IMPACT CLIMATE
PRIMER

Event Date: 9/17/20

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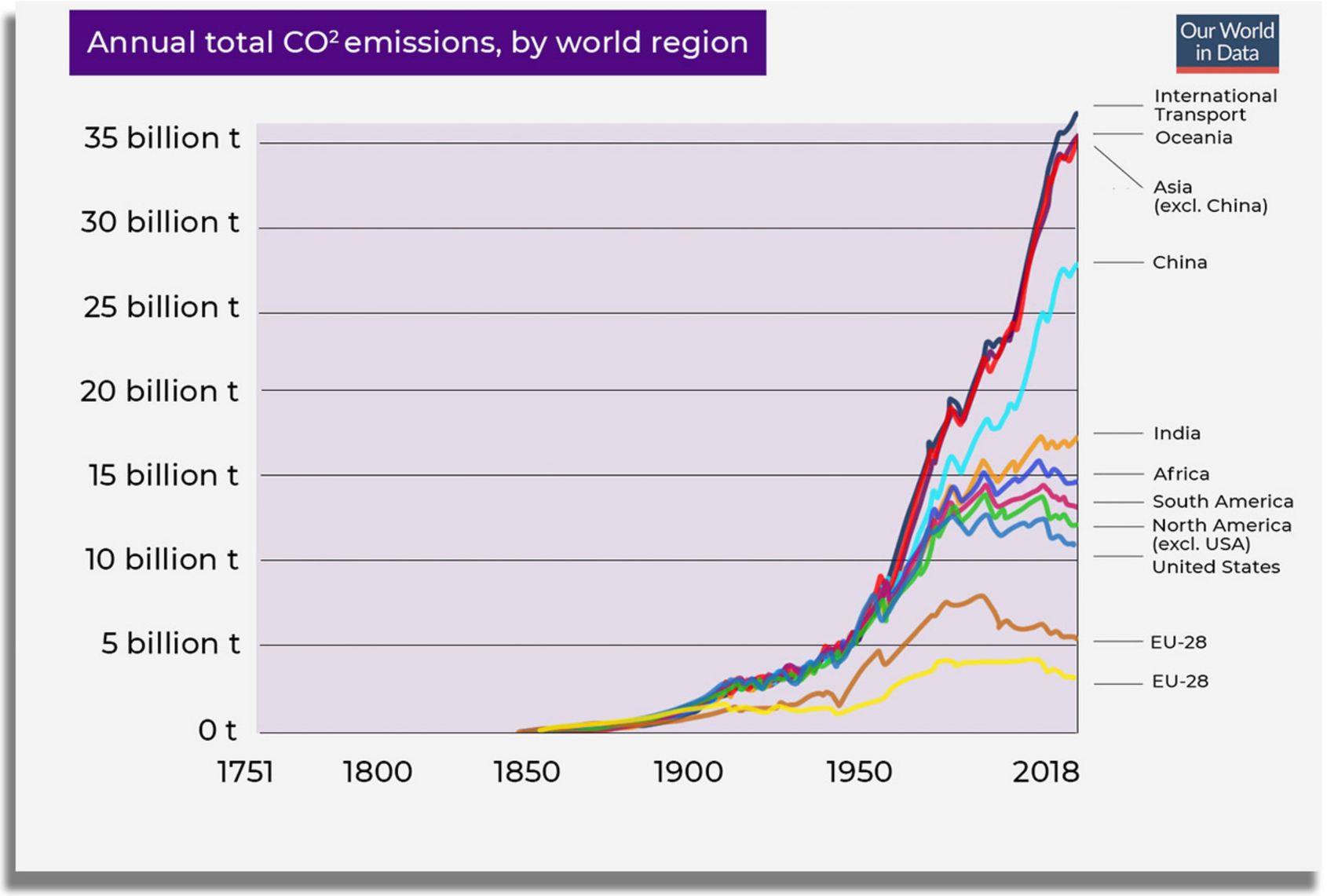
The Industrial revolution and human progress have led to a dramatic increase in CO2 emissions across the planet.



