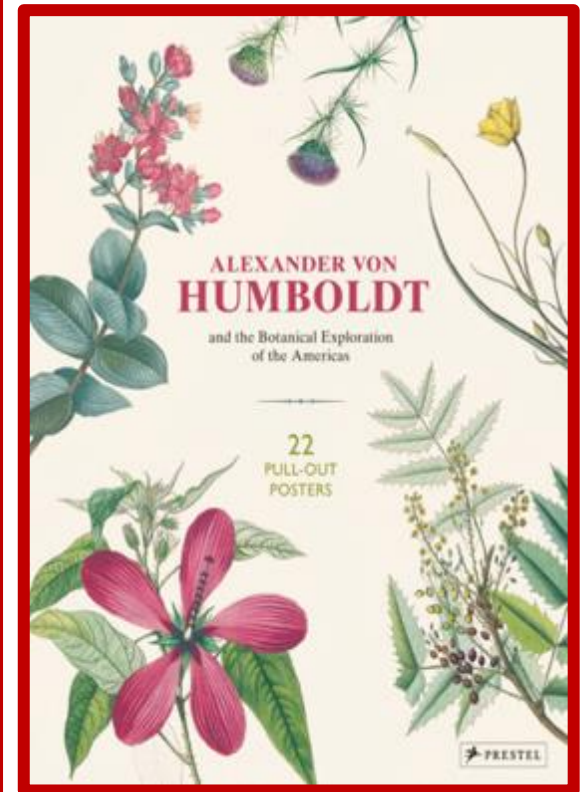
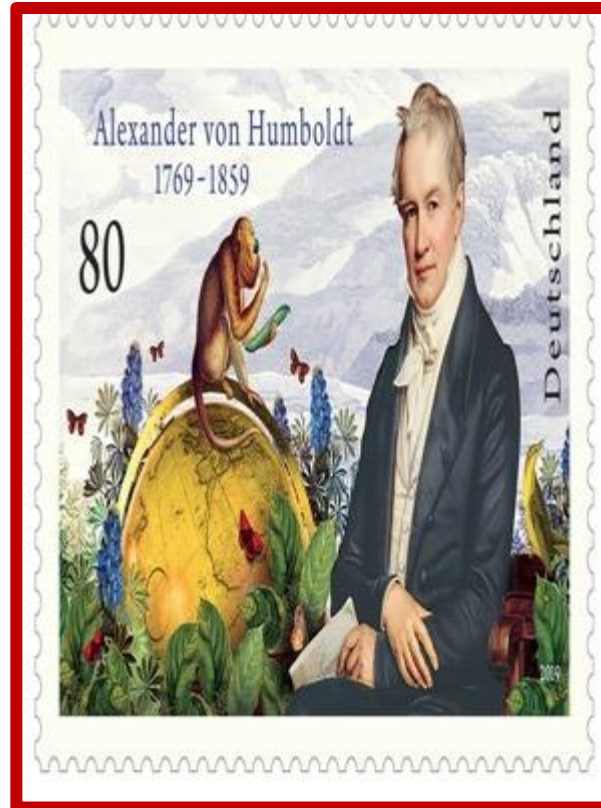
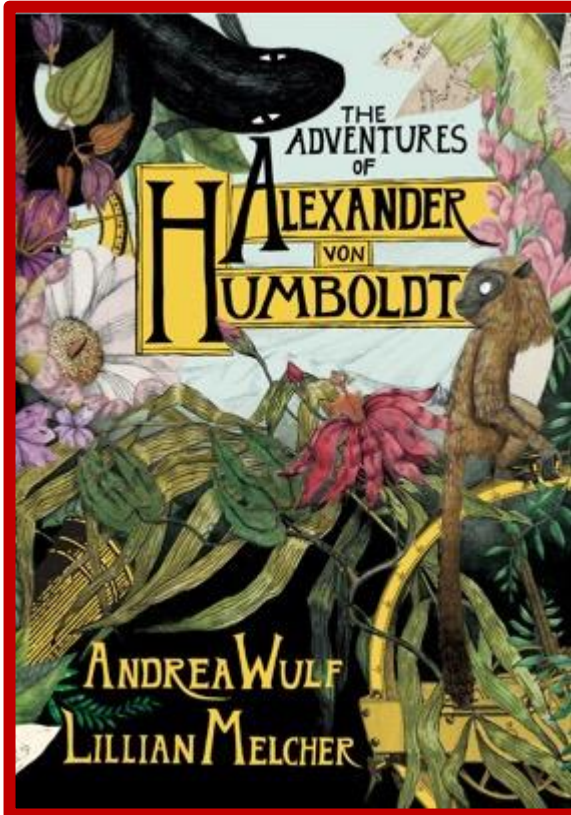


Lifetime Learning Institute, 2021



HUMBOLDT, MORE THAN A CURRENT

Barry Centini, Ph.D.

barry.centini@verizon.net

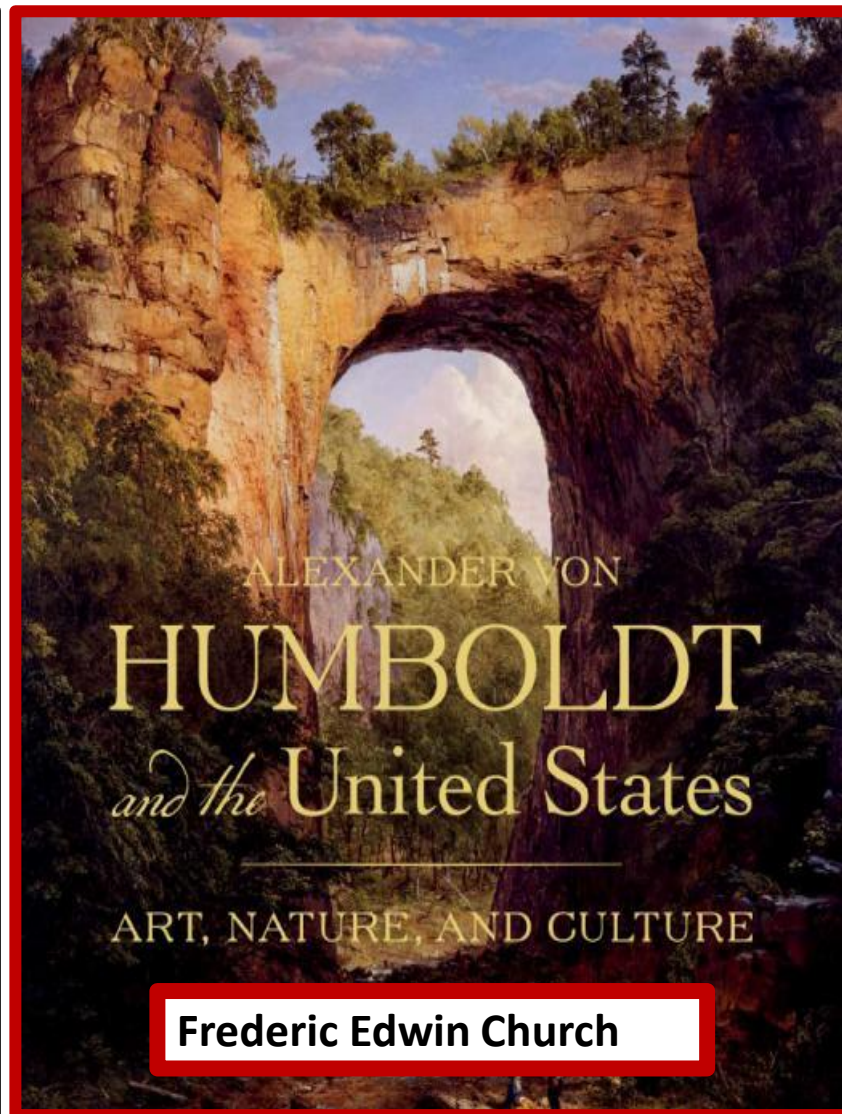
As a public health precaution due to COVID-19, all Smithsonian museums are closed temporarily. All public programs are online only, on-site public tours and events are currently suspended. We are not announcing a reopening date at this time and will provide updates on our websites and social media.

Alexander von Humboldt and the United States: Art, Nature, and Culture

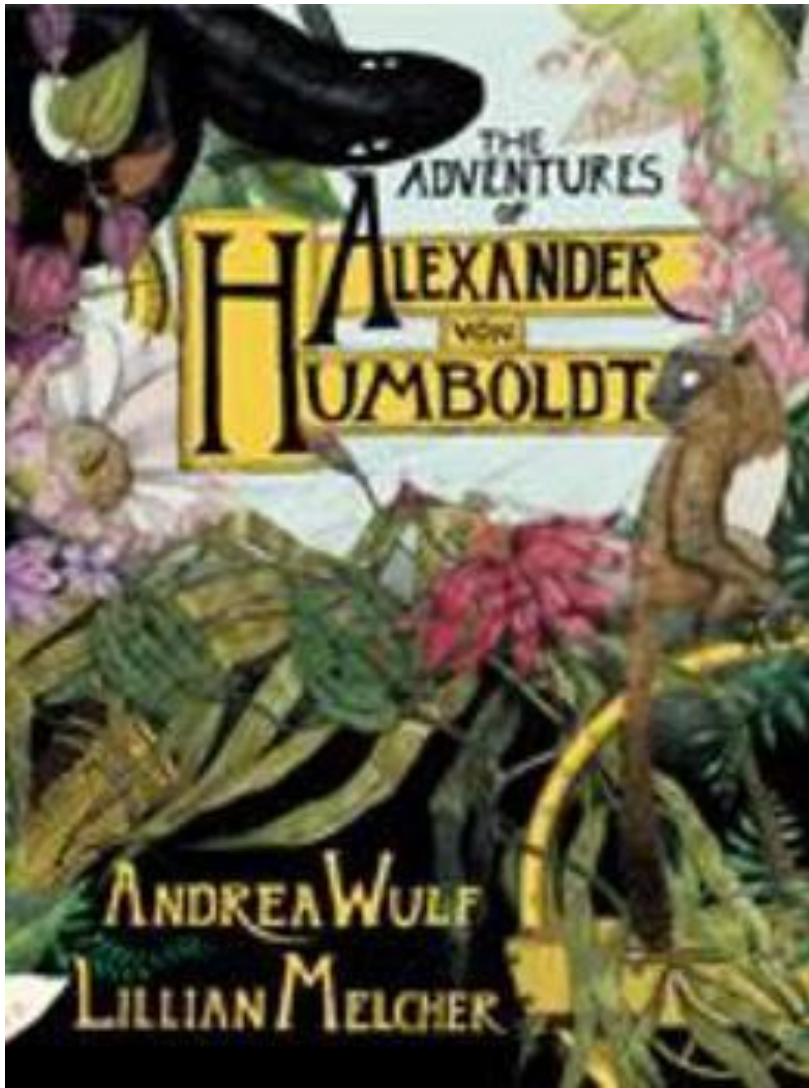
Reopening 2021

This exhibit places American art squarely in the center of a conversation about **Humboldt's lasting influence** on the way we think about our relationship to the natural world.

This exhibition will be the first to examine Humboldt's impact on five spheres of American cultural development: the visual arts, sciences, literature, politics, and exploration, between 1804 and 1903.



Frederic Edwin Church



**The Adventures of
Alexander Von Humboldt
by [Andrea Wulf](#)**

From the New York Times bestselling author of *The Invention of Nature*, comes a breathtakingly illustrated and brilliantly evocative recounting of Alexander Von Humboldt's five year expedition in South America.

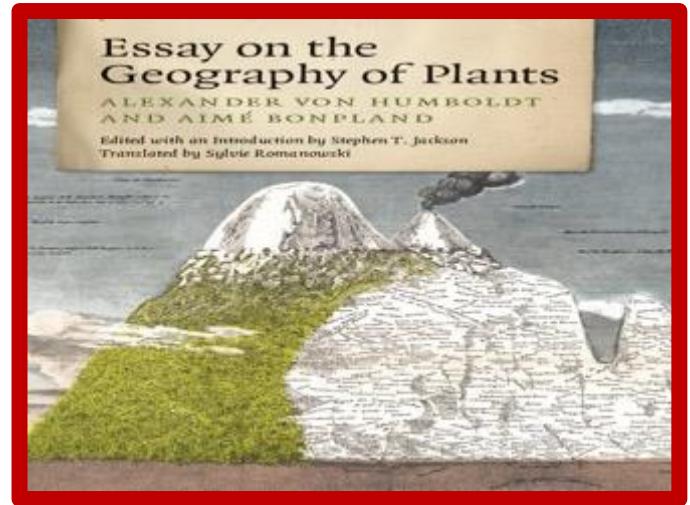
What I will talk about
(and you will chat about)

- 1. Alexander Von Humboldt**
- 2. What he accomplished with little or no US fanfare**
- 3. Why he is probably the least known polymath**
- 4. Humboldt's relationship to biodiversity and climate**
- 6 Human induced climate effects (HICE)**
- 7 Acceptance and denial of HICE**
- 8 Similarities with denial and acceptance of Covid-19**
- 9 Where do we go from here**
- 10 John Donne**

The most influential scientist you may never have heard **of**



Alexander von Humboldt
(1769 –1859):



- Alexander von Humboldt's **holistic** description of nature was a great source of guidance and inspiration for the young Charles Darwin sailing on the Beagle.
- Humboldt established the foundation for the **Earth Sciences**: the integrated system of knowledge on which human society may depend in the face of global climate change.
- Through Humboldt's observational records an **important trend emerged** through his techniques of observation, scientific instruments used and unique perspective on nature.

**A naturalist figured out climate change in 1799.
The world forgot him.**

**More places, plants and animals are named
after Humboldt than anyone else**

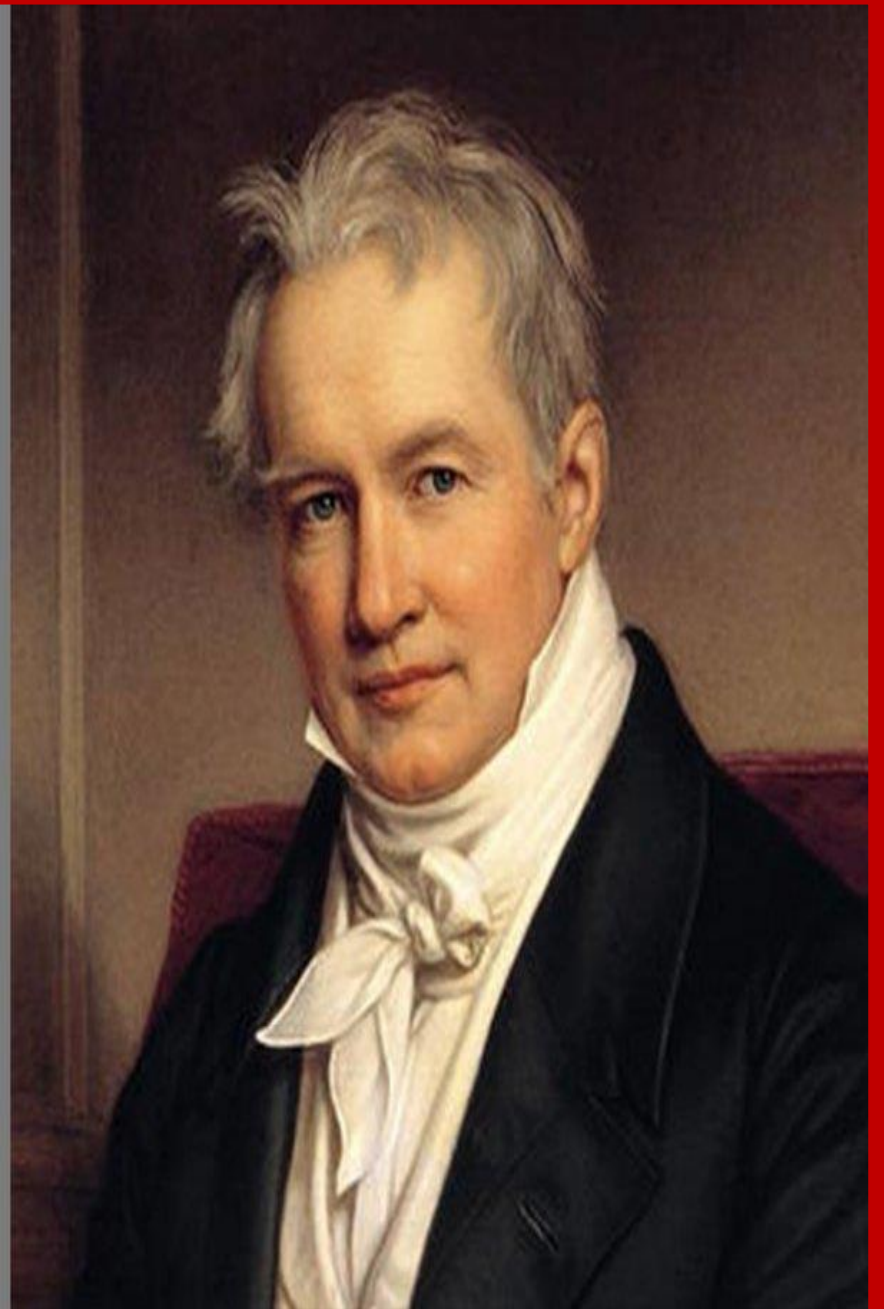
**His diary entry in November 1801 revealed
that he worried about a future in which
humankind might expand into space... and
spread our lethal mix of vice and greed!**

The
Economist

On this day

“The most
dangerous
worldview is the
worldview of those
who have not
viewed the world.”

