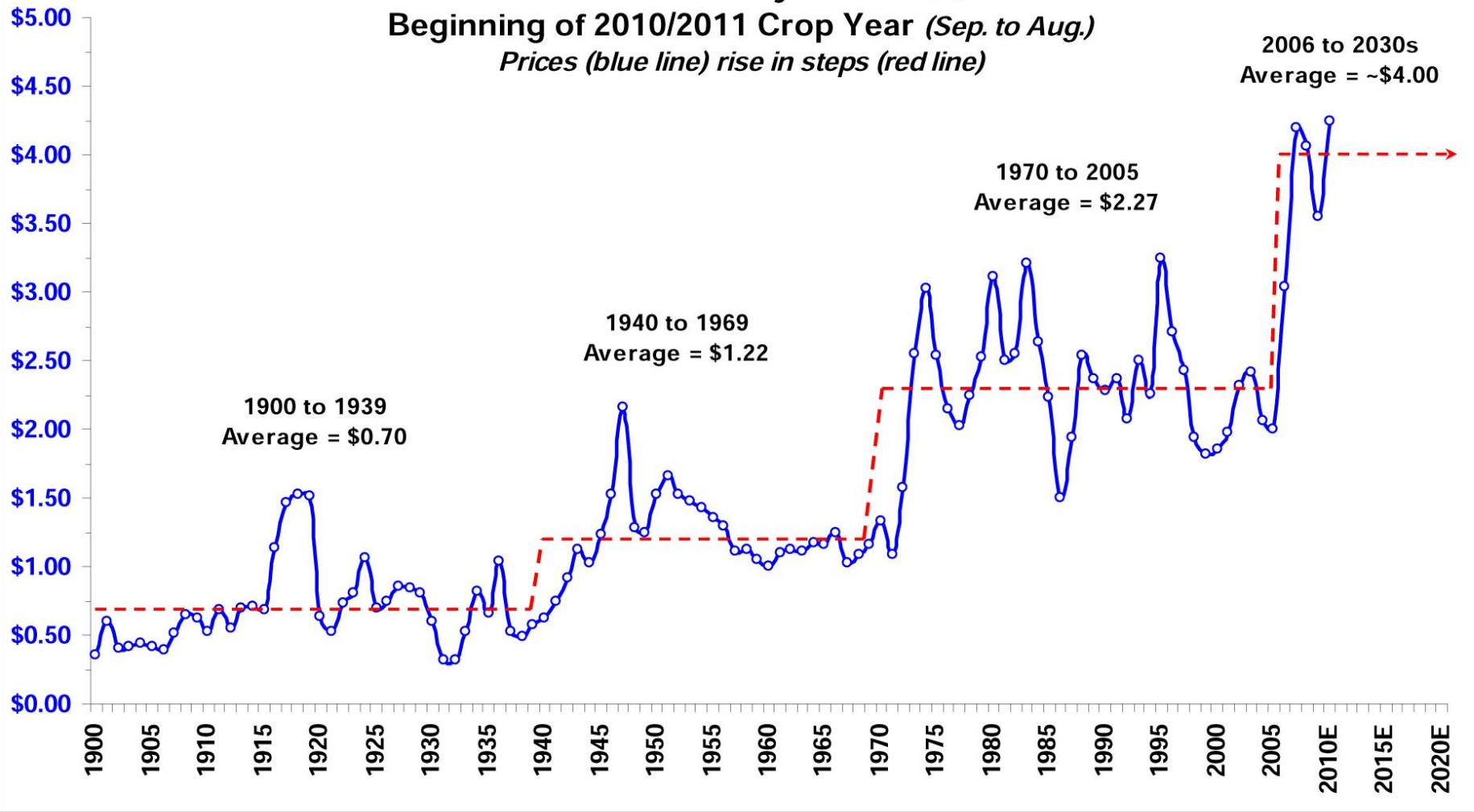
Precipitation

Annual

Get Graph



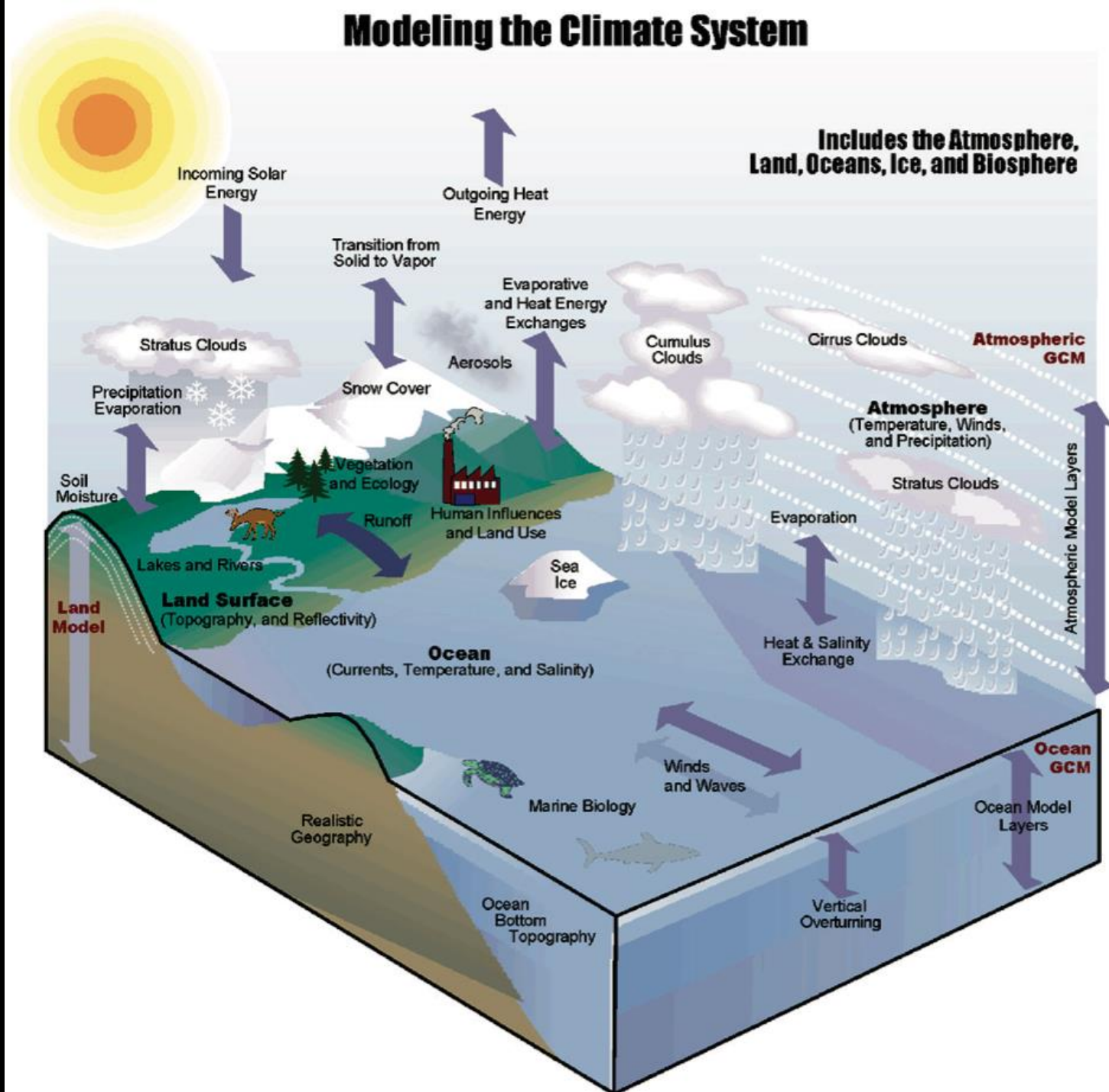
**U.S. Corn Prices Received by Farmers, \$/bu. 1900 to
Beginning of 2010/2011 Crop Year (Sep. to Aug.)**
Prices (blue line) rise in steps (red line)



From *Ag Equipment Intelligence*, Barry Bannister, Stifel-Niclaus



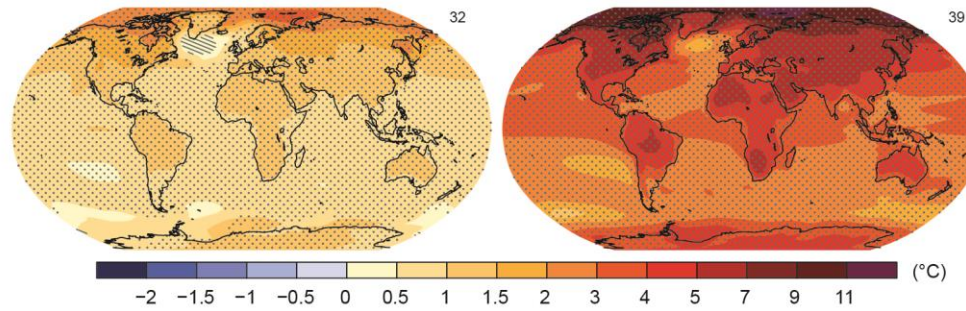
Modeling the Climate System



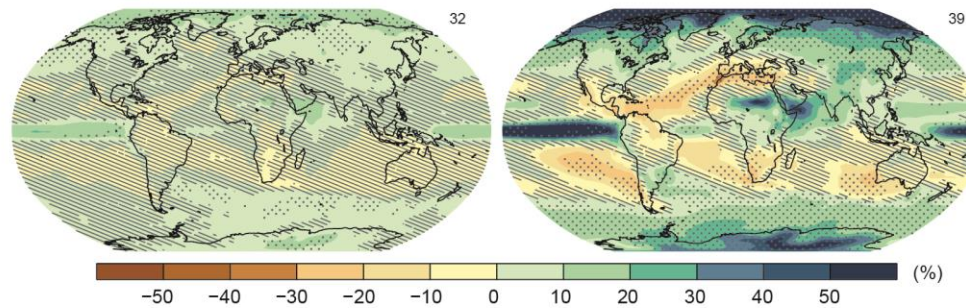
RCP 2.6

RCP 8.5

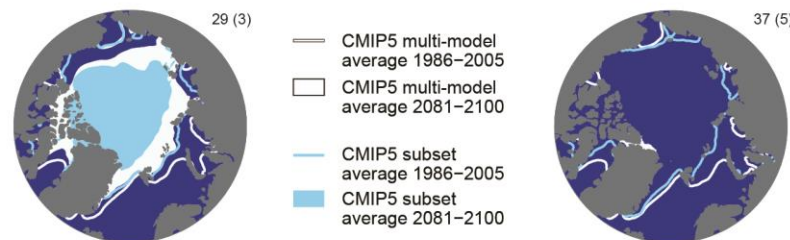
(a) Change in average surface temperature (1986–2005 to 2081–2100)



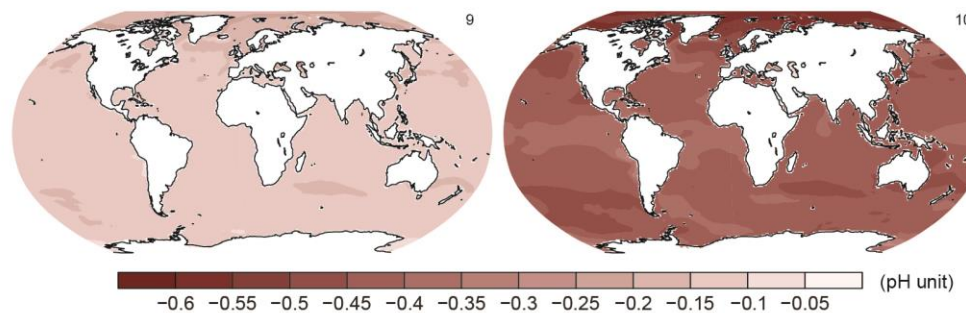
(b) Change in average precipitation (1986–2005 to 2081–2100)

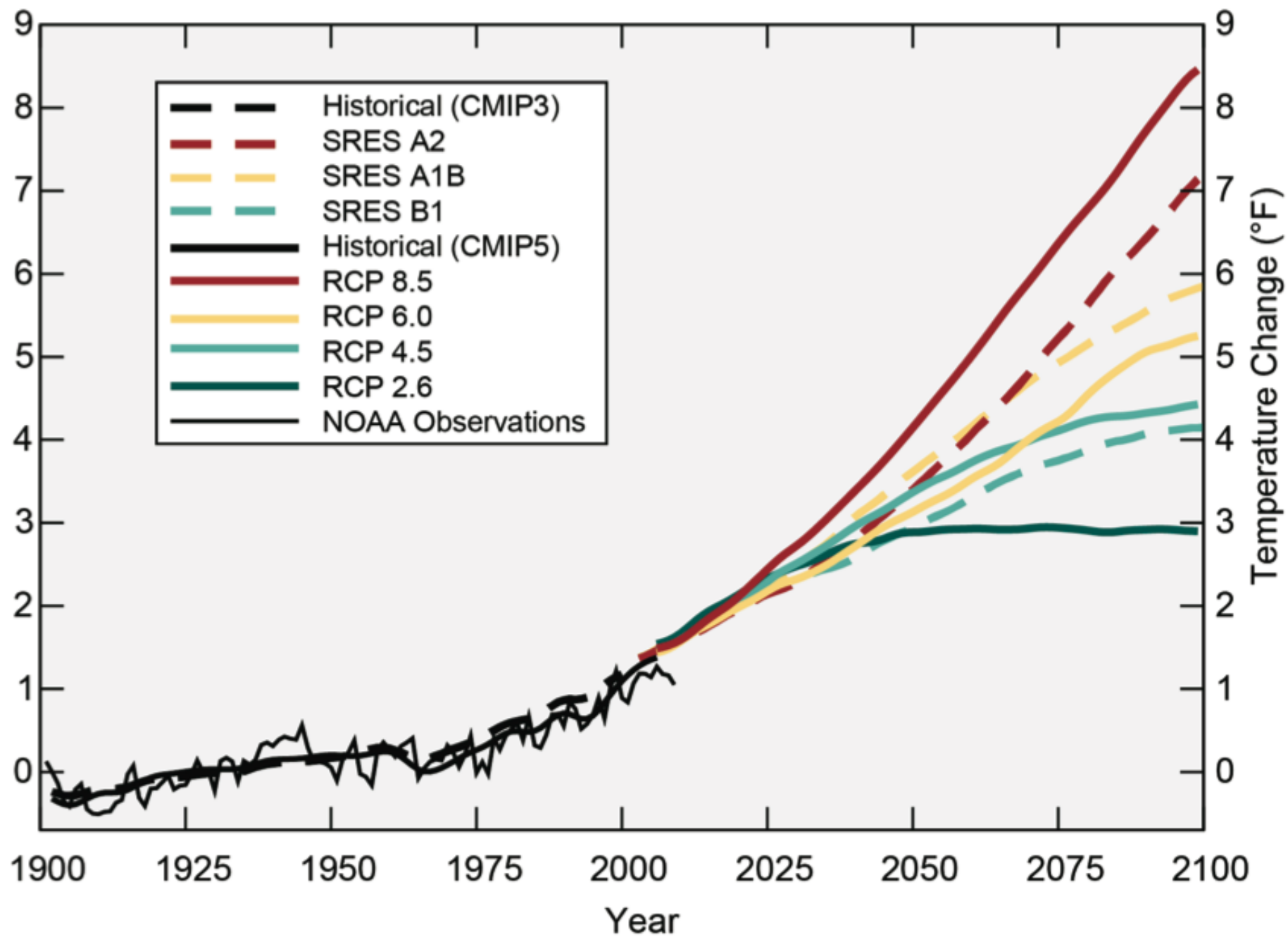


(c) Northern Hemisphere September sea ice extent (average 2081–2100)



(d) Change in ocean surface pH (1986–2005 to 2081–2100)





Precipitation history - Annual, Statewide

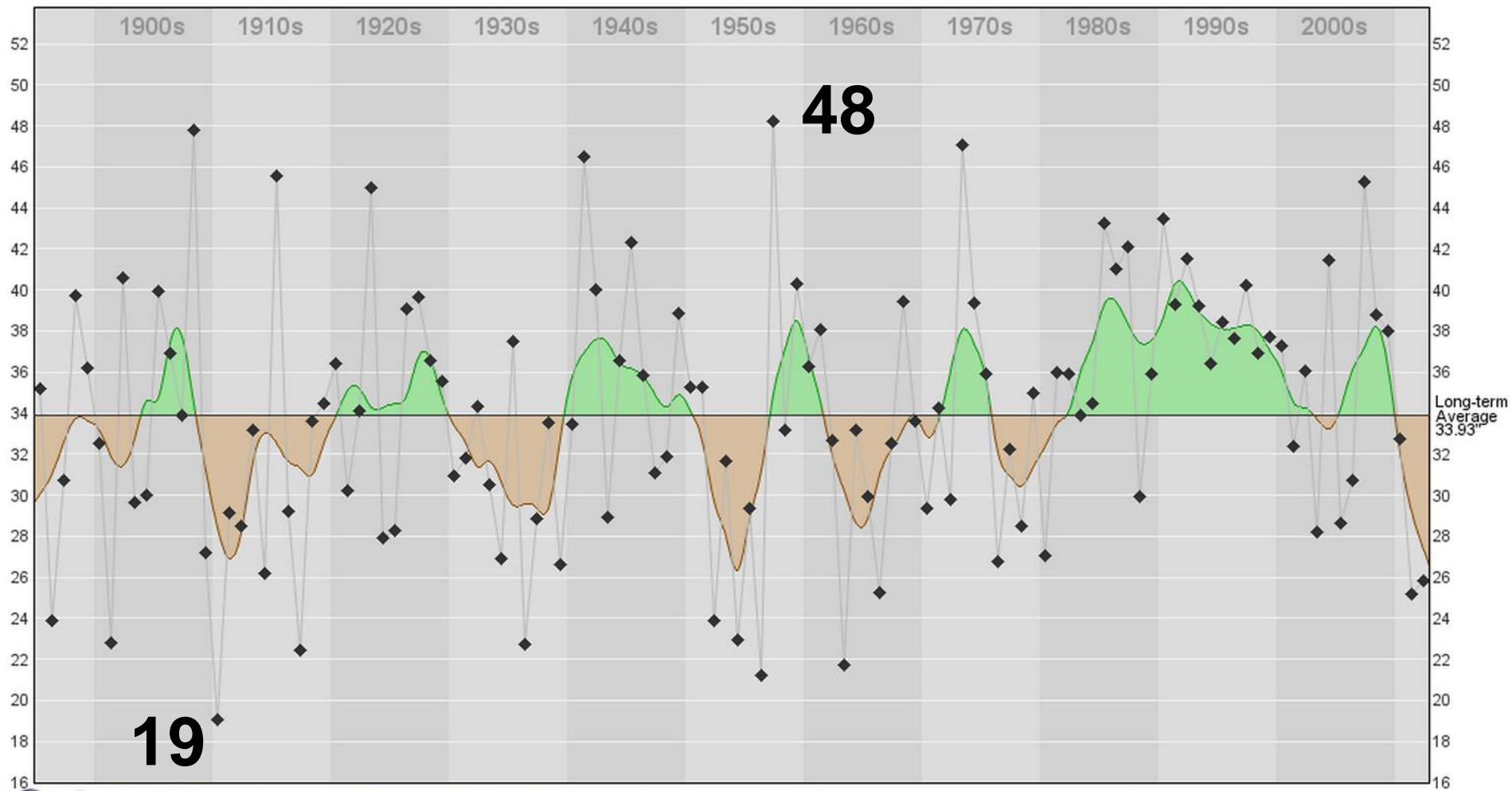
[f Share](#) [t Tweet](#)

