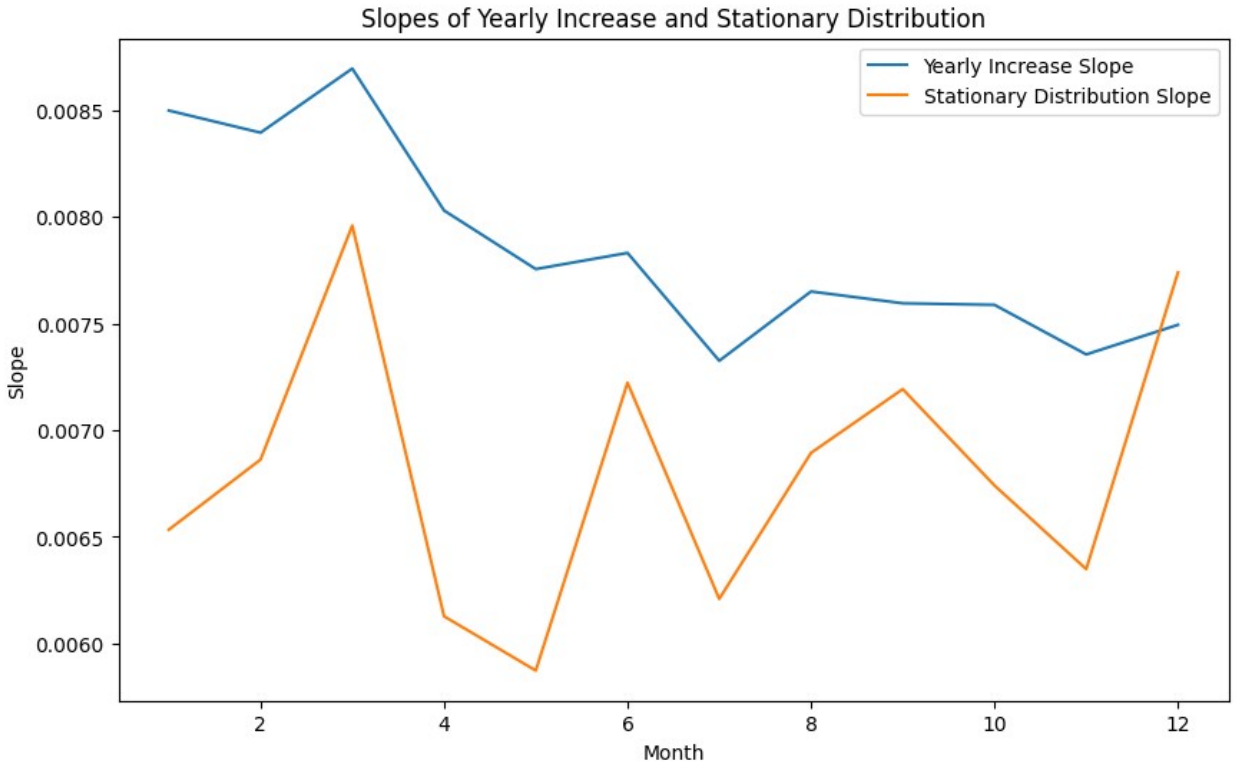
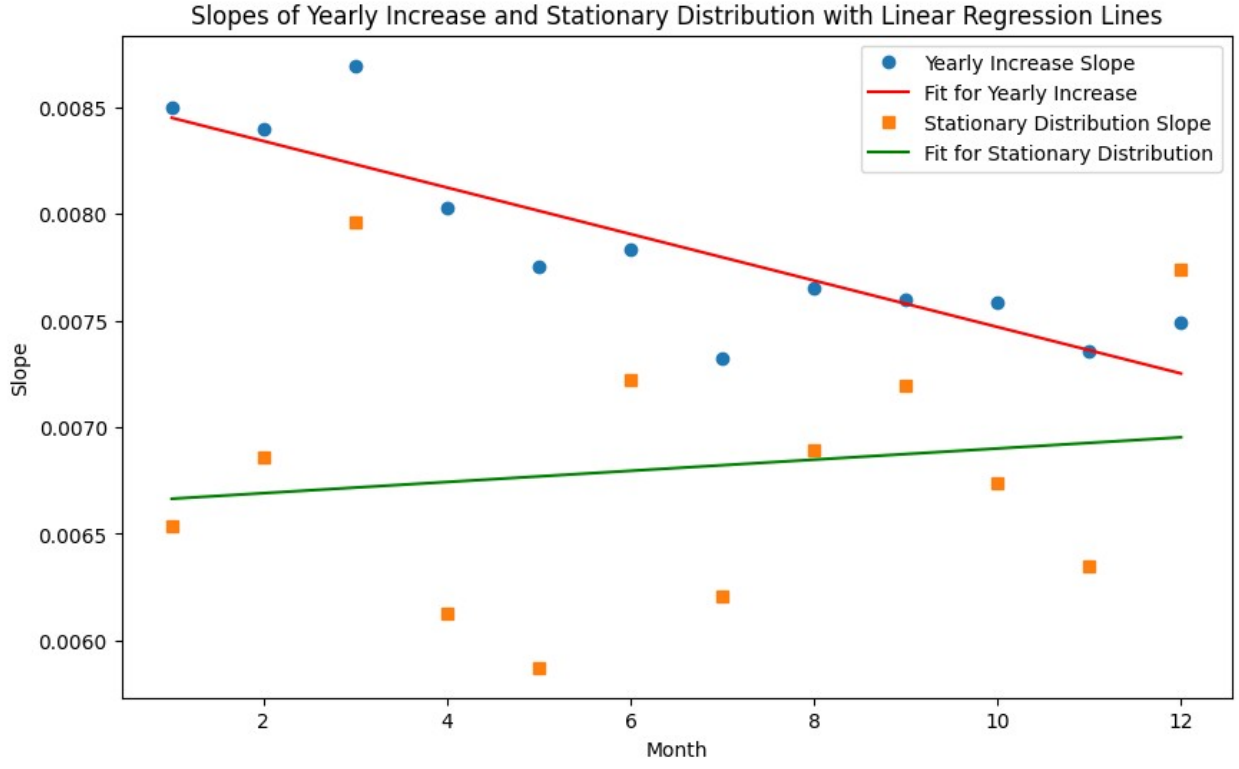
```
import pandas as pd
import matplotlib.pyplot as plt

# Read the data
data = pd.read_csv('slopes_intercepts.csv')

# Plotting
plt.figure(figsize=(10, 6))
plt.plot(data['Month'], data['Yearly Increase Slope'], label='Yearly
Increase Slope')
plt.plot(data['Month'], data['Stationary Distribution Slope'],
label='Stationary Distribution Slope')
plt.xlabel('Month')
plt.ylabel('Slope')
plt.title('Slopes of Yearly Increase and Stationary Distribution')
plt.legend()
plt.show()
```

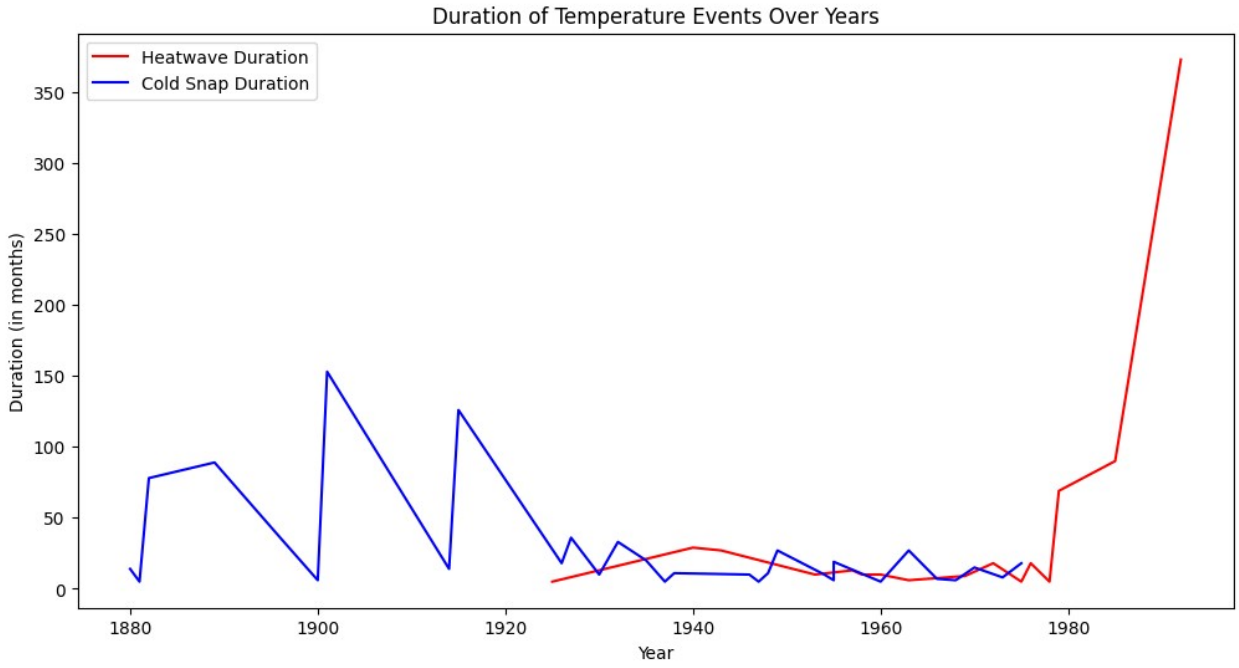



```
import pandas as pd
import matplotlib.pyplot as plt
import numpy as np
from scipy import stats

# Read the data
data = pd.read_csv('slopes_intercepts.csv')
```

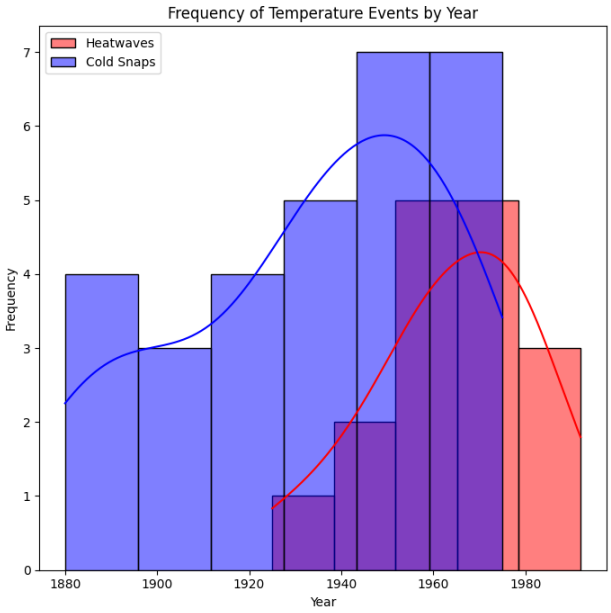
```
# Linear regression for Yearly Increase Slope
slope_yi, intercept_yi, _, _, _ = stats.linregress(data['Month'],
data['Yearly Increase Slope'])
line_yi = slope_yi * data['Month'] + intercept_yi

# Linear regression for Stationary Distribution Slope
slope_sd, intercept_sd, _, _, _ = stats.linregress(data['Month'],
