Climate Study for the United States

Team 10

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GitHub: https://github.com/WFighter909/ECE-143-Group-10

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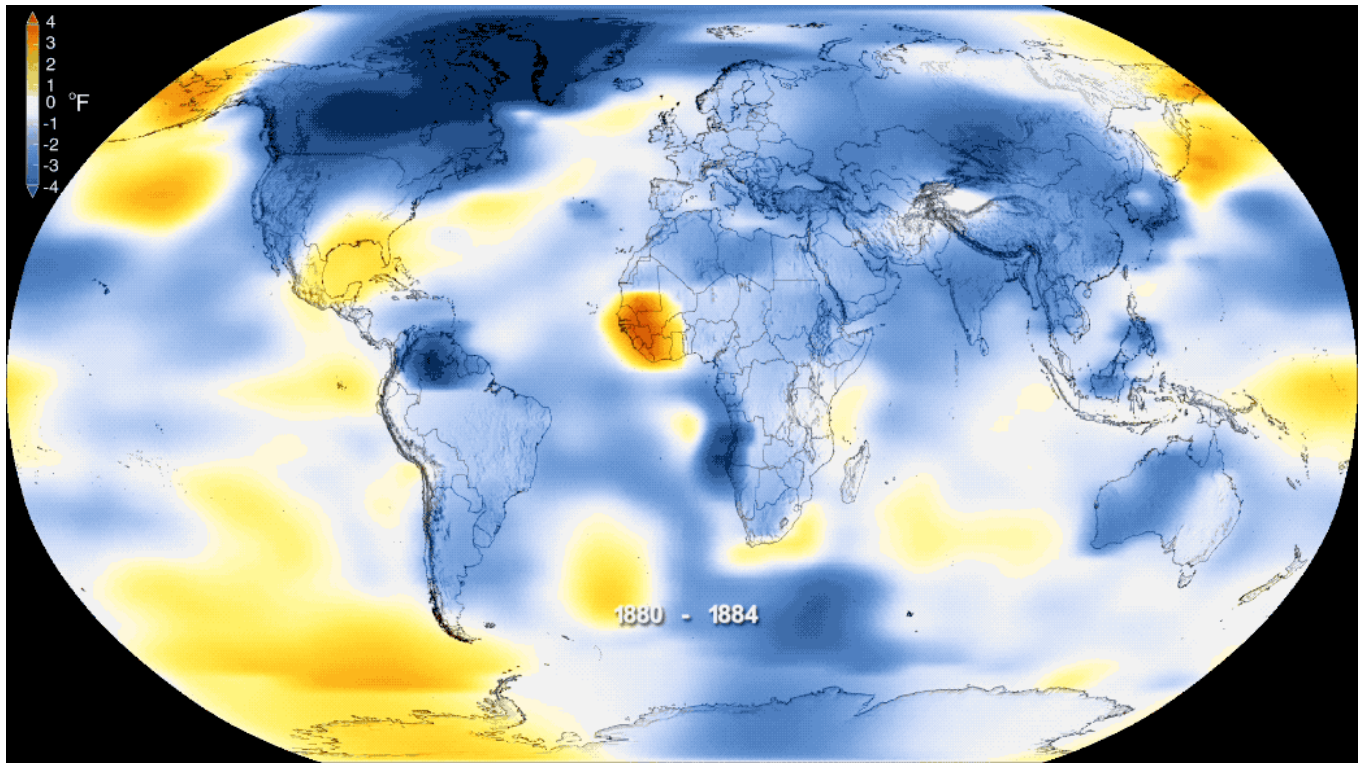
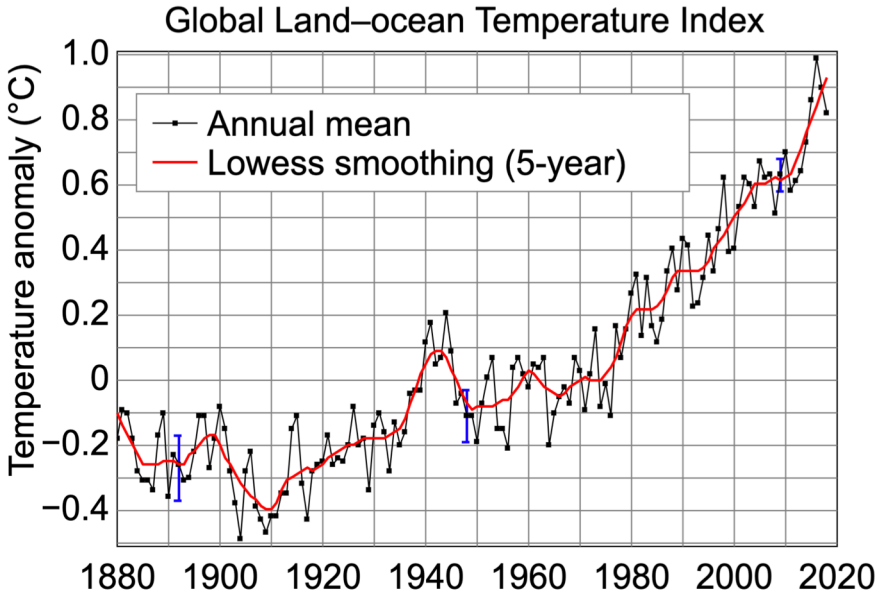
Introduction

Climate Change in Recent Years



https://climate.nasa.gov/news/2876/new-studies-increase-confidence-in-nasas-measure-of-earths-temperature/



The Phenomenon of Climate Change:

