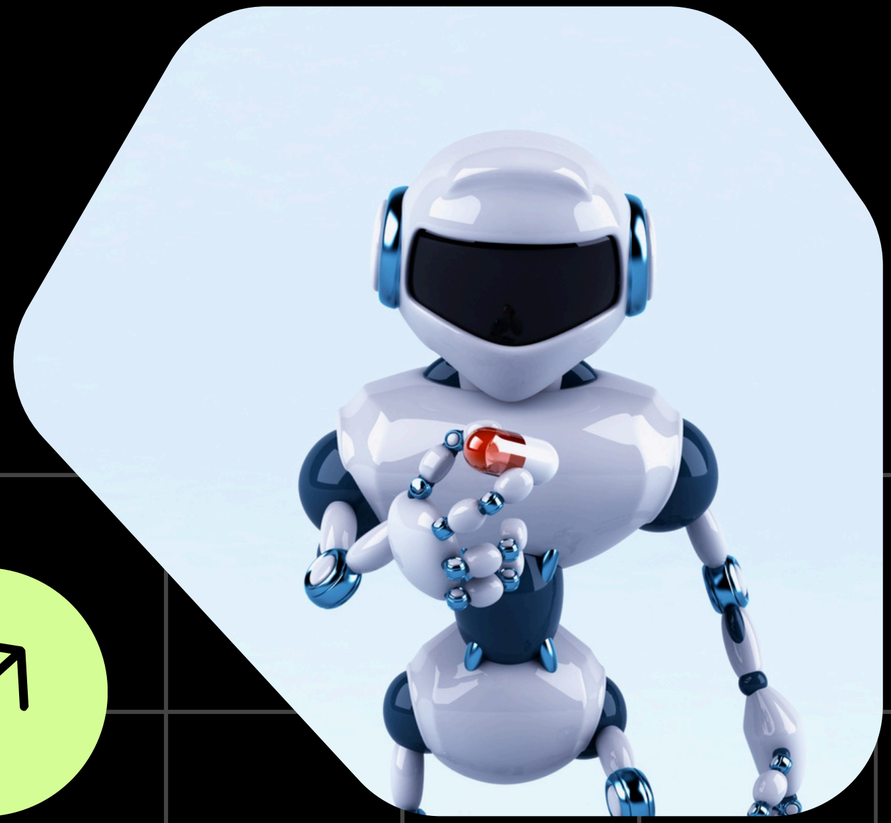
PROJECT ELYSIUM

Temperature and Air Quality Analysis



- Elijah Mercier
- Robert Green
- Eric Clayton
- Ivanna Price

Project **ELYSIUM** is an in-depth analysis focusing on the intersection of **temperature, precipitation** and **air quality patterns** across key cities in the United States. By leveraging historical weather data and air quality indices (AQI), this project aims to uncover trends and correlations that can provide valuable insights into the impacts of climate change on urban environments.

About **Project**

CITIES ANALYZED:

- Tulsa, Oklahoma:
  - Latitude 36.1540, Longitude -95.9928
- New York City, New York:
  - Latitude 40.7128, Longitude -74.0060
- Los Angeles, California:
  - Latitude 34.0549, Longitude -118.2426

Data Sources

01

Historical Weather Data: The data spans from 2014 to 2023, providing daily and quarterly data for temperature, precipitation, and the Air Quality Index (AQI). This extensive dataset, accessible via the Open-Meteo Historical Weather API, allows for a deep dive into historical weather records, helping to identify trends over the past decade.

02

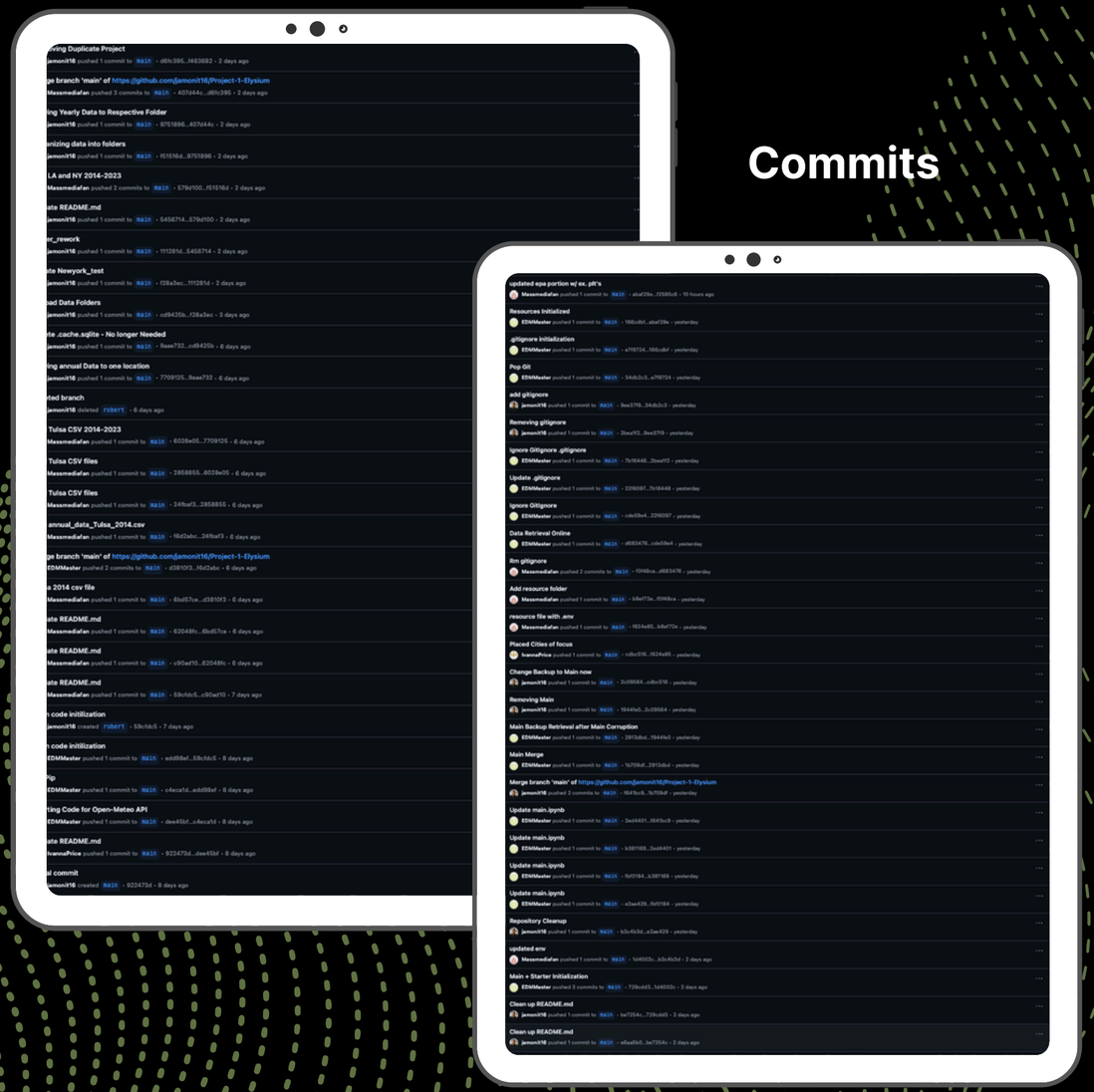
Air Quality Data: Sourced from the EPA's Air Quality System (AQS) API, this dataset provides detailed air quality measurements, including key pollutants and AQI values.