Statewide

Precipitation

Annual

Get Graph



OKLAHOMA Annual Precipitation History with 5-year Tendencies
CLIMATOLOGICAL SURVEY Oklahoma Statewide: 1895-2012

Wetter periods Drier periods
◆ Annual precipitation value

Temperature history - Annual, Statewide

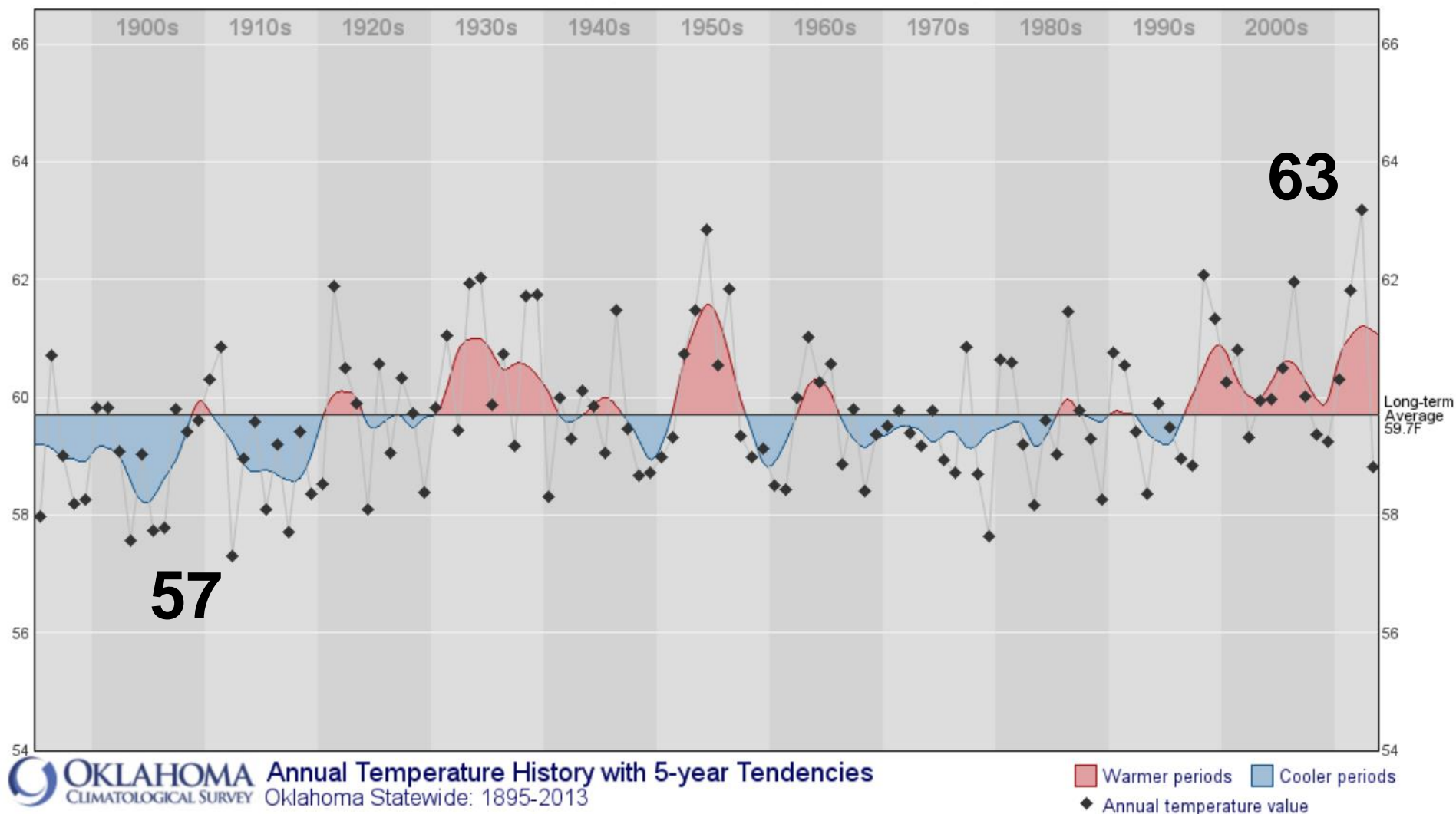
[f Share](#) [t Tweet](#)

Statewide

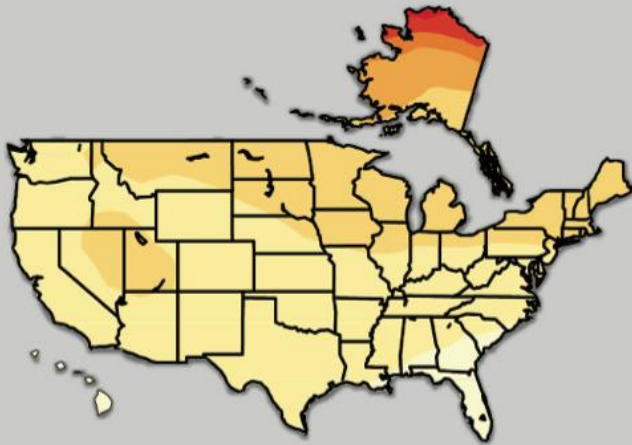
Temperature

Annual

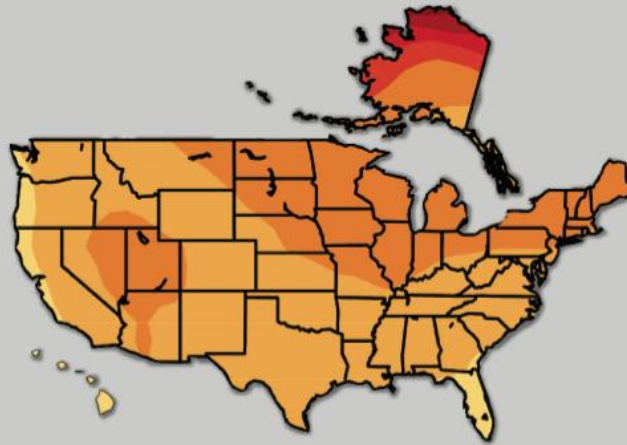
Get Graph



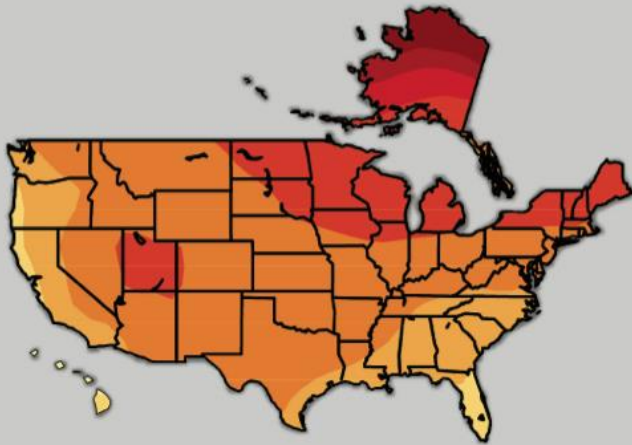
RCP 2.6



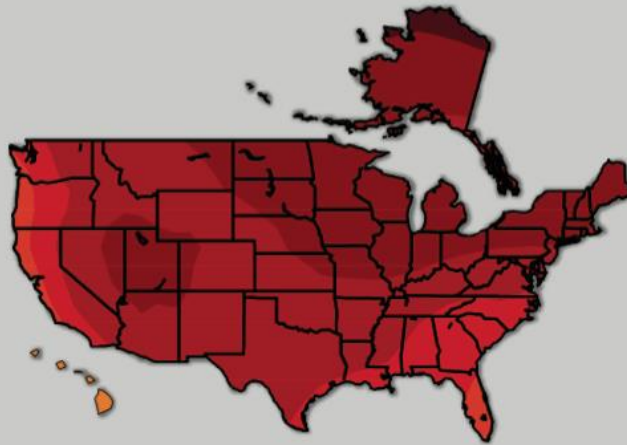
RCP 4.5



RCP 6.0



RCP 8.5

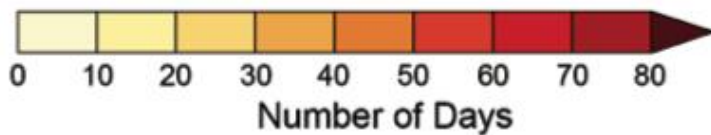
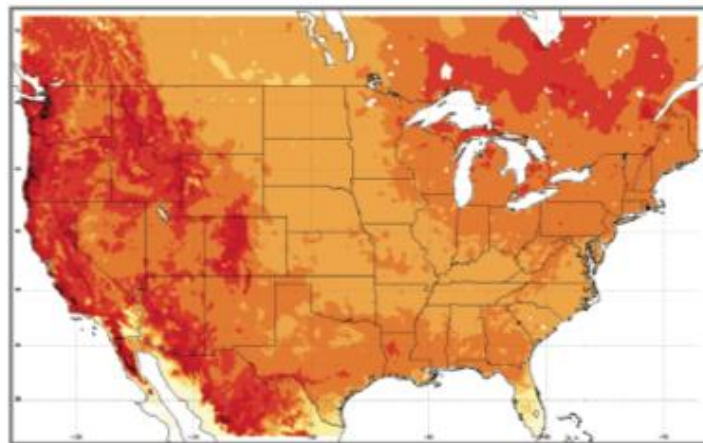


2071-2099
compared to
1971-2000
(30 years)

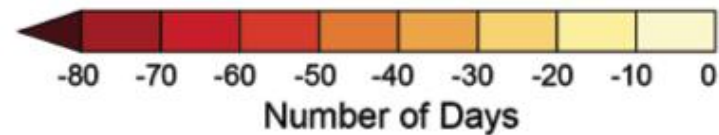
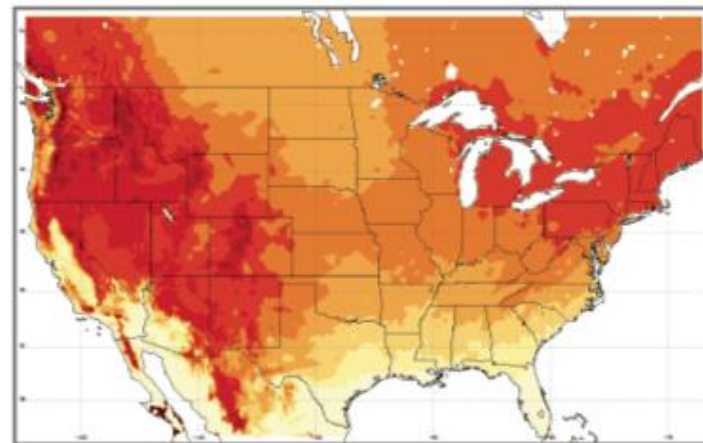
Degrees F



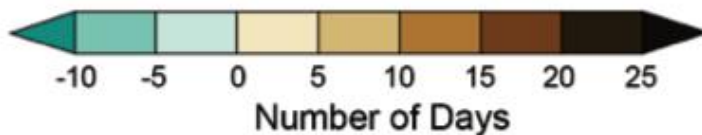
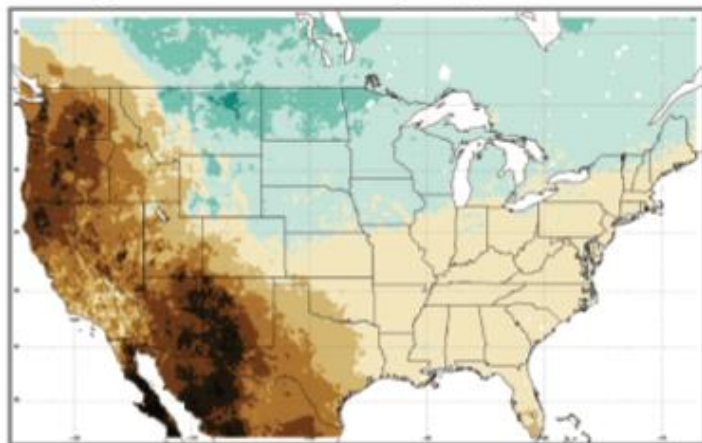
Change in Frost-free Season Length



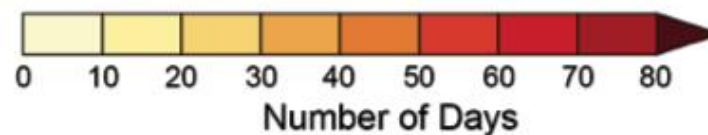
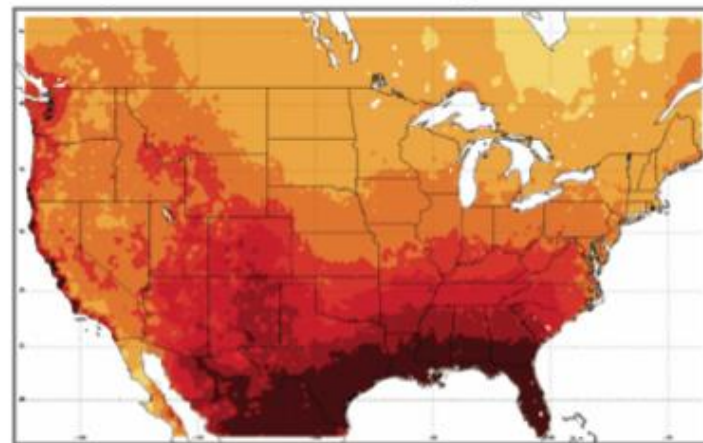
Change in Number of Frost Days

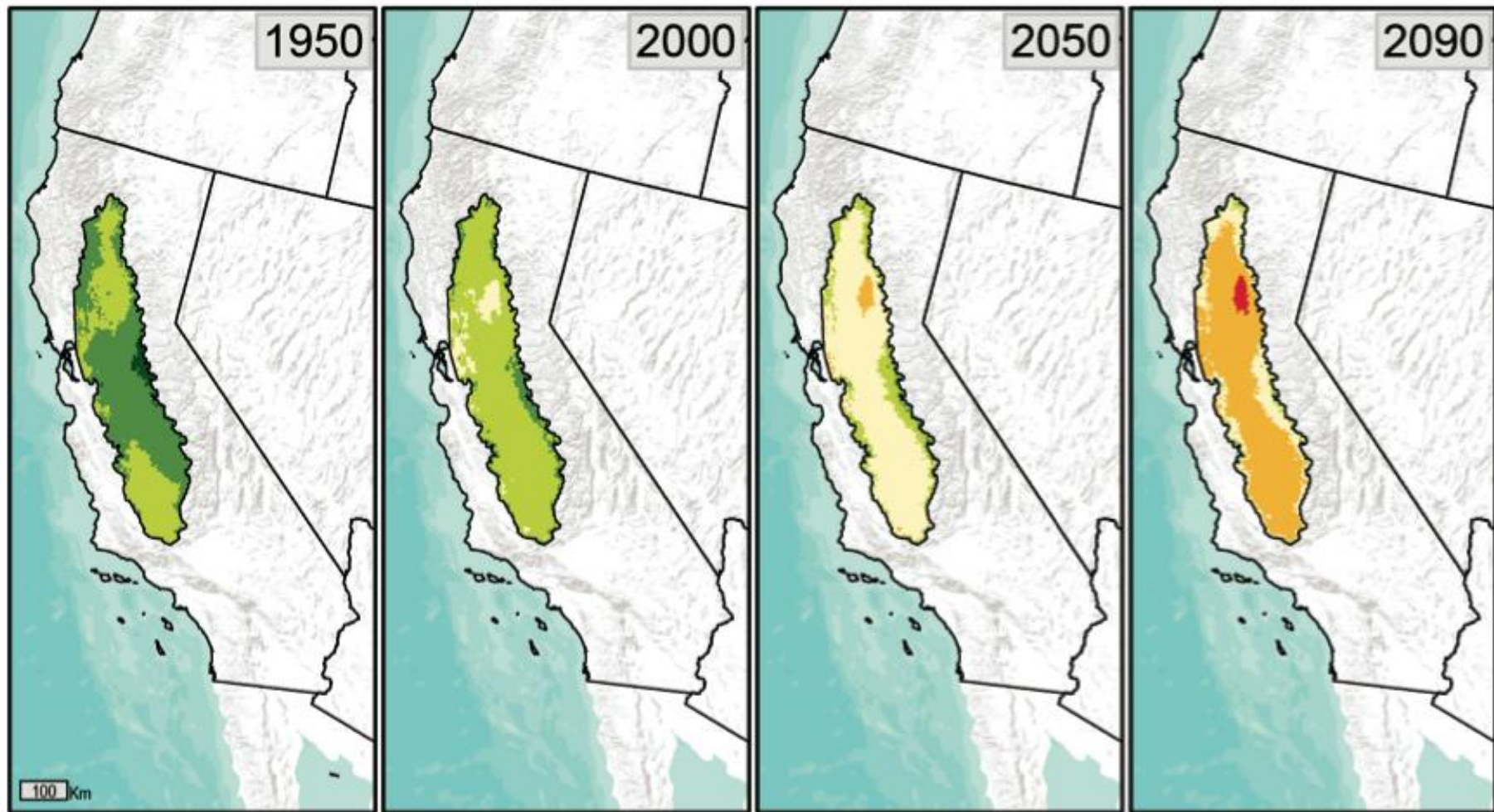


Change in Number of Dry Days



Change in Number of Hot Nights

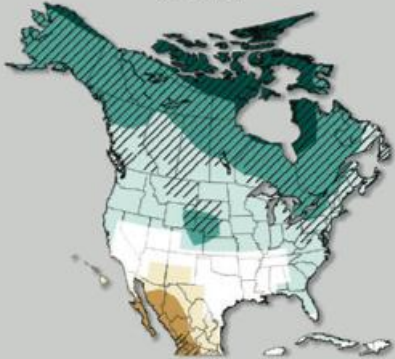




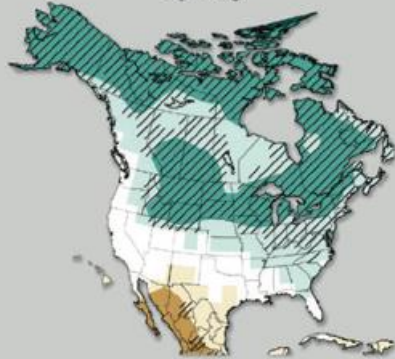
Precip – 1971-2000 vs 2071-2099

Low Pathway (RCP 2.6)

