

Analysis On Global Warming

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Motivation



Donald J. Trump ✓
@realDonaldTrump

The concept of global warming was created by and for the Chinese in order to make U.S. manufacturing non-competitive.

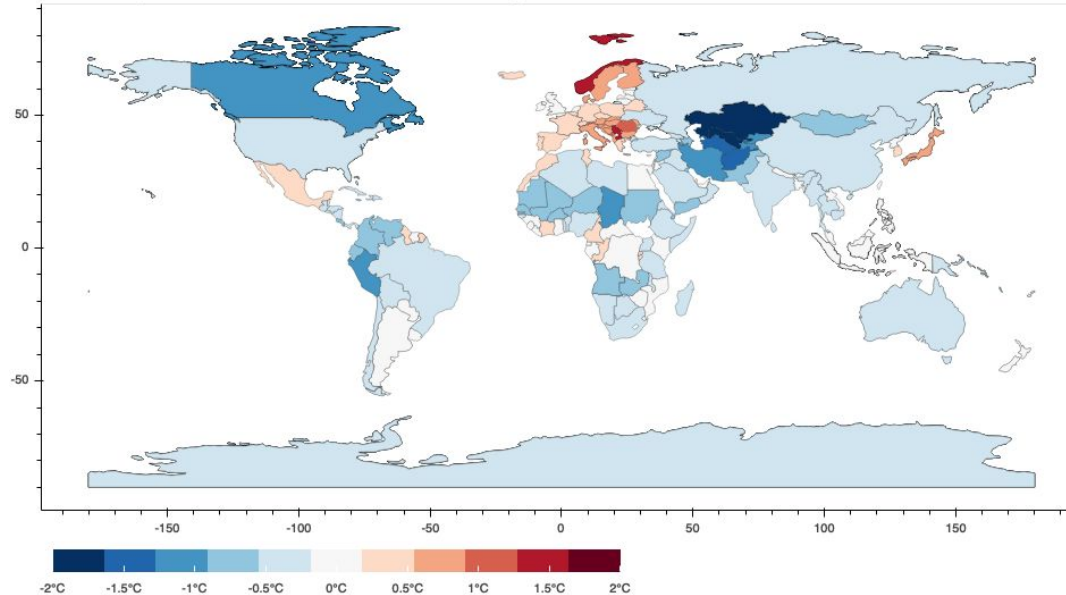
11:15 AM · Nov 6, 2012 · [Twitter Web Client](#)

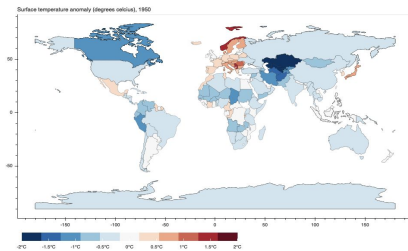
96.1K Retweets **67K** Likes



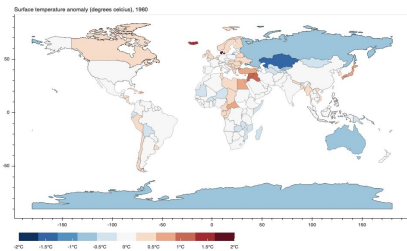
World Temperature Heat Map (1950-2015)

Temperature anomaly, 1950

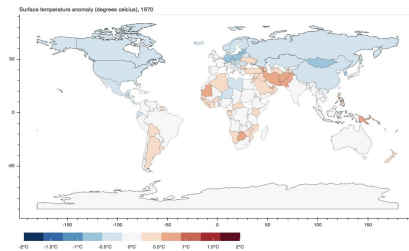




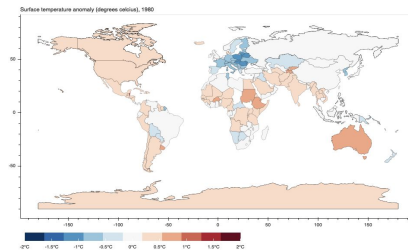
1950



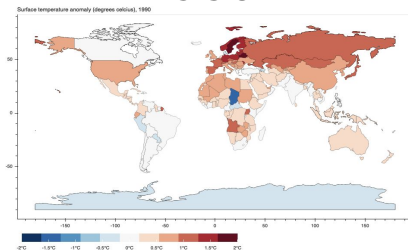
1960



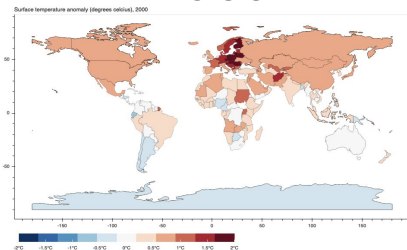
1970



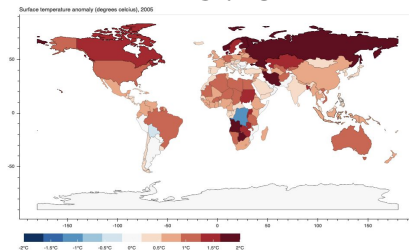
1980



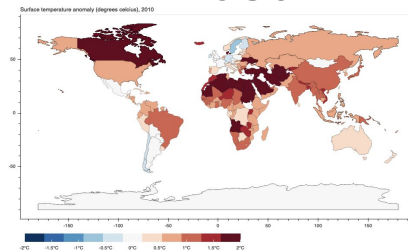
1990



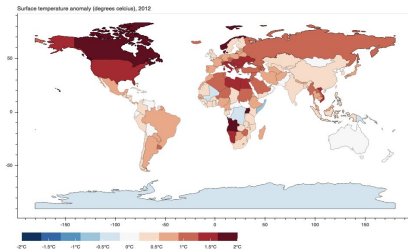
2000



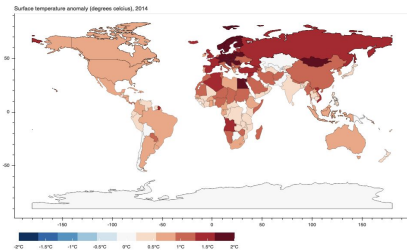
2005



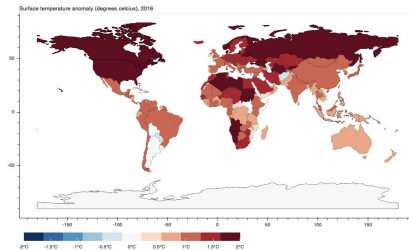
2010



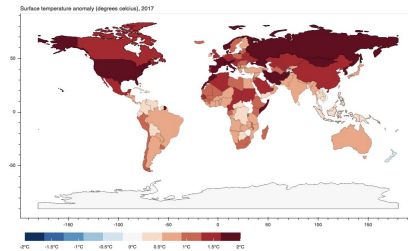
2012



2014



2016



2017



What Is Actually Warming the Earth?