- **Global Warming**
- **Forest Degradation**
- **Desertification**

Proposals & Goals

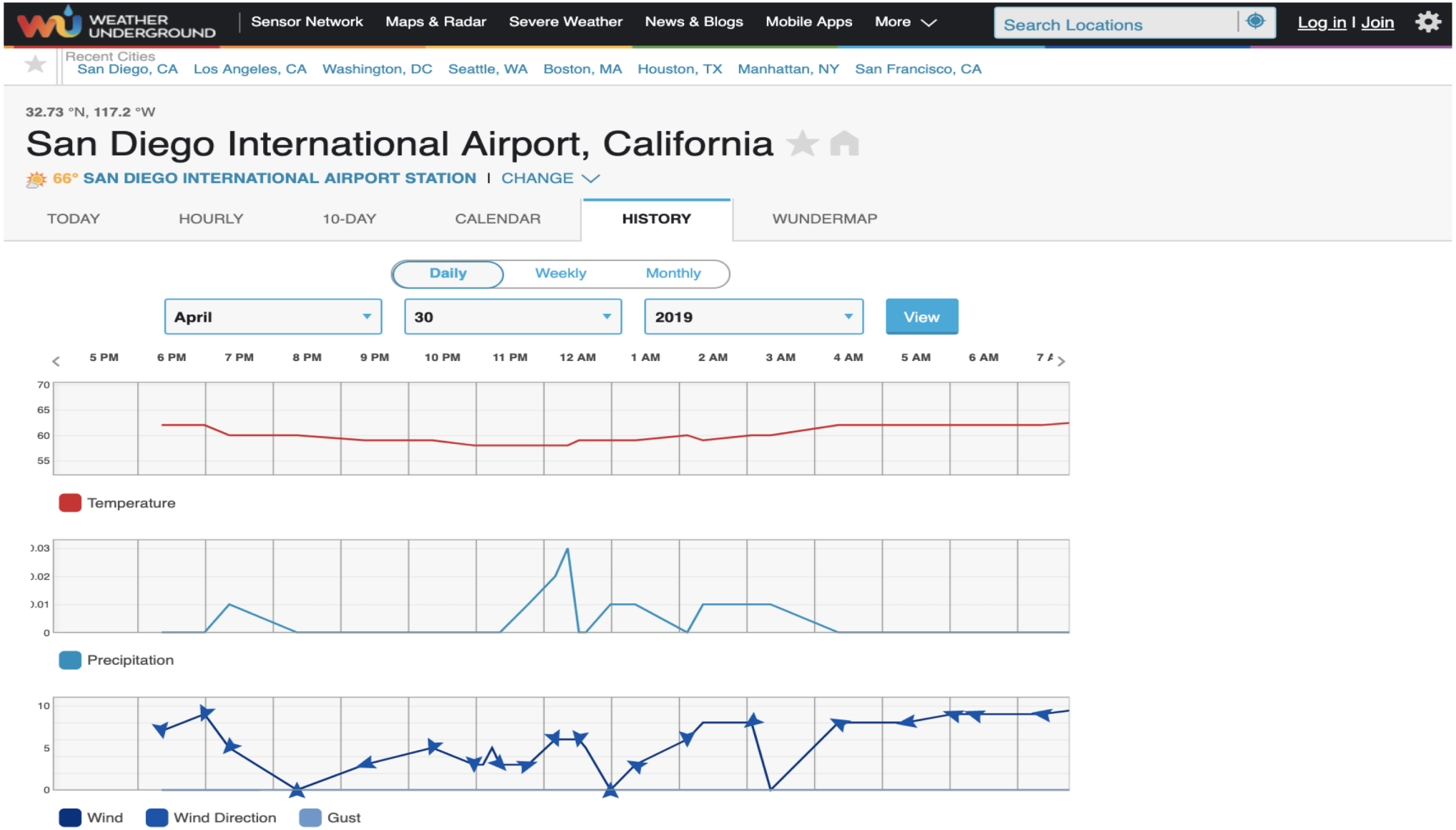
- **To explore the trends of climate change in some cities in the United States by visualizing weather data over the past few decades.**

- **To study the relationship between the geographical position and climatic conditions.**

- **Take a deep-dive into San Diego's weather.**

Data Collection and Preprocessing

Weather Underground



Data Summary

Temperature (° F)	Actual	Historic Avg.	Record
High Temp	65	68	94
Low Temp	58	58	46
Day Average Temp	62	63	-

Precipitation (Inches)	Actual	Historic Avg.	Record
Precipitation	0.07	0.01	0.88
Month to Date	0.16	0.78	-
Year to Date	7.61	6.84	-

Degree Days (° F)	Actual	Historic Avg.	Record
Heating Degree Days	3	3	-
HDD Month to Date	33	113	-
HDD Since July 1	781	1149	-
Cooling Degree Days	0	1	-
CDD Month to Date	18	14	-
CDD Year to Date	22	24	-
Growing Degree Days	10	-	-

Dew Point (° F)	Actual	Historic Avg.	Record
Dew Point	54	-	-
High	57	-	-
Low	50	-	-
Average	54	-	-

Wind (MPH)	Actual	Historic Avg.	Record
Max Wind Speed	15	-	-
Visibility	10	-	-

Sea Level Pressure (Hg)	Actual	Historic Avg.	Record
Sea Level Pressure	30.05	-	-

Astronomy	Day Length	Rise	Set
Actual Time	13h 26m	6:04 AM	7:30 PM
Civil Twilight		5:37 AM	7:56 PM
Nautical Twilight		5:06 AM	8:27 PM
Astronomical Twilight		4:33 AM	9:00 PM
Moon: waning crescent		4:03 AM	3:43 PM

Data Selected

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weather icon

Data Cleaning

- missing_values = ["n/a", "na", "--", None, 'None']

- use forward-fill to fill the missing values:

  pandas.DataFrame.fillna(method="ffill", inplace=True)

