Introduction to Data Visualization with Matplotlib

INTRODUCTION TO DATA VISUALIZATION WITH MATPLOTLIB

Ariel Rokem
Data Scientist

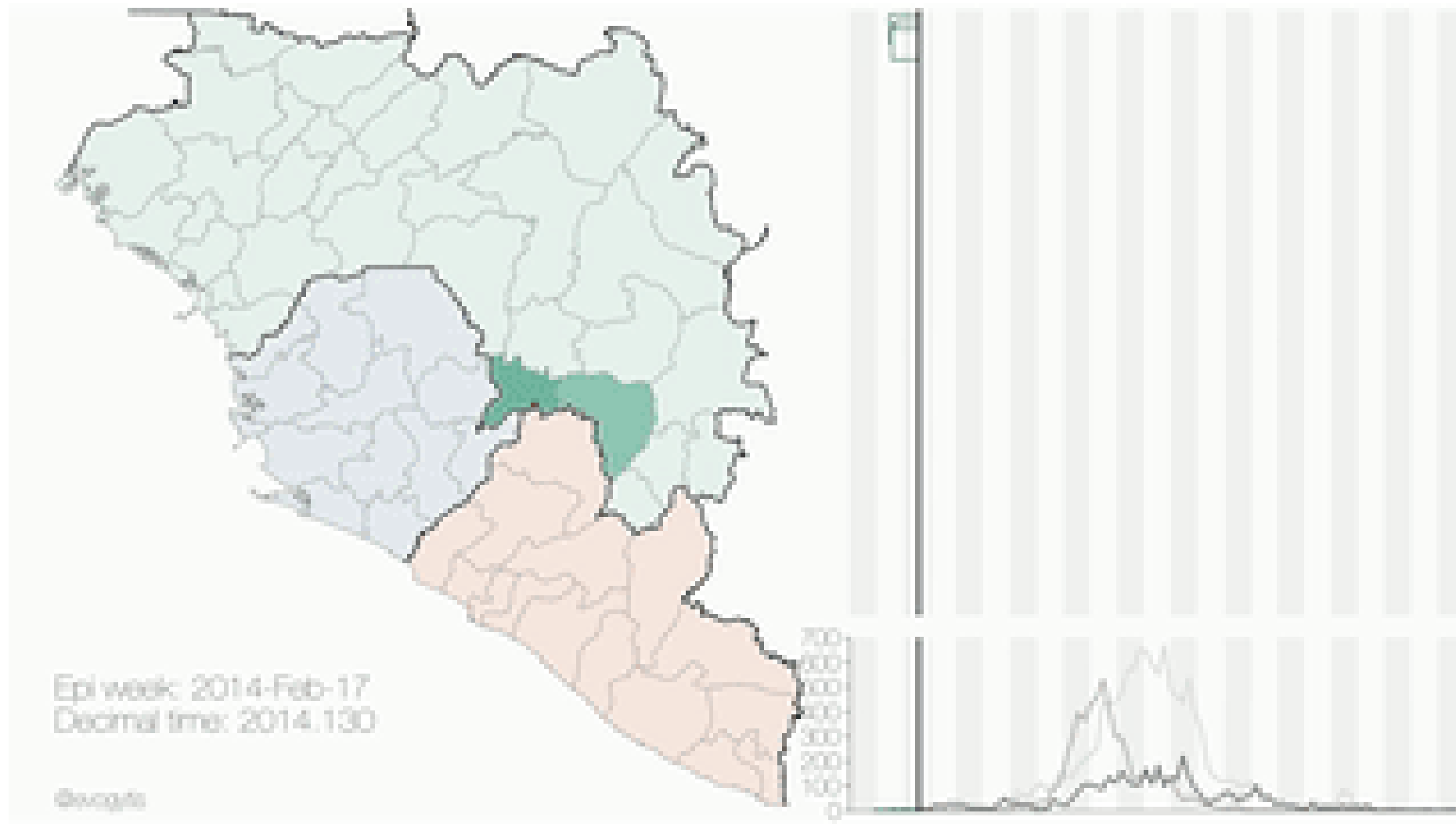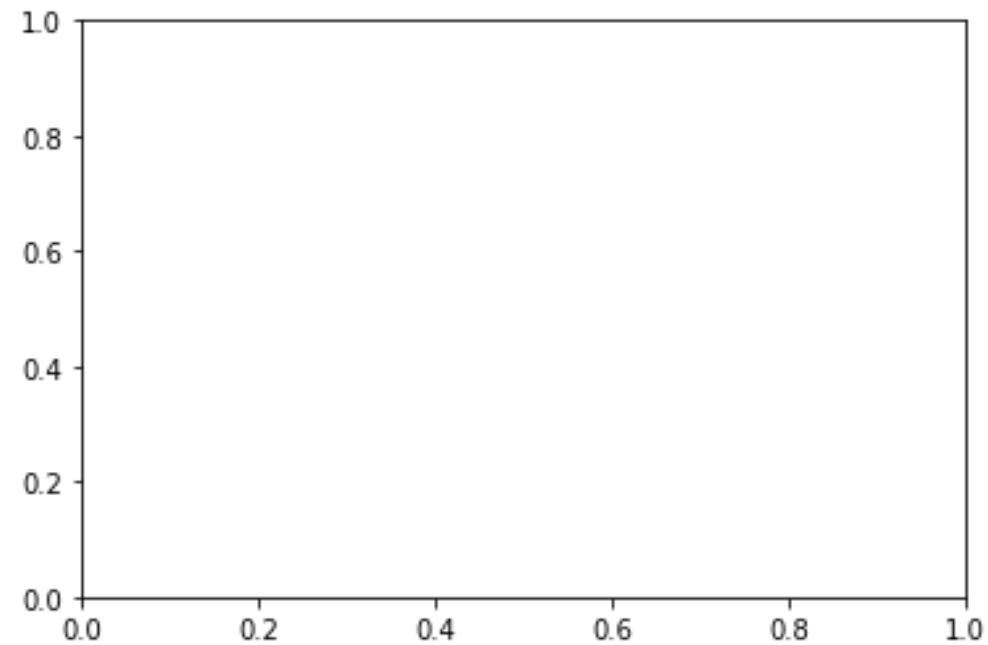# Data visualization

Image credit: **Gytis Dudas** and **Andrew Rambaut**

Introducing the pyplot interface

```python
import matplotlib.pyplot as plt
fig, ax = plt.subplots()
plt.show()
```