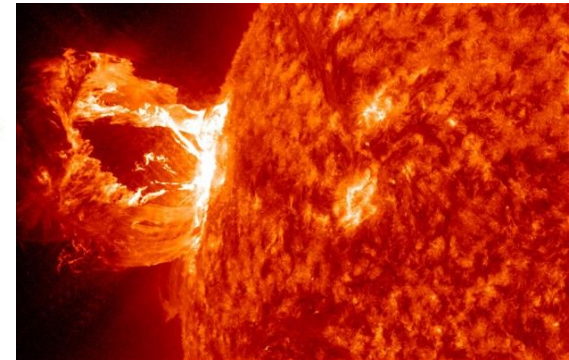
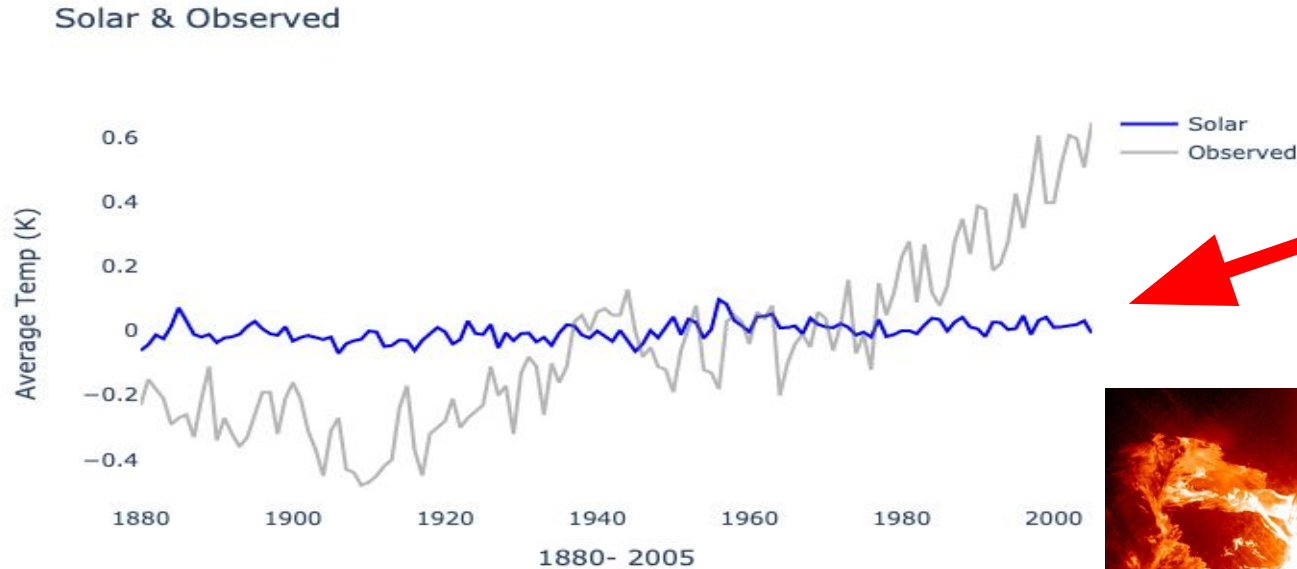
Solar Activity?

Volcanic Activity?

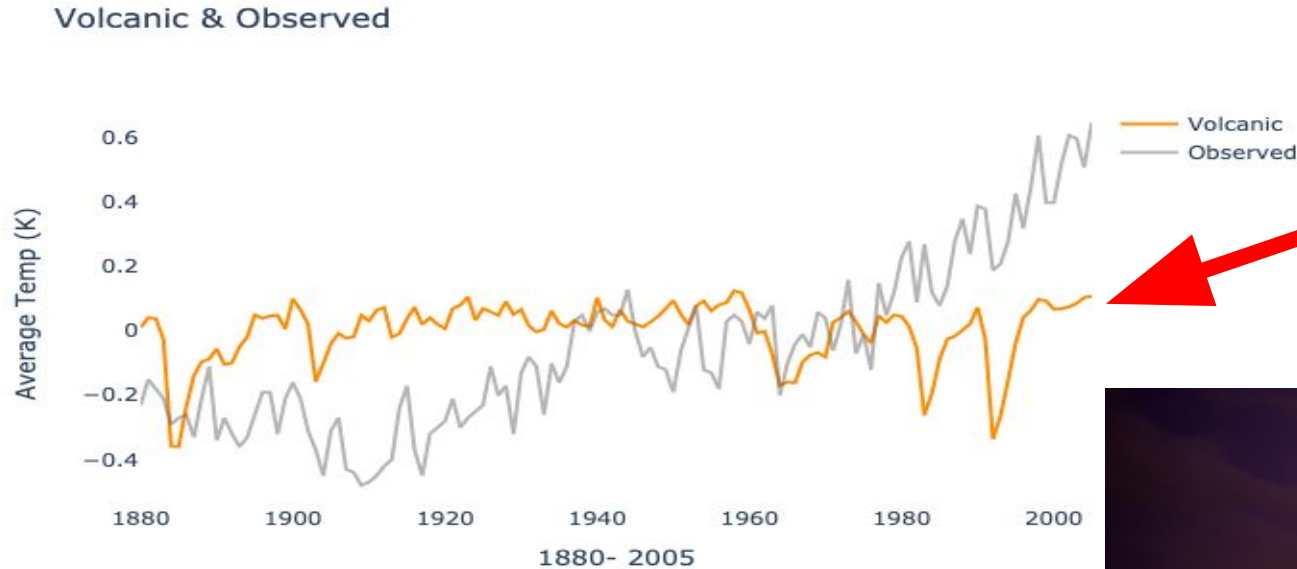
Ozone?

Greenhouse Gases?