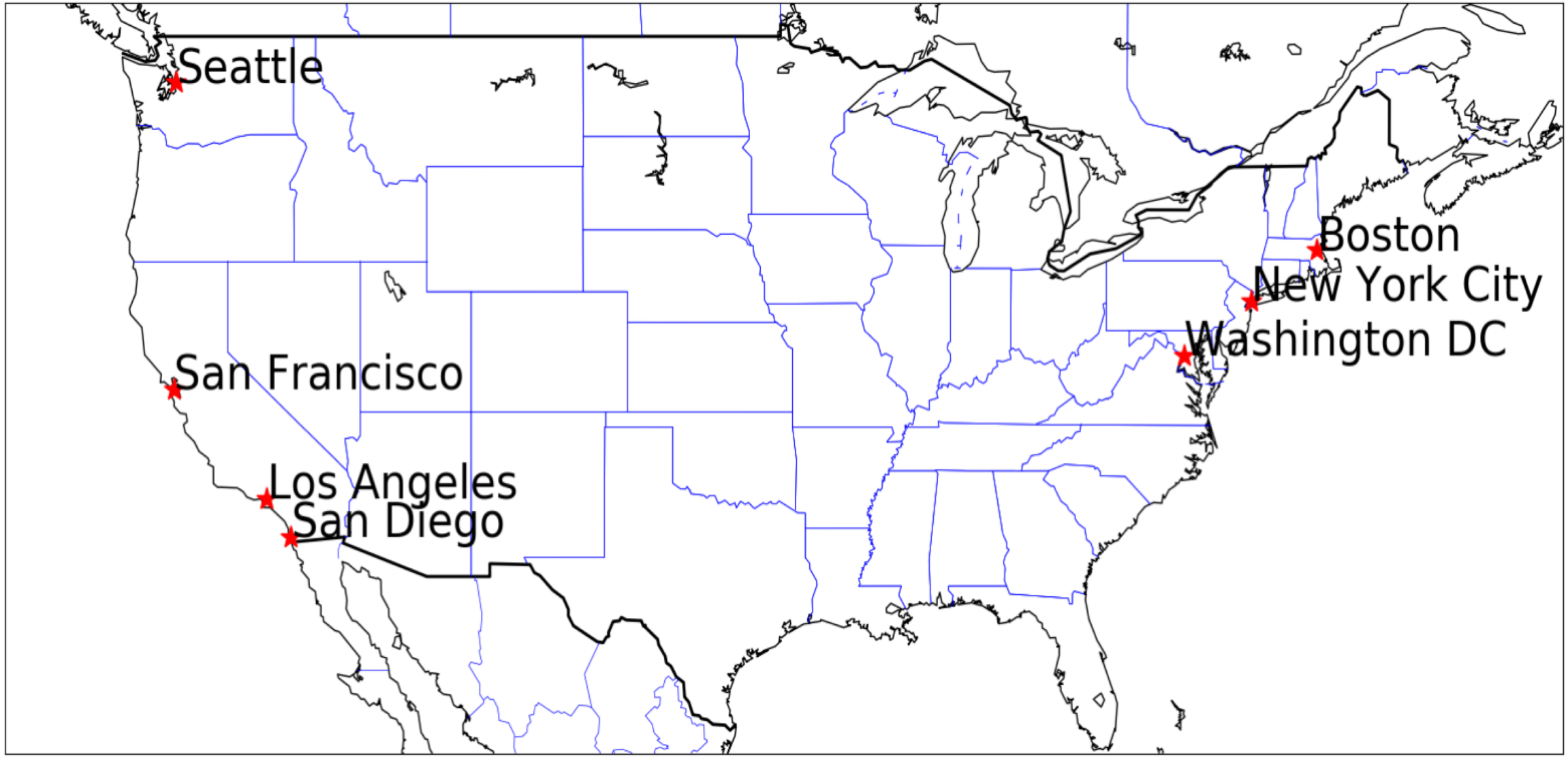
date	temperature	precip
19900101	54	0
19900102	55	0.42
19900103	53	0
19900104	None	0
19900105	None	None
19900106	None	0
19900107	54	0
19900108	56	0
19900109	60	None
19900110	58	0
19900111	60	0

date	temperature	precip
19900101	54	0
19900102	55	0.42
19900103	53	0
19900104	53	0
19900105	53	0
19900106	53	0
19900107	54	0
19900108	56	0
19900109	60	0
19900110	58	0
19900111	60	0

Data - City Code Reference

City Name	City Code	Address
San Diego	KSAN	San Diego International Airport, California
San Francisco	KSFO	San Francisco International Airport, California
New York City	KLGA	LaGuardia Airport, New York
Boston	KBOS	Gen. Edward Lawrence Logan International Airport, Massachusetts
Seattle	KSEA	Seattle-Tacoma International Airport, Washington
Washington DC	KDCA	Ronald Reagan Washington National Airport, Virginia
Los Angeles	KBUR	Bob Hope Airport, California

