

# Air Quality Egg (AQE)

Elizabeth Spencer



# What is an AQE?

The AQE is a measuring tool that measures the quality of the air. It can measure CO<sub>2</sub>, parts per million of air pollution, humidity, temperature, O<sub>3</sub>, and more.



# Question

How do CO<sub>2</sub> levels fluctuate based on season and setting of industrial, urban, and forested surroundings?

# Hypothesis

The CO<sub>2</sub> levels will change in the spring and the fall because of the plant respiration cycle. Additionally, human contributions of CO<sub>2</sub> in the atmosphere will be greater in the winter than the other 3 seasons due to the need of warmth. I also predict that the industrial area will have more CO<sub>2</sub> than the urban and forested area.

# Procedure

1. Customize 3 AQE's and make so that each data probe measures barometric pressure, humidity, temperature, and CO<sub>2</sub> levels.
2. Contact 3 different sites which vary in amount of vegetation and industrial surroundings. Note that each site needs to have Wi-Fi and an outlet to plug the probe into.
  - a. Forestry Center=primarily vegetation
  - b. St. Paul=fair amount of vegetation around the campus, but outside campus it is industrial.
  - c. Rochester=industrial environment

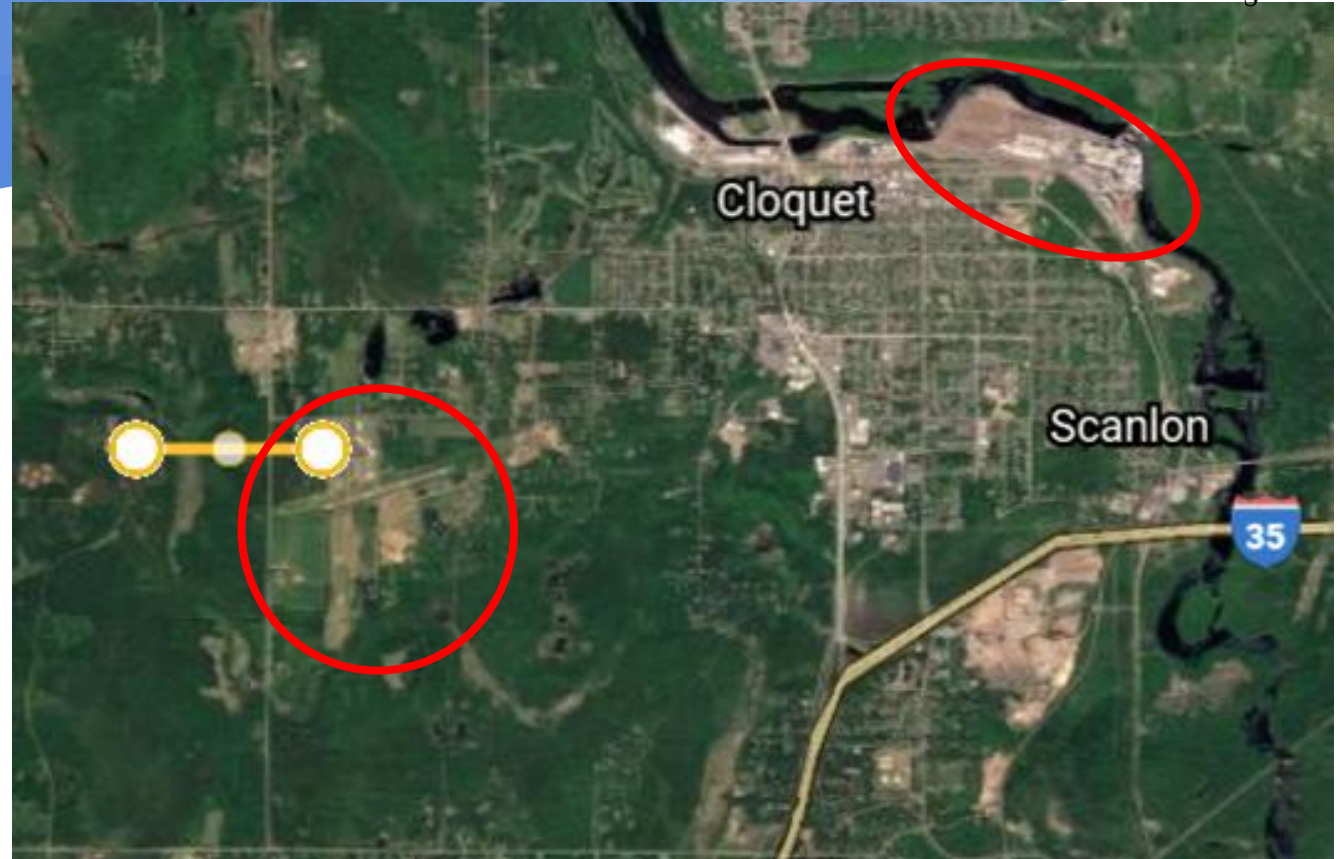
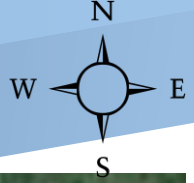
# Procedure *continued*