data['Stationary Distribution Slope'])
line_sd = slope_sd * data['Month'] + intercept_sd

# Plotting
plt.figure(figsize=(10, 6))
plt.plot(data['Month'], data['Yearly Increase Slope'], 'o',
label='Yearly Increase Slope')
plt.plot(data['Month'], line_yi, 'r', label='Fit for Yearly Increase')
plt.plot(data['Month'], data['Stationary Distribution Slope'], 's',
label='Stationary Distribution Slope')
plt.plot(data['Month'], line_sd, 'g', label='Fit for Stationary
Distribution')
plt.xlabel('Month')
plt.ylabel('Slope')
plt.title('Slopes of Yearly Increase and Stationary Distribution with
Linear Regression Lines')
plt.legend()
plt.show()
```

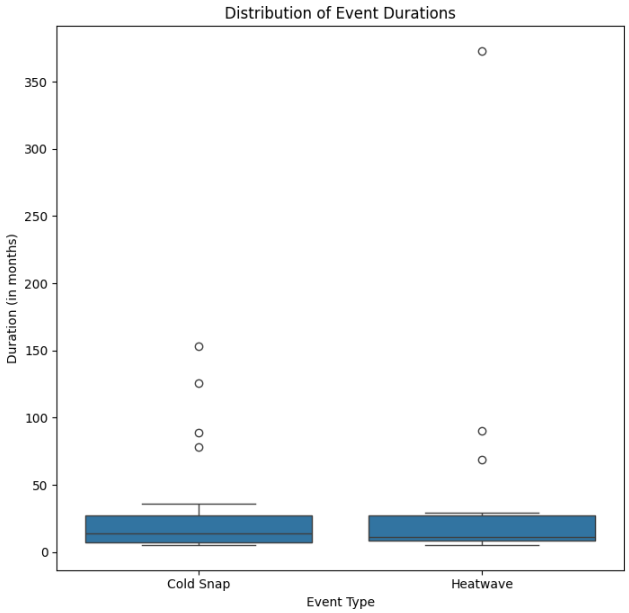


```python
import pandas as pd
import matplotlib.pyplot as plt

# Load the CSV file
data = pd.read_csv('temperature_events.csv')

# Separate the data by event type
heatwaves = data[data['Event Type'] == 'Heatwave']
coldsnap = data[data['Event Type'] == 'Cold Snap']

# Plotting
plt.figure(figsize=(12, 6))