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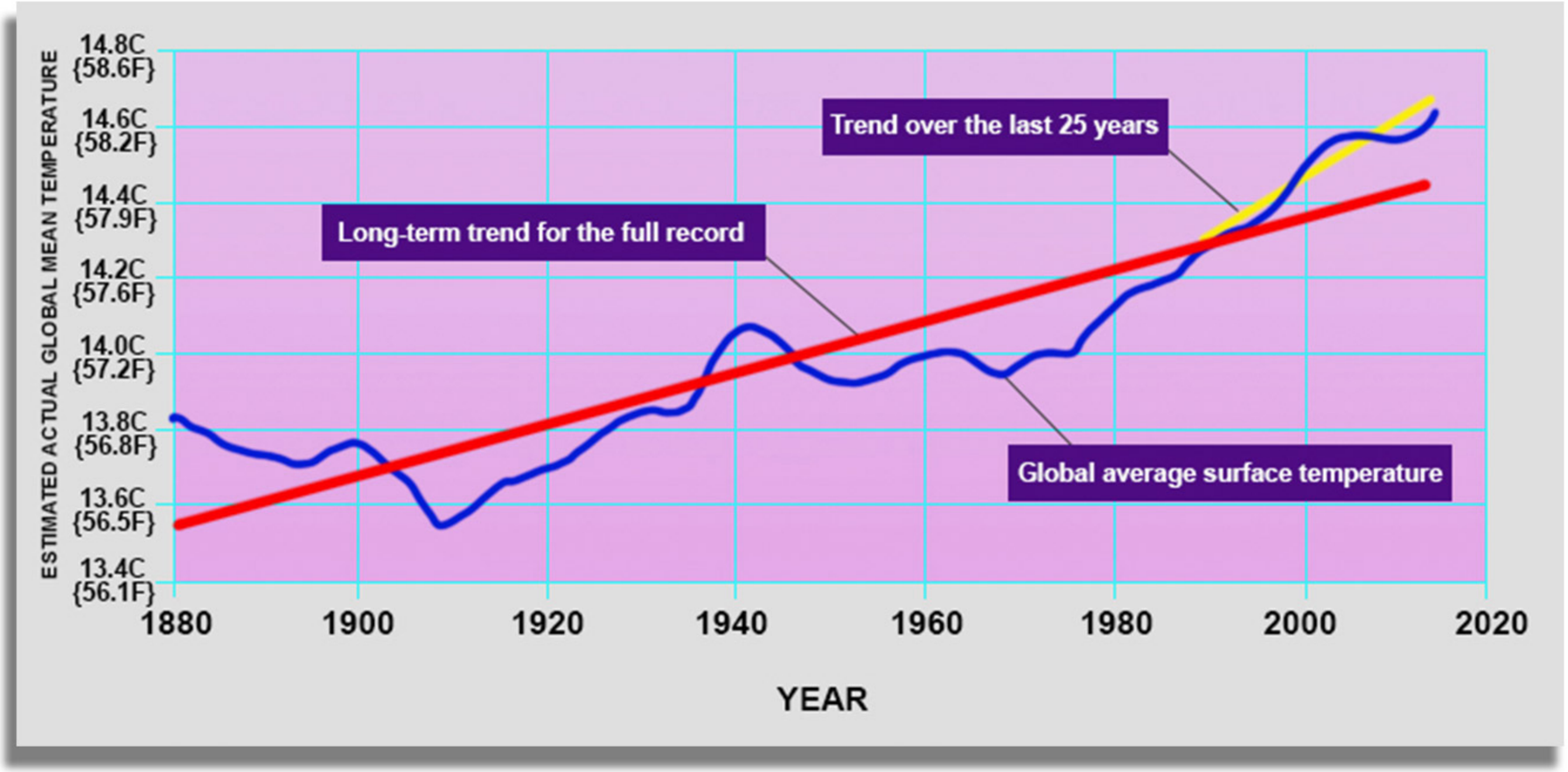
This has led to a statistically observable increase in temperatures over the last 120 years