The Distribution of Selected Cities



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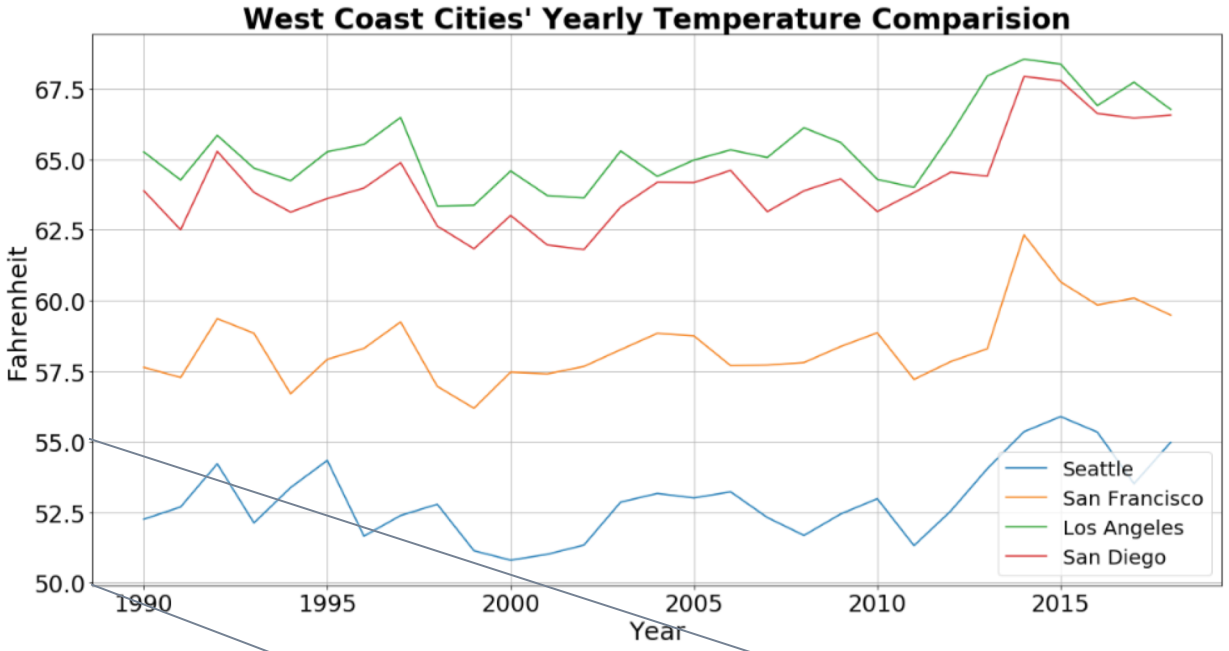
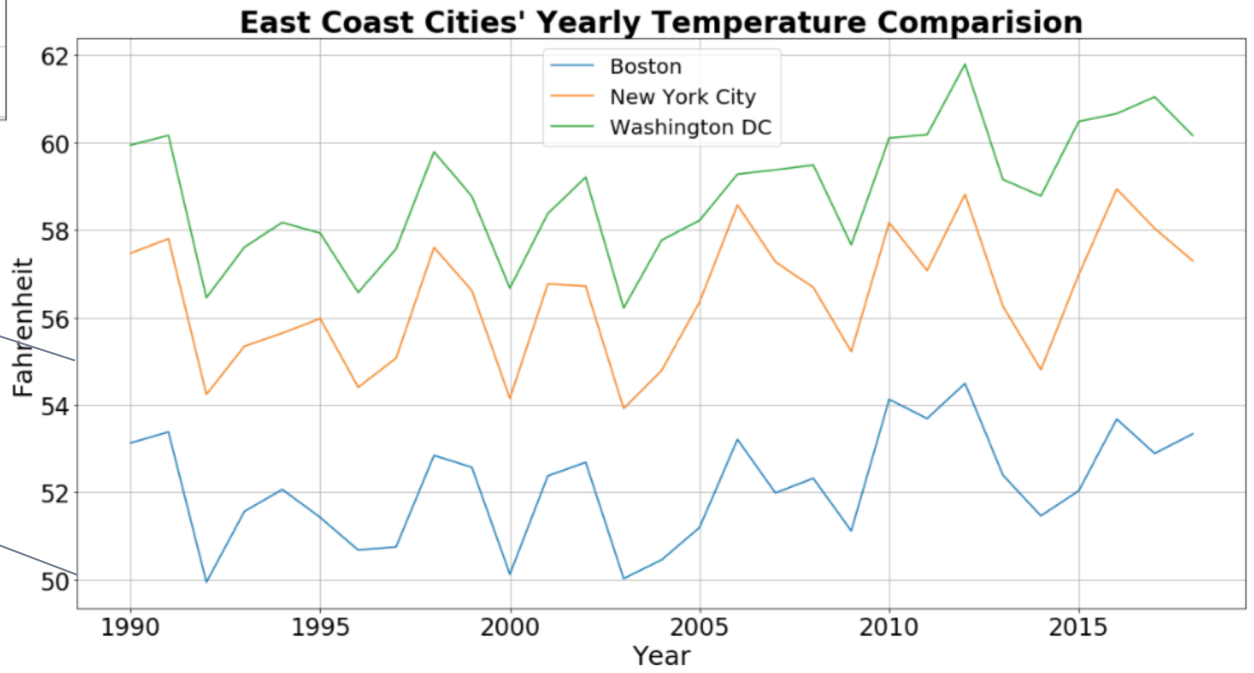
Comparison between West and East Coast