OBJECTIVE

The primary objective of Project ELLYSIUM is to :

- analyze the relationship between urban temperature variations and air quality, while also aligning these trends with broader climate change projections. The insights gained will contribute to understanding the localized impacts of global climate phenomena, potentially guiding policy and mitigation strategies in urban planning and public health.

This project combines robust data analysis with environmental science to address some of the most pressing challenges of our time, providing a foundation for future research and policy development.



Commits

PROCESS

Project ELLYSIUM followed a systematic approach to organize, analyze, and visualize weather and air quality data across different urban areas. The processes involved **data retrieval, cleanup, structured analysis, and consistent documentation**, all tracked via GitHub for effective version control and collaboration. The project's focus on temperature and air quality trends aligns with its overarching goal of understanding the environmental impacts on urban living conditions.

This structured process ensures that the findings are reliable and can contribute to further research or policy-making in urban planning and environmental protection.

Project Processes:

Data Organization and Initialization:

01

Repository Setup:

Repository Setup: The project started with setting up a structured repository, including the initialization of key folders such as LA_Data, New_York_Data, Tulsa_Data, and Resources. These folders were designated for storing data and resources related to the respective cities analyzed.

02

Data Folders Creation:

Separate folders were created for different cities to organize the yearly weather and air quality data. This structure allowed for easy access and management of the datasets.

Project Processes:

Data Ingestion and Cleanup:

01

Data Retrieval:

Historical weather and air quality data were retrieved from the relevant APIs, specifically the Open-Meteo Historical Weather API and the EPA's Air Quality System API.

02

Data Organization:

The raw data files, particularly for Tulsa (2014-2023), were moved into their respective folders for processing. This step included renaming, restructuring, and organizing data to ensure consistency across datasets.

03

Data Clean Up

The data files were cleaned to remove any redundant or unnecessary information. .gitignore files were used to exclude irrelevant data files and system-specific files from version control.

Project Processes:

Data Processing and Analysis:

01

Temperature and Air Quality Analysis:

Jupyter Notebooks (main.ipynb, main_backup.ipynb, and others) were used to perform in-depth analysis on the retrieved data. This analysis involved:

- Analyzing temperature trends over the past decade for each city.
- Correlating temperature data with air quality indices to understand the impact of temperature variations on urban air quality.
- Visualizing Data: Various graphs were created, such as line charts and bar charts, to visualize temperature, precipitation, and air quality trends.

Project Processes:

Version Control and Collaboration:

01

Git Commits and Merges:

Throughout the project, multiple commits were made to track changes in the code and data. Branches were merged to integrate different parts of the analysis, ensuring that the main branch had the latest updates.

02

Issue Resolution:

There were instances of backup retrievals and repository cleanups to manage file corruption and other issues. This ensured the integrity and continuity of the project.

03

Resource Management:

Additional resources such as .env files for API keys and configuration settings were added to the repository, aiding in the smooth execution of scripts and notebooks.

Project Processes:

Finalization and Documentation:

01

Documentation Updates:

The README.md files were updated regularly to reflect the current state of the project, including descriptions of new datasets, added graphs, and changes in analysis scope.