Alexander von Humboldt Scientist



- ❑ **Friedrich Wilhelm Heinrich Alexander von Humboldt**
(14 September 1769 – 6 May 1859):
 - ❖ **Prussian polymath**
 - ❖ **Geographer**
 - ❖ **Naturalist**
 - ❖ **Explorer**
 - ❖ **Proponent of Romantic philosophy and science.**
- ❑ **Humboldt's quantitative work on botanical geography laid the foundation for the field of biogeography.**
- ❑ **Humboldt's advocacy of long-term systematic geophysical measurement laid the foundation for modern geomagnetic and meteorological monitoring.**

Alexander von Humboldt

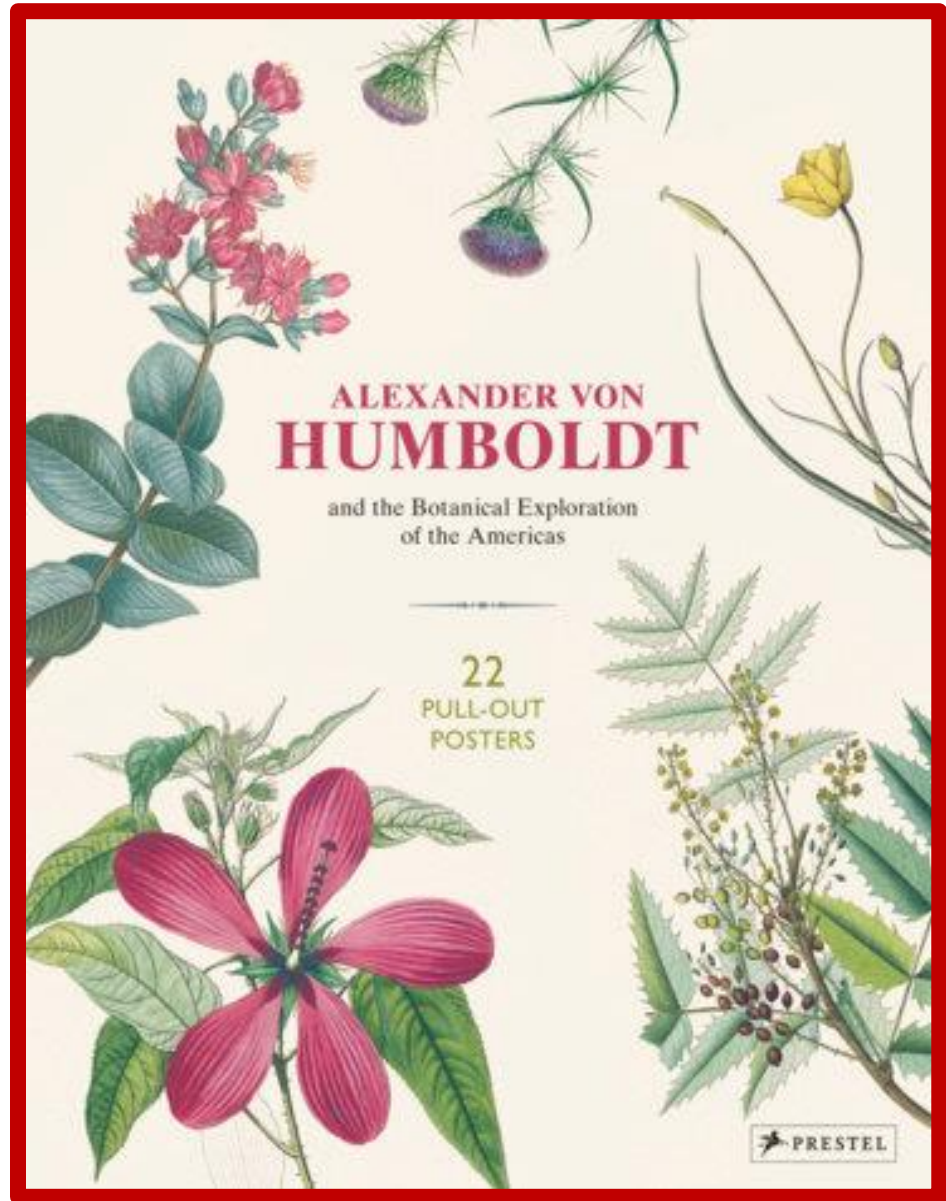
COSMOS

➤ A SKETCH OF THE
PHYSICAL DESCRIPTION
OF THE UNIVERSE

Volume 2



*Translated by E. C. Otté
Introduction by Michael Dettelbach*



- ❑ Humboldt was born on September 14, 1769, in Berlin, Germany.
- ❑ His family belonged to a prominent Pomeranian family, and so they were able to afford private tutors to provide the boys a good education in mathematics, languages and classic
- ❑ As a child, Alexander had a hobby of collecting and labeling different plants, insects, and shells.
- ❑ At the University of Frankfurt Humboldt developed an interest in botany, geology and minerology
- ❑ His mother died when he was 27, in 1796 and this left him a good inheritance which would pay for his future explorations.



- ❑ On the 5th of June 1799 Humboldt set sail aboard the ship Pizarro.
- ❑ He had a 6-day stop at Tenerife, where he explored the **Teide** volcano.



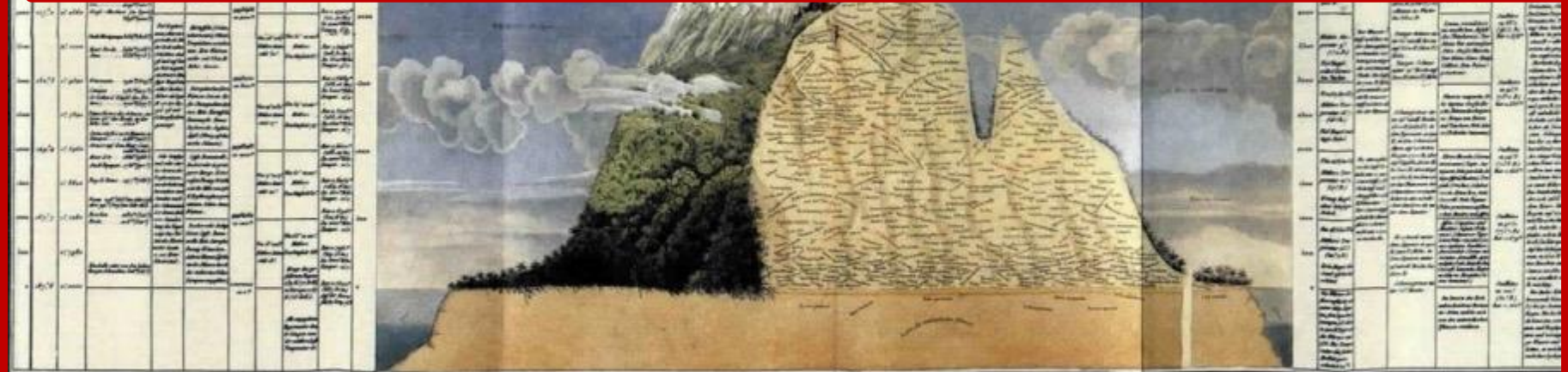
- ❑ Other notable experiences from his explorations in South America included being able to see an amazing meteor shower the “Leonids”**
- ❑ Humboldt was the first person to connect altitude sickness to a lack of oxygen, due to his many mountain climbs and his own personnel experiences at high altitudes.**
- ❑ Humboldt captured and dissected electric eels from which he received a number of electric shocks himself.**
- ❑ After a great amount of exploration in South America, Humboldt visited Washington, D.C.**
- ❑ He stayed for three weeks during which Humboldt was able to have several meetings with President Thomas Jefferson who called Humboldt "one of the greatest ornaments of the age."**
- ❑ In 1804, Humboldt travelled to Paris and he spent his time writing 30 volumes about his different field studies.**
- ❑ He stayed in Paris for 23 years, meeting and discussing with other bright minds of his age.**

- ❑ **Eventually the fortune from his mother's inheritance ran out. Humboldt then found a stable source of income and became one of the advisors of Prussia's King.**
- ❑ **He was invited to Russia in 1829 and on his extensive journey found diamonds in the gold mines of the Urals and collected data for an isothermal world map.**
- ❑ **In 1827, Humboldt visited in Berlin, giving public lectures. These lectures became so popular that he decided to write all his research in a work which he called the "Kosmos". The first volume was published in 1845 when he was 76 years old. Five volumes in total were published, the final volume posthumously.**
- ❑ **Humboldt died on May 6, 1859. To this day, he is known as one of the most significant contributors to the earth sciences.**
- ❑ **The German author and poet Wolfgang von Goethe said of the explorer and scientist, "Spending a few days with Humboldt is like having lived several years."**

- ❑ It is impossible to pigeonhole Humboldt. A brilliant observer and recorder of the tiniest details, he was also able to zoom out and see the bigger picture, mapping the relationships between biology, meteorology and geology.
- ❑ Humboldt's wider perspective inspired him to map the world using isotherms (lines connecting points with the same mean temperature) and identify climate zones from the equatorial Torrid Region, to the Frozen Regions.
- ❑ “Humboldt was one of the last people to hold essentially all scientific knowledge in one head,” write researchers in a special birthday issue of the Journal of Biogeography.
- ❑ By necessity today's scientists are specialised, but some of the greatest challenges would benefit from a Humboldtian approach, and by working together scientists can make the kind of connections that Humboldt's one single polymath brain was able to make.

International Humboldt Day 2020

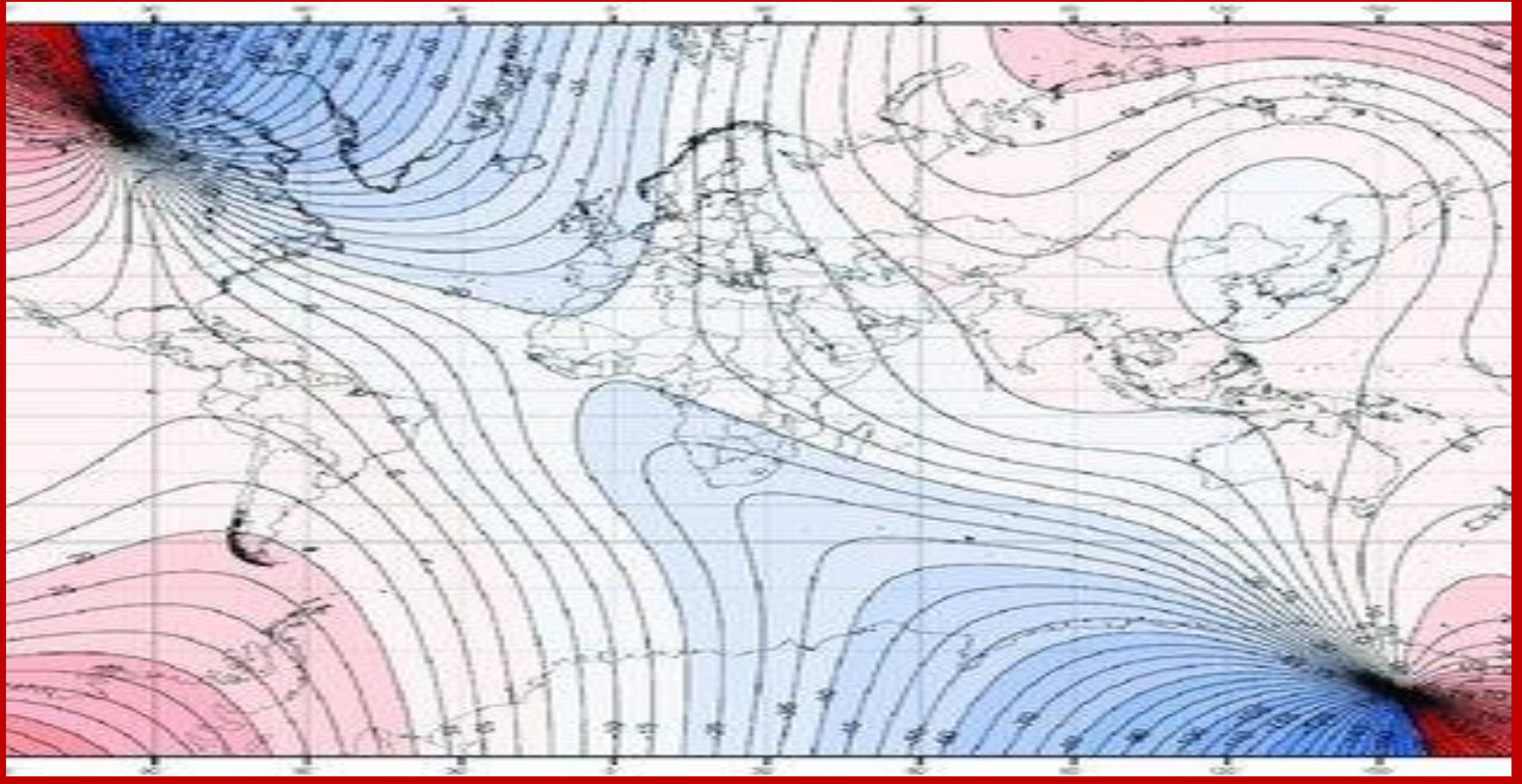
The **International Biogeography Society** is launching – **International Humboldt Day** – an annual celebration of Humboldt's legacy and the breadth of research that was prompted by his pioneering work in botanical geography.



*Geographie der Pflanzen in den Tropen-Ländern;
Ein Naturgemälde der Anden,
gegründet auf Beobachtungen und Messungen, welche vom 10.^{ten} Grade nördlicher bis zum 10.^{ten} Grade südlicher Breite angestellt worden sind, in den Jahren 1791
von ALEXANDER VON HUMBOLDT and A. G. BONPLAND.*

- ❑ Humboldt defined not only the distribution zones of vegetation in relation to altitude, temperature and humidity, but crucially also compared these distributions to other mountain ranges of the world — implying a global connection between the biotic and abiotic realms.
- ❑ Humboldt's idea of a holistic web of connections presented a dramatically different vision to the dominant scientific ideas of the time, which focused on organisms at the level of the individual, with humans set apart — ideas influenced largely by Carl Linnaeus.
- ❑ Humboldt anticipated Charles Darwin's famous idea of an entangled bank of connections in the web of life, and also recognized that organisms have a reciprocal effect on their environment — for example, in the shade provided by trees, or the stabilizing effects of vegetation on soil.

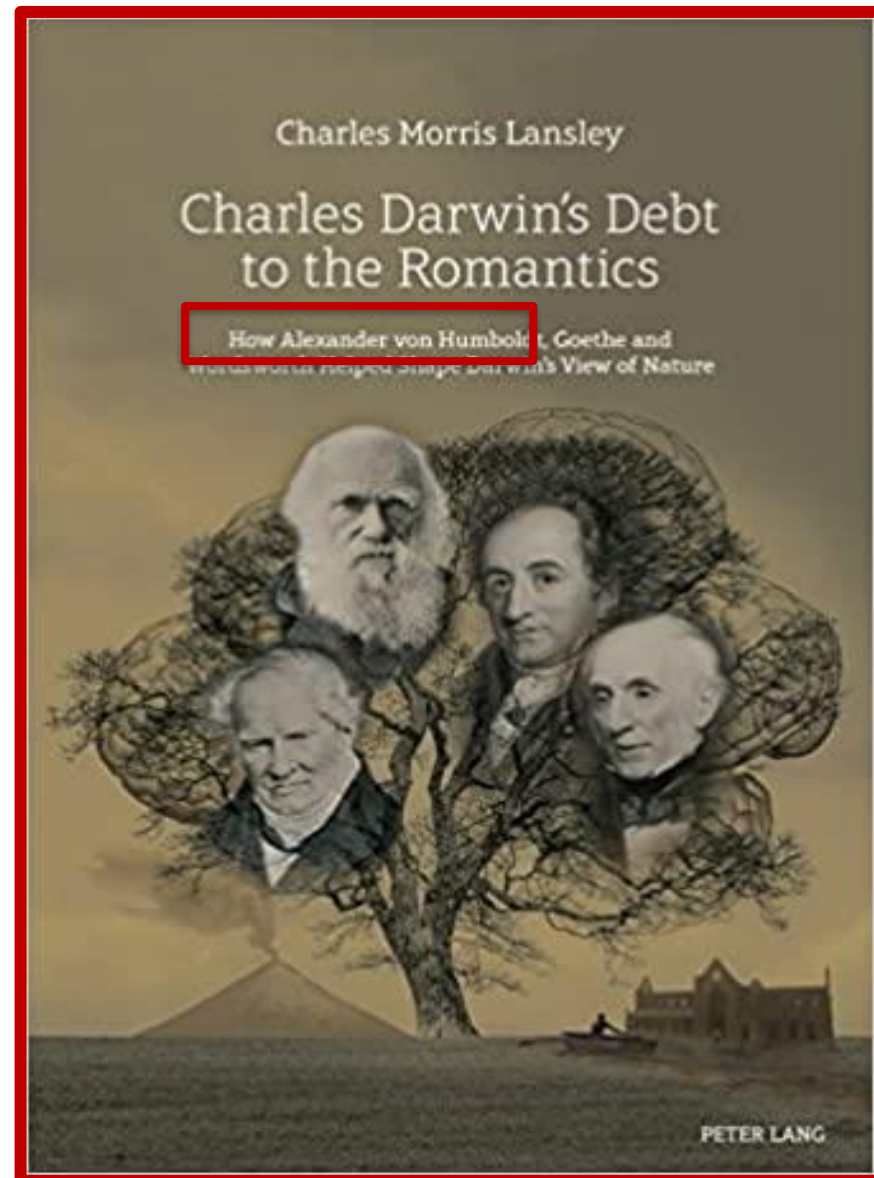
- ❑ Latin America also proved an excellent place to satisfy Humboldt's obsession with volcanoes.**
- ❑ Little was known about the formation of volcanic mountains outside of the few active ones in Europe, and in a short trip Humboldt would climb dozens.**
- ❑ Taking data on altitude, pressure, geology and magnetic compass bearings led Humboldt to discover that the Earth's geomagnetic equator was some 500 miles farther south than its geographic one.**
- ❑ Later in life, he established the first coordinated network of geomagnetic monitoring stations across the world, pre-empting the era of big data, international collaborative science and distributed experiments**

