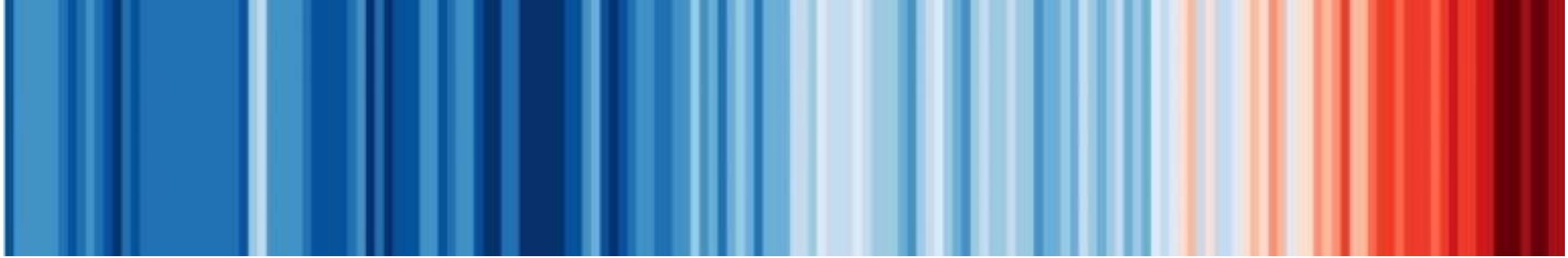
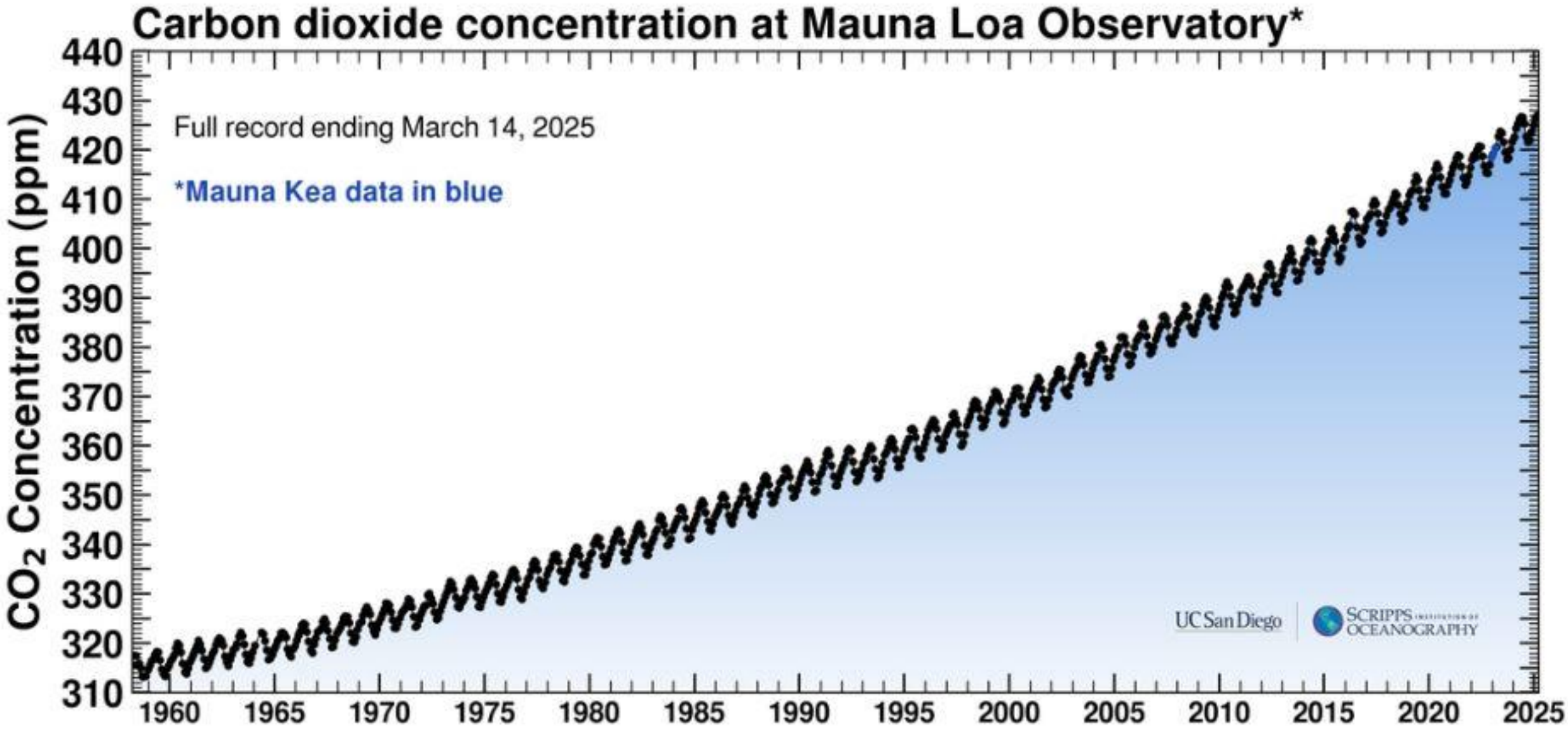