# Plot each event type in a different color
plt.plot(heatwaves['Start Year'], heatwaves['Duration'], 'r-',
label='Heatwave Duration')
plt.plot(coldsnap['Start Year'], coldsnap['Duration'], 'b-',
label='Cold Snap Duration')

# Labeling the plot
plt.xlabel('Year')
plt.ylabel('Duration (in months)')
plt.title('Duration of Temperature Events Over Years')
plt.legend()

# Show the plot
plt.show()
```



```
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns

# Load the CSV file
data = pd.read_csv('temperature_events.csv')

# Separate the data by event type
heatwaves = data[data['Event Type'] == 'Heatwave']
coldsnap = data[data['Event Type'] == 'Cold Snap']

# Set up the matplotlib figure
plt.figure(figsize=(14, 7))

# Histogram for the frequency of events by year
plt.subplot(1, 2, 1)
sns.histplot(heatwaves['Start Year'], color="red", label='Heatwaves',
kde=True)
sns.histplot(coldsnap['Start Year'], color="blue", label='Cold Snaps',
kde=True)
plt.xlabel('Year')
plt.ylabel('Frequency')
plt.title('Frequency of Temperature Events by Year')
plt.legend()

# Boxplot for the duration of events
plt.subplot(1, 2, 2)
sns.boxplot(x='Event Type', y='Duration', data=data)
plt.xlabel('Event Type')
plt.ylabel('Duration (in months)')
plt.title('Distribution of Event Durations')

# Show the plots
plt.tight_layout()
plt.show()
```

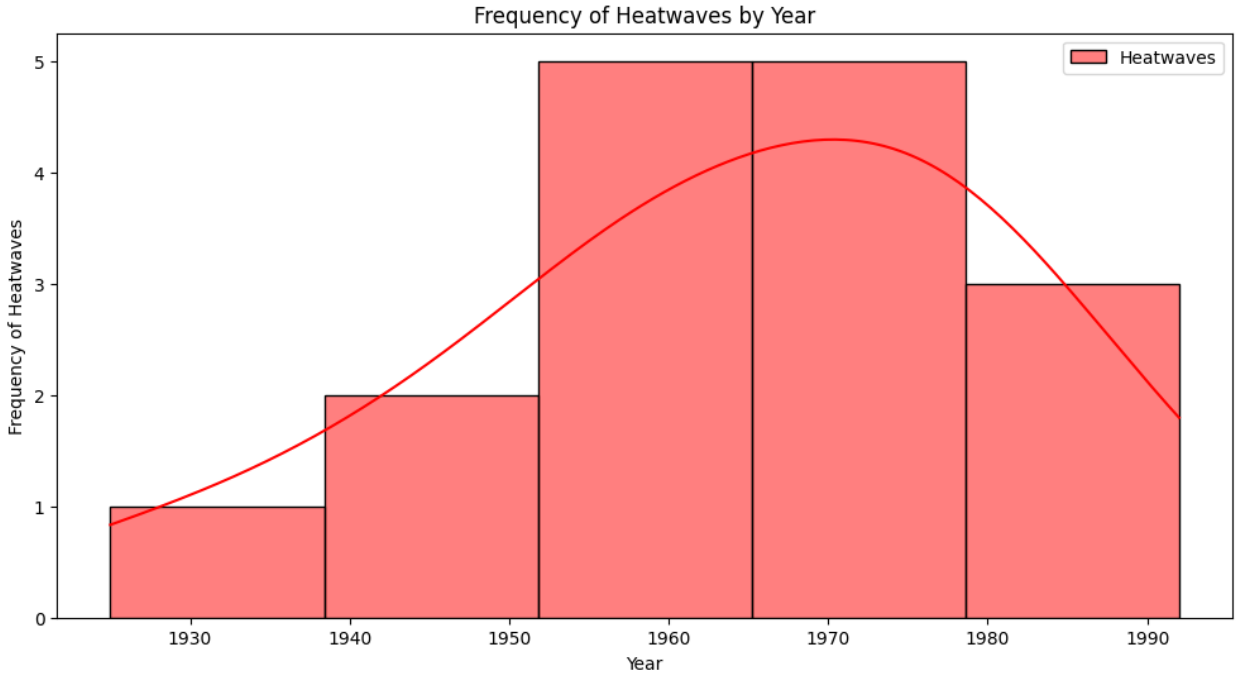


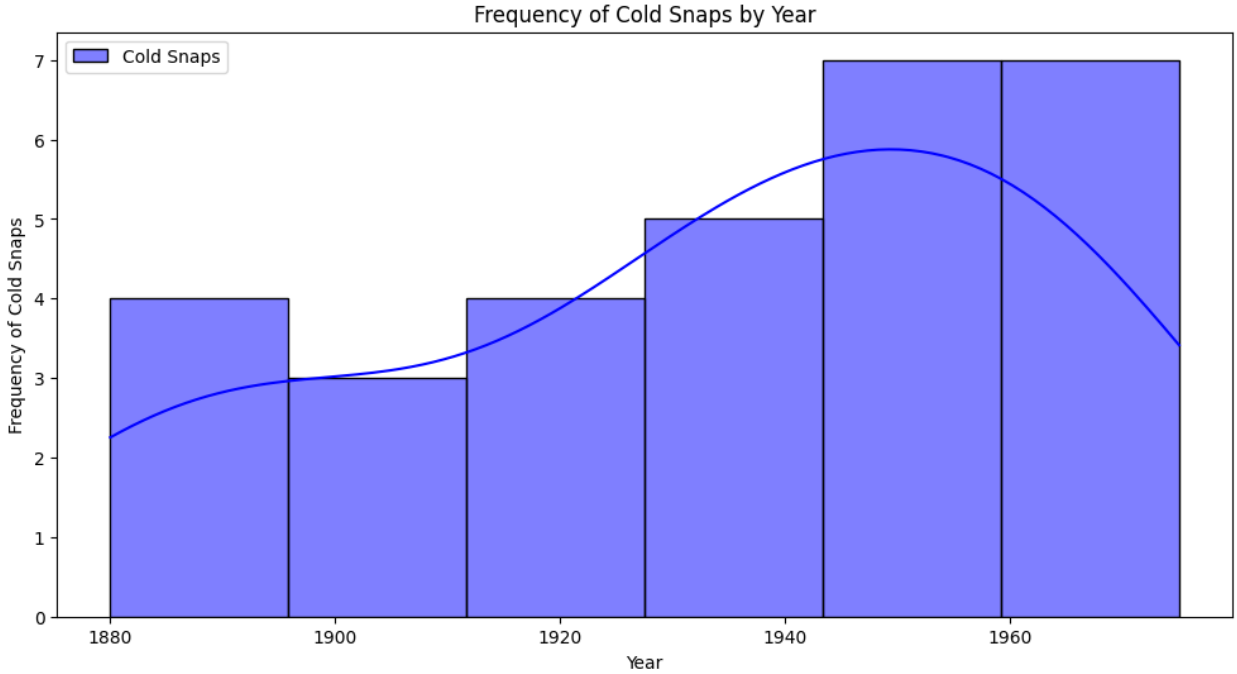



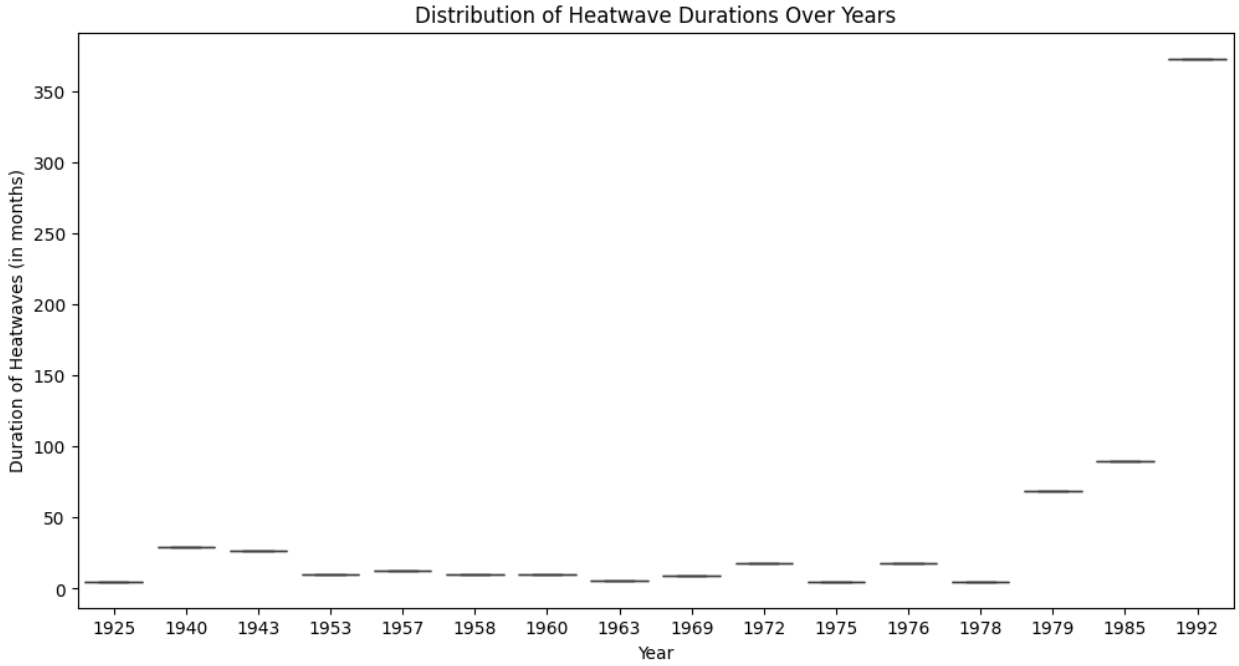

```
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns

# Load the CSV file
data = pd.read_csv('temperature_events.csv')

# Separate the data by event type
heatwaves = data[data['Event Type'] == 'Heatwave']
coldsnap = data[data['Event Type'] == 'Cold Snap']

# Calculate bin width based on the range of years and desired number
of bars
year_range = data['Start Year'].max() - data['Start Year'].min()
bins_heatwaves = year_range  # Adjust this to set the desired number
of bars for heatwaves
bins_coldsnap = year_range  # Adjust this to set the desired number of
bars for cold snaps

# Plotting the frequency of each event type by year with specified
bins
plt.figure(figsize=(12, 6))
sns.histplot(heatwaves['Start Year'], color="red", label='Heatwaves',
