NO2 observations from the Sentinel-5P TROPOMI – Turkey

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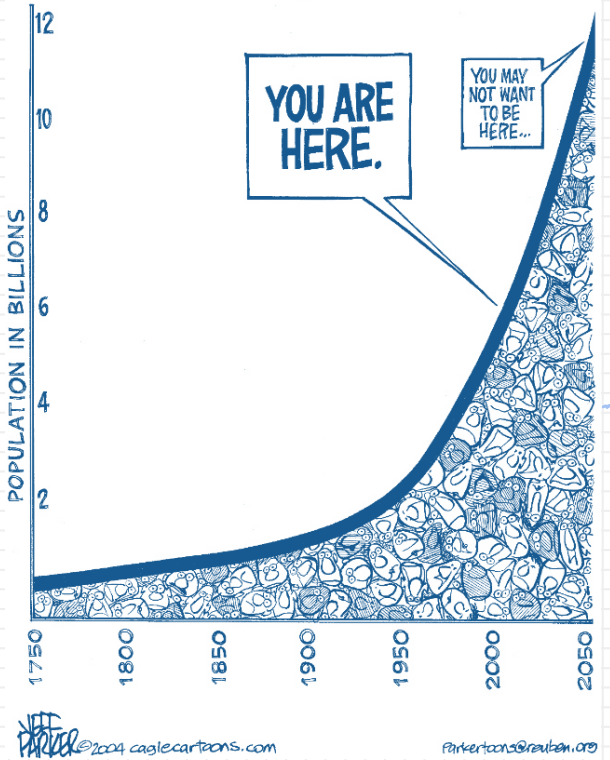
Introduction

Main causes of air pollution include:

- Increase of Urban Population
- Economic Development
- Urbanization
- Energy Consumption
- Transportation

Main causes air pollutants are:

- Sulfur Dioxide SO_2
- Nitrogen Dioxide NO_2
- Ozone O_3
- Carbon Monoxide CO
- Carbon Dioxide CO_2



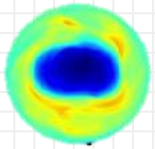
Aim of the Study

Sentinel-5p

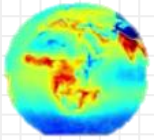
Global revisit time

0 24h

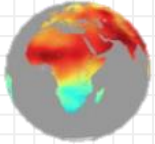
NO_2



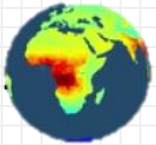
O_3



HCHO



CH_4

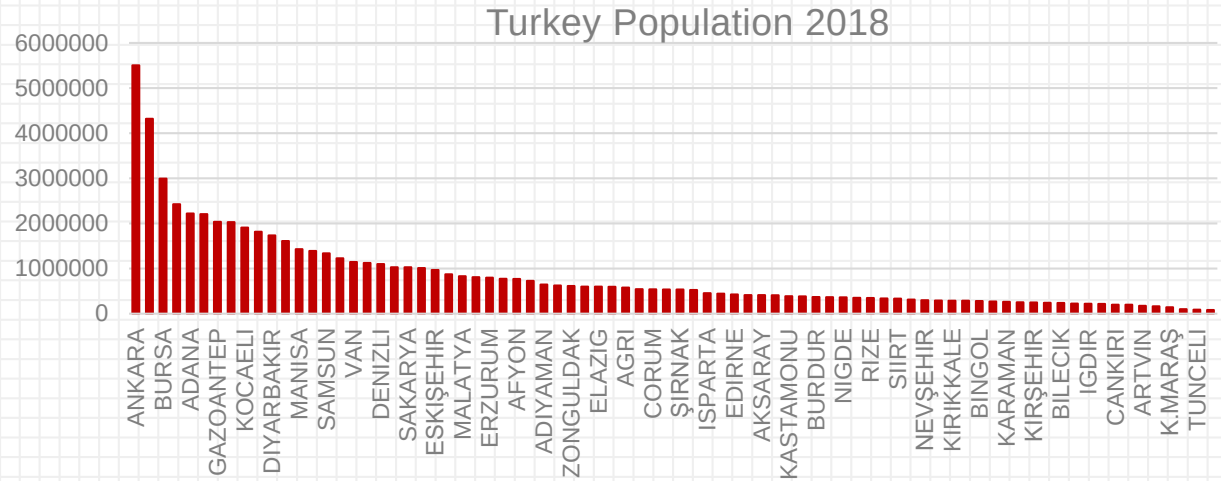


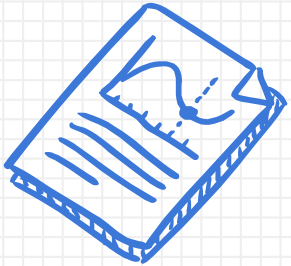
CO

SO_2

In this study, the relation between NO_2 from Sentinel-5p and population statistics have been investigated. Turkey has been selected as a study area.