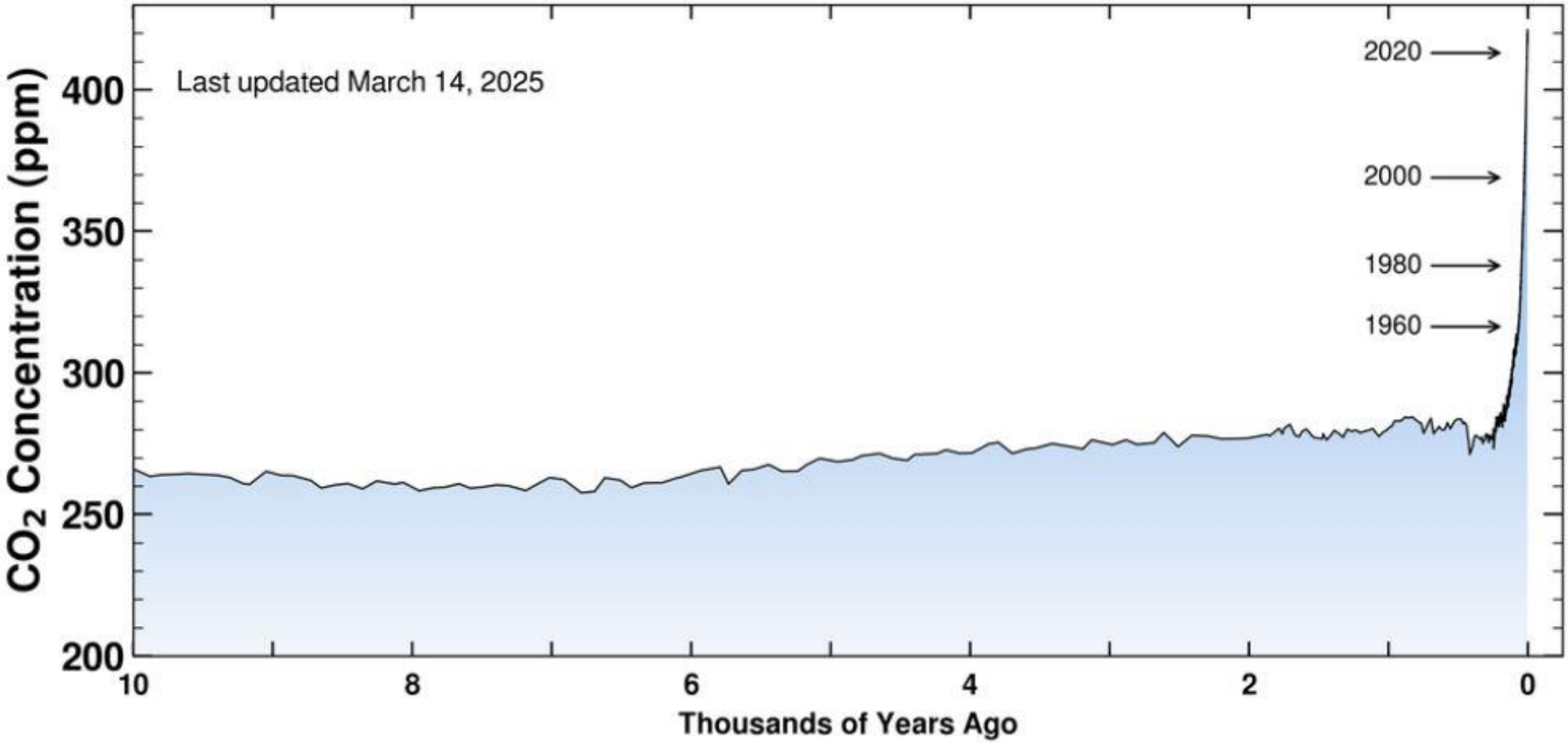
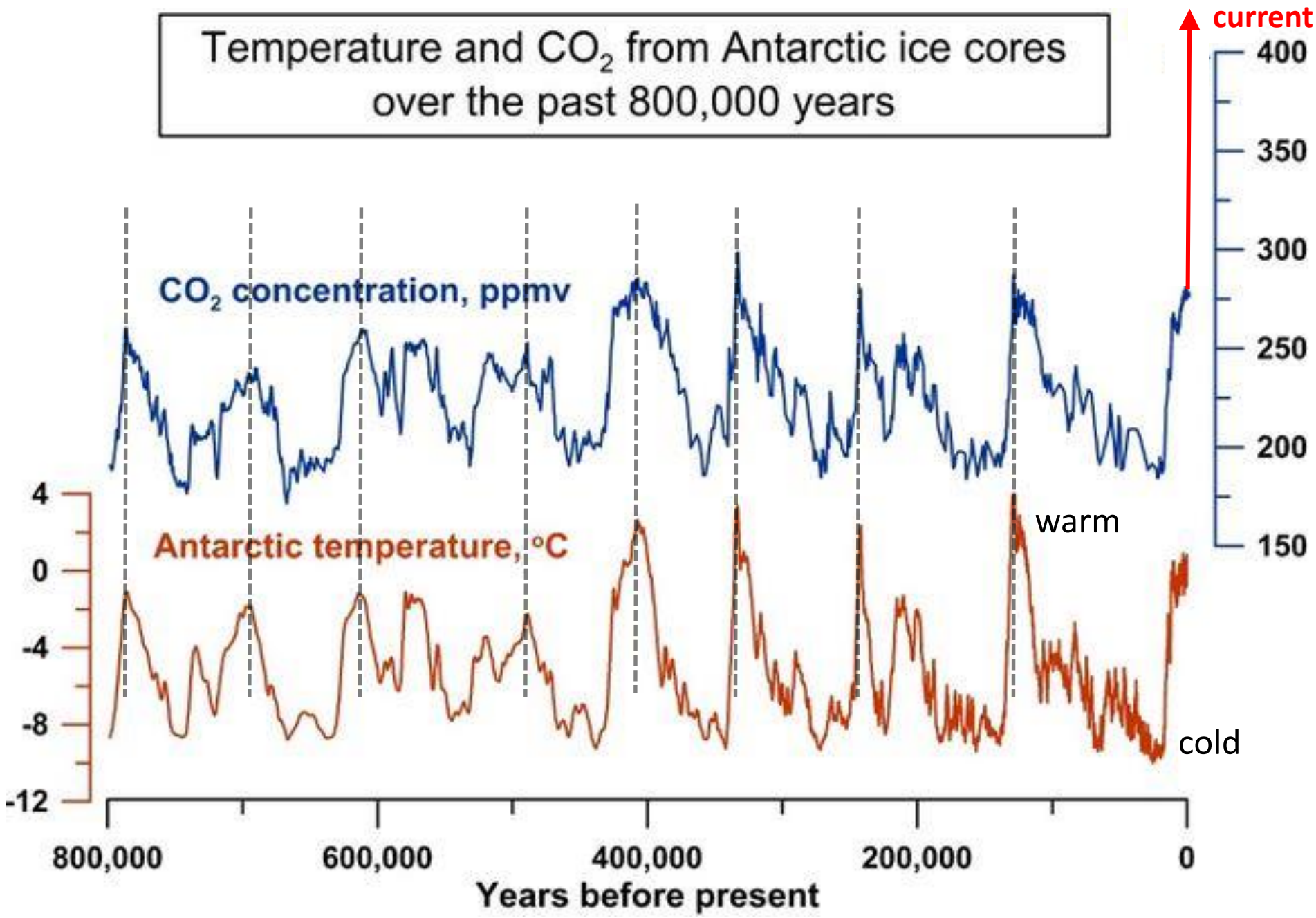


