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The Climate Change War

An Analysis

Climate Change Warriors
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Hypothesis

Anthropogenic CO_2 emissions since the beginning of the industrial age have caused global temperatures to rise.

(Note: This phenomenon is known generally as Climate Change or Global Warming.)

Summary and Status: For maximum engagement, our research summary and status of our hypothesis has been saved for the final slide.

Research Questions

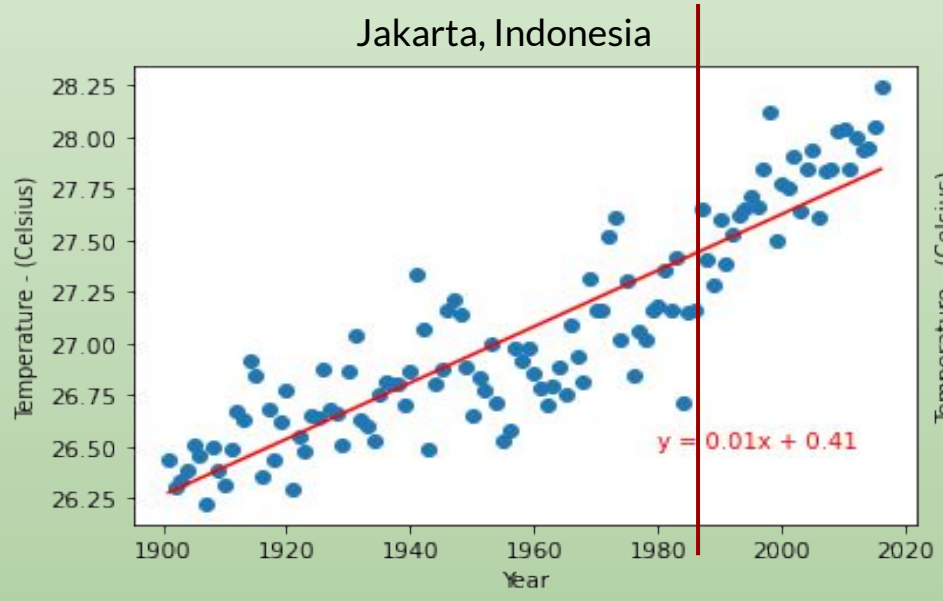
- Do correlations exist between CO_2 emissions, sea ice extent, as well as local and global temperature variations over the last century?
- Are there salient trends/patterns in the data that provide substantive evidence to support the theory of human induced (anthropogenic) climate change?
- What projections for the future can be reasonably drawn from the data?

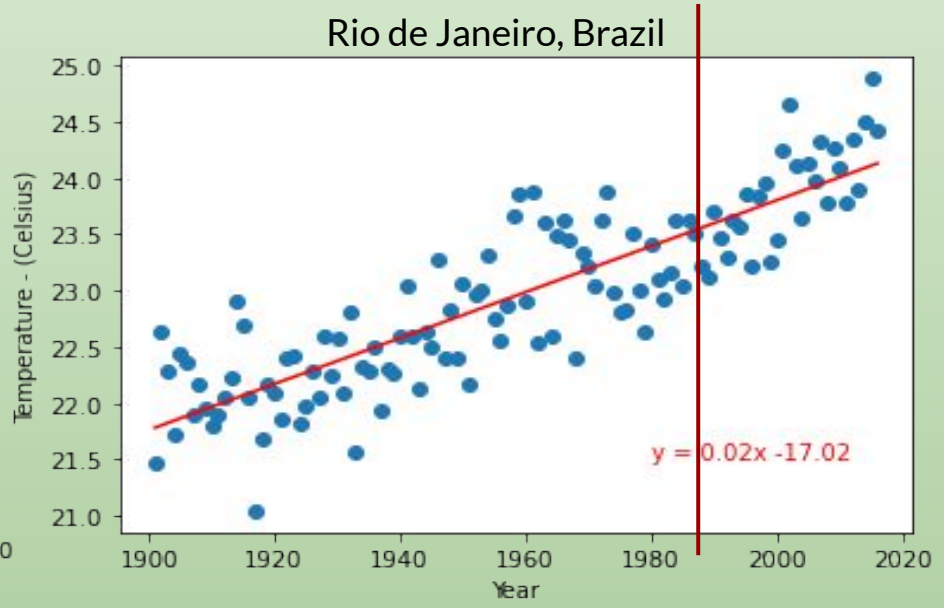
Tropical Zones

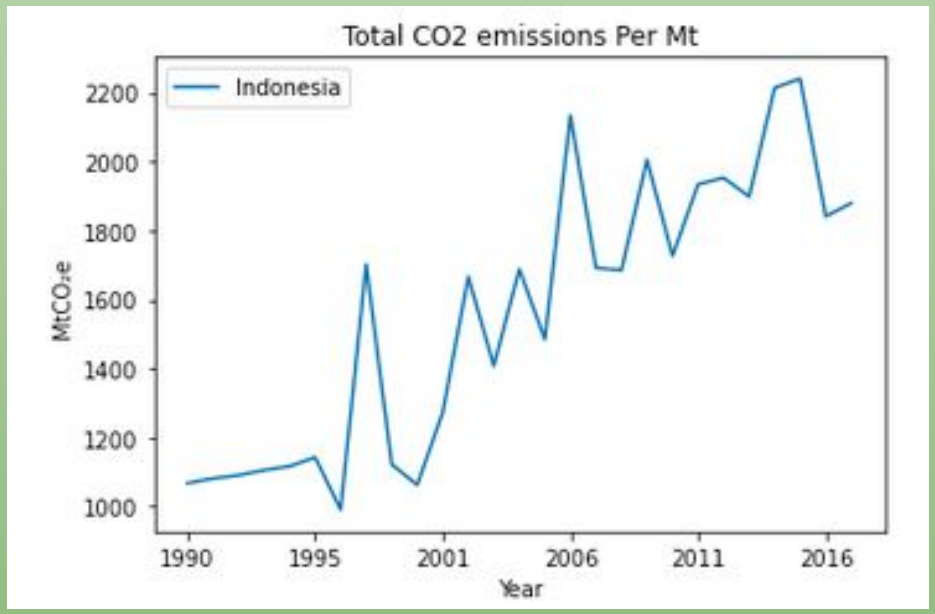
- The following data compares global CO_2 volume against histories from two tropical locations on similar latitudes and elevations: Jakarta, Indonesia and Rio de Janeiro, Brazil.
- Representing the 4th and 5th largest countries in the world by population, both countries lay claim to the largest expanses of rainforest in the world which are being subject to extreme levels of deforestation.
- Deforestation adds to the problem of climate change as trees are the main sequesters of CO_2 in these areas.