Average Temperature Comparison -- Year wise

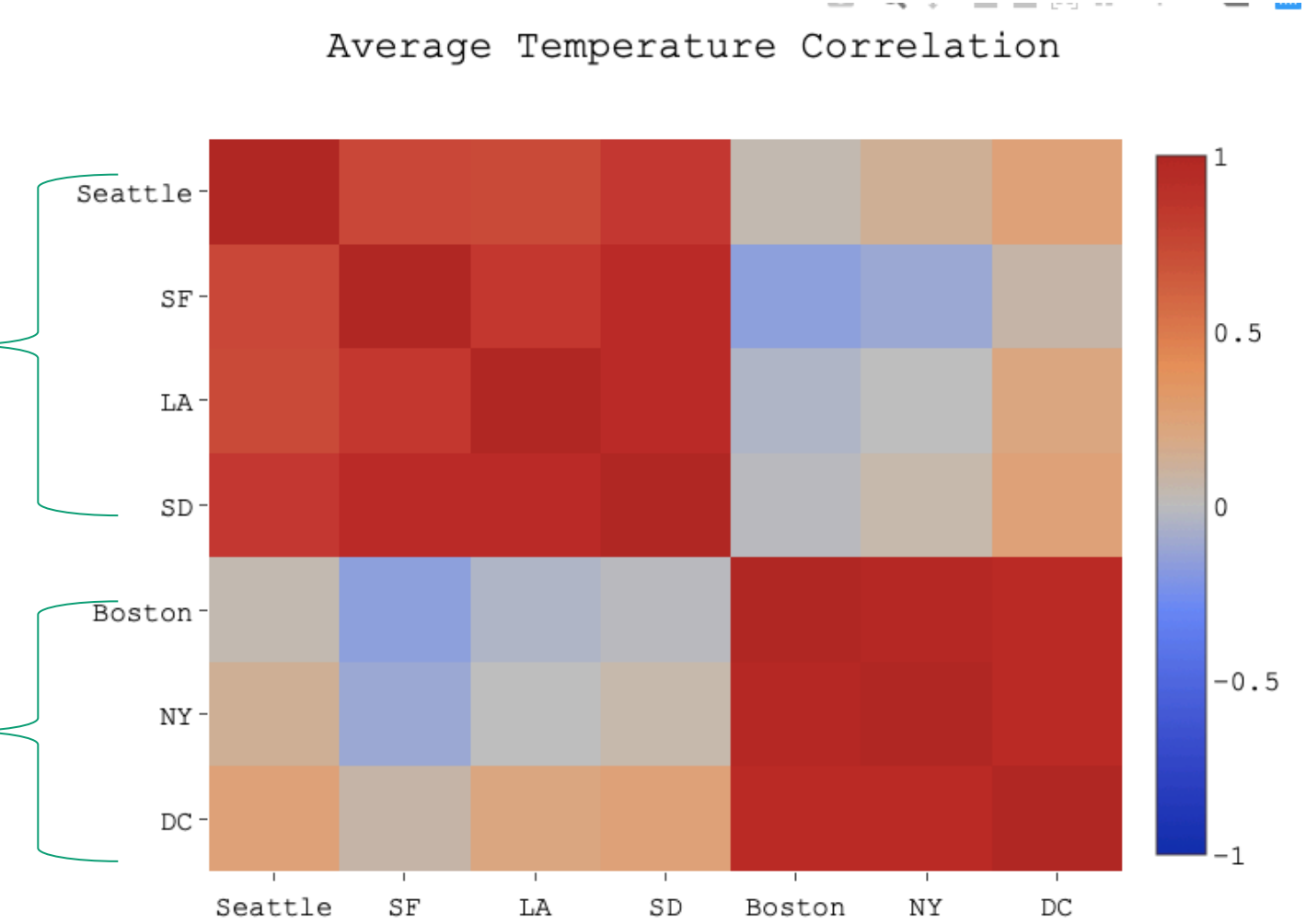




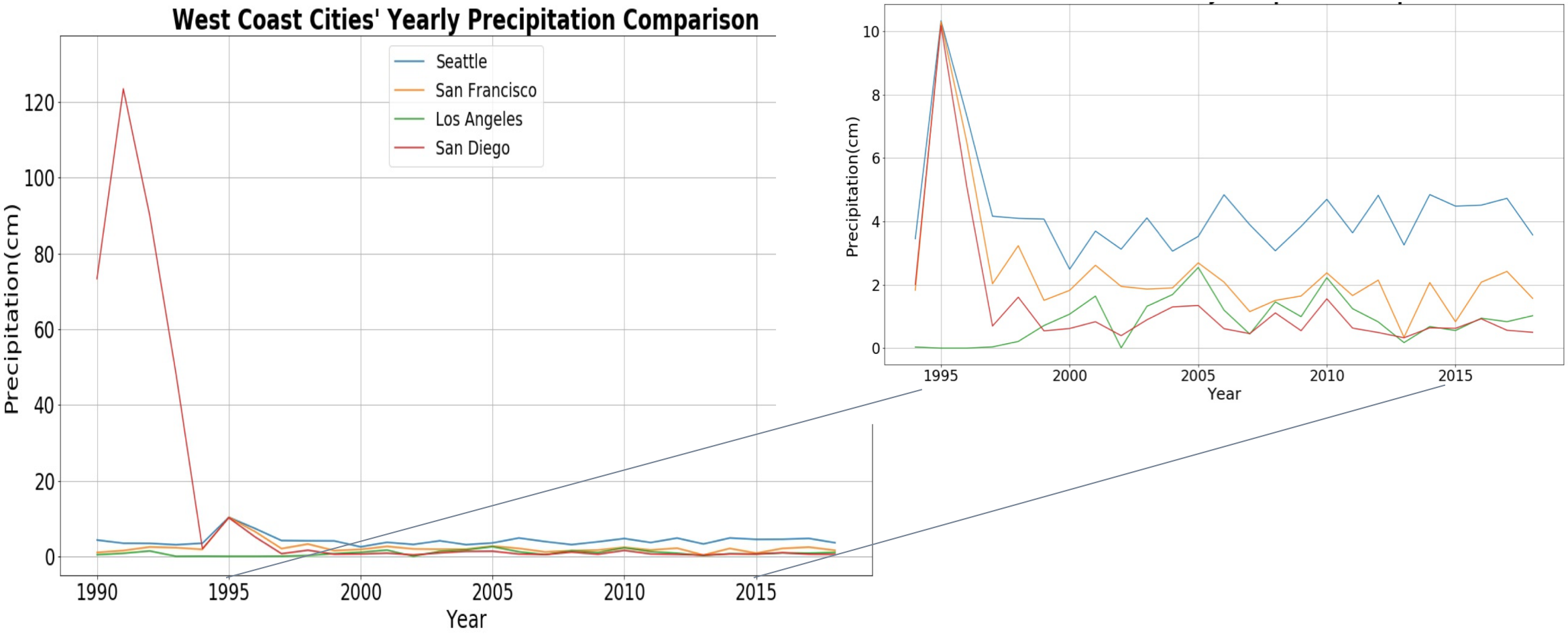
Average Temperature Correlation

West Coast Cities