Ely Climate Group
elyminnesota.com/elyclimate & YouTube

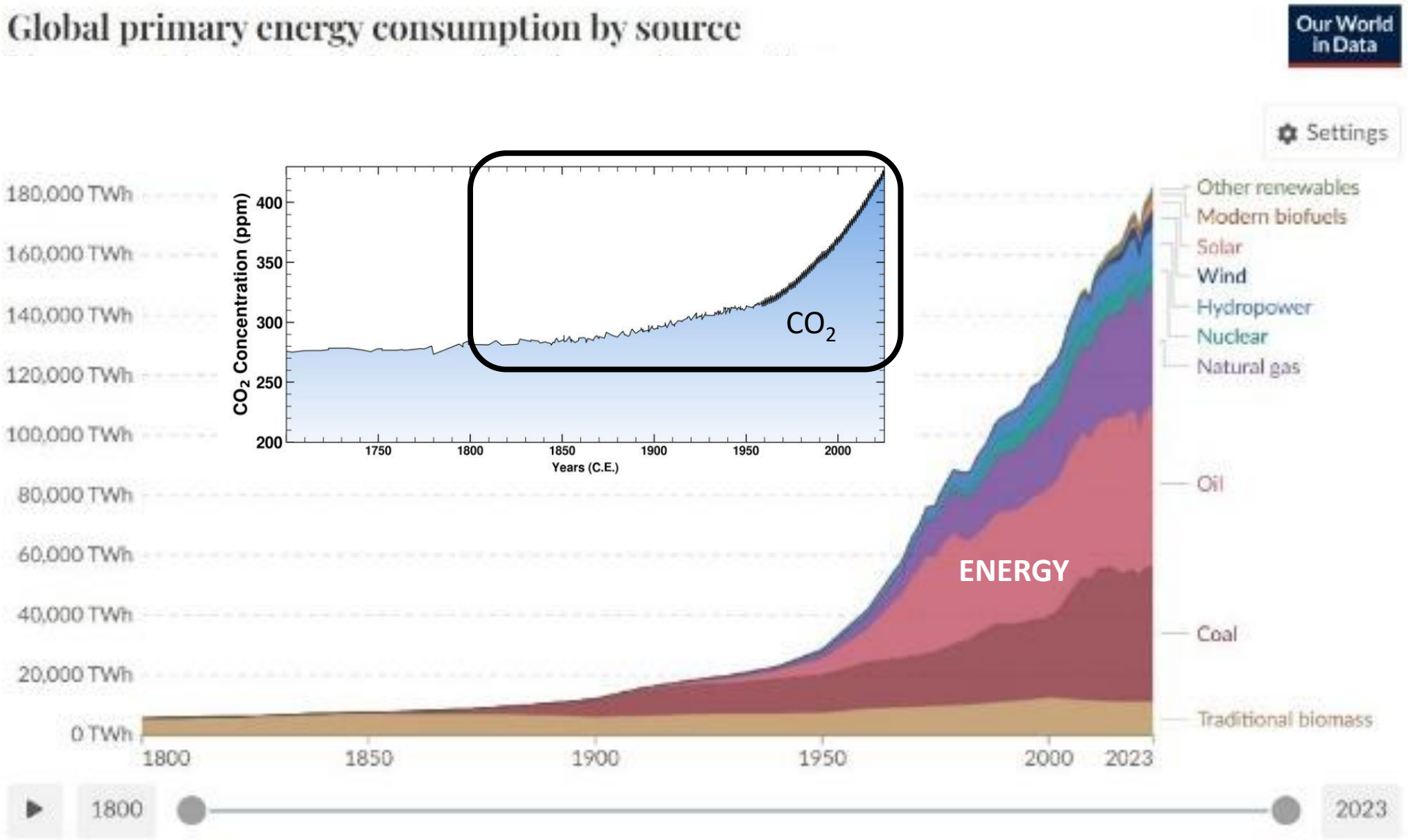
Barb Jones
b2jonesmn@gmail.com


Carbon dioxide concentration at Mauna Loa Observatory*
Full record ending March 14, 2025
*Mauna Kea data in blue
CO_2 Concentration (ppm)
440
430
420
410
400
390
380
370
360
350
340
330
320
310
1960
1965
1970
1975
1980
1985
1990
1995
2000
2005
2010
2015
2020
2025
UC San Diego
SCRIPPS INSTITUTION OF OCEANOGRAPHY


Last updated March 14, 2025
2020
2000
1980
1960
400
350
300
250
200
CO_2 Concentration (ppm)
10
8
6
4
2
0
Thousands of Years Ago


Temperature and CO_2 from Antarctic ice cores over the past 800,000 years
current
400
350
300
250
200
150
CO_2 concentration, ppmv
4
0
-4
-8
-12
Antarctic temperature, °C
warm
cold
800,000
600,000
400,000
200,000
0
Years before present

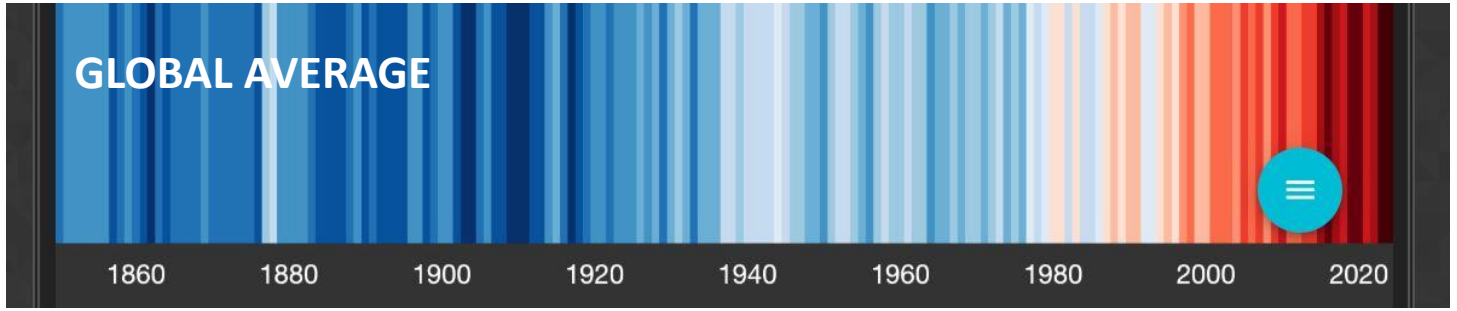
Global primary energy consumption by source