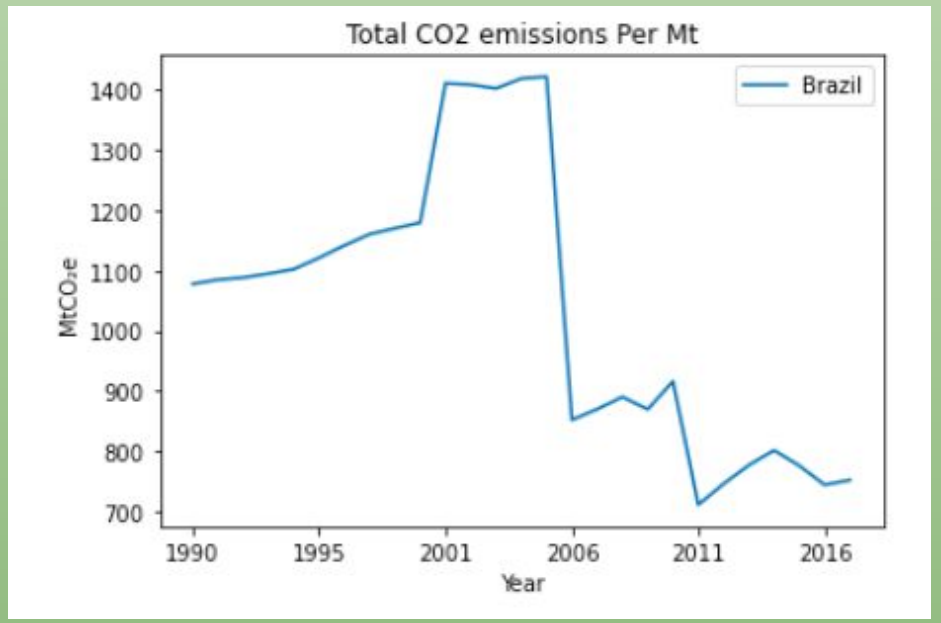
Tropical Zone Data for Jakarta, Indonésia & Rio de Janeiro, Brazil

Top Row: Temperature over time Bottom Row: CO2 Emissions over time









Temperate Zones

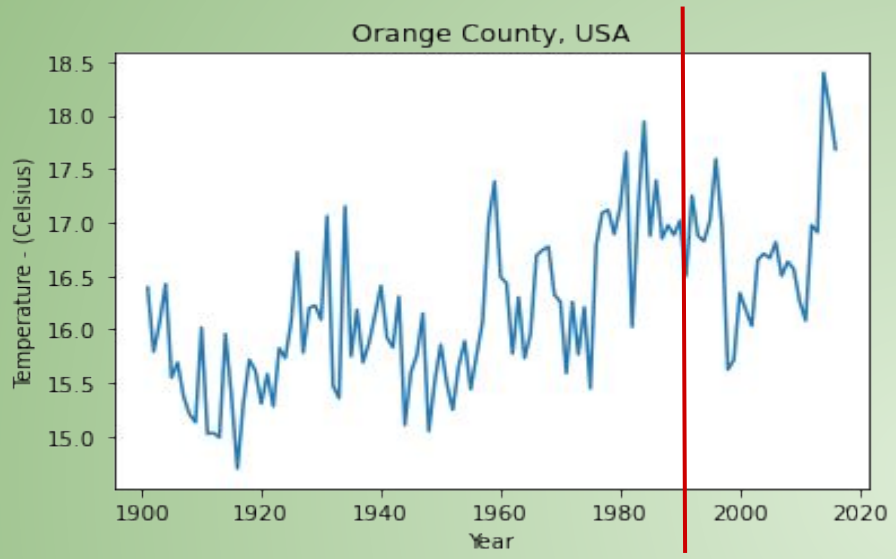
- The following data compares global CO_2 volume against temperature histories from two temperate locations on similar latitudes and elevations in the United States & China.

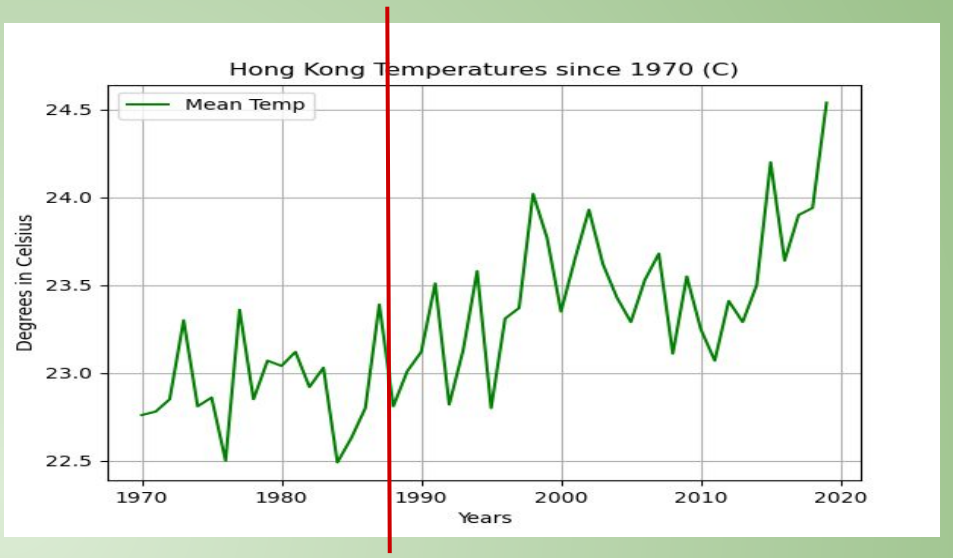
- Representing the world's two largest economies as well as the two largest emitters of CO_2, data from the iconic regions of Southern California and Hong Kong may provide crucial insight into local effects for densely populated economic hubs.

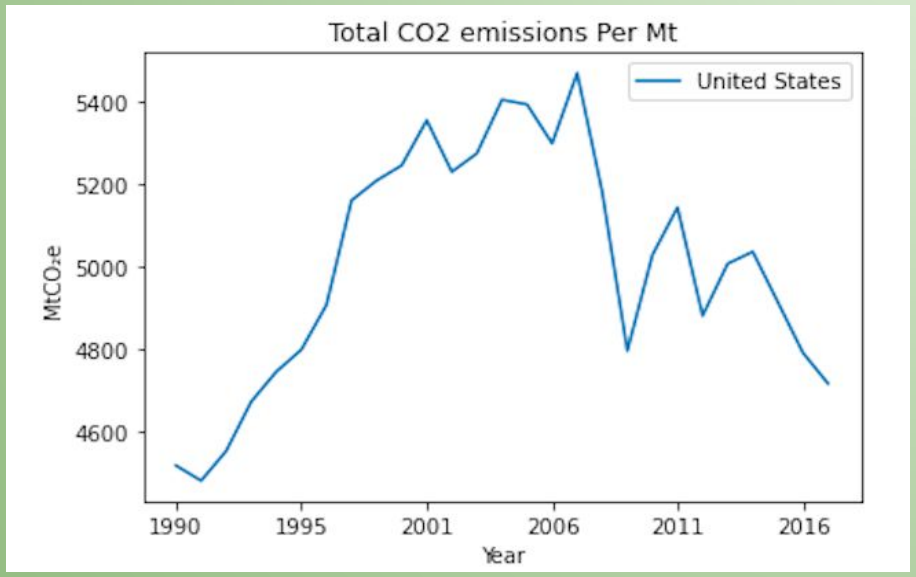
Temperate Zone Data: The OC, CA & Hong Kong