Winter



Spring



Summer



Fall



High Pathway (RCP 8.5)

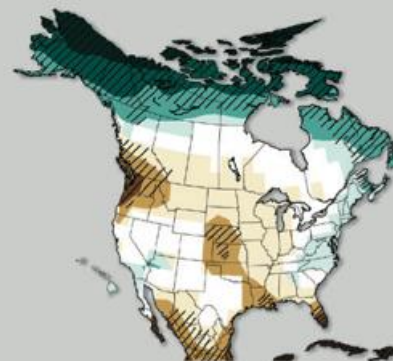
Winter



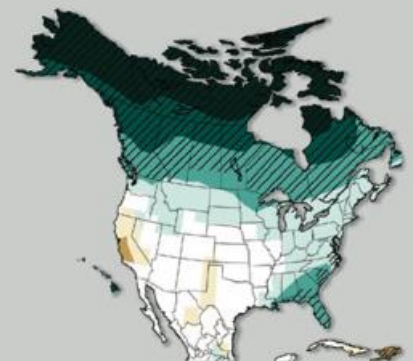
Spring



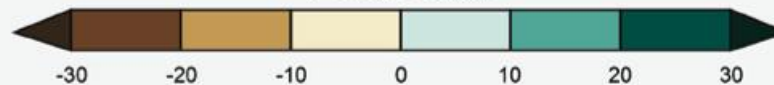
Summer



Fall

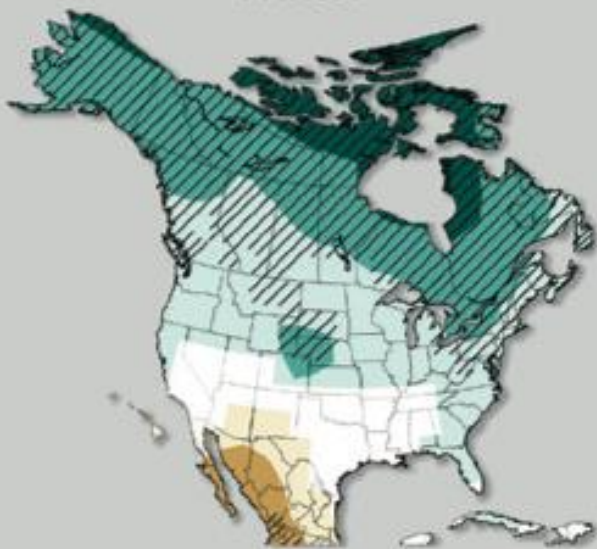


Percent Change

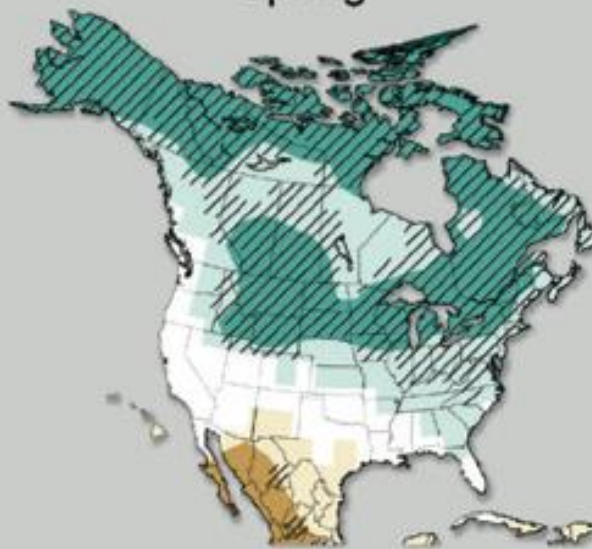


Low Pathway (RCP 2.6)

Winter



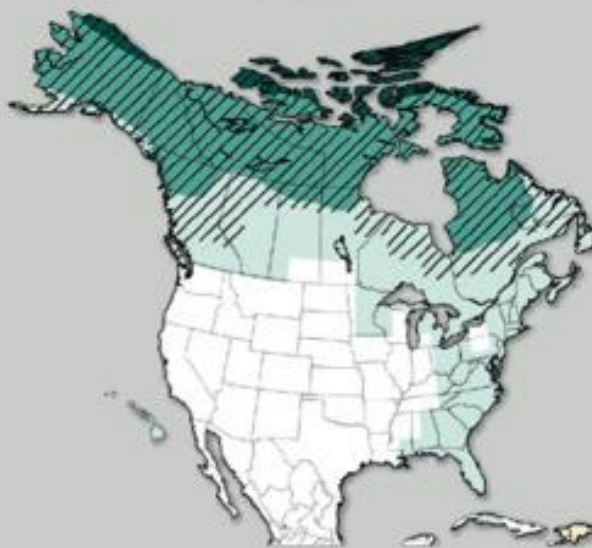
Spring



Summer



Fall



2071-2099
compared to
1971-2000
(30 years)

High Pathway (RCP 8.5)

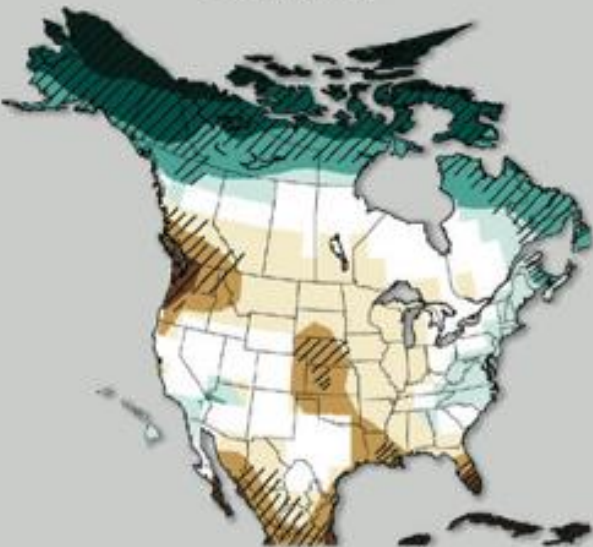
Winter



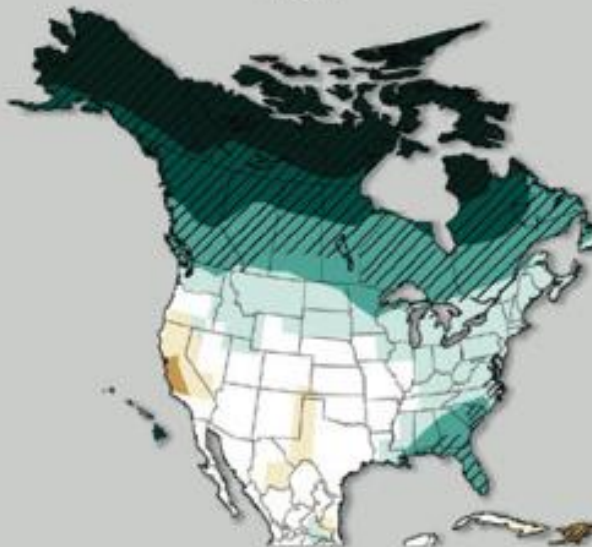
Spring



Summer



Fall



2071-2099
compared to
1971-2000
(30 years)

Projected Change in Soil Moisture

1971-2000

VS

2041-2070

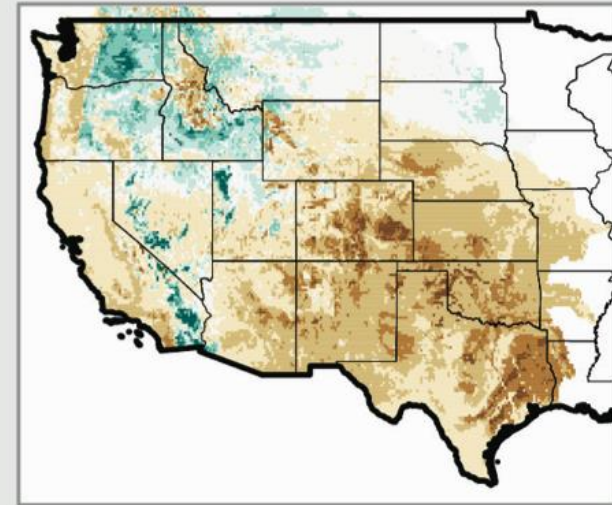
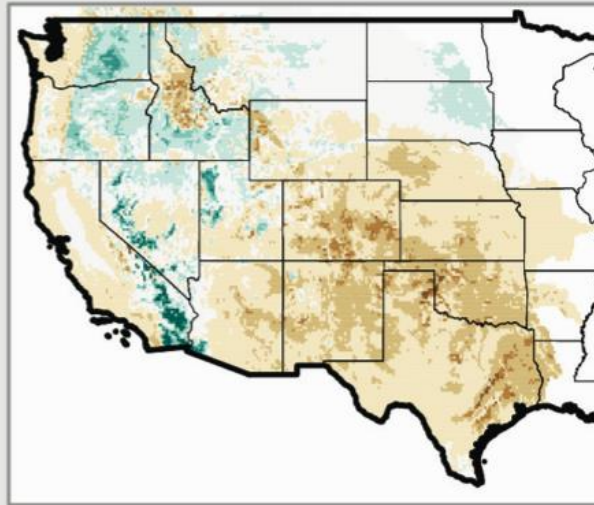
&

2071-2100

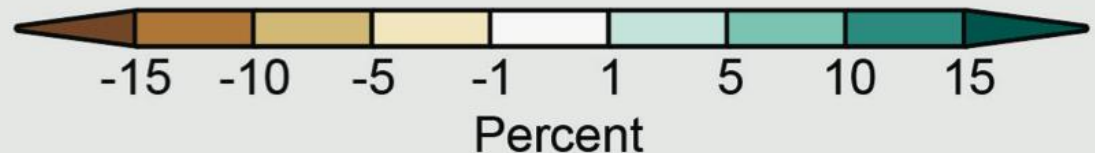
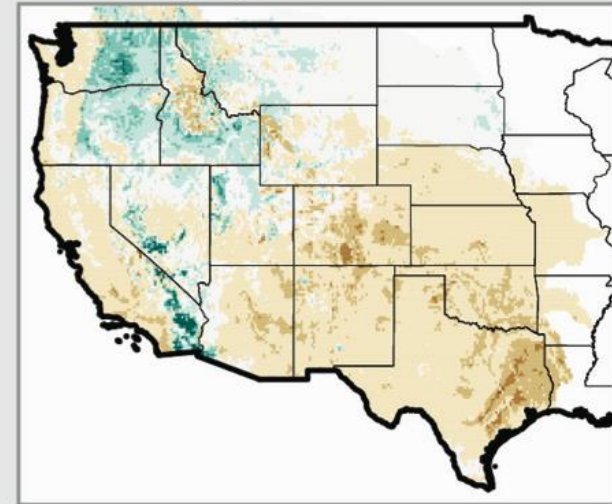
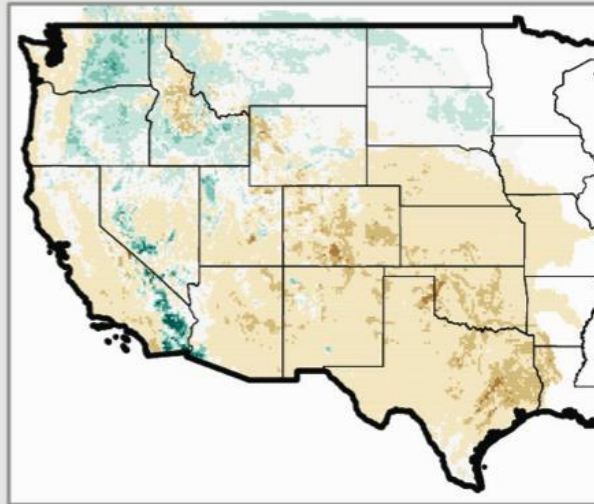
Mid-Century Changes

End-of-Century Changes

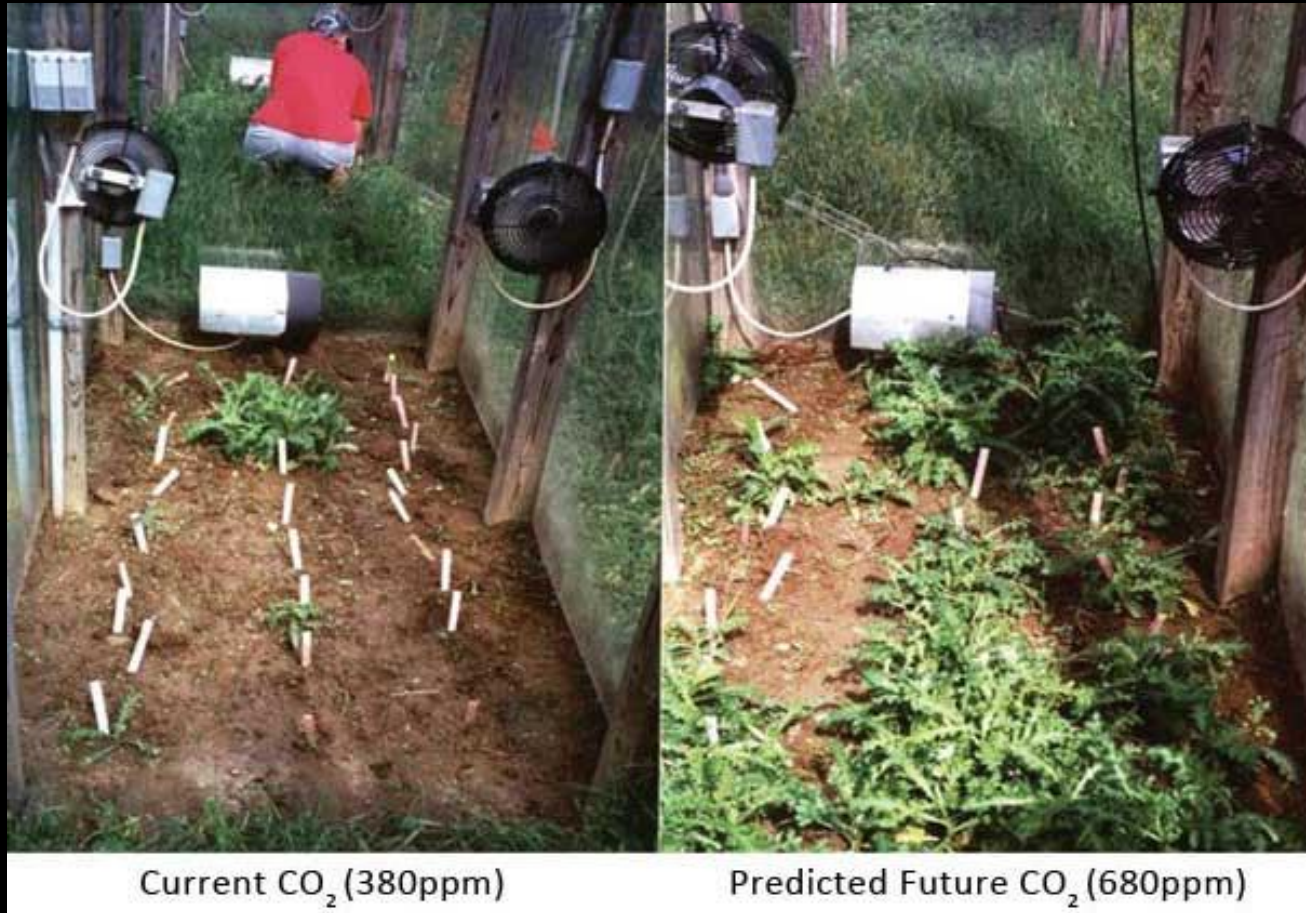
Higher Emissions Scenario (A2)



Lower Emissions Scenario (B1)