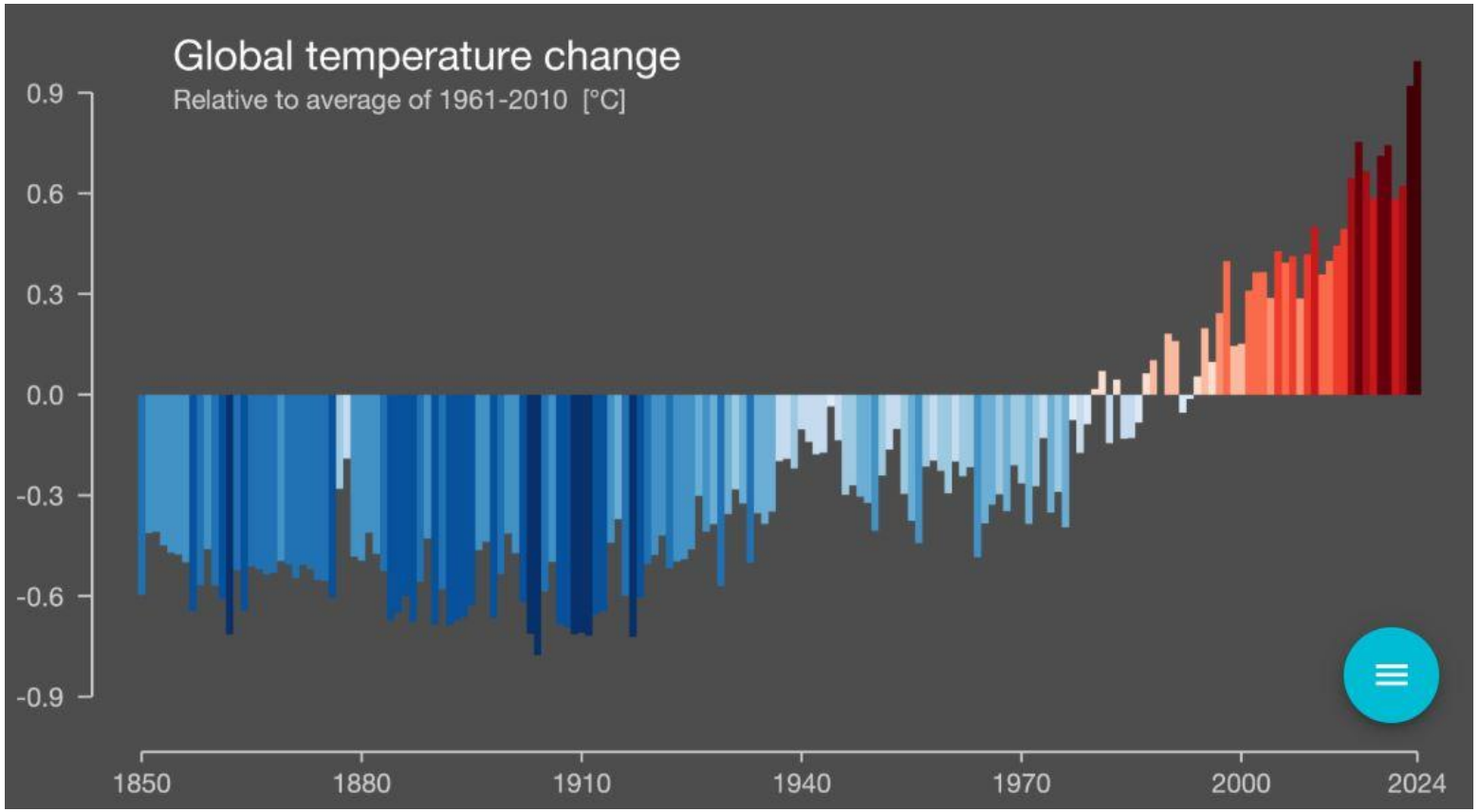


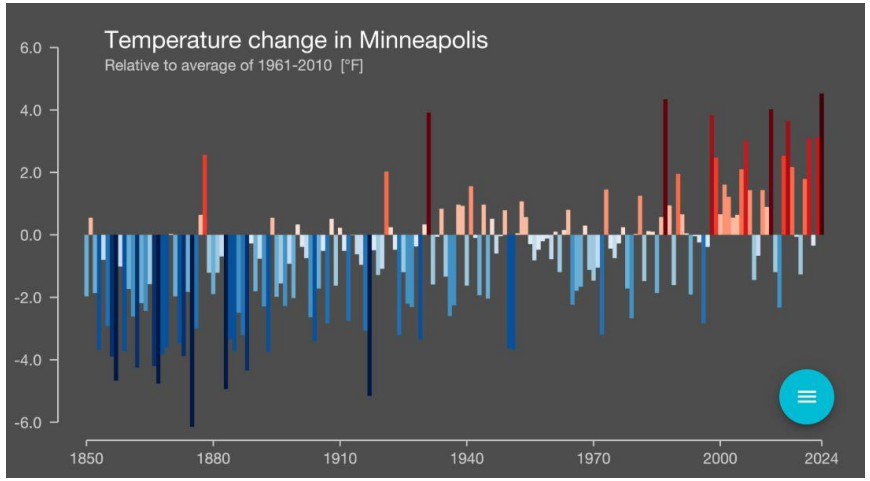
Data source: Energy Institute - Statistical Review of World Energy (2024); Smil (2017) – Learn more about this data

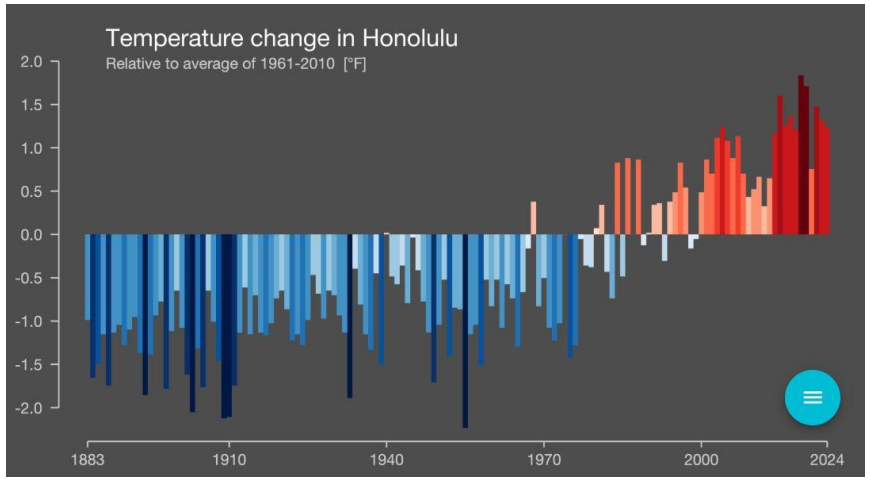
https://showyourstripes.info/c/globe
University of Reading UK