kde=True, bins=bins_heatwaves)
plt.xlabel('Year')
plt.ylabel('Frequency of Heatwaves')
plt.title('Frequency of Heatwaves by Year')
plt.legend()
plt.show()

plt.figure(figsize=(12, 6))
```

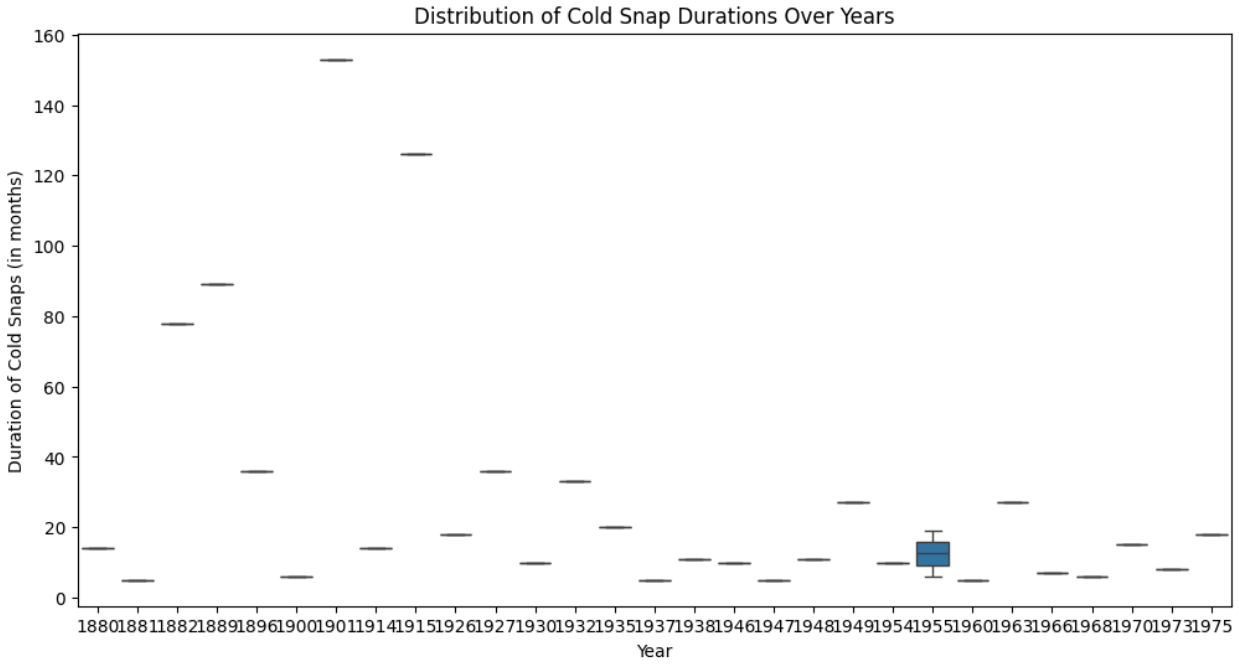
```
sns.histplot(coldsnap['Start Year'], color="blue", label='Cold Snaps',
kde=True, bins=bins_coldsnap)
plt.xlabel('Year')
plt.ylabel('Frequency of Cold Snaps')
plt.title('Frequency of Cold Snaps by Year')
plt.legend()
plt.show()

# Boxplots remain unchanged as they already show individual data
points
# ...

import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns

# Load the CSV file
data = pd.read_csv('temperature_events.csv')

# Separate the data by event type
heatwaves = data[data['Event Type'] == 'Heatwave']
coldsnap = data[data['Event Type'] == 'Cold Snap']

# Plotting the frequency of each event type by year
plt.figure(figsize=(12, 6))
sns.histplot(heatwaves['Start Year'], color="red", label='Heatwaves',
kde=True)
plt.xlabel('Year')
plt.ylabel('Frequency of Heatwaves')