Adding data to axes
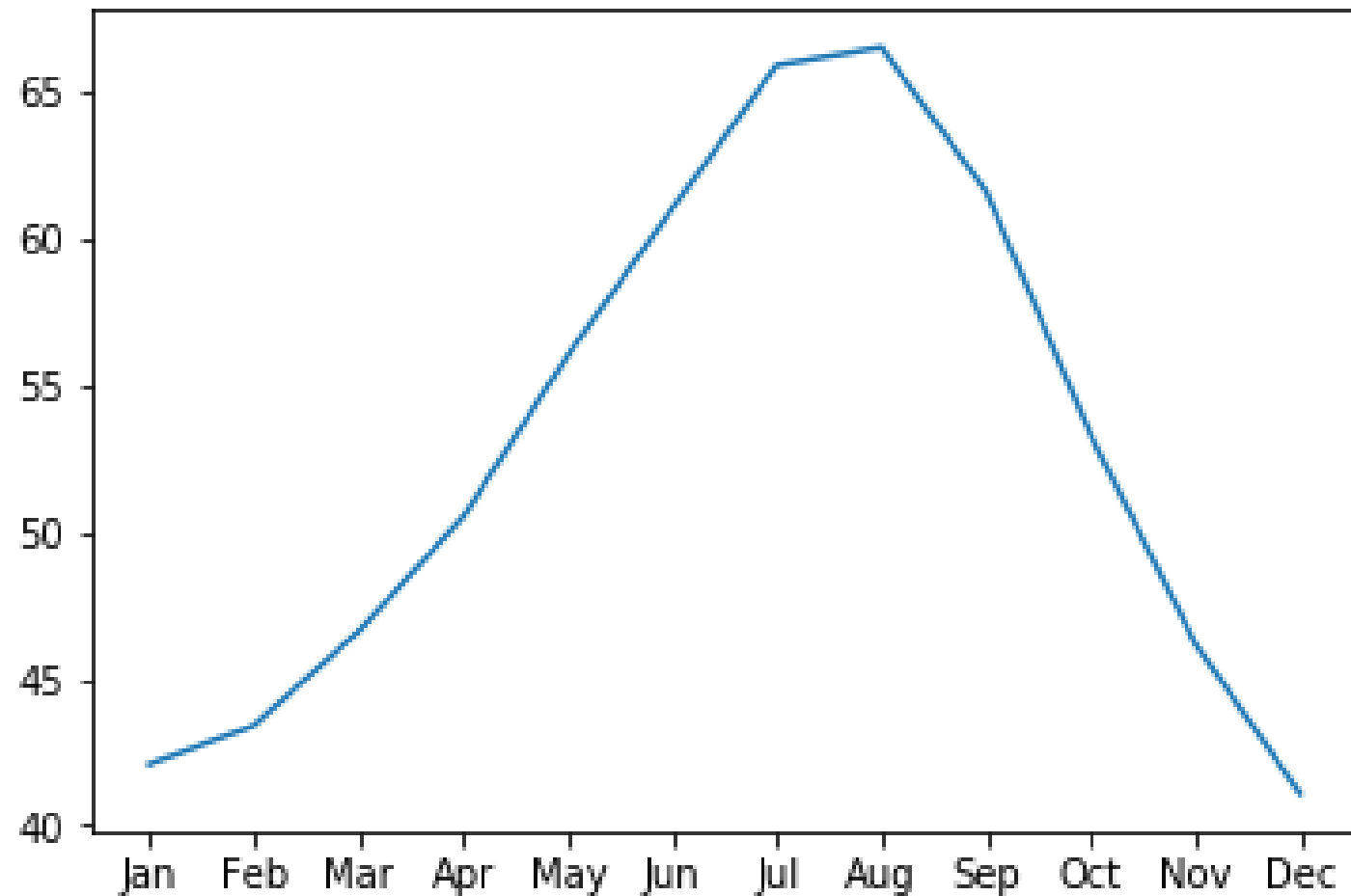
```
DATE
1      Jan
2      Feb
3      Mar
4      Apr
5      May
6      Jun
7      Jul
8      Aug
9      Sep
10     Oct
11     Nov
12     Dec
Name: MONTH, dtype: object
```

```
1       42.1
2       43.4
3       46.6
4       50.5
5       56.0
6       61.0
7       65.9
8       66.5
9       61.6
10      53.3
11      46.2
12      41.1
Name: MLY-TAVG-NORMAL, dtype: float64
```
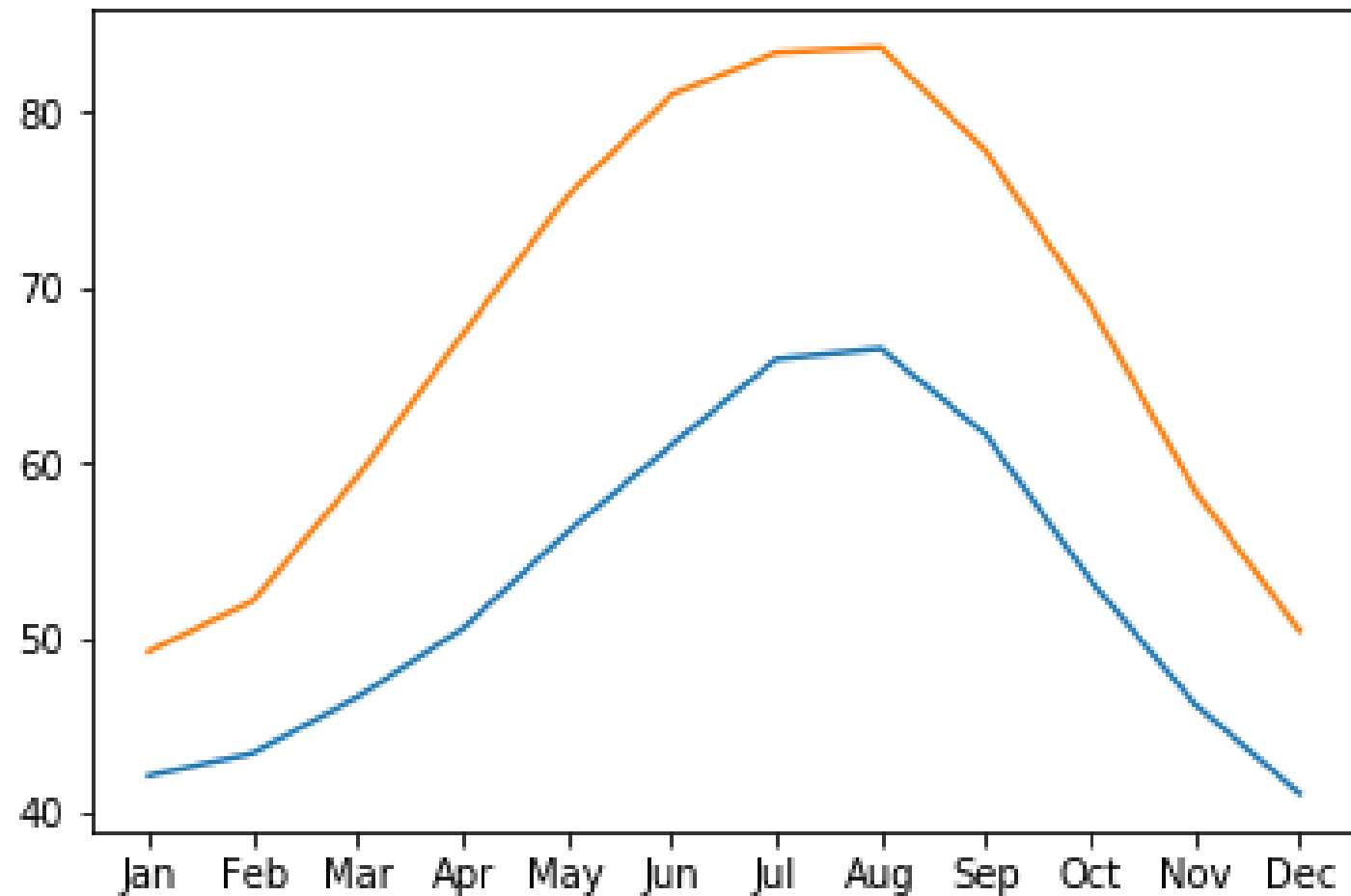
Adding data to axes

```
ax.plot(seattle_weather["MONTH"], seattle_weather["MLY-TAVG-NORMAL"])
plt.show()
```
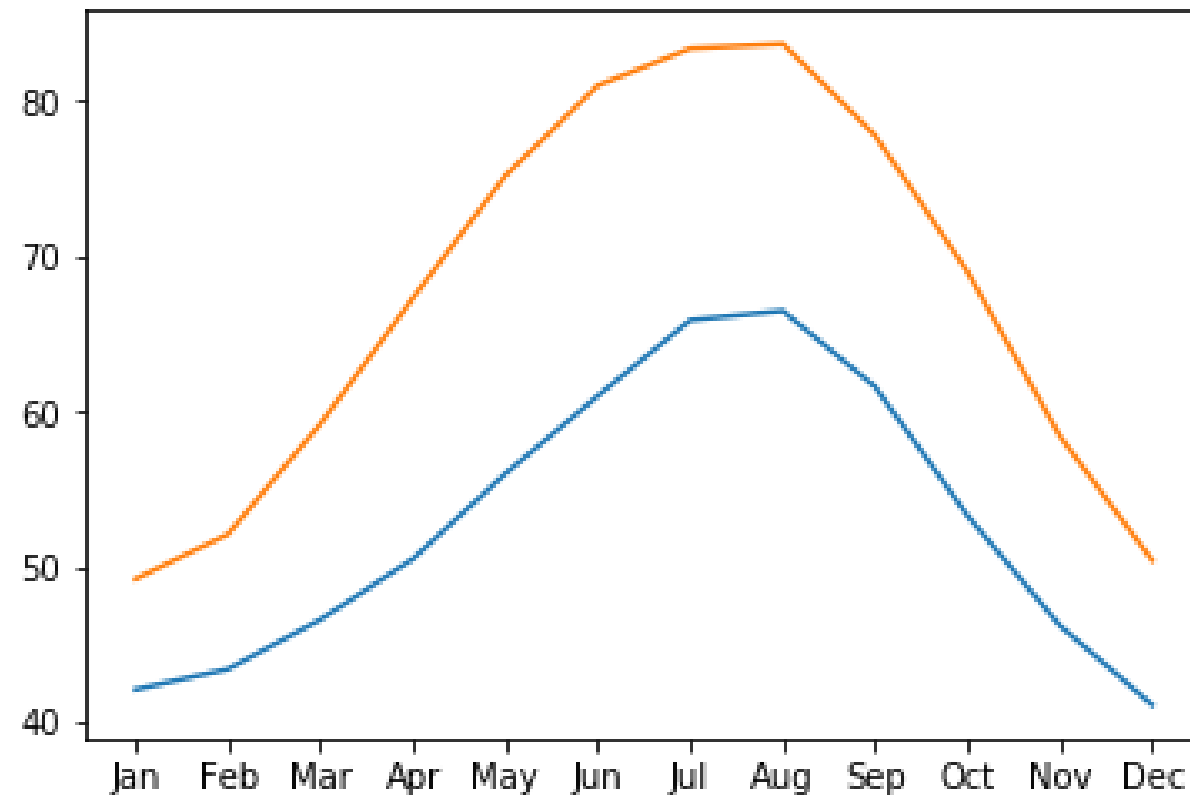
Adding more data

```
ax.plot(austin_weather["MONTH"], austin_weather["MLY-TAVG-NORMAL"])
plt.show()
```