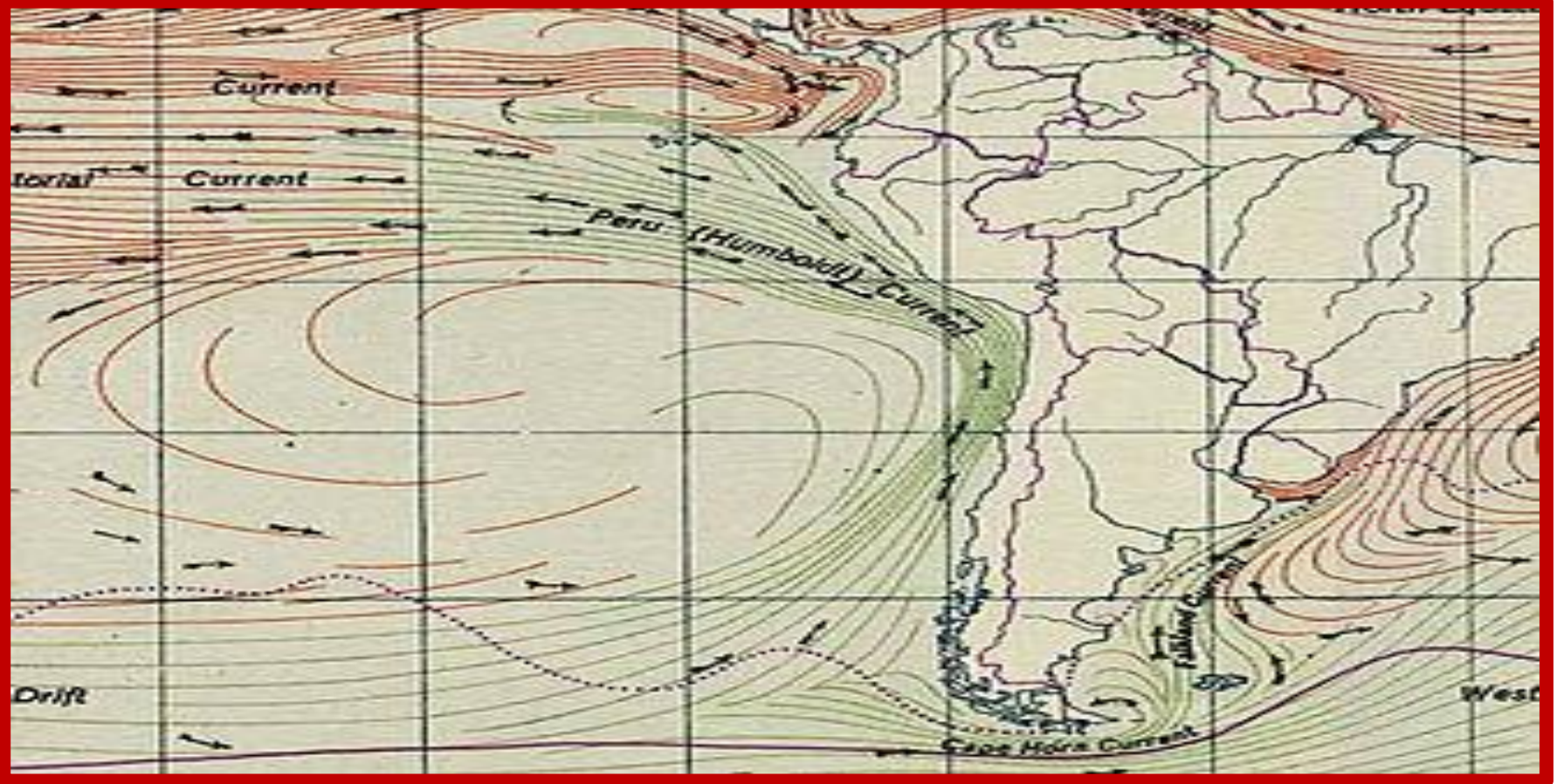


- Alexander von Humboldt played an important role in establishing the science of geomagnetism.**
- He described the systematic change of magnetic field strength with distance from the equator, and he initiated synchronized magnetic field observations worldwide.**

- After he saw the disastrous environmental effects of colonial plantations in Venezuela in 1800, Humboldt became the first scientist to talk about harmful human-induced climate change.
- Deforestation made the land barren, he said, and with the disappearance of brushwood, torrential rains washed away the soils, while water levels of lakes were falling.
- Everything,” Humboldt later said, “is interaction and reciprocal.”
- Towards the end of his life, he even prophetically warned about deleterious gas emissions at industrial centers.
- There were moments when he was so pessimistic that he painted a bleak future of voyages into space, when humans would spread their lethal mix of vice and greed even across other planets.

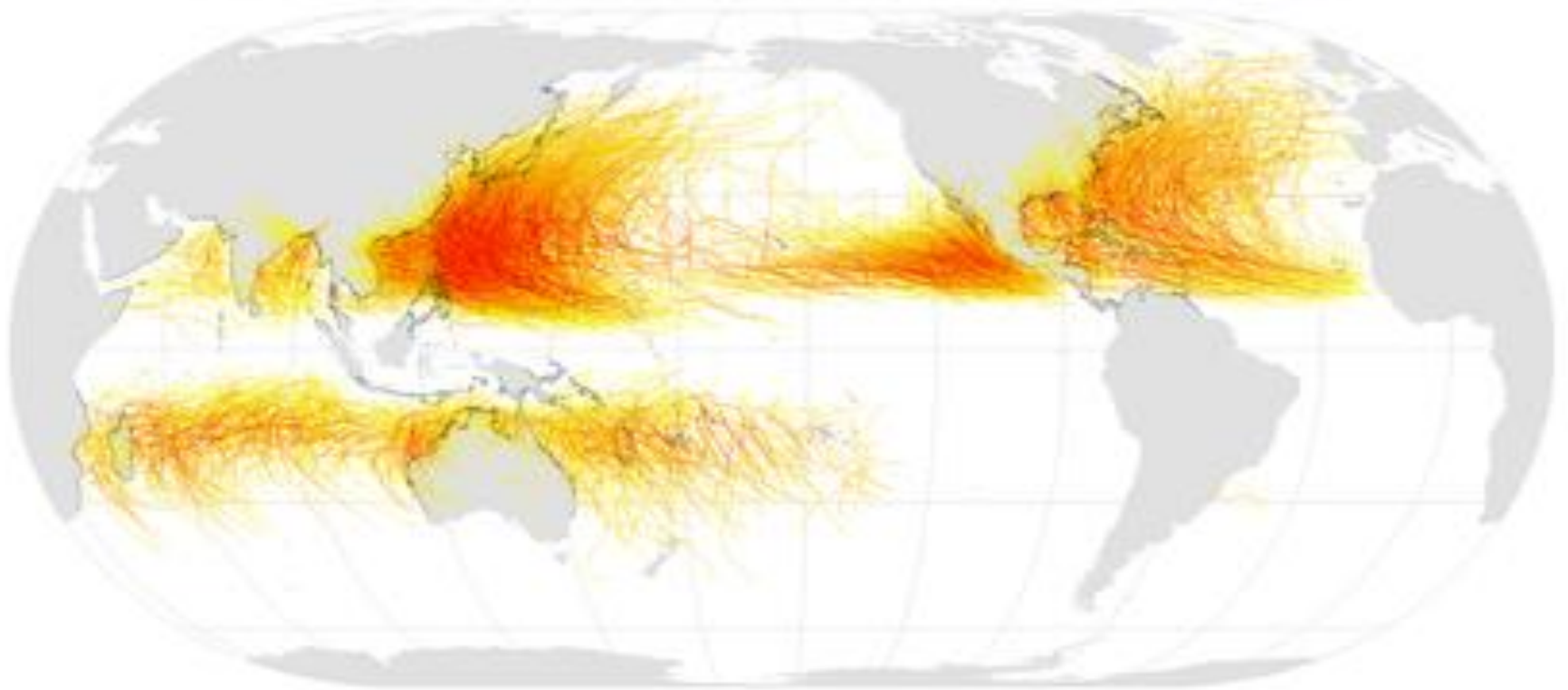
- ❑ Darwin's voyage was undoubtedly inspired by Humboldt's adventures, and later in life the two met and exchanged letters about their overlapping ideas on the transformation of species.
- ❑ No other person has had as many species, places or geographic features named after them than Alexander von Humboldt — yet, among these species are those threatened by the very dangers that he identified during his travels





The Humboldt Current is named after **him**.
He reported measurements of the cold-water
current in his book *Cosmos*.

Tropical Cyclones, 1945–2006

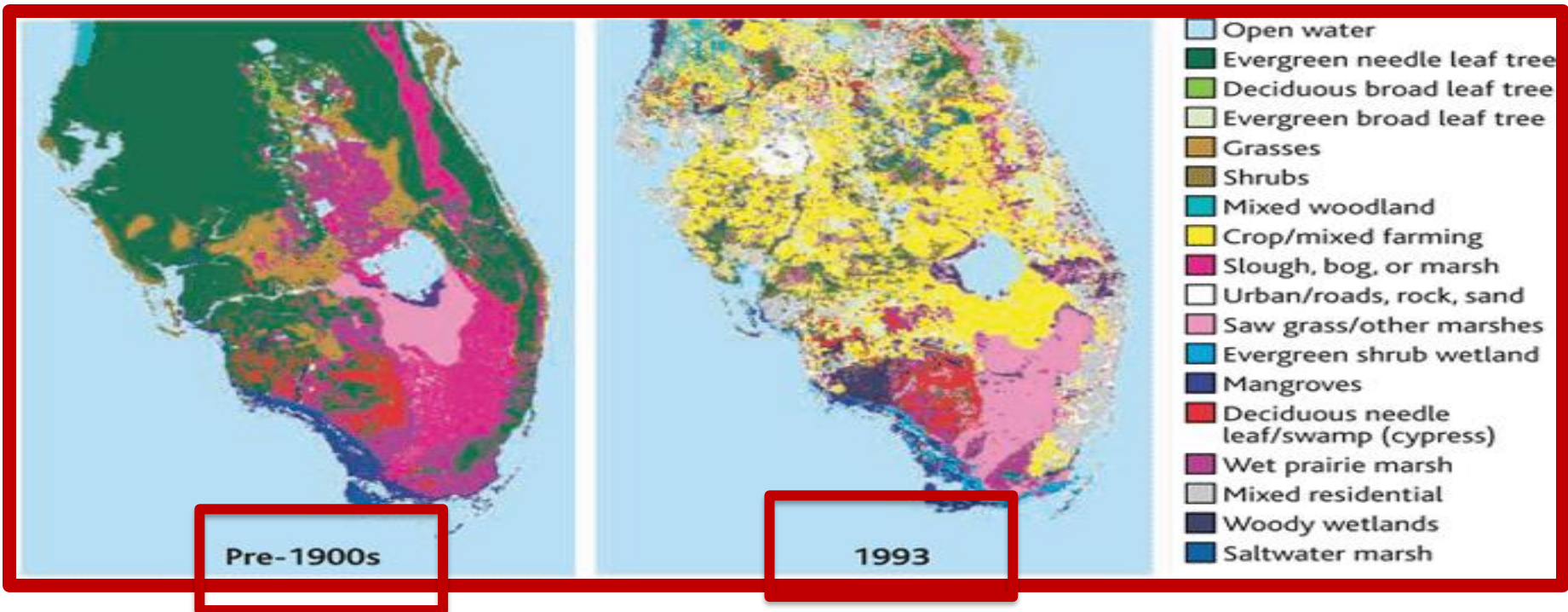


Saffir-Simpson Hurricane Scale:

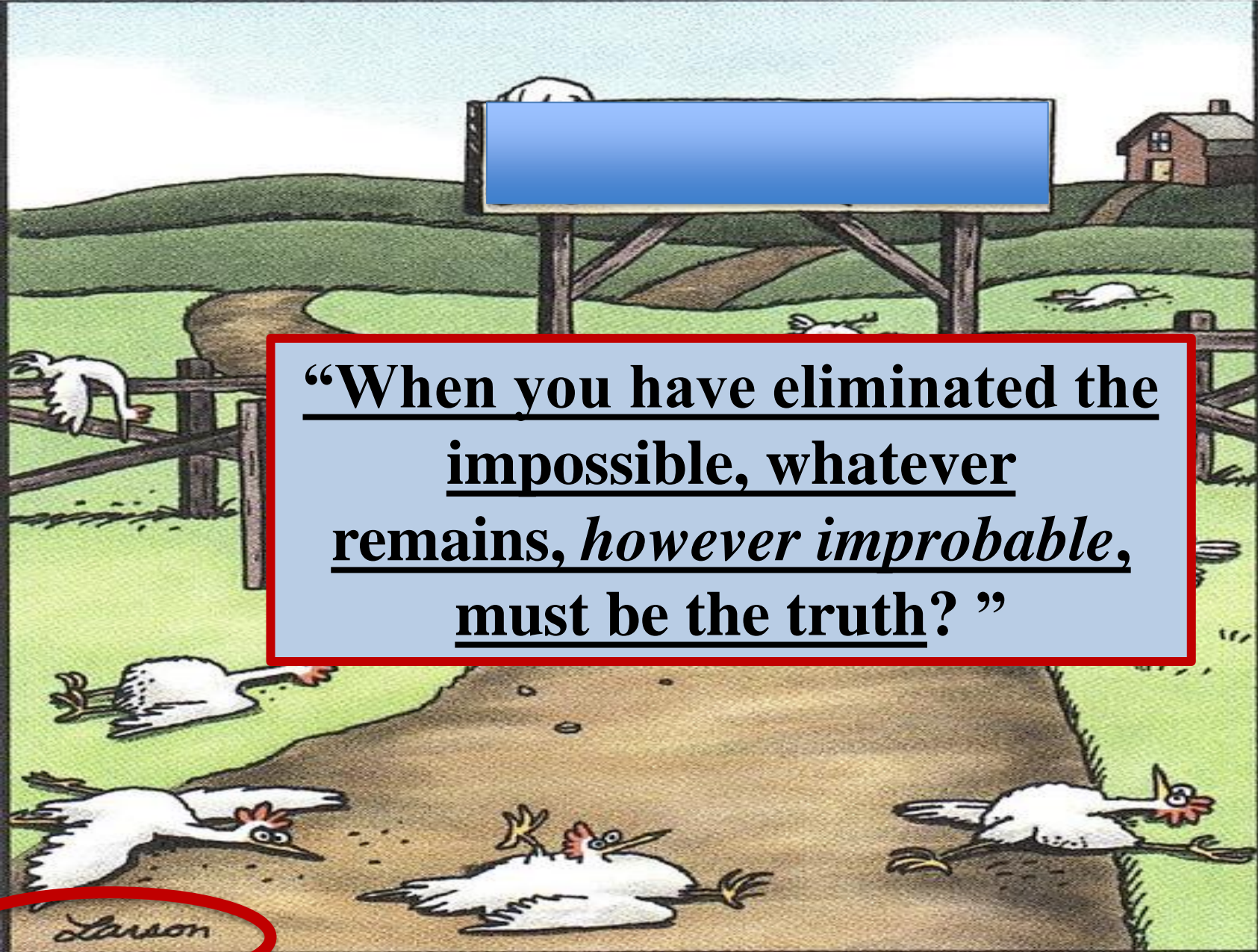


The presence of the Humboldt Current and its associated wind shear makes for conditions that inhibit the formation of **tropical cyclones**.(Worldwide tropical cyclone tracks, 1945–2006.)

- ❑ Humboldt recognized that wetland draining and forest clearance by colonists for agricultural production:
 - ✓ left indelible scars on the landscape
 - ✓ reduced, the cover provided by natural vegetation,
 - ✓ left the land arid and unproductive.
- ❑ He was the first to highlight the effects of human-induced land-use and climate change on the natural world.



- ❑ In the nineteenth century Alexander von Humboldt was acclaimed as "the second Columbus" and "the scientific discoverer of America."
- ❑ His prestige and fame were such that on 14 September 1869, the hundredth anniversary of his birth, a grand celebration was held with parades, speeches, concerts, and the unveiling of memorials in cities across the country.
- ❑ Humboldt's popularity in the United States endured for the remainder of the nineteenth century, but he dropped from public consciousness in the twentieth century.
- ❑ Why?
 - ✓ a shift in the character of scientific endeavor
 - ✓ the quality of Humboldt's written work
 - ✓ and the rise of anti-German sentiment with a concurrent rush to "de-Germanize" the United States in the early twentieth century.

A cartoon illustration of a farm scene. In the foreground, a dirt path leads through a green field. Several chickens are running along the path. In the background, there is a wooden fence, rolling green hills, and a red barn. A signpost with a blue rectangular sign stands in the middle ground. The sign contains a quote. The artist's signature 'Larson' is in the bottom left corner.

“When you have eliminated the impossible, whatever remains, *however improbable*, must be the truth?”

Larson

Human-induced climate effects



Instead of "climate change" the preferred terms are "climate emergency, crisis or breakdown" and "global heating" is favoured over "global warming," although the original terms are not banned.