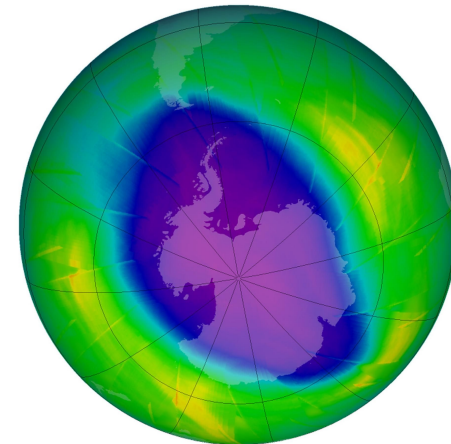
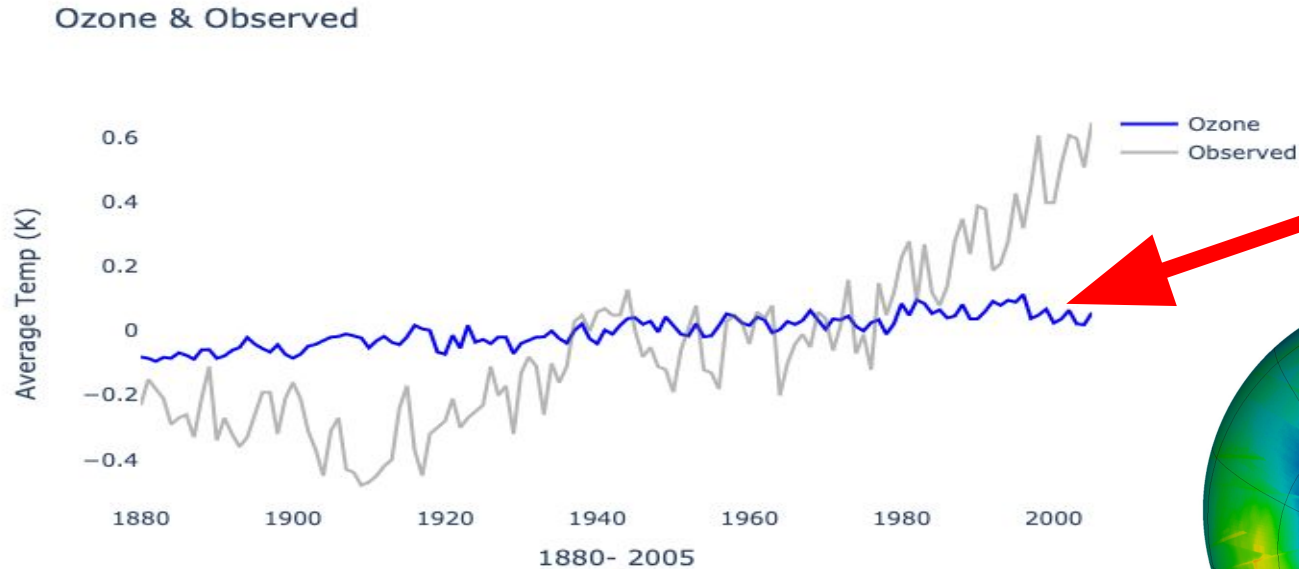
Temperature and Solar Activities



