```
!pip install pmdarima --quiet
                                                                     - 2.2/2.2 MB 24.4 MB/s eta 0:00:00
from google.colab import files
files.upload()
 Choose Files kaggle.json

    kaggle.json(application/json) - 64 bytes, last modified: 4/11/2025 - 100% done

       Saving kaggle.json to kaggle.json
                                                               un" "bou":"c02h006202dd00h4o241625407ch6056"l'l
!mkdir -p ~/.kaggle
!cp kaggle.json ~/.kaggle/
!chmod 600 ~/.kaggle/kaggle.json
!kaggle datasets download -d berkeleyearth/climate-change-earth-surface-temperature-data
!unzip climate-change-earth-surface-temperature-data.zip
      Dataset URL: <a href="https://www.kaggle.com/datasets/berkeleyearth/climate-change-earth-surface-temperature-data">https://www.kaggle.com/datasets/berkeleyearth/climate-change-earth-surface-temperature-data.zip</a>
Archive: climate-change-earth-surface-temperature-data.zip
inflating: GlobalLandTemperaturesByCountry.csv
inflating: GlobalLandTemperaturesByCountry.csv
inflating: GlobalLandTemperaturesByMajorCity.csv
inflating: GlobalLandTemperaturesByState.csv
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import pandas as pd
import numpy as np
from sklearn.metrics import mean_squared_error from sklearn.preprocessing import MinMaxScaler
from tadm import tadm
import matplotlib.pyplot as plt
from tensorflow.keras.models import Sequential
from tensorflow.keras.layers import LSTM, Dense
from statsmodels.tsa.arima.model import ARIMA
# Load and clean data
df = pd.read_csv("GlobalLandTemperaturesByCity.csv")
df['dt'] = pd.to_datetime(df['dt'])
df = df[df['AverageTemperature'].notnull()]
df['City_Country'] = df['City'] + ', ' + df['Country']
cities = df['City_Country'].unique()
results = []
for city in tqdm(cities, desc="Processing cities"):
     city in tqum(cities, desc= Processing cities'):
city_data = df[df['City_Country'] == city].copy()
city_data.set_index('dt', inplace=True)
# city_data = city_data.resample('M').mean()
city_data = city_data.resample('M').agg({'AverageTemperature': 'mean'})
      if city_data['AverageTemperature'].isnull().sum() > 0 or len(city_data) < 100:
            continue
      try:
# Scale
            scaler = MinMaxScaler()
            y_scaled = scaler.fit_transform(city_data[['AverageTemperature']])
            # Supervised learning
            def create_sequences(data, look_back=12):
                 X, y = [], []
for i in range(len(data) - look_back):
                      X.append(data[i:i+look_back])
y.append(data[i+look_back])
                 return np.array(X), np.array(y)
            look_back = 12
            X, y = create_sequences(y_scaled, look_back)
            split = int(len(X) * 0.8)
X_train, X_test = X[:split], X[split:]
            y_train, y_test = y[:split], y[split:]
            model = Sequential()
            model.add(LSTM(50, input_shape=(X_train.shape[1], X_train.shape[2])))
            model.add(Dense(1))
            model.compile(optimizer='adam', loss='mse')
            model.fit(X\_train, \ y\_train, \ epochs=10, \ batch\_size=32, \ verbose=0)
            # ARIMA
            arima series = city data['AverageTemperature']
            arima_model = ARIMA(arima_series, order=(3,1,2))
arima_fitted = arima_model.fit()
            arima_forecast = arima_fitted.forecast(steps=len(y_test))
           y_test_actual = scaler.inverse_transform(y_test)
arima_forecast_flat = arima_forecast.squeeze()
residual_correction = model.predict(X_test)[:len(arima_forecast_flat)]
residual_correction = scaler.inverse_transform(residual_correction)
            hybrid forecast = arima forecast flat + residual correction.squeeze()
            arima_rmse = np.sqrt(mean_squared_error(y_test_actual, arima_forecast_flat))
            lstm_rmse = np.sqrt(mean_squared_error(y_test_actual, residual_correction))
hybrid_rmse = np.sqrt(mean_squared_error(y_test_actual, hybrid_forecast))
            results.append({
                 "City": city,
"ARIMA_RMSE": arima_rmse,
```

"LSTM\_Residual\_RMSE": lstm\_rmse,
"Hybrid\_RMSE": hybrid\_rmse

except Exception as e:

```
# Save
results_df = pd.DataFrame(results)
results_df.to_csv("citywise_forecast_rmse.csv", index=False)
print(" Saved to citywise_forecast_rmse.csv")

# Visualization: Top 10 cities by Hybrid RMSE
results_df_sorted = results_df.sort_values(by="Hybrid_RMSE")

plt.figure(figsize=(12, 6))
plt.barh(results_df_sorted['City'].head(10), results_df_sorted['Hybrid_RMSE'].head(10), color='green')
plt.xlabel("Hybrid RMSE")
plt.title("Top 10 Cities with Lowest Hybrid Forecast Error")
plt.gca().invert_yaxis()
plt.tight_layout()
plt.show()
```

```
→ Processing cities:
                                                     0%|
                                                                                    | 0/3490 [00:00<?, ?it/s]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME' instead.
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Processing cities: 2%|| 77/3490 [01:35<32:51, 1.73it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_dim'
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          Processing cities: 3%| | 89/3490 [02:10<1:18:31, 1.39s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `inple super().__init__(**kwargs) | 89/3490 [02:10<1:18:31, 1.39s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `inple super().__init__(**kwargs) | 89/3490 [02:10<1:18:31, 1.39s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `inple super().__init__(**kwargs) | 89/3490 [02:10<1:18:31, 1.39s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `inple super().__init__(**kwargs) | 89/3490 [02:10<1:18:31, 1.39s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `inple super().__init__(**kwargs) | 89/3490 [02:10<1:18:31, 1.39s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `inple super().__init__(**kwargs) | 89/3490 [02:10<1:18:31, 1.39s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `inple super().__init__(**kwargs) | 89/3490 [02:10<1:18:31, 1.39s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `inple super().__init__(**kwargs) | 89/3490 [02:10<1:18:31, 1.39s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `inple super().__init__(**kwargs) | 89/3490 [02:10<1:18:31, 1.39s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `inple super().__init__(**kwargs) | 89/3490 [02:10<1:18:31, 1.39s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `inple super().__init__(**kwargs) | 89/3490 [02:10<1:18:31, 1.39s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.python3.11/dist-packages/keras/src/layers/rnn/rnn.pyt
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          city_data = city_data_resample('M').agg({'AverageTemperature': 'mean'})

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/usr/local/lib/python3.11/dist-packages/statsmodels/base/model.py:607: ConvergenceWarning: Maximum Likelihood optimization failed to converge. Check mle_retvals warnings.warn("Maximum Likelihood optimization failed to "
                                       | | 133/3490 [03:46<4:37:33, 4.96s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME resample('M').agg({'AverageTemperature': 'mean'})
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                                       | 135/3490 [03:54<4:26:13, 4.76s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME resample('M').agg({'AverageTemperature': 'mean'})
| 136/3490 [03:55<3:15:32, 3.50s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_d
- support () __inter__ name; not parameters found. Using zeros as starting parameters. () usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
   warn('Non-invertible starting MA parameters found.
12/12 -
                                          0s 11ms/step
Processing cities: 4%| | | | 137/3490 [04:03<4:34:26, city_data = city_data.resample('M').agg({'AverageTemperature
                                                        | 137/3490 [04:03<4:34:26, 4.91s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME
                                                       | 159/3490 [04:16/36:06, 1.54it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_dim
Processing cities:
                                5%|
super().__init__(**kwargs)
Processing cities:
                                 5%|
                                                       | 160/3490 [04:23<2:15:32, 2.44s/it]</ri>
city_data = city_data.resa
Processing cities: 5%||
super().__init__(**kwargs)
                                       resample('M').agg({'AverageTemperature': 'mean'}) | 170/3490 [04:29<36:41, 1.51it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_dim
// Jusr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters. warn('Non-invertible starting MA parameters found.'

14/14 ________ 0s 9ms/step
                                       | 171/3490 [04:35<2:05:56, resample('M').agg({'Ayona-7
Processing cities:
city_data = city_
                                5%1■
                                                                                                  2.28s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME
city_data = city_data
Processing cities: 5%
                                                     'M').agg({'AverageTemperature': 'mean'})
| 185/3490 [04:44<31:09, 1.77it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_dim'
                  cities: 5%||
init (**kwargs)
   super()
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
   warn('Non-invertible starting MA parameters found.
20/20
                                          0s 8ms/step
Processing cities:
                                5%|
                                                      | 186/3490 [04:54<2:56:18, 3.20s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME'
   city_data = city_data.resample('M').agg({'AverageTemperature': 'mean'})
rocessing cities: 5%| | 190/3490 [04:56<1:05:22, 1.19s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_di
Processing cities:
                                5%|
super().__init__(**kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
warn('Non-invertible starting MA parameters found.'
/usr/local/lib/python3.11/dist-packages/statsmodels/base/model.py:607: ConvergenceWarning: Maximum Likelihood optimization failed to converge. Check mle_retvals warnings.warn("Maximum Likelihood optimization failed to "
12/12 -
                                         - 0s 4ms/step
Processing cities: 5% | | 191/3490 [05:04<3:05:46, 3.38s/it]<a href="mailto:sample">191/3490 [05:04<3:05:46, 3.38s/it]</a> | 191/3490 [05:04<3:05:46, 3.38s/it]<
Processing cities: 6%| | 223/3490 [05:23<30:34, 1.78it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `inpu super().__init__(**kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
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12/12
                                        - 0s 10ms/step
  2.78s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME
Processing cities: 7% | | 227/3490 [05:33<1:11:25, 1.31s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `in super().__init__(**kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
                                                       227/3490 [05:33<1:11:25, 1.31s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_d
   warn('Non-invertible starting MA parameters found.
5/15 ——— Os 8ms/step
15/15
                                7%|
                                                       | 228/3490 [05:39<2:37:00, 2.89s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME
Processing cities:
rocessing cities: 7% 230/3490 [05:34x(1:39:14, 1.83s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_d super().__init__(**kwargs)
super().__init__("~kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
warn('Non-invertible starting MA parameters found.'
13/13
                                         - 0s 10ms/step
| 231/3490 [05:48<3:00:51, 3.33s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME city_data = city_data.resample('M').agg(('AverageTemperature': 'mean'))

| 266/3490 [06:09<33:50, 1.59it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_dim super()__init__(**twargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
   warn('Non-invertible starting MA parameters found.
4/14 —————— 0s 9ms/step
14/14
Processing cities: 8%|■
                                                        267/3490 [06:15<1:59:11, 2.22s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME
   city_data = city_data.resample('M').agg({'AverageTemperature
Processing cities: 8% | | 280/3490 [06:23<31:49, 1.68it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnm/rnm.py.200. User Maining. User Mainin
                                                       | 280/3490 [06:23<31:49, 1.68it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_dim
   warn('Non-invertible starting MA parameters found.'

5/15 — 0s 8ms/step

rocessing cities: 8%| | 281/3490 [06:29<1:57:46, 2.20s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME
Processing cities:
   city_data = city_data.resample('M').agg({'AverageTemperature
| 305/3490 [06:44<2:53, 1.24it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/insuper().__init__(**kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:966: UserWarning: Non-stationary starting autoregressive parameters found. Using zeros as starting parameters.
                                                       | 385/3490 [06:44<42:53, 1.24it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`inp
warn('Non-stationary starting autoregressive parameters' /usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
   warn('Non-invertible starting MA parameters found.
/usr/local/lib/python3.11/dist-packages/statsmodels/base/model.py:607: ConvergenceWarning: Maximum Likelihood optimization failed to converge. Check mle_retvals warnings.warn("Maximum Likelihood optimization failed to "
15/15 -
                                         - 0s 9ms/step
| 306/3490 [06:52<2:33:41, 2.90s/it]</td>
    | 306/3490 [06:52<2:33:41, 2.90s/it]<ip>rocessing cities: 9%| | | 306/3490 [06:52<2:33:41, 2.90s/it]<ip>rocessing city_data = city_data.resample('M').agg(('AverageTemperature': 'mean'))

                                                       | 307/340 [06:53<1:56:11, 2.19s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input shape`/`input d
Processing cities: 9%| super().__init__(**kwarg:
super().__init__(**kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
   warn('Non-invertible starting MA parameters found.
                                         - 0s 8ms/step | 308/3490 [07:00<3:17:29, 3.72s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME
15/15
Processing cities:
                                9%|
  city_data_resample('M').agg('AverageTemperature': 'mean'))
rocessing cities: 9%| | | 310/3490 [07:01<1:51:29, 2.10s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_d
Processing cities: 9% | | 310/3490 [07:01<1:51:29, 2.10s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `in super().__init__(**kwargs) / usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
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warn('Non-invertible starting MA parameters found.'
//usr/local/lib/python3.11/dist-packages/statsmodels/base/model.py:607: ConvergenceWarning: Maximum Likelihood optimization failed to converge. Check mle\_retvals warnings.warn("Maximum Likelihood optimization failed to "

'mean'})

city\_data\_resample('M').agg(('AverageTemperature': 'mean'))

Processing cities: 9%| | 312/3490 [07:10<2:43:12, 3.08s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape'/`input\_d

Processing cities: % | | 312/3490 [07:10<2:43:12, 3.08s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an in super().\_\_init\_\_(\*\*kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.

4.16s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME

313/3490 [07:17<3:31:12, 3.99s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME

328/3490 [07:26<31:07, 1.69it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_dim

15/15 -

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Processing cities:

Processing cities:

Processing cities:

super(). init (\*\*kwar

0s 9ms/step

**0s** 11ms/step

city\_data = city\_data.resample('M').agg(\"4verageTemperature' rocessing cities: 9%| | | 328/3490 [07:26<31:07, 1.

9%|

9%|

warn('Non-invertible starting MA parameters found.

| 311/3490 [07:10<3:40:34,

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/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
warn('Non-invertible starting MA parameters found.'
/usr/local/lib/python3.11/dist-packages/statsmodels/base/model.py:607: ConvergenceWarning: Maximum Likelihood optimization failed to converge. Check mle_retvals
  warnings.warn("Maximum Likelihood optimization failed to
16/16
                             0s 12ms/step
Processing cities: 9%
  city data
super().__init__(**kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
```