Human-induced climate effects

Human

Anthropomorphic



Induced

Effect, Cause

Be Responsible For

Climate

Not Anecdotal

Weather

Effects

Hot, Cold, Wet Dry

Calm, Stormy,



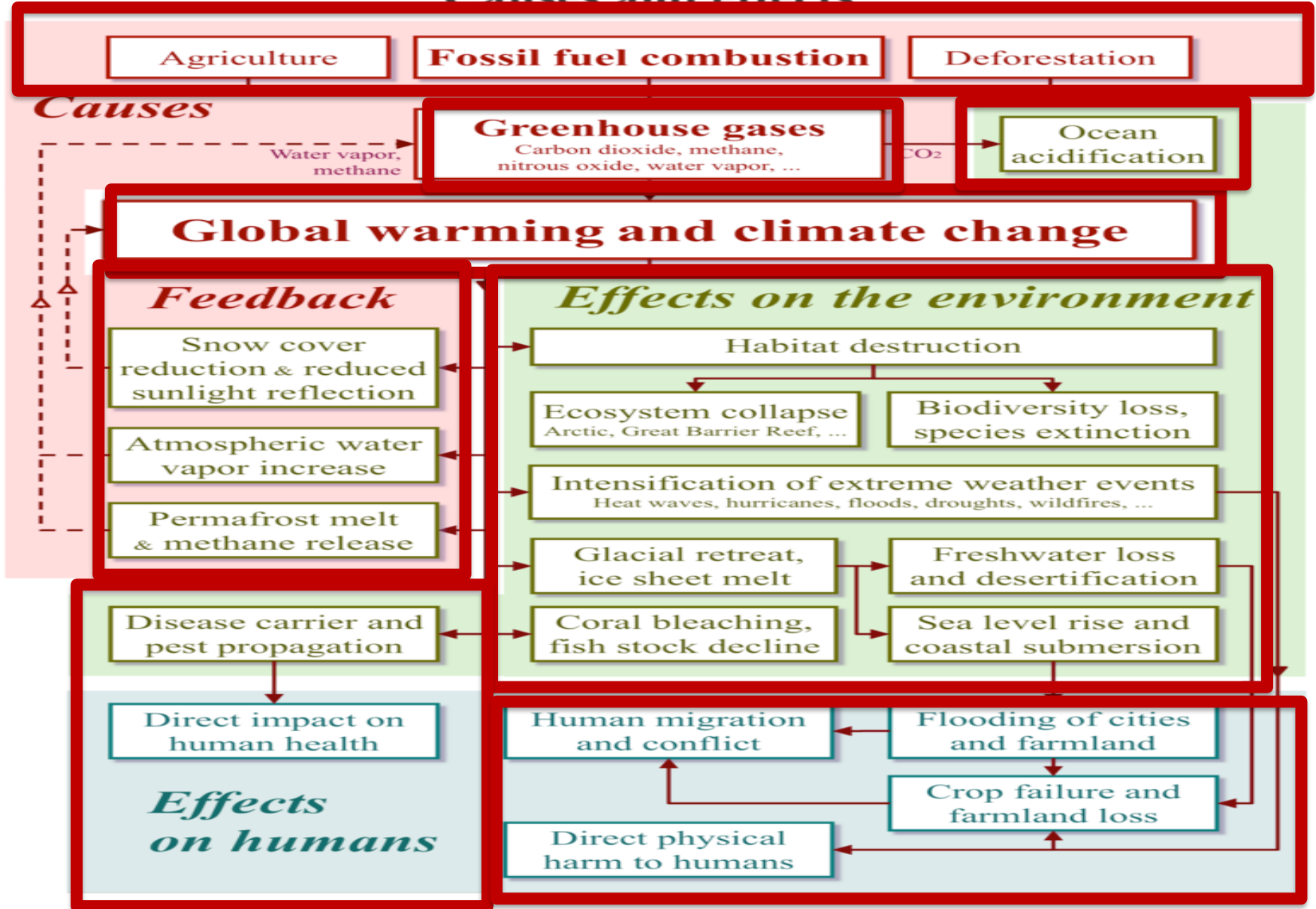
6/11/20

HICCE research falls into nine independently studied, but physically related, lines of evidence:

- 1. Simple chemistry** burning carbon-based materials, (CO₂) is emitted
- 2. Basic accounting** of what we burn, and therefore how much CO₂ we emit
- 3. Measuring CO₂** and other greenhouse gases in the atmosphere and **trapped in ice** to find levels higher than anything we've seen in nearly 1,000,000yrs .
- 4. Chemical analysis** CO₂ increase is coming from burning fossil fuels
- 5. Basic physics** that shows us that CO₂ absorbs heat
- 6. Monitoring climate conditions** to find that the air, sea and land is warming,, ice is melting and sea level is rising
- 7. Ruling out natural factors** that influence climate like the sun and ocean cycles.
- 8. Employing computer models** of natural versus human-influenced simulations of Earth
- 9. Consensus among scientists** who consider all previous lines of evidence and make their own conclusions .

Global warming and climate change

Causes and effects



The evidence for rapid climate change is compelling:

❑ Global Temperature Rise

The planet's average surface temperature has risen about 2.05 degrees Fahrenheit since the late 19th century,

❑ Warming Ocean

The ocean has absorbed much of this increased heat, with the top 328 feet of ocean showing warming of more than 0.6 degrees Fahrenheit. Earth stores 90% of the extra energy in the ocean.

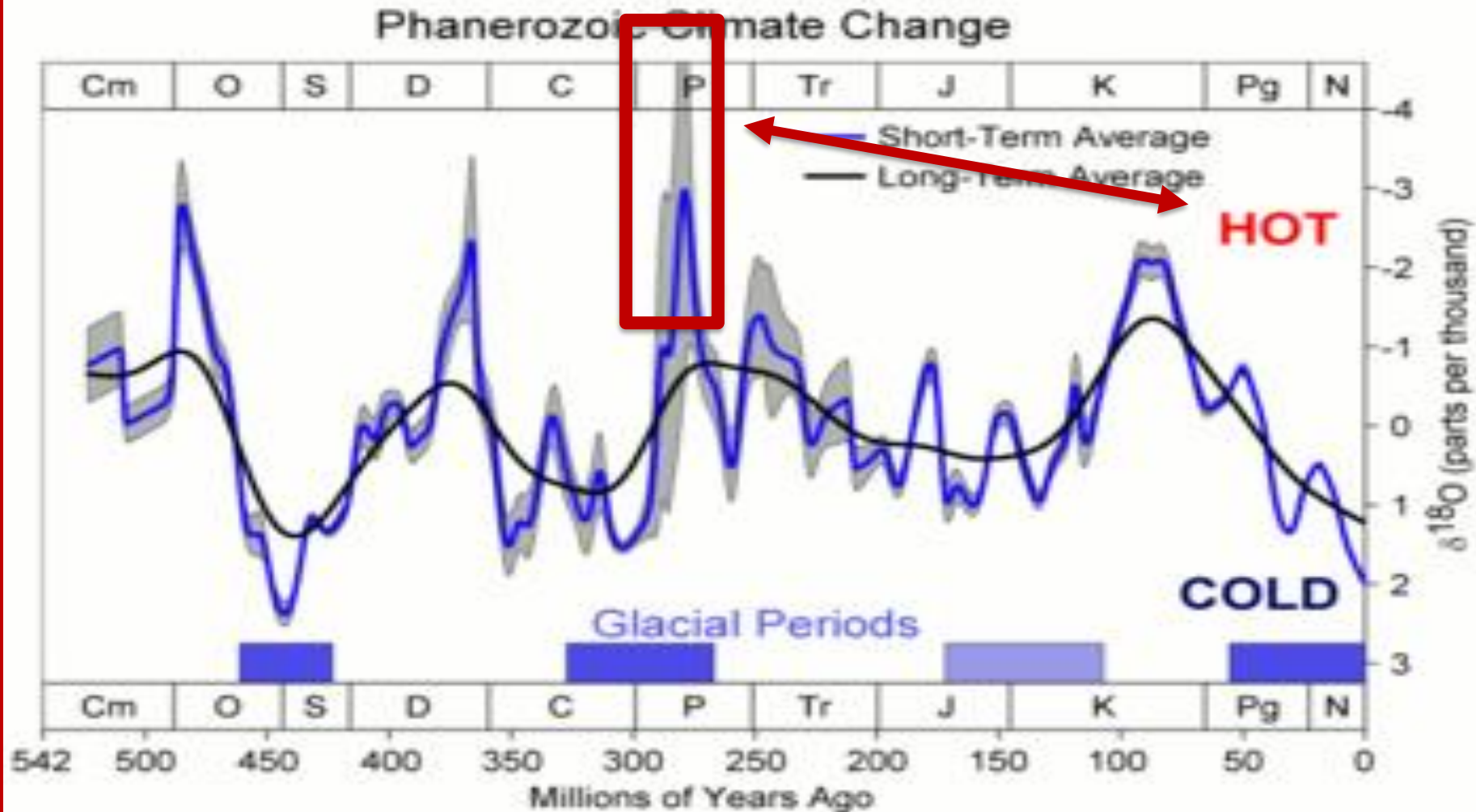
❑ Shrinking Ice Sheets

The Greenland and Antarctic ice sheets have decreased in mass. Greenland lost an average of 279 billion tons of ice per year between 1993 and 2019, while Antarctica lost about 148 billion tons of ice per year.

❑ Glacial Retreat

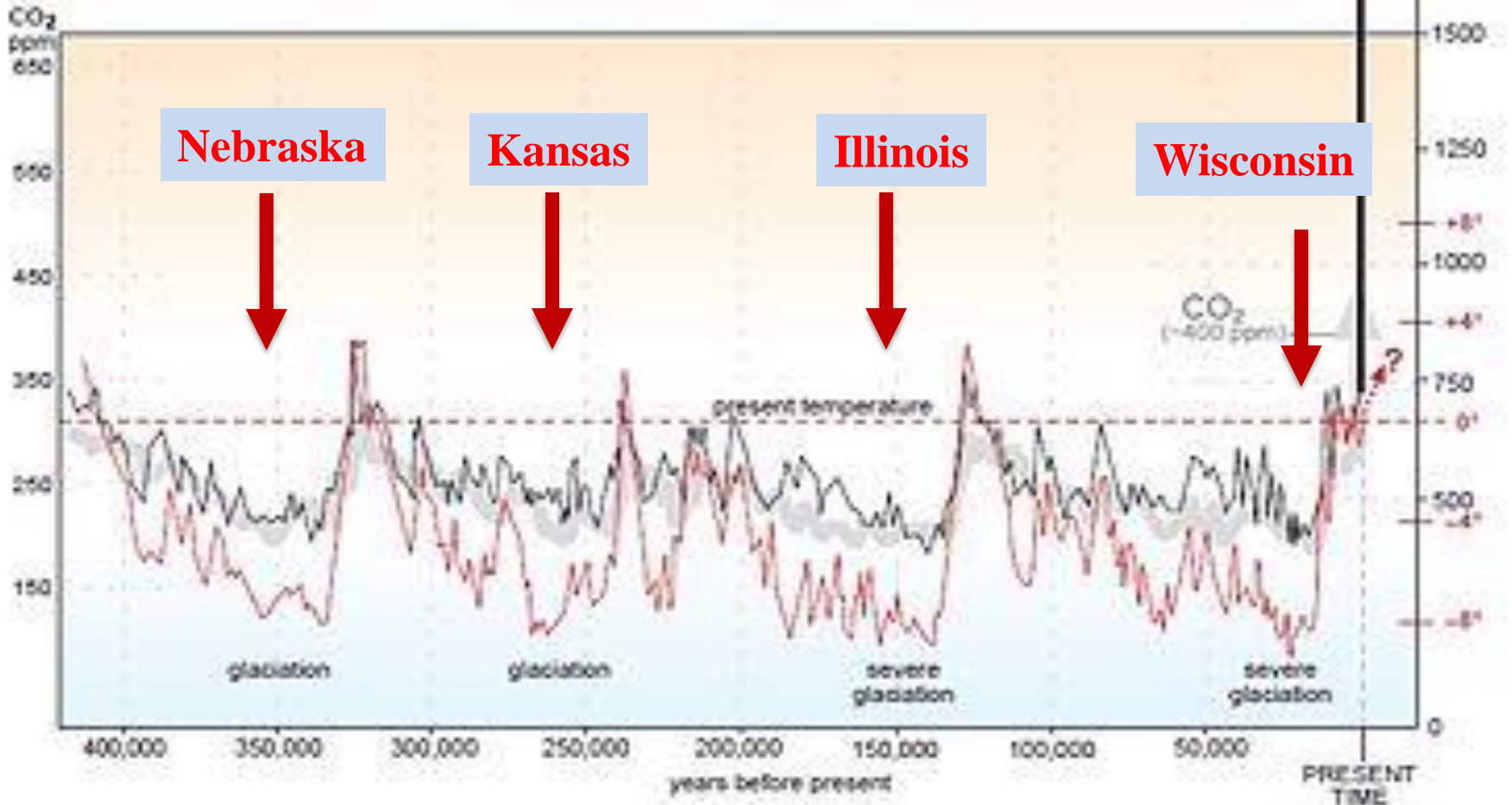
Glaciers are retreating almost everywhere around the world — including in the Alps, Himalayas, Andes, Rockies, Alaska, and Africa.

NOW THIS IS REAL CLIMATE CHANGE!! (It did "Happen Before")



ATMOSPHERIC CH₄:CO₂:°C

420,000 years BP – present time

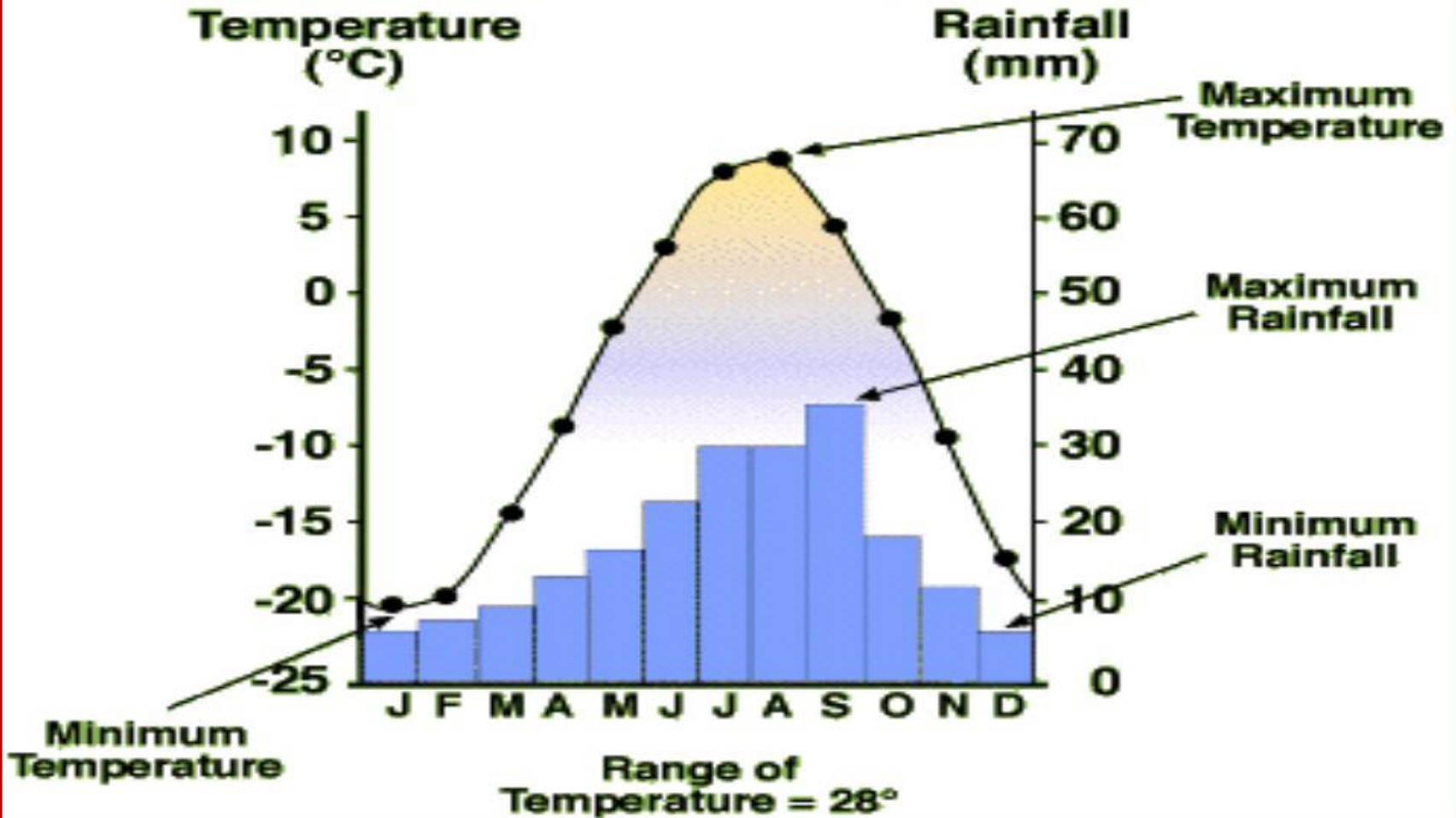


— temperature variation from present shown in °C
 — methane (CH₄) parts per billion (ppb by volume)
 — carbon dioxide (CO₂) parts per million (ppm/v)

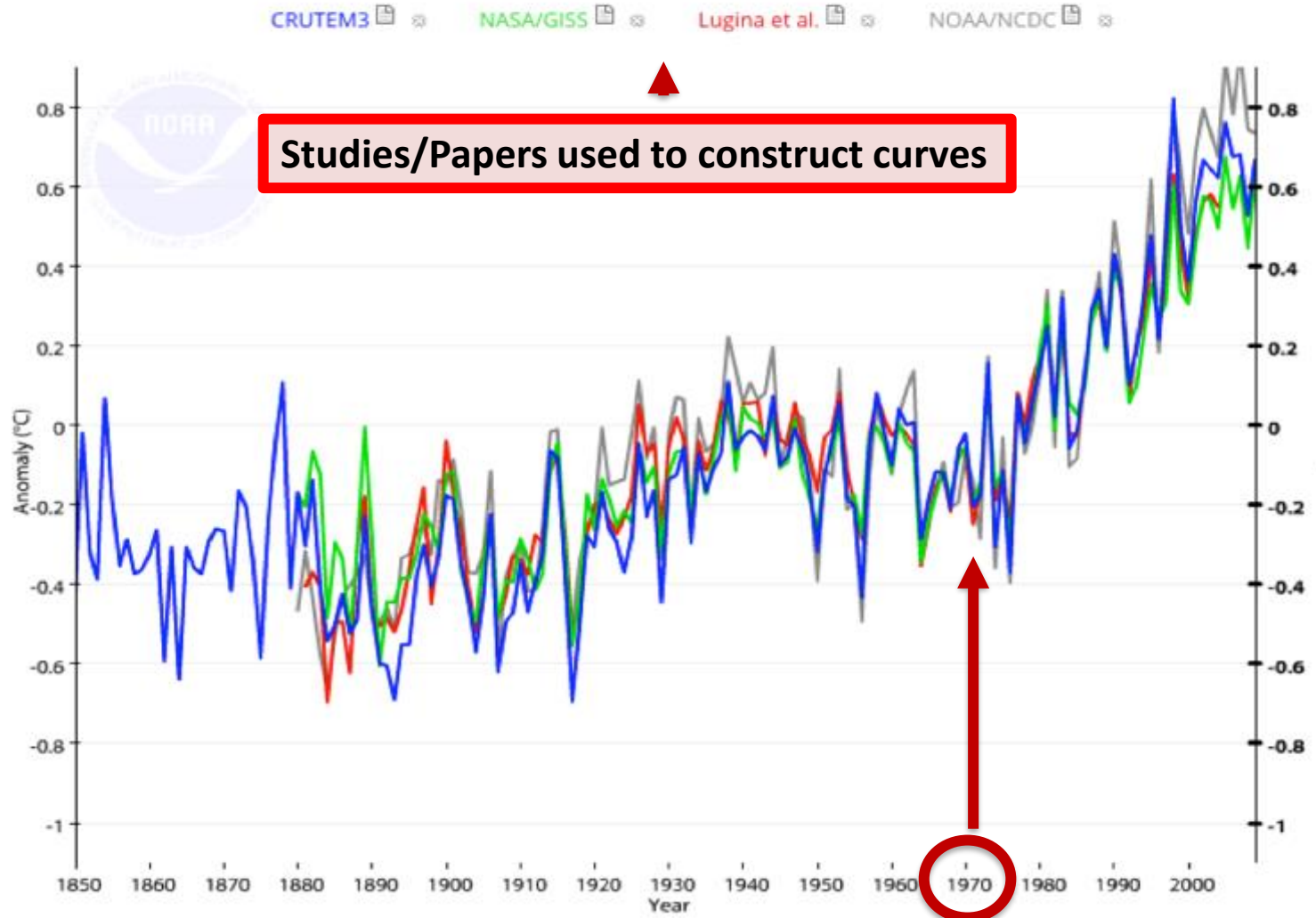
Based on Antarctic and Greenland ice-core data, and atmospheric data from Cape Grim, Tasmania. Vostok ice core data: Petit et al. Nature (70,599, 1999). Law Dome ice core data: Etheridge et al. Journal of Geophysical Research (2006). Cape Grim Station data: CSIRO Atmospheric Research and Bureau of Meteorology. °C between 160,000 and 420,000 years BP from IPCC.