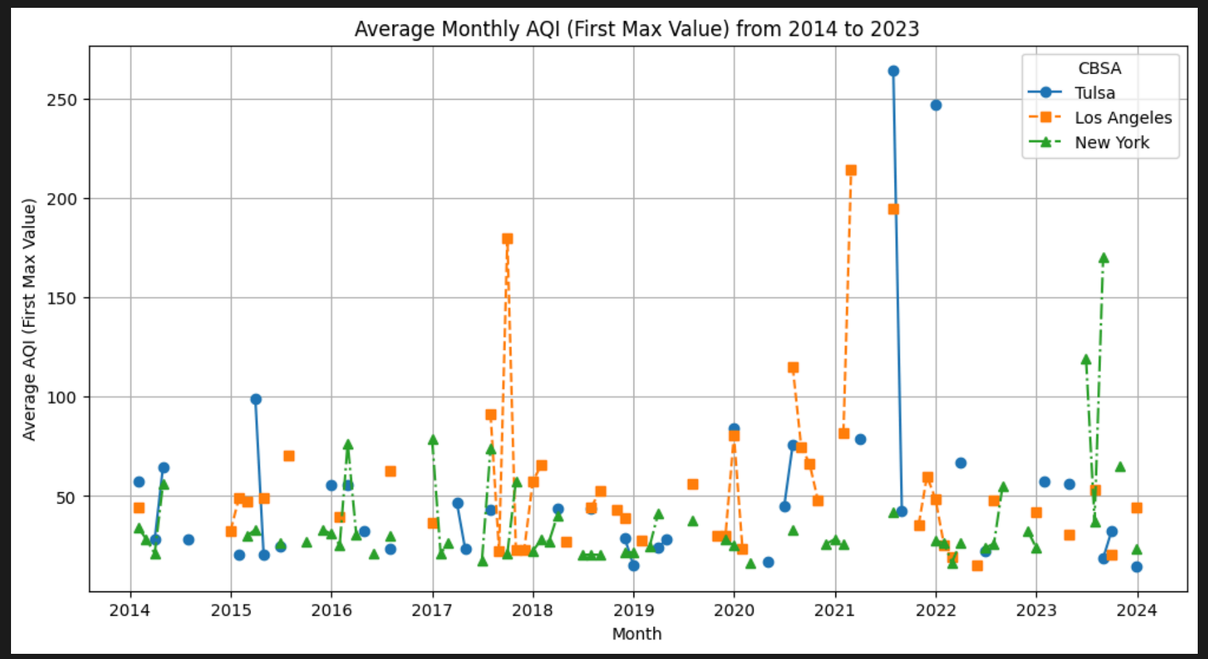
02

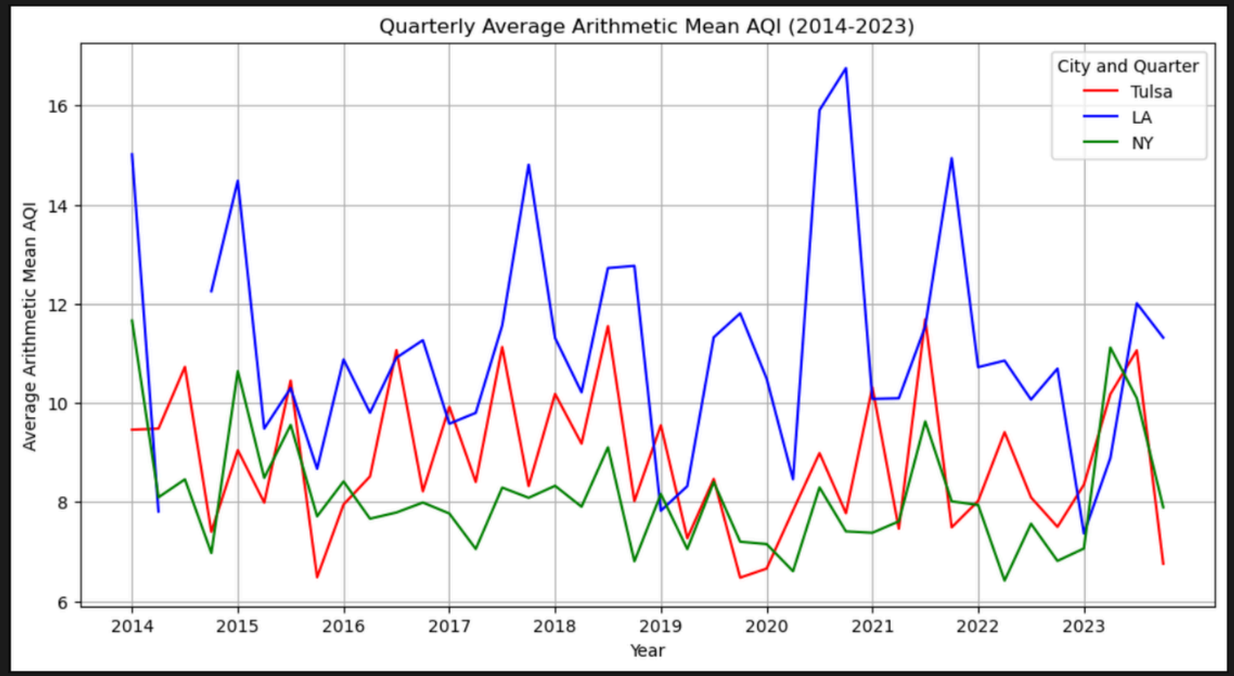
Project Enhancements:

Final graphs and additional analysis were added to the notebooks to complete the study. This included enhanced visualizations and more refined data correlation studies. This improved on past graph mishaps such as...

PROJECT ELYSIUM

ORIGINAL AQI GRAPH





Our Questions

01 How have the maximum and minimum temperatures changed over the past 10 years in different cities?

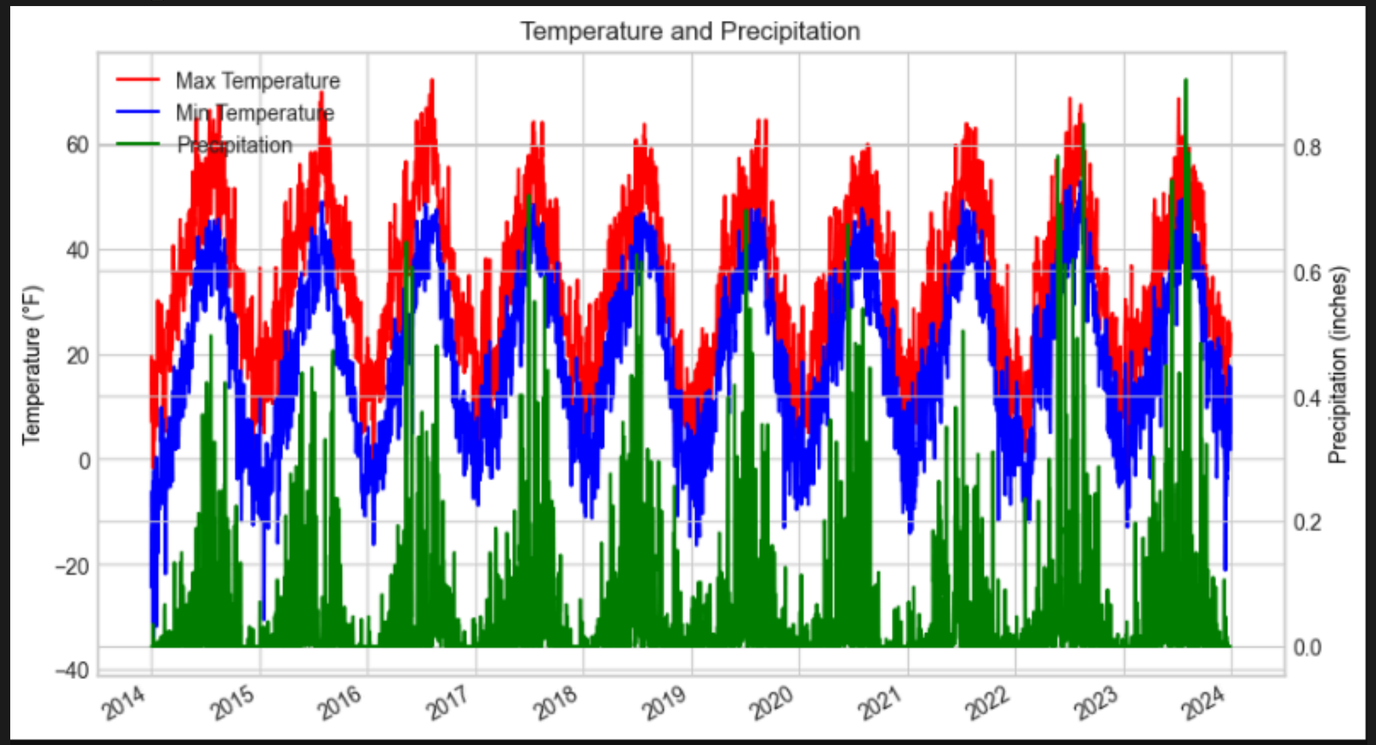
02 How do variations in maximum and minimum temperatures and precipitation correlate with air quality levels in these cities?