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cities: 9% | 329/3490 [07:34<2:26:14, 2.78s/it]</td>
    | 329/34<2:26:14, 2.78s/it]</td>
    | 329/34<2:26:14, 2.78s/it]</td>
    | 329/34<2:26:14, 2.78s/it]</td>
    | 329/34<2:2
/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_dim` argument to a layer. When using Sequential models, prefer using an
warn('Non-invertible starting MA parameters found.'
/usr/local/lib/python3.11/dist-packages/statsmodels/base/model.py:607: ConvergenceWarning: Maximum Likelihood optimization failed to converge. Check mle_retvals warnings.warn("Maximum Likelihood optimization failed to "
13/13 -
                                                - 0s 10ms/step
   | 330/3490 [07:41<3:29:28, 3.98s/it]</ri>
ip | | | | 330/3490 [07:41<3:29:28, 3.98s/it]</pre>
| | | | 330/3490 [07:41<3:29:28, 3.98s/it]</p>
| | | | 330/3490 [07:41<3:29:28, 3.98s/it]</p>
| | | | 330/3490 [07:41<3:29:28, 3.98s/it]</p>
| | | 330/3490 [07:41<3:29:28, 3.98s/it]</p>
| | | 330/3490 [07:41<3:29:28, 3.98s/it]</p>
| 330/3490 [07:41<
Processing cities: 10% | 337/3490 [07:44<43:14, 1.22it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `inpu super().__init__(**kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
                                                                | 337/3490 [07:44443:14, 1.22it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/ input_dim
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Processing cities: 10%
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:966: UserWarning: Non-stationary starting autoregressive parameters found. Using zeros as starting parameters.
warn('Non-stationary starting autoregressive parameters'
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
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4/14 _____ 0s 9ms/step
Processing cities: 11%
                                                               1 387/3490 [08:33<2:01:16, 2.35s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME'
                                              resample('M').agg({'AverageTemperature': 'mean'}) | 397/3490 [08:40<31:56, 1.61it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_dim
   city_data = city_data.
Processing cities: 11% | 397/3490 [08:40<31:56, 1.61it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `inpu super().__init__(**kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
warn('Non-invertible starting MA parameters found.

15/15 ——————— 0s 8ms/step
1398/3490 [08:46<2:00:45, 2.34s/it]</pre>
Processing cities: 11% | | 398/3490 [08:46<2:00:45, 2.34s/it]</pre>
input_data = city_data.resample('M').agg({'AverageTemperature': 'mean'})
Processing cities: 11% | | 400/3490 [08:48<1:24:49, 1.65s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape'/`input_d super().__init_(**kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
warn('Non-invertible starting MA parameters found.'
Processing cities: 11% | 401/3490 [08:55<2:42:52, 3.16s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME city_data = city_data.resample('M').agg('AverageTemperature': 'mean') | 422/3490 [09:07<28:17, 1.81it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape' / input_dim super(').__init__(**kwargs) | 422/3490 [09:07<28:17, 1.81it/s]/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
    warn('Non-invertible starting MA parameters found.
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Processing cities: 12%
                                                                 423/3490 [09:15<2:15:35, 2.65s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME
   city_data = city_data.resample('M').agg(('AverageTemperature'
rocessing cities: 12%| 432/3490 [09:20<31:52, 1.
Processing cities: 12%| super().__init__(**kwargs
                                                                 432/3490 [09:20<31:52, 1.60it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_dim
super().__init__(~~wwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
    warn('Non-invertible starting MA parameters found.
3/13 ————— Os 10ms/step
es lums/step

Processing cities: 12% | | 433/3490 [09:28<2:23:07, 2.81s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME city_data = city_data.resample('M').agg({'AverageTemperature': 'mean'})

Processing cities: 13% | | 442/3490 [09:33<32:29, 1.56it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape'/ input_dim super().__init__(**kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters. warn('Non-invertible starting MA parameters found.'
15/15
                                                - 0s 9ms/step
                                                                | 443/3490 [09:41<2:22:12, 2.80s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME M').agg({'AverageTemperature': 'mean'})
| 481/3490 [10:03<39:16, 1.28it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape'/`input_dim
Processing cities: 13%
13/13
                                                - 0s 10ms/step
   Processing cities: 14%
Processing cities: 14% | 495/3490 [10:18<31:41, 1.58it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `inpur super().__init__(**kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
                                                                 495/3490 [10:18<31:41, 1.58it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_dim
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warn('Non-invertible starting MA parameters found.

3/20 ———— 0s 7ms/step

12/12 -

Processing cities: 15%

Processing cities: 15%

Processing cities: 14% 497/3490 [10:35<3:51:23, 4.64s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME Processing cities: 14%| super().\_\_init\_\_(\*\*kwargs) Super().\_\_init\_\_(\*\*Kwargs)
//usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters. warn('Non-invertible starting MA parameters found.'

20/20 — 65 7ms/step

Processing cities: 15% | 507/3490 [10:50<2:52:30, 3.47s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME esample('M').agg({'AverageTemperature': 'mean'}) | 307/3430 [10:57<33:43, 1.47it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_dim warn('Non-invertible starting MA parameters found.

**- 0s** 26ms/step Processing cities: 15% 11:11<3:50:22, 4.65s/it]<ip>ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME | 522/3490 [11:131:17:42, 1.57s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_d

| 523/3490 [11:21<2:44:48, 3.33s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME

warn('Non-invertible starting MA parameters found.
3/13 — 0s 11ms/step 13/13

city\_data = city\_data\_resample('M').agg({'AverageTemperature': 'mean'})

Processing cities: 15% | | 525/3490 [11:22<1:34:31, 1.91s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape'/insuper().\_init\_\_(\*\*kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:966: UserWarning: Non-stationary starting autoregressive parameters found. Using zeros as starting parameters. esample('M').agg({'AverageTemperature': 'mean'})
| 525/3490 [11:22<1:34:31, 1.91s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_di warn('Non-stationary starting autoregressive parameters'
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warn('Non-invertible starting MA parameters found. OS 8ms/step | 526/3490 [11:28<2:45:50, 3.36s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME'

city\_data = city\_data.resample('M').agg({'AverageTemperature': 'mean'}) | 536/3490 [11:35<32:24, 1.52it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`inp super().\_\_init\_\_(\*\*kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:966: UserWarning: Non-stationary starting autoregressive parameters found. Using zeros as starting parameters. | 536/3490 [11:35<32:24, 1.52it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_dim`

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Processing cities: 15%| | 537/city_data = city_data.resample(''')
Processing cities: 15% | | 537/3490 [11:42<2:09:04, 2.62s/it]<ip>kerolar city_data = city_data_resample('M').agg({'AverageTemperature': 'mean'})
Processing cities: 16% | | 552/3490 [11:51<27:24, 1.79it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape'/ input_dim` super()__init__(**kwargs)
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15/15
                                   - 0s 8ms/step
Processing cities: 16%
                                               553/3490 [11:59<2:08:19, 2.62s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME'
city_data_resample('M').agg('AverageTemperature': 'mean'))

Processing cities: 16% | | 561/3490 [12:03<32:26, 1.50it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input super().__init_(**kwargs)

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Processing cities: 16% 1 | 573/3490 [12:16<32:34, 1.49it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `inpu super().\_init\_\_(\*\*kwargs)
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12/12 \_\_\_\_\_\_\_\_ 0s 4ms/step

/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.

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Processing cities: 16%

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warn('Non-invertible starting MA parameters found.
4/14 \_\_\_\_\_\_ 0s 9ms/step

warn('Non-invertible starting MA parameters found.
3/13 \_\_\_\_\_\_ 0s 10ms/step

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warn('Non-invertible starting MA parameters found.

- **0s** 11ms/step

• 0s 10ms/step

Processing cities: 18%

Processing cities: 18%

Processing cities: 18%

12/12 -

14/14 -

15/15

13/13

Processing cities: 19%

init (\*\*kwargs)

super().

- 0s 9ms/step

- **0s** 11ms/step

warn('Non-invertible starting Ma parameters found.'

2/12 — \_\_\_\_\_\_\_ 0s 10ms/step

rocessing cities: 16%| | | 562/3490 [12:10<2:06:51, 2.60s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME'

warn('Non-invertible starting MA parameters found.'