Greenhouse Effect
https://youtu.be/H4YSwajvFAY

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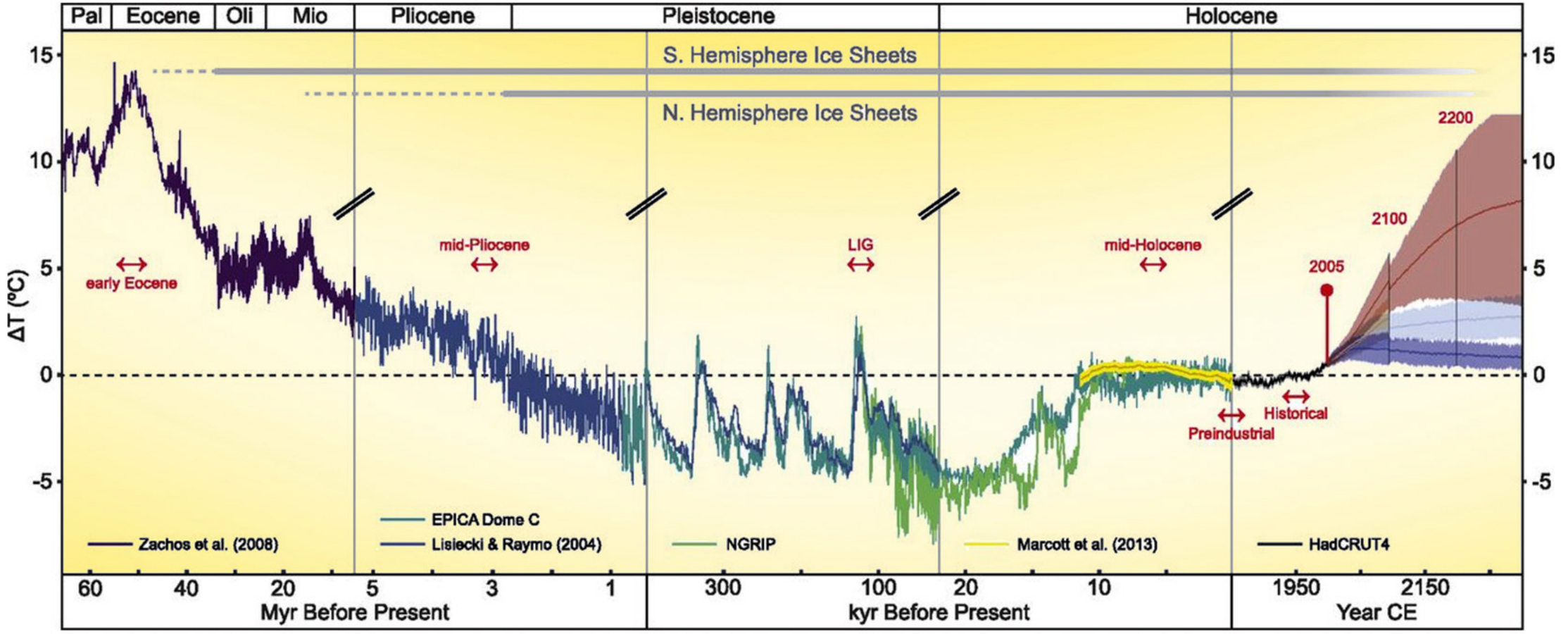
But what about the [history of the planet's temperature?]