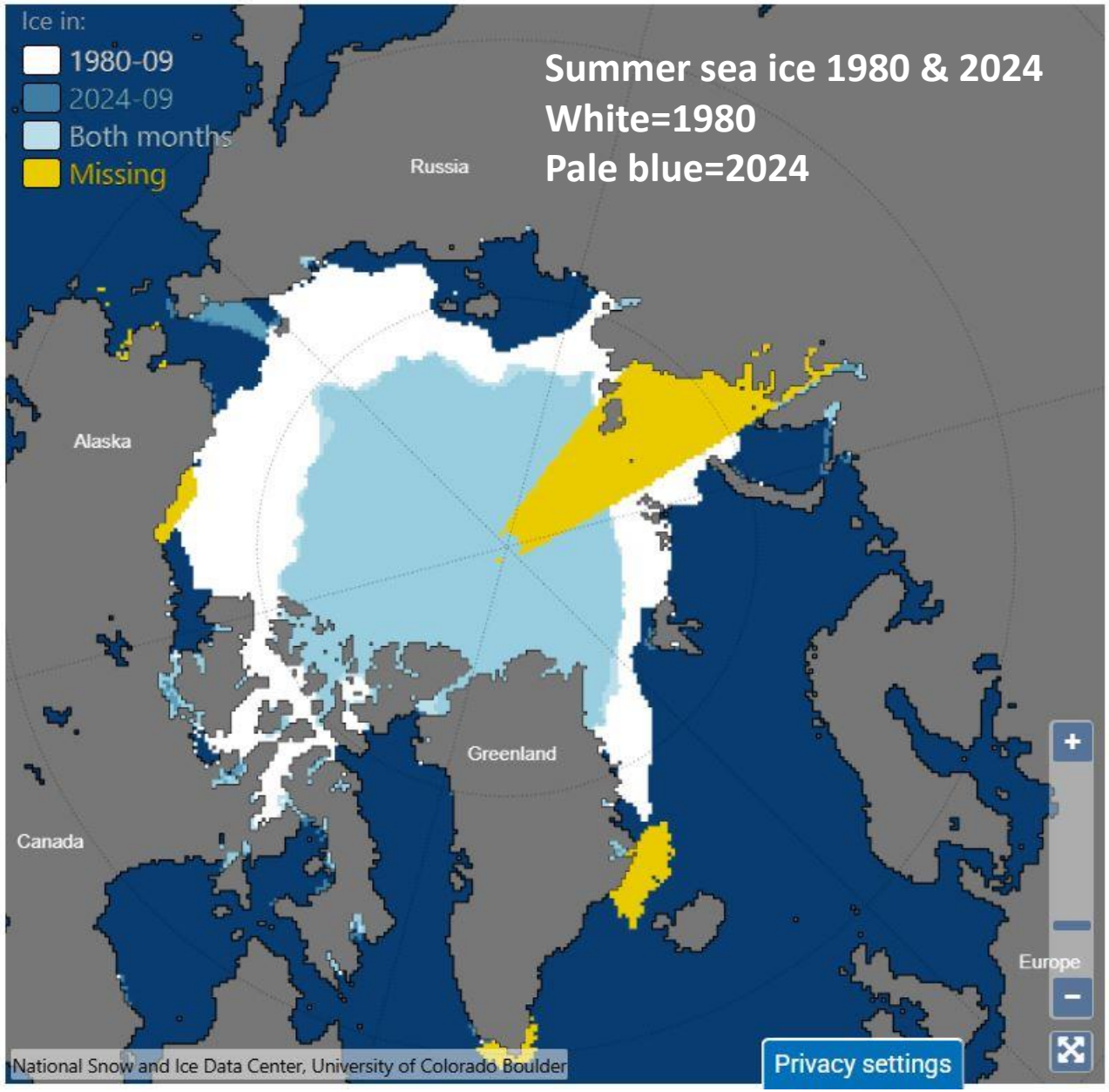
Graphics and lead scientist: **Ed Hawkins, National Centre for Atmospheric Science, UoR.**
Data: **Berkeley Earth & ERA5-Land, NOAA, UK Met Office, MeteoSwiss, DWD, SMHI, UoR & ZAMG**