10 SIMPLE GRAPHS THAT SAY IT ALL

Climate Graphs



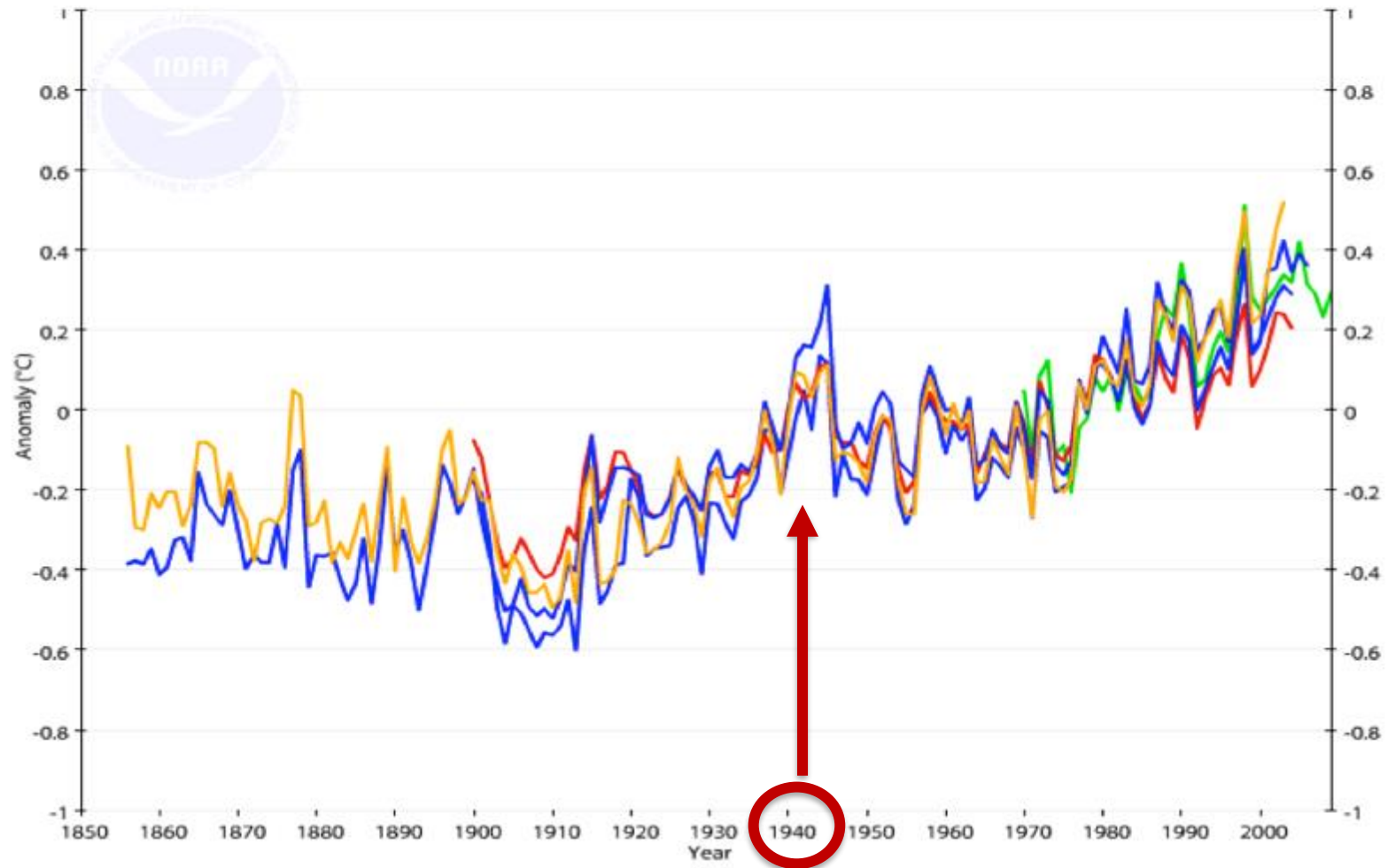
Land Surface Air Temperature



1. AIR TEMPERATURES OVER LAND ARE INCREASING.

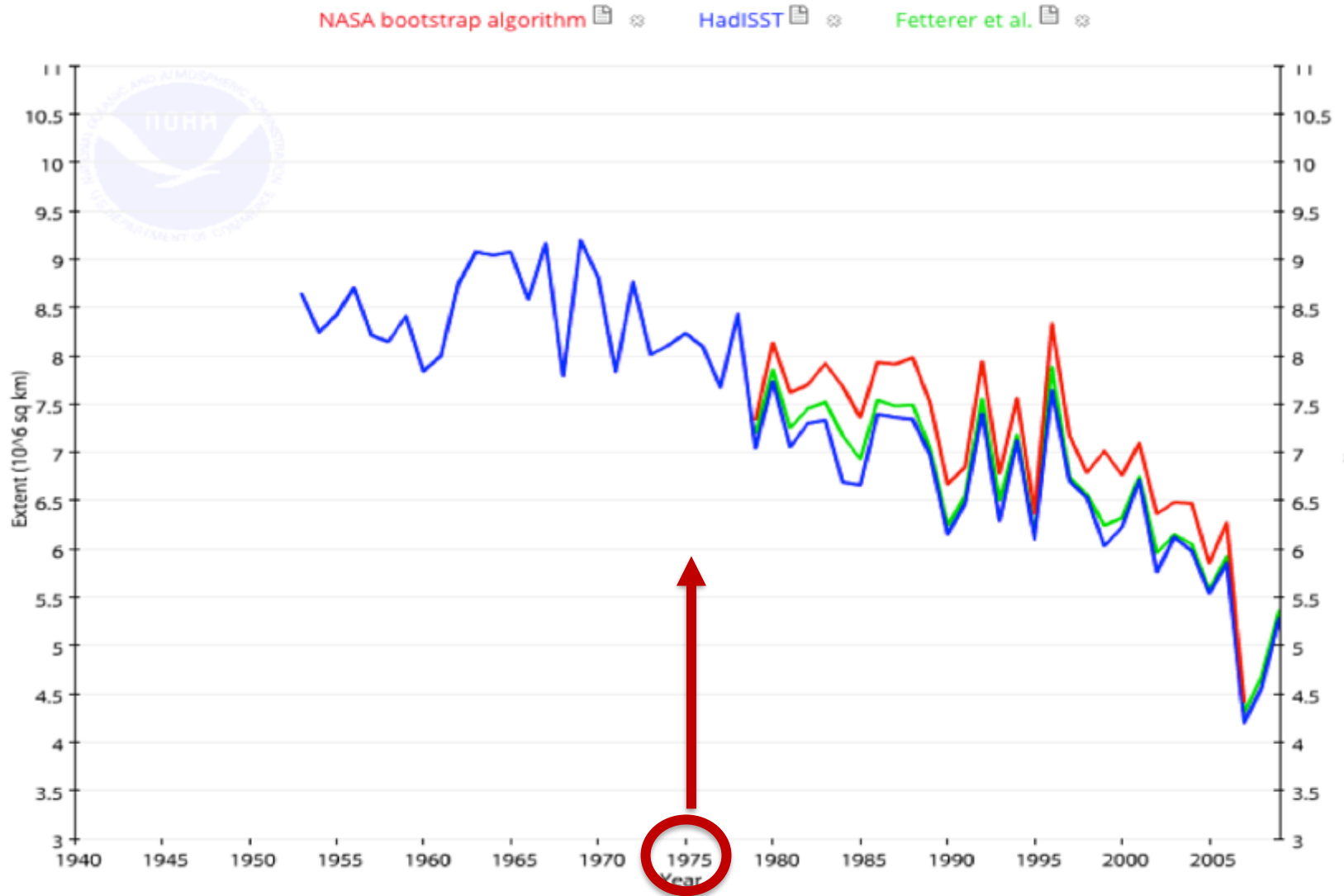
Marine Air Temperature

HadMAT Ishii et al. (uninterpolated) Ishii et al. (interpolated) MOHMAT Berry and Ke



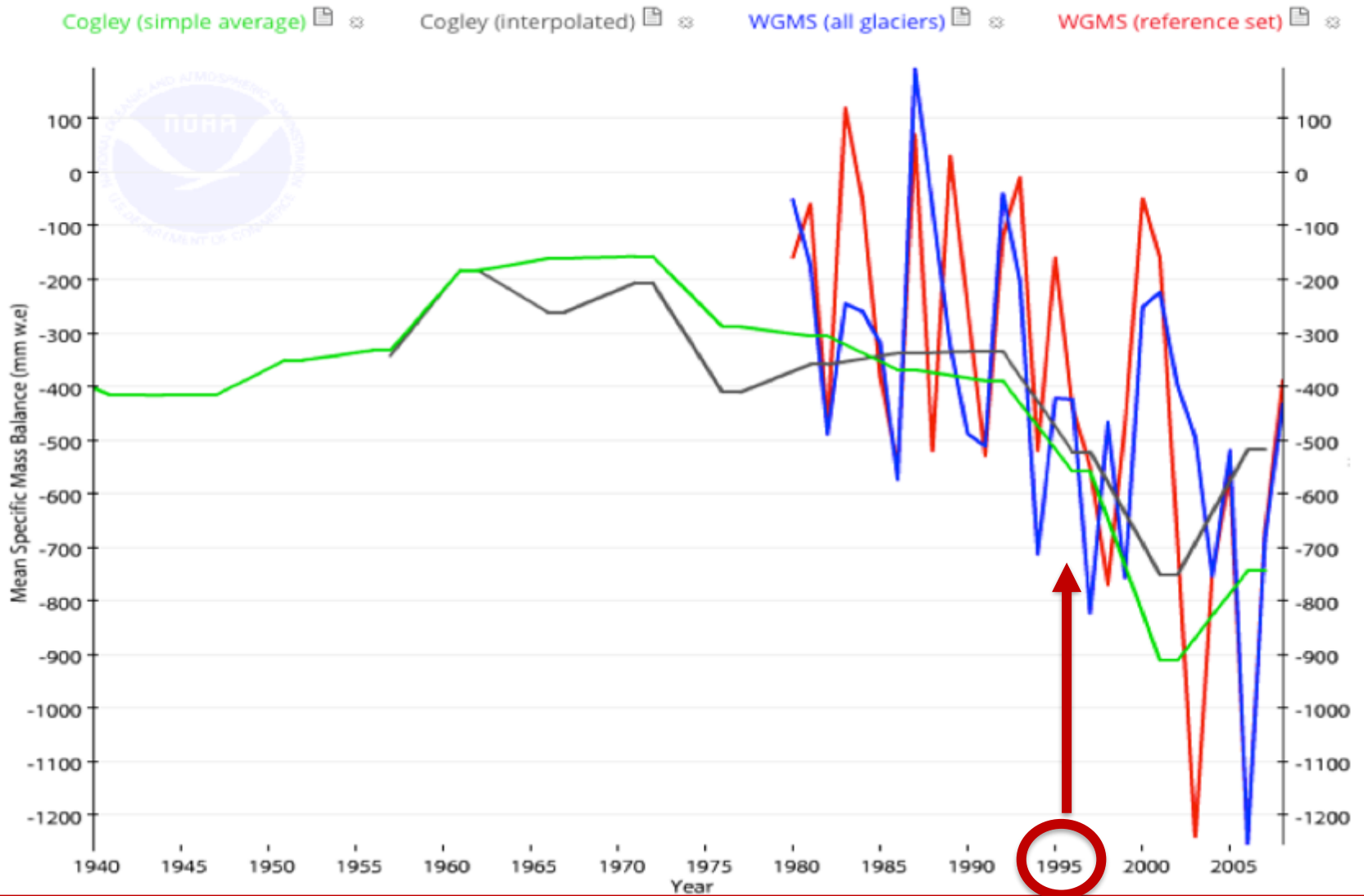
2. AIR TEMPERATURES OVER OCEANS ARE INCREASING

September Arctic Sea-Ice Extent



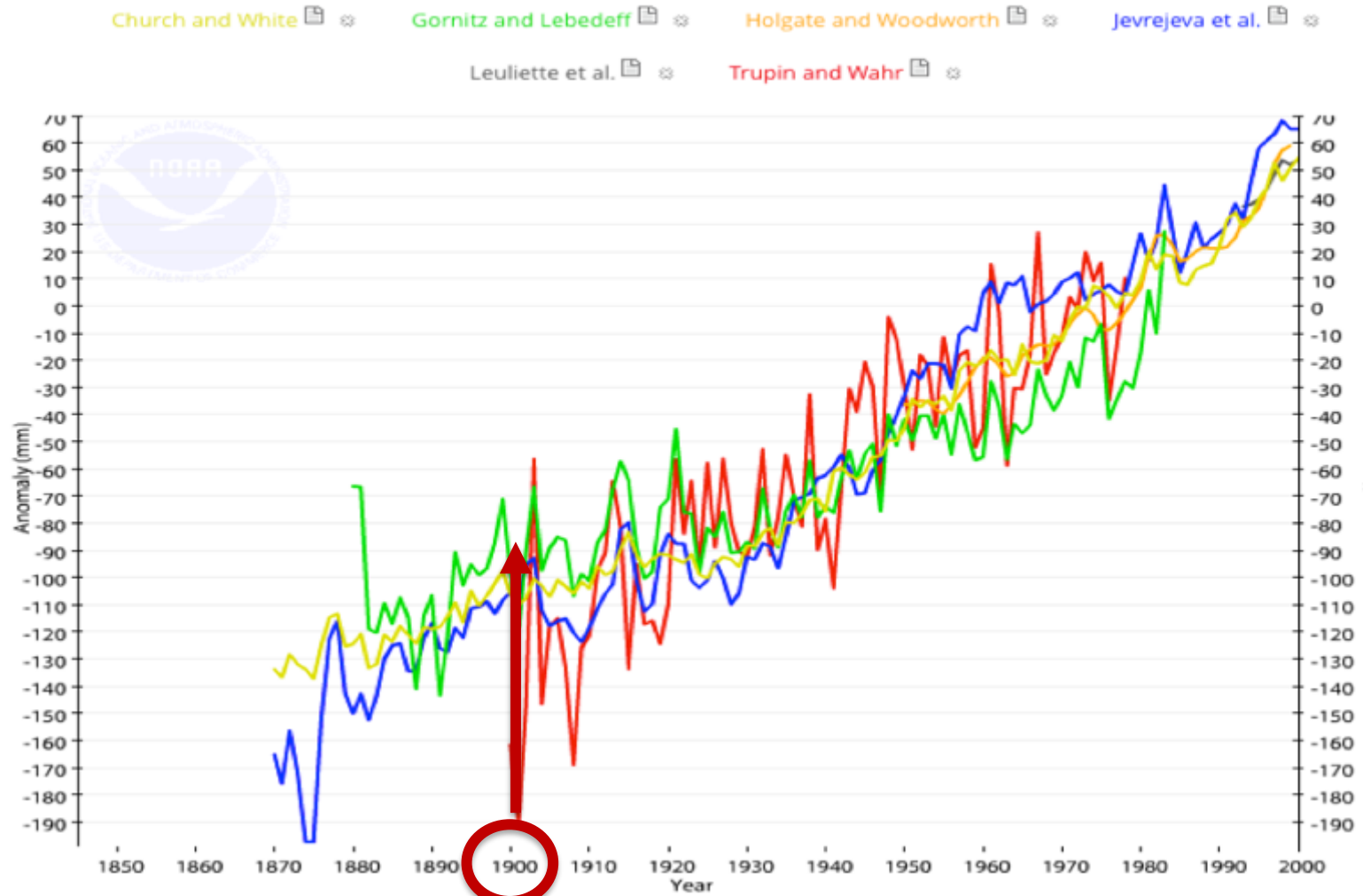
3. ARCTIC SEA ICE IS DECREASING

Glacier Mass Balance



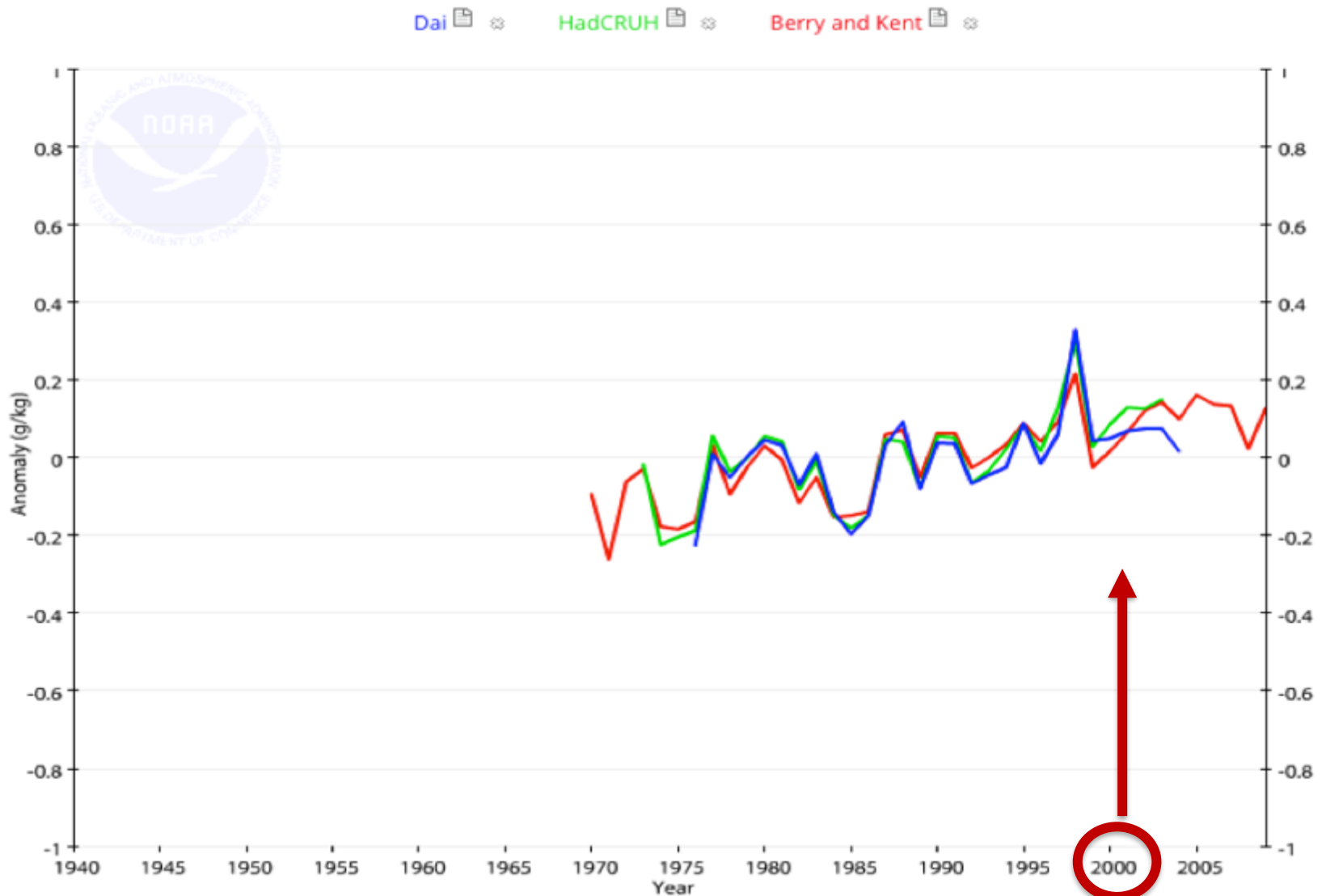
4. GLACIERS ARE MELTING.