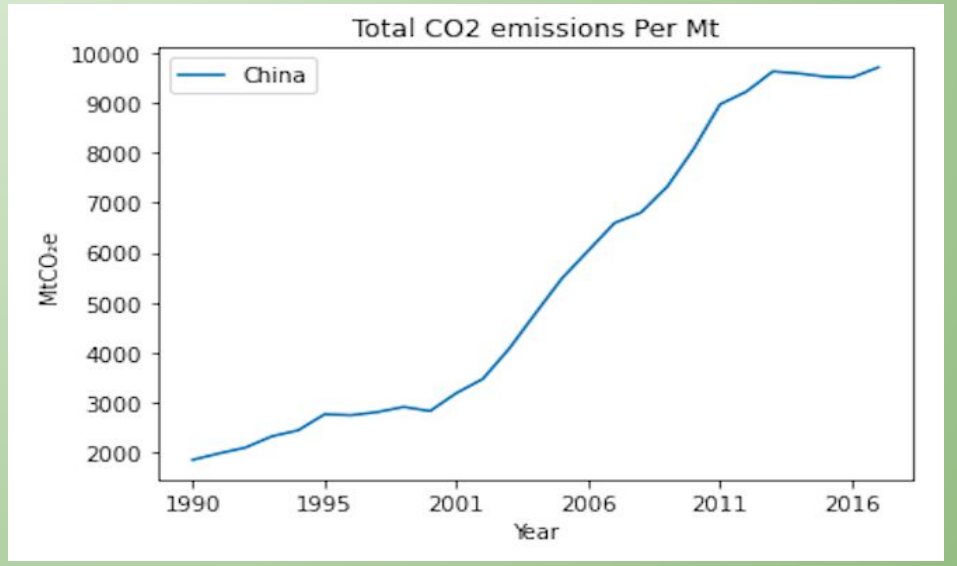
Top Row: Temperature over time

Bottom Row: CO_2 emissions over time







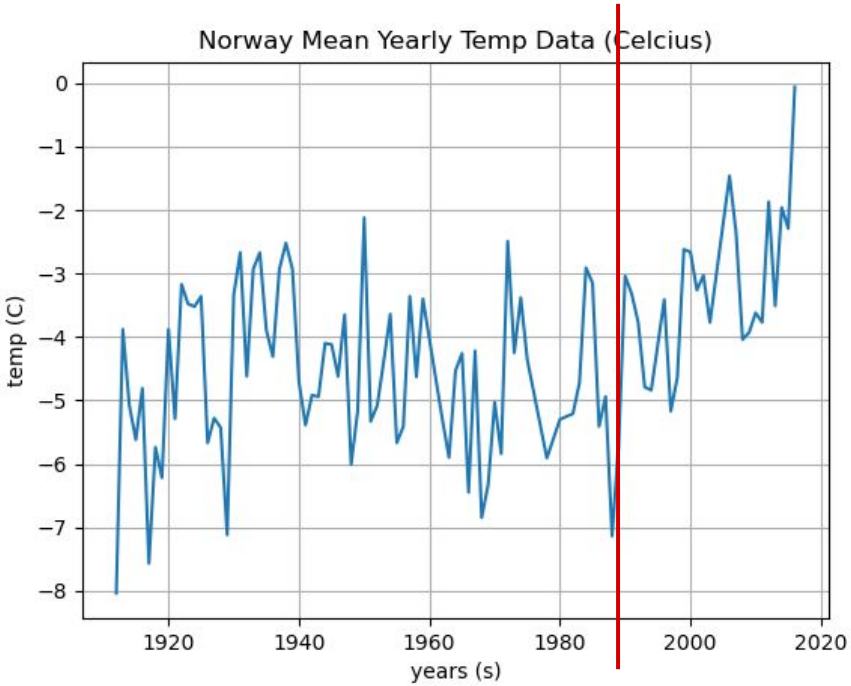


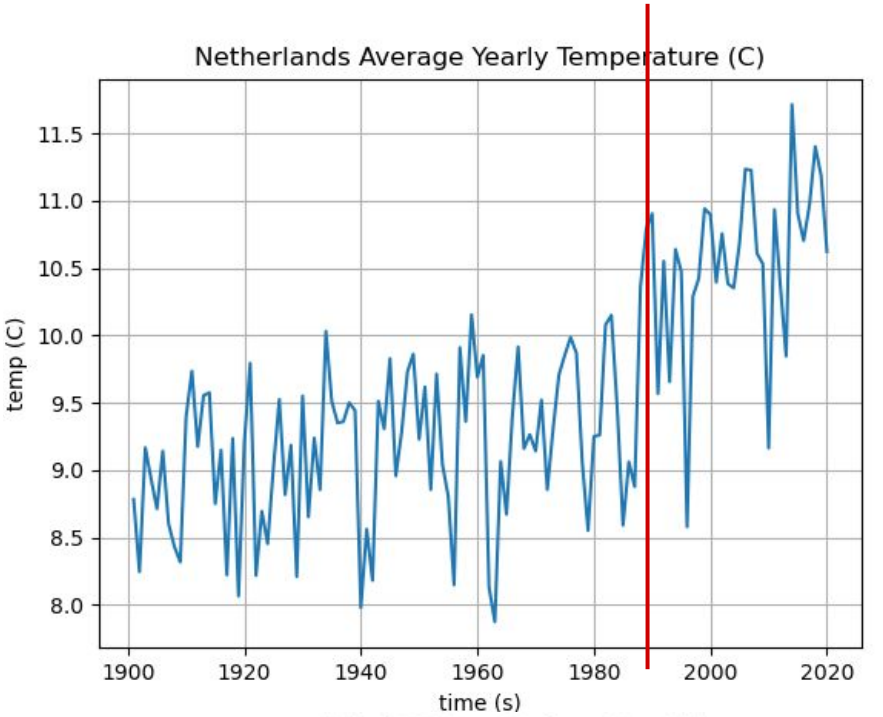
The Polar Region

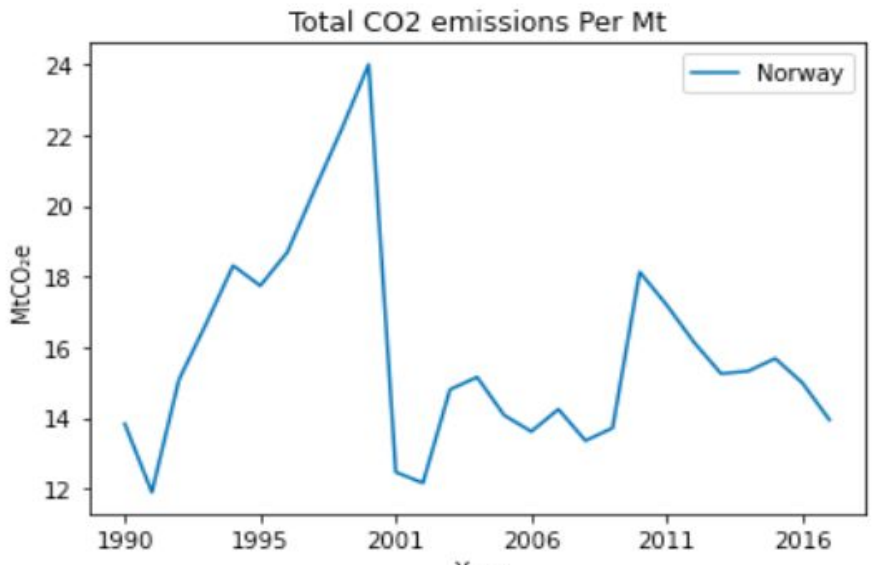