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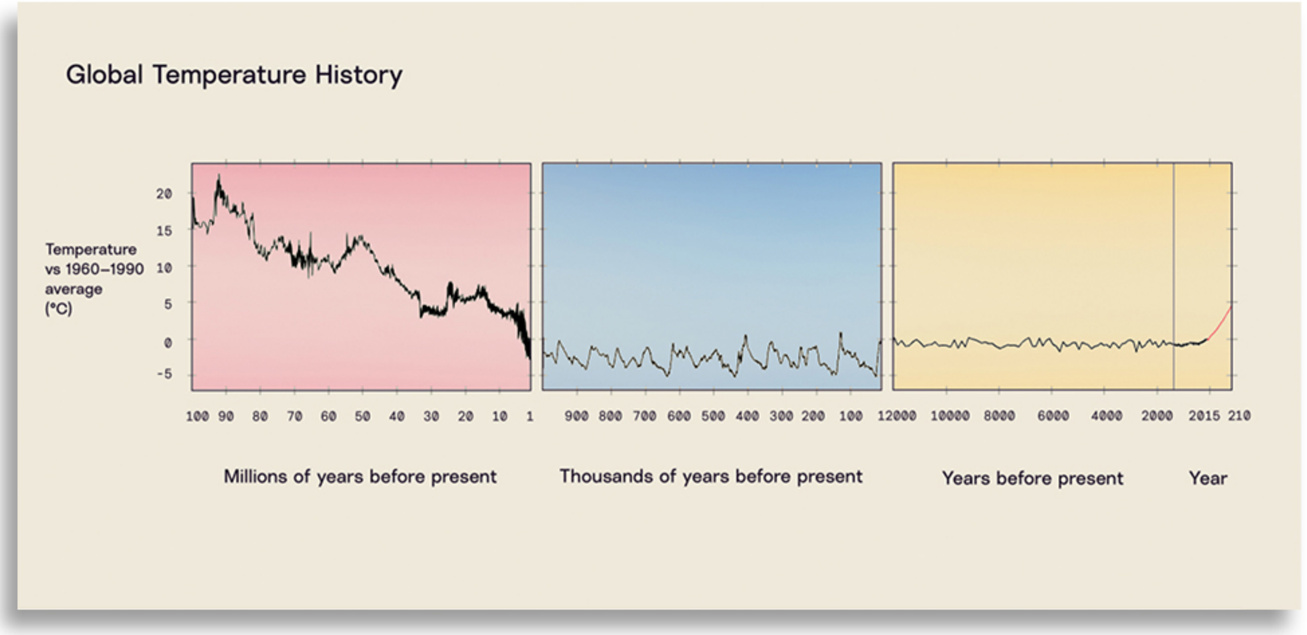
The graph is divided up into three sections. The left section shows the average temperature of the Earth as reconstructed from a variety of sources from 100 million years ago to 1 million years ago. The middle section is from 1 million years ago to 12,000 years ago, and the right section shows the time period from 12,000 years ago (10,000 BCE) to 2100. The vertical axis shows temperature in °C relative to the period from 1960 to1990, today's leaders' formative years. You can see that tens of millions of years ago the Earth was much warmer than we are used to. Indeed, it likely would have been too hot for humans to survive, as our mammalian bodies generate heat and need to be cooled by our surroundings. Reptiles, amphibians, and the precursors to many birds were suited to this climate. Then, about 10 million years ago, the climate began cooling, gradually dipping into an ice age.



The middle panel shows this ice age. An ice age is a period when substantial portions of the continents are covered by glaciers. The regular pattern of cooling
and warming from 0°C to -5°C and back are oscillations between glacial maxima—when ice covered most land—and warmer "interglacial" periods when glaciers receded to mountainous regions and areas nearer the Arctic and Antarctic Circles. These roughly 100,000-year cycles were triggered by changes in the Earth's orbit and axis. Homo sapiens emerged during this time, around 200,000 years ago. Our ancestors were born into a world whose climate was constantly changing. It should be no surprise then, that they were mobile and often nomadic. A major factor of life must have been chasing the places where the weather was nice, as the nice places kept moving.
Which brings us to the last panel. Starting in about 10,000 BCE, the climate did something remarkable: it stabilized in an interglacial period. An ideal equilibrium was reached. The mix of the reflectiveness of the Earth's surface (ice sends sunlight back into space) and the composition of the atmosphere (about 285ppm of CO_2) was just right for homo sapiens. There were many nice places, and they stayed put.