Putting it all together

```
fig, ax = plt.subplots()
ax.plot(seattle_weather["MONTH"], seattle_weather["MLY-TAVG-NORMAL"])
ax.plot(austin_weather["MONTH"], austin_weather["MLY-TAVG-NORMAL"])
plt.show()
```

Practice making a figure!

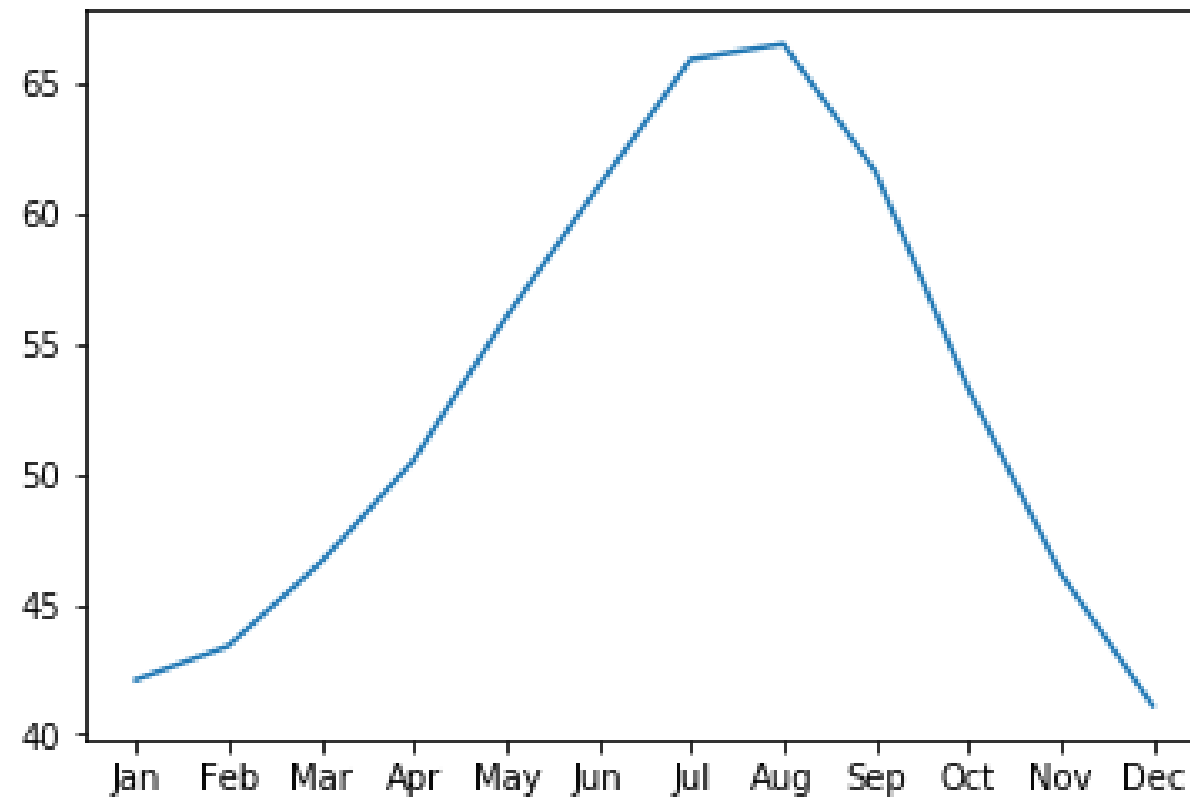INTRODUCTION TO DATA VISUALIZATION WITH MATPLOTLIB

Customizing your plots

INTRODUCTION TO DATA VISUALIZATION WITH MATPLOTLIB
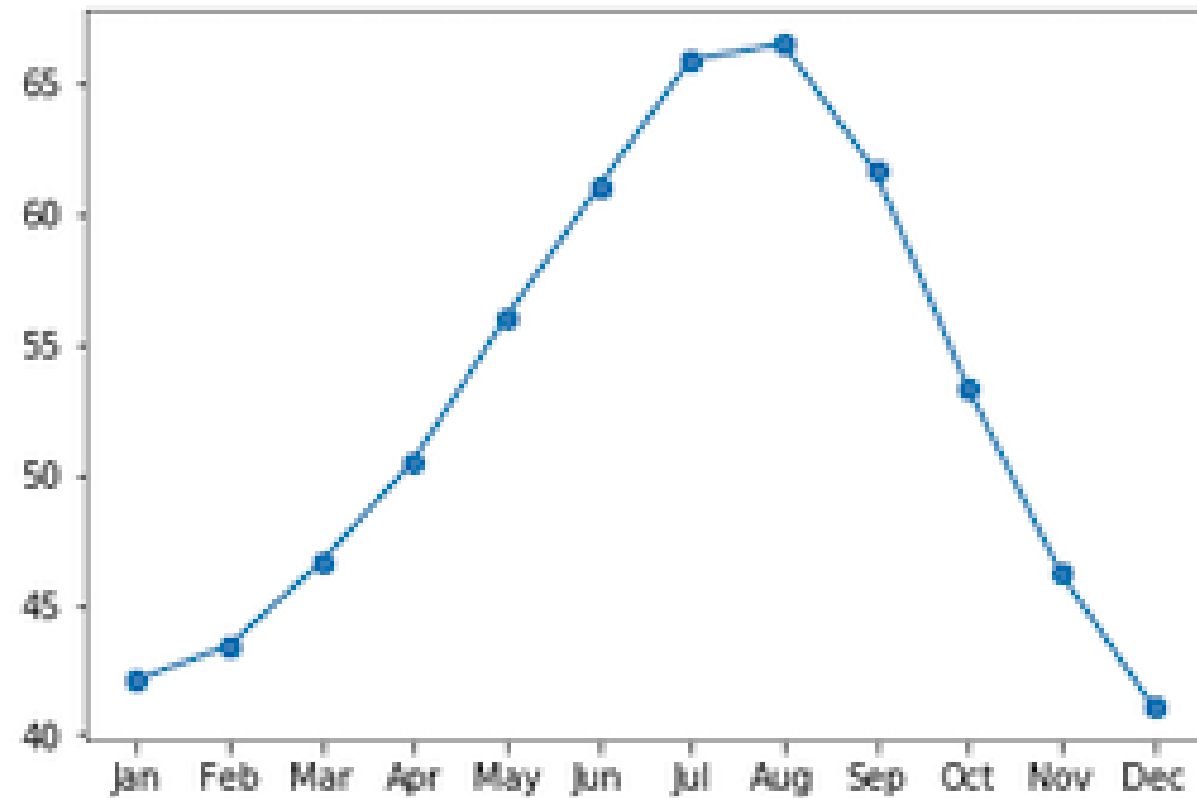
Ariel Rokem
Data Scientist