03 Based on the observed trends in temperature, air quality, and precipitation from 2014 to 2024, what future challenges and opportunities might these cities face?

Our Questions

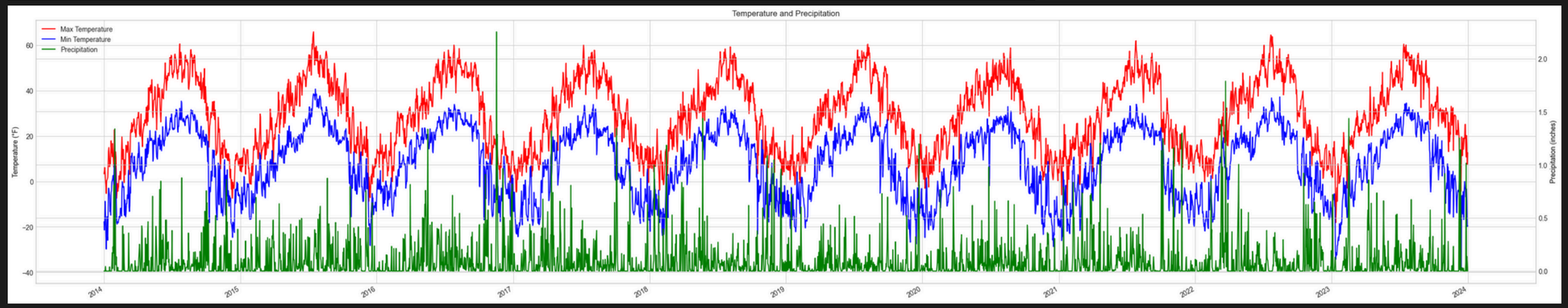
ELIJAH MERCIER

01 How have the maximum and minimum temperatures changed over the past 10 years in different cities?

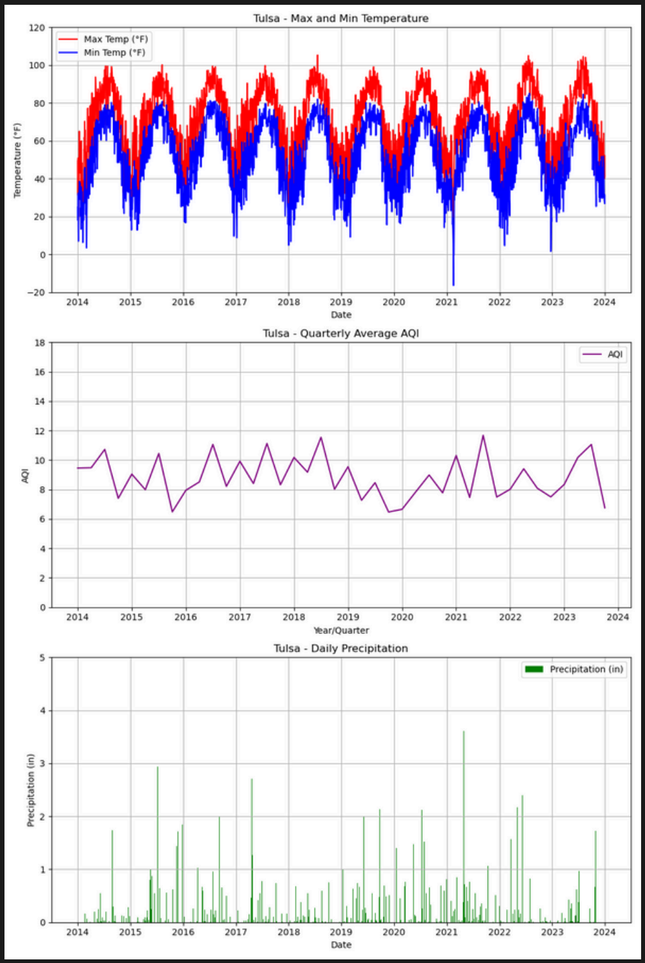


TEMPERATURE + PRECIPITATION