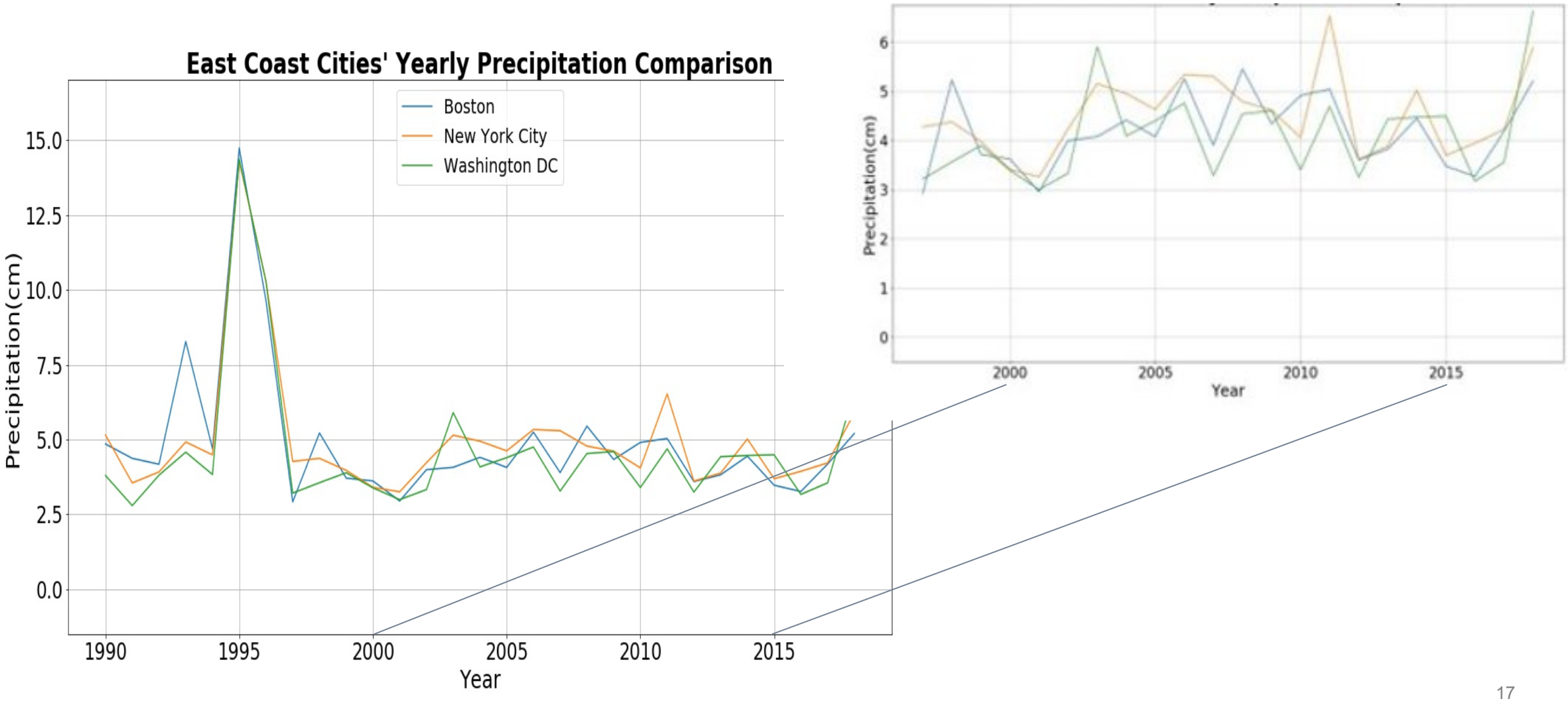
East Coast Cities



Average Precipitation West Coast

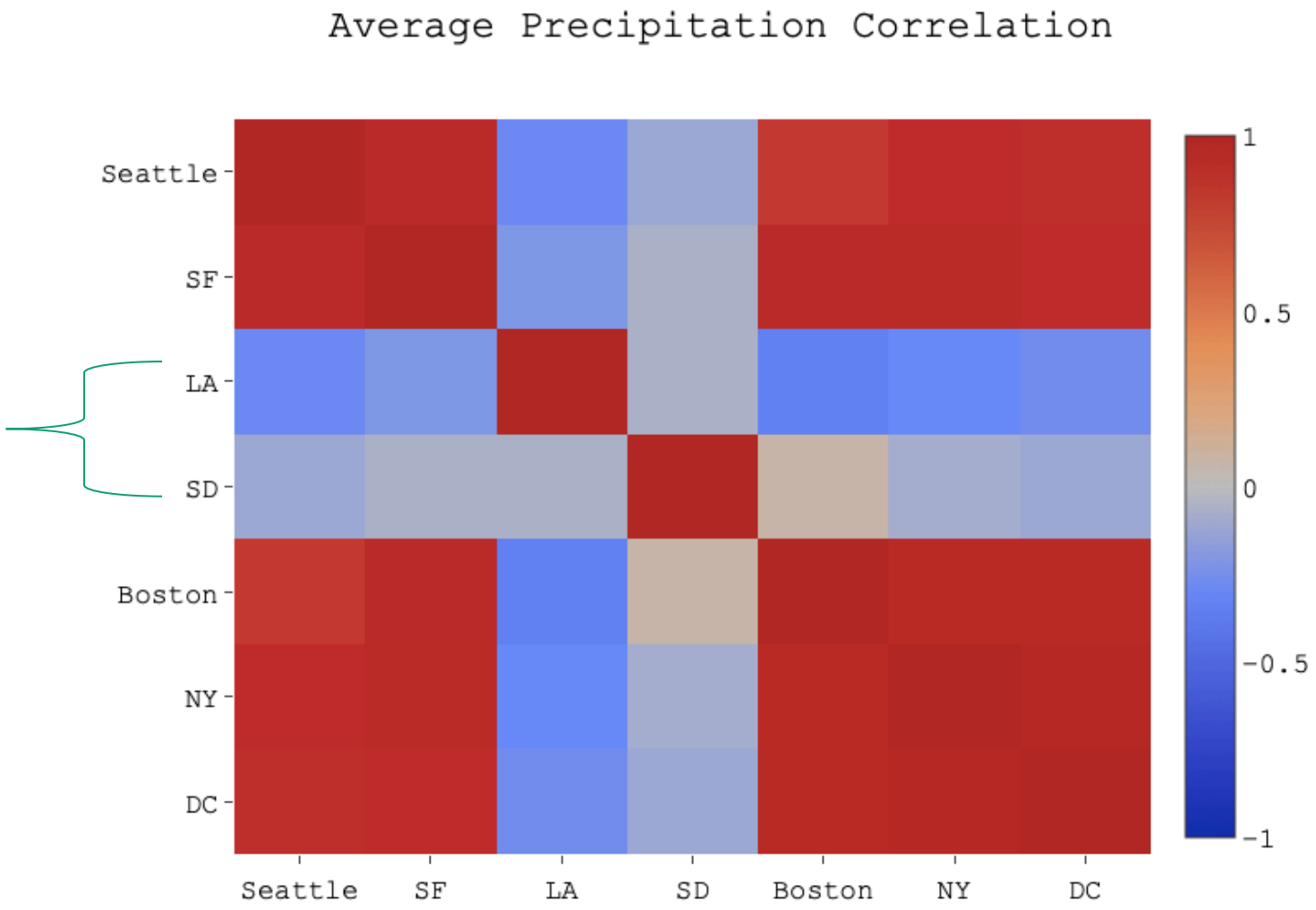


Average Precipitation East Coast



Average Precipitation Correlation