Humans have now lived in stability for so long that we have terrible trouble imagining it ending. Perhaps even more problematic, however, is the way in which that stability has been woven into the tools experts use to investigate, explain, and advise, and storytellers help us know ourselves. The assessments you have undoubtedly read about what the future will be like are often worse than useless because they were built in a period of stability and cannot portray a world of instability.

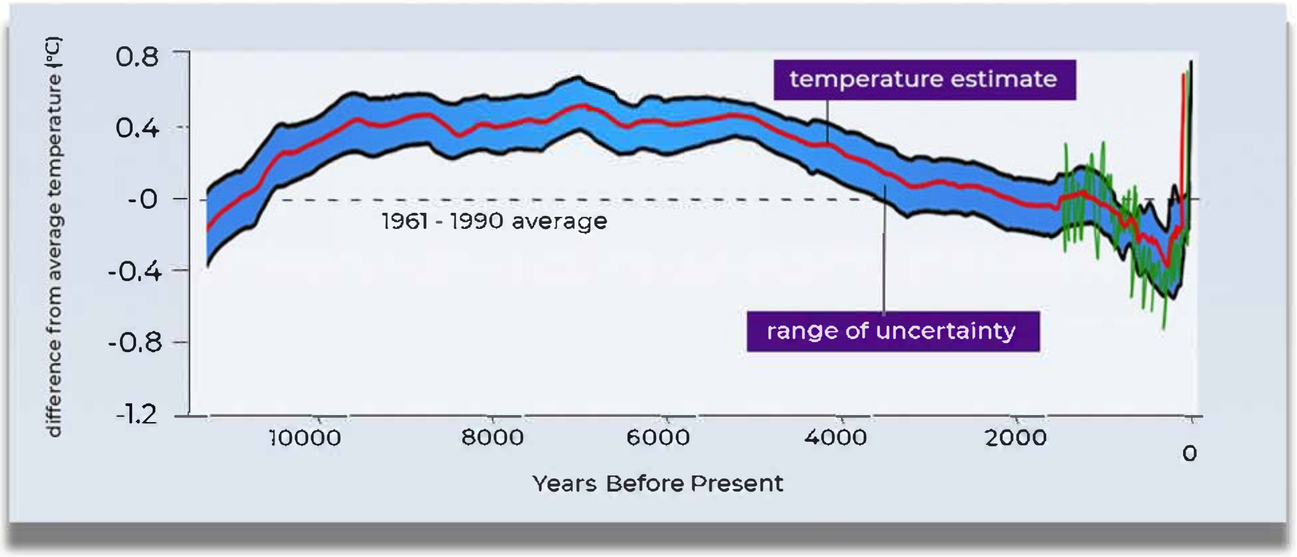
Cred: Spencer Glendon, Improbable Futures

So we're left with two questions. How big of a deal is this and if so what should we do about it?

Generally accepted science suggests that humans are driving a change in the temperature of the earth through carbon emission more rapidly than normal planetary conditions can justify. While this may not be at higher temperatures than we have seen in our planet's history the issue more lies on whether we believe this increasing temperature and this increase by a historically high rate will impact our planet and human life on it. Said differently, even if not solely driven by human actions, is there a sufficient impact that it's consequences are worth humans understanding, planning for, and potentially mitigating?

For a visually rich explanation of the long running impacts of climate change visit the OSS Foundation.

The chart below maps anomalous temperature changes over the last +10,000 years. We are at a relatively volatile time for planet temperature change.