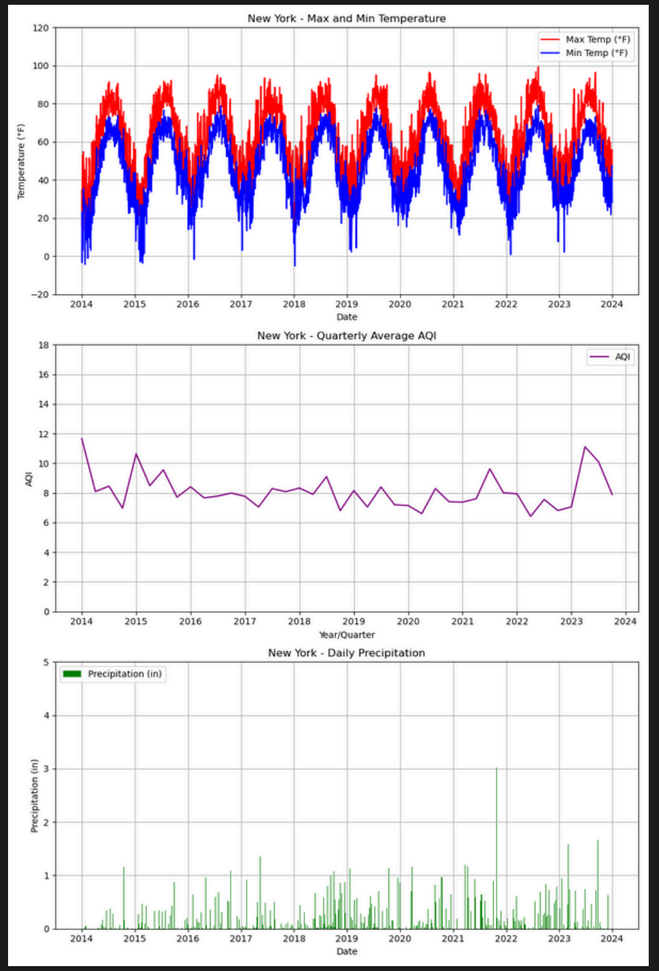
AVERAGE OF ALL THREE CITIES TOGETHER



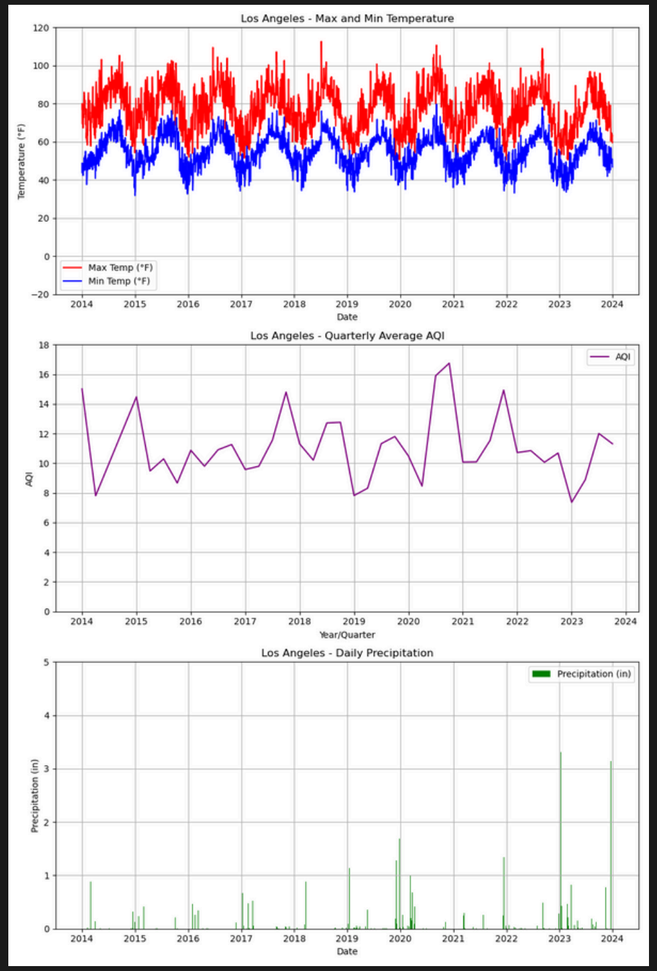
MAX + MIN TEMPERATERATURE



TULSA



NEW YORK



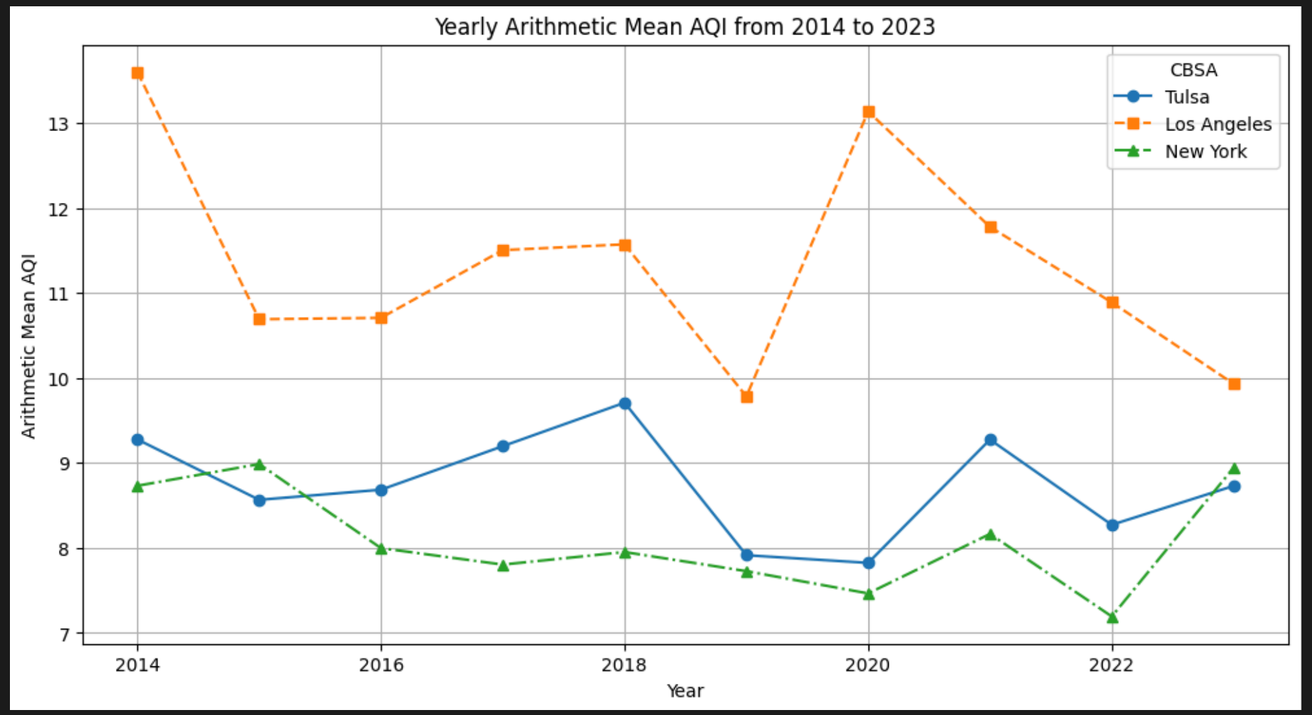
LOS ANGELES

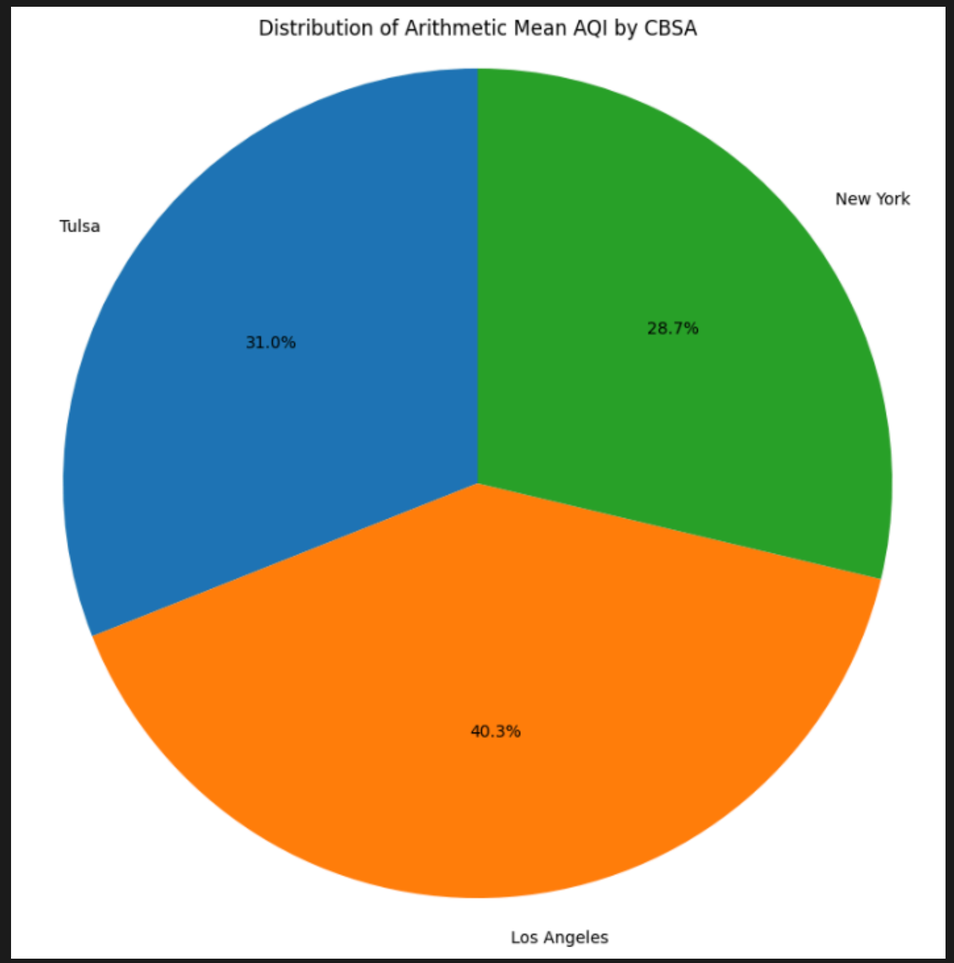
Our Questions

ERIC CLAYTON

02 How do variations in maximum and minimum temperatures and precipitation correlate with air quality levels in these cities?