Customizing data appearance

```python
ax.plot(seattle_weather["MONTH"],
        seattle_weather["MLY-PRCP-NORMAL"])

plt.show()
```
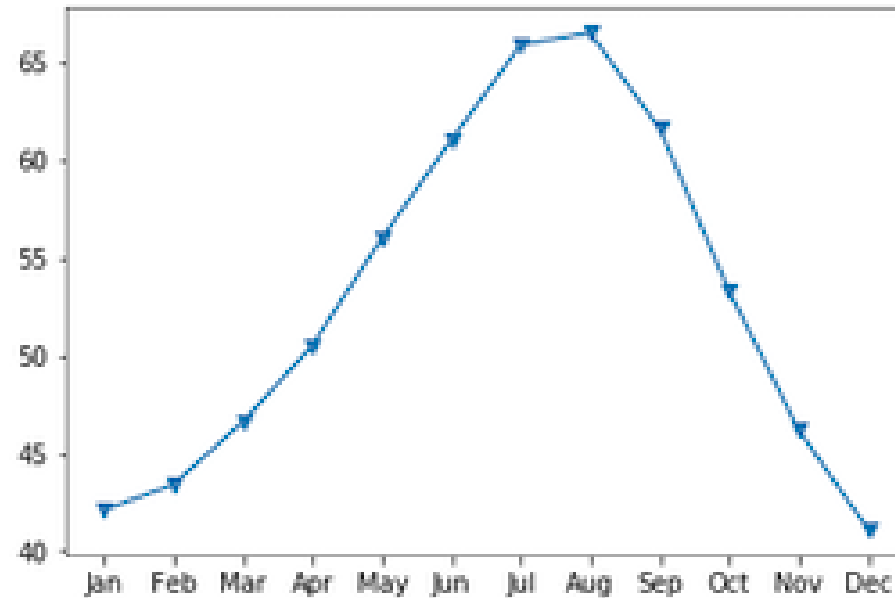
Adding markers

```
ax.plot(seattle_weather["MONTH"],
        seattle_weather["MLY-PRCP-NORMAL"],
        marker="o")

plt.show()
```
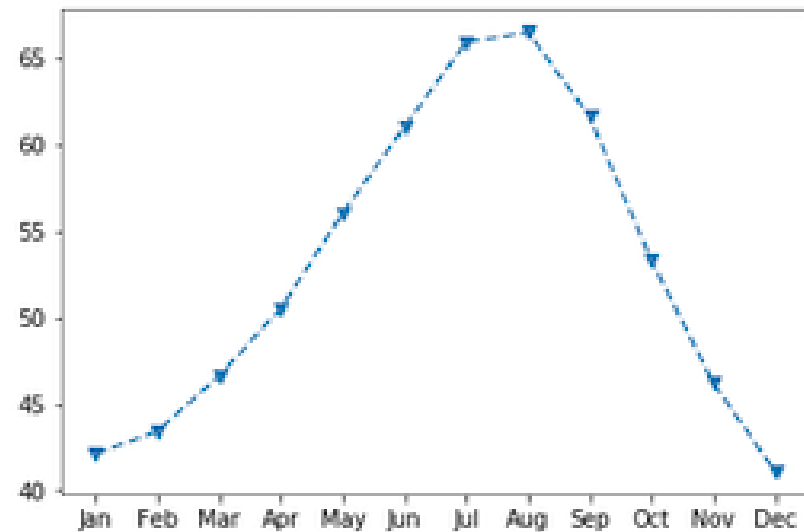
Choosing markers

```
ax.plot(seattle_weather["MONTH"],
        seattle_weather["MLY-PRCP-NORMAL"],
        marker="v")
plt.show()
```