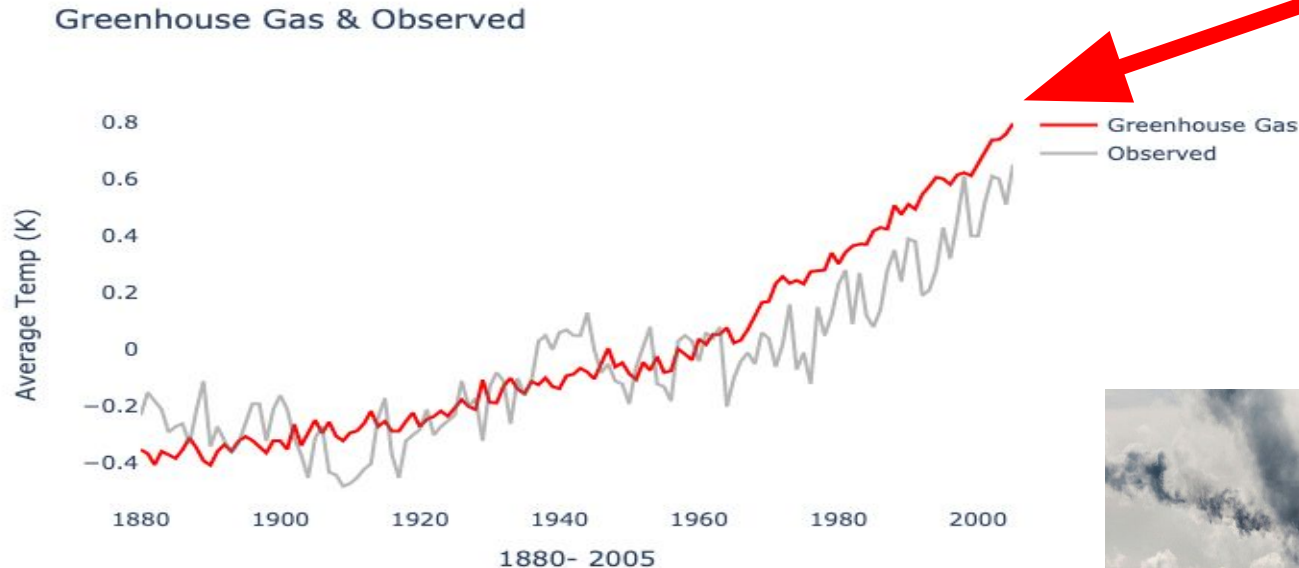
Temperature and Volcanic Activities



Temperature and Ozone Depletion



Temperature and Greenhouse Gas

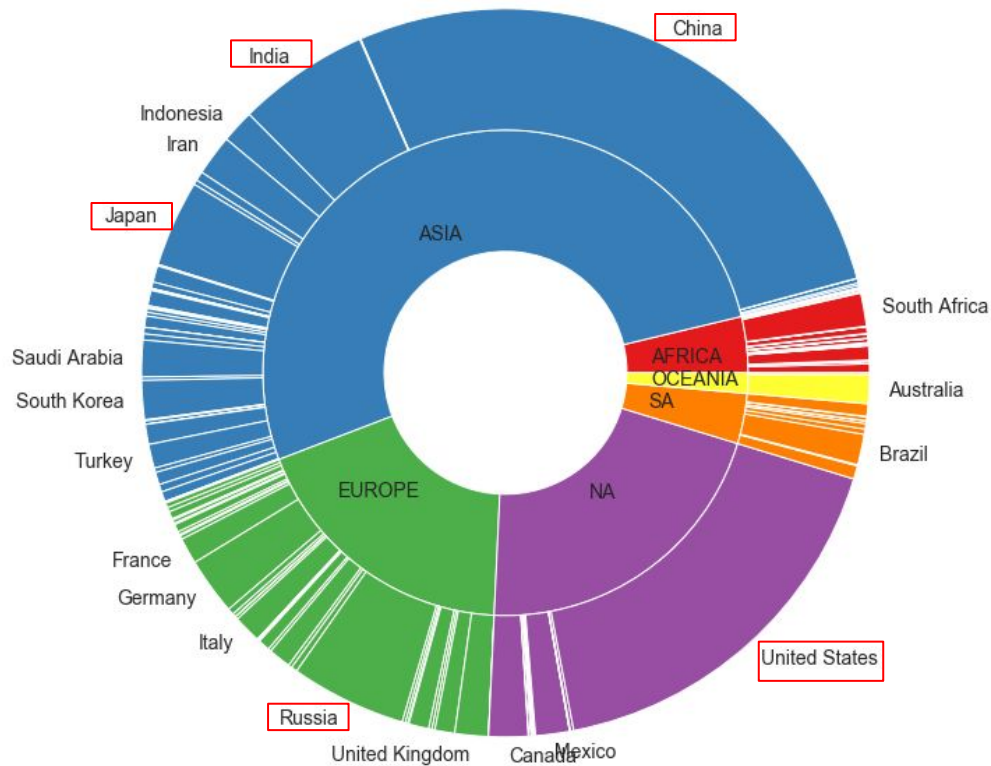


82% of Greenhouse Gas is CO₂

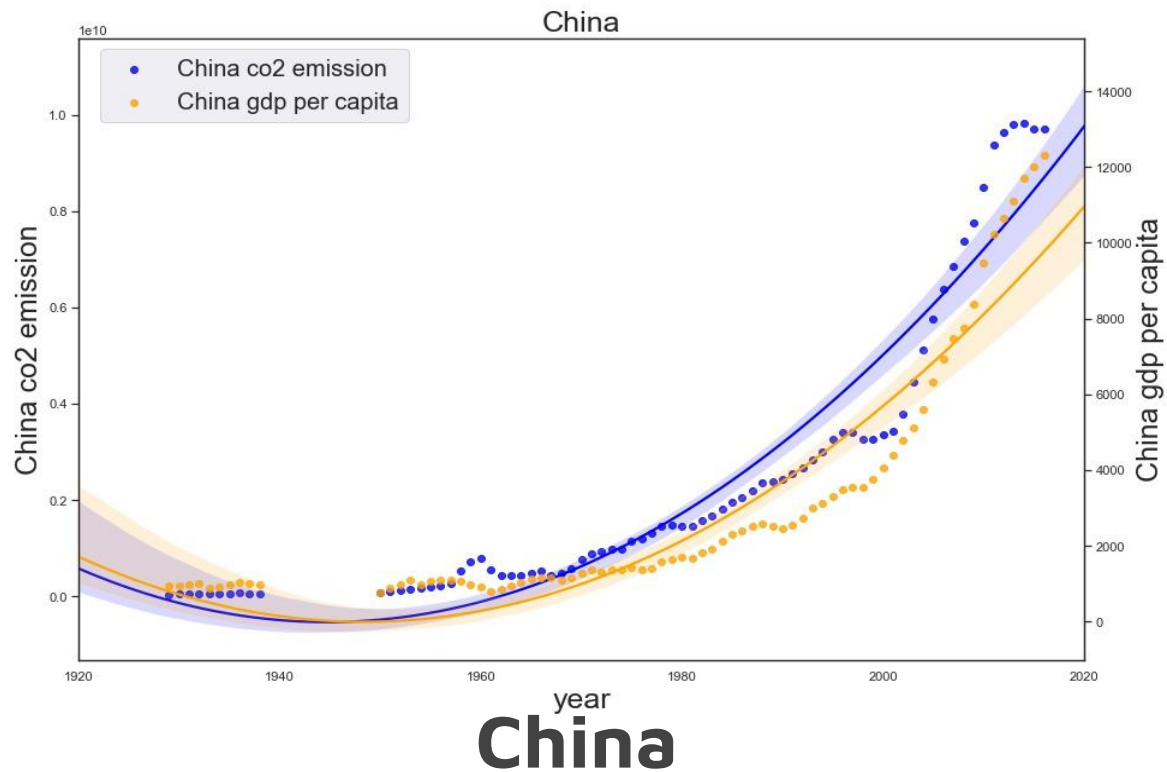