- While Climate Change affects the entire globe in theory, the most noticeable changes in temperature and geography often occur at the poles.

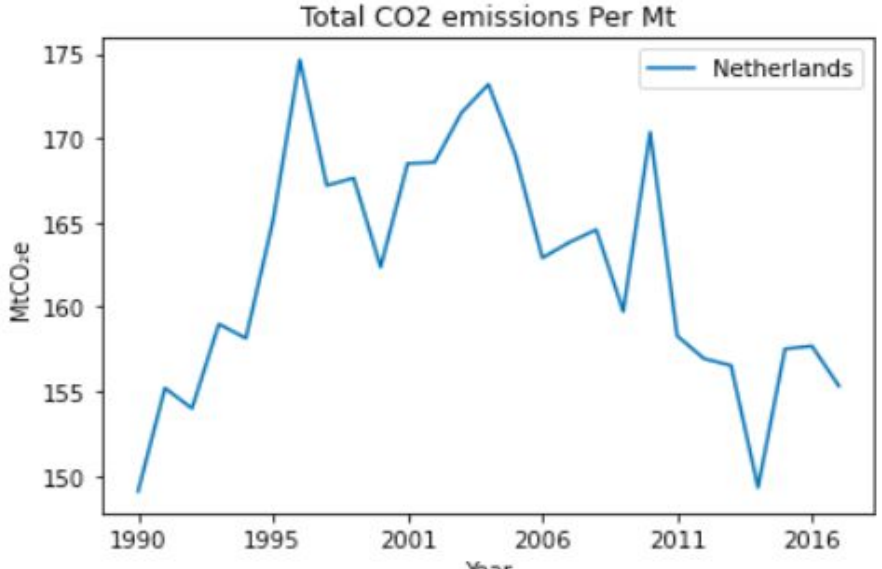
- The following data examines two datasets taken at latitudes above the Arctic Circle for more than a century each.

Arctic Zones (Northern EU)