https://matplotlib.org/api/markers_api.html
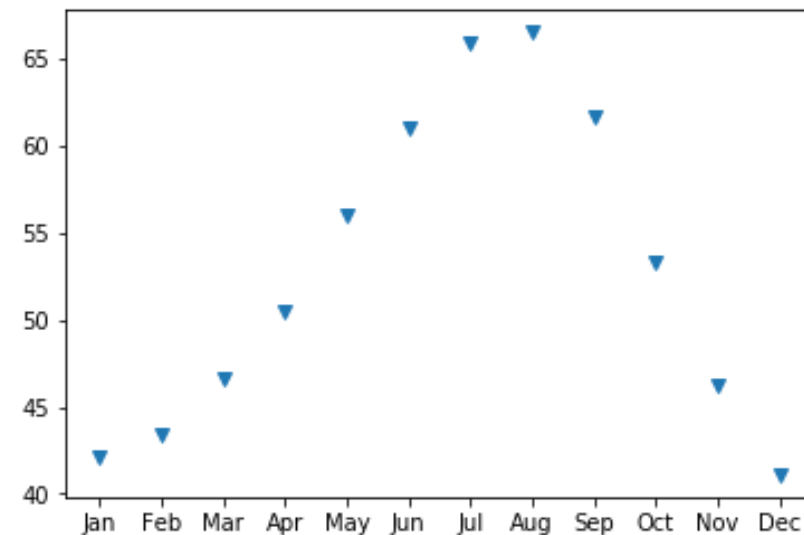
Setting the linestyle

```python
fig, ax = plt.subplots()
ax.plot(seattle_weather["MONTH"],
        seattle_weather["MLY-TAVG-NORMAL"],
        marker="v", linestyle="--")
plt.show()
```
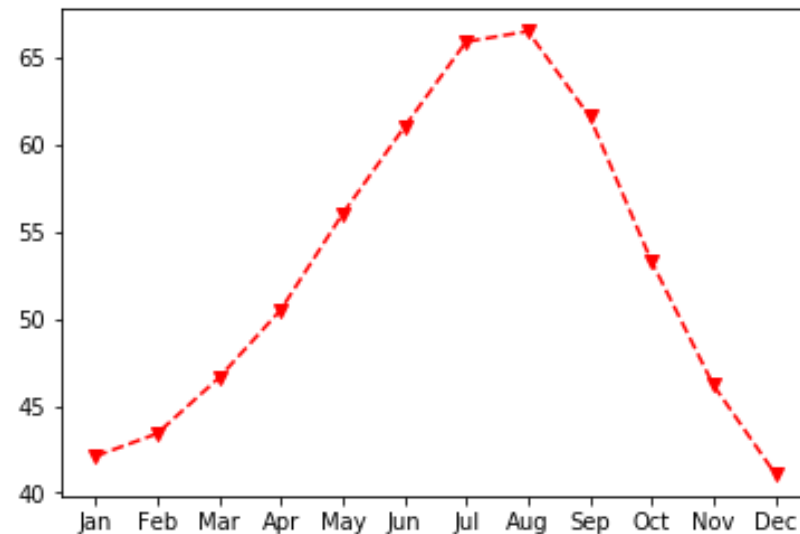
Eliminating lines with linestyle

```python
fig, ax = plt.subplots()
ax.plot(seattle_weather["MONTH"],
        seattle_weather["MLY-TAVG-NORMAL"],
        marker="v", linestyle="None")
plt.show()
```
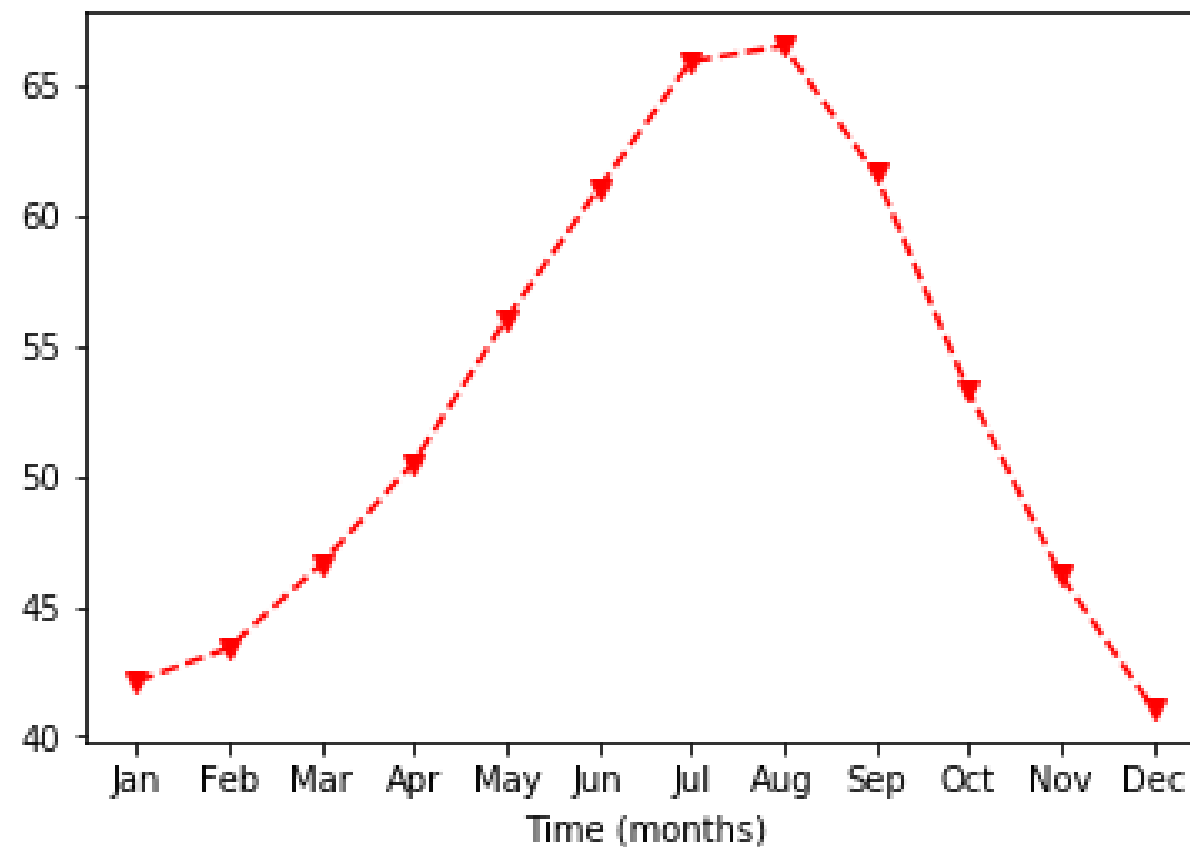
Choosing color

```
fig, ax = plt.subplots()
ax.plot(seattle_weather["MONTH"],
        seattle_weather["MLY-TAVG-NORMAL"],
        marker="v", linestyle="--", color="r")
plt.show()
```
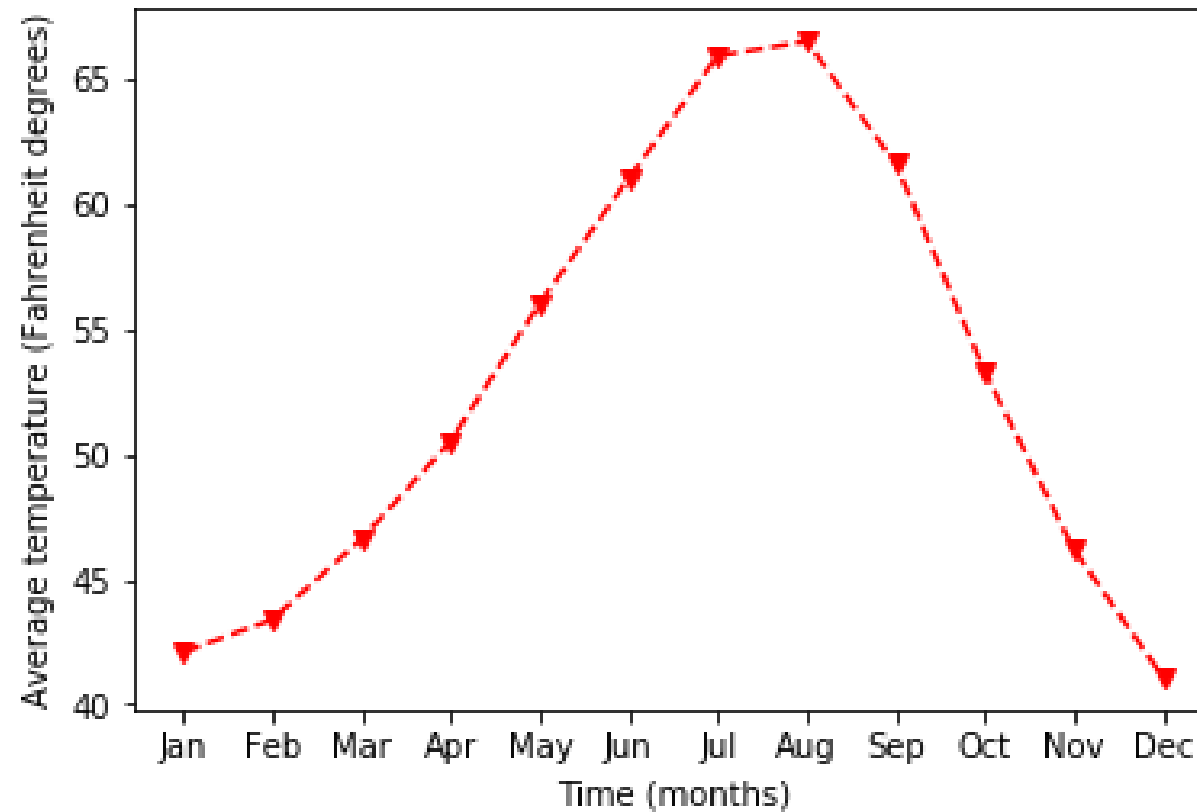
Customizing the axes labels

```
ax.set_xlabel("Time (months)")

plt.show()
```
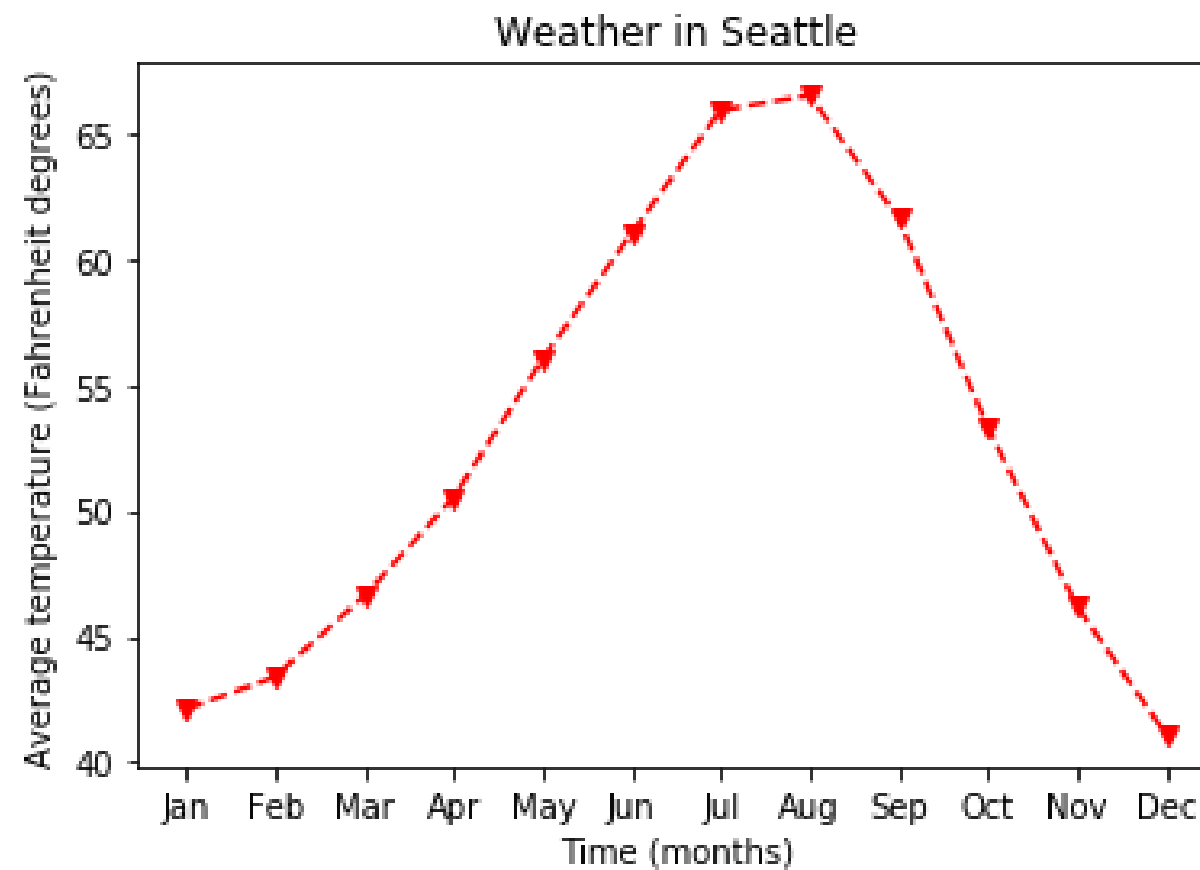
Setting the y axis label

```
ax.set_xlabel("Time (months)")
ax.set_ylabel("Average temperature (Fahrenheit degrees)")
plt.show()
```