Climate.gov
science & information for a climate-smart nation

What's the hottest Earth has been "lately"?

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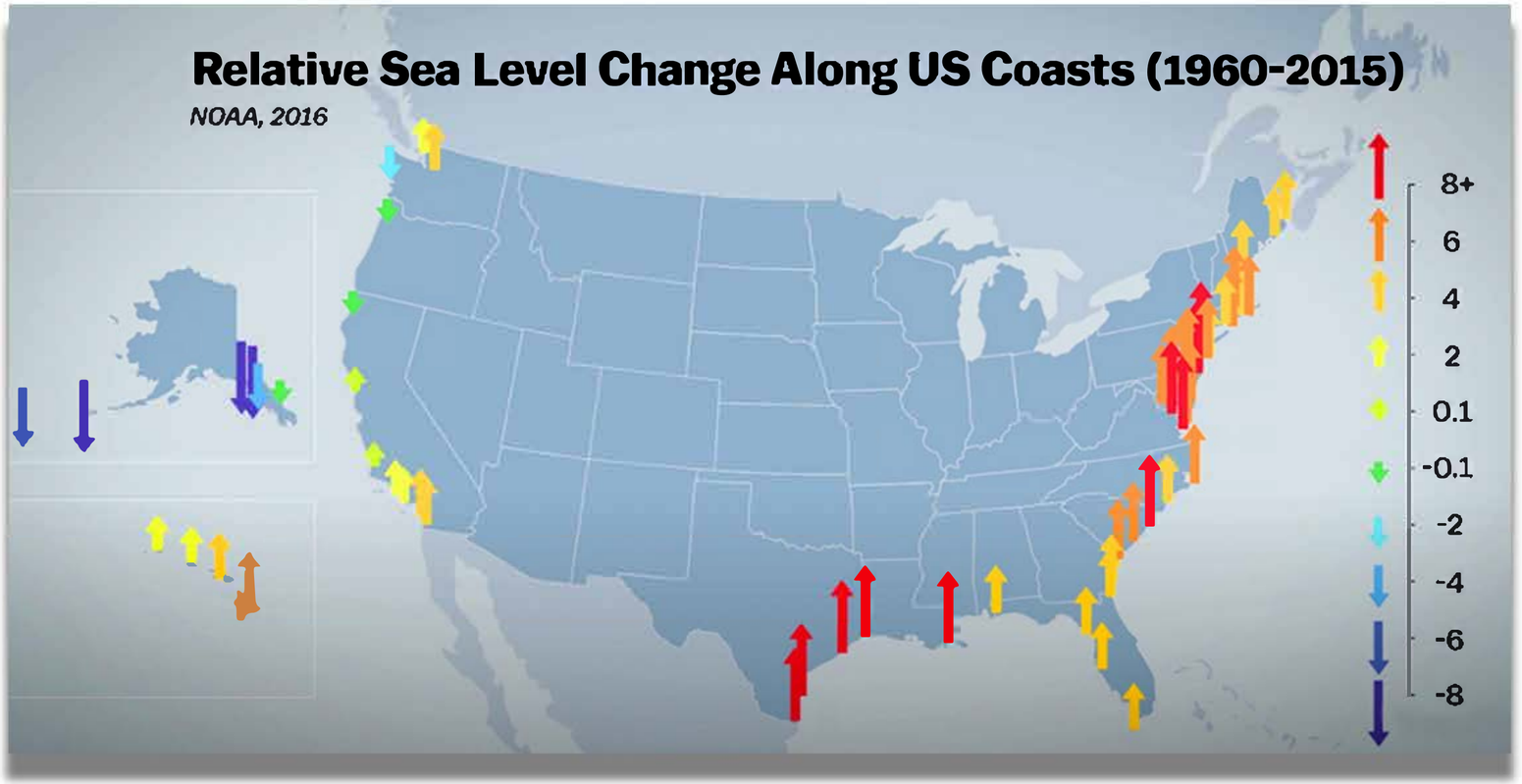
The impact of climate change on our planet is a topic of intensive study among client scientists and will eventually become priced into many of the products and services we use today (insurance, real estate, agriculture, etc.).