Data & Methods



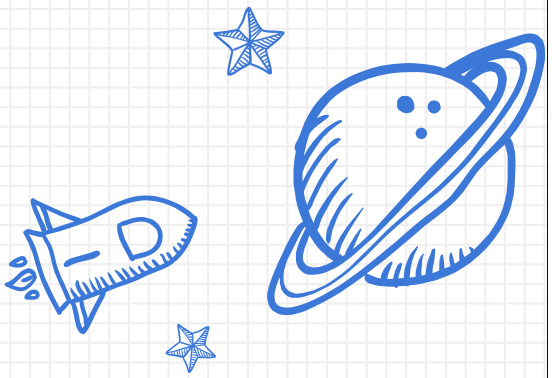


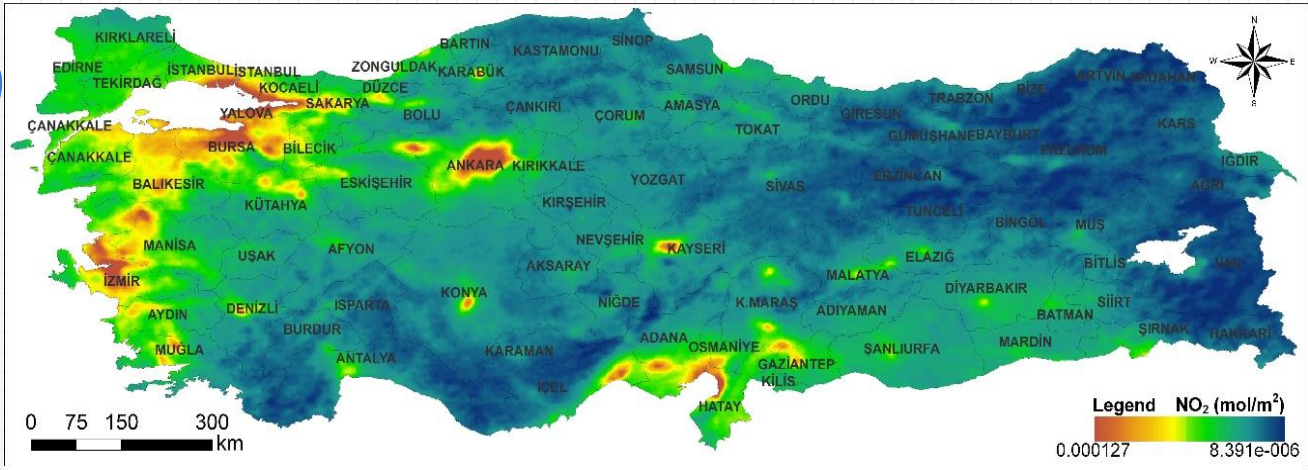
π

$\sqrt{2}$

$E = mc^2$

H_2O

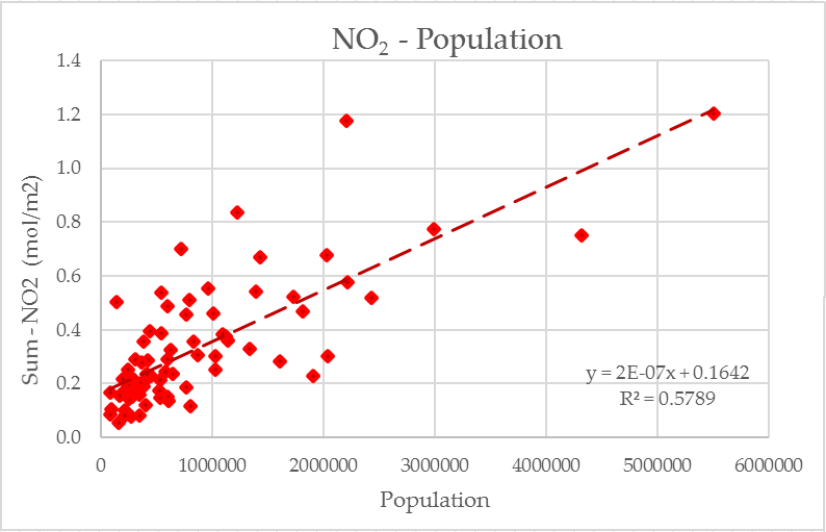




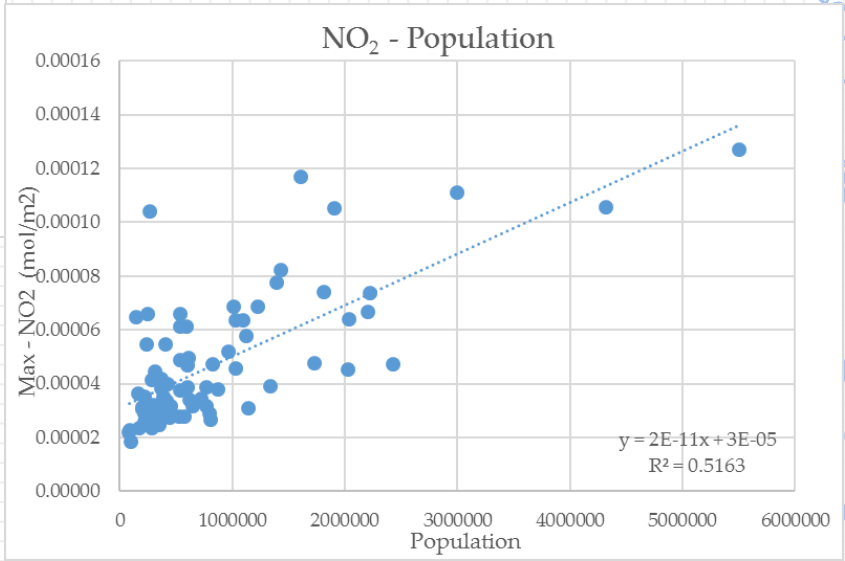
Data & Methods

- Using the Google Earth Engine tools, the average NO2 values over Turkey in the period of 10 July 2018 – 10 January 2019, were downloaded and statistically correlated with the population statistics for Turkey`s population from 2018.
- For all 81 provinces in Turkey, the minimum, maximum, mean, and sum of the NO2 values were extracted.
- Because of the specific geographical position of Istanbul, it has been excluded from the statistical analyses.

Results



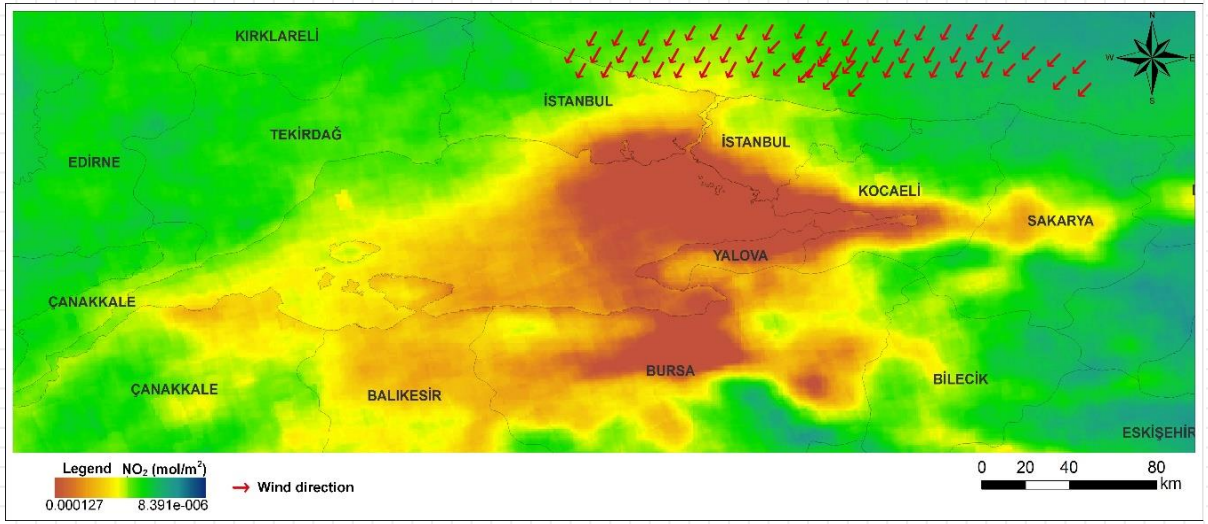
The correlation between the summary of the NO2 and the population statistics is r = 0.76.



The correlation between the maximum value of NO2 and the population is r = 0.72.

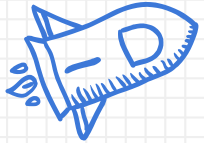
Results

Since Istanbul is surrounded from both north and south part with sea (Black Sea and Marmara Sea), the wind direction takes an important role in the air pollution and air quality. Thus, as shown in Ruso et al. [9], the average wind direction in the Black Sea and Marmara Sea region, is north-east south-west.



Discussion & Conclusion

- ✓ Due to urban structure of the mega city, Istanbul, the predominant wind direction in the city and the possible wind transport of pollutants to neighboring cities. Air pollutants from Istanbul are carried to north-east south-west wind directions over the Marmara Sea.
- ✓ The positive correlation between NO2 and population statistics was expected as more than 80% of the NO2 comes from motor vehicle exhaust.
- ✓ In comparison with other satellite remote sensing sensors for monitoring the air quality, Sentinel-5p has better spatial and spectral resolution, allowing the users to be able to observe smaller areas such as single cities



Thank you for your attention

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