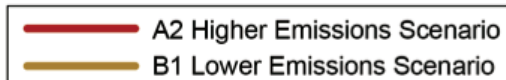
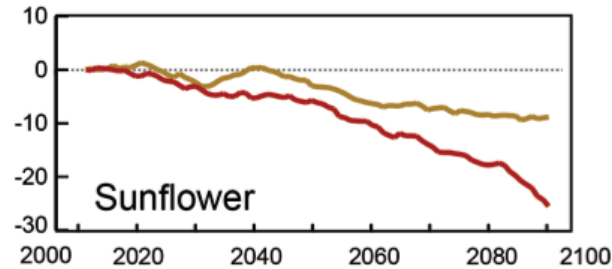
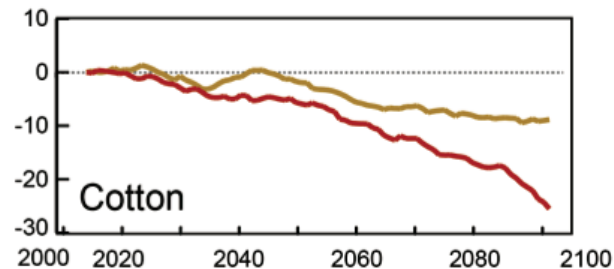
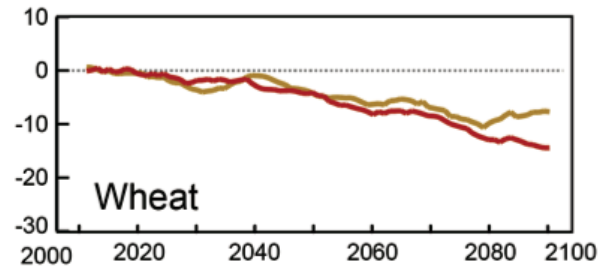
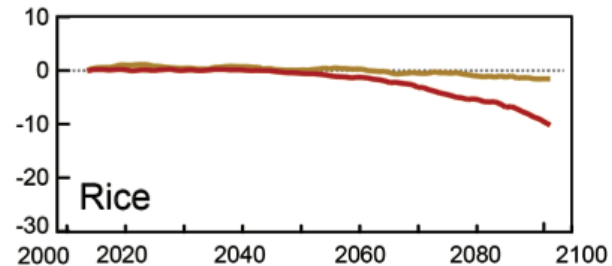
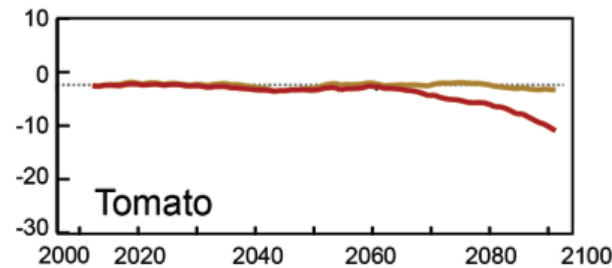
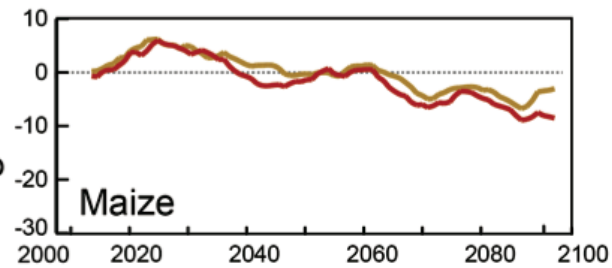
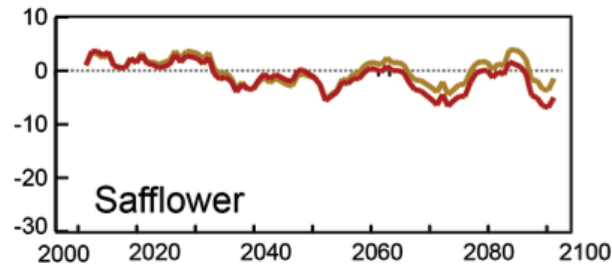
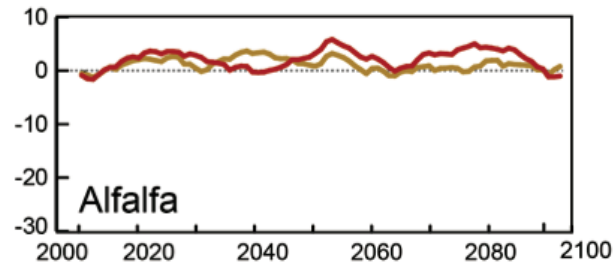


Loss of herbicide efficacy



Round-up, Ziska 1999

Crop Yield Response to Warming in California's Central Valley

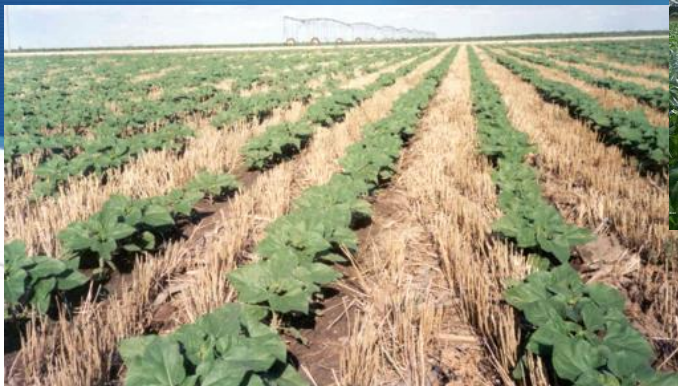


5-year
moving
averages
from
2000
baseline

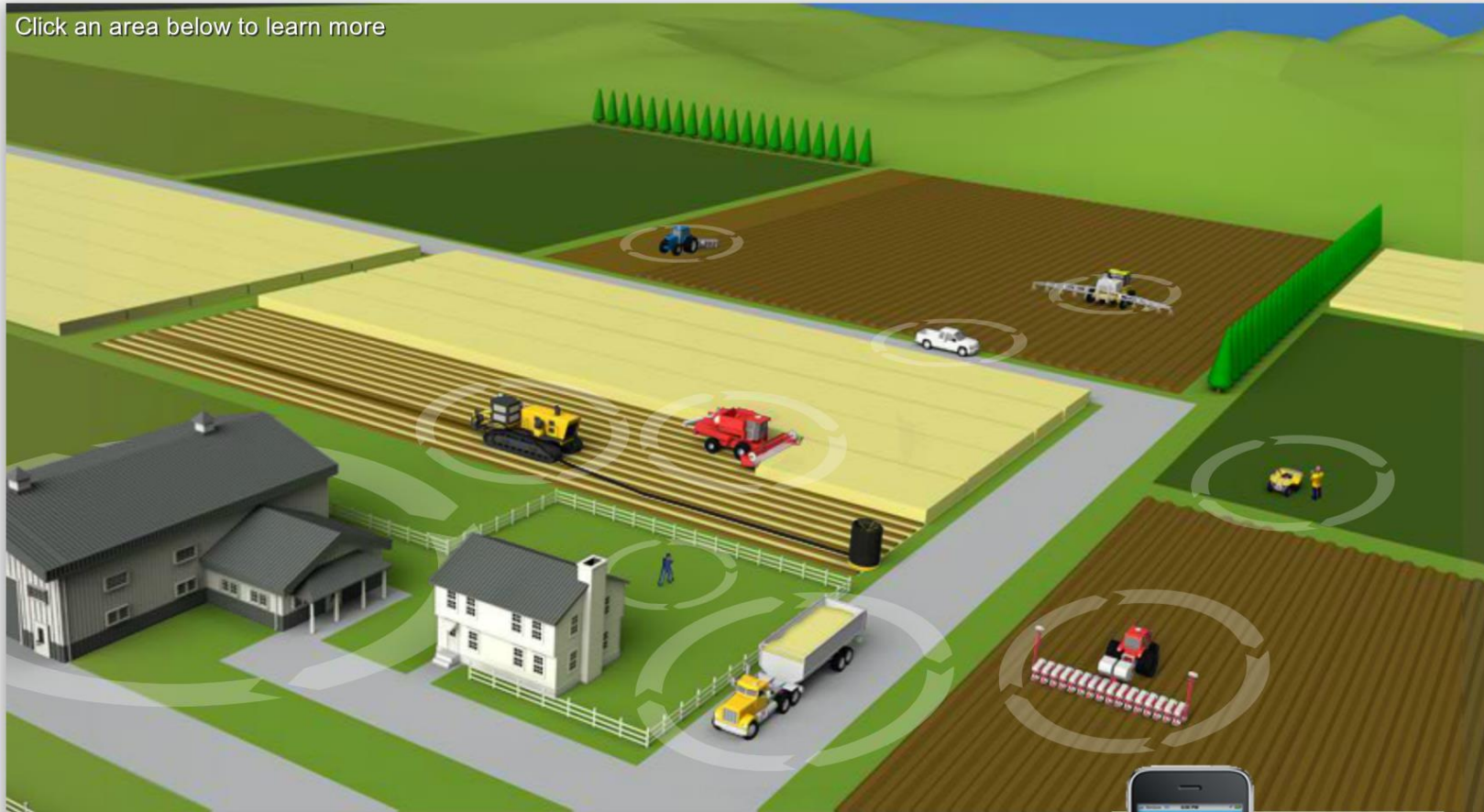
What can we do?

Ag has always been adapting

- New crop varieties
- Nitrogen use efficiency
- LEPA pivots and drip
- No-till and reduced tillage
- New crop rotations
- Weather monitoring



Click an area below to learn more



Share Information Across the Entire Farm

Connected Farm™ is an integrated operations management solution that combines industry-leading hardware and software to increase efficiency and enable better decision making for today's farming business.



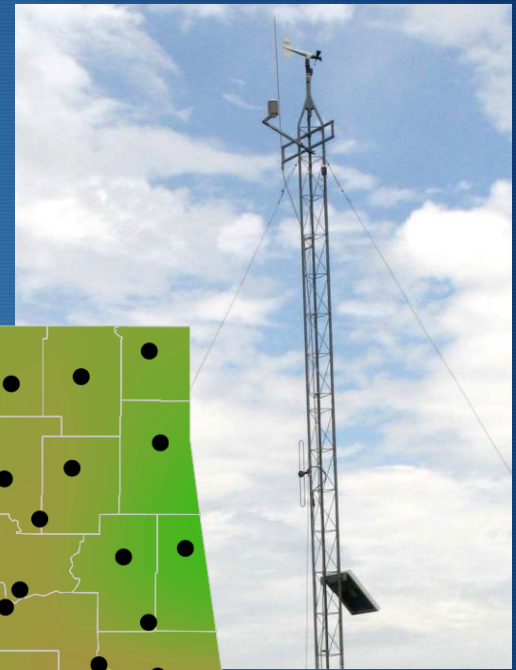
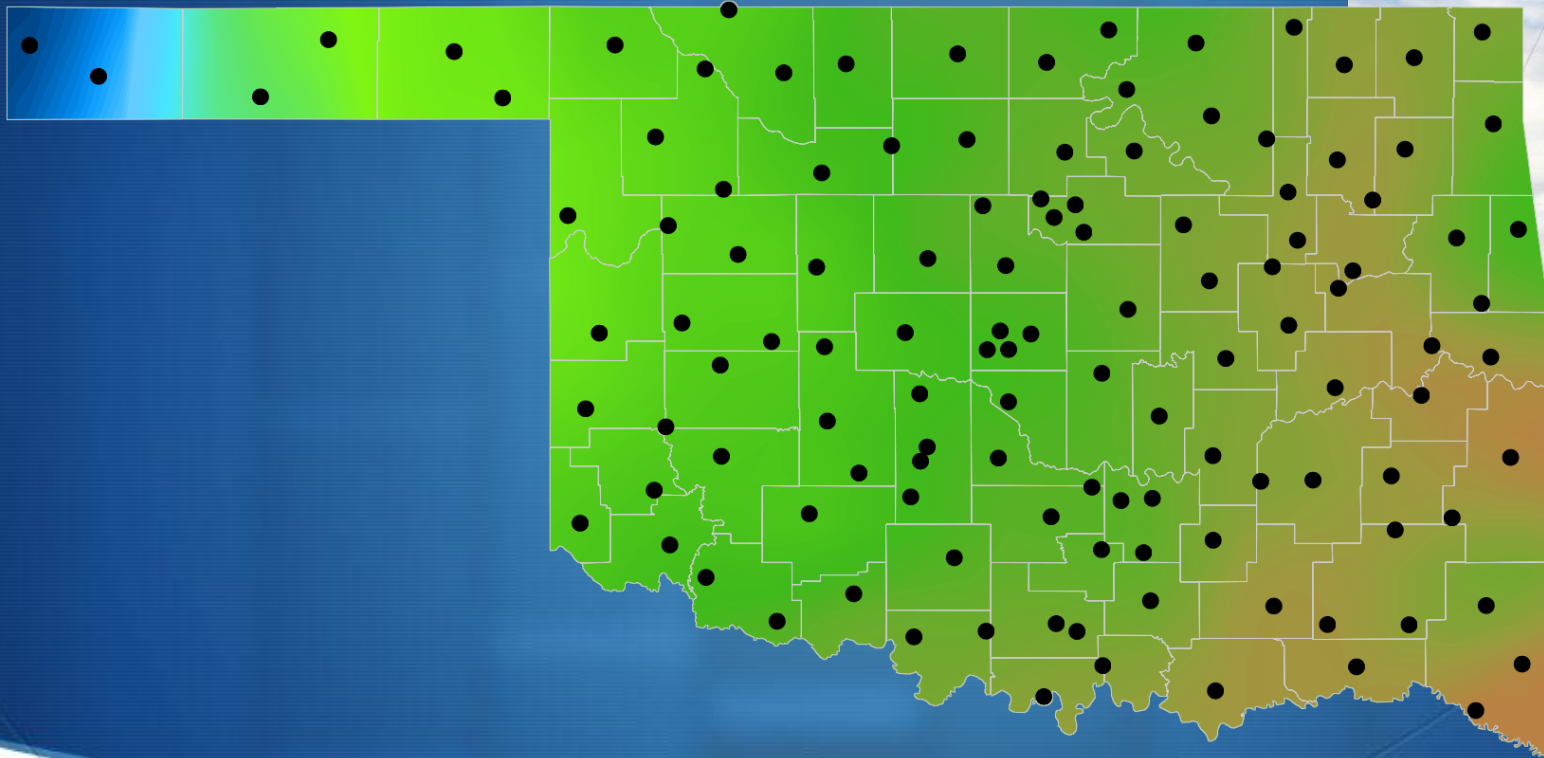
FREE! MAP WITH THE APP AND
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On Farm Weather Stations



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Oklahoma's Weather Network

Oklahoma Mesonet Tower Locations



Mesonet Measurements

Air temperature

Rainfall

Relative humidity

Soil moisture

Soil temperature

Solar radiation

Station pressure

Wind direction

Wind speed



Mesonet
Oklahoma's Weather Network



Southeast

South

Southwest

Chickasha Mesonet Site



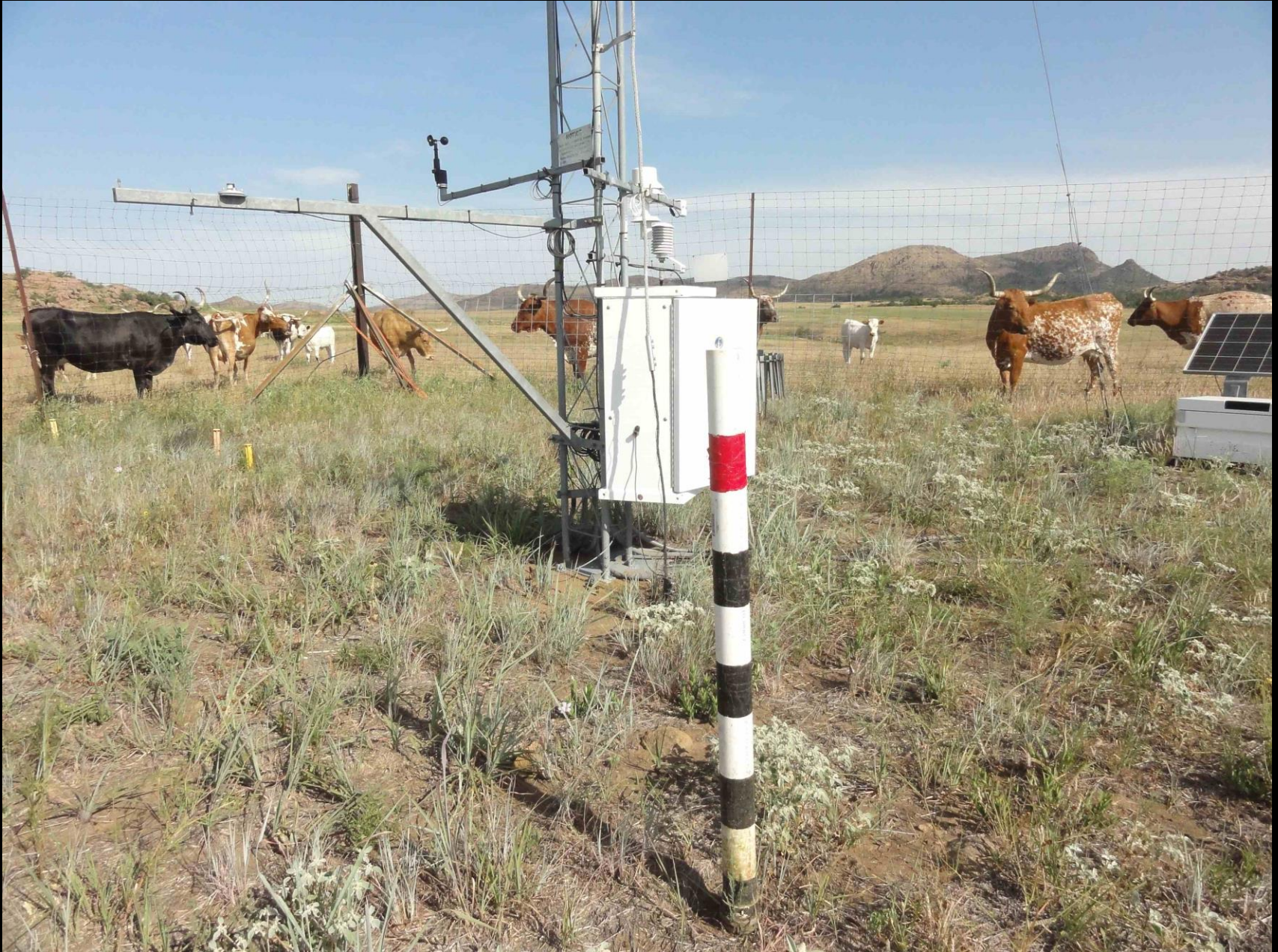
Southeast

South

Southwest

Madill Mesonet Site

Medicine Park Mesonet Site



Oklahoma Mesonet



Established 1994





El Reno

93 °F heat index:
93 °F

Dewpoint: **61 °F**
24-hr Rainfall: **0.00 in.**
Wind: **SSE at 3 mph**
Last observed at: 3:00 pm CDT