14/14 \_\_\_\_\_\_\_\_ 0s 9ms/step

Processing cities: 16%| | 574/3490 [12:24<2:17:42, 2.83s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME

Processing cities: 17% | | 586/3490 [12:43<3:00:00, 3.72s/it]</pre>
| 586/3490 [12:43<3:00:00, 3.72s/it]</pre>
| 586/3490 [12:43<3:00:00, 3.72s/it]</pre>
| 586/3490 [12:43<3:00:00, 3.72s/it]</pre>
| 620/3490 [12:43<3:00:00, 3.72s/it]</pre>
| 620/3490 [13:04<26:12, 1.82it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_dim super().\_init\_(\*\*kwargs)

city\_data = city\_data\_resample('M').agg({'AverageTemperature': 'mean'})

Processing cities: 18%| | 622/3490 [13:13<1:48:13, 2.26s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_d super().\_\_init\_\_(\*\*kwargs)

Processing cities: 18% | 623/3490 [13:19<2:41:32, 3.38s/it]<pre>
| 623/3490 [13:19<2:41:32, 3.38s/it]</pre>
| 623/3490 [13:19<2:41:32, 3.38s/it]</pre>
| 623/3490 [13:19<2:41:32, 3.38s/it]</pre>
| 624/3490 [13:20<2:00:51, 2.53s/it]</pre>

13/13 — 68 lomm/step
Processing cities: 18% | 638/3490 [13:49<2:38:39, 3.34s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME city\_data = city\_data.resample('M').agg({'AverageTemperature': 'mean'})
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Processing cities: 18% | 645/3490 [14:01<2:24:41, 3.05s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME city\_data = city\_data.resample('M').agg({'AverageTemperature': 'mean'})
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13/13 — 0s 11ms/step
Processing cities: 19% | 647/3490 [14:15<4:02:52, 5.13s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME
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Processing cities: 19% | 650/3490 [14:16<1:40:17, 2.12s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_d
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city\_data = city\_data.resample('M').agg(('AverageTemperature': 'mean'))

Processing cities: 19%| | 658/3490 [14:28<42:31, 1.11it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_dim super().\_\_init\_\_(\*\*kwargs)

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| 651/3490 [14:23<2:41:24, 3.41s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME

super().\_\_init\_\_(\*\*kwargs)
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573/3490 [12:16432:34, 1.49it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_dim

| 621/3490 [13:13<2:23:29, 3.00s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME

633/3490 [13:32<36:07, 1.32it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_dim

warn('Non-invertible starting MA parameters found.'

15/15 — 69 9ms/step

Processing cities: 19%| 660/3490 [14:42<3:15:41, 4.15s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME M').agg({'AverageTemperature': 'mean'})
| 677/3490 [14:53<30:15, 1.55it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_dim | | 678/3490 [14:59<1:50:18, 2.35s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME esample('M').agg({'AverageTemperature': 'mean'}) Processing cities: 19% M').agg({'AverageTemperature': 'mean'})
| 683/3490 [15:02<48:14, 1.03s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_dim **- 0s** 9ms/step Processing cities: 20% -r-684/3490 [15:09<2:10:59, 2.80s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME City\_data = city\_data = cass\_more ("M').agg(('AverageTemperature': 'mean'))

Processing cities: 20% | | 685/3490 [15:10<1:39:12, 2.12s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do super().\_\_init\_((\*\*kwargs))

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2/12 — 0s 10ms/step

rocessing cities: 20%| 686/3490 [15:18<3:01:02, 3.87s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME 12/12 -Processing cities: 20% city\_data = city\_data.resample('M').agg({'AverageTemperature | G96/3490 [15:23<29:47, 1.56it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `inpur super().\_\_init\_\_(\*\*kwargs)

//usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters. | 696/3490 [15:23<29:47, 1.56it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_dim warn('Non-invertible starting MA parameters found.'
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rocessing cities: 20% | 697/3490 [15:30<2:00:23, 2.59s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME city\_data = city\_data.resample('M').agg({'AverageTemperature': 'mean'}) 12/12 -Processing cities: 20% | 698/3490 [15:31<1:31:55, 1.988/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/isuper().\_\_init\_\_(\*\*kwargs)
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20/20 \_\_\_\_\_\_\_ 0s 7ms/step warn('Non-invertible starting MA parameters found. 12/12 -**0s** 11ms/step rocessing cities: 20%| | 707/3490 [16:02<2:31:27, 3. city\_data = city\_data.resample('M').agg({'AverageTemperature': /usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_dim` argument to a layer. When using Sequential models, prefer using an super().\_\_init\_\_(\*\*kwargs) /usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters. warn('Non-invertible starting MA parameters found.'

2/12 — \_\_\_\_\_\_\_ 0s 10ms/step

rocessing cities: 20%| 708/3490 [16:09<3:31:59, 4.57s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME' 12/12 Processing cities: 20%

Processing cities: 20% | 70%/3496 [16:09<3:31:59, 4.5/5/11/(a)pthon-input-/-328d46eed31c>:2e: Futurewarning: M° is deprecated and will be removed in a future version, please use Mc city\_data = city\_data.resample('M').agg('AverageTemperature': 'mean'))

Processing cities: 20% | 709/3490 [16:10<2:35:57, 3.36s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape'/input\_di super().\_\_init\_\_(\*\*kwargs)

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1/2/12

— 0s 12ms/step

Processing cities: 20% | 710/3490 [16:19<3:59:58, 5.18s/it]<a href="https://apython-input-7-328d46eed31c>:26">apython-input-7-328d46eed31c>:26</a>: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME'

Processing cities: 20% | 710/3490 [16:190:39:30, 3:165/Li(t)python3-li/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_disuper().\_\_init\_\_(\*\*kwargs) /usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:966: UserWarning: Non-stationary starting autoregressive parameters found. Using zeros as starting parameters. warn('Non-stationary starting autoregressive parameters'
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13/13 — 0s 10ms/step

Processing cities: 20% 713/3490 [16:26<2:51:39, 3.71s/it]</ri> city\_data = city\_data\_resample('M').agg({'AverageTemperature': 'mean'})

Processing cities: 21%| 716/3490 [16:28<1:15:15, 1.63s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_di super().\_\_init\_\_(\*\*kwargs)

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3/13 ————— 0s 11ms/step

rrocessing cities: 21% | 717/3490 [16:35<2:28:39, 3.22s/it]<a href="mailto:dity\_data" | 717/3490 [16:35<2:28:39, 3.22s/it]</a> | 726/3490 [16:35<2:28:39, 3.22s/it]</a> | 3.22s/it]</a> | 726/3490 [16:40<30:10, 1.53it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_dim` super().\_\_init\_\_(\*\*kwargs)

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Processing cities: 21% | 9s 10ms/step 

/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters. warn('Non-invertible starting MA parameters found

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city\_data = city\_data.resample('M').agg(('AverageTemperature': 'mean'))

Processing cities: 22% | 753/3490 [17:09<29:41, 1.54it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_dim super().\_\_init\_\_(\*\*kwargs) super().\_\_init\_\_(\*\*kwargs)
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13/13 -- **0s** 11ms/step

| 754/3490 [17:15<1:40:48, 2.21s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME city\_data = city\_data.resample('M').agg({'AverageTemperature': 'mean'})
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- 0s 8ms/step | 755/3490 [17:22<2:54:20, 3.82s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME Processing cities: 22%

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city data =
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| 756/3490 [17:23<2:09:24, 2.84s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `in| super().__init__(**kwargs)
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Processing cities: 22%| | 759/3490 [17:32<1:54:29, 2.52s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_d super().__init__(**kwargs)</p>
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Processing cities: 22%
city_data = city_data.resample('M').agg(('AverageTemperature': 'mean'))
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                                 - 0s 9ms/step | 783/3490 [18:00<2:12:42, 2.94s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME
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Processing cities: 23% | 786/3490 [18:02<1:01:38, 1.37s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_d super().__init__(**kwargs)

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city\_data = city\_data\_resample('M').agg({'AverageTemperature': 'mean'})

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| 18:45<1:45:57, 2.39s/it]</p>
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| 829/3490 [18:53<2:30:47, 3.40s/it]<ip>| 829/3490 [18:53<2:30:47, 3.40s/it]</p>
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| 828/3490 [18:46<1:28:06, 1.99s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_d

| 830/3490 [19:01<3:28:34, 4.70s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME

| 832/3490 [19:02(1:54:29, 2.58s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_d

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| 860/3490 [19:40<29:42, 1.48it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_dim

862/3490 [19:47<1:15:23, 1.72s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_d

863/3490 [19:54<2:27:29, 3.37s/it]<pre>solution
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| 888/3490 [20:18<1:51:56, 2.57s/it]<irython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME'

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903/3490 [20:44<33:43, 1.28it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input

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city\_data = city\_data.resample('M').agg(('AverageTemperature': 'mean'))

Processing cities: 27% | 950/3490 [21:47<37:43, 1.12it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_dim super().\_\_init\_\_(\*\*kwargs)

super().\_\_init\_\_(\*\*kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
warn('Non-invertible starting MA parameters found.'

super().\_\_init\_\_(\*\*kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
warn("Non-invertible starting MA parameters found."

/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:966: UserWarning: Non-stationary starting autoregressive parameters found. Using zeros as starting parameters. warn('Non-stationary starting autoregressive parameters'
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.

warn('Non-invertible starting MA parameters found.'
3/13 — 0s 9ms/step
0ccessing cities: 28%| | 961/3490 [22:13<1:52:11, 2.66s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME city\_data = city\_data.resample('M').agg({'AverageTemperature': 'mean'})

cities: 28% | | 962/3490 [22:21<3:02:30, 4.33s/it]</ri>
i 962/3490 [22:21<3:02:30, 4.33s/it]</p>
i your formula for the formula of the control of the

/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_dim` argument to a layer. When using Sequential models, prefer using an super().\_\_init\_\_(\*\*kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.

/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/ input\_dim` argument to a layer. When using Sequential models, prefer using an super().\_\_init\_\_(\*\*kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.

rocessing cities: 28% | 972/3490 [22:40<1:49:50, 2.62s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME city\_data = city\_data.resample('M').agg({'AverageTemperature': 'mean'})

rocessing cities: 28% | 979/3490 [22:55<1:53:27, 2.71s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME city\_data = city\_data.resample('M').agg({'AverageTemperature': 'mean'}) /usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/ input\_dim` argument to a layer. When using Sequential models, prefer using an super().\_\_init\_\_(\*\*kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.

/Wary/local/lib/python3.11/dist-packages/keras/statsmodels/base/model.py:607: ConvergenceWarning: Maximum Likelihood optimization failed to converge. Check mle\_retvals

13/13 — 0s 10ms/step

Processing cities: 28% 981/3490 [23:12<3:53:54, 5.59s/it]</p> | 7501/3470 | 23:12<3:53:54, 5.59s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city\_data = city\_data.resample('M').agg({'AverageTemperature': 'mean'})
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Processing cities: 29% | 997/3490 [23:33<1:35:50, 2.31s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME city\_data = city\_data.resample('M').agg({'AverageTemperature': 'mean'})
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/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
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| 973/3490 [22:40<1:23:41, 2.00s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/` super().\_\_init\_\_(\*\*kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:966: UserWarning: Non-stationary starting autoregressive parameters found. Using zeros as starting parameters.