Adding a title

```
ax.set_title("Weather in Seattle")
plt.show()
```

Practice customizing your plots!

INTRODUCTION TO DATA VISUALIZATION WITH MATPLOTLIB
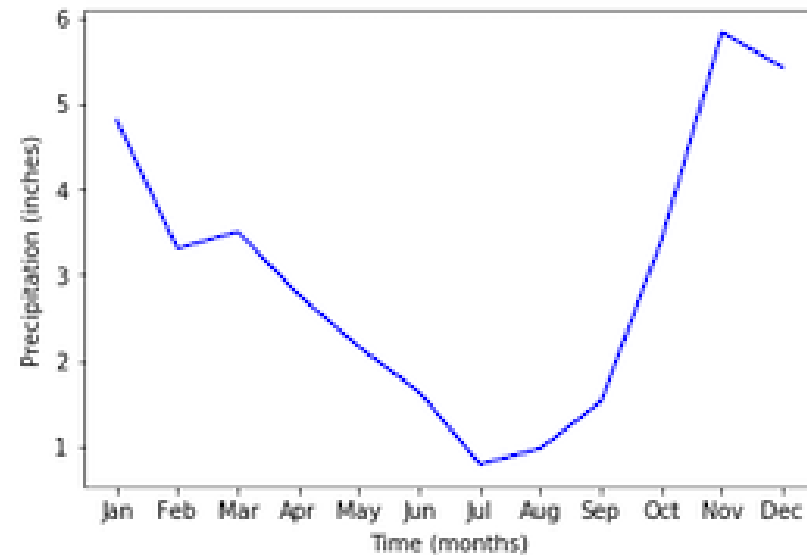
Small multiples