Percent of Carbon Emission by Region

Last 10 Years

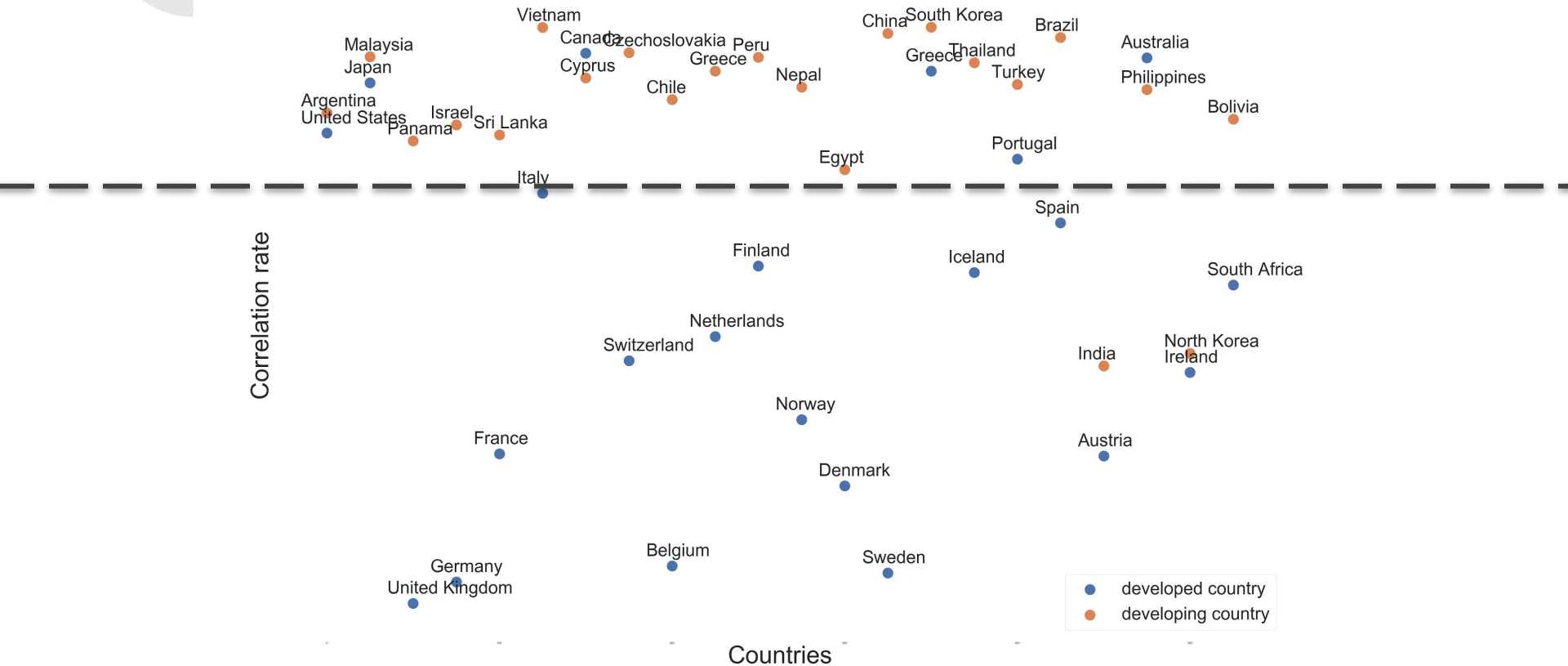


CO₂ emission and GDP

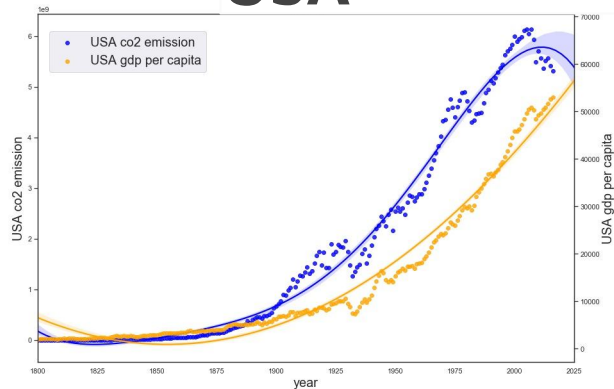




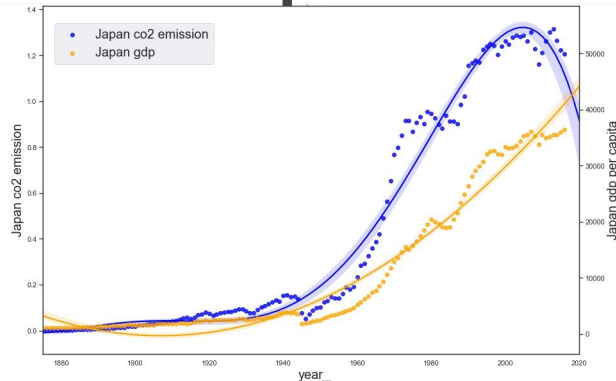
Correlation between GDP and CO₂ emission