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3.49s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME

3.13s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME

945/3490 [21:44<1:50:17, 2.60s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME

952/3490 [21:56<1:39:43, 2.365/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_d

| 960/3490 [22:07<42:45, 1.01s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_dim

963/3490 [22:28<3:27:03, 4.92s/it]<pre>kit]cityfing a future version, please use 'ME

M').agg({'AverageTemperature': 'mean'})
| 971/3490 [22:33<43:12, 1.03s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_dim

973/3490 [22:40<1:23:41, 2.00s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_d

| 974/3490 [22:47<2:20:49, 3.36s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME

980/3490 [23:03<2:55:14, 4.19s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME

- 0s 10ms/step | 953/3490 [22:02<2:26:08, 3.46s/it]<pre>
| 953/3490 [22:02<2:26:08, 3.46s/it]</pre>
| 953/3490 [22:02<2:26:08, 3.46s/it]</pre>
| 953/3490 [22:02<2:26:08, 3.46s/it]</pre>

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                                          on3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
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                                                         - 0s 10ms/step
| 998/3490 [23:40<2:34:32, 3.72s/it]</td>
    | 998/3490 [23:40<2:34:32, 3.72s/it]</td>

                                                                             999/3490 [23:40<1:55:00, 2.77s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_d
 Processing cities: 29%| super(), init (**kwargs)
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 Processing cities: 29%
    city_data = city_data.resample('M').agg({'AverageTemperature
                                                                                                                                                'mean'})
Processing cities: 30%| super().__init__(**kwargs)
                                            30%|
                                                                           | 1055/3490 [24:2727:59, 1.45it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_dim
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                                                           0s 3ms/step
| 1056/3490 [24:31<1:17:31, 1.91s/it]<a href="https://doi.org/10.1016/j.jr/j.com/refe/310/10.1016/j.jr/j.com/refe/310/10.1016/j.jr/j.com/refe/310/10.1016/j.jr/j.jr/j.com/refe/310/10.1016/j.jr/j.com/refe/310/10.1016/j.jr/j.com/refe/310/10.1016/j.jr/j.com/refe/310/10.1016/j.jr/j.com/refe/310/10.1016/j.jr/j.com/refe/310/10.1016/j.jr/j.com/refe/310/10.1016/j.jr/j.com/refe/310/10.1016/j.jr/j.com/refe/310/10.1016/j.jr/j.com/refe/310/10.1016/j.jr/j.com/refe/310/10.1016/j.jr/j.com/refe/310/10.1016/j.jr/j.com/refe/310/10.1016/j.jr/j.com/refe/310/10.1016/j.jr/j.com/refe/310/10.1016/j.jr/j.com/refe/310/10.1016/j.jr/j.com/refe/310/10.1016/j.jr/j.com/refe/310/10.1016/j.jr/j.com/refe/310/10.1016/j.jr/j.com/refe/310/10.1016/j.jr/j.com/refe/310/10.1016/j.jr/j.com/refe/310/10.1016/j.jr/j.com/refe/310/10.1016/j.jr/j.com/refe/310/10.1016/j.jr/j.com/refe/310/10.1016/j.jr/j.com/refe/310/10.1016/j.jr/j.com/refe/310/10.1016/j.jr/j.com/refe/310/10.1016/j.jr/j.com/refe/310/10.1016/j.jr/j.com/refe/310/10.1016/j.jr/j.com/refe/310/10.1016/j.jr/j.com/refe/310/10.1016/j.jr/j.com/refe/310/10.1016/j.jr/j.com/refe/310/10.1016/j.jr/j.com/refe/310/10.1016/j.jr/j.com/refe/310/10.1016/j.jr/j.com/refe/310/10.1016/j.jr/j.com/refe/310/10.1016/j.jr/j.com/refe/310/10.1016/j.jr/j.com/refe/310/10.1016/j.jr/j.com/refe/310/10.1016/j.jr/j.com/refe/310/10.1016/j.jr/j.com/refe/310/10.1016/j.jr/j.com/refe/310/10.1016/j.jr/j.com/refe/310/10.1016/j.jr/j.com/refe/310/10.1016/j.jr/j.com/refe/310/10.1016/j.jr/j.com/refe/310/10.1016/j.jr/j.com/refe/310/10.1016/j.jr/j.com/refe/310/10.1016/j.jr/j.com/refe/310/10.1016/j.com/refe/310/10.1016/j.com/refe/310/10.1016/j.com/refe/310/10.1016/j.com/refe/310/10.1016/j.com/refe/310/10.1016/j.com/refe/310/10.1016/j.com/refe/310/10.1016/j.com/refe/310/10.1016/j.com/refe/310/10.1016/j.com/refe/310/10.1016/j.com/refe/310/10.1016/j.com/refe/310/10.1016/j.com/refe/310/10.1016/j.com/refe/310/10.1016/j.com/refe/310/10.1016/j.com/refe/310/10.1016/j.com/refe/310/10.1016/j.com/refe/310/10.1016/j.com/refe/310/10.1016/j.com/refe/310/10.1016
                                                             ample('M').agg({'AverageTemperature': 'mean'})
| 1058/3490 [24:32<49:04, 1.21s/it] /usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_d
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    city_data = city_data.
| 1075/3490 [24:58<23:00, 1.75it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `inpu super().__init__(**kwargs)
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 13/13
Processing cities: 31% | 1076/3490 [25:05<1:40:23, 2.50s/it]<ip>ip 1076/3490 [25:05<1:40:23, 2.50s/it]</p>
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                                     (**kwargs)
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/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
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3/13 ______ 0s 11ms/step
Processing cities: 31% | 1092/3490 [25:28<1:39:14, 2.48s/it]</ri>
Processing cities: 31% | 1092/3490 [25:28<1:39:14, 2.48s/it]</pre>
ipy_data = city_data = city_data.resample('M').agg('AverageTemperature': 'mean'))
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                                                                            | 1113/3490 [25:53-41:58, 1.06s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_di
13/13 — 05:10ms/step

Processing cities: 32% | 1114/3490 [25:59<1:43:51, 2.62s/it]</p>

| 1114/3490 [25:59<1:43:51, 2.62s/it]</p>
| 1120/3490 [26:03<40:39, 1.03s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `inple super().__init__(**kwargs)
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                                                                             d').agg({'AverageTemperature': 'mean'})
| 1123/3490 [26:11<1:03:42,  1.62s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_
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6/16 8 ms/step
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Processing cities: 32%| super().__init__(**kwargs)
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Processing cities: 32% | 1126/3490 [26:27<2:37:58, 4.01s/it]<a href="mailto:dipython-input-7-328d46eed31c">lipython-input-7-328d46eed31c</a>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city_data = city_data.resample('M').agg({'AverageTemperature': 'mean'})
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                         init (**kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters. warn('Non-invertible starting MA parameters found.'
/usr/local/lib/python3.11/dist-packages/statsmodels/base/model.py:607: ConvergenceWarning: Maximum Likelihood optimization failed to converge. Check mle_retvals
     warnings.warn("Maximum Likelihood optimization failed to "
                                                           0s 9ms/step
 Processing cities: 32%
                                                                             | 1127/3490 [26:34<3:21:07, 5.11s/it]</pre>
ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M'
city_data = city_data.resample('M').agg(\(\frac{1}{2}\) werageFemperature': 'mean'\)

Processing cities: 32% | 1129/3490 [26:35<1:49:33, 2.78s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_super().__init__(**kwargs)
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city\_data = city\_data.resample('M').agg(('AverageTemperature': 'mean'))

Processing cities: 33%| | 1140/3490 [26:48<25:31, 1.53it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_di super().\_\_init\_\_(\*\*kwargs)

| 1130/3490 [26:42<2:39:09, 4.05s/it]</rr>
ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M

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     | 1147/3490 [27:11<2:19:15, 3.57s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city_data = city_data.resample('M').agg({'AverageTemperature': 'mean'})
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Processing cities: 33% | 1162/3490 [27:35<30:31, 1.27it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`isuper().__init__(**kwargs)
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/usr/local/lib/python3.11/dist-packages/statsmodels/fsa

Processing cities: 35% | 1235/3490 [30:57<2:44:36, 4.38s/it]<ip>ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME city\_data = city\_data.resample('M').agg({'AverageTemperature': 'mean'})
/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_dim` argument to a layer. When using Sequential models, prefer using an `input\_shape`/`input\_dim` argument to a layer. When using Sequential models, prefer using an `input\_shape`/`input\_dim` argument to a layer. When using Sequential models, prefer using an `input\_shape`/`input\_dim` argument to a layer. When using Sequential models, prefer using an `input\_shape`/`input\_dim` argument to a layer. When using Sequential models, prefer using an `input\_shape`/`input\_dim` argument to a layer. When using Sequential models, prefer using an `input\_shape`/`input\_dim` argument to a layer. When using Sequential models, prefer using an `input\_shape`/`input\_dim` argument to a layer. When using Sequential models, prefer using an `input\_shape`/`input\_dim` argument to a layer. When using Sequential models, prefer using an `input\_shape`/`input\_dim` argument to a layer. When using Sequential models, prefer using an `input\_shape`/`input\_dim` argument to a layer. When using Sequential models, prefer using an `input\_shape`/`input\_dim` argument to a layer. When using Sequential models, prefer using an `input\_shape`/`input\_dim` argument to a layer. When using Sequential models, prefer using an `input\_shape`/`input\_dim` argument to a layer. When using Sequential models, prefer using an `input\_shape`/`input\_dim` argument to a layer. When using Sequential models, prefer using an `input\_shape`/`input\_dim` argument to a layer. When using Sequential models, prefer using an `input\_shape`/`input\_dim` argument to a layer. When using Sequential models, prefer using a sequential models, prefer using a sequential models.

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Processing cities: 35% | 1238/3490 [31:11<2:49:29, 4.52s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME city\_data = city\_data.resample('M').agg({'AverageTemperature': 'mean'})

Processing cities: 36% | 1239/3490 [31:12<2:04:49, 3.33s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_d super().\_\_init\_\_(\*\*kwargs)

13/13 — 0s 10ms/step

Processing cities: 36% 10ms | 1240/3490 [31:19<2:46:06, 4.43s/it]</p>

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Processing cities: 37% | 1289/3490 [32:00<1:20:13, 2.19s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city\_data = city\_data.resample('M').agg(('AverageTemperature': 'mean'))
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| 1221/3490 [30:09<3:31:13, 5.59s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M'M').agg({'AverageTemperature': 'mean'})
| 1224/3490 [30:11<1:25:56, 2.28s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_d

| 1331/3490 [30:41<2:37:22, 4.18s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME

| 1232/3990 [30:42<1:56:23, 3.095/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_d

| 1234/3490 [30:50<2:01:47, 3.24s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_d

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/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.

| Interesting Cities: 35%| | Interesting Cities:

super().\_\_init\_\_(\*\*kwargs)
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Processing cities: 3% | 1232/3490 [30:42<1:56:23, 3.09s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `in super().\_\_init\_\_(\*\*kwargs)

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resample('M').agg({'AverageTemperature

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Processing cities: 35%

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Processing cities: 35%| super().\_\_init\_\_(\*\*kwargs)

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Processing cities: 35%

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Processing cities: 37%|
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13/15 — 95 sins/step | 1305/3490 [32:39<2:17:15, 3.775/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city_data = city_data.resample('M').agg(('AverageTemperature': 'mean'))

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Processing cities: 39%| super().\_\_init\_\_(\*\*kwargs)

Processing cities: 40%| super().\_\_init\_\_(\*\*kwargs)

Processing cities: 40%

Processing cities: 40%

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 Processing cities: 40%
                                                                           1 403/3490 [35:47<1:40:37, 2.89s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME
city_data = city_data_resample('M').agg({'AverageTemperature': 'mean'})

Processing cities: 40%| | 1404/3490 [35:47<1:16:06, 2.19s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_d
                         _init__(**kwargs)
    super()
super().__init__("~kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
warn('Non-invertible starting MA parameters found.'
13/13
                                                          • 0s 10ms/step
13/13 — 90 lows/step

Processing cities: 40% [ 1405/3490 [35:54<2:05:11, 3.60s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME city_data = city_data.resample('M').agg(('AverageTemperature': 'mean'))
                                                                           m ).agg(( Average temperature : mean )) | 1406/3490 | 35:55<:133:24, 2.695/it]|usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_d
Processing cities: 40% | 1406/3490 [35:55<1:33:24, 2.69s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an in super()._init_(**kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
warn('Non-invertible starting MA parameters found.