Sea Level



5. SEA LEVELS ARE RISING.

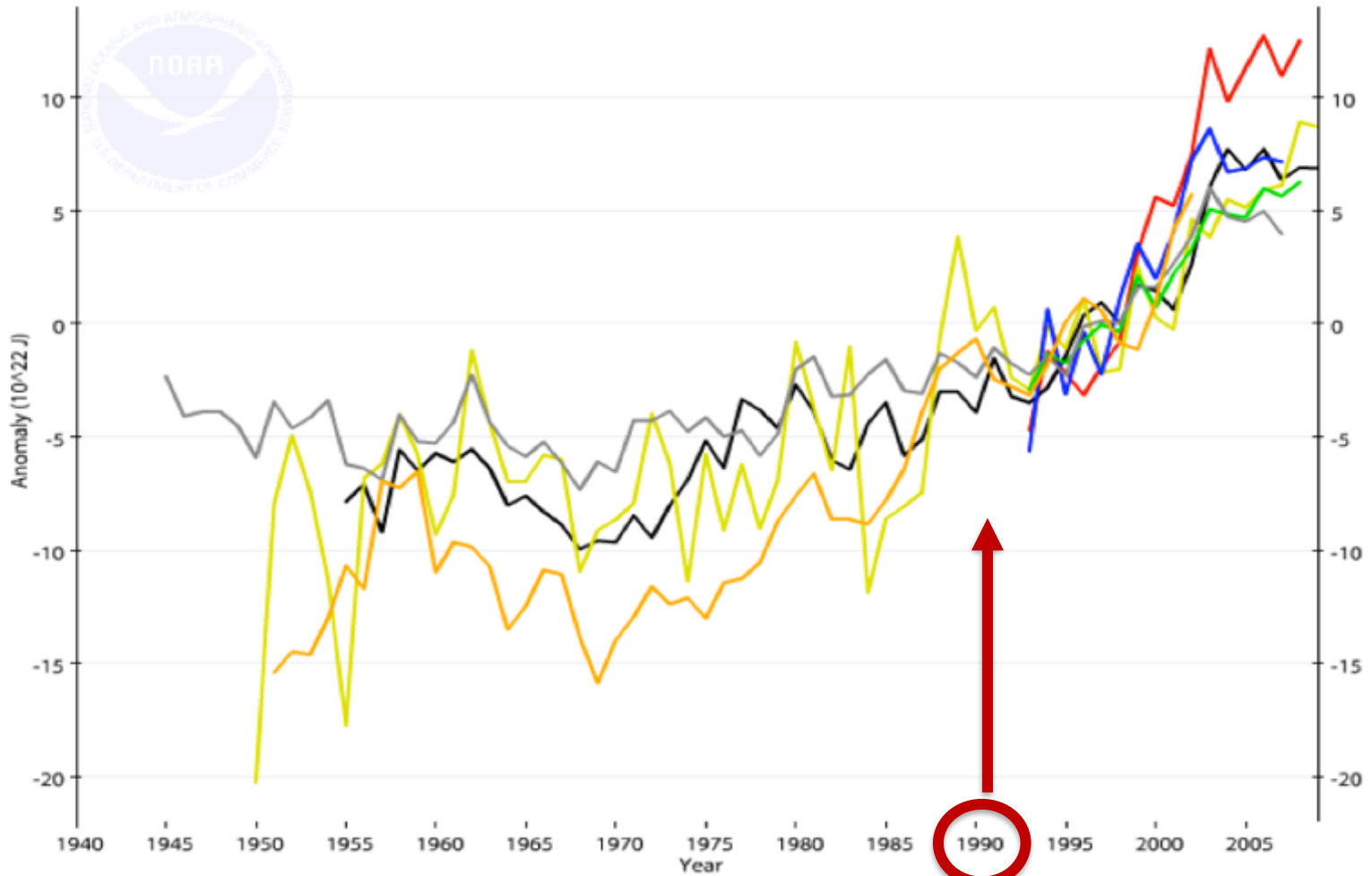
Specific Humidity



6. HUMIDITY (EVERYONE'S FAVORITE) IS INCREASING

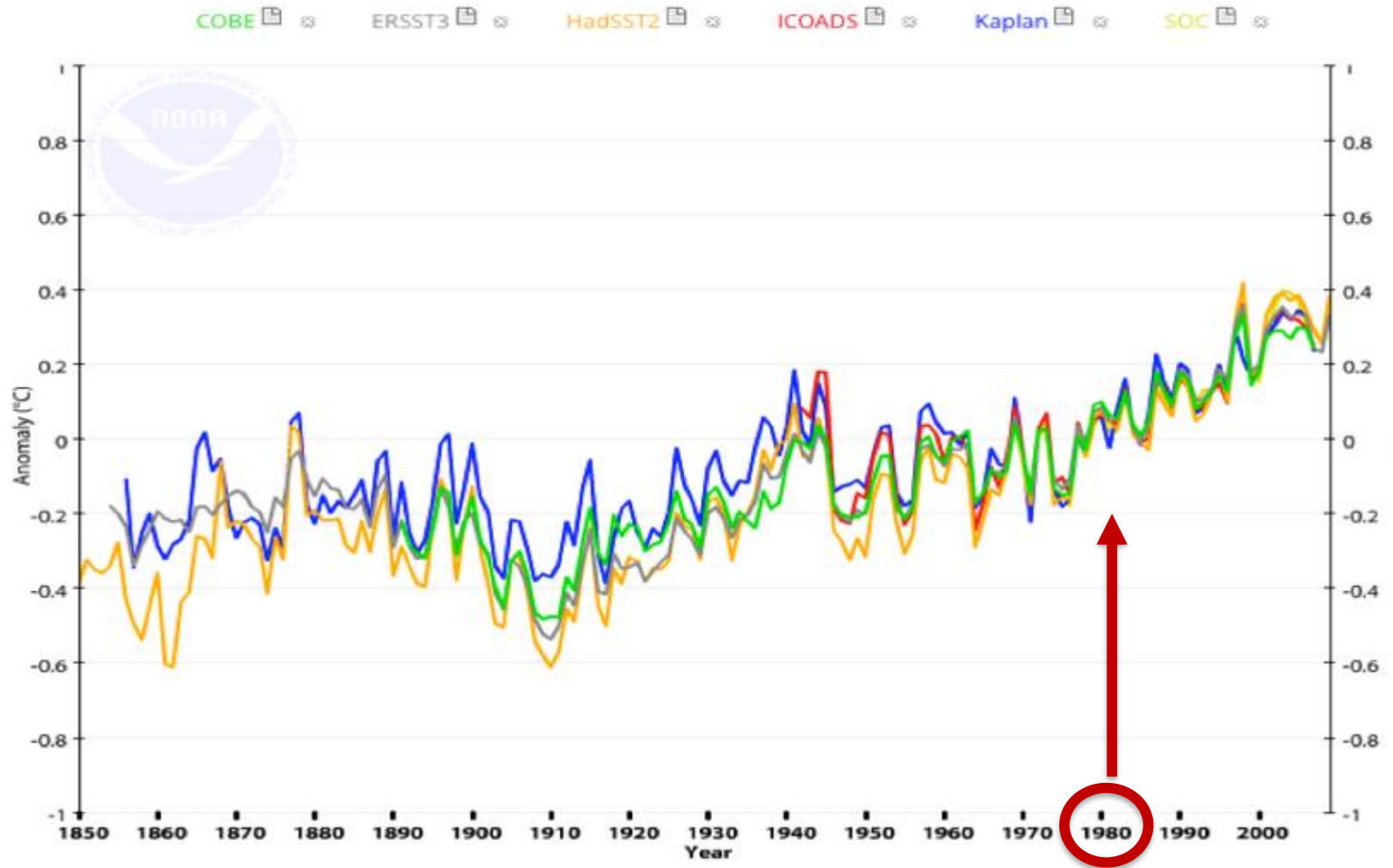
Ocean Heat Content (0-700m)

Domingues et al. Ishii and Kimoto Willis et al. Lyman and Johnson Palmer et al.
Levitus et al. Gouretski and Reseghetti



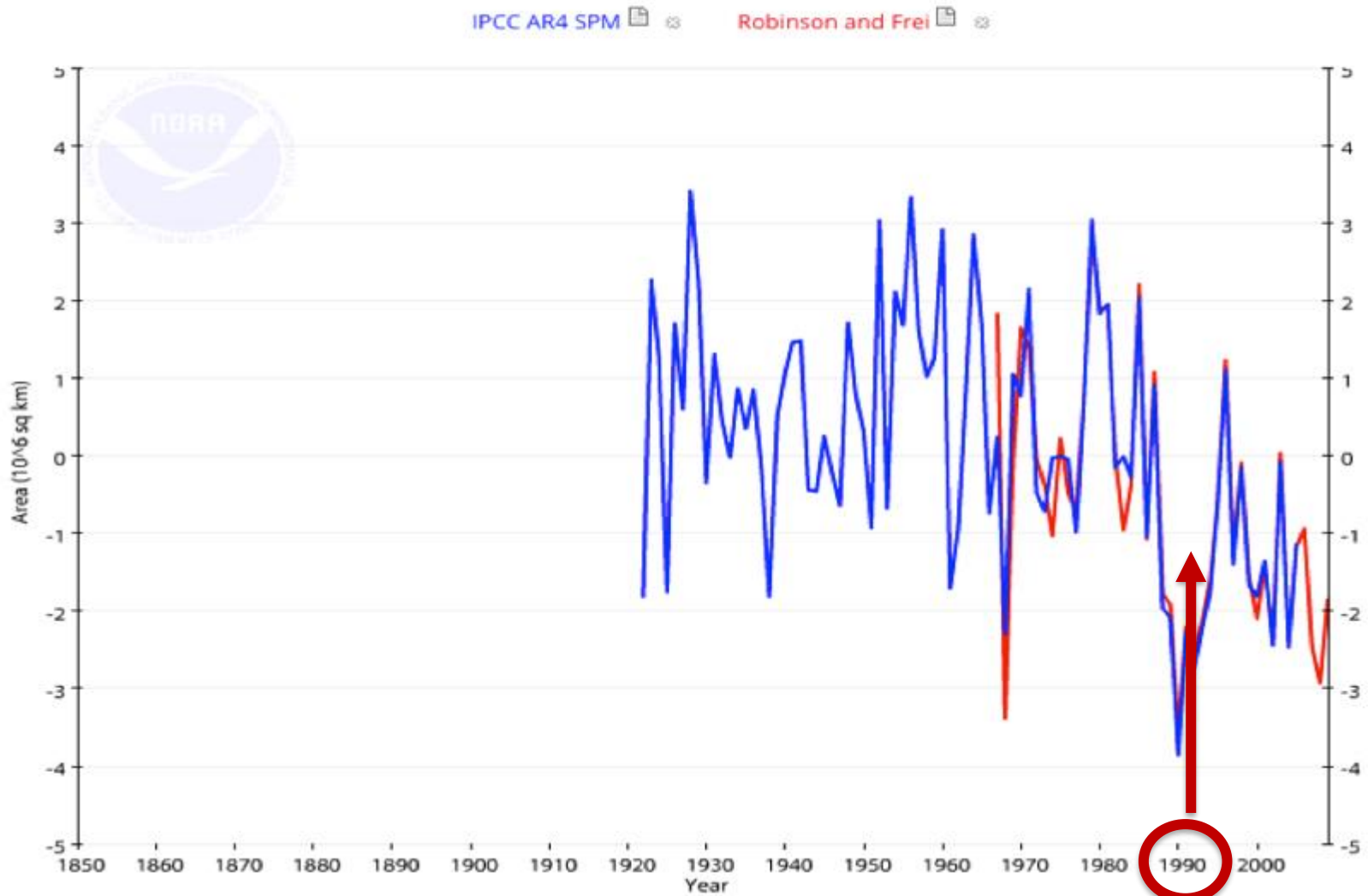
7. OCEAN HEAT CONTENT IS INCREASING.

Sea-surface Temperature



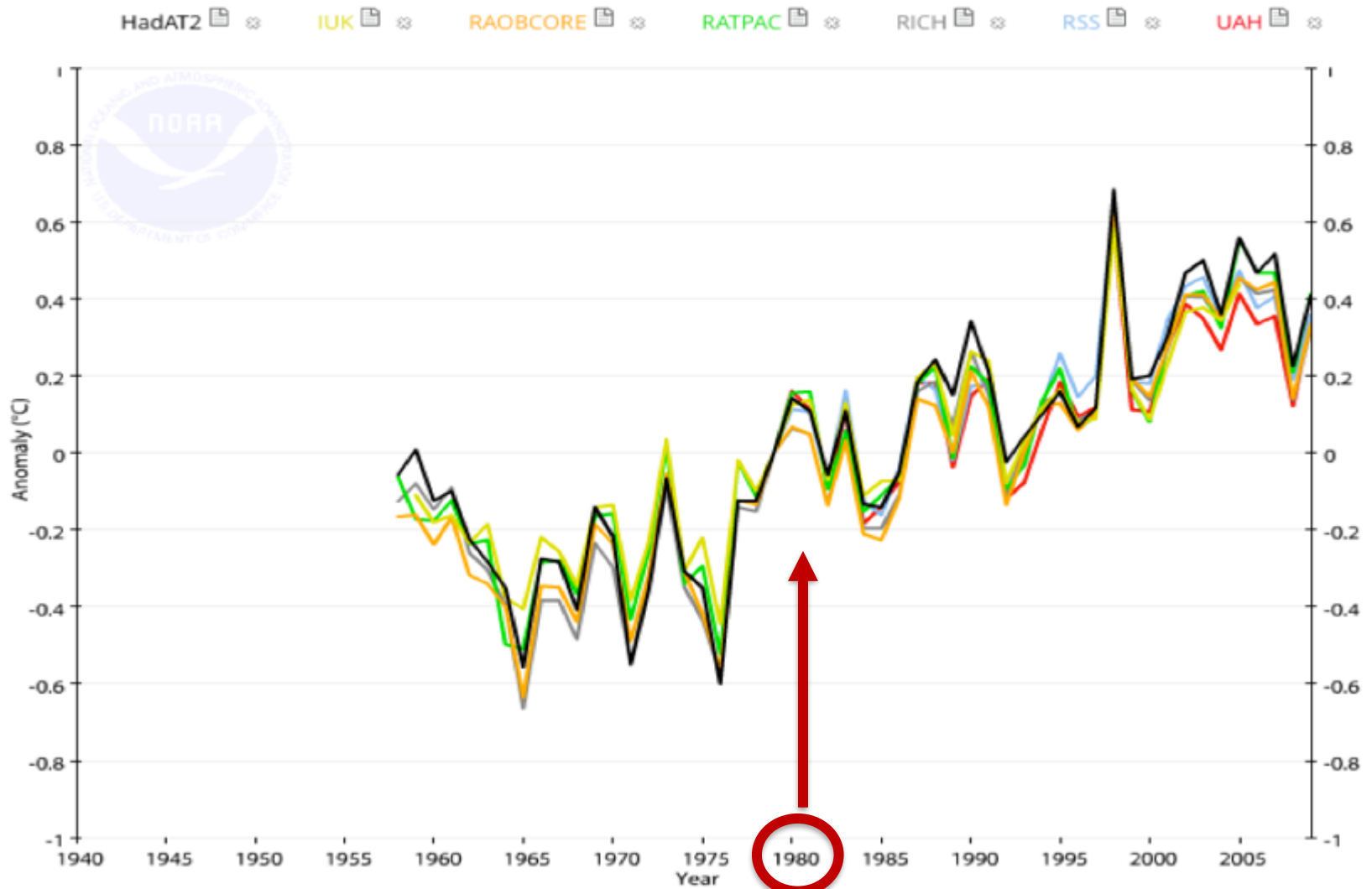
8. SEA SURFACE TEMPERATURE IS INCREASING.