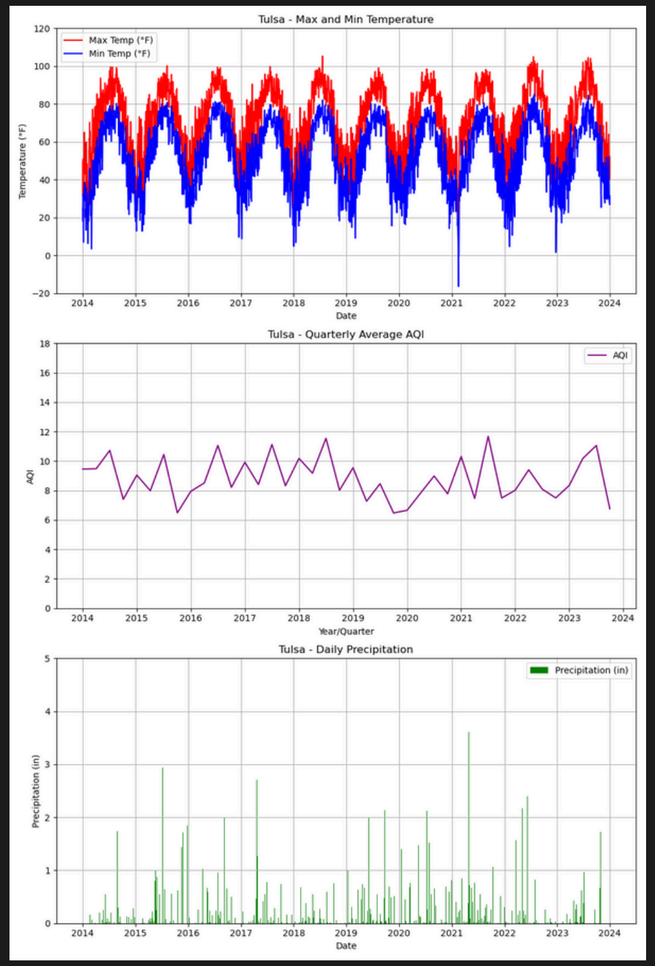
PROJECT ELYSIUM



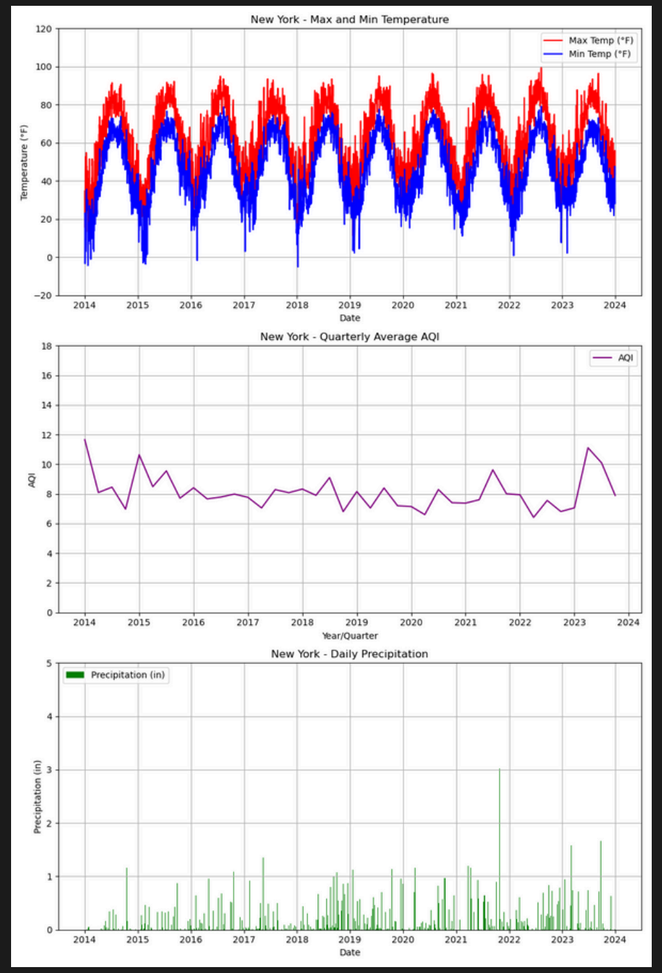


ARITHMETIC MEAN

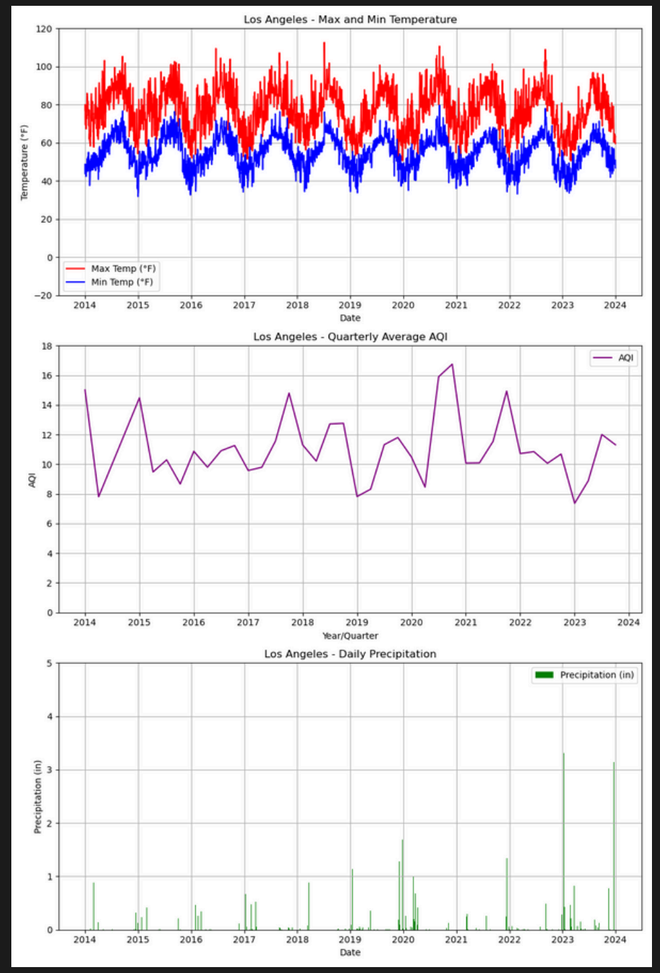
MAX + MIN TEMPERATERATURE



TULSA



NEW YORK



LOS ANGELES

