

# Observations

Initially, I observed the change in car traffic and air quality (based on  $PM_{2.5}$  levels) in 1 hour intervals between December 2, 2019 12:00AM and December 9, 2019 12:00AM. [This video](#) displays the described data. In car traffic and air quality data, green represents less congestion and better air quality and yellow, orange, and red represent more congestion and worse air quality, respectively. There are certain frames in the video, at which both variables changed together, showing some positive correlation between bad congestion and bad air quality. However, due to the lack of time label and legends, the temporal patterns (time of the day, day of the week) in the two variables were unclear.

For my final analysis, I decided to scale down my time frame to a regular weekday (December 19, 2019) and with shorter time intervals (15 minutes). I focused on 3 specific times of the day: morning rush hour (6:30AM - 9:30AM), lunch (11:00AM - 2:00PM), and afternoon rush hour (4:00PM - 7:00PM). I expected to observe high traffic levels during morning and afternoon rush hours and thus high AQI levels (bad air quality). However, traffic and air quality seemed to not be an issue on this particular day. The air quality data points and traffic lines were both mostly green throughout the day, while the discussed video showed much more variation in color.

06\_Final folder holds 3 PDF files (of exported layout views) and 3 AVI video files (of animations) of the ArcMap in the said periods. The 3 PDF files includes an Inverse Distance Weighting (IDW) interpolation based on the 11 PurpleAir sensors located around Claremont, which serves as an estimation of the local air quality in between data points. However, the interpolation does not consider other factors of particulate matter dispersion, such as wind direction and air from outside the square boundary. In addition, the representation of the air quality is limited in that the interpolated layer has a classified symbology (green for AQI 1-50, yellow AQI 51-100, etc.) and thus does not have a gradient view of the interpolated AQI values.

The 3 videos are animations of the time series data in 15 minute intervals over 3 hours in each time period. An interesting observation to note that even though most AQI measurements are in the "Good" range (represented in the green), the air sensor located on the South-West corner of the map has consistently "Moderate" range AQI observations throughout the day. I suspect that it is due to its proximity to the 10 Freeway. I concluded that December 19th because there were not much variations in both traffic and air quality to observe a correlation between the two.

Nonetheless, I found it to be a very valuable experience because I learned new tools, such as IDW interpolation, animation, layout view, and using symbology to standardize data representation. Further extension of this project would involve incorporating aggregated data, such as average AQI levels and average traffic levels at a certain time of the day.