INTRODUCTION TO DATA VISUALIZATION WITH MATPLOTLIB

Ariel Rokem

Data Scientist

Adding data

```python
ax.plot(seattle_weather["MONTH"],
        seattle_weather["MLY-PRCP-NORMAL"],
        color='b')
ax.set_xlabel("Time (months)")
ax.set_ylabel("Precipitation (inches)")
plt.show()
```
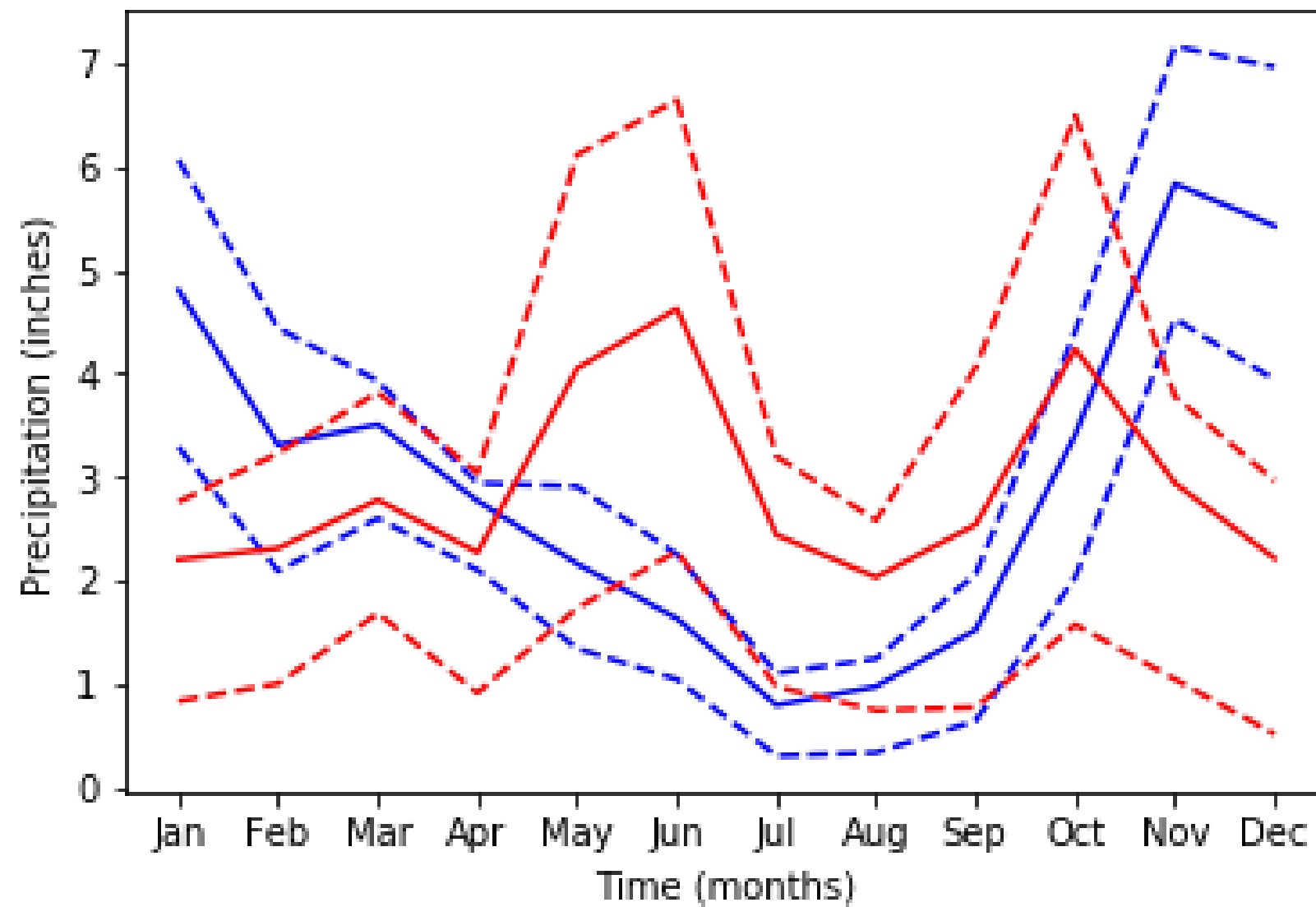
Adding more data

```
ax.plot(seattle_weather["MONTH"], seattle_weather["MLY-PRCP-25PCTL"],
        linestyle='--', color='b')
ax.plot(seattle_weather["MONTH"], seattle_weather["MLY-PRCP-75PCTL"],
        linestyle='--', color=color)
plt.show()
```
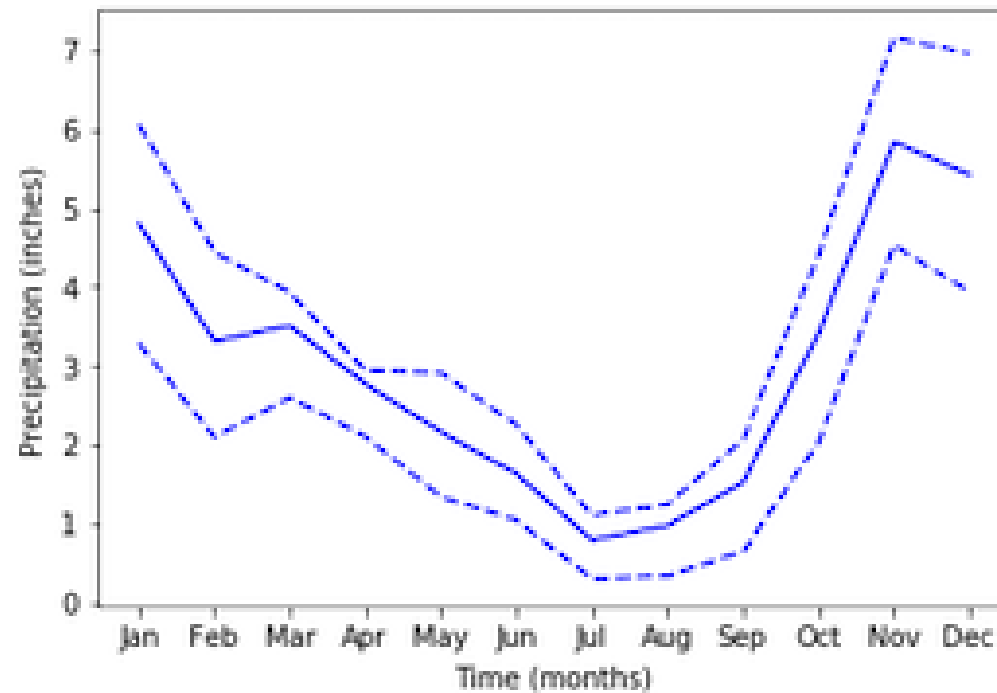
And more data

```python
ax.plot(austin_weather["MONTH"], austin_weather["MLY-PRCP-NORMAL"],
        color='r')
ax.plot(austin_weather["MONTH"], austin_weather["MLY-PRCP-25PCTL"],
        linestyle='--', color='r')
ax.plot(austin_weather["MONTH"], austin_weather["MLY-PRCP-75PCTL"],
        linestyle='--', color='r')
plt.show()
```
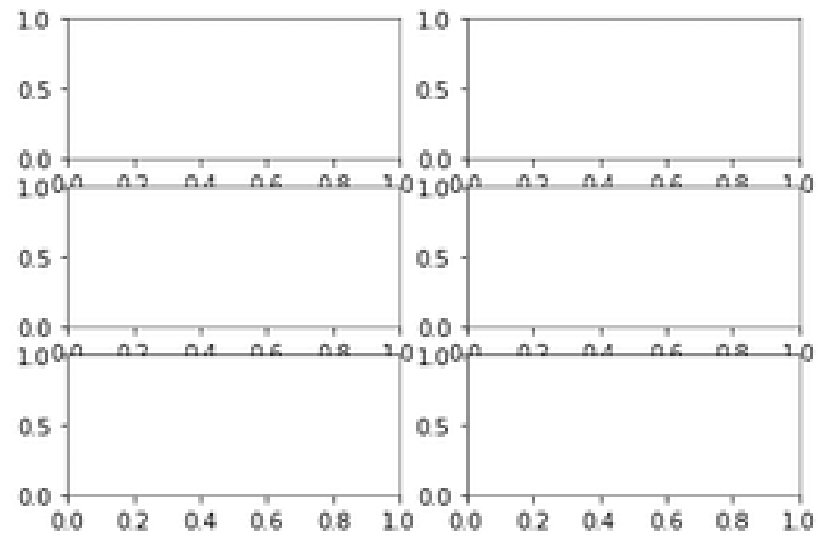
Too much data!

Small multiples with plt.subplots

```
fig, ax = plt.subplots()
```
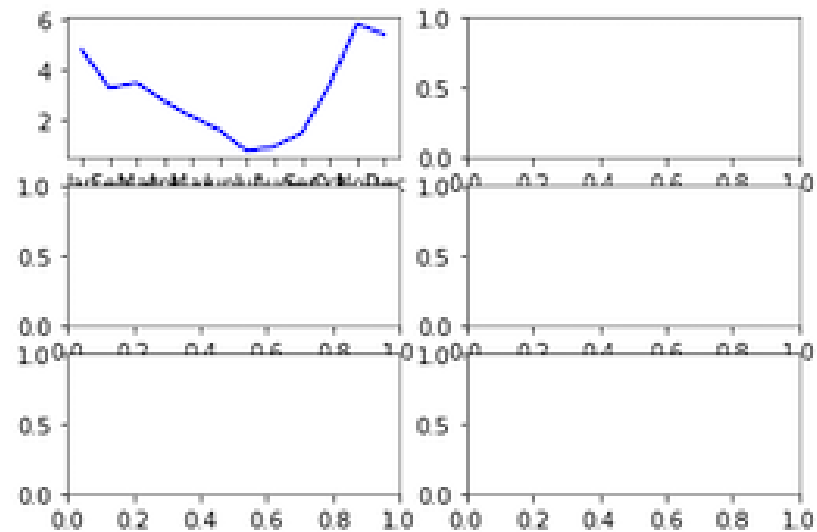
```
fig, ax = plt.subplots(3, 2)
plt.show()
```

Adding data to subplots

```
ax.shape
(3, 2)
```

```
ax[0, 0].plot(seattle_weather["MONTH"],
              seattle_weather["MLY-PRCP-NORMAL"],
              color='b')

plt.show()
```

Subplots with data

```python
fig, ax = plt.subplots(2, 1)
ax[0].plot(seattle_weather["MONTH"], seattle_weather["MLY-PRCP-NORMAL"],
        color='b')
ax[0].plot(seattle_weather["MONTH"], seattle_weather["MLY-PRCP-25PCTL"],
        linestyle='--', color='b')
ax[0].plot(seattle_weather["MONTH"], seattle_weather["MLY-PRCP-75PCTL"],
        linestyle='--', color='b')
ax[1].plot(austin_weather["MONTH"], austin_weather["MLY-PRCP-NORMAL"],
        color='r')
ax[1].plot(austin_weather["MONTH"], austin_weather["MLY-PRCP-25PCTL"],
        linestyle='--', color='r')
ax[1].plot(austin_weather["MONTH"], austin_weather["MLY-PRCP-75PCTL"],
        linestyle='--', color='r')
ax[0].set_ylabel("Precipitation (inches)")
ax[1].set_ylabel("Precipitation (inches)")
ax[1].set_xlabel("Time (months)")
plt.show()
```

