Climate change. Global warming. You often hear those phrases together, and often both are controversial and polarizing terms. 97% of Climate Change studies agree that the earth is warming and man-made activities are the cause. Around 3% of Climate Change studies find the opposite. Check out the Climate Change Controversy links for more information. According to ThinkProgress.org, there are 180 members of Congress in the Climate Deniers camp, so that is around 41% of Congress. These are just those that have made public statements or taken public positions on Climate Change, but that is a large number, so while the scientific community is more decided that isn't the case for other groups and the public in general. Our project took a look at temperature and CO2 (from fossil fuels and cement production) data, and tried to understand the correlation and causation implications.

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Our hypothesis is that CO2 is trending upwards and so is temperature, so we think there is correlation and causation between these two factors. That is easy to say but there is a lot of work that went into what we found to support or disprove our hypothesis. More details on the process of that effort are on our "About" page. Also, we have analysis details and charts on subsequent pages. Going into this, we expected to have results that were a little more conclusive and clearly proved our hypothesis; however, with a topic as complex and controversial as this one, we found more questions and that while the data is trending in the expected direction, there was still room for skepticism and fuel for critics and climate deniers. That is the real world, and the data we found and used is what we have to go by at this time and for this project.

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To summarize our process, we started by searching for data sets, exploring sites like Data.World, BerkeleyEarth.org, or CDIAC (Carbon Dioxide Information Analysis Center part of DOE). We used Excel, Pandas, Numpy, and Matplotlib to cleanse and inspect the data. We created numerous charts to get a pictures of the data, like does it have structure or does it appear randomly distributed. Do the two values correlate, and is there a strong or weak correlation? Also, do the charts clearly show or prove correlation and-or causation?

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Our infrastructure was primarily csv files in Jupyter notebooks using Matplotlib and Python, and we have a data visualization set up as an application on Heroku which required HTML, CSS, Bootstrap, JavaScript, and D3. We have a local postgreSQL database that is also set up on Heroku. However, the Heroku postgreSQL database is not actively used because our data exceeds the basic free level, but it is available locally for research and could be activated on Heroku if we found the cost justification. The D3 is quite limited, and like other technical choices some were made because we wanted to demonstrate and use classroom experience and some were made with future learning in mind. The site will be available for us to continue to make changes and additions, so the learning won't stop with the end of this project or this class.