Today



Mostly Sunny
High **95°F**

Tonight



Mostly Clear
Low **68°F**

Tomorrow



Mostly Sunny
High **91°F**

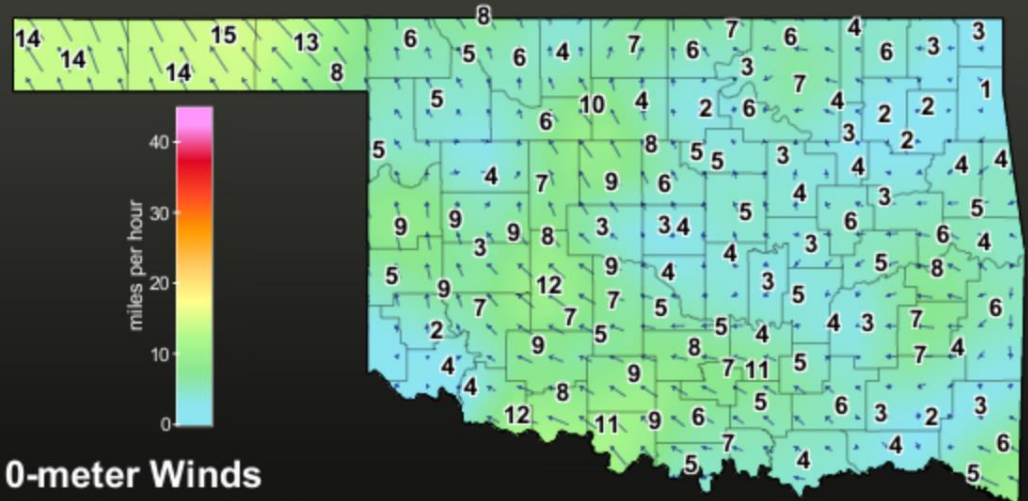
Air Temperature

24-hr Rainfall

Wind

Radar

More Maps



10-meter Winds

3:00 PM September 5, 2013 CDT

News

An Uncommon July Brings Drought Relief

Thu, Aug 1, 2013

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Agriculture Essentials

[Farm Monitor](#)[Cattle Comfort Advisor](#)[Drift Risk Advisor](#)[Degree Day Heat Units](#)[Irrigation Planner](#)[Drought](#)[Dispersion](#)[Evapotranspiration](#)

El Reno Farm Monitor

Current Conditions at 3:40 pm CDT - September 5, 2013

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Sunrise: 7:06 am



Sunset: 7:55 pm

94°F

Wind Direction

Feels Like: **95°F**Humidity: **34%**24-hr Rainfall: **0.00 in**Wind Speed 10-meter: **4 mph**Wind Speed 2-meter: **1.8 mph**3-day Avg 4" Bare Soil: **82°F**10-day Rainfall: **0.00 in**

TODAY

**Mostly Sunny**
High **95°F**

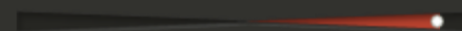
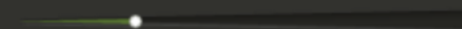
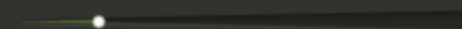
TONIGHT

**Mostly Clear**
Low **68°F**

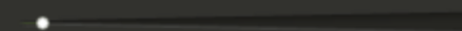
TOMORROW

**Mostly Sunny**
High **91°F**

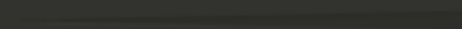
Cattle Comfort

-40  120Evapotranspiration:
Short0.05  0.5Evapotranspiration:
Tall0.05  0.8

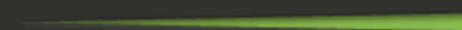
Burning Index

0  120


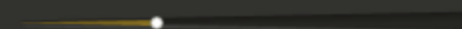
Inversion

0  +12

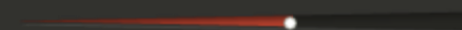
Dispersion

1  6

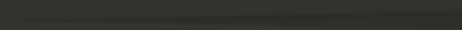
10-inch Soil Moisture

0  1Keetch-Byram Drought
Index0  800

Peanut Leaf Spot

0  60

Pecan Scab

0  60

Okemah **Wed 2/27/13**

Weather **4:20 pm CST**


Temperature: 46°F
 Wind Chill: 39°F
 Relative Humidity: 45%
 10-m Wind: WNW 17 mph G24
 24-h Rainfall: 0.00"
 Dispersion: Moderately Good

Fire Danger **3:00 pm CST**

Current Fire Danger:
HIGH

Burning Index: 45
 Spread Component: 51
 Ignition Component: 22%
 NFDRS Fuel Model: T
 1-hr Fuel Moisture: 8%
 10-hr Fuel Moisture: 13%
 KBDI: 0
 Relative Greenness: 26%

Sunrise: 6:59 am Sunset: 6:18 pm

 **CHOOSE A STATION**

Weather-Based Decision Support Products for *Wildland Fire Management in Oklahoma*



WeatherScope
required



The interactive features of this web site require the free WeatherScope software.

[Click Here to download WeatherScope.](#)

 **DOWNLOAD NOW**

**Fire
Prescription
Planner**



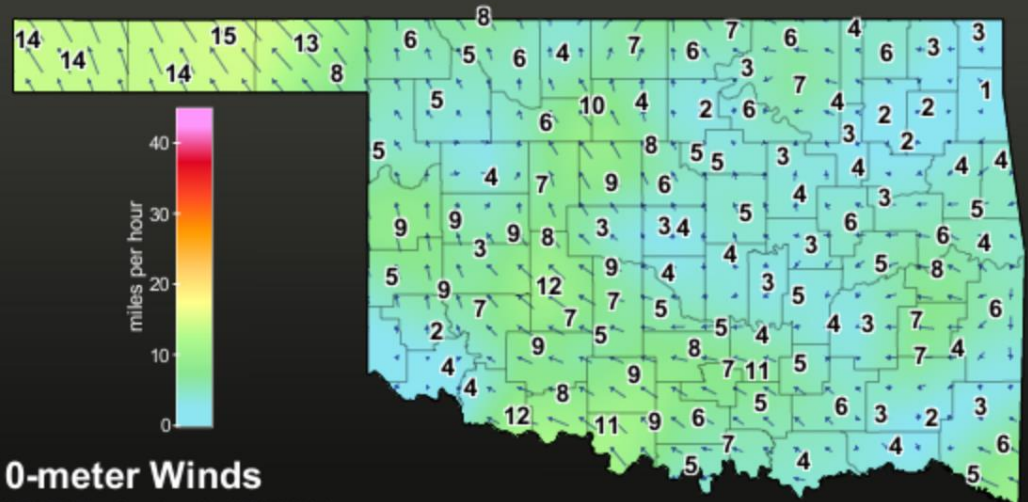
OK-FIRE is a program of the Oklahoma Mesonet with leadership being provided by Oklahoma State University. Initial funding for OK-FIRE was provided from a grant from the Joint Fire Science Program (# 05-2-1-81). Copyright © 2006-2013 Board of Regents of the University of Oklahoma. All Rights Reserved. webmaster@mesonet.org



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[Weather](#)[Climate](#)[Forecast](#)[K-12 Education](#)[Agriculture](#)[Public Safety](#)[Fire Management](#)**El Reno****93 °F**heat index:
93 °FDewpoint: **61 °F**24-hr Rainfall: **0.00 in.**Wind: **SSE at 3 mph**

Last observed at: 3:00 pm CDT

Today**Tonight****Tomorrow****Mostly Sunny**High **95°F****Mostly Clear**Low **68°F****Mostly Sunny**High **91°F**[Air Temperature](#)[24-hr Rainfall](#)[Wind](#)[Radar](#)[More Maps](#)**10-meter Winds**

3:00 PM September 5, 2013 CDT

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El Reno

Current Conditions at 3:25 pm CDT

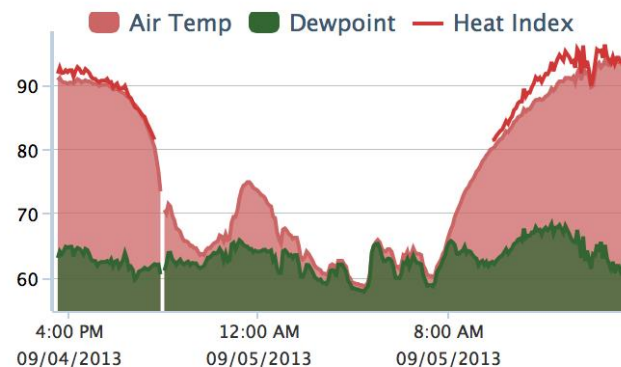
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[Site Information](#)
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93 °F

heat index:
94 °F

Dewpoint: 63 °F
Humidity: 37%
24-hr Rainfall: 0.00 in.
Wind: SSE at 6 mph
Wind Gusts: 9 mph
Pressure: 30.10 in.
Solar Radiation: 802 W/m2

Sunrise: 7:06 am
Sunset: 7:55 pm



Forecast at a Glance

Today	Tonight	Tomorrow	Tomorrow Night	Saturday	Saturday Night	Sunday	Sunday Night	Monday
								
Mostly Sunny High 95°F Wind SE at 7 mph	Mostly Clear Low 68°F Wind S at 6 mph	Mostly Sunny High 91°F Wind S to SE at 6-9 mph	Mostly Clear Low 67°F Wind SE to S at 6-7 mph	Mostly Sunny High 92°F Wind S at 6-9 mph	Mostly Clear Low 69°F Wind S at 8 mph	Mostly Sunny High 93°F Wind SW to S at 6-9 mph	Mostly Clear Low 67°F Wind S at 8 mph	Mostly Sunny High 92°F Wind S at 6-13 mph

Forecast data provided by the [National Weather Service](#). See the [complete forecast](#) or an **Hourly Forecast**:


[graph](#)

[table](#)



Q Search

Consecutive Days with Less than 0.25 inches

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Rainfall Accumulation



Mesonet
1-Hour Rainfall (inches)

4:05 PM April 18, 2013 CDT

1-hr Rainfall Accumulation

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Mesonet
3-Hour Rainfall (inches)

4:05 PM April 18, 2013 CDT

3-hr Rainfall Accumulation

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Mesonet
6-Hour Rainfall (inches)

4:05 PM April 18, 2013 CDT

6-hr Rainfall Accumulation

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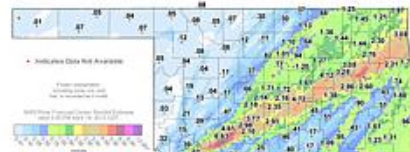


Mesonet
12-Hour Rainfall (inches)

4:05 PM April 18, 2013 CDT

12-hr Rainfall Accumulation

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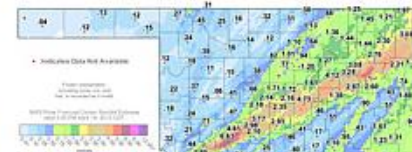


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24-Hour Rainfall (inches)

4:05 PM April 18, 2013 CDT

24-hr Rainfall Accumulation

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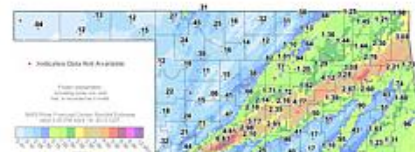


Mesonet
2-Day Rainfall (inches)

4:05 PM April 18, 2013 CDT

2-day Rainfall Accumulation

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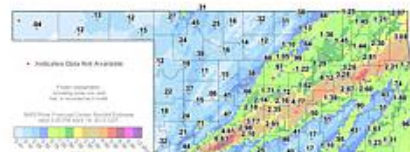


Mesonet
3-Day Rainfall (inches)

4:05 PM April 18, 2013 CDT

3-day Rainfall Accumulation

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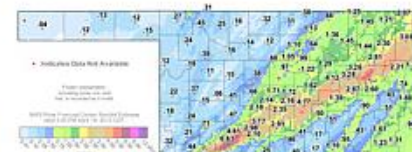


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4-Day Rainfall (inches)

4:05 PM April 18, 2013 CDT

4-day Rainfall Accumulation

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Mesonet
5-Day Rainfall (inches)

4:05 PM April 18, 2013 CDT

5-day Rainfall Accumulation

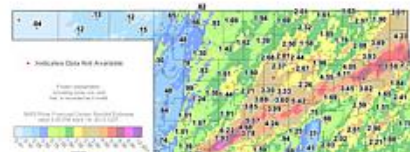
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7-Day Rainfall (inches)

4:05 PM April 18, 2013 CDT

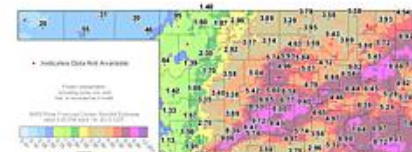
7-day Rainfall Accumulation



Mesonet
10-Day Rainfall (inches)

4:05 PM April 18, 2013 CDT

10-day Rainfall Accumulation

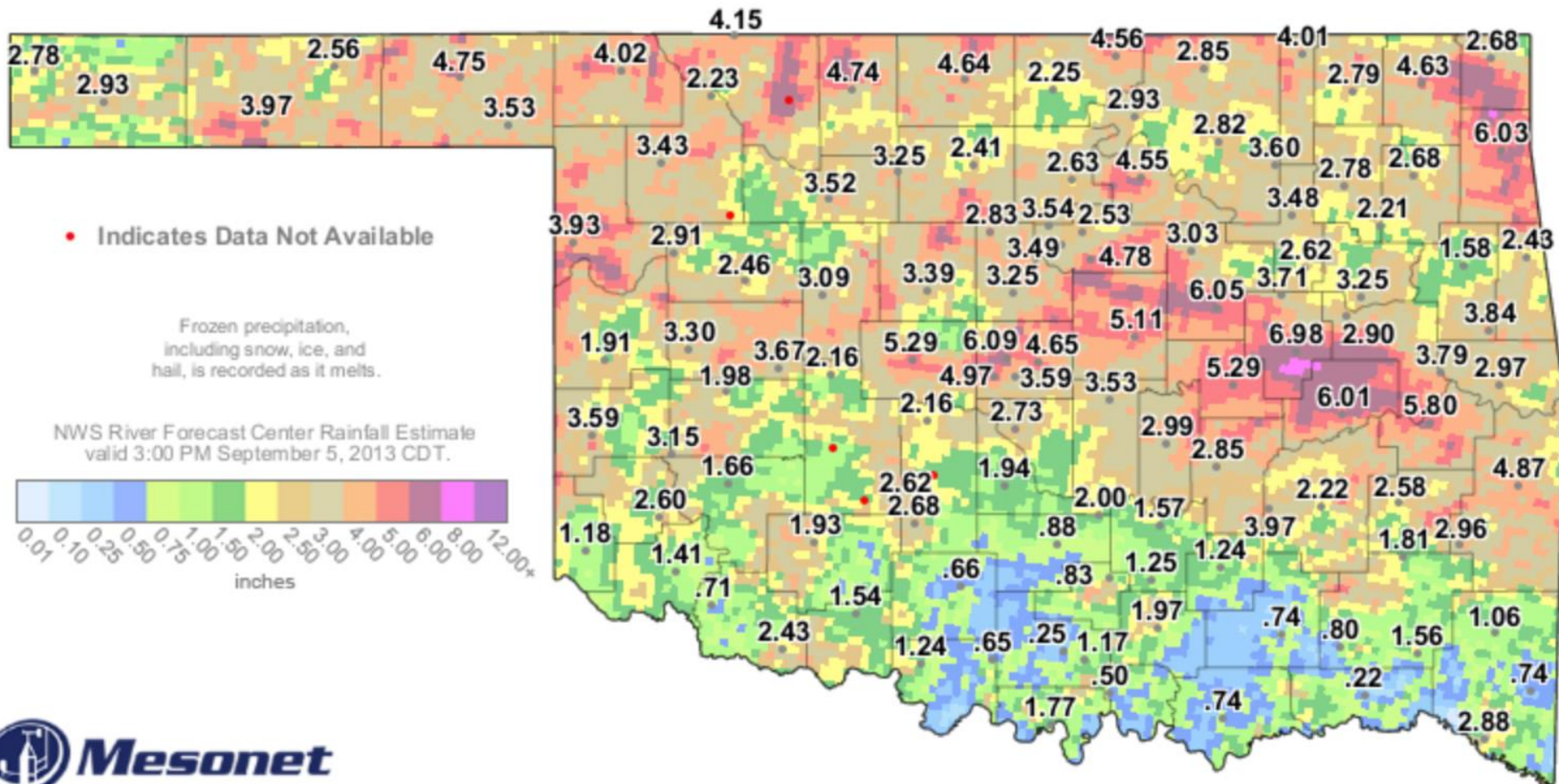


Mesonet
30-Day Rainfall (inches)

4:05 PM April 18, 2013 CDT

30-day Rainfall Accumulation

30-day Rainfall Accumulation

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30-Day Rainfall (inches)

3:35 PM September 5, 2013 CDT

Created 3:39:12 PM September 5, 2013 CDT. © Copyright 2013



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Decision Action Triggers

Shift from calendar-based management to weather-based management.