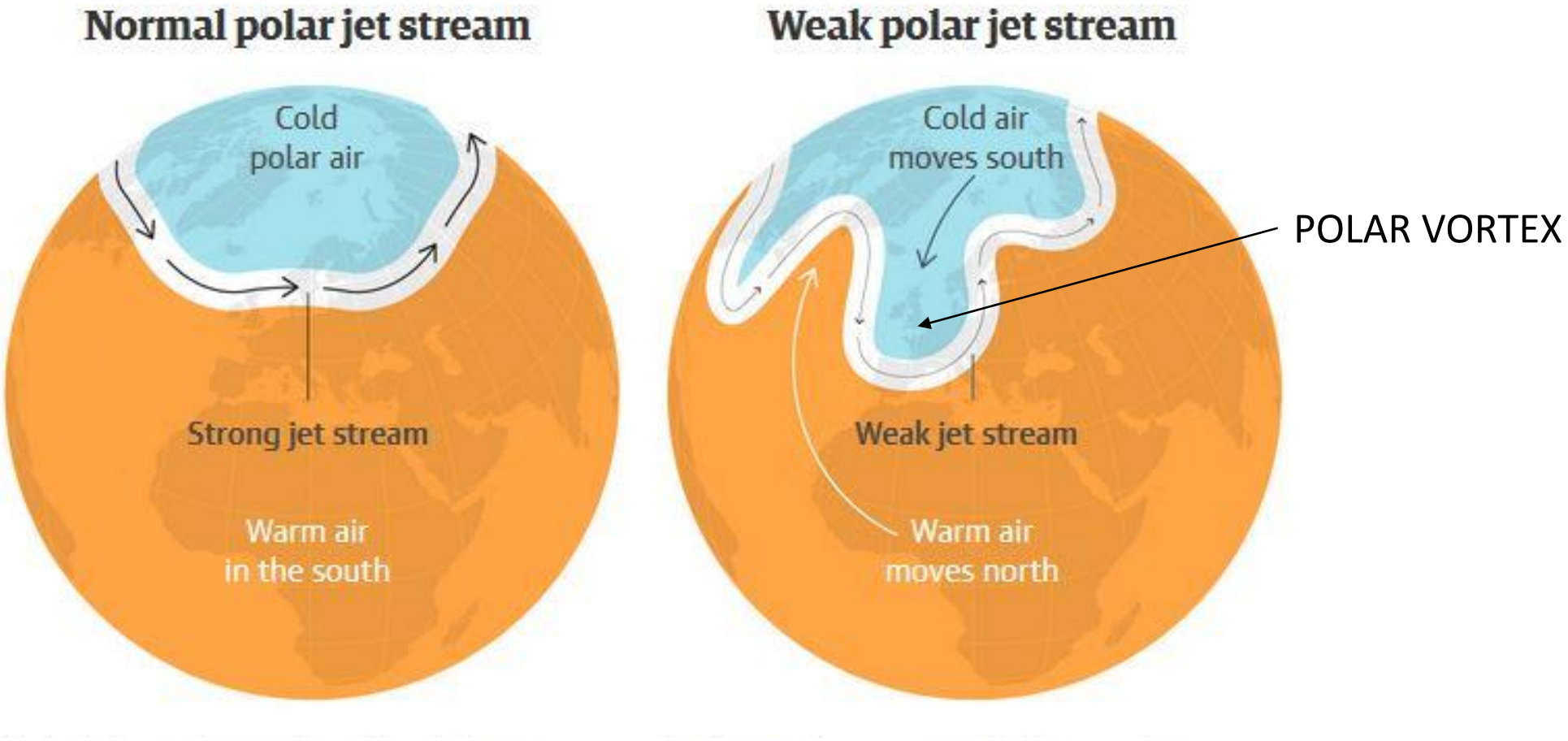




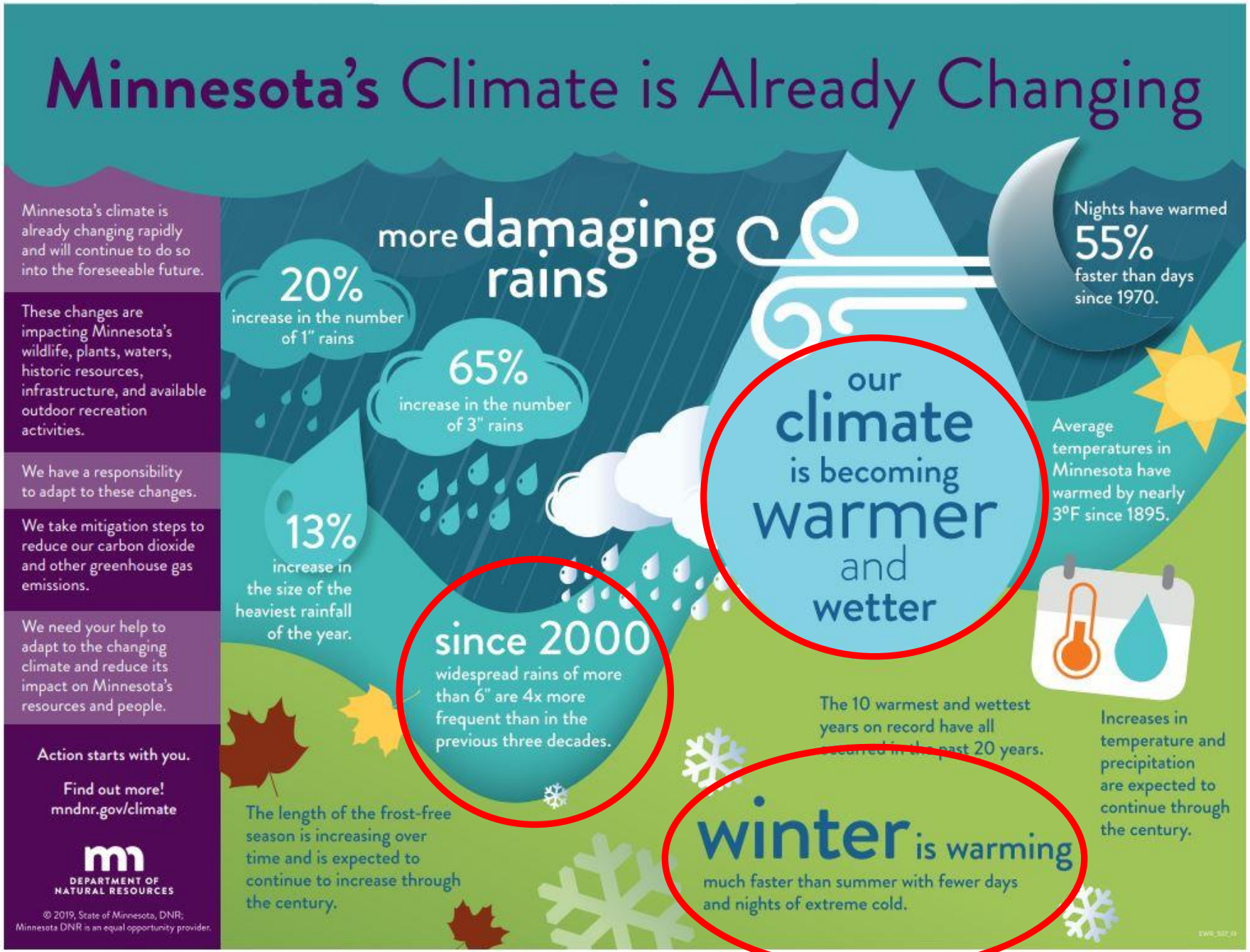


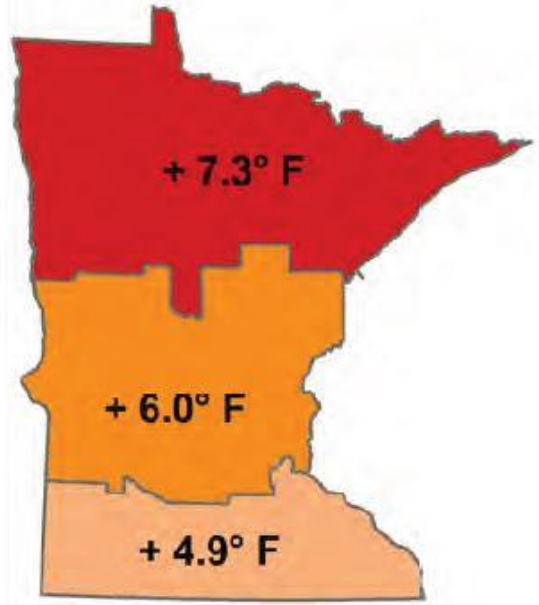

Ice in:
1980-09
2024-09
Both months
Missing
Summer sea ice 1980 & 2024
White=1980
Pale blue=2024
Russia
Alaska
Greenland
Canada
Europe
National Snow and Ice Data Center, University of Colorado Boulder
Privacy settings

