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**CHAPMAN UNIVERSITY**  
Center for Undergraduate Excellence

## Dynamics of Atmospheric Pollution Along The U.S. Coast during 2003-2020

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### Introduction

This study measures the trends and variability of atmospheric pollution along the U.S. Coast from 2003-2020. The atmospheric parameters included in this study were aerosol optical depth, the total ozone column, carbon monoxide, air temperature & the Angstrom Exponent. Ground data such as PM 2.5 & PM 10 were also considered. All data was collected using satellite data from NASA Giovanni, NASA AIRS, MODIS, & TERA.

### Methods

Data was taken using bounding box feature on NASA Giovanni, and each measuring 1°x1°. Each box containing a set of monthly data from 2003 to 2020. All satellite data was measured at 700 hPa. Using Microsoft Excel Data sets were then plotted to conclude trends and patterns on each coast. The figure below indicates how each coast was organized for data analysis.

### Variability of Aerosol Optical Depth & the Angstrom Exponent

**Figure 2:** West Coast experiences the Highest level of Aerosol Optical Depth since 2003 during Sept, 2020. Main source of AOD came from high quantities of forest fires.

### Variability of Carbon Monoxide

**Figure 4:** Overall declining trend of carbon monoxide from 2003-2020. This pattern is consistent on all coasts.

### Variability of Air Temperature

**Figure 1:** Seasonal trend of air temperature along the west coast. Data indicates an increase in atmospheric temperature by 1° kelvin along all coasts

### Variability of the Total Ozone Column and Air Temperature

**Figure 3:** Overall declining trend of 6 to 10% along the East Coast for the Total Ozone Column.

### Variability of Methane

**Figure 5:** Overall increase in methane levels of up to 5% along the West coast.

### Highlights

- ❖ Overall decreasing trend of the total ozone column of 3 to 10 % along the west, gulf, and east coast.
- ❖ Consistent decrease of carbon monoxide along the west, gulf, and east coast since 2003
- ❖ Increasing trend of AOD along the west coast of up to 60%.
- ❖ General decreasing trend in the angstrom exponent of up to 20% along the coasts.

### Acknowledgements

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*My research measured the trends and variability of atmospheric pollution along the U.S. coast from 2003-2020 using satellite data. This study also included the correlations between pollutants and their effects on public health.*

Alternate Text:

Jason Diaz

Quote: "My research measured the trends and variability of atmospheric pollution along the U. S. coast from 2003-2020 using satellite data. This study also included the correlations between pollutants and their effects on public health."

Image of Jason Diaz

Image of text and graphic laden project presentation entitled "Dynamics of Atmospheric Pollution Along the U. S. Coast During 2003-2020. J. Diaz, R.P. Singh"