3. Create enclosures, if needed, that are tailored to each location to make sure the probe is taken care of. Bring the AQE online and make sure each location is accurate on the map that displays the locations of all the eggs worldwide.

4. Set each probe to start data collection on January 3, 2020 and have it end January 3, 2021.

5. Egg location adjustment or enclosure adjustment would be logged a notable occurrence log.

# Egg Location-Cloquet



Red Circles:  
Industrial Area  
Airport

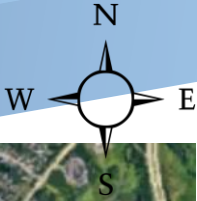
Yellow Line: 0.85 mi  
Distance from AQE to  
Airport



# Egg Set Up-Cloquet

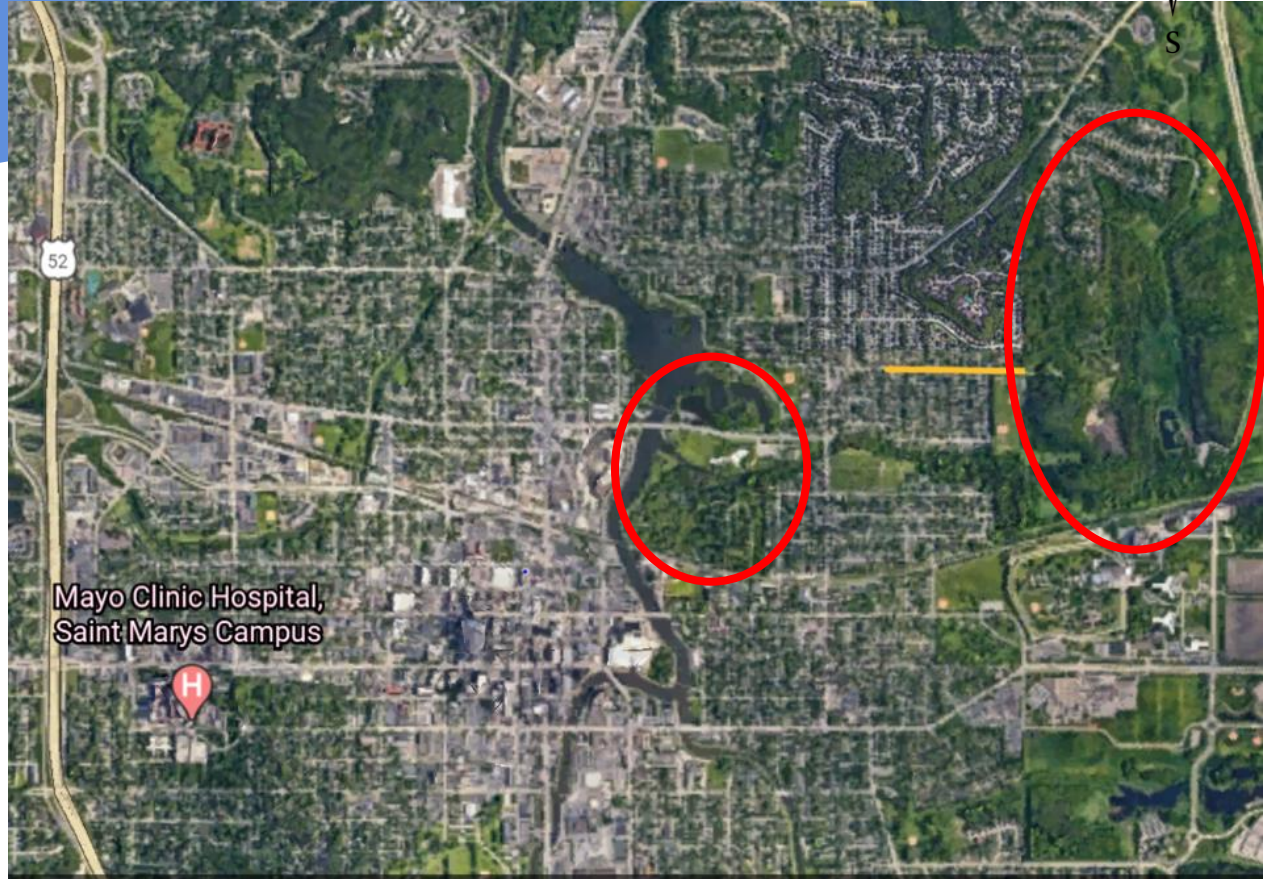


# Egg Location-Rochester



Red Circles:  
Quarry Hill Park  
Silver Lake Park

Yellow Line: 0.35 mi  