How Arctic meltdown can lead to extreme weather



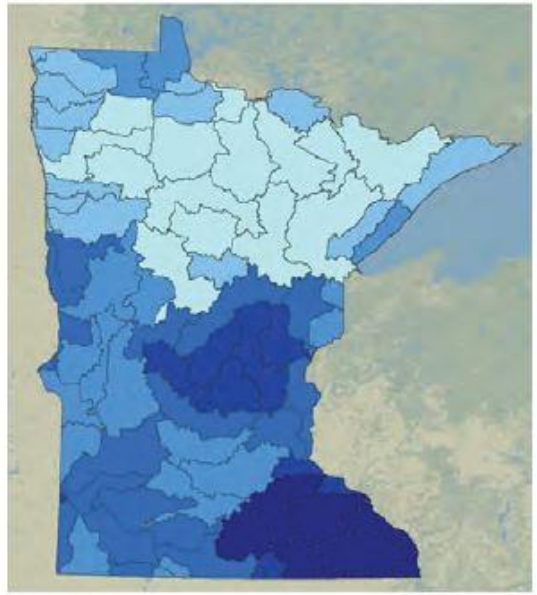
Minnesota's Climate is Already Changing





Minnesota is getting warmer, especially winter nights in the northern parts of the state.

Change in daily average minimum temperature during winter (Dec-Feb), 1895-2021.



Minnesota is getting wetter, especially the southern parts of the state.

- 0 - 1 in.
- 1 - 2 in.
- 2 - 3 in.
- 3 - 4 in.
- 4 - 5 in.
- 5 - 6 in.

Annual precipitation change by watershed for 2000-2019, compared to 20th century averages.

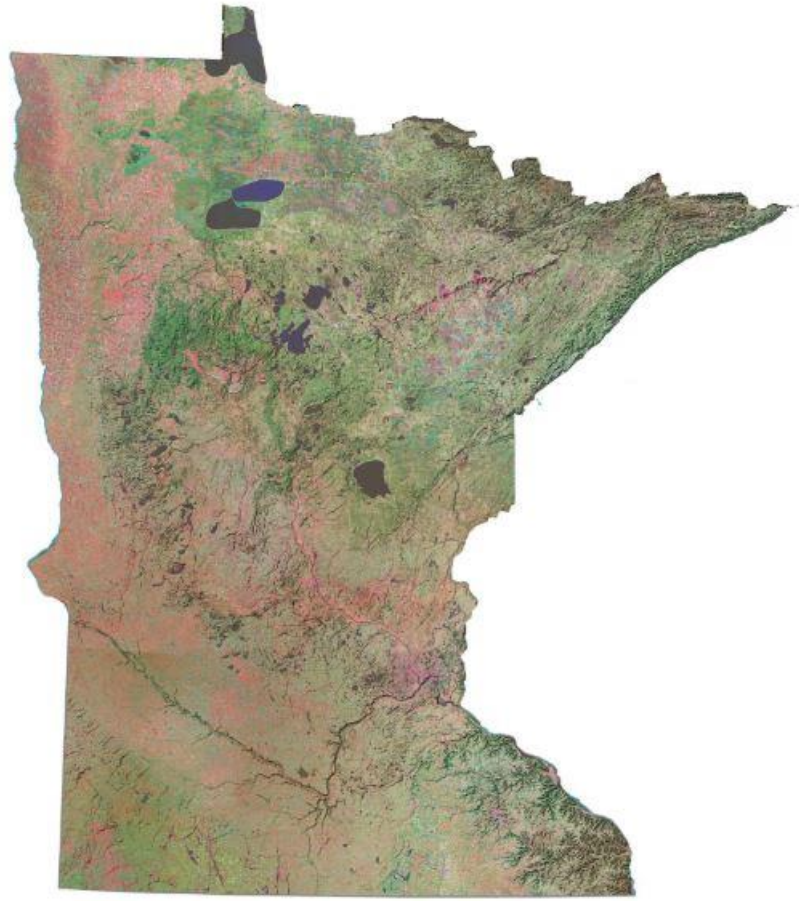
Courtesy of Lee Frehlich (UMN)

Here in NE Minnesota:

More heavy rains – flooding low areas and flood damage to infrastructure
Periods of drought – wild fire danger
Less snow, bad for skiing, snowmobiles, sled dogs and Ely's economy
Changes in tree cover, seasons, allergies, invasive species

This couples with environmental damage from 8 billion humans
industrial agriculture, pollution, pesticides, plastics

Since we are potentially less impacted than other places
(eg AZ, FL, Bangladesh from heat, sea level rise, water shortages)
We are a climate refuge, Duluth is already advertising itself this way
Expect population shifts



Agriculture patterns are shifting:
We depend on the rest of the state/world for energy, food, consumer goods, medicine

Some Recent Federal Climate Legislation:

2022 **The Chips and Science Act**

- semiconductor manufacture in USA, funding public sector science research

2022 **The Inflation Reduction Act**

- Invests in domestic energy production and manufacturing
- Reduces carbon emissions by roughly 40 percent by 2030
- $369 billion in Energy Security and Climate Change programs
- Permitting reform to benefit domestic energy and transmission projects

Some Recent MN Climate Legislation:

2007 (Pawlenty) **Next Generation Energy Act** - GHG emission reduction goals

2020 **ECO Act** - Energy efficiency, climate adaptation planning grants, community resilience

2021 **Clean Cars Act**

2021 **MN Climate Action Framework** - reduce emissions 50% by 2030 and achieve net-zero emissions by 2050

2023 **100% Electrical Energy Carbon Free by 2040**, 80% by 2030
(and good jobs, less pollution, cheaper energy)
similar laws in 17 other states, exemptions, RECs, off ramps

2024 Permitting reform, energy code, electric buses, lighting, electric outdoor equipment, ECO updates, geothermal

2022 MN Climate Action Framework - reduce emissions 50% by 2030 and achieve net-zero emissions by 2050

https://climate.state.mn.us/minnesotas-climate-action-framework

Minnesota's plan to address and prepare for climate change.