Subplots with data
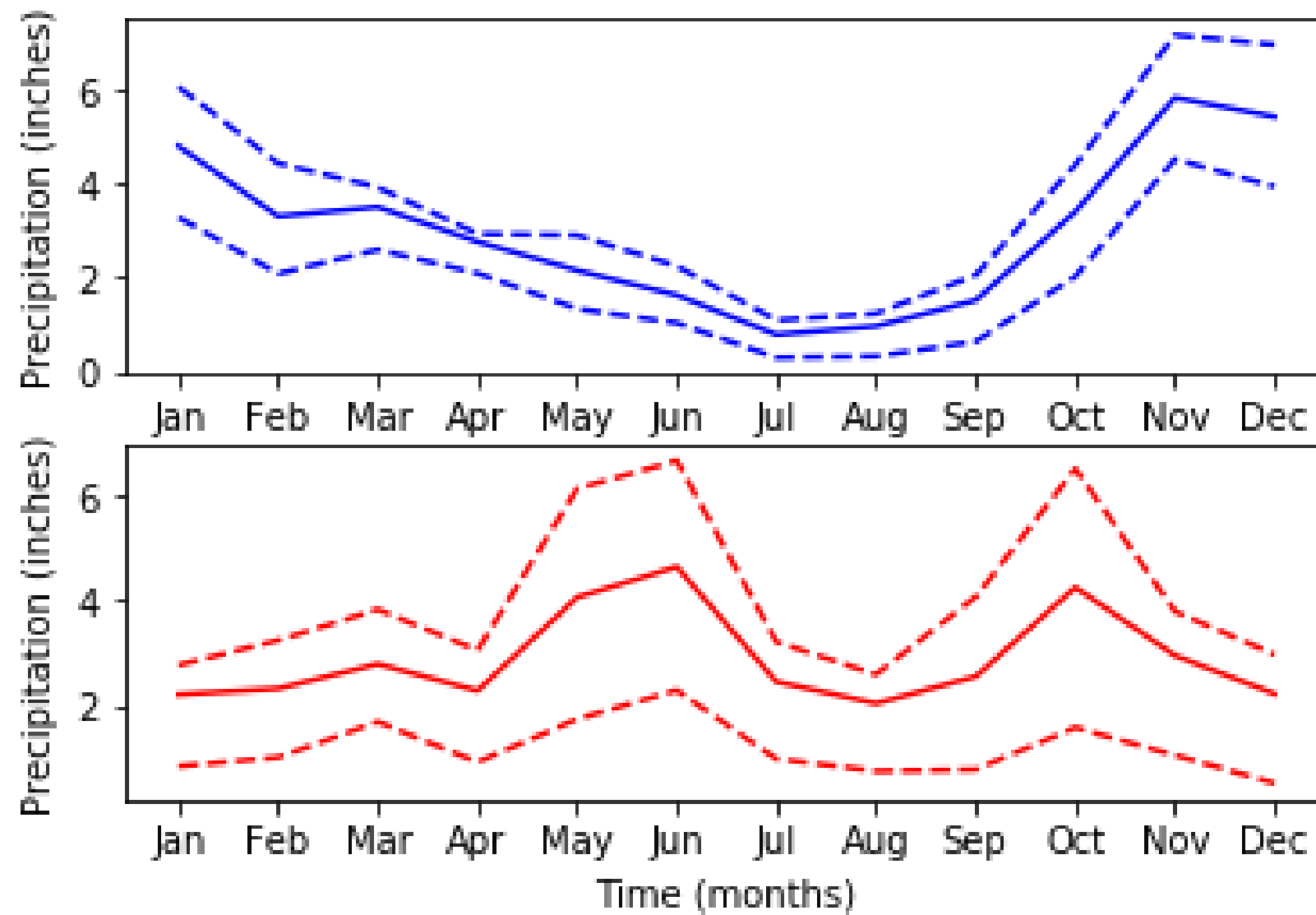
Sharing the y-axis range

```
fig, ax = plt.subplots(2, 1, sharey=True)
```
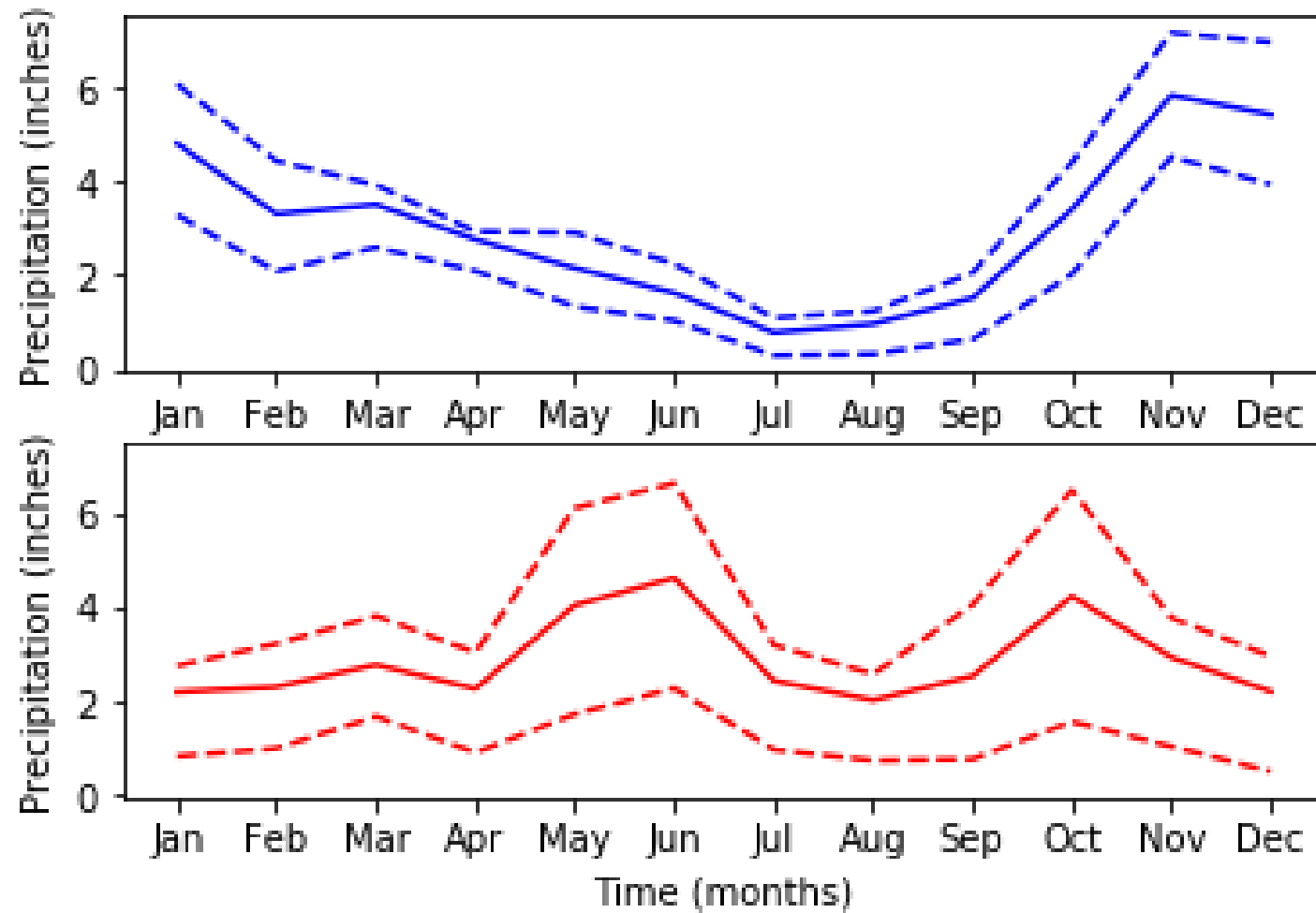
Practice making subplots!

INTRODUCTION TO DATA VISUALIZATION WITH MATPLOTLIB