STA 141A Final Project
Group 12 Project Proposal

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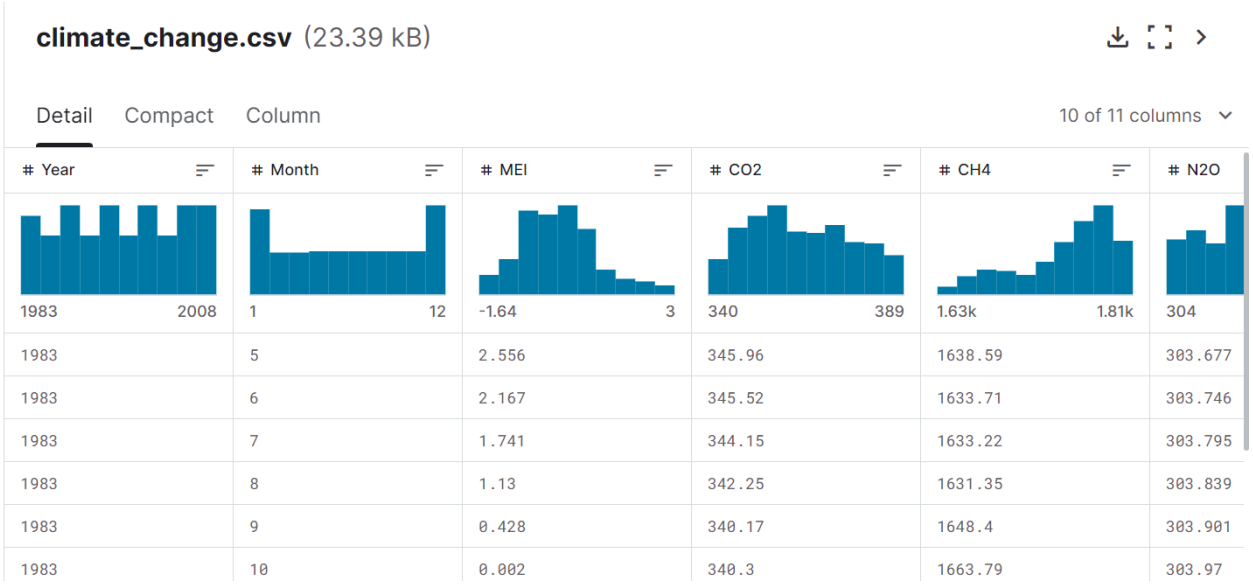

climate_change.csv (23.39 kB)

Detail | Compact | Column | 10 of 11 columns

# Year	# Month	# MEI	# CO2	# CH4	# N2O
1983 – 2008	1 – 12	-1.64 – 3	340 – 389	1.63k – 1.81k	304
1983	5	2.556	345.96	1638.59	303.677
1983	6	2.167	345.52	1633.71	303.746
1983	7	1.741	344.15	1633.22	303.795
1983	8	1.13	342.25	1631.35	303.839
1983	9	0.428	340.17	1648.4	303.901
1983	10	0.002	340.3	1663.79	303.97

Preliminary Planned Contributions:

Code: Max Vo
Visualization: Josh Velazquez
Methodology:Yanying He
Reporting: Nihal Prabhu

REMARK: For the above sections of the project, the respective listed individual will lead the completion/planning of that section's completion, but for the most part, the entire group plans to work on all sections of the project together.

Dataset: https://www.kaggle.com/datasets/econdata/climate-change
Brief Description:
We will be using a dataset about climate change that contains several data points on Atmospheric Concentrations such as CO2, N2O, and CH4 Aerosols, and Multivariate El Nino Southern Oscillation index. Using these indicators of climate change we will conduct an inferential analysis on how these factors affect temperature.

Questions to be Addressed

1. How CO2 and other atmospheric concentrations affect climate?
2. How is the climate affected each year by Aerosols?
3. How can we account for natural cyclic changes in climate change (El Nino-La Nina Oscillation) in order to explore the effects of other variables? (especially man-made factors); i.e. the multivariate El Nino Southern Oscillation index (MEI)

Methodologies

- Fit the Model whilst accounting for independent variables: Useful to verify which models adequately represent the data
- Data Visualization through ggplot to find Time Series Graph, Histograms, Heatmaps, etc.: Useful to give insight on the data values with easy to understand plots and graphs.
- Performing t-tests to find p-value: Useful to verify the validity to questions that are being addressed.
- Testing normality assumptions of the error terms (i.e. equal variances, qqplot): Useful to ensure that data is normally distributed and unbiased.
- Finding Correlations between different climate change indicators on temperature (i.e. Aerosols, CO2, MEI): Useful to find which indicator affects temperature greatest and which indicator affects temperature the least.

Data Sources:

https://rmets.onlinelibrary.wiley.com/doi/full/10.1002/joc.2336

https://www.energy.gov/science/doe-explainsclouds-and-aerosols

https://www.nature.com/scitable/knowledge/library/aerosols-and-their-relation-to-global-climate-102215345/#:~:text=An%20increased%20amount%20of%20aerosols,Twomey%201977%3B%20Figure%203b).

https://earth.gsfc.nasa.gov/climate/data/deep-blue/aerosols

https://oehha.ca.gov/climate-change/epic-2022/climate-change-drivers/atmospheric-greenhouse-gas-concentrations#:~:text=Rising%20global%20temperatures%20are%20directly,Earth's%20surface%20by%20trapping%20heat.