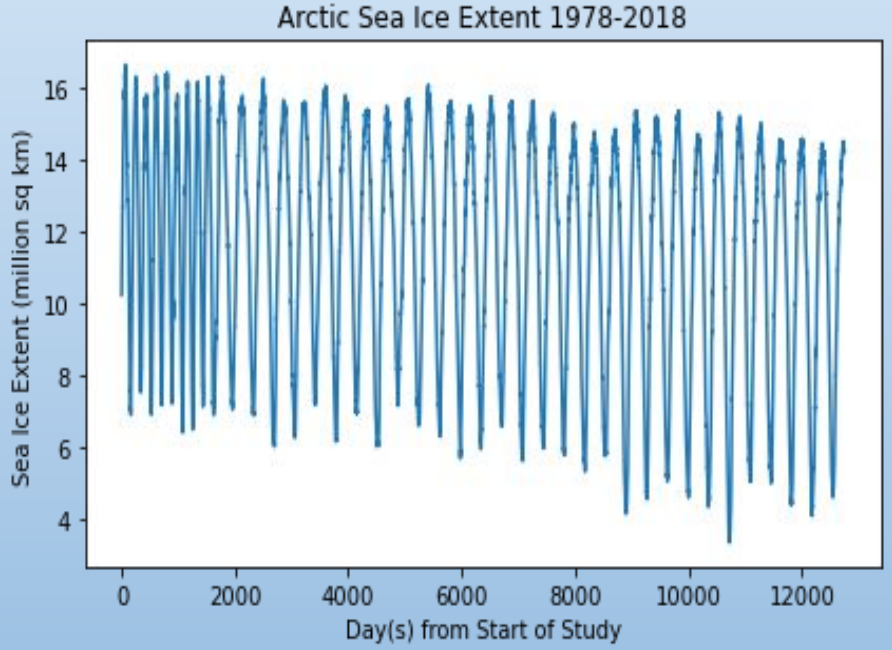


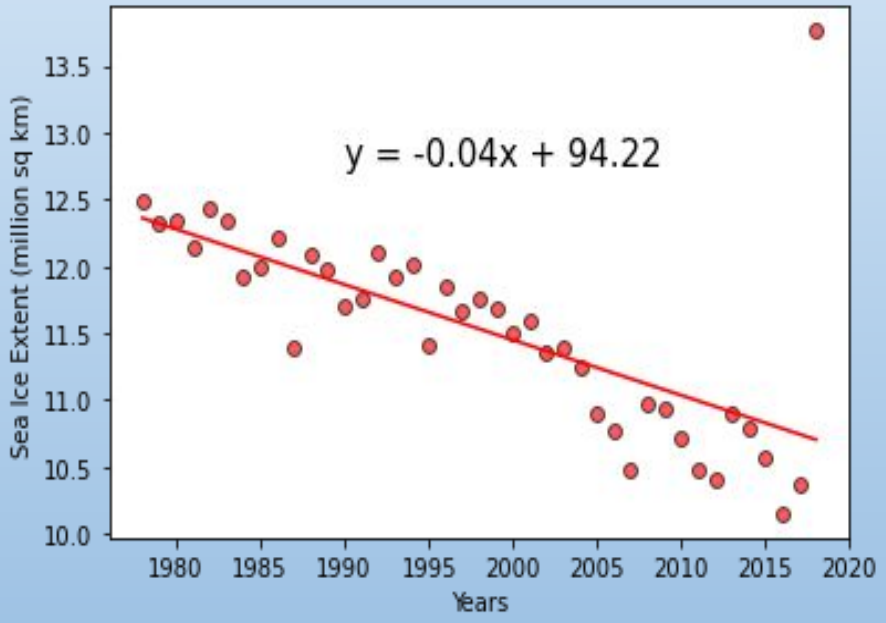


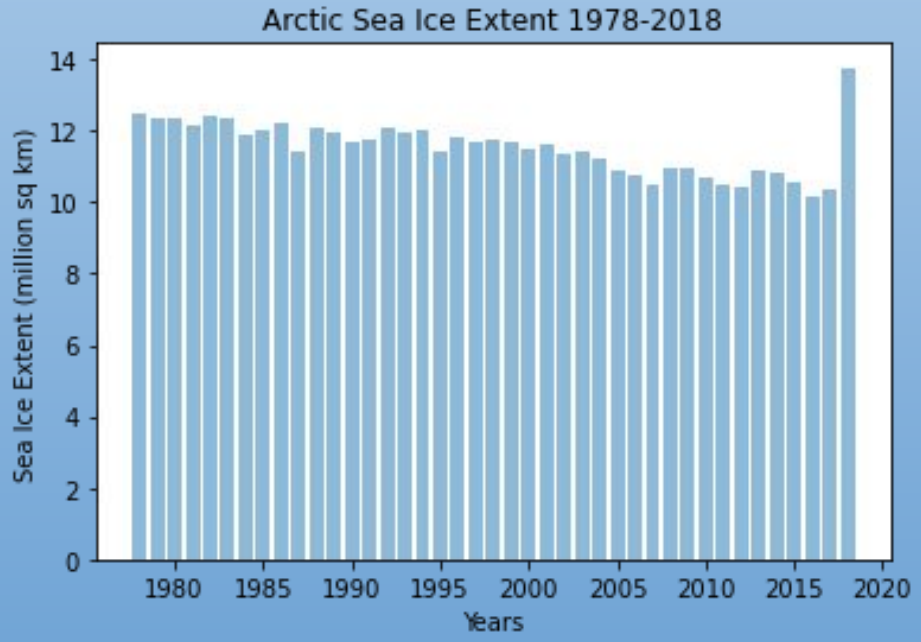


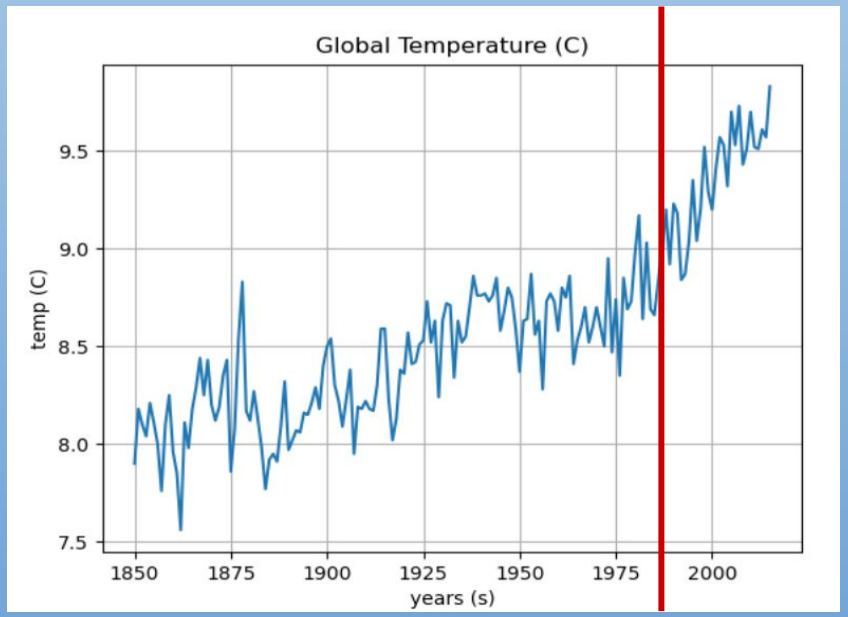


Sea Ice Extent



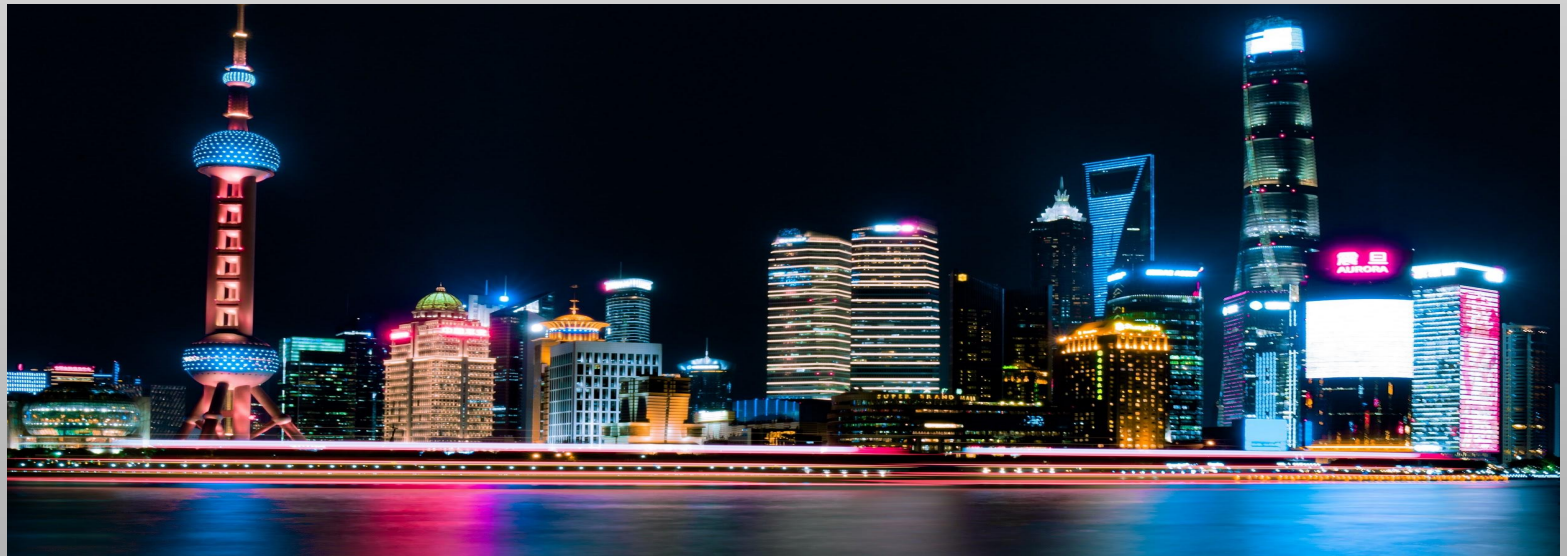