We share some of this work and encourage you to take an independent view in determining the risk of this change. We then turn to ways we can address it. We provide a basic introduction to some of these changes followed by more advanced and deeper points of analysis.



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Advanced Investigations:

Professor Horton Testifies before a Congressional Subcommittee about rising water levels, property damage estimates, and potential increases in hurricane severity.

Radley Horton Testimony

Spencer Glendon
2019 Sohn Investment Conference

Spencer Glendon shares his research on how climate change may affect real estate values, living conditions, coastal lifestyles, and human and agricultural productivity.

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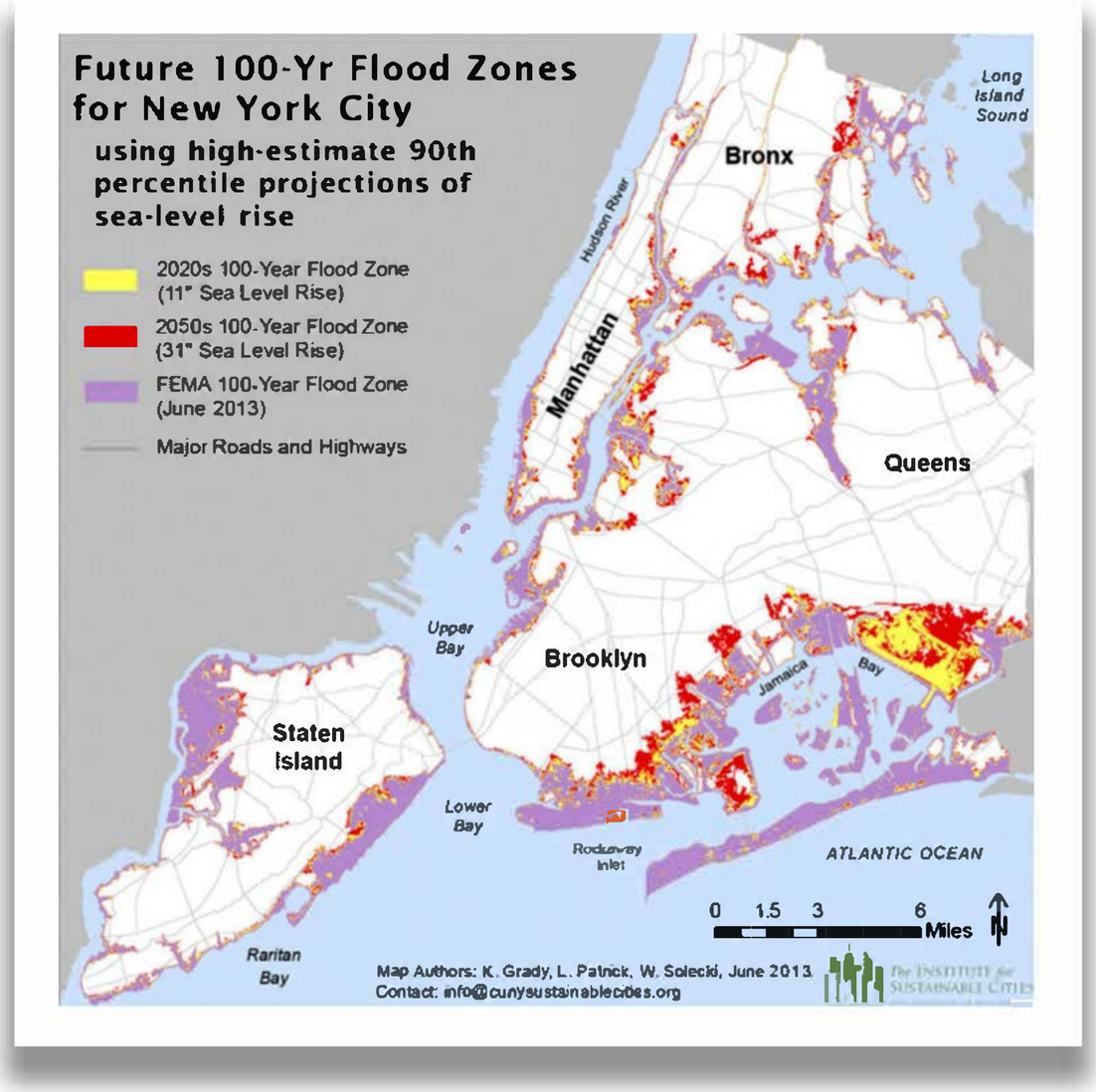