13/13 — 0s 14ms/step

Processing cities: 40%| 1407/3490 [36:01
13/13 — 6s 14ms/step
Processing cities: 40%| | 1407/3490 [36:01c2:08:20, 3.70s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME city_data = city_data.resample('M').agg({'AverageTemperature': 'mean'})
//usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape'/'input_dim' argument to a layer. When using Sequential models, prefer using an `super()._init_(**kwargs)
//usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
| 1408/3490 [36:08<2:44:57, 4.75s/it]</td>
    | 1408
Processing cities: 40%| super().__init__(**kwargs)
Processing cities: 40% | 1413/3490 [36:17<1:50:11, 3.18s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME city_data = city_data.resample('M').agg(('AverageTemperature': 'mean'))

Processing cities: 41% | 1414/3490 [36:18<1:22:53, 2.40s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_d super()._init_(**kwargs)
super().__init__(**kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
warn("Non-invertible starting MA parameters found."
Warm (Non-Invertible Starting Ma parameters found.

13/13 — 0s 10ms/step

Processing cities: 41%| 1415/3490 [36:24<2:02:33, 3.54s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future vers city_data = city_data.resample('M').agg(('AverageTemperature': 'mean'))

Processing cities: 41% | 1418/3490 [36:26<59:35, 1.73s/it] /usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `in super().__init__(**kwargs)

/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
                                                     | 1415/3490 [36:24<2:02:33, 3.54s/it]<pre><ir><ir><ir>| 1415/3490 [36:24<2:02:33, 3.54s/it]</pre>| 1415/3490 [36:24<2:02:33, 3.54s/it]</pre>| 1415/3490 [36:24<2:02:33, 3.54s/it]</pre>| 1415/3490 [36:24<2:02:33, 3.54s/it]</pre>| 1415/3490 [36:24<2:02:33, 3.54s/it]</p>| 1415/3490 [36:24<2:02:33, 3.54s/it]</td>| 141
                                                                           1418/3490 [36:26c59:35, 1.73s/it] /usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_d
    warn('Non-invertible starting MA parameters found.
14/14 — 0s 10ms/step
Processing cities: 41%| 141
                                                                            1419/3490 [36:33<1:47:56, 3.13s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME
| City_data = city_data resample('M').agg({'AverageTemperature': 'mean'}) |
| 1434/3490 [36:42<21:41, 1.58it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_dim super().__init_(**kwargs)
 /usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
warn('Non-invertible starting MA parameters found.'

12/12 — 0s 11ms/step

Processing cities: 41% 1435/3490 [36:48<1:20:51, 2.36s/it]</p>
 | 1435/3472 | 1436/3493 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436/3494 | 1436
Processing cities: 41% | 1447/3490 [37:02<1:18:42, 2.31s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city_data = city_data.resample('M').agg({'AverageTemperature': 'mean'})
/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_dim` argument to a layer. When using Sequential models, prefer using an `input_shape`/`input_dim` argument to a layer. When using Sequential models, prefer using an `input_shape`/`input_dim` argument to a layer. When using Sequential models, prefer using an `input_shape`/`input_dim` argument to a layer. When using Sequential models, prefer using an `input_shape`/`input_dim` argument to a layer. When using Sequential models, prefer using an `input_shape`/`input_dim` argument to a layer. When using Sequential models, prefer using an `input_shape`/`input_dim` argument to a layer. When using Sequential models, prefer using an `input_shape`/`input_dim` argument to a layer. When using Sequential models, prefer using an `input_shape`/`input_dim` argument to a layer. When using Sequential models, prefer using an `input_shape`/`input_dim` argument to a layer. When using Sequential models, prefer using an `input_shape`/`input_dim` argument to a layer. When using Sequential models, prefer using an `input_shape`/`input_dim` argument to a layer. When using Sequential models, prefer using an `input_shape`/`input_dim` argument to a layer. When using Sequential models, prefer using an `input_shape`/`input_dim` argument to a layer. When using Sequential models, prefer using a `input_shape`/`input_dim` argument to a layer. When using Sequential models, prefer using a `input_shape`/`input_dim` argument to a layer.
Justical National Indistruction of the American States of the Americ
Processing cities:
                                            42%|
                                                                             | 1457/3490 [37:29<2:03:34, 3.65s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M
city_data = city_data resample('M').agg(\'averageTemperature': 'mean'\)

Processing cities: 42%| | 1478/3490 [37:42<26:21, 1.27it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_di super().__init__(**kwargs)
15/15 — 68 9ms/step
Processing cities: 42%| 1479/3490 [37:48<1:20:56, 2.41s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city_data = city_data.resample('M').agg('AverageTemperature': 'mean'))
Processing cities: 43%| 1485/3490 [37:51<25:32, 1.31it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape'/input_di super().__init__(**kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
warn('Non-invertible starting MA parameters found.'
```

15/15 — 68 9ms/step
Processing cities: 43% | 1486/3490 [37:59<1:33:46, 2.81s/it]</p>
| 1486/3490 [37:59<1:33:46, 2.81s/it]</p>
| 1486/3490 [37:59<1:33:46, 2.81s/it]</p>
| 1486/3490 [37:59<1:33:46, 2.81s/it]</p>
| 1499/3490 [38:07<27:49, 1.19it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_di super(). init\_(\*\*kwargs)

// usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.

15/15 — 0s 9ms/step Processing cities: 43%

13/13

warn('Non-invertible starting MA parameters found. 3/13 \_\_\_\_\_\_\_ 0s 10ms/step

```
Processing cities
                                                         43%11
                                                                                                        T200/3
                                                                                                                           490 |38:13<1:19:24,
                                                                                                                                                                                     2.395/1t[<1python-input-/-32
                                                                                                                                                                                        'mean'})
                                                                                                  | 1513/3490 [38:22<21:29, 1.53it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_di
 super().__init__(~~wwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
      Processing cities: 44% 1514/3490 [38:30<1:35:33, 2.90s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city_data = city_data.resample('M').agg({'AverageTemperature': 'mean'})

Processing cities: 44% 152/3490 [38:35<24:45, 1.32it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_distantal of the control 
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters. warn('Non-invertible starting MA parameters found.'
/usr/local/lib/python3.11/dist-packages/statsmodels/base/model.py:607: ConvergenceWarning: Maximum Likelihood optimization failed to converge. Check mle_retvals
     warnings.warn("Maximum Likelihood optimization failed to "
wariangs.warin( resimum thermood optimization failed to 15/15 — 0s 14ms/step — 0s 14ms/step — 0s 14ms/step Processing cities: 44% | 1523/3490 [38:44<1:37:45, 2.98s/it]</ri>
Processing cities: 44% | 1523/3490 [38:44<1:37:45, 2.98s/it]</p>
city_data = city_data.resample('M').agg(('AverageTemperature': 'mean'))
/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape'/input_dim` argument to a layer. When using Sequential models, prefer using an `input_shape'.
      super().__init__(**kwargs)
     | 1524/3490 [38:50<2:16:43, 4.17s/it]</ri>
| 1524/3490 [38:50<2:16:43, 4.17s/it]</p>
| 4| | 1524/3490 [38:50<2:16:43, 4.17s/it]</p>
| 5| | 4| | 1524/3490 [38:50<2:16:43, 4.17s/it]</p>
| 6| | 1524/3490 [38:50<2:16:43, 4.17s/it]</p>
| 6| | 1524/3490 [38:50<2:16:43, 4.17s/it]</p>
| 6| | 1524/3490 [38:50<2:16:43, 4.17s/it]</p>
| 7| | 1524/3490 [38:50<2:16:43, 4.17s/it]</p>
| 7| | 1524/3490 [38:50<2:16:43, 4.17s/it]</p>
| 7| | 1524/3490 [38:50<2:16:43, 4.17s/it]</p>
| 8| | 1524/3490 [38:50<2:16:43, 4.17s/it]</p>
| 8| | 1524/3490 [38:50<2:16:43, 4.17s/it]</p>
| 8| | 1524/3490 [38:50<2:16:43, 4.17s/it]</p>
| 9| | 1524/3490 [38:50<2:16:43, 4.17s/it]</p>
| 9| | 1524/3490 [38:50<2:16:43, 4.17s/it]</p>
| 1524/3490 [38:50<2:16:4
 Processing cities: 44%
city_data = city_data_resample('M').agg({'AverageTemperature': 'mean'})
/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape'/`input_dim` argument to a layer. When using Sequential models, prefer using an `super().__init__(**kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
super().__init__(**kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
warn('Non-invertible starting MA parameters found.'
14/14 — 0s 15ms/step

Processing cities: 44%| | 1529/3490 [39:10<2:14:31, 4.12s/it]</p>
                                                                                                 | 1529/3490 [39:10<2:14:31, 4.12s/it]</pre>
| 1529/3490 [39:10<2:14:31, 4.12s/it]</pre>
| 1529/3490 [39:10<2:14:31, 4.12s/it]</pre>
| 1529/3490 [39:10<2:14:31, 4.12s/it]</pre>
Processing cities: 44% | | 1546/3490 [39:20<17:58, 1.80it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_di super().__init__(**kwargs)
Super().__init__(**Kwargs)
//usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `inp
//usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
warn('Non-invertible starting MA parameters found.'
14/14 _________ 0s 9ms/step
| | 1558/3496 | 39:394121:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, | 2.535/11/21:32, 
                                                                                               | 1577/3490 [39:51<18:22, 1.74it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_dim
     warn('Non-invertible starting MA parameters found.'

3/13 — 0s 11ms/step

rocessing cities: 45%| | 1578/3490 [39:57<1:12:41, 2.28s/it]</ri>
ip 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/20 | 1/2
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 Processing cities: 45%
| 1579/3490 [40:04<1:58:58, 3.74s/it]<a href="fitting-right-no-input-7-328d46eed31c>:26">itting-warning: 'M'</a> is deprecated and will be removed in a future version, please use 'ME
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/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters warn('Non-invertible starting MA parameters found.'

/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.

super().\_\_init\_\_(\*\*kwargs)
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/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.

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// Usr/local/lib/python3.11/dist-packages/statsmodels/base/model.py:607: ConvergenceWarning: Maximum Likelihood optimization failed to converge. Check mle\_retvals warnings.warn("Maximum Likelihood optimization failed to "

12/12 — 0s 13ms/step

13/13 — 68 lows/step
Processing cities: 46% | 1588/3490 [40:15<1:22:26, 2.60s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME city\_data = city\_data.resample('M').agg(('AverageTemperature': 'mean'})
Processing cities: 46% | 1602/3490 [40:24<25:17, 1.24it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape'/`input\_dim super().\_\_init\_\_(\*\*kwargs)

warn('Non-invertible starting MA parameters found.'