Minnesota is updating the Climate Action Framework in 2024 and 2025.

Check out the update process and how you can participate.

Clean transportation

Connect all people through a safe, equitable, and sustainable transportation system.

Climate-smart natural and working lands

Manage our lands to reduce GHG emissions and sustain resilient landscapes.

Resilient communities

Prepare communities with resources to build a more resilient future for themselves.

Clean energy and efficient buildings

Expand the use of carbon-free energy and create healthy, comfortable buildings that are cheaper to operate and pollute less.

Healthy lives and communities

Protect the health and wellbeing of all Minnesotans in the face of climate change.

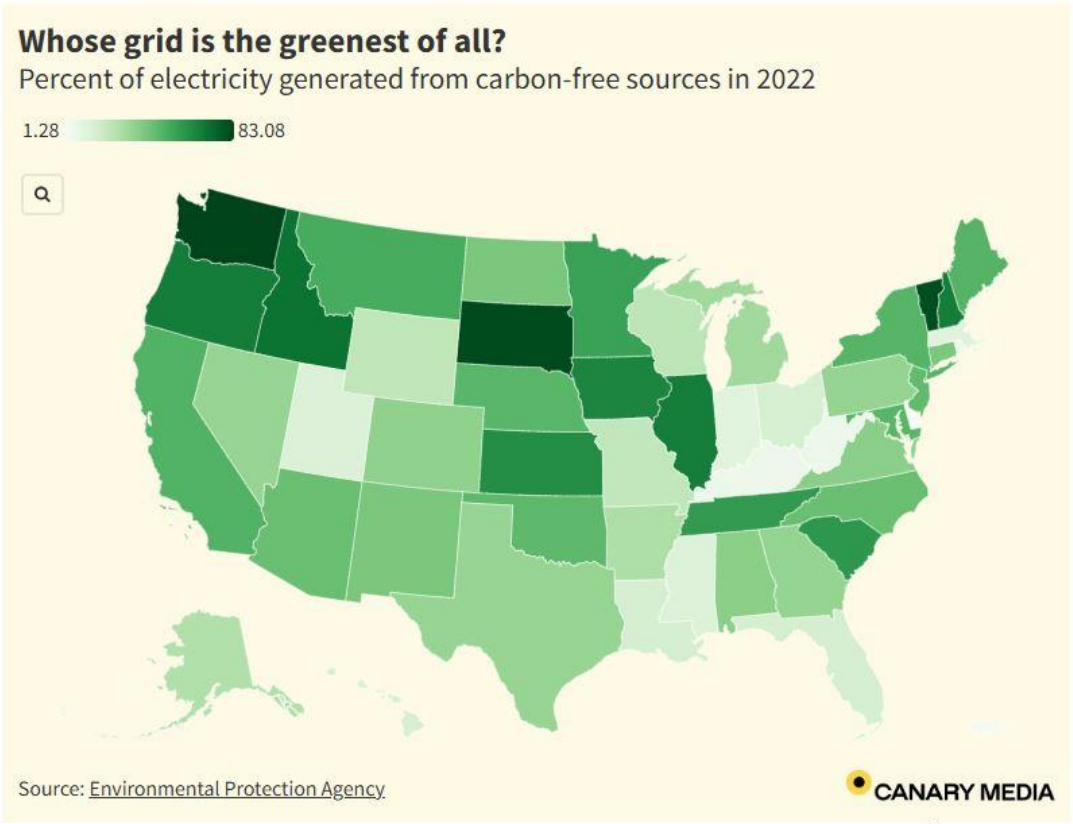
Clean economy

Build an economy that addresses climate change and creates equitable opportunities.

2023 **100% Electrical Energy Carbon Free by 2040**, 80% by 2030 (and good jobs, less pollution, cheaper energy) similar laws in 17 other states, exemptions, RECs, off ramps

Figure 1: Minnesota power sector carbon (CO^2) emissions vs U.S. emissions

Source: BloombergNEF, EIA.



WA 83%
SD 81%
MN 55%
WV 6%

About Ely Climate Group

Meetings 2nd Tuesday each month on varied topics 4pm at Ely Field Naturalists Resource Center
in person and by zoom, recordings on YouTube

Smaller active group working with other orgs to help Ely

- Solar on Schools
- GreenStep – Ely Green Team
- Lobby for climate/environmental causes (emails, letters, phone calls etc)

ECG works with CERTs, CCL, CURE, HPHC, Univ MN

What you can do:

- Join Ely Climate Group
- Low hanging fruit – LED lights, insulate your house, drive less, stop flying, zoom meetings, buy less junk
- Install solar panels, drive an EV, install heat pumps
- Have fewer kids, don’t bug your kids for more grand-kids
- Talk about climate to family, friends, neighbors, schools, city officials
- Lobby politicians

The worst effects can be averted – we have the know how and resources to make clean energy
Electrify everything, stop burning things, NO COAL, GAS, OIL
Get energy from wind, solar, hydro, nuclear, geothermal
Need 2-3x more electrical energy, more energy storage, modifications to the electrical grid
Develop hydrogen, green steel, clean concrete …..
There is work to be done, moving fast is important

All we lack is the political will to make it happen

Nuclear Power would make life easier as we approach 100% clean electrical power

MN has 2 nuclear plants, Prairie Island and Monticello
They make 20% of our electrical energy, always ON baseload power
Built 1970's permitted through 2050's
Waste stored in casks on site

In 1994 MN enacted a nuclear moratorium – no new plants allowed – motivated by waste storage

There is a move to lift the moratorium in the legislature.
This would allow proposals for new nuclear plants to compete against solar/wind/hydro on their merits

New nuclear plants are not the "one-off" monsters of the 1970s
Small modular reactors are made in factories, shipped in trucks, identical modules
Some designs can use "spent fuel" for energy

There is no free lunch

Coal CO_2, coal ash in lined and unlined ponds

Gas CO_2 and CH_4, methane leaks, pipelines

Oil CO_2, pipelines

Wind intermittent, need rare elements for magnets, large area, visual impact, birds and bats, ultrasonics, transmission lines, blade/tower disposal

Solar intermittent, large area, covers farmland, ugly, needs silicon, transmission lines

Batteries storage still needs R&D, need exotic elements, hydro needs exotic landscapes

Corn ethanol, biofuels, CCUS corn for fuel displaces crops for food, CO_2 pipes dangerous, use for oil recovery

Nuclear no USA depository for spent fuel, paranoia over radiation, link to weapons