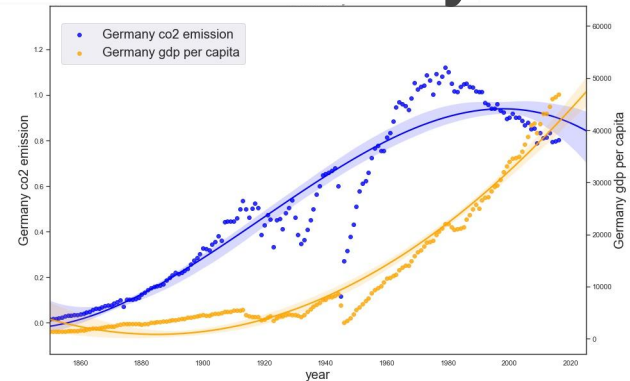
USA



Japan



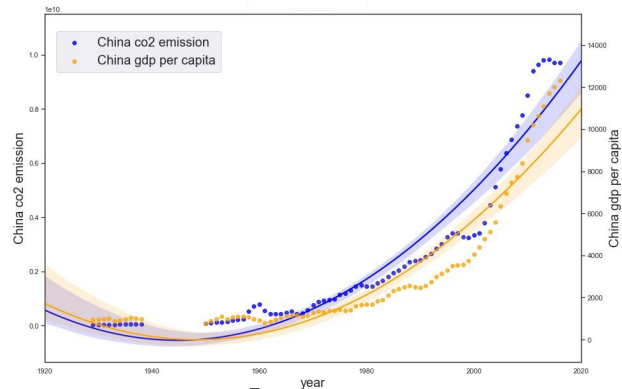
Germany



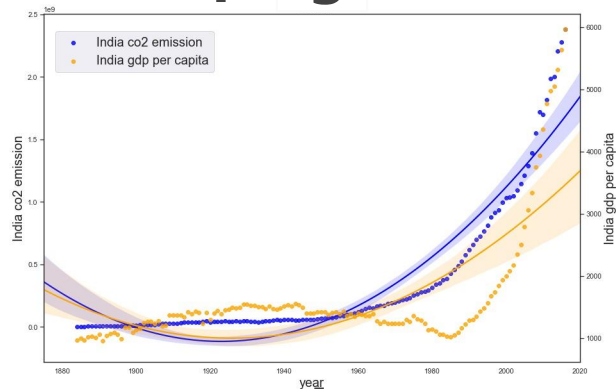
Developed Countries

Developing Countries

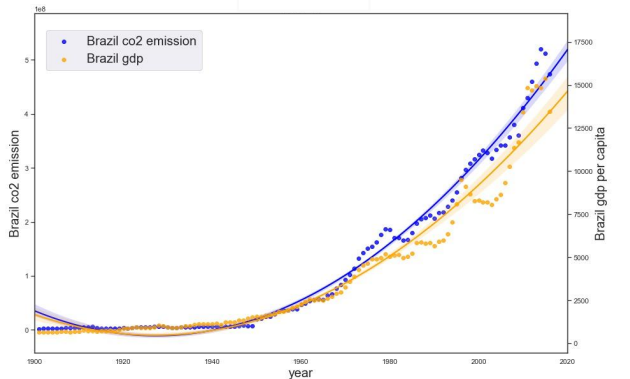
China



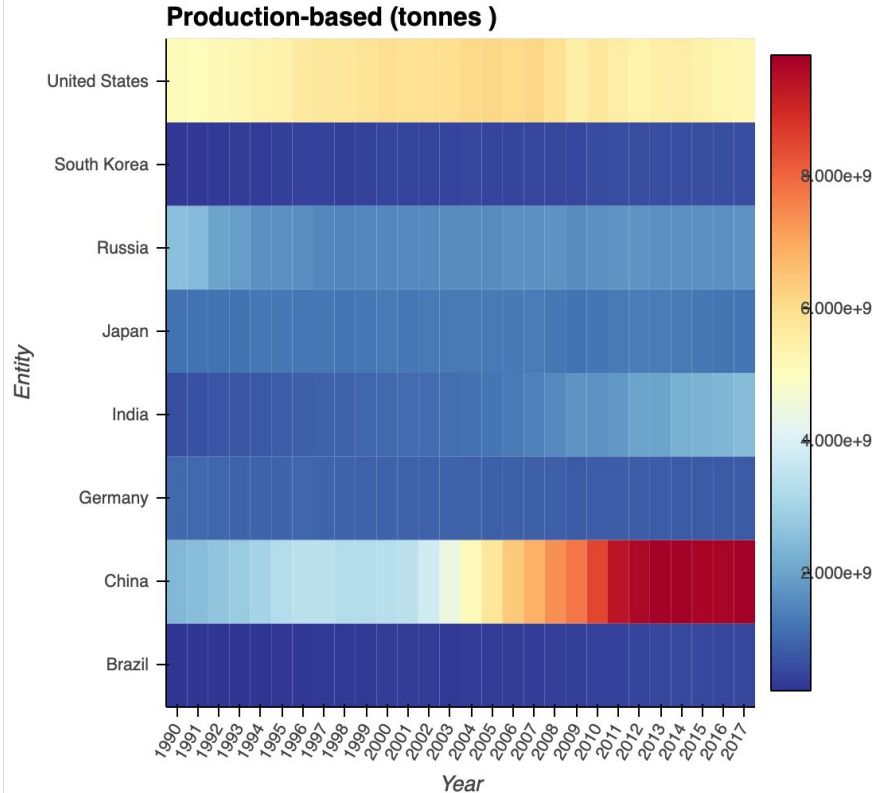
India



Brazil

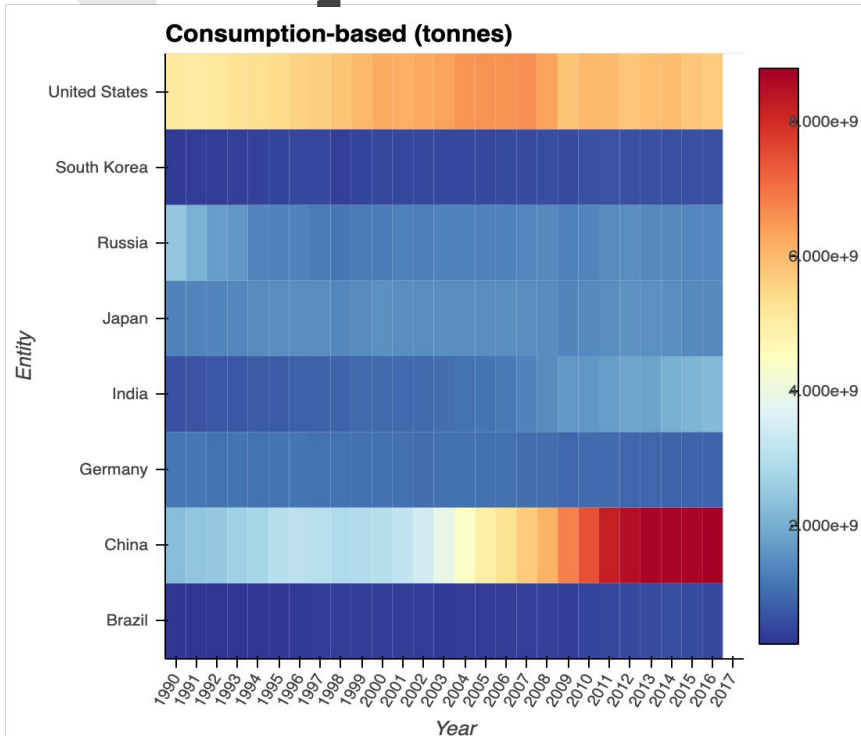


CO₂ Emission Adjusted By Trade



Production Based CO₂ = Country's Emission

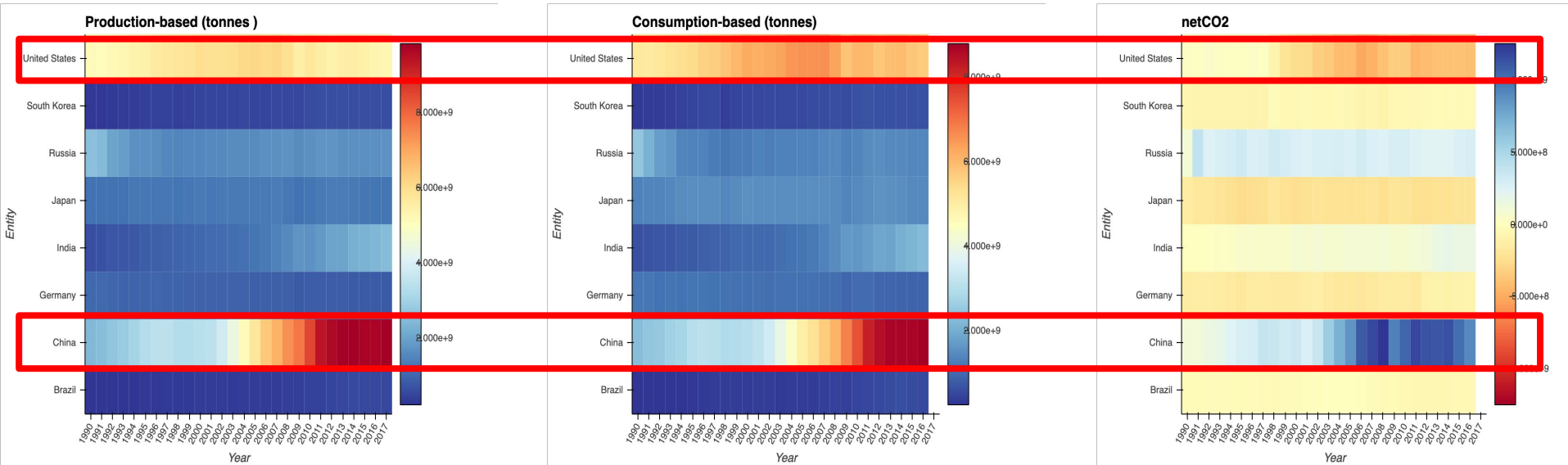
CO₂ Emission Adjusted By Trade



Consumption - based CO₂: consumption and lifestyle choices of a country's citizens.