14/14 — 0s 10ms/step

Processing cities: 46%| | | 1603/3490 [40:31<1:19:18, 2.52s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME

city\_data = city\_data resample('M').agg('AverageTemperature': 'mean'})

Processing cities: 47% | 1624/3490 [40:43:17:34, 1.77it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_di super().\_\_init\_\_(\*\*kwargs)

/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.

Processing cities: 47% | 1625/3490 [40:50<1:18:16, 2.525/it]</p>

| 1625/3490 [40:50<1:18:16, 2.525/it]</pr>
| 1625/3490 [40:50<1:18:16, 2.525/it]</p>
| 1625/3490 [40:50<1:18:16, 2.525/it]</p>
| 1625/3490 [40:50<1:18:16, 2.525/it]</p>
| 1625/3490 [40:50<1:18:16, 2.525/it]</p>
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10/13 - 09 lows/step
Processing cities: 47%| | 1648/3490 [41:10<1:12:00, 2.35s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city\_data = city\_data.resample('M').agg({'AverageTemperature': 'mean'})
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13/13 — 6s 10ms/step
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Processing cities: 47% | 1651/3490 [41:18<1:04:35, 2.11s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_super().\_init\_\_(\*\*kwargs)
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city\_data = city\_data resample('M').agg(('AverageTemperature': 'mean'))

Processing cities: 47% | | 1657/3490 [41:28<34:22, 1.13s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_di super().\_\_init\_\_(\*\*kwargs)

Processing cities: 48% | 1660/3490 [41:42<1:51:45, 3.665/it]<pre>ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city\_data = city\_data.resample('M').agg(('AverageTemperature': 'mean'))
Processing cities: 48% | 1662/3490 [41:44<1:03:13, 2.08s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_super().\_\_init\_\_(\*\*kwargs)

| 1663/3490 [41:52<1:59:34, 3.93s/it]</ri>

- **0s** 10ms/step

warn('Non-invertible starting MA parameters found.

15/15 \_\_\_\_\_\_ @s 9ms/step

- 0s 10ms/step

13/13 -

13/13 -

Processing cities: 48%

super()

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super().__init__(**kwargs)
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                    ties: 48%| | 1664/3490 [42:00<2:37:37, 5.18s/it]</rr>
ties: 48%| | 1664/3490 [42:00<2:37:37, 5.18s/it]</rr>
city_data.resample('M').agg({'AverageTemperature': 'mean'})
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12/12 -
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                 cities: 48%| | | 1665/3490 [42:07<2:55:50, 5.78s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M = city_data.resample('M').agg({'AverageTemperature': 'mean'})
Processing cities: 48%
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12/12 — 0s 11ms/step

Processing cities: 48%  | 1666/3490 [42:13
                                                     1666/3490 [42:13<3:00:42, 5.94s/it]<pre>ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M'
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Processing cities: 48%| | 1667/3490 [42:14<2:11:35, 4.33s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_super().__init__(**kwargs)
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Processing cities: 48% | | 1668/3490 [42:22<2:41:53, 5.335/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city_data = city_data.resample('M').agg(('AverageTemperature': 'mean'})

Processing cities: 48% | | 1669/3490 [42:22<1:58:14, 3.90s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_super()__init__(***kwargs)
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Processing cities: 48%| super().__init__(**kwargs)
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14/14 _______ 0s 9ms/step

Processing cities: 49%| | 1704/3490 [43:22<1:20:59, 2.72s/it]</p>
From the starting MA parameters found.'
14/14 _______ 0s 9ms/step

Processing cities: 49%| | 1704/3490 [43:22<1:20:59, 2.72s/it]</p>
From the starting MA parameters found.'
14/14 _________ 0s 9ms/step

Processing cities: 49%| | 1704/3490 [43:22<1:20:59, 2.72s/it]</p>
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M').agg({'AverageTemperature': 'mean'})
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| 1739/3490 [44:03-18:22, 1.99it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_di

1740/3490 [44:10<1:15:19, 2.58s/it]<a href="mailto:1740/3490">ipython-input-7-328d46eed31c</a>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M

| 1742/3490 [44:11<45:02, 1.55s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_di

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cities: 50% | 1744/3490 [44:17<1:03:51, 2.19s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape'/`input\_

| 1/32/2421 [44.2441:45:45, 3.645/1T]1/32/2421 [44.2441:45:45, 3.645/1T]
= city\_data.resample('M').agg({'AverageTemperature': 'mean'})
cities: 50%| | 1752/3490 [44:28<23:18, 1.24it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_dim\_init\_\_(\*\*kwargs)

city\_data = city\_data\_resample('M').agg(['AverageTemperature': 'mean'})
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ocessing cities: 49%| | 1721/3490 [43:39<1:18:30, 2.66s/it]</p>
ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M'

Processing cities: 49% | 1727/3490 [43:49<1:18:11, 2.665/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city\_data = city\_data\_resample('M').agg(('AverageTemperature': 'mean'})

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Processing cities: 49% | 172

warn('Non-invertible starting MA parameters found. 3/13 ————— Os 10ms/step

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**- 0s** 7ms/step

Processing cities: 50% | 1729/3490 [43:57<1:43:58, city\_data = city\_data.resample('M').agg({'AverageTemperature

| 1729/3490 [43:57<1:43:58,

| 1753/3490 [44:36<1:26:56,

Processing cities: 49% city\_data = city\_data.resamp Processing cities: 49% super().\_\_init\_\_(\*\*kwargs)

Processing cities: 50%| super(). init (\*\*kwargs)

Processing cities: 50%

Processing cities: 50%

city\_data = city Processing cities:

city\_data = city Processing cities: super()

super().

20/20

13/13 Os 10ms/step Processing cities: 50% 10ms/step

Non-invertible starting

13/13 -

```
3/13 — 0s 16ms/step

rocessing cities: 50%| 1756/3490 [44:45<1:44:01, 3.60s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME city_data = city_data.resample('M').agg({'AverageTemperature': 'mean'})
 13/13
 Processing cities:
 Processing cities: 51%| super().__init__(**kwargs)
                                          51%|
                                                                       | 1767/3490 [44:52<17:33, 1.64it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_dim
 /usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:966: UserWarning: Non-stationary starting autoregressive parameters found. Using zeros as starting parameters.
 warn('Non-stationary starting autoregressive parameters'
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
     warn('Non-invertible starting MA parameters found.
 13/13
                                                       • 0s 11ms/step
 Processing cities: 51%
                                                                        | 1768/3490 [44:59<1:13:37, 2.57s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME
    rocessing cities. 318 and a city_data.resample('M').agg({'AverageTemperature': 'mean'})
rocessing cities: 51% | 1769/3490 [44:59<56:11, 1.96s/it] /usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_d
rocessing cities: 51% | 1769/3490 [44:59<56:11, 1.96s/it] /usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_d
 Processing cities:
 /usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
 warn('Non-invertible starting MA parameters found.'

15/15 — 0s 9ms/step

Processing cities: 51%| | 1770/3490 [45:06<1:35:49, 3.345/it]</p>
ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME
Processing cities: 51% [ 17/0/3490 [43:96:41:35:49, 3.34s/11/3typthon-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'Mt city_data = city_data.resample('M').agg(('AverageTemperature': 'mean'))
/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape'/input_dim` argument to a layer. When using Sequential models, prefer using an `super().__init__(**kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
warn('Non-invertible starting MA parameters found.'
/usr/local/lib/python3.11/dist-packages/statsmodels/base/model.py:607: ConvergenceWarning: Maximum Likelihood optimization failed to converge. Check mle_retvals
    warnings.warn("Maximum Likelihood optimization failed to
 15/15 — 05 9ms/step

Processing cities: 51% | 1771/3490 [45:14<2:18:05, 4.82s/it]</p>
From 15/15 — 05 9ms/step
Processing cities: 51% | 1771/3490 [45:14<2:18:05, 4.82s/it]</p>
From 15/15 — 17/16
From 15/16
Future Warning: 'M' is deprecated and will be removed in a future version, please use 'ME
    city_data = city_data.resample('M').agg({'AverageTemperature'
 Processing cities: 51%| super().__init__(**kwargs)
                                                                       | 1774/3490 [45:16<57:25, 2.01s/it] /usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_d
 /usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters. warn('Non-invertible starting MA parameters found.'
/usr/local/lib/python3.11/dist-packages/statsmodels/base/model.py:607: ConvergenceWarning: Maximum Likelihood optimization failed to converge. Check mle_retvals
     warnings.warn("Maximum Likelihood optimization failed to
warnings.warn("Maximum Likelihood optimization failed to "

1/2/12 — 0s 11ms/step

Processing cities: 51%| | 1775/3490 [45:24<1:49:08, 3.82s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME city_data = city_data.resample('M').agg(('AverageTemperature': 'mean'})

/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_dim` argument to a layer. When using Sequential models, prefer using an `super().__init__(**kwargs)

/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
     warn('Non-invertible starting MA parameters found.
3/13 _______0s_ 10ms/step
 Processing cities:
                                          51%|
                                                                       | 1776/3490 [45:29<2:05:55, 4.41s/it]</rr>
    city_data = city_data.resample('M').agg({'AverageTemperature': 'mean'})
rocessing cities: 51%| | 1777/3490 [45:30<1:32:45, 3.25s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_d
 Processing cities: 51%| Super().__init__(**kwargs)
1778/3490 [45:38<2:10:48, 4.58s/it]<a href="https://doi.org/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10.1007/10
 city_data = city_data_resample('M').agg(('AverageTemperature': 'mean'))
Processing cities: 51%| | 1784/3490 [45:41<29:12, 1.03s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_dim super().__init__(**kwargs)
 super().__init__(**kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
warn('Non-invertible starting MA parameters found.'
 /usr/local/lib/python3.11/dist-packages/statsmodels/base/model.py:607: ConvergenceWarning: Maximum Likelihood optimization failed to converge. Check mle_retvals warnings.warn("Maximum Likelihood optimization failed to "
                                                      - 0s 3ms/step
 Processing cities: 51% | | 1785/3490 [45:51<1:45:53, 3.73s/it]</td>
    | 1785/3490 [45:51<1:45:53, 3.73
     super()
                         init (**kwargs)
 /usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
     warn('Non-invertible starting MA parameters found
 13/13 — 0s 10ms/step

Processing cities: 51%| | 1786/3490 [45:57<2:08:39, 4.53s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME city_data = city_data.resample('M').agg(('AverageTemperature': 'mean'))
                                                                        | 1798/3490 [46:05<17:13, 1.64it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_di
 Processing cities: 52%
 // Just/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
    warn('Non-invertible starting MA parameters found.
3/13 ——— 0s 14ms/step
 13/13
    rocessing cities: 52% | 1799/3490 [46:13<1:19:02, 2.80s/it]</ri>
ip | 1799/3490 [46:13<1:19:02, 2.80s/it]</p>
ip | 1799/3490 [46:13<1:19:02, 2.80s/it]</p>
city_data = city_data.resample('M').agg({'AverageTemperature': 'mean'})
 Processing cities: 52%
 /usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_dim` argument to a layer. When using Sequential models, prefer using an `super().__init__(**kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
warn('Non-invertible starting MA parameters found.'
13/13 — 0s 10ms/step

Processing cities: 52% | 1800/3490 [46:19<1:46:40, 3.79s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city_data = city_data.resample('M').agg(('AverageTemperature': 'mean')')
/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an 'input_shape'/'input_dim' argument to a layer. When using Sequential models, prefer using an 'super().__init__(**kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
warn('Non-invertible starting MA parameters found.'
13/13 — 0s 10ms/step

Processing cities: 52% | 1801/3490 [46:27<2:20:13, 4.98s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city_data = city_data.resample('M').agg(('AverageTemperature': 'mean'))

Processing cities: 52% | 1810/3490 [46:32<20:26, 1.37it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape'/`input_di super().__init__(**kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
 super()._init__(**kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
warn('Non-invertible starting MA parameters found.'
 20/20 -
                                                      - 0s 7ms/step
20/20 — 68 /ms/step

1811/3490 [46:41<1:30:42, 3.24s/it]</p>
| lattl/3490 [46:41<1:30:42, 3.24s/it]</p>
| city_data = city_data.resample('M').agg({'AverageTemperature': 'mean'})

//usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape'/ input_dim` argument to a layer. When using Sequential models, prefer using an `super()._init_("*kwargs)

//usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
    20/20 -
 Processing cities:
 /usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/ input_dim` argument to a layer. When using Sequential models, prefer using an
                        _init__(**kwargs)
 /usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:966: UserWarning: Non-stationary starting autoregressive parameters found. Using zeros as starting parameters.
 warn('Non-stationary starting autoregressive parameters'
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
 warn('Non-invertible starting MA parameters found.'

15/15 — 0s 9ms/step

Processing cities: 52%| | 1813/3490 [46:57<2:33:57, 5.51s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M'
```