Distance from AQE to Quarry Hill

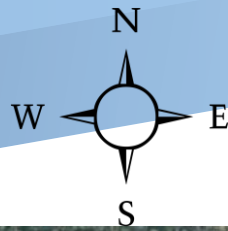


# Egg Set Up-Rochester





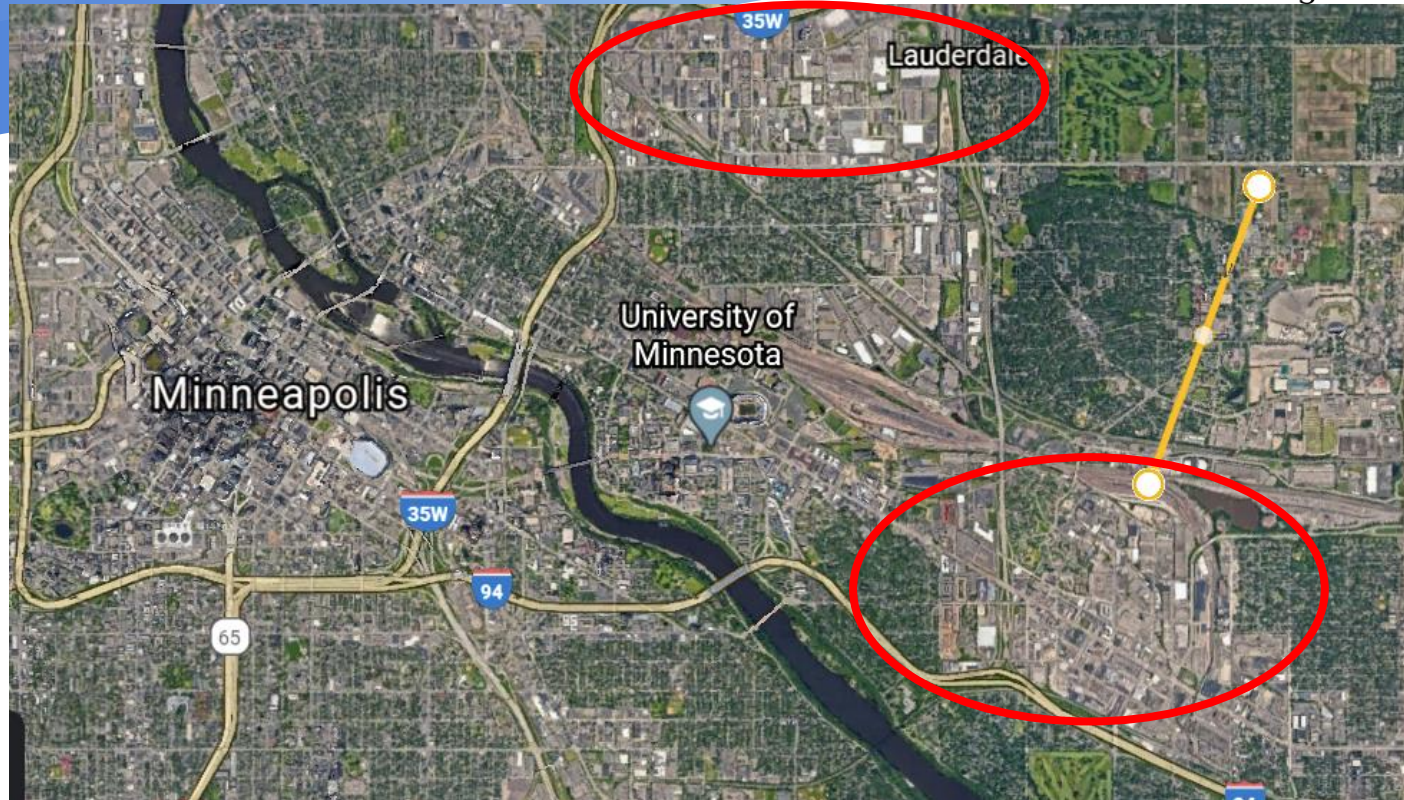
# Egg Location-St. Paul UMN



Red Circles:  
Industrial Areas

Yellow Line: 1.35 mi  
Distance from AQE to  
Industrial Area.

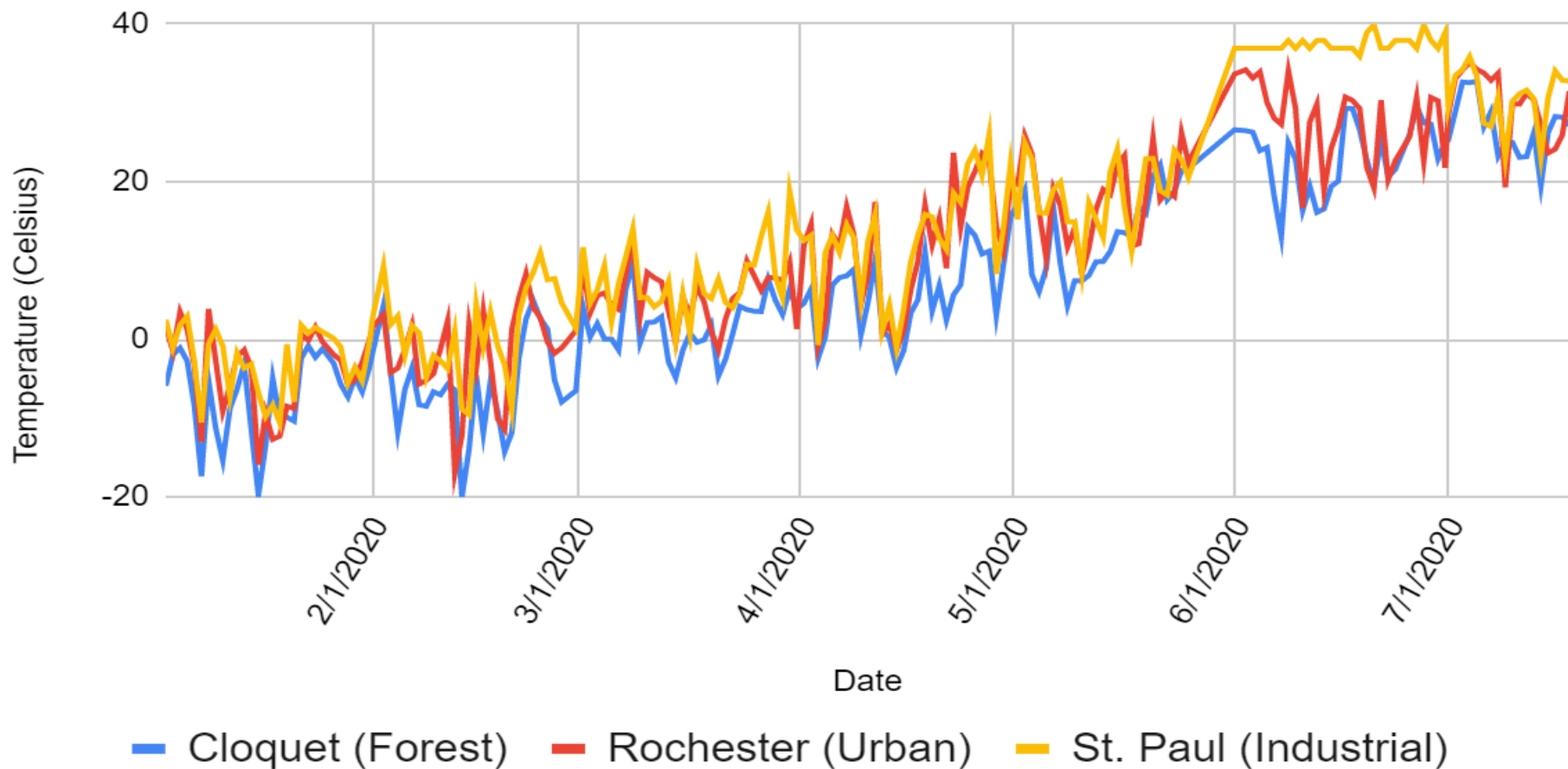
\*Equidistant between  
both industrial areas