Our Questions

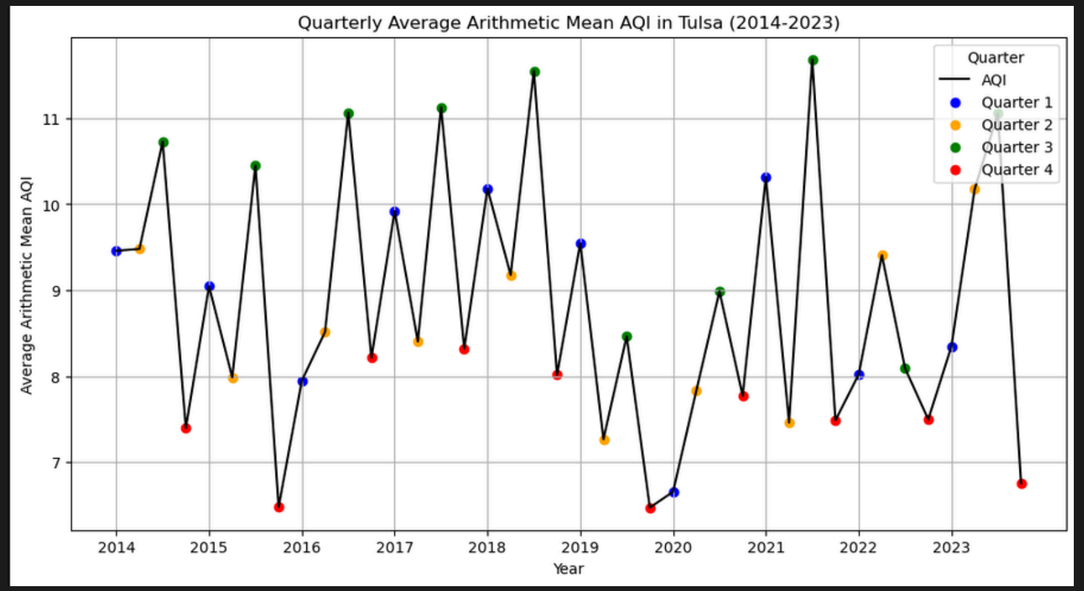
ERIC CLAYTON

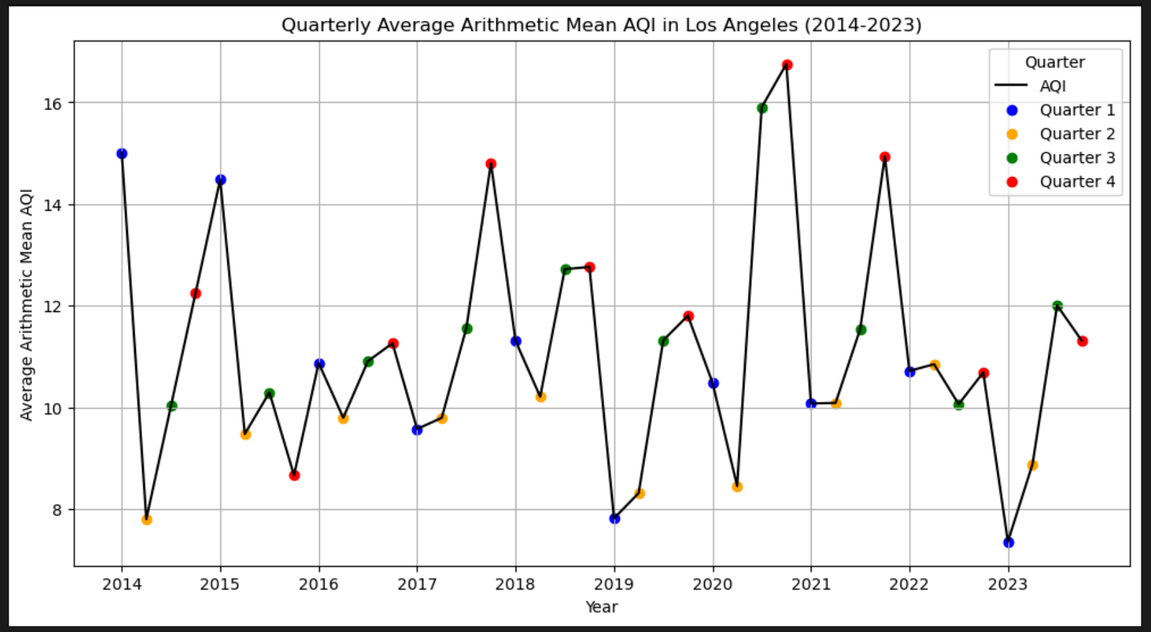
03

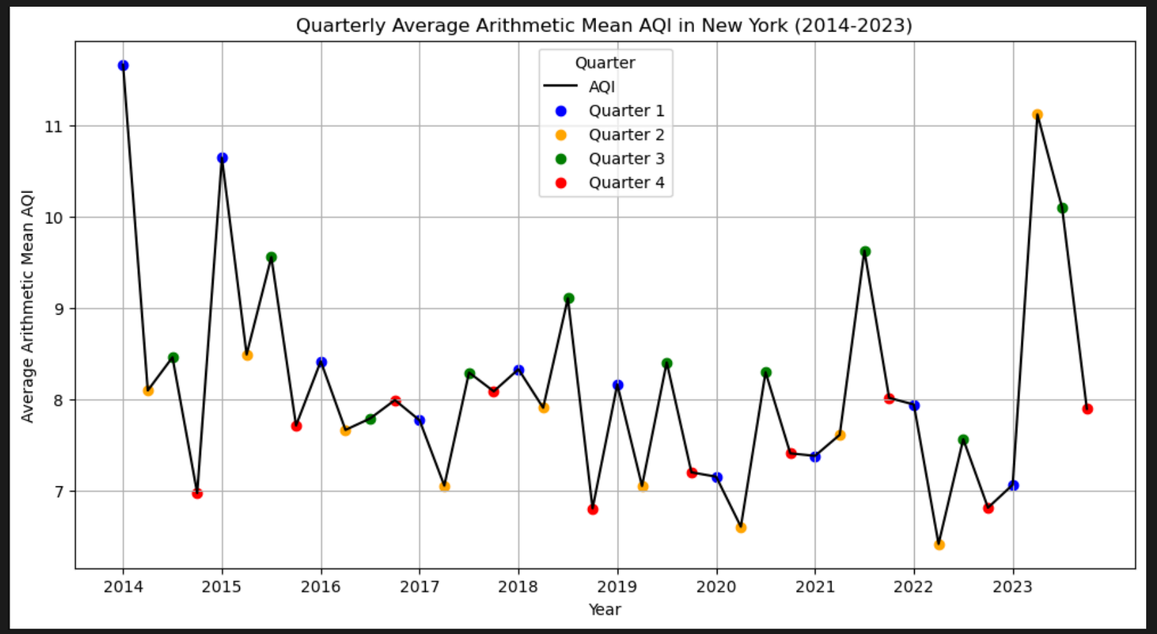
Based on quarterly and other trends in temperature, air quality, and precipitation