city\_data = city\_data.resample('M').agg({'AverageTemperature'

0s 4ms/step

Processing cities: 52%

rocessing cities: 53%

rocessing cities: 53%

11/11

'mean'})

| 1817/3490 [46:59<48:31, 1.74s/it] / usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `in super().\_\_init\_\_(\*\*kwargs) / usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.

Processing cities: 52% | 1825/3490 [47:10<21:52, 1.27it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_di super().\_\_init\_\_(\*\*tkwargs)

\text{Var}(Non-invertible starting MA parameters found.}

13/13 — 08 10ms/step

\text{Oscity\_data} = city\_\_data\_resample('M').agg(('AverageTemperature': 'mean'))}

\text{Var}(Non-invertible starting MA parameters found.}

\text{Var}(Non-invertible starting MA paramete

city\_data = city\_data\_resample('M').agg({'AverageTemperature': 'mean'})

Processing cities: 53%| | 1849/3490 [47:31<15:57, 1.71it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_di

| 1817/3490 [46:59:48:31, 1.74s/it] /usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn.py:200: UserWarning: Do not pass an `input\_shape`/ input\_

| 1818/3490 [47:06<1:34:51, 3.40s/it]</rr>
ip | 1818/3490 [47:06<1:34:51, 3.40s/it]</pre>
ip | 1818/3490 [47:06<1:34:51, 3.40s/it]</p>
ip | 1818/3490 [47:06<1:34:5

| 1826/3490 [47:17<1:15:00, 2.70s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M

```
city_data = city_data.resample('M').agg({'AverageTemperature': 'mean'})

Processing cities: 54% | 1882/3490 [47:56:15:42, 1.71it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape'/issuper()._init_(**kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:966: UserWarning: Non-stationary starting autoregressive parameters found. Using zeros as starting parameters.
                                                                       | 1882/3490 [47:56<15:42, 1.71it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_di
warn('Non-stationary starting autoregressive parameters'
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
    warn('Non-invertible starting MA parameters found
/usr/local/lib/python3.11/dist-packages/statsmodels/base/model.py:607: ConvergenceWarning: Maximum Likelihood optimization failed to converge. Check mle_retvals warnings.warn("Maximum Likelihood optimization failed to "
                                                      • 0s 9ms/step
Processing cities: 54% | | 1883/3490 [48:03<1:07:23, 2.52s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city_data = city_data.resample('M').agg({'AverageTemperature': 'mean'})
/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_dim` argument to a layer. When using Sequential models, prefer using an `input_shape`/`input_dim` argument to a layer. When using Sequential models, prefer using an `input_shape`/`input_dim` argument to a layer. When using Sequential models, prefer using an `input_shape`/`input_dim` argument to a layer. When using Sequential models, prefer using an `input_shape`/`input_dim` argument to a layer. When using Sequential models, prefer using an `input_shape`/`input_dim` argument to a layer. When using Sequential models, prefer using an `input_shape`/`input_dim` argument to a layer. When using Sequential models, prefer using an `input_shape`/`input_dim` argument to a layer. When using Sequential models, prefer using an `input_shape`/`input_dim` argument to a layer. When using Sequential models, prefer using an `input_shape`/`input_dim` argument to a layer. When using Sequential models, prefer using an `input_shape`/`input_dim` argument to a layer. When using Sequential models, prefer using an `input_shape`/`input_dim` argument to a layer. When using Sequential models, prefer using an `input_shape`/`input_dim` argument to a layer. When using Sequential models, prefer using a sequential models, prefer using an `input_shape`/`input_dim` argument to a layer. When using Sequential models, prefer using a sequential models, prefer using a sequential models.
                        init
                                  (**kwargs)
 /usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:966: UserWarning: Non-stationary starting autoregressive parameters found. Using zeros as starting parameters.
warn('Non-stationary starting autoregressive parameters'
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
warn('Non-invertible starting MA parameters found.'
 /usr/local/lib/python3.11/dist-packages/statsmodels/base/model.py:607: ConvergenceWarning: Maximum Likelihood optimization failed to converge. Check mle retvals
     warnings.warn("Maximum Likelihood optimization failed to
05 10ms/step

Processing cities: 54% | 1884/3490 [48:10<1:48:06, 4.04s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city_data = city_data.resample('M').agg('AverageTemperature': 'mean'))

Processing cities: 54% | 1885/3490 [48:10<1:48:06, 4.04s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city_data_resample('M').agg('AverageTemperature': 'mean')

Processing cities: 54% | 1885/3490 [48:10<1:48:06, 4.04s/it]</p>

| 1885/3490 [48:11<1:19:53, 2.99s/it]/usr/local/lib/mthsq.
| 2.99s/it]/usr/local/lib/mthsq.
| 1885/3490 [48:10<1:48:06, 4.04s/it]/usr/local/lib/mthsq.
| 1885/3490 [48:10<1
 /usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
Processing cities: 54% | 1886/3490 [48:19<1:59:30, 4.475/it]<pre>city_data = city_data_resample('M').agg(('AverageTemperature': 'mean'))
Processing cities: 54% | 1888/3490 [48:20<1:06:04, 2.475/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_super()__init__(***kwargs)</pre>
| 1888/3490 [48:20<1:06:04, 2.475/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_super()__init__(***kwargs)</pre>
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:966: UserWarning: Non-stationary starting autoregressive parameters found. Using zeros as starting parameters. warn('Non-stationary starting autoregressive parameters'
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
    warn('Non-invertible starting MA parameters found.'

2/12 — _______ 0s 10ms/step

rocessing cities: 54%| | 1889/3490 [48:26<1:34:08, 3.53s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M'
 Processing cities: 54%
city_data = city_data_resample('M').agg({'AverageTemperature': 'mean'})

Processing cities: 54%| | 1897/3490 [48:32<23:00, 1.15it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_di super().__init__(**kwargs)
super().__int__(____(approximates) / (usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters. warn('Non-invertible starting MA parameters found.'
 20/20
                                                     - 0s 7ms/step
Processing cities: 54% | 1898/3490 [48:40<1:24:39, 3.19s/it]<a href="https://example/">ipython-input-7-328d46eed31c>:26</a>: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city_data = city_data.resample('M').agg({'AverageTemperature': 'mean'})

Processing cities: 55% | 1913/3490 [48:49<14:43, 1.79it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_di
                        init (**kwa
super().__init__(**kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:966: UserWarning: Non-stationary starting autoregressive parameters found. Using zeros as starting parameters.
    warn('Non-stationary starting autoregressive parameters
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters. warn('Non-invertible starting MA parameters found.'
Processing cities: 55% | 1914/3490 [48:57<1:10:54, 2.70s/it]<pre>city_data = city_data_resample('M').agg(('AverageTemperature': 'mean'))
Processing cities: 56% | 1940/3490 [49:12<14:28, 1.79it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_dim super().__init__(**kwargs)
 15/15
Processing cities: 56% | | 1941/3490 [49:19<1:03:39, 2.47s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME city_data = city_data.resample('M').agg({'AverageTemperature': 'mean'})
Processing cities: 56%| super().__init__(**kwargs)
                                                                     | 1945/3490 [49:22<27:22, 1.06s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_dim
super().__init__(**kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
    warn('Non-invertible starting MA parameters found
 12/12 — 0s 11ms/step
Processing cities: 56%
                                                                      1346/3490 [49:28<1:07:27, 2.62s/it]/ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME
city_data = city_data_resample('M').agg(('AverageTemperature': 'mean'))

Processing cities: 56% | | 1947/3490 [49:29<51:31, 2.00s/it] /usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an 'in super().__init__(**kwargs)

/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
                                                                     | 1947/3490 [49:29<51:31, 2.00s/it] //usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_d
```

| 1948/3490 [49:35<1:23:51, 3.26s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME

| 1960/3490 [50:03<1:23:53, 3.29s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_d

| 1961/3490 [50:11<2:00:46, 4.74s/it]</pre>ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME

| 1974/3490 [50:25<1:04:03, 2.54s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M

1985/3490 [50:40<1:22:34, 3.29s/it]<iipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M

| 1987/3490 [56:41-47:21, 1.89s/it] //usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_

| 1991/3490 [50:51:41:27, 1.66s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_di

city\_data = city\_data.resample('M').agg(('AverageTemperature': 'mean'))

Processing cities: 56%| | 1951/3490 [49:37<38:08, 1.49s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_dim super().\_\_init\_\_(\*\*kwargs)

Processing cities: 56%| | 1991/3490 [49:3/X30.00, 1.433/II]/usi, Jocal/IID, Jusi, J

Processing cities: 56%| | 1958/3490 [49:55<1:20:53, 3.17s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME city\_data = city\_data.resample('M').agg({'AverageTemperature': 'mean'})
/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape'/`input\_dim` argument to a layer. When using Sequential models, prefer using an `input\_shape'/`input\_dim` argument to a layer. When using Sequential models, prefer using an `input\_shape'/`input\_dim` argument to a layer. When using Sequential models, prefer using an `input\_shape'/`input\_dim` argument to a layer. When using Sequential models, prefer using an `input\_shape'/`input\_dim` argument to a layer. When using Sequential models, prefer using an `input\_shape'/`input\_dim` argument to a layer. When using Sequential models, prefer using an `input\_shape'/`input\_dim` argument to a layer. When using Sequential models, prefer using an `input\_shape'/`input\_dim` argument to a layer. When using Sequential models, prefer using an `input\_shape'/`input\_dim` argument to a layer. When using Sequential models, prefer using an `input\_shape'/`input\_dim` argument to a layer. When using Sequential models, prefer using an `input\_shape'/`input\_dim` argument to a layer. When using Sequential models, prefer using an `input\_shape'/`input\_dim` argument to a layer. When using Sequential models, prefer using an `input\_shape'/`input\_dim` argument to a layer. When using Sequential models, prefer using a sequential models, prefer using an `input\_shape'/`input\_dim` argument to a layer. When using Sequential models, prefer using a sequential models.

city\_data = city\_data\_resample('M').agg(('AverageTemperature': 'mean'))

Processing cities: 57%| | 1973/3490 [50:18<15:05, 1.67it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_di super().\_\_init\_\_(\*\*kwargs)

| 13/4/3430 [30:25<1:04:05, 2.545/1t]<1python-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city\_data = city\_data.resample('M').agg({'AverageTemperature': 'mean'})

| 1984/3490 [50:30<15:11, 1.65it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_di super().\_\_init\_\_(\*\*kwargs)

warn('Non-invertible starting MA parameters found.'