# Egg Set Up-St. Paul

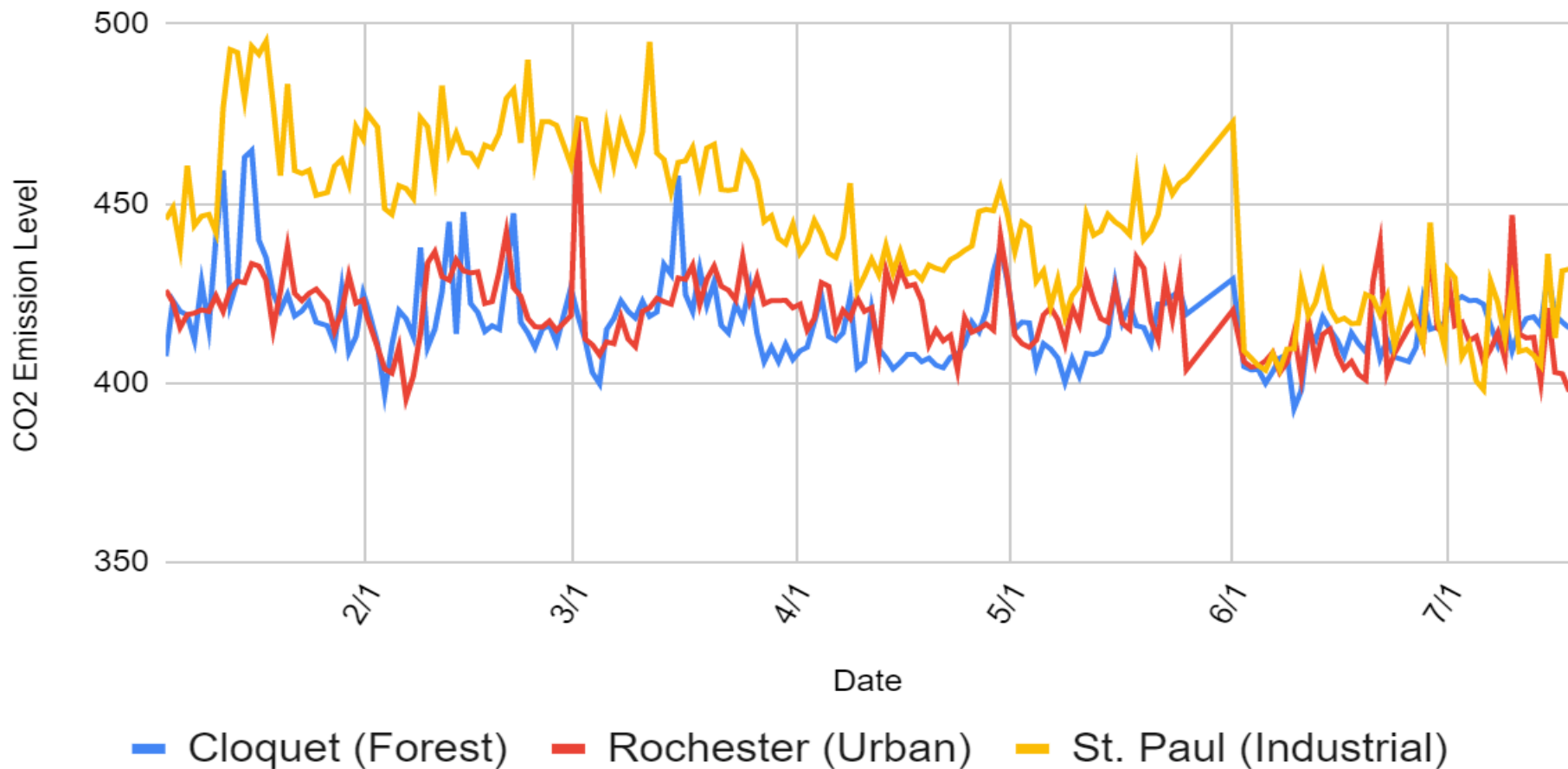


# Temperature vs. Date

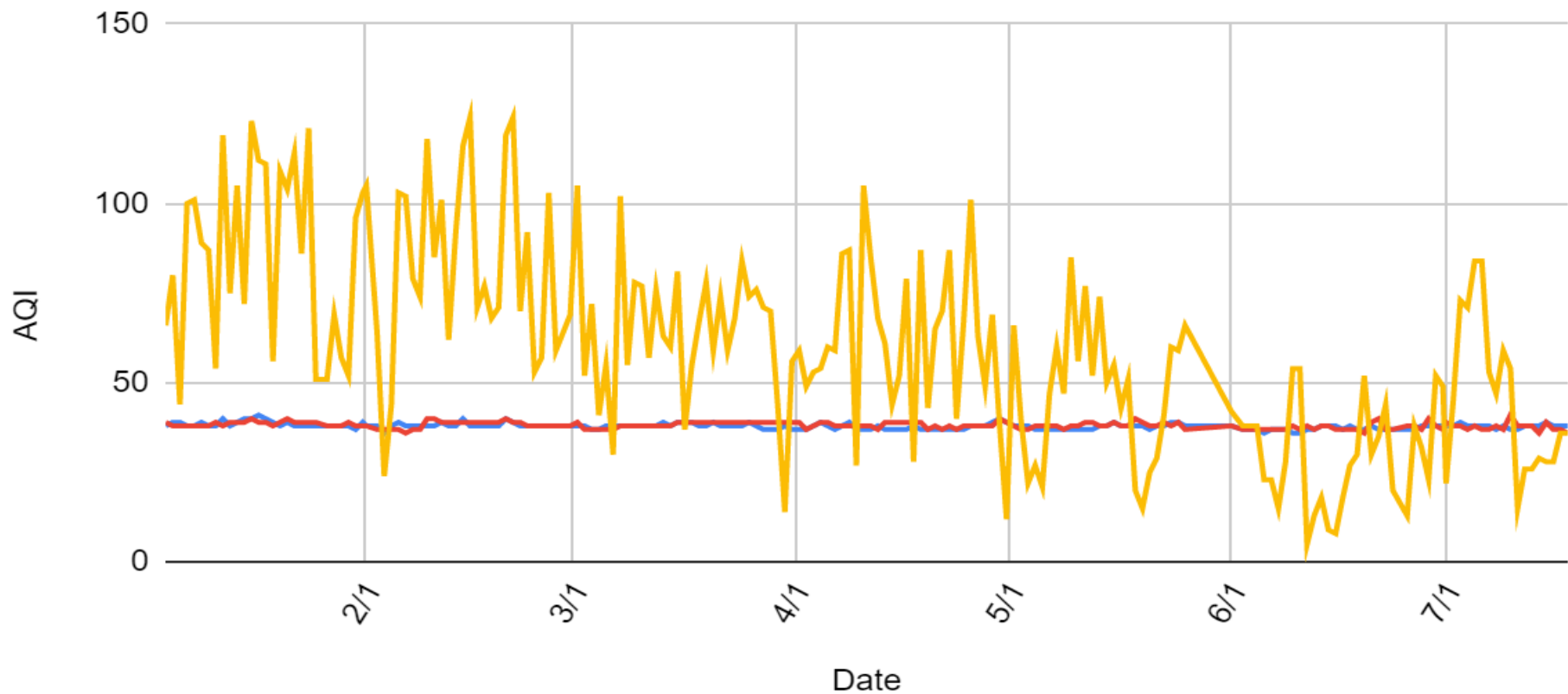




# CO2 Emission Levels vs. Date



# AQI vs. Date



— Cloquet (Forest)

— Rochester (Urban)

— St. Paul (Industrial)



# Conclusion

- Inconclusive at this time
- COVID-19 impacts
- CO2 Emissions and AQI in St. Paul are similar in their pattern

# Special Thanks

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# Questions?