from 2014 to 2024, what future challenges and opportunities might these cities face?

PROJECT ELYSIUM

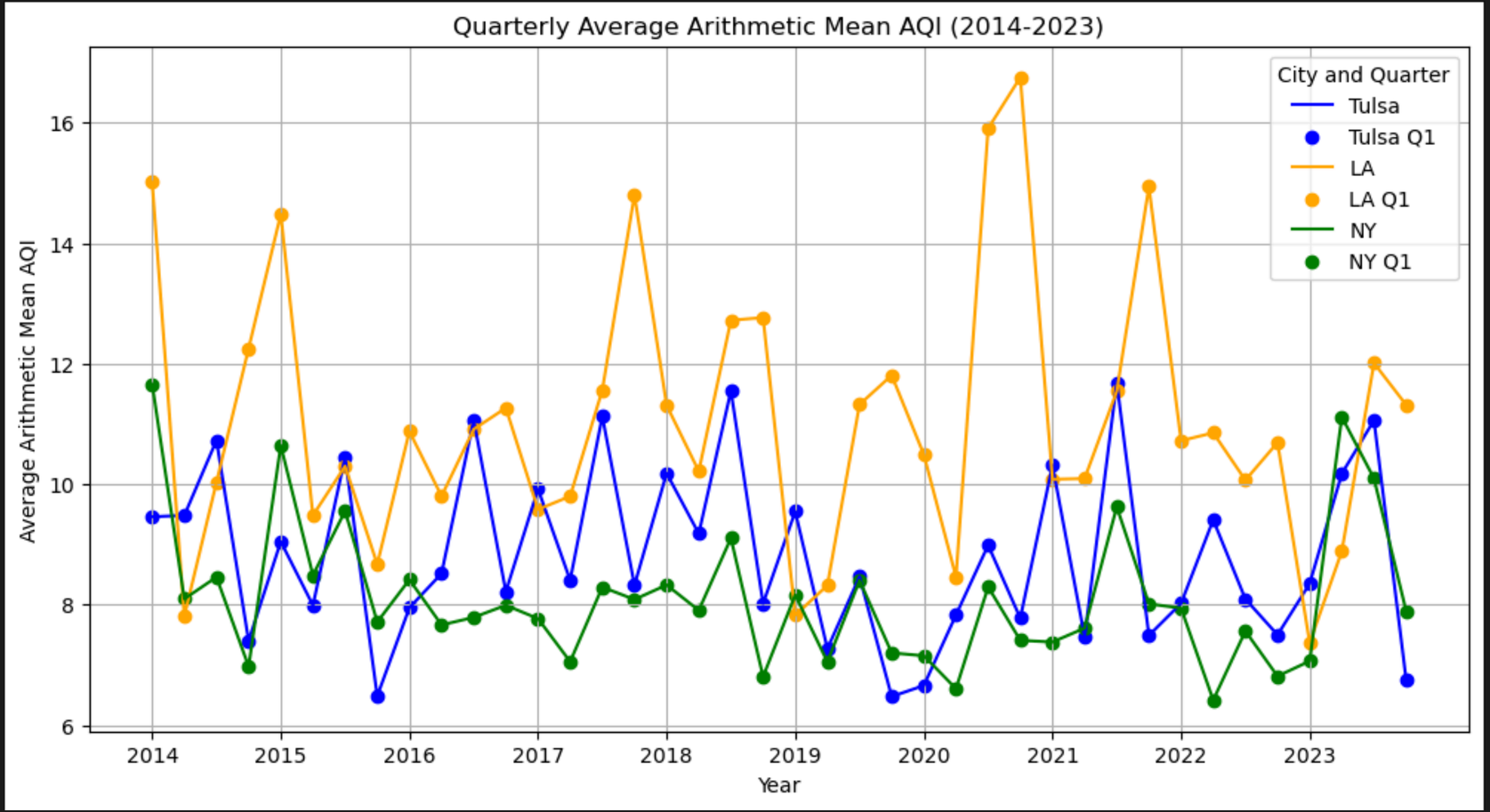
QUARTERLY AVG ARITHMETIC MEAN







QUARTERLY AVG ARITHMETIC MEAN



QUESTIONS?