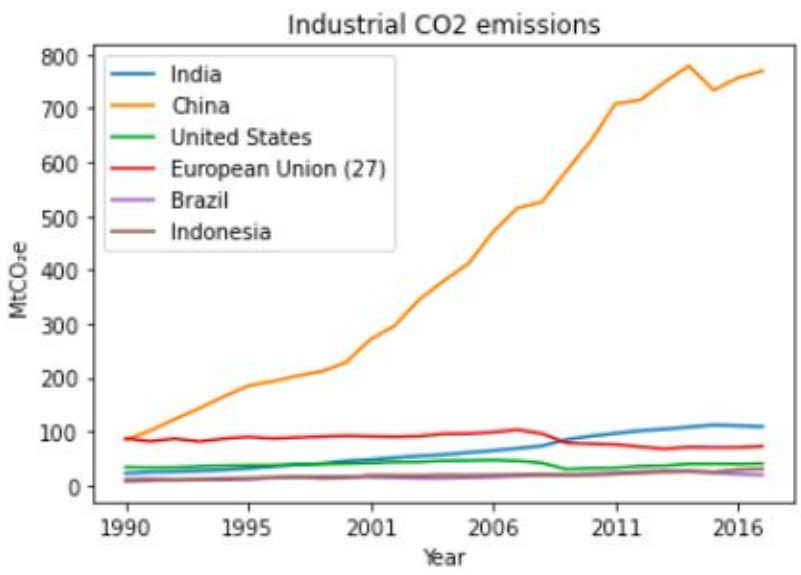


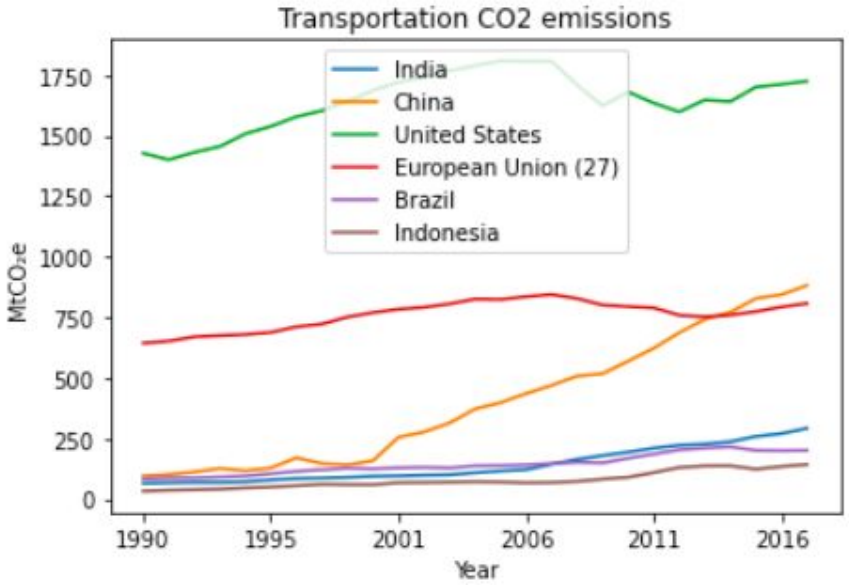
Oh The Ways You'll Make CO2: Emissions by Category

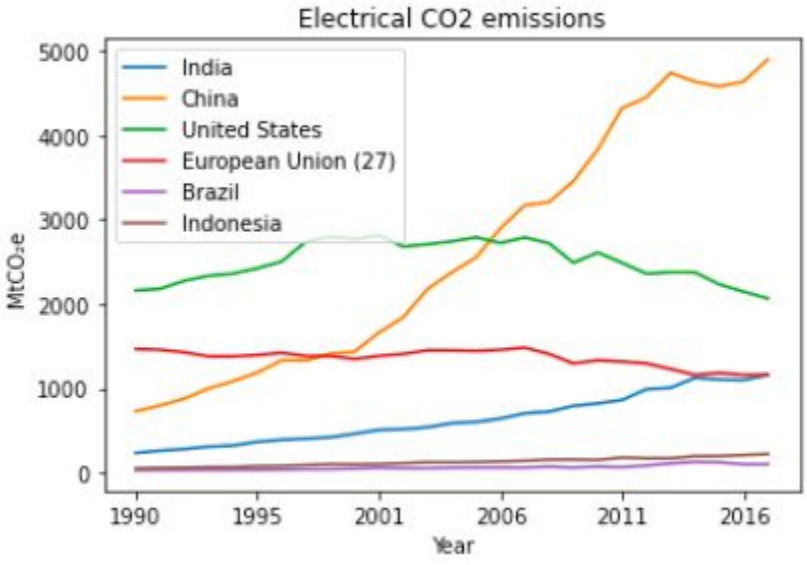
(Los Angeles & Shanghai below)