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Oklahoma's Weather Network

Tipton Farm Monitor

Current Conditions at 3:15 pm CDT - August 1, 2013

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 Sunrise: 6:46 am  Sunset: 8:39 pm

96°F

Wind Direction



Feels Like: **99°F**
Humidity: **35%**
24-hr Rainfall: **0.00 in**

Wind Speed 10-meter: **7.6 mph**
Wind Speed 2-meter: **5.6 mph**

3-day Avg 4" Bare Soil: **89°F**
10-day Rainfall: **0.35 in**

TODAY



Hot
High **99°F**

TONIGHT

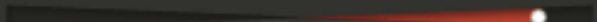


Partly Cloudy
Low **76°F**

TOMORROW

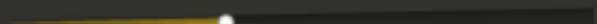


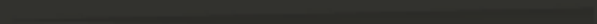
Hot
High **104°F**


Cattle Comfort -40  120


Evapotranspiration: Short 0.05  0.5


Evapotranspiration: Tall 0.05  0.8

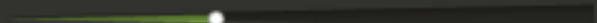
Burning Index 0  120

Inversion 0  +12

Dispersion 1  6

10-Inch Soil Moisture 0  1

Keetch-Byram Drought Index 0  800

Peanut Leaf Spot 0  60

Pecan Scab 0  60

CATTLE COMFORT

Weather Variables

**AIR
TEMPERATURE**

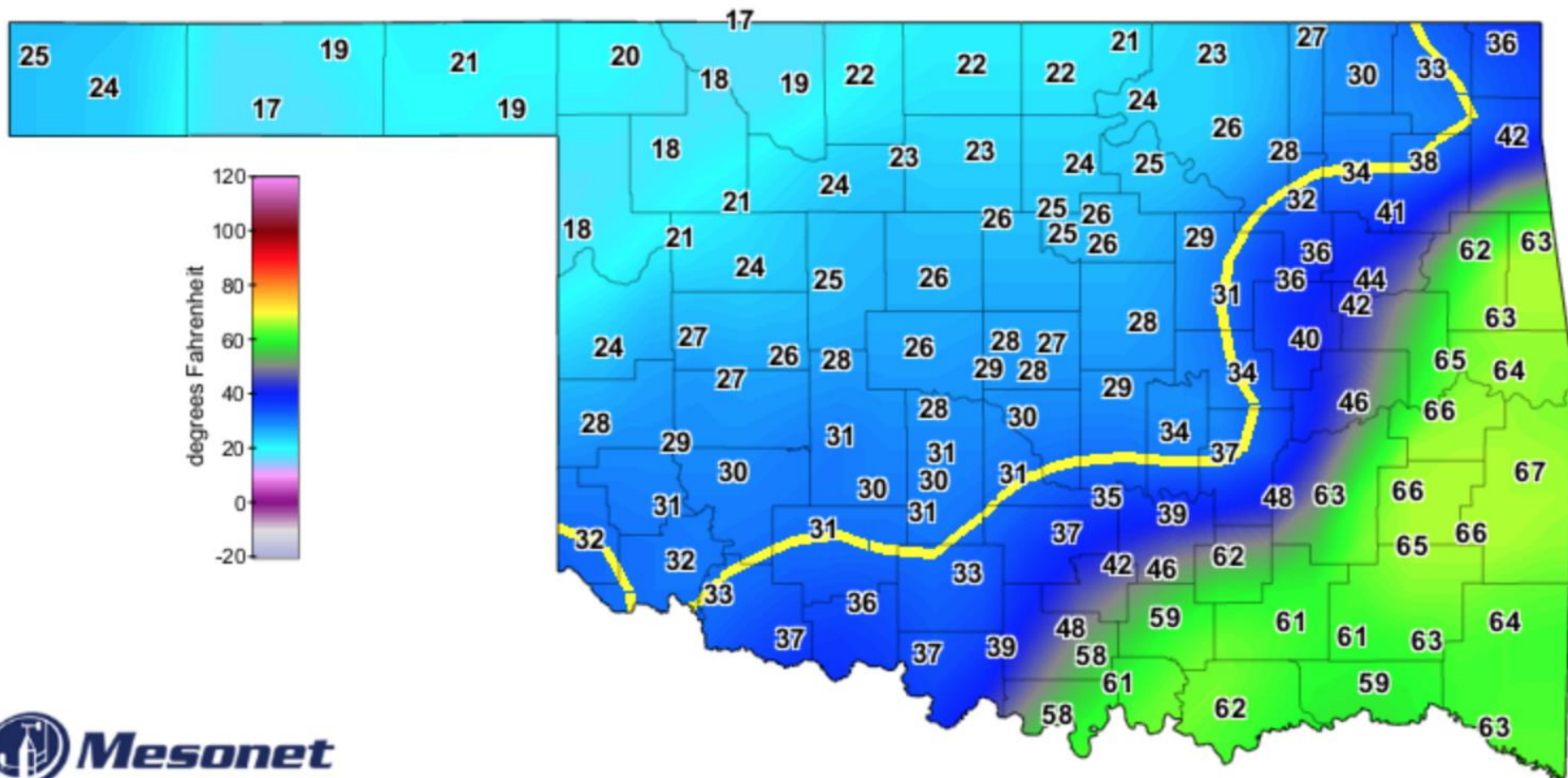
**Relative
Humidity**

Wind Speed

**Solar
Radiation**







 **Mesonet**
Air Temperature (°F)

7:20 AM December 20, 2013 CST
Created 7:23:56 AM December 20, 2013 CST. © Copyright 2013



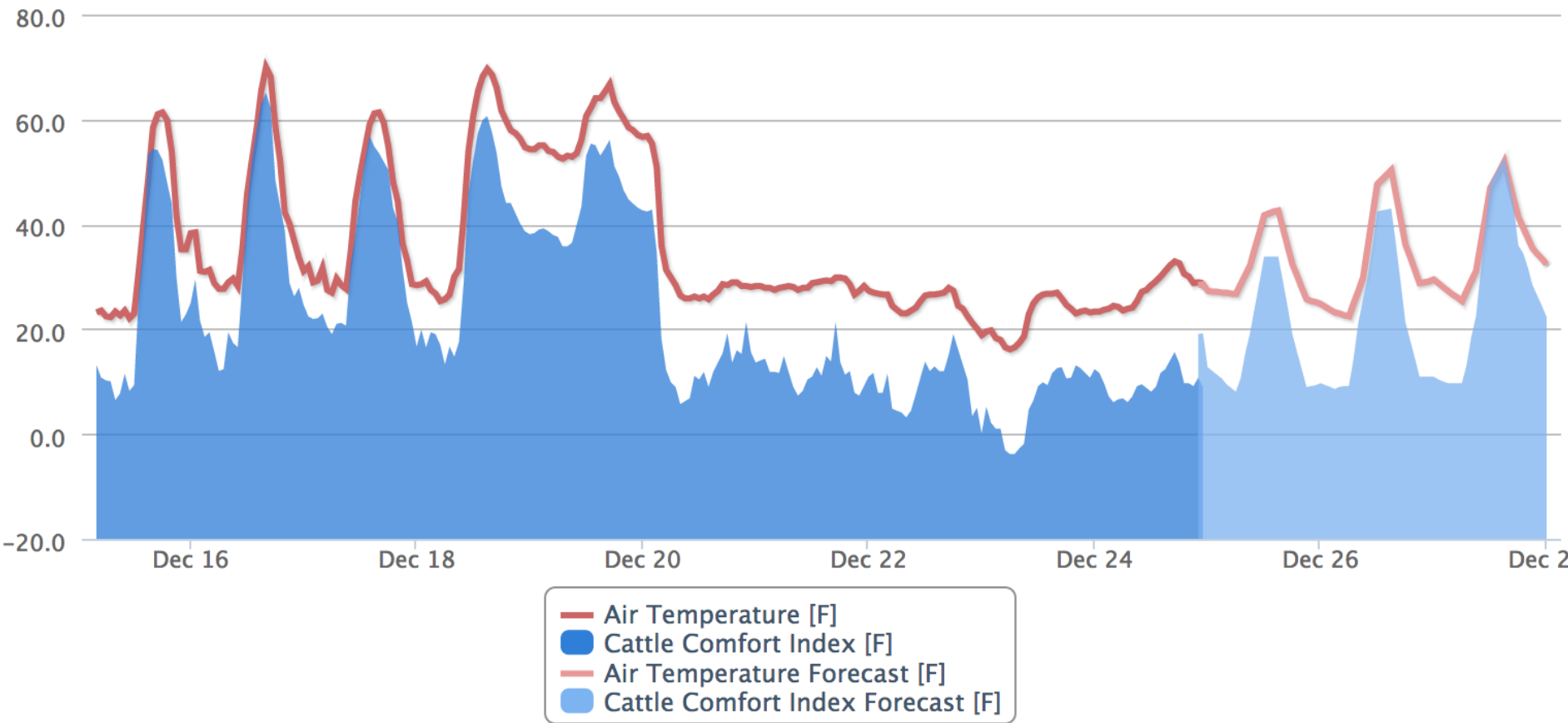


View Graph



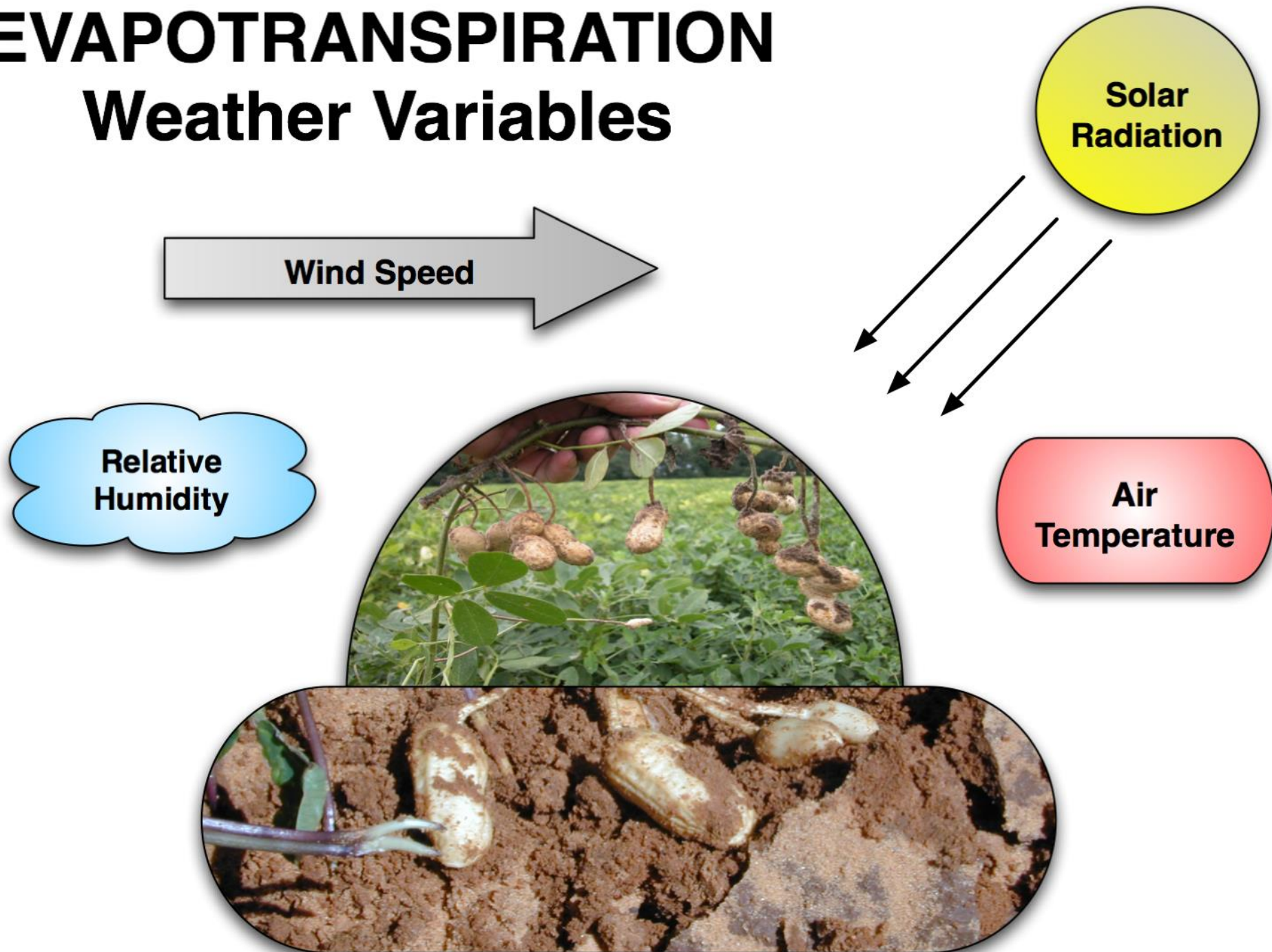
View Table

Past 10 Days and Forecast Cattle Comfort Graph for Kingfisher



EVAPOTRANSPIRATION

Weather Variables



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Wheat

[Wheat Growth Day Counter](#)[Drift Risk Advisor](#)[Irrigation Planner](#)[Degree-day Heat Unit Calculator](#)[First Hollow Stem Advisor](#)

Wheat Links

[OSU Nitrogen Use Efficiency](#)[OSU/USDA Greenbug Advisor](#)[OSU Wheat Pest Database](#)[OSU Wheat Publications](#)[USDA OK Grain Market News](#)[USDA Daily Grain Summary](#)[Kansas City Board of Trade](#)

First Hollow Stem Advisor

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STATEWIDE MAPS

[Statewide Maps](#)[Local Mesonet Site](#)

2 WEEK PROJECTION MAP

☐ Current Conditions☐ 1 Week Projection☒ 2 Week Projection

Choose FHS Category

First Hollow Stem Category

☐ Early Varieties☐ Middle Varieties☐ Late Varieties[Look up category by specific wheat variety](#)

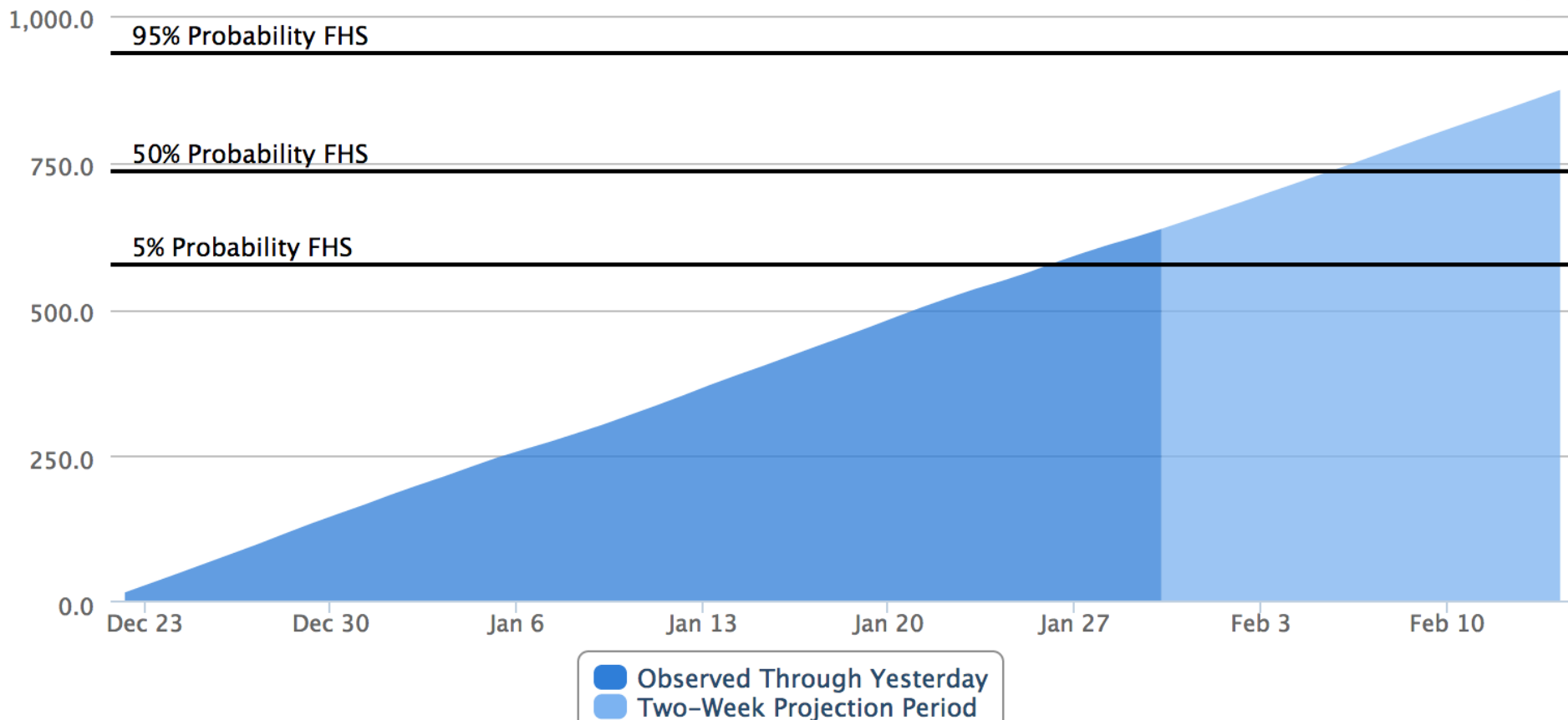


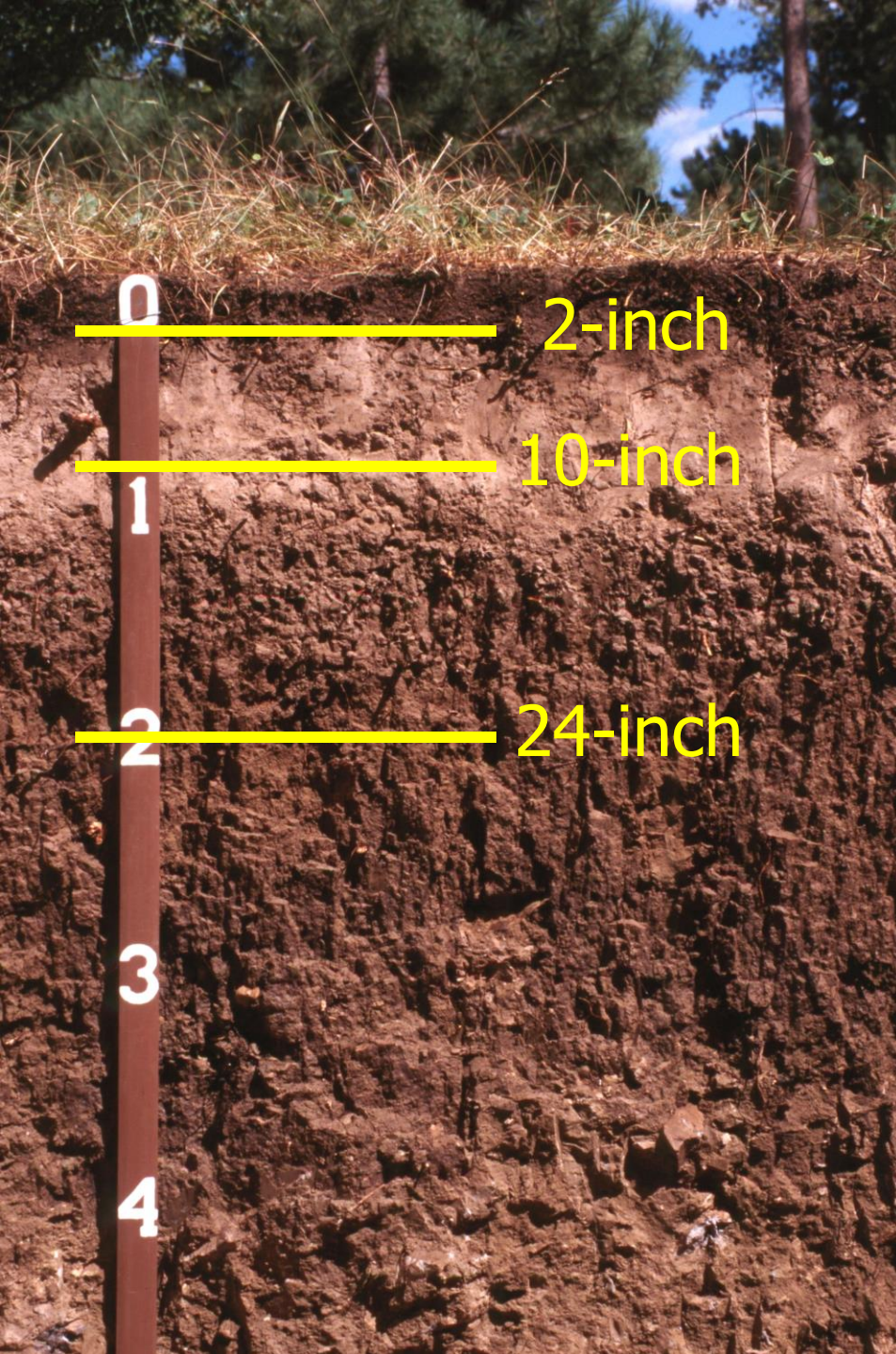
through February 14, 2014

Created 2:00:06 AM January 31, 2014 CST. © Copyright 2014

[LOCAL MESONET SITE](#)[NEWPORT](#)[SOIL HEAT UNITS \(EARLY\)](#)[View Graph](#)[View Table](#)