$$\text{Consumption CO}_2 = \text{Production CO}_2 + \text{Imported Goods CO}_2 - \text{Exported Goods CO}_2$$

CO₂ Emission Adjusted By Trade



$$\text{CO}_2 \text{ Production} - \text{CO}_2 \text{ Consumption} = \text{Net CO}_2$$

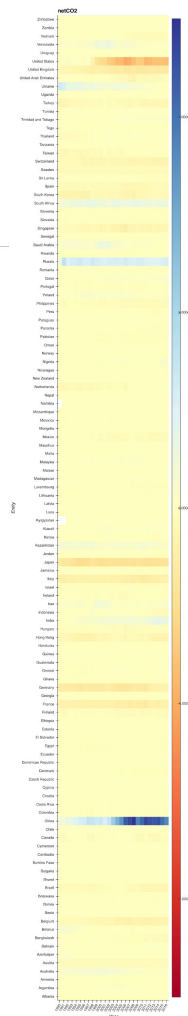
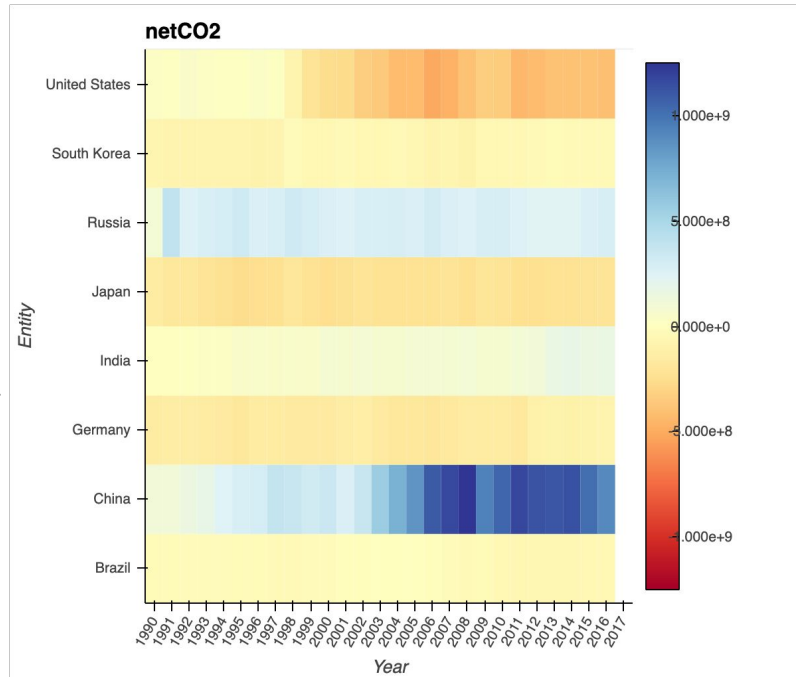


CO₂ Emission Adjusted By Trade

China exported the most CO₂

United States imported the most CO₂

Most of the world roughly balanced their CO₂





Mitigation Curves

Goal: Limit global warming to +1.5°C and +2°C since pre-industrial era by 2100

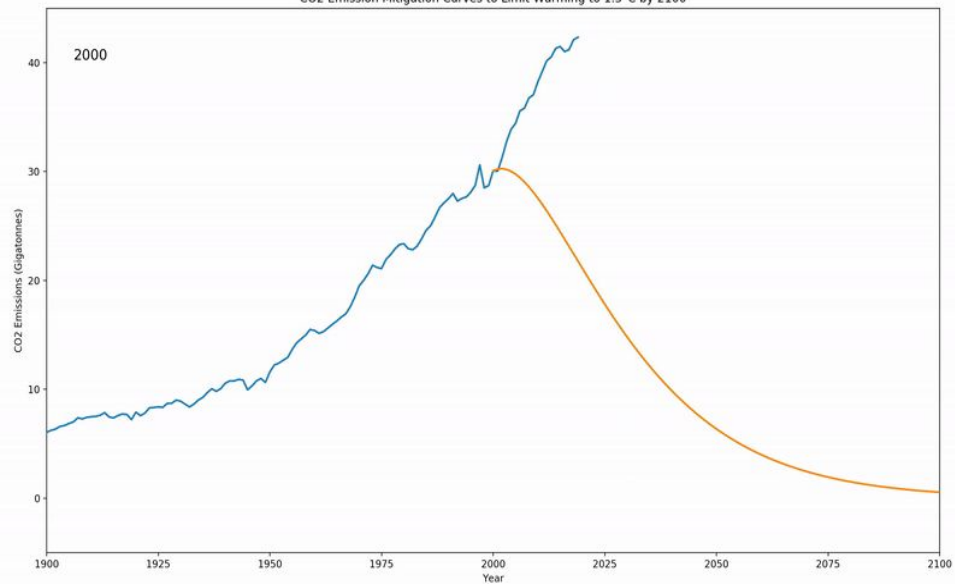
Global Temperature Limit by 2100	Remaining Carbon Budget	Years Remaining at Current Trend
For a >66% chance of staying below +2°C	1170 Gigatonnes of CO ₂	21 (2040)
For a >66% chance of staying below +1.5°C	420 Gigatonnes of CO ₂	6 (2025)



Mitigation Curves (2000-2026)