Northern Hemisphere (March-April) Snow Cover

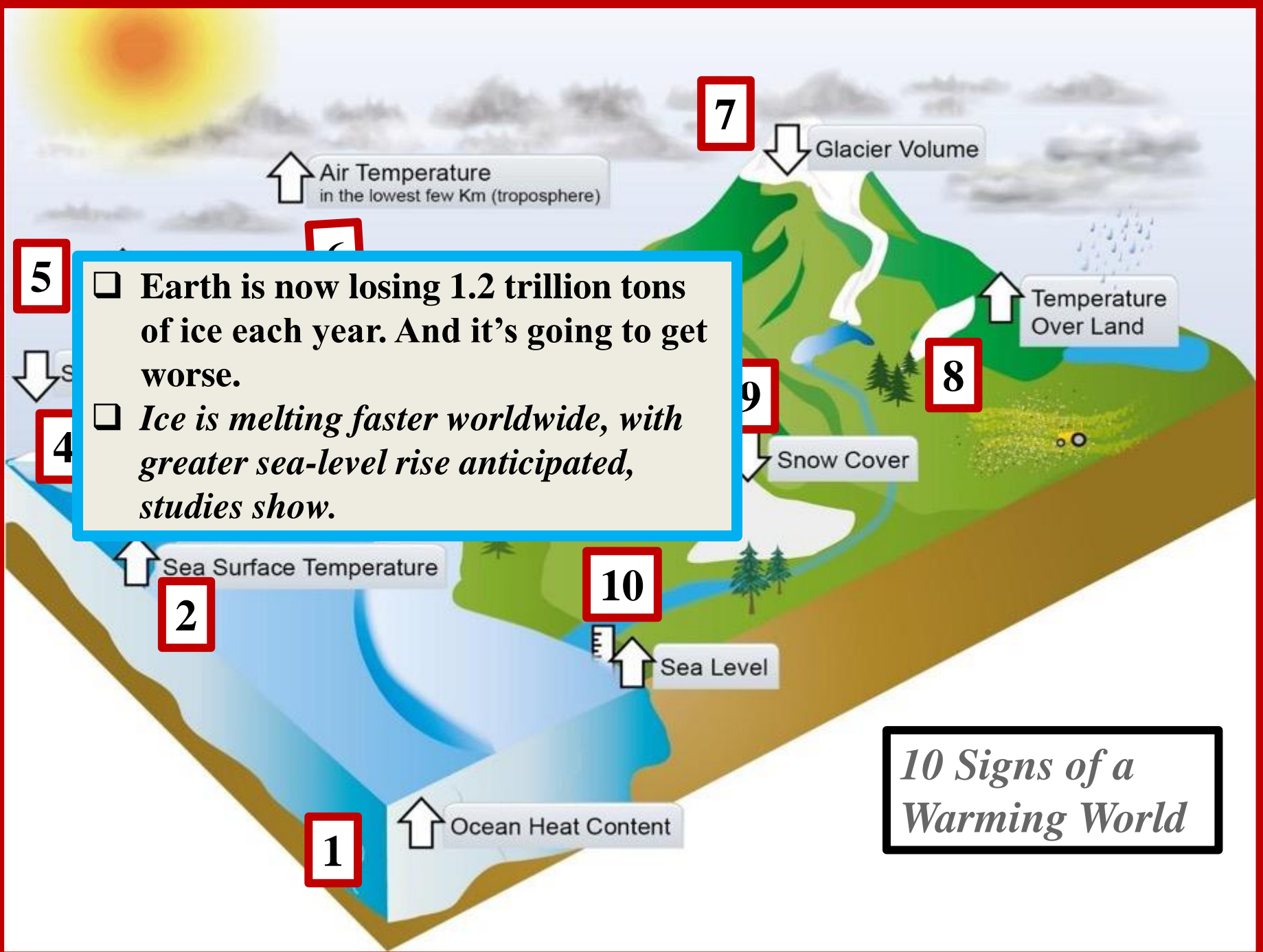


9. SNOW IS DECREASING.

Tropospheric Temperature



10. EARTH'S LOWER ATMOSPHERE TEMPERATURE IS INCREASING.



5

- ❑ Earth is now losing 1.2 trillion tons of ice each year. And it's going to get worse.
- ❑ *Ice is melting faster worldwide, with greater sea-level rise anticipated, studies show.*

4

2

1

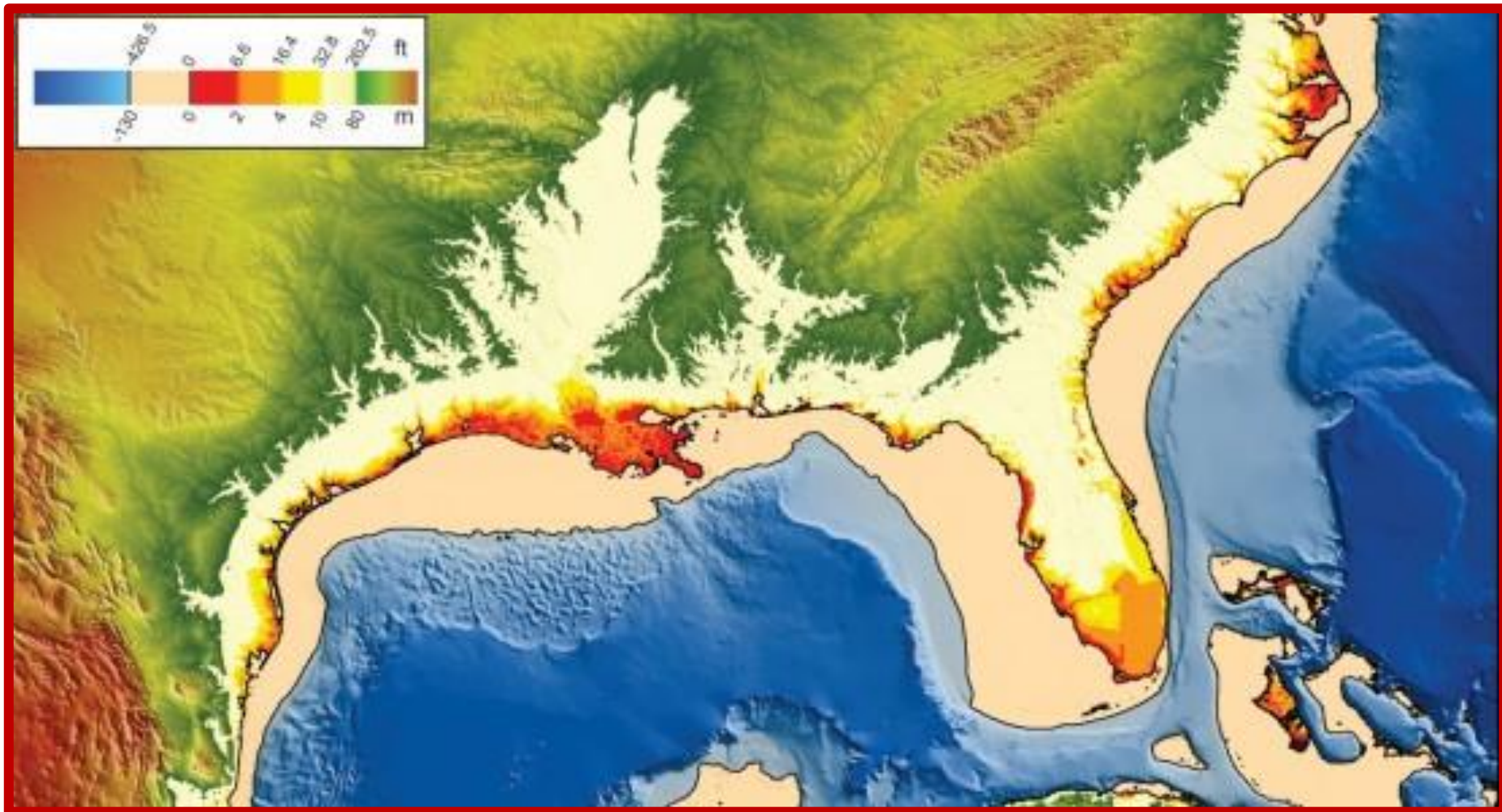
7

8

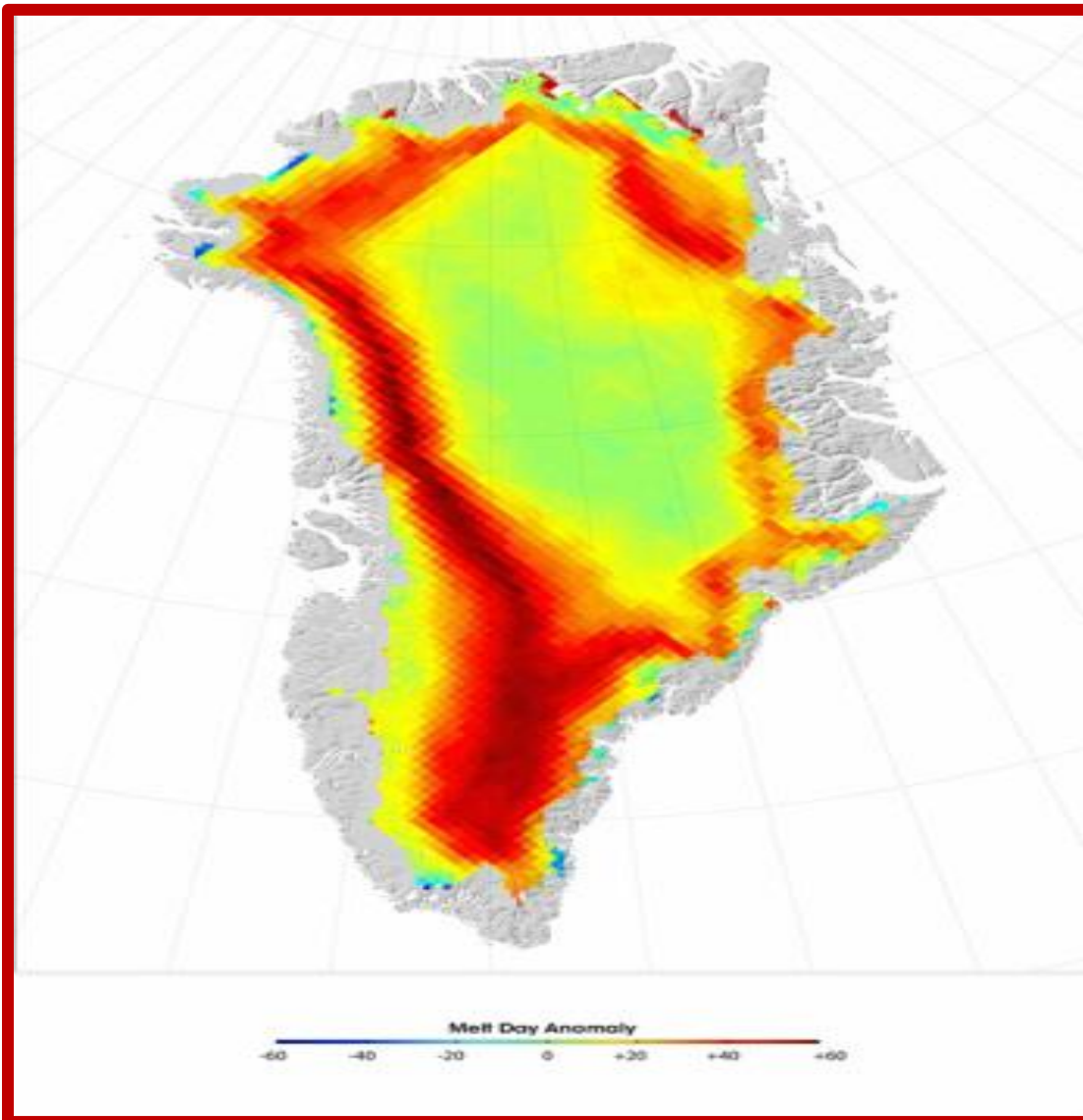
9

10

10 Signs of a Warming World

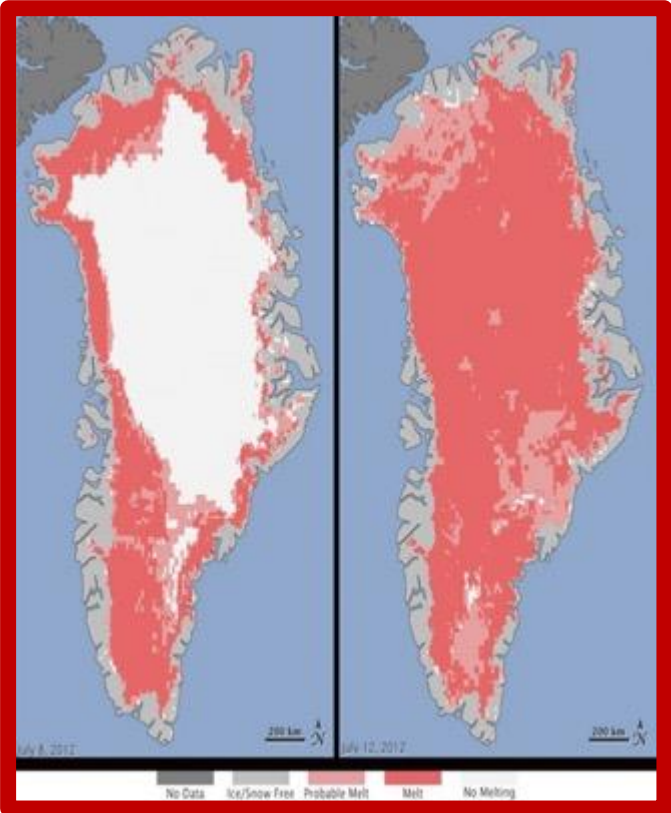


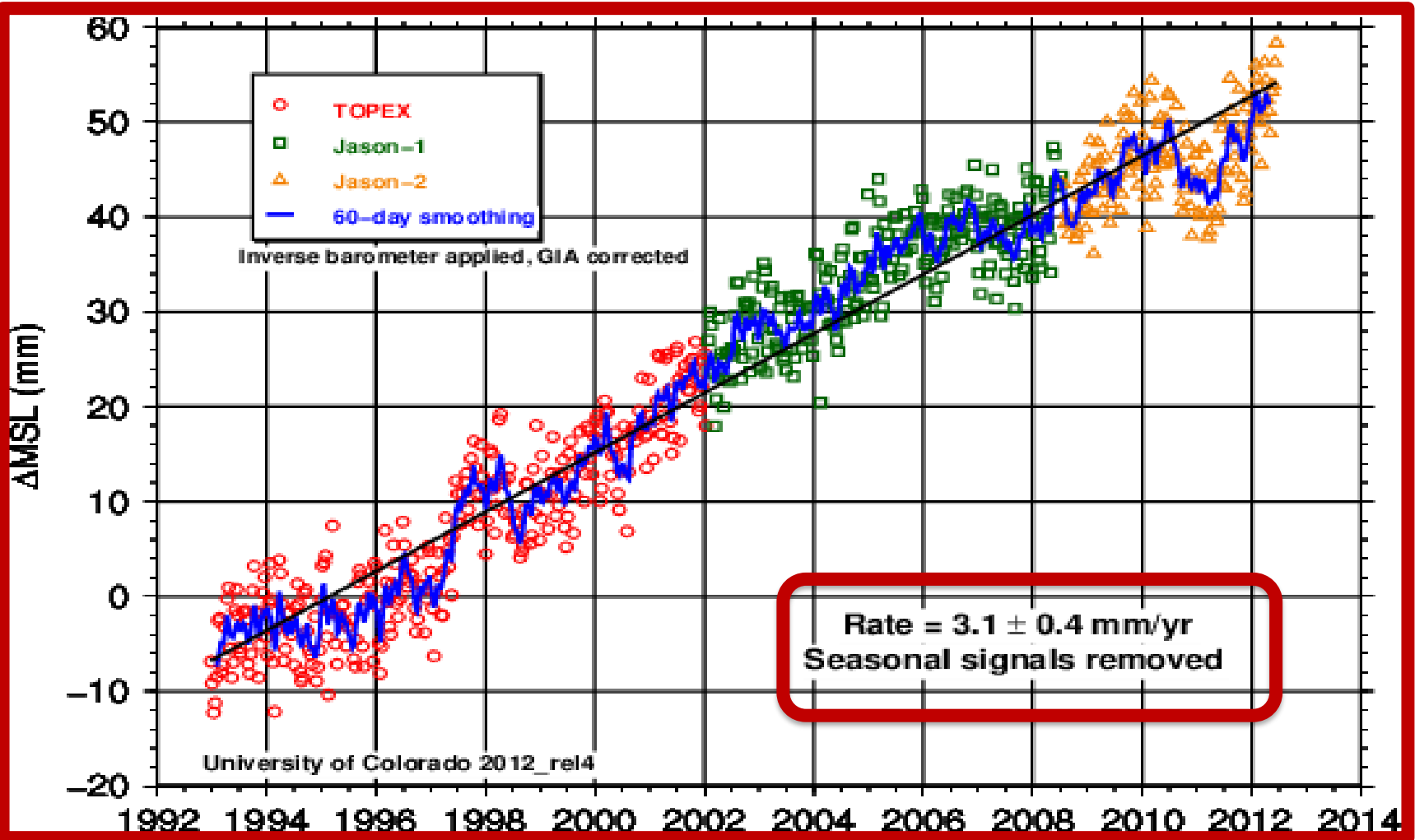
- This map shows extremes in past and possible future changes in sea level.
- A rise of one meter by the end of this century won't be nearly this extreme.



Red color indicates areas where melting lasted up to 50 days above the 1980 – 1999 mean

Map of Greenland showing the number of melting days in 2012 with respect to the 1980 – 1999 average (e.g.).





University of Colorado scientists released this chart of sea level rise earlier in 2012. It is based on data collected since 1993 via satellite radar altimeters, with the measurements

There are just four critical global warming accelerating tipping points *and* **deadlines** to never forget:

1. The 2025 carbon 425-450 ppm tipping point, (the Climate Cliff)
2. The 2042-2067 or earlier, extinction-accelerating, runaway global ice melting tipping point level,
3. The 2063-2072 or earlier, extinction-accelerating, massive methane release tipping point level.
4. The post-2072, runaway rising global warming temperature tipping point level.