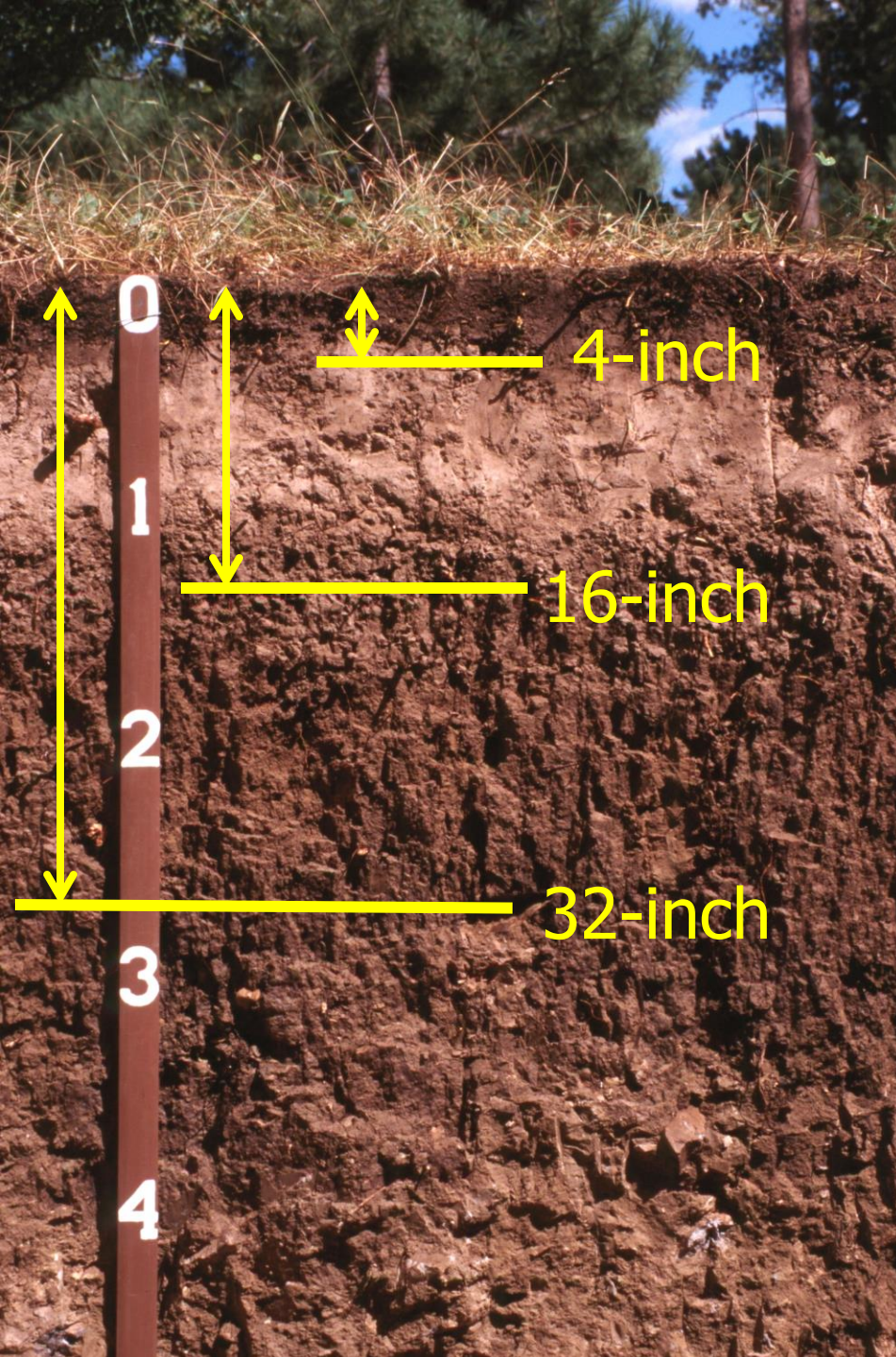
Soil Heat Units for Newport (EARLY Varieties)





Soil Moisture Sensors

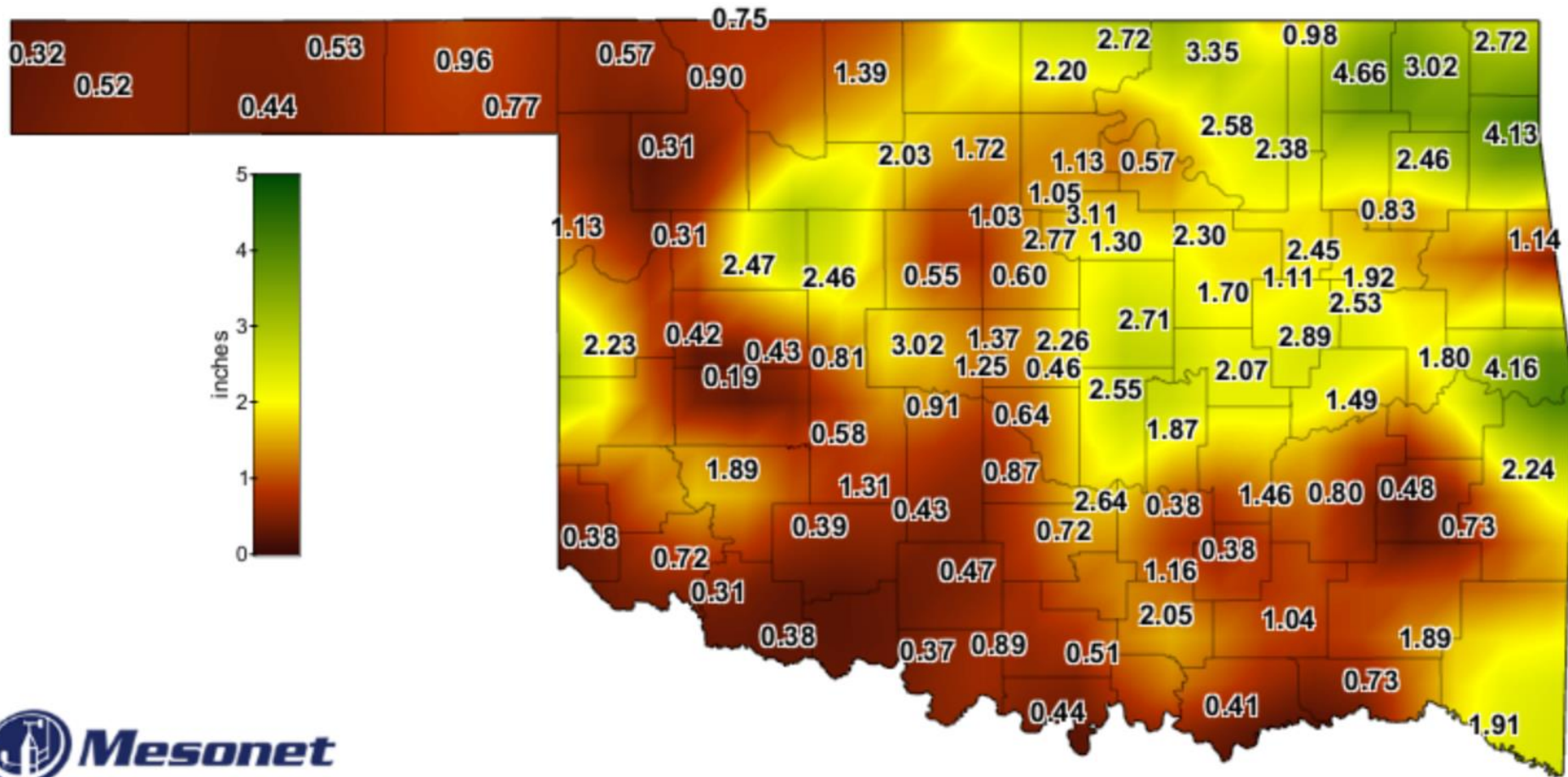
Plant Available Water



16-inch Plant Available Water

[Back to Soil Moisture/Temperature](#)

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16-inch Plant Available Water

September 4, 2013

Created 7:30:13 AM September 5, 2013 CDT. © Copyright 2013



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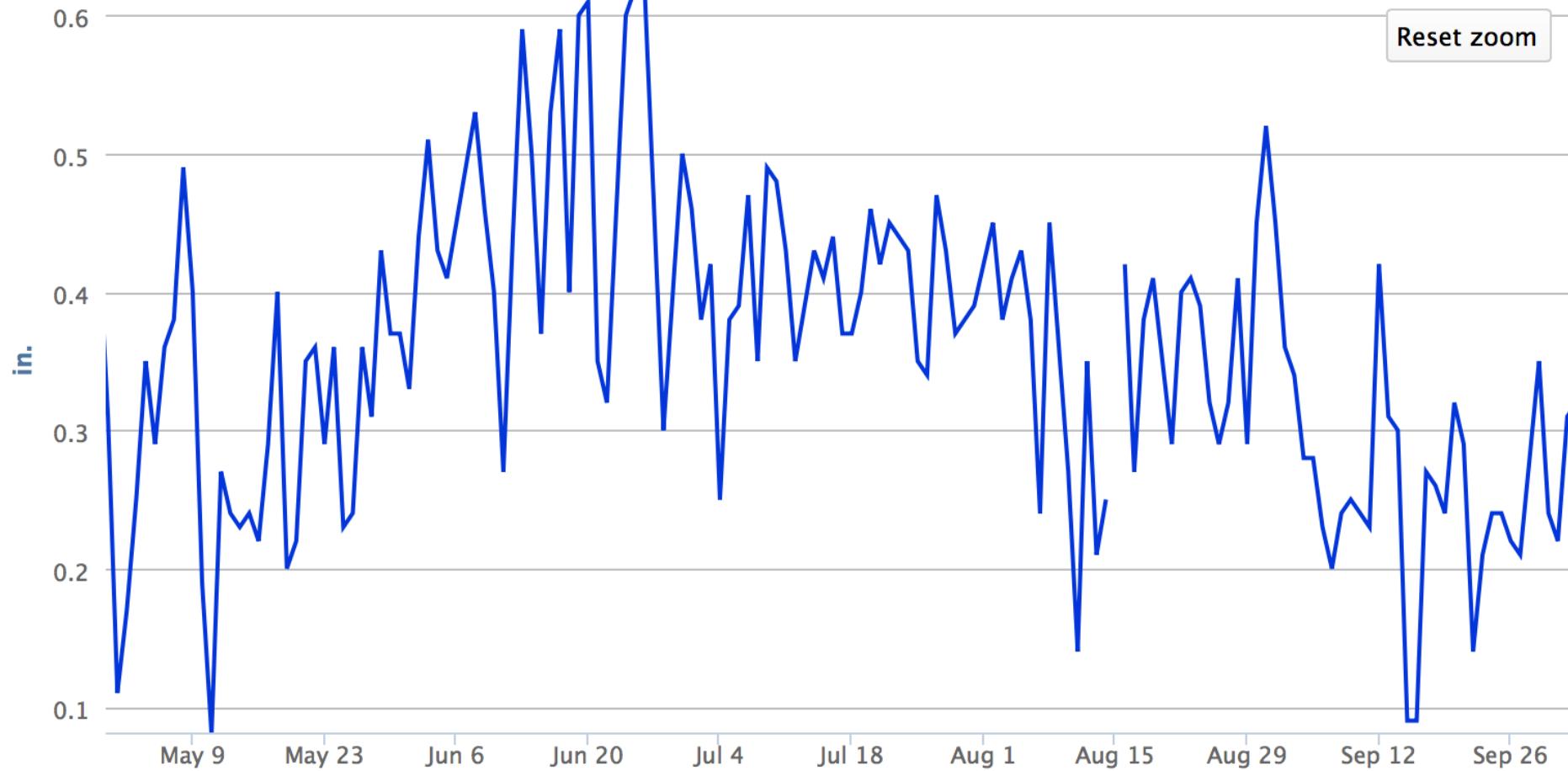
MOBILE MESONET

FREE APP AVAILABLE FOR IPHONE AND ANDROID!





Long-Term Averages

[Clear Graph](#)[Reset zoom](#)

— Weatherford Total Potential Evapotranspiration, Short Crop, 2011 (in.)