Arid Conditions



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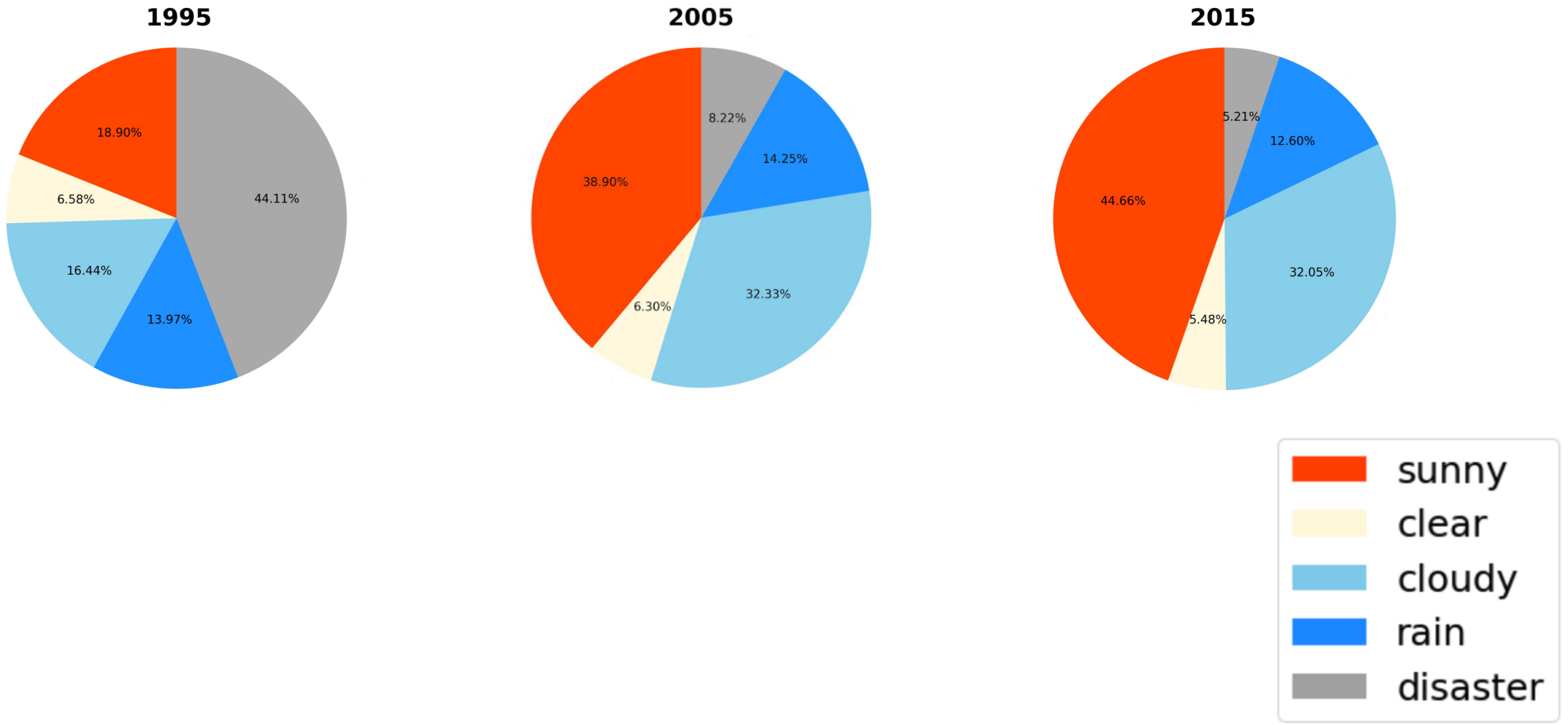
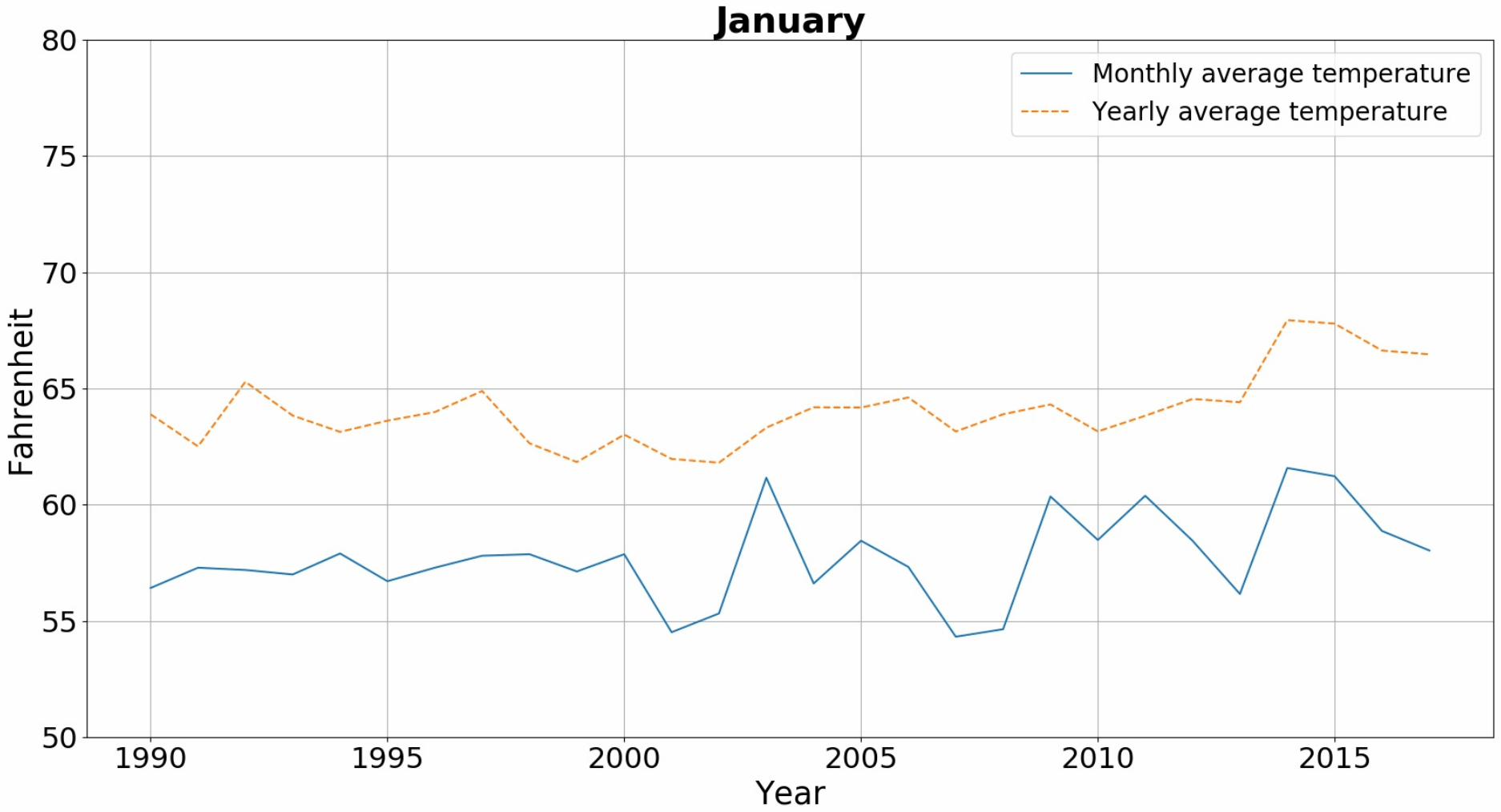
Weather Analysis for San Diego