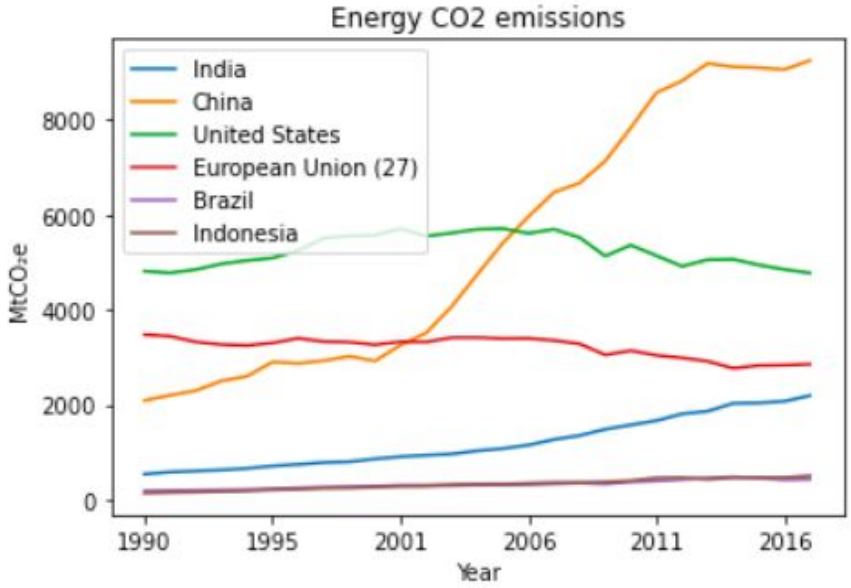


CO2 Emissions by Category & Country



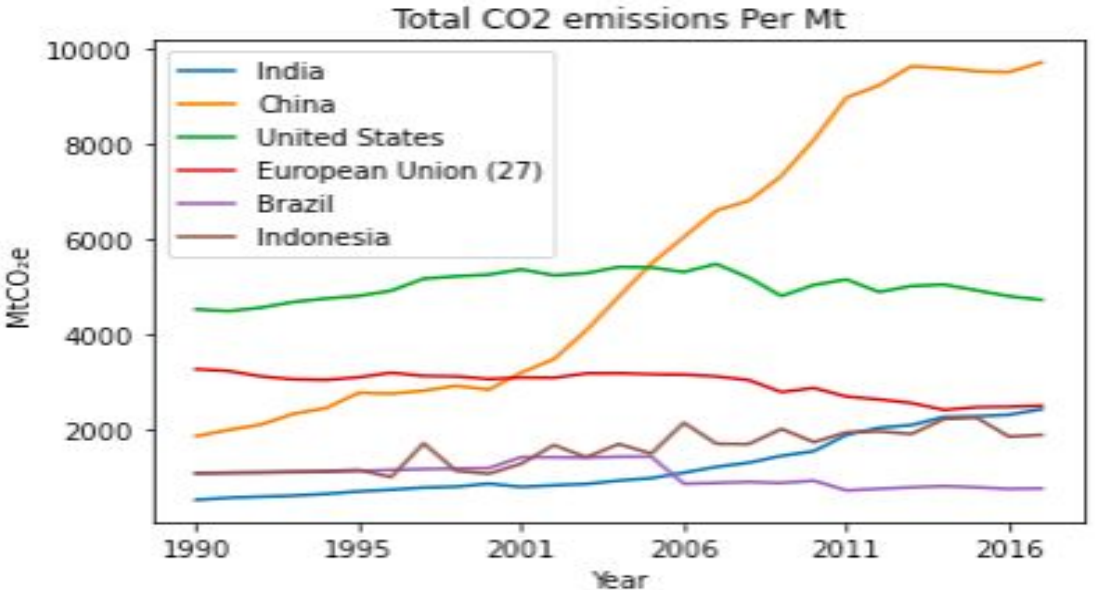


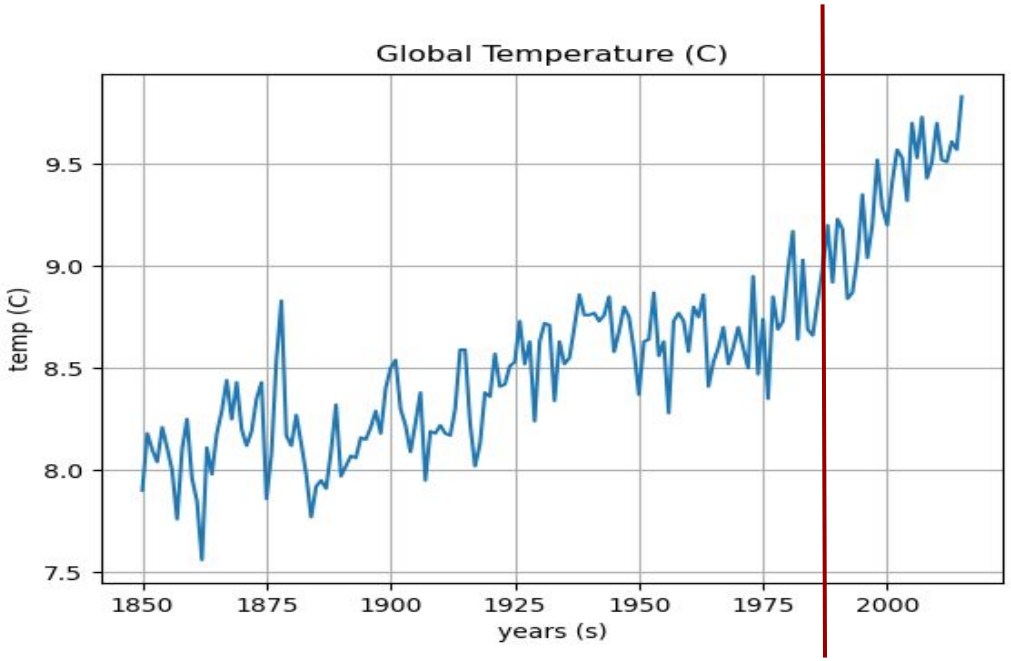




CO_2 and Global Warming: The Big Picture

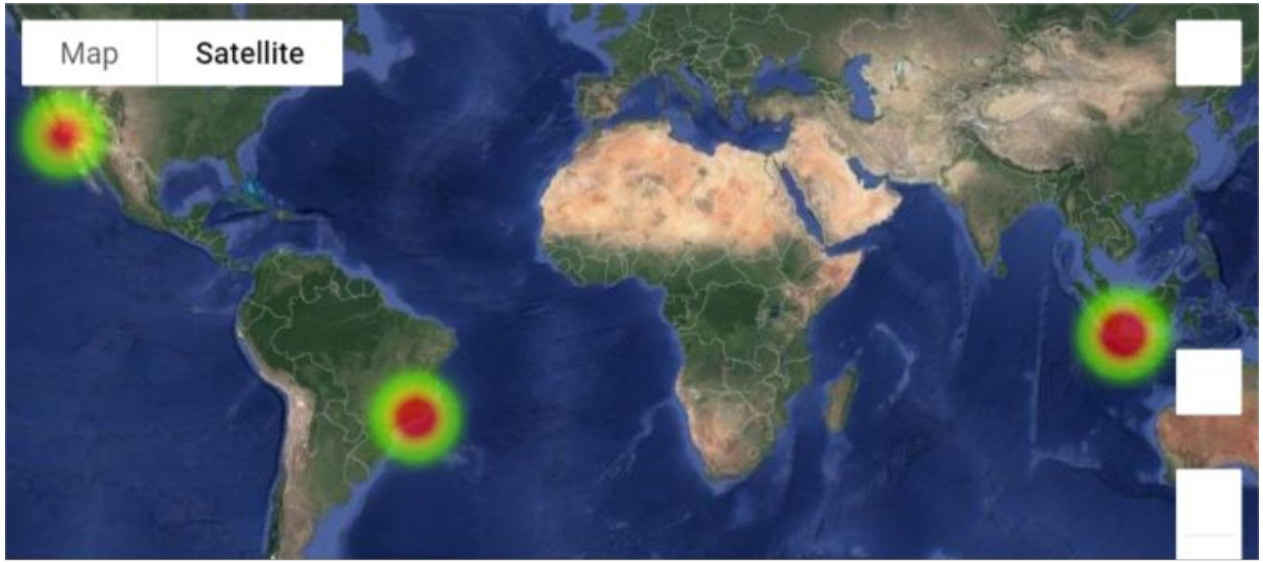
Global Overview: CO2 & Global Temperature Compared