plt.title('Frequency of Heatwaves by Year')
plt.legend()
plt.show()

plt.figure(figsize=(12, 6))
sns.histplot(coldsnap['Start Year'], color="blue", label='Cold Snaps',
kde=True)
plt.xlabel('Year')
plt.ylabel('Frequency of Cold Snaps')
plt.title('Frequency of Cold Snaps by Year')
plt.legend()
plt.show()

# Plotting the distribution of durations for each event type
plt.figure(figsize=(12, 6))
sns.boxplot(x='Start Year', y='Duration', data=heatwaves)
plt.xlabel('Year')
plt.ylabel('Duration of Heatwaves (in months)')
plt.title('Distribution of Heatwave Durations Over Years')
plt.show()
```

```
plt.figure(figsize=(12, 6))
sns.boxplot(x='Start Year', y='Duration', data=coldsnap)
plt.xlabel('Year')
plt.ylabel('Duration of Cold Snaps (in months)')
plt.title('Distribution of Cold Snap Durations Over Years')
plt.show()
```



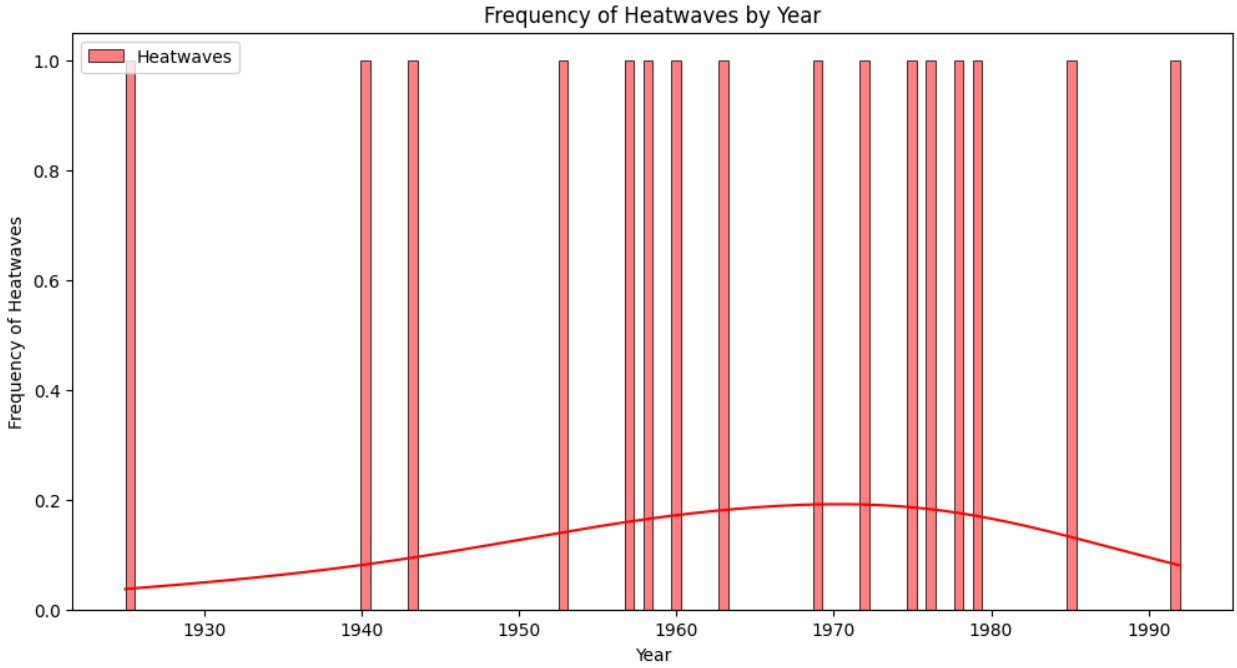



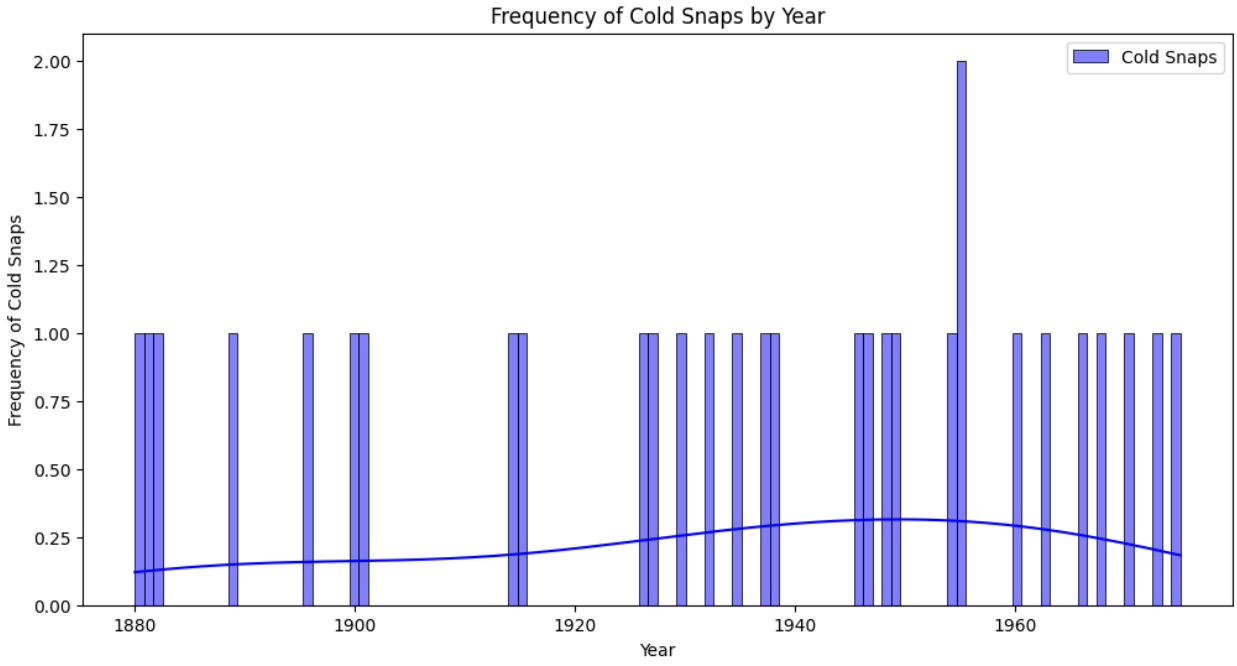



```
import pandas as pd
import matplotlib.pyplot as plt
import seaborn as sns

# Load the CSV file
data = pd.read_csv('temperature_events.csv')

# Separate the data by event type
```