The Atlantic shares new work on changes in emissions being able to predict temperature changes more accurately.

Many cities have commissioned studies and are developing and approving action plans in anticipation of long term impacts of climate change as well as the increased potential of extreme weather events.

Calls for long term planning, regulations, and various taxes to offset climate impact and enable preparedness continue though the public sector and countries across the globe have various levels of commitment and focus to climate initiatives. Debates between the responsibility of wealthy nations versus emerging economies abound with limited progress at geo political levels. While the conversation continues at the United Nations with some history of various agreements and other bilateral opportunities, the private sector domestically has started to mobilize.

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Private Sector Pathways

While we forecast the potential impacts on our planet and society, many actors in the private and non-profit sectors are moving to get ahead of the curve and anticipate the changes that might come as well as mitigate negative consequences of actions that might be avoidable. Additionally we anticipate the creation of and investment in new sustainable companies in the coming years as private capital seeks profit opportunities in this coming change.

The growth of funds and investors focused on ESG (Environmental, Social, and Governance) and other environmentally forward criteria has increased as well as shareholder opportunities to advocate for policies and governance around climate awareness. Organizations themselves have made various pledges around carbon footprint futures. Belows is a small list of examples:

- Microsoft pledges to be carbon negative by 2030 and Apple says it will be carbon neutral by 2030.
- Amazon pledges to be carbon zero by 2040.
- Verizon, Infosys and Reckitt Benckiser signed onto Amazon's "The Climate Pledge" to reach net zero by 2040.
- Google issues a record breaking $5.75 billion of sustainability bonds aimed at green principles.
- Harvard recently announced its endowment would be carbon neutral by 2050 and Ford Motor Company pledged to reach net zero by 2050.

With large corporations and organizations starting to transition to a new climate future (though at times in fits and starts), investors of all kinds are reassessing their approaches as well. One of the key questions at the center of this change is whether financial markets are appropriately pricing the risk of exogenous factors like climate change into their asset pricing models. Leading thinkers like Bob Litterman and Geeta Aiyer are among a new wave of portfolio managers and financial thought leaders pushing for a more holistic assessment of climate change and risk. With that will eventually come changes to wealth management and portfolio construction impacting sophisticated, institutional, and retail investors.

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Resources:

https://gca.org/solutions/why-investing-in-resilience-is-good-for-business
https://www.nytimes.com/interactive/2020/04/19/climate/climate-crash-course-7.html
https://www.forbes.com/sites/michaelshellenberger/2019/11/25/why-everything-they-say-about-climate-change-is-wrong/#fe362d312d6a
https://www.nytimes.com/2020/08/28/your-money/impact-investing-coronavirus.html
https://www.climatepolicyinitiative.org/publication/global-landscape-of-climate-finance-2019/
https://www.iigcc.org/news/16-trillion-investors-develop-first-ever-framework-for-net-zero-investing/
https://www.iigcc.org/download/net-zero-investment-framework-consultation/?wpdmdl=3602&masterkey=5f270ef146677