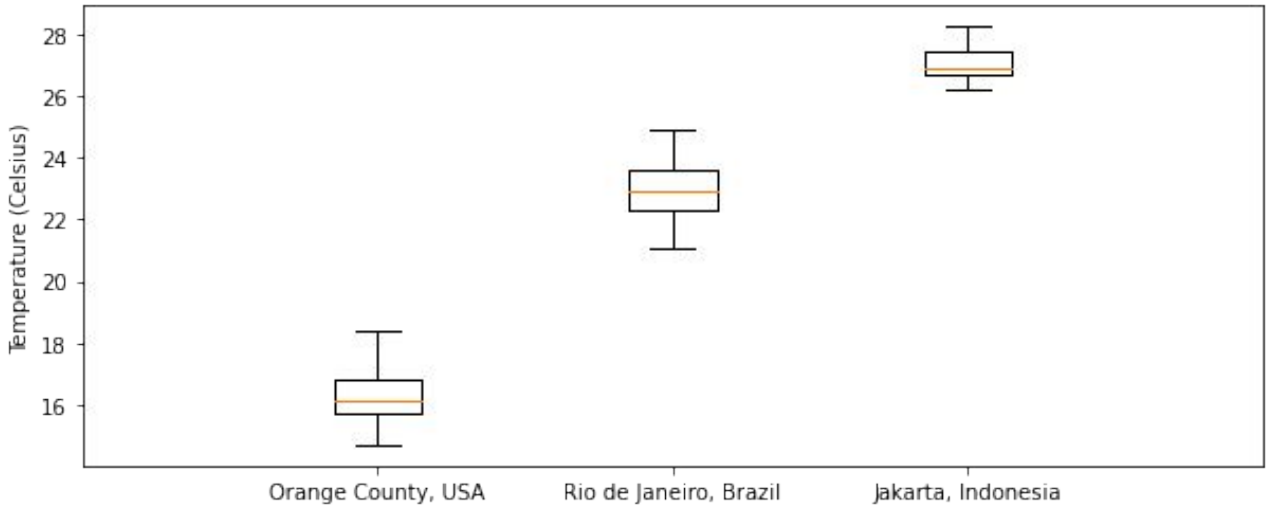




Temperature Ranges between 1901 and 2016

Locations: Orange County, CA / Rio De Janeiro, Brazil / Jakarta, Indonesia



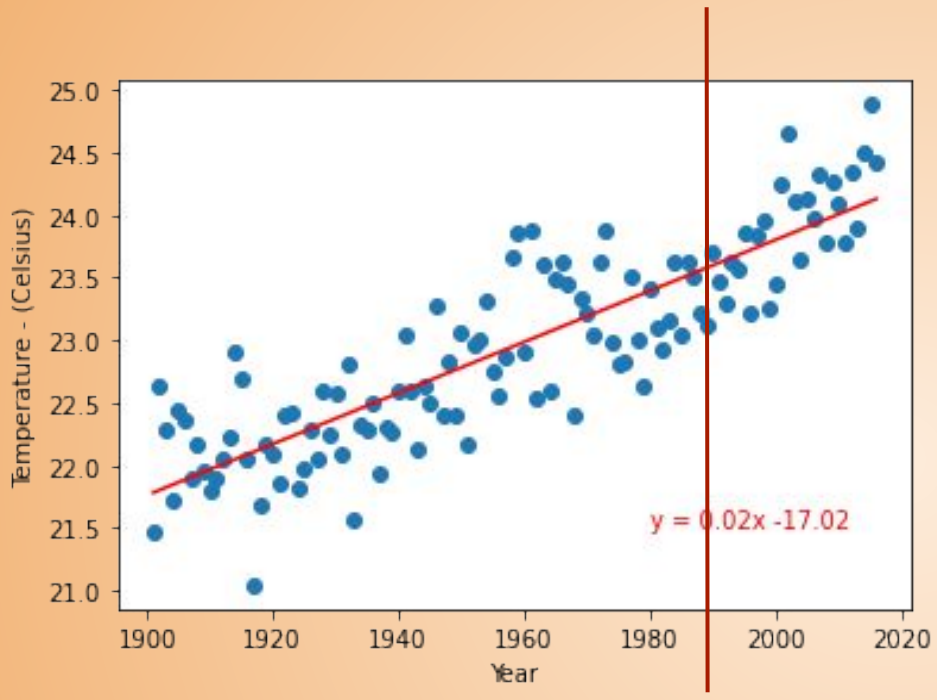


The Outsiders(liers)

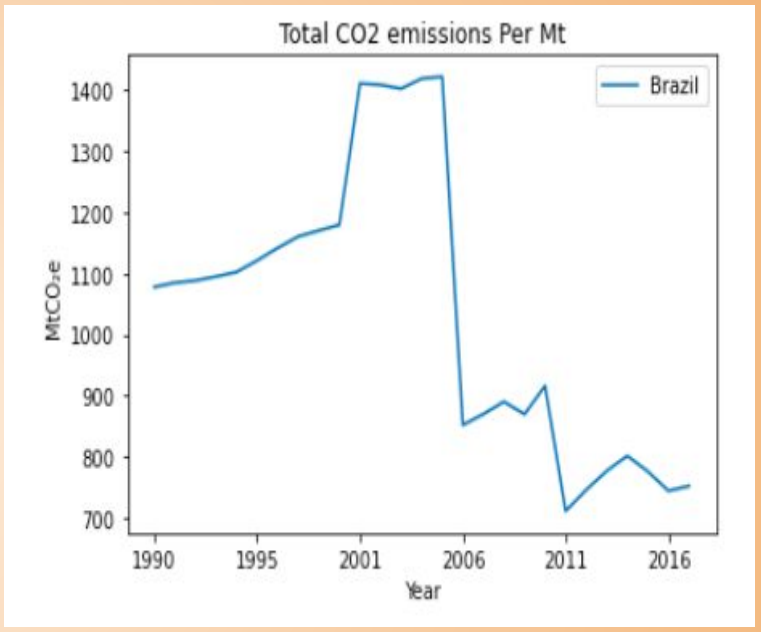
What about the data that looks like it doesn't fit in?

Explaining Discrepancies

While much of the data between CO2 and temperature in our group's research shows correlation, there are clearly data set comparisons that diverge in the short term.



Brazil



It may seem that such discrepancies invalidate the theory of anthropogenic climate change or at least call the fundamentals into question, it is important to remember that emissions that have been generated over hundreds of years *remain* in the atmosphere long after an individual country or even the whole world cuts back on the output of CO2.

It is much like having an oven on at 400 F for the evening and expecting it go back to room temperature immediately after turning it off.

This leads us to our final status of theory and conclusion.

Conclusion & Summary: The Post Mortem

- There is indeed a correlation between a number of factors
- Even with CO2 decrease, temperatures will still increase
- Sources of CO2 vary greatly
- If we carry on with business as usual, global temperatures will continue to rise.
- The continued effect of temperature rise will be extensive and inescapable. Polar ice melt will cause continued sea level rise.
- For the hundreds of millions living in coastal areas around the globe, the resulting geographical changes will force massive population displacement likely resultanting in violent conflict.
- The planet as a whole will experience loss of habitat and species, extreme weather events, as well as the likelihood of yet unpredictable results with unforeseen consequences long into the future.

Thank You For Your Time & Good Luck

Climate Change Warriors
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Elizabeth Lau
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Ryan Louderback

Software & Sources:
Python
Pandas
Matplotlib
Google Images

Special Thanks to the oil industry for making this presentation possible.

Data Sources/Data Cleanup

kaggle

BERKELEY EARTH

The Data Incubator

Data Mapping

Google
Dataset Search

Try coronavirus covid-19 or education outcomes site:data.gov.

Learn more about Dataset Search.

If we had more time...

<u>The Science:</u>

Sea Level Rise

Ice Core Data

Emissions other than CO2

Populations in Transition/ Forced Migration/Broad Human Impact

<u>Dollars & Cents:</u>

Technological/ Financial opportunities that are needed now and opportunities that should exist for for money making ventures in the future based on the projections from the data.