HICE Denial

- 1. THIS IS THE COLDEST WINTER WE'VE HAD IN YEARS! SO MUCH FOR GLOBAL WARMING.**
- 2. CLIMATE CHANGE IS NATURAL AND NORMAL**
- 3. IT'S HAPPENED AT OTHER POINTS IN HISTORY.**
- 4. THERE'S NO CONSENSUS AMONG SCIENTISTS THAT CLIMATE CHANGE IS REAL**
- 5. PLANTS AND ANIMALS CAN ADAPT.**
- 6. ANTARCTIC ICE IS INCREASING, NOT MELTING.**
- 7. CLIMATE CHANGE IS GOOD FOR US.**
- 8. CLIMATE TEMPERATURES HAVE BEEN HIGH IN THE PAST. THE CURRENT TEMPERATURE INCREASE IS NOTHING NEW OR UNIQUE, BUT JUST NATURAL VARIATION.**

Climate hazards

Human systems

WHAT ARE THE CONSEQUENCES OF HICE?

Jan. 25, 2021

World's Ice Is Melting Faster Than Ever, Climate Scientists Say

- Research shows the Earth lost a sheet of ice 100 meters thick roughly equivalent to the size of the U.K. in recent decade*
- From Antarctica to the Arctic, the world's ice is melting faster than ever, according to a new global satellite survey that calculated the amount of ice lost from a generation of rising temperatures.*
- Ice plays a crucial role in regulating the global climate, and losses will increase the frequency of extreme weather events such as flooding, fires, storm surges and heat waves."*

BROKEN CLIMATE RECORDS

ICE MELTS



HEAT WAVES



MONTHLY TEMPS



DENIERS



Peer Review Process

HOW PROFESSIONAL SCIENCE AND MEDICINE REPORT STUDIES



5 CHARACTERISTICS OF SCIENCE DENIAL

F



Fake Experts

L



Logical Fallacies

I



Impossible Expectations

C



Cherry Picking

C



Conspiracy Theories



Magnified Minority



Red Herring



Misrepresentation



Jumping to Conclusions



False Dichotomy

Google

climate change

All News Images Videos Books

About 588,000,000 results (0.61 seconds)

Ad · www.edf.org/climate_change

What Is Climate Change - Why It Matters

Facts, Dangers, Science – And How You Can Make A Difference. Learn More. Tackling Urgent Threats. Using Science & Economics. Bipartisan Approach.

[How You Can Help](#) · [News Center](#) · [About Us](#) · [Our Solutions](#)

Settings Tools

That's 588 MILLION in less than a second

Google

Covid-19

All News Images Books

About 7,410,000,000 results (1.16 seconds)

Settings Tools

That's 7.414 BILLION in a tad over a second

Technology enables the spread of misinformation in a way that wasn't possible before!



KOCH INDUSTRIES: STILL FUELING CLIMATE DENIAL

From 1997 to 2017, the Kochs funneled \$127,006,756 to 92 organizations that advance the Kochs' attacks on climate change science while presenting themselves as experts. These organizations are listed below:

**Acton Institute for the Study of
Religion and Liberty**

**American Council on Science
and Health (ACSH)**

**American Legislative Exchange
Council (ALEC)**

**Americans for Prosperity
Foundation (AFP)**

Atlas Network

Capital Research Center (CRC)

**American Council for Capital
Formation (ACCF)**

**American Enterprise Institute
(AEI)**

American Spectator Foundation

Americans for Tax Reform (ATR)

Ayn Rand Institute (ARI)

Cato Institute

**Center for Freedom & Prosperity
Foundation**

**Center for the Study of Carbon
Dioxide and Global Change
(CO2 Science)**

**Citizens for a Sound Economy
(disbanded – now
FreedomWorks)**

**Collegians For A Constructive
Tomorrow (CFACT Campus)**

**Competitive Enterprise Institute
(CEI)**

**Center for Independent Thought:
Stossel in the Classroom**

**Center for the Study of Market
Processes**

**CO2 Coalition (formerly George
C. Marshall Institute)**

**Commonwealth Foundation for
Public Policy Alternatives**

Council for National Policy

**Environmental Literacy Council
(disbanded)**

**Foundation for Economic
Education (FEE)**

Fraser Institute

Goldwater Institute

The Heritage Foundation

Independent Institute

**Federalist Society for Law and
Public Policy Studies**

**Foundation for Research on
Economics and the Environment
(FREE)**

Frontiers of Freedom

Heartland Institute

Independence Institute

**Independent Women's Forum
(IWF)**

**Institute for Energy Research
(IER) & American Energy
Alliance (AEA)**

**Institute for Humane Studies
(IHS)**

James Madison Institute (JMI)

John Locke Foundation (JLF)

**Mackinac Center for Public
Policy**

**The Manhattan Institute for
Policy Research**

Media Research Center (MRC)

Mercatus Center

**National Center for Policy
Analysis (NCPA)**

National Review Institute

**National Taxpayers Union
Foundation (NTUF)**

**Pacific Research Institute for
Public Policy (PRI)**

**Property and Environment
Research Center (PERC)**

The Reason Foundation

State Policy Network (SPN)

Students for Liberty (SFL)

Tax Foundation

**Texas Public Policy Foundation
(TPPF)**

**Washington Legal Foundation
(WLF)**

<https://skepticalscience.com/argument.php>

Here is a summary of global warming and climate change myths, sorted by recent popularity vs what science says. Click the response for a more detailed response. You can also view them sorted by taxonomy, by popularity, in a print-friendly version, with short URLs or with fixed numbers you can use for permanent references.

Climate Myth

vs

What the Science Says

1

"Climate's changed before"

Climate reacts to whatever forces it to change at the time; humans are now the dominant forcing.

10

"Antarctica is gaining ice"

Satellites measure Antarctica losing land ice at an accelerating rate.

had little impact on recent global warming.

22

"1934 - hottest year
on record"

1934 was one of the hottest years in the US, not globally.

Science denial

- ❑ This is the type of denial we are all familiar with: that the science of climate change is not settled.
 - ✓ Deniers suggest climate change is just part of the natural cycle.
 - ✓ Or that climate models are unreliable and too sensitive to carbon dioxide.
- ❑ Some even suggest that CO₂ is such a small part of the atmosphere it cannot have a large heating affect.
- ❑ Or that climate scientists are fixing the data to show the climate is changing

Techniques of Science Denial



Fake
Experts



Logical
Fallacies



Impossible
Expectations



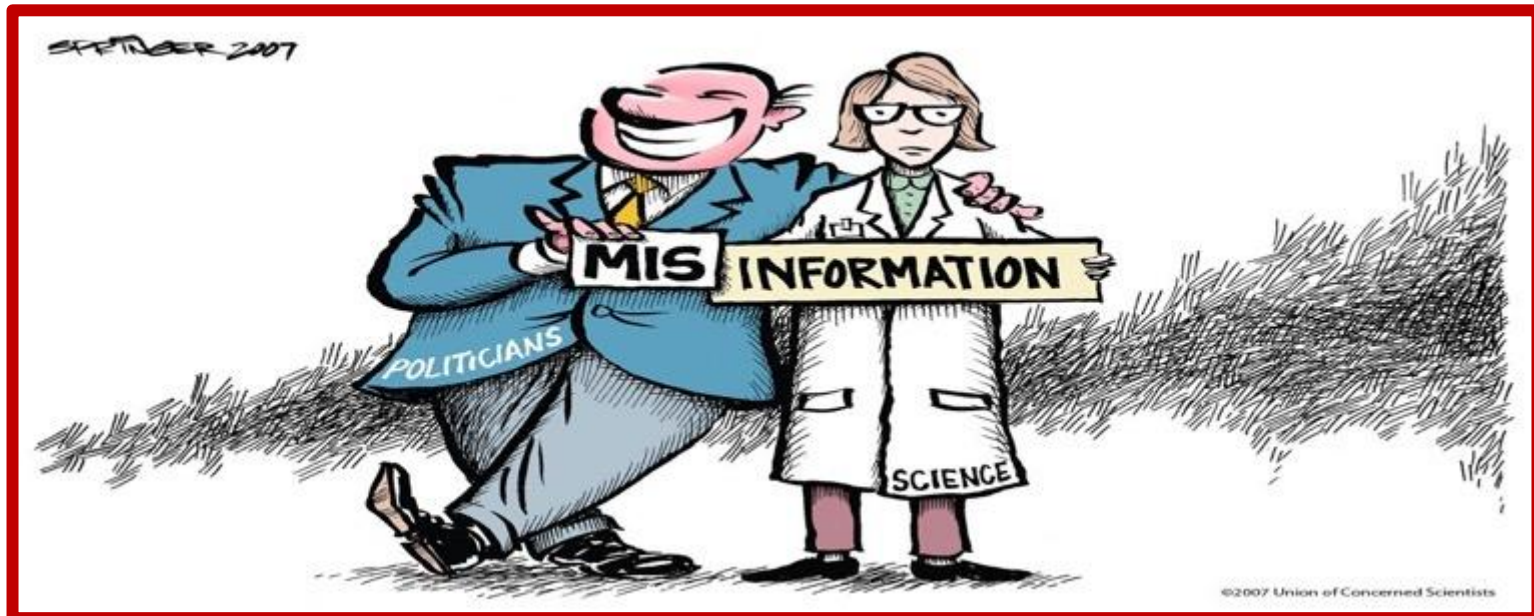
Cherry
Picking



Conspiracy
Theories

Political denial

- ❑ Climate change deniers argue we cannot take action because other countries are not taking action.
- ❑ But not all countries are equally guilty of causing current climate change.
- ❑ For example, 25% of the human-produced CO₂ in the atmosphere is generated by the US, another 22% is produced by the EU. Africa produces just under 5%.



Humanitarian denial

- ❑ Climate change deniers also argue that climate change is good for us.
- ❑ They suggest longer, warmer summers in the temperate zone will make farming more productive.
- ❑ These gains, however, are often offset by the drier summers and increased frequency of heatwaves in those same areas.
- ❑ For example, the 2010 “Moscow” heatwave killed 11,000 people, devastated the Russian wheat harvest and increased global food prices.



Crisis denial

- ❑ Deniers argue that climate change is not as bad as scientists make out.
- ❑ We will be much richer in the future and better able to fix climate change.
- ❑ They also play on our emotions as many of us don't like change and can feel we are living in the best of times – especially if we are richer or in power.



HUMANITY AND
INHUMANITY DURING
CRISIS
COVID-19



Decades of Science Denial Related to Climate Change Has Led to Denial of the Coronavirus Pandemic.

- Gretchen Goldman, research director of the Union of Concerned Scientists' Center for Science and Democracy says:*
- I'm skeptical that this situation is enough to change people's minds on climate change.
- There will never be an event that you can point to and say that it's climate.
- You won't have a 'gotcha moment' as you would with this virus because you have a more definite link to deaths when you have a virus.
- If coronavirus changes people's science denial ways here, I wouldn't put money on it changing their views on other scientific issues.

Parallels between the coronavirus and the climate crisis

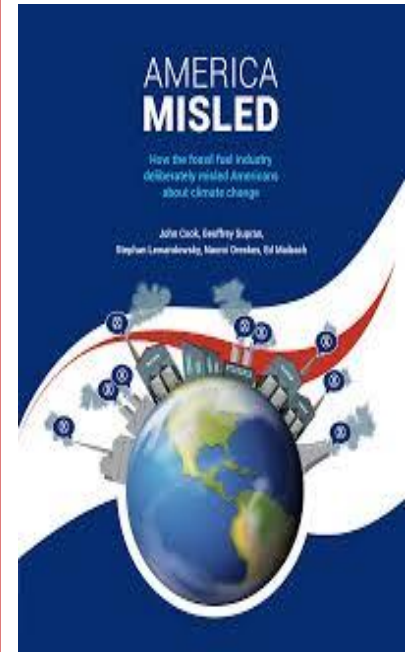
- You could just as easily replace the words ‘climate change’ with ‘COVID-19’; it is truly the tale of two pandemics deferred, denied, and distorted.**
- Just as in today’s pandemic, progress has been halted by**
 - ✓ **finger-pointing**
 - ✓ **denial**
 - ✓ **replacing real science with junk science**
 - ✓ **misinformation**
 - ✓ **flat-out lies**
 - ✓ **elevating political hacks instead of scientists and experts**
 - ✓ **refusal to work with allies and even adversaries**
 - ✓ **leaving states and cities to fend for themselves**
- Sound familiar?**
 - ✓ **It’s no coincidence that the same person who called COVID-19 a “Democratic hoax” referred to climate change as a “hoax invented by the Chinese.”**

Covid-19 Denials

- If you look at the number of COVID-19 deaths compared with the U.S. population, it's a very small percentage, not enough to worry about.**
- The virus is going to do what it is going to do. We cannot stop it; we cannot slow it. It's just going to have to run its course..**
- Hospitals are inflating COVID-19 death numbers to get more money.**
- Most people who die of COVID-19 are older; younger people don't have to worry. Numbers of COVID-19 cases are inflated because of repeat testing.**
- Do you know how many people die of Swine Flu each year?**
- Dr. Fauci is making millions off the vaccine development.**

How Identity—Not Ignorance—Leads to Science Denial

- ❑ Changing the minds of Covid-19/Climate deniers may require a lot more than sound reasoning.
- ❑ The people who deny science are often trying to uphold membership in something that they find meaningful.
- ❑ Once a community absorbs an idea into its collective viewpoint, rejecting that idea becomes akin to rejecting the whole community.
- ❑ An individual alone can seldom fulfill the basic psychological needs of another.
- ❑ That fulfillment comes from a larger community and identifying with them and being a part of them.



HOW ABOUT A LITTLE GOOD NEWS



Many Companies have committed to going 100% Renewable Energy to power their businesses,:

- ✓ **Apple**
- ✓ **Levi Strauss & Co**
- ✓ **Bank of America**
- ✓ **Bloomberg**
- ✓ **Citi**
- ✓ **Clif Bar**
- ✓ **eBay**
- ✓ **General Motors**
- ✓ **JPMorgan Chase**
- ✓ **Nike**
- ✓ **Wells Fargo**
- ✓ **Xylem**

**WHAT WE NEED
IS MORE OF THIS**



The war on climate denial has been won.

And that's not the only good news.

By David Wallace-Wells

- A decade ago, capitalists deemed decarbonization too expensive.
- Suddenly, it appears too good a deal to pass up.
- The IEA, a notoriously conservative forecaster, recently called solar power **“the cheapest electricity in history”** and projected that India will build **86 %** less new coal power capacity than it thought just one year ago.
- It would appear that the age of climate denial is over, thanks to **extreme weather** and the march of science and the historic labor of activists — climate strikers, **Sunrise, Extinction Rebellion** — whose success in raising alarm may have been so sudden that they brought an end to the age of climate Jeremiahs as well.

#1 *New York Times* Bestseller

The
Uninhabitable
Earth

Life After Warming

David
Wallace-Wells



What I talked about
(and you will chat about)

- 1. Alexander Von Humboldt**
- 2. What he accomplished with little or no US fanfare**
- 3. Why he is probably the least known polymath**
- 4. Humboldt's relationship to biodiversity and climate**
- 6 Human induced climate effects (HICE)**
- 7 Acceptance and denial of HICE**
- 8 Similarities with denial and acceptance of Covid-19**
- 9 Where do we go from here**
- 10 John Donne**



Excerpt from *Lines Written in Early Spring*

BY WILLIAM WORDSWORTH

*To her fair works did Nature link
The human soul that through me ran;
And much it grieved my heart to think*

CREATOR'S REMORSE

**No man is an island entire of itself;
every man is a piece of the continent, a part of the main;
if a clod be washed away by the sea, Europe is the less,
as well as if a promontory were,
as well as any manor of thy friends or of thine own were;
any man's death diminishes me,
because I am involved in mankind.**

And therefore never send to know for whom the bell tolls;

it tolls for thee.

**THAT'S ALL
FOLKS!**

- ❑ A polymath is an individual whose knowledge spans a substantial number of subjects.
- ❑ Polymaths include the great scholars and thinkers of the [Islamic Golden Age](#), [Renaissance](#) and the [Enlightenment](#), who excelled at several fields in science, technology, engineering, mathematics, and the arts.,



*Leonardo da Vinci
Michelangelo
Galileo Galilei*

**RENAISSANCE
PERSON**



*Marie Curie
Isaac Newton
Theodore Roosevelt*

POLYMATH



**PHILOSOPHER
KING**



*Aristotle
Marcus Aurelius
Archimedes*

**GENTLEMAN
SCHOLAR**

*Thomas Jefferson
Benjamin Franklin
John Adams*



**MODERN
POLYMATH**

? *Elon Musk
Steve Jobs
Mark Zuckerberg*

**Why one can't
be a
Polymath
anymore**

Homework Assignment

Speculate on the scenario that would result if this particular event had taken place:

Covid-19 pandemic had occurred in 1950.

What to consider:

1. The state of knowledge about DNA, RNA
2. Communications of the times, e.g. lack of internet
3. Much smaller amount of mass travel
4. Public divisiveness or cohesion
5. Polio

Decades of Science Denial Related to Climate Change Has Led to Denial of the Coronavirus Pandemic

- ❑ After the fossil fuel industry spent hundreds of millions of dollars attacking climate scientists it isn't hard to understand how pandemic denial happened.
- ❑ Climate deniers have long attacked climate scientists, and Covid-19 deniers recently launched a smear campaign against [Dr. Anthony Fauci](#), in part because he corrected the President's inaccurate statements about the pandemic.
- ❑ Between 2003 and 2010, 91 climate denialist groups received more than half a billion dollars.
- ❑ A 2016 survey by the Pew Research Center found that fewer than 30 percent of Americans understood that the vast majority of climate scientists and peer-reviewed studies support the conclusion that climate change is a human created threat.

- ❑ Human activities, particularly the combustion of fossil fuels, are altering the climate system.
- ❑ Human-driven changes in land use and land cover:
 - ✓ urbanization,
 - ✓ deforestation
 - ✓ shifts in vegetation patterns that, resulting in changes to the reflectivity of the Earth surface (albedo)
 - ✓ emissions from burning forests
 - ✓ urban heat island effects and
 - ✓ changes in the natural water cycle.