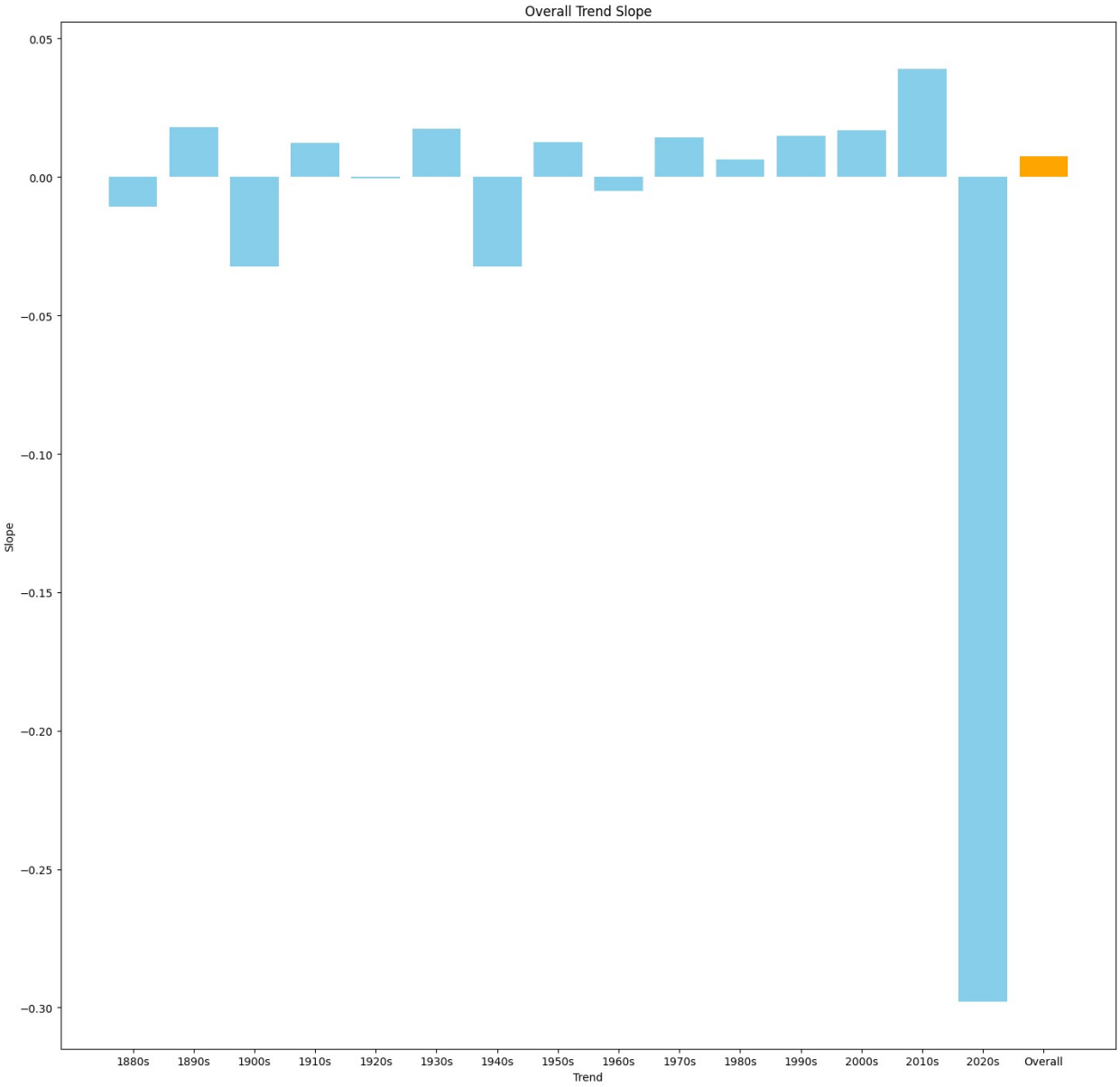
```
heatwaves = data[data['Event Type'] == 'Heatwave']
coldsnap = data[data['Event Type'] == 'Cold Snap']

# Calculate bin width based on the range of years and desired number
of bars
year_range = data['Start Year'].max() - data['Start Year'].min()
bins_heatwaves = year_range  # Adjust this to set the desired number
of bars for heatwaves
bins_coldsnap = year_range  # Adjust this to set the desired number of
bars for cold snaps

# Plotting the frequency of each event type by year with specified
bins
plt.figure(figsize=(12, 6))
sns.histplot(heatwaves['Start Year'], color="red", label='Heatwaves',
kde=True, bins=bins_heatwaves)
plt.xlabel('Year')
plt.ylabel('Frequency of indictive Heatwaves')
plt.title('Frequency of indictive Heatwaves by Year')
plt.legend()
plt.show()

plt.figure(figsize=(12, 6))
sns.histplot(coldsnap['Start Year'], color="blue", label='Cold Snaps',
kde=True, bins=bins_coldsnap)
plt.xlabel('Year')
plt.ylabel('Frequency of indictive Cold Snaps')
plt.title('Frequency of indictive Cold Snaps by Year')