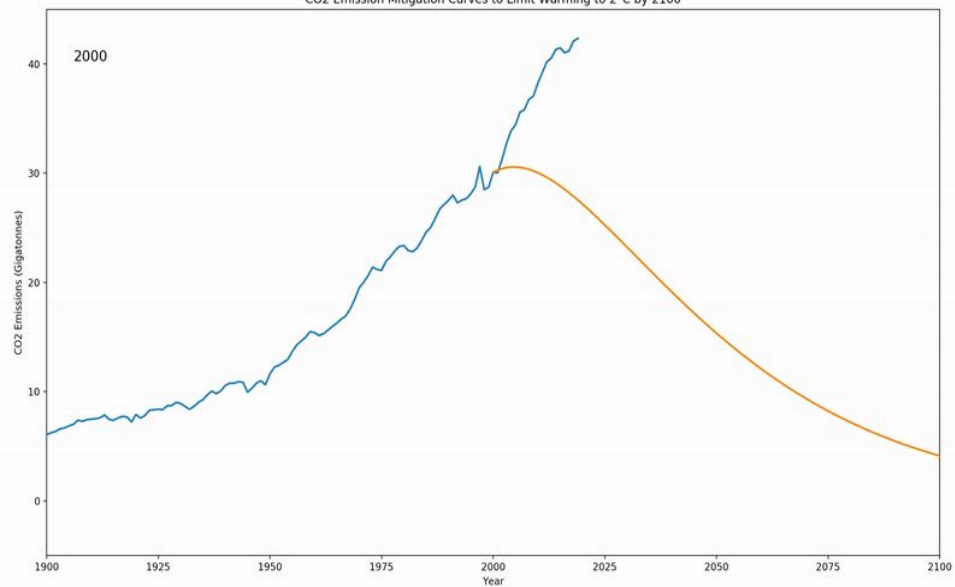
+1.5°C

CO2 Emission Mitigation Curves to Limit Warming to 1.5°C by 2100



+2°C

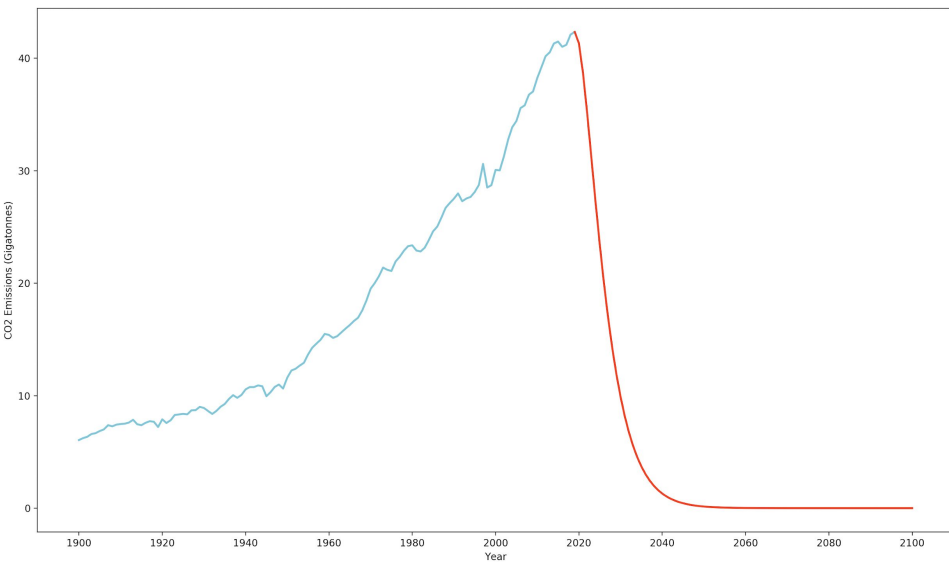
CO2 Emission Mitigation Curves to Limit Warming to 2°C by 2100



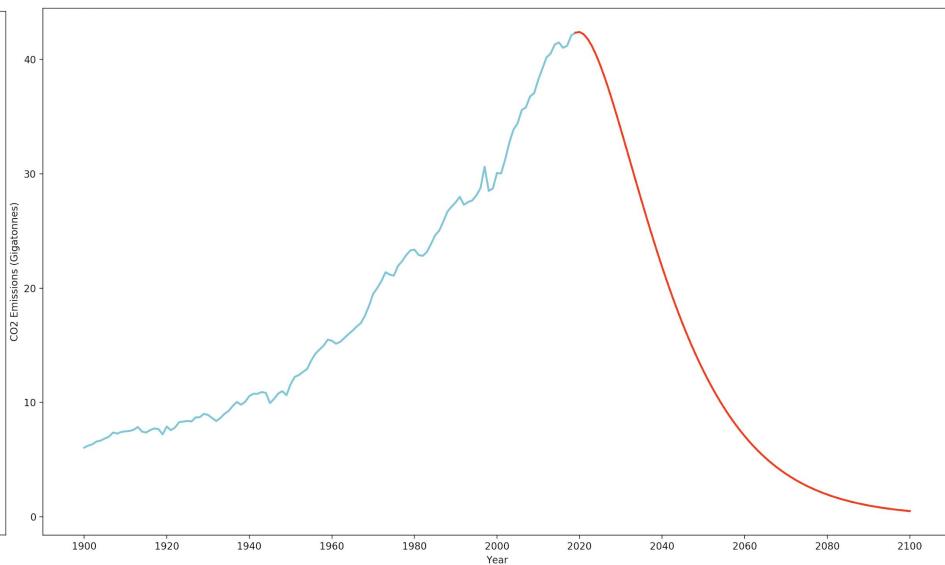


Mitigation Curves starting in 2020

+1.5°C



+2°C





2°C vs 1.5°C Warming Differences

	1.5°C	2°C
Severe Heat Waves	14%	37%
Sea Level Rise	0.4	0.46
Vertebrate Species Lost	4%	8%
Plants Lost	8%	16%
Insects Lost	6%	18%
Coral Reefs Decline	70 - 90%	99%





Conclusion

- CO₂ emissions are causing global warming
- Developing countries: CO₂ emissions correlates to GDP
- Developed countries: taking actions to reduce CO₂ emissions
- CO₂ mitigation must be a worldwide mission
- Drastic reduction must start now



Thank You!

**If coronavirus doesn't kill all of us,
global warming will if we don't act now.**



Dataset

- WorldBank
- Our World In Data
- IPCC (Intergovernmental Panel on Climate Change)
- Robbie Andrew - CICERO Center for International Climate Research
- NASA - Goddard Institute for Space Studies
- Bloomberg - What's Really Warming the World?