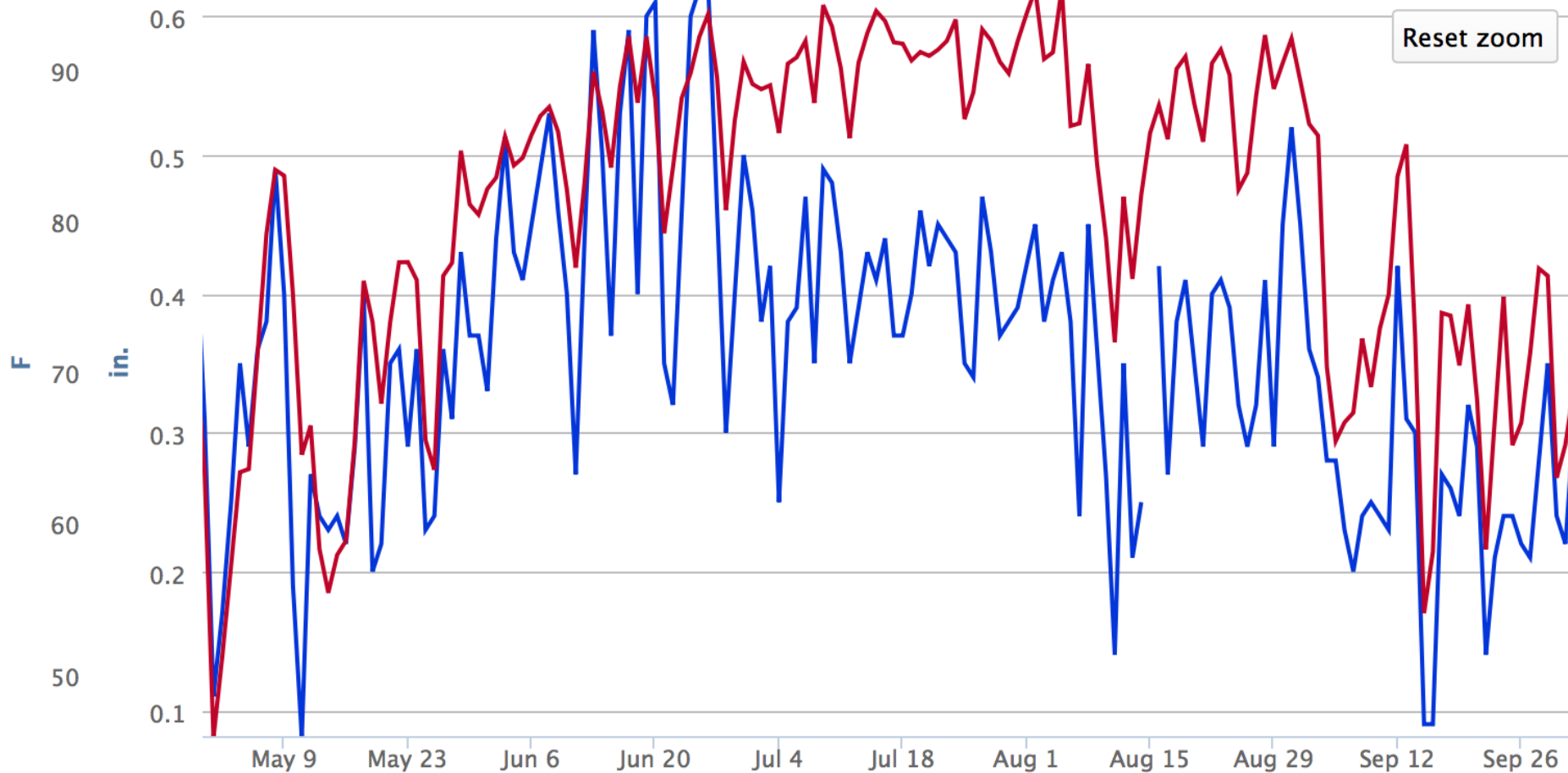
Mesonet
Oklahoma's Weather Network

Long-Term Averages

Clear Graph



Reset zoom

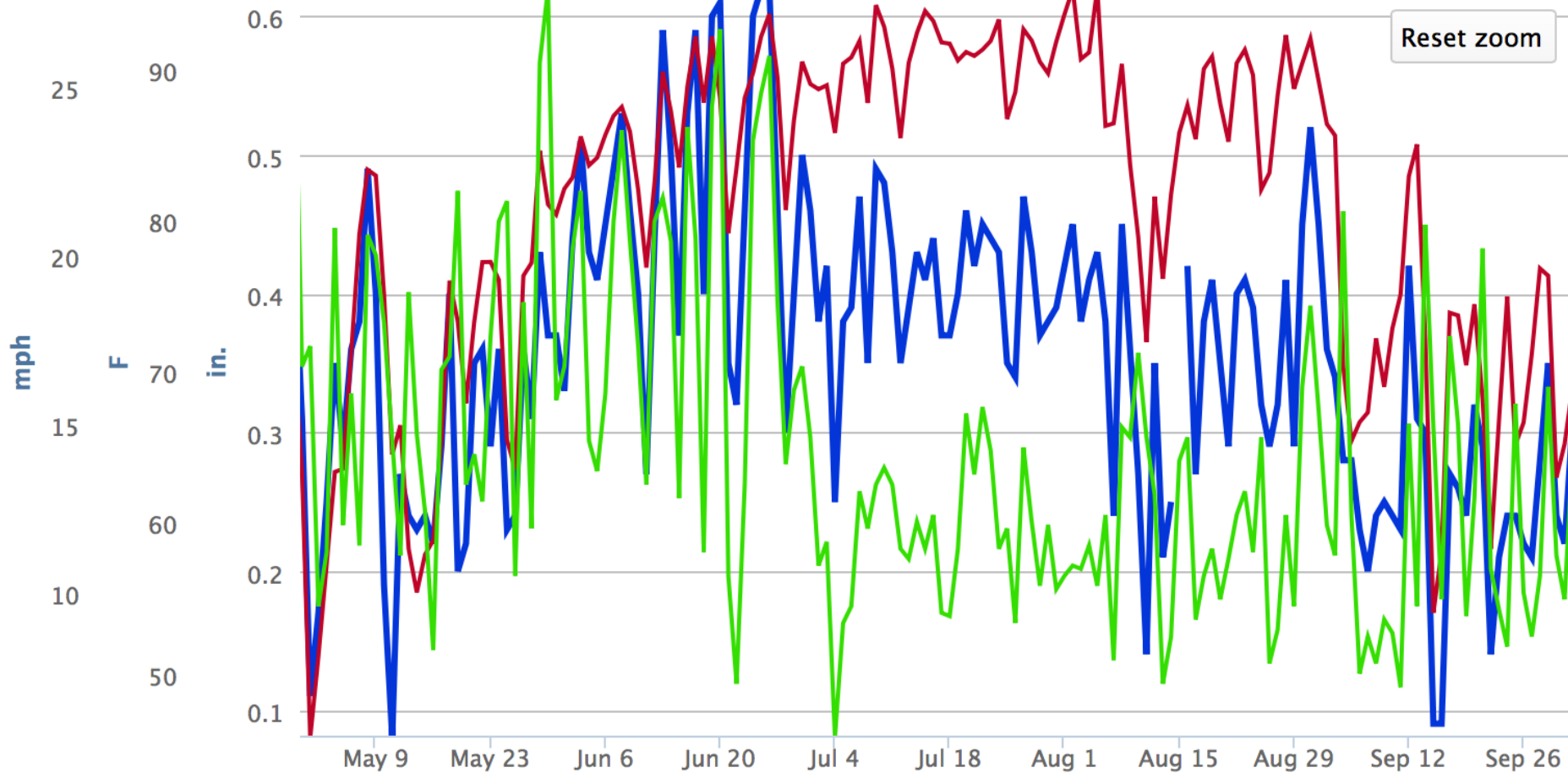


— Weatherford Total Potential Evapotranspiration, Short Crop, 2011 (in.)
— Weatherford Average Air Temperature, 2011 (F)



Mesonet
Oklahoma's Weather Network

Long-Term Averages

[Clear Graph](#)[Reset zoom](#)

- Weatherford Total Potential Evapotranspiration, Short Crop, 2011 (in.)
- Weatherford Average Air Temperature, 2011 (F)
- Weatherford Average Wind Speed, 2011 (mph)



Mesonet
Oklahoma's Weather Network

National Weather Service and NOAA



ABOUT

Local forecast by
"City, St" or ZIP code

Enter location ...

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Winter Storm Affecting Central Plains and Ohio Valley

A winter storm moving out of the Rockies will bring a wintry mix to the central Plains and Ohio Valley on Friday, and move into the Great Lakes and northern New England on Saturday. Heavy snow is expected from the central Plains to Lake Michigan on Friday, and from the Great Lakes and northern New England on Saturday. Freezing rain is forecast from the southern Plains to the Ohio Valley on Friday. [Read More...](#)

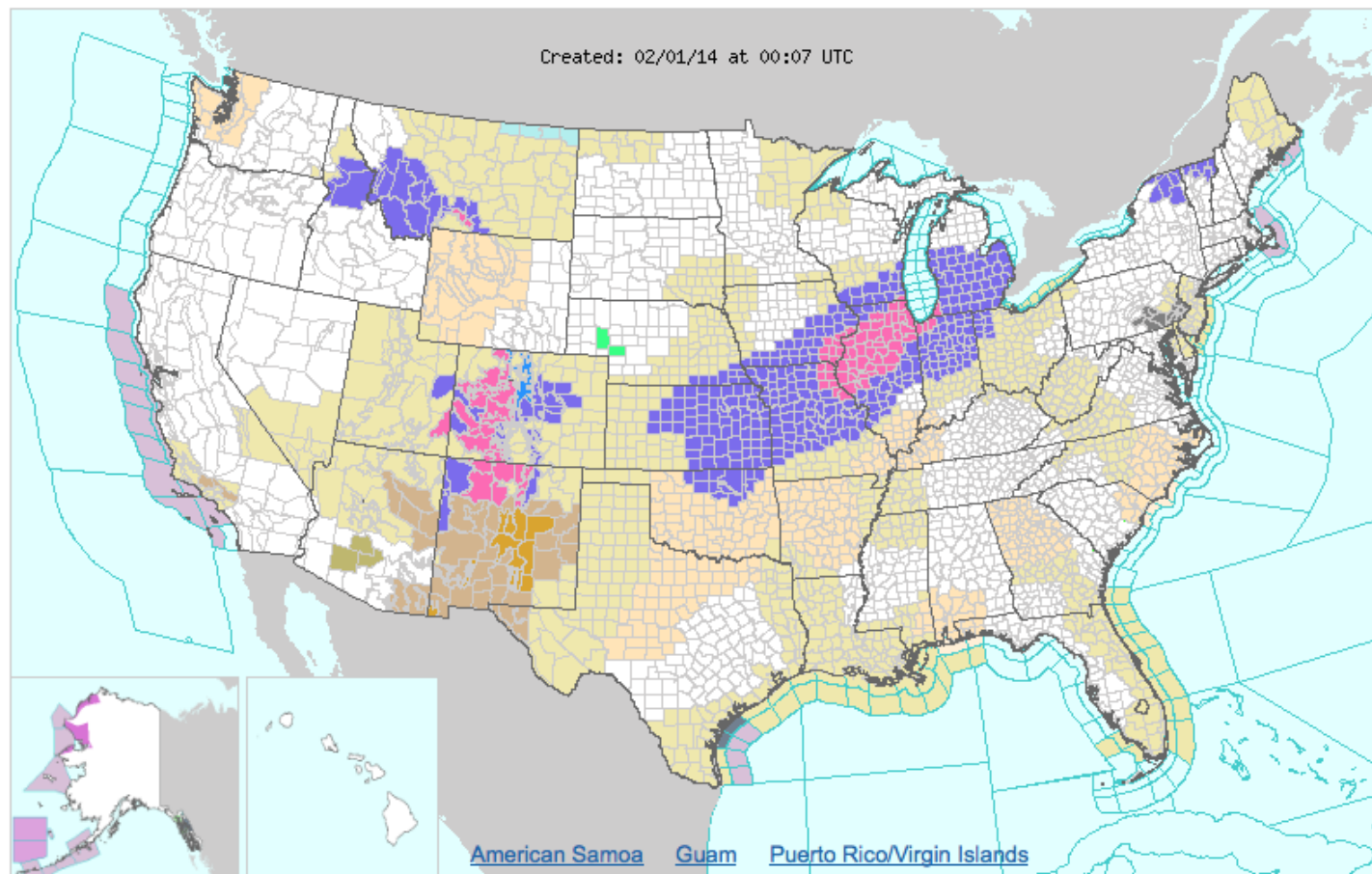
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Quad Cities, IA/IL

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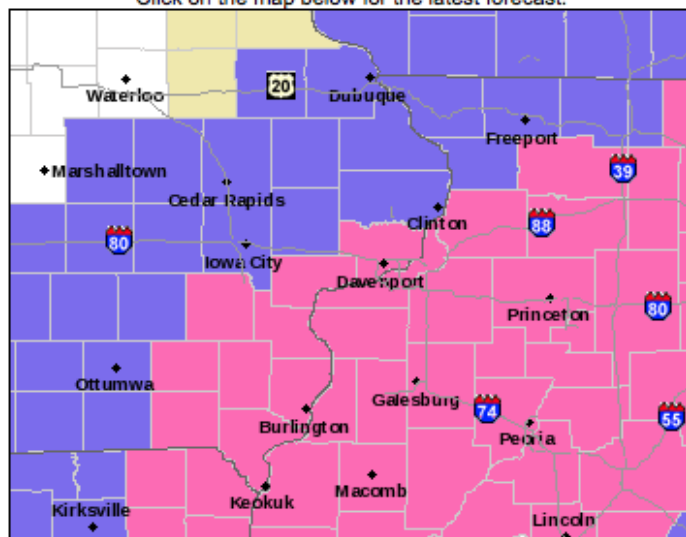
Top News of the Day

Recently Issued: [Storm Report](#)

- [Winter Storm Web Briefing Jan 31st, 2014](#)
- [Accumulating Snow On the Way...Mainly Tonight & Saturday AM](#)
- [2014 Spotter Training...More Classes to be Scheduled](#)

[Watches & Warnings](#)[Observations](#)[Forecast Graphics](#)[Rivers & Lakes](#)[Climate](#)[Briefing](#)

Click on the map below for the latest forecast.

[Read watches, warnings & advisories](#)[Winter Storm Warning](#)[Winter Weather Advisory](#)[Hazardous Weather Outlook](#)

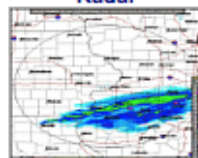
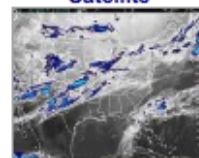
Last map update: Fri, Jan. 31, 2014 at 6:12:15 pm CST

Latest Conditions in **Moline, IL**

Choose Your Front Page City

Jan 31
5:52 pm

Fair

15°F
(-9°C)Select A City: [Weather Story](#)[Radar](#)[Satellite](#)[Weather Map](#)

Local forecast by

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HAZARDOUS WEATHER CONDITIONS

[Winter Storm Warning in effect from January 31, 06:00 PM CST until February 1, 06:00 PM CST](#)

[Hazardous Weather Outlook](#)

Current Conditions

[En Español](#)

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Fair

12°F
-11°C

Humidity 64%
Wind Speed N 8 mph
Barometer 30.10 in (1020.8 mb)
Dewpoint 2°F (-17°C)
Visibility 10.00 mi
Wind Chill 0°F (-18°C)

Last Update on 31 Jan 5:52 pm CST

Current conditions at

Davenport Municipal Airport (KDVN)

Lat: 41.62°N Lon: 90.58°W Elev: 753ft.

[More Local Wx](#) | [3 Day History](#) | [Mobile Weather](#)

Davenport IA

7 Day Forecast

[Quad Cities, IA/IL](#)

NWS Weather Forecast Office

TONIGHT



100%

Snow

Low: 13 °F ↑

SATURDAY



100%

Snow

High: 25 °F

SATURDAY
NIGHT



40%

Chance
Snow

Low: 0 °F

SUNDAY



Cold

High: 9 °F

SUNDAY
NIGHT



Mostly
Clear

Low: -8 °F

MONDAY



Mostly
Sunny

High: 17 °F

MONDAY
NIGHT



20%

Slight Chc
Snow

Low: 7 °F

TUESDAY



Snow
Likely

High: 21 °F

TUESDAY
NIGHT



Snow
Likely

Low: 10 °F

Tonight Occasional snow. Temperature rising to around 18 by 5am. East wind 5 to 10 mph. Chance of precipitation is 100%. Total nighttime snow accumulation of around 3 inches.

Saturday Snow, mainly before 4pm. High near 25. Northeast wind 10 to 15 mph becoming north in the afternoon. Chance of precipitation is 100%. New snow accumulation of around 3 inches.

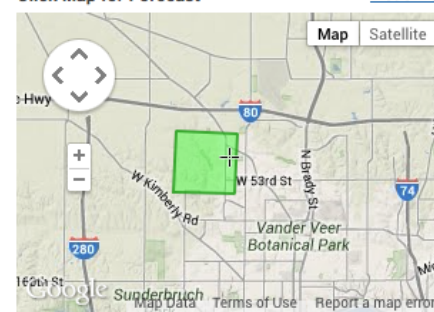
Saturday Night A 40 percent chance of snow before 7pm. Cloudy, then gradually becoming partly cloudy, with a low around 0. Wind chill values as low as -10. Northwest wind 10 to 15 mph. New snow accumulation of less than a half inch possible.

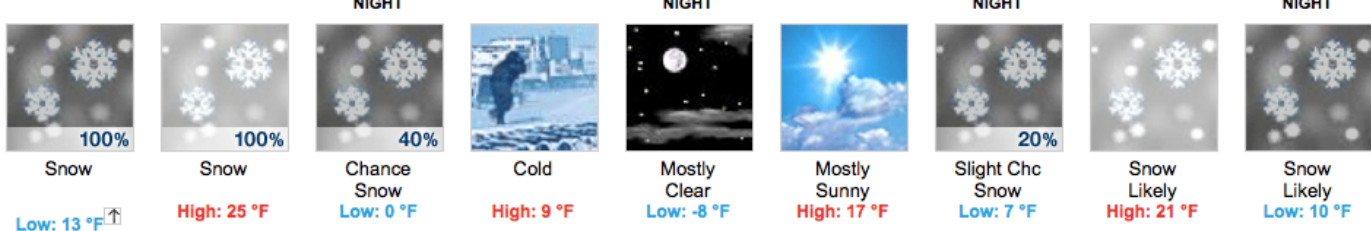
Sunday Sunny and cold, with a high near 9. Wind chill values as low as -15.

Sunday Night Mostly clear, with a low around -8.

[Click Map for Forecast](#)

[Disclaimer](#)





Tonight	Occasional snow. Temperature rising to around 18 by 5am. East wind 5 to 10 mph. Chance of precipitation is 100%. Total nighttime snow accumulation of around 3 inches.
Saturday	Snow, mainly before 4pm. High near 25. Northeast wind 10 to 15 mph becoming north in the afternoon. Chance of precipitation is 100%. New snow accumulation of around 3 inches.
Saturday Night	A 40 percent chance of snow before 7pm. Cloudy, then gradually becoming partly cloudy, with a low around 0. Wind chill values as low as -10. Northwest wind 10 to 15 mph. New snow accumulation of less than a half inch possible.
Sunday	Sunny and cold, with a high near 9. Wind chill values as low as -15.
Sunday Night	Mostly clear, with a low around -8.
Monday	Mostly sunny, with a high near 17.
Monday Night	A 20 percent chance of snow after 7pm. Mostly cloudy, with a low around 7.
Tuesday	Snow likely. Cloudy, with a high near 21.
Tuesday Night	Snow likely. Cloudy, with a low around 10.
Wednesday	Snow likely. Cloudy, with a high near 13.
Wednesday Night	Mostly cloudy, with a low around -12.
Thursday	Mostly sunny and cold, with a high near 5.
Thursday Night	Mostly cloudy, with a low around -6.
Friday	A slight chance of snow. Mostly cloudy, with a high near 14.

Additional Forecasts and Information

[ZONE AREA FORECAST FOR SCOTT COUNTY, IA](#)

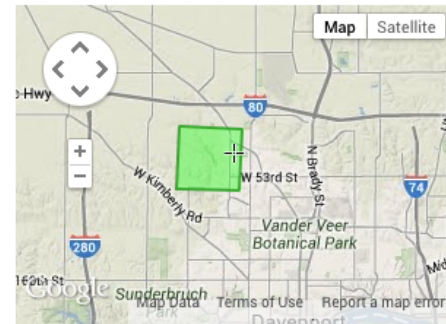
[Forecast Discussion](#)
[Printable Forecast](#)
[Text Only Forecast](#)

[Hourly Weather Graph](#)
[Tabular Forecast](#)
[Quick Forecast](#)

[Air Quality Forecasts](#)
[International System of Units](#)
[About Point Forecasts](#)

Click Map for Forecast

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Lat/Lon: 41.58°N 90.62°W Elevation: 699 ft

FORECAST DETAILS

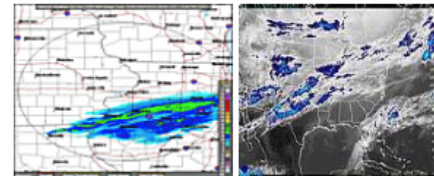
Point Forecast: Point Forecast: Davenport IA
 41.58°N 90.62°W (Elev. 699 ft)
 3:12 pm CST Jan 31, 2014

Last Update:
Forecast Valid: 7pm CST Jan 31, 2014-6pm
 CST Feb 7, 2014

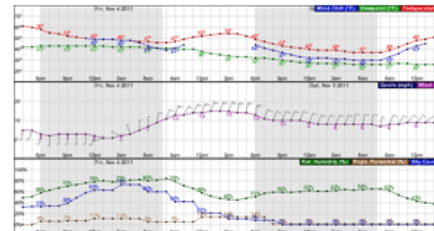
[Forecast Discussion](#)

[KML](#) [XML](#)

RADAR & SATELLITE IMAGES



HOURLY WEATHER GRAPH



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Featured on Climate.gov

1 2 3 4 5



FEMA



US Army Corps
of Engineers



Drought Resilience Partnership formed under Climate Action Plan »

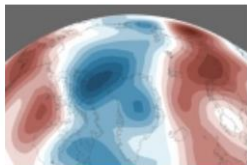
November 26, 2013

Filed in: [Supporting Decisions](#)

Under the Climate Action Plan, the White House launched the National Drought Resilience Partnership on November 1. The partnership will make it easier for communities to find drought assistance and preparedness information by promoting partnership and information-sharing across government.

[learn more about the partnership »](#)

Recent Topics



2013 Arctic Report Card: Visual Highlights

December 10, 2013

Filed in: [News & Features](#)



NOAA's CanVis Tool lets coastal planners see 'What would it look like if...?'

December 19, 2013

Filed in: [News & Features](#)



Impacts of Climate Change/The GLOBE Program: Green-Up

December 20, 2013

Filed in: [Teaching Climate](#)

Weather drives agriculture



Climate Drives Weather





Thanks!

Al Sutherland
albert@mesonet.org

mesonet.org