plt.legend()
plt.show()

# Boxplots remain unchanged as they already show individual data
points
# ...
```




```python
import pandas as pd
import matplotlib.pyplot as plt

# Load the CSV file
data = pd.read_csv('trend_analysis.csv')

# Separate the overall trend from the decade-wise trends
overall_trend = data[data['Decade'] == 'Overall']
```

```
decade_trends = data[data['Decade'] != 'Overall']

# Set up the matplotlib figure
plt.figure(figsize=(28, 14))

# Plotting the decade-wise trends
plt.subplot(1, 2, 1)
plt.bar(decade_trends['Decade'], decade_trends[' Slope'],
color='skyblue')
plt.xlabel('Decade')
plt.ylabel('Slope')
plt.title('Decade-wise Trend Slopes')

# Plotting the overall trend slope
plt.subplot(1, 2, 1)
plt.bar('Overall', overall_trend[' Slope'].iloc[0], color='orange')
plt.xlabel('Trend')
plt.ylabel('Slope')
plt.title('Overall Trend Slope')

plt.tight_layout()
plt.show()
```


Overall Trend Slope
0.05
0.00
−0.05
−0.10
−0.15
−0.20
−0.25
−0.30
Slope
1880s
1890s
1900s
1910s
1920s
1930s
1940s
1950s
1960s
1970s
1980s
1990s
2000s
2010s
2020s
Overall
Trend