Methodology:

We investigated Co2 emission from January 1 2019 - December 30 2020 through the daily Co2 emission data in the world and 13 countries specifically. The countries include Brazil, China, EU27 & U.K, France, Germany, India, Italy, Japan, ROW, Russia, Spain, UK and the U.S. We acquired the data through Carbon Monitor, which updates daily Co2 regularly.

The dataset is 5.6 MB, containing 92064 rows and 5 columns, including country name, measure date, emission sector, emission value and measure timestamp. The data is measured from a diverse range of activity, including electrical power generation, industrial production, ground transportation, residential activity, domestic aviation, and international aviation, and the sector column shows the source activity that the emission is measured from.

We also downloaded historical yearly Co2 emission data from 1990 to 2018 through Climate Watch, a website that provides open climate data to show countries' climate progress. In this dataset, we focus on 10 countries to compare the historical emission with the one within 2019 to 2020. Those countries are China, the U.S, India, Japan, Russia, Brazil, Germany, U.K, Italy, France and Spain. This dataset is 37KB, containing 195 rows, and the columns are the emission values from 1990 to 2018, respectively.

Combining the historical yearly Co2 from 1990 to 2018 and the daily Co2 from 2019 to 2020, we analyzed the trend of yearly Co2 emission within six years, from 2014 to 2020 and plotted a line chart for each country in the joined dataset. As 2019 and 2020 are considered as an important period for COVID-19, we then focused our research on the daily Co2 emission in this period by classifying the daily emission data into four groups: pre-COVID-19 period and COVID-19 period in 2019 and 2020 respectively. The COVID-19 period spans March 1 - December 21, with March 1st being when most countries started to report cases and suggested social distancing. The pre-COVID-19 period is January 1st - March 1st, exclusively. Emissions from 2020 are considered 'current' data and emissions in 2019 are considered 'previous'. Statistics are calculated during the COVID-19 period and pre-COVID periods. We report both absolute differences in CO2 and percentage change in Co2 from previous to current year.