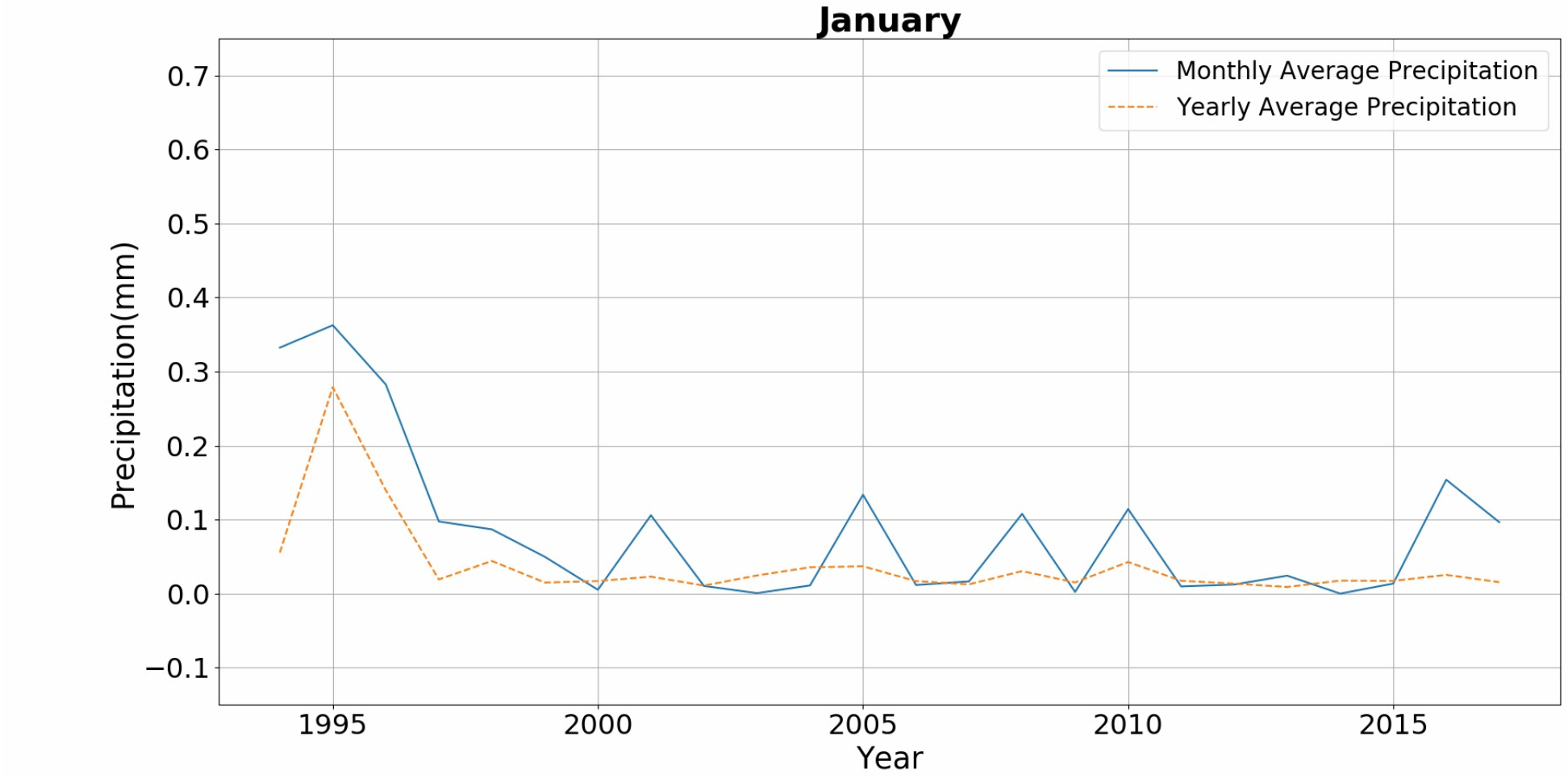
Weather of San Diego



Average Temperature (San Diego, 1990 - 2018)



Average Precipitation in San Diego (1990 - 2018)



Conclusions

- **Average temperature correlates well with longitude; has gone slightly up in the past few years**

- **Average precipitation does not show any apparent trend**

- **The precipitation in San Diego is relatively small, mostly in the autumn and winter seasons.**

- **As seen, San Diego is a city with moderate temperatures, mostly sunny days and less precipitation.**

Evaluations and Applications

Evaluations and Applications

- **Since we didn’t have access to the comprehensive weather data prior to 1990, we were not able to make any comment on climate change in general.**

- **This project can be used to get an overall picture of the weather conditions of a city, just by plugging in the city code.**

Thanks!