3/13 — \_\_\_\_\_ 0s 11ms/step

\*\*nocessing cities: 57%| | 1988/3490 [50:49<1:35:00, 3.80s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M'

super().\_\_init\_\_(\*\*kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.

super().\_init\_\_(\*\*kwargs)
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// User/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.

super().\_\_init\_\_(\*\*kwargs)
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| 1967/3496 [36.4041.22.34, 3.235] [1] | 1967/3496 [36.4041.22.34, 3.235] [1] | 1967/3496 [36.4041.22.34, 3.235] [1] | 1967/3496 [36.4041.22.34, 3.235] [1] | 1967/3496 [36.404.47:21, 1.89s/it] | 1987/3490 [56:41447:21, 1.89s/it] | 1987/3490 [56:4147:21, 1.89s/it] | 1987/3490 [56:4147:21, 1.89s/it] | 1987/3490 [36:4147:21, 1.89s/i

/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.

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2/12 \_\_\_\_\_ 0s 11ms/step

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city\_data = city\_data.resample('M').agg(('AverageTemperature' rocessing cities: 56%| | 1960/3490 [50:03<1:23:53,

warn('Non-invertible starting MA parameters found.

15/15 — 0s 13ms/step

Processing cities: 56% 1961/3490 [50:11

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warn('Non-invertible starting MA parameters found. 0/20 ---- 0s 7ms/step

city\_data = city\_data.resample('M').agg({'AverageTemperature'

Processing cities: 56%

Processing cities: 56%| super().\_\_init\_\_(\*\*kwargs)

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Processing cities: 57%

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Processing cities: 57%

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1992/3490 [50:57<1:16:54, 3.08s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M
 Processing cities: 57%
 city_data = city_data.resample('M').agg(('AverageTemperature': 'mean'))

Processing cities: 58% | 2016/3490 [51:13<20:07, 1.22it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_di super().__init__(**kwargs)
  /usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
 Processing cities: 58% 2017/3490 [51:18<\58:03, 2.36s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME' city_data = city
 // Just/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameter warn('Non-invertible starting MA parameters found.'
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20/20 — 05 Tms/step
Processing cities: 59%  | 2054/3490 [51:52<1:28:24, 3.69s/it]<a href="https://docs.org/linear-style="text-align: center;">1 | 2054/3490 [51:52<1:28:24, 3.69s/it]<a href="https://distribution.org/linear-style="text-align: center;">1 | 2054/3490 [51:52<1:28:24, 3.69s/it]<a href="https://distribution.org/linear-style="text-align: center;">1 | 2054/3490 [51:57<15:18, 1.55it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape'/ input_distaper.center; input_distaper.ce
                                                                                                | 2064/3490 [51:57<15:18, 1.55it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_di
 warn('Non-invertible starting MA parameters found.'

14/14 — 0s 9ms/step

Processing cities: 59%| 2065/3490 [52:05<1:06:00, 2.78s/it]cipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M
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  /usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
       Processing cities: 59% | 2073/3490 [52:17<1:09:40, 2.95s/it]<pre>city_data = city_data_resample('M').agg(['AverageTemperature': 'mean'})
Processing cities: 59% | 2075/3490 [52:18<40:45, 1.73s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_di super()__init__(**kwargs)</pre>
  /usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
       warn('Non-invertible starting MA parameters found.
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  15/15 — 0s 9ms/step
Processing cities: 59%
 super()
                                 init (**kwargs)
  /usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
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                                                                        - 0s 11ms/step
 Processing cities: 60% | 1077/3490 [52:31<1:40:45, 4.28s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city_data = city_data.resample('M').agg({'AverageTemperature': 'mean'})
 Processing cities: 60% | 2083/3490 [52:35<23:25, 1.00it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `inpl super().__init__(**kwargs)
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                                                                                               | 2003/3490 [52:35c23:25, 1.00it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_di
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      warn('Non-invertible starting MA parameters found.
  /usr/local/lib/ovthon3.11/dist-packages/statsmodels/base/model.pv:607: ConvergenceWarning: Maximum Likelihood optimization failed to converge. Check mle retvals
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14/14 ——— 0s 9ms/step
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Processing cities: 61% | 2112/3490 [53:17<18:36, 1.23it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_dim super().__init__(**kwargs)
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Processing cities: 61% | 2116/3490 [53:26<29:06, 1.27s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape'/`input_dim
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Processing cities: 61%|
super().__init__(**kwargs)
  Super().__init__(~~kwargs)
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 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 | 200 
      super(). init (**kwargs)
 12/12 — 6s 17ms/step
Processing cities: 61%| | 2118/3490 [53:40<1:35:53, 4.19s/it]<br/>
data = city_data.resample('M').agg(('AverageTemperature': 'mean'))
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/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
                                                                                             | 2118/3490 [53:40<1:35:53, 4.19s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME 'M').agg({'AverageTemperature': 'mean'})
| 2133/3490 [53:49<12:47, 1.77it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_dim
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1 2134/3490 [53:57<59:21, 2.63s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME'

2139/3490 [54:00<20:08, 1.12it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_di

2142/3490 [54:0941:40, 1.86s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_di

2143/3490 [54:16<1:10:54, 3.16s/it]kipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M

M').agg({'AverageTemperature': 'mean'})
| 2146/3490 [54:17<32:19, 1.44s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_di

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super().\_init\_\_(\*\*kwargs)
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rocessing cities: 61%| | 2140/3490 [54:08<1:12:30, 3.22s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city\_data = city\_data.resample('M').agg({'AverageTemperature': 'mean'})

warn('Non-invertible starting MA parameters found.

14/14 — 0s 9ms/step

Processing cities: 61% 2134/3490 [53:57

warn('Non-invertible starting MA parameters found.

13/13 — 0s 10ms/step

Processing cities: 61%| super().\_\_init\_\_(\*\*kwargs)

(\*\*L //usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters. 13/13 Processing cities: 62% 2160/3490 [54:39<53:44, 2.42s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME' | 2160/3490 [54:39<53:44, 2 city\_data = city\_data.resample('M').agg({'AverageTemperature' rocessing cities: 62% | 2165/3490 [54:41<19:14. 1 Processing cities: 62%| super().\_\_init\_\_(\*\*kwargs) 2165/3490 [54:41:19:14, 1.15it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_di Processing cities: 62%| 2166/3490 [54:49<1:02:28, 2.83s/it]</r>
Processing cities: 62%| 2166/3490 [54:49<1:02:28, 2.83s/it]</r>
Processing cities: 62%| 2166/3490 [54:50<36:49, 1.67s/it]/usr/local/lib/python3.11/dist-packages/keras/src/lavers/rns/rns = 11/dist = 11/d /usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters. warn('Non-invertible starting MA parameters found.'
/usr/local/lib/python3.11/dist-packages/statsmodels/base/model.py:607: ConvergenceWarning: Maximum Likelihood optimization failed to converge. Check mle\_retvals Processing cities: | 2170/3490 [54:59<1:02:54, 2.86s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `in super().\_\_init\_\_(\*\*kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters. 2170/3490 [54:59:1:02:54, 2.86s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_ warn('Non-invertible starting MA parameters found.

13/13 —————— 0s 10ms/step 13/13 — 68 ldms/step
Processing cities: 62% | 217/3490 [55:05<1:22:43, 3.76s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city\_data = city\_data.resample('M').agg('AverageTemperature': 'mean'})
Processing cities: 63% | 2182/3490 [55:12<14:40, 1.48it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape'/ input\_di super().\_\_init\_\_(\*\*kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
warn('Non-invertible starting MA parameters found.'
/usr/local/lib/python3.11/dist-packages/statsmodels/base/model.py:607: ConvergenceWarning: Maximum Likelihood optimization failed to converge. Check mle\_retvals wannings.warn("Maximum Likelihood optimization failed to 15/15 — 0s 9ms/step
Processing cities: 63% | 2183/3490 [55:20<56:40 Processing cities: 63% 2183/3490 [55:20<56:40, 2.60s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME' city\_data = city\_data.resample('M').agg('AverageTemperature': 'mean'))

Processing cities: 63% 2185/3490 [55:21<36:52, 1.70s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape'/ input\_di super().\_\_init\_\_(\*\*tkwargs) /usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters. warn('Non-invertible starting MA parameters found.'
/usr/local/lib/python3.11/dist-packages/statsmodels/base/model.py:607: ConvergenceWarning: Maximum Likelihood optimization failed to converge. Check mle\_retvals 5/15 — 0s 8ms/step

rocessing cities: 63%| | 2186/3490 [55:29<1:14:43, 3.44s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city\_data\_resample('M').agg(('AverageTemperature': 'mean'))

rocessing cities: 63%| | 2186/3490 [55:29<1:14:43, 3.44s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city\_data\_resample('M').agg(('AverageTemperature': 'mean'))

rocessing cities: 63%| | 2186/3490 [55:29<1:14:43, 3.44s/it]</pre> Processing cities: 63% Processing cities: 63% | 2195/3490 [55:34<19:00, 1.14it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_di /usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:966: UserWarning: Non-stationary starting autoregressive parameters found. Using zeros as starting parameters. warn('Non-stationary starting autoregressive parameters'
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters. Processing cities: 63% /usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:966: UserWarning: Non-stationary starting autoregressive parameters found. Using zeros as starting parameters. warn('Non-stationary starting autoregressive parameters'
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters. warn('Non-invertible starting MA parameters found. 13/13 -**0s** 11ms/step | 2204/3490 [55:52<52:18, 2.44s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME' Processing cities: Processing cities: 638 244949 [55:32<32:18, 2.445/11/[atptnon-input-/-328d4eed3165:26: Futurewarning: M° 15 deprecated and will be removed in a future version, please use Mrcity\_data = city\_data.resample('M').agg('AverageTemperature': 'mean'))
Processing cities: 64% | 2228/3490 [56:06<11:38, 1.81it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape'/input\_di super().\_\_init\_\_(\*\*kwargs)
// usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters. warn('Non-invertible starting MA parameters found.'
3/13 \_\_\_\_\_\_ 0s 10ms/step 64%| Processing cities: 2229/3490 [56:14<59:57, 2.85s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME' rocessing cities: 64% | | 2232/3490 [30.47637.7, 2.003/2], | 2322/3490 [56:16<28:08, 1.34s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_di Processing cities: 64% /usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters. warn('Non-stationary starting autoregressive parameters Processing cities: 64% 2239/3490 [56:32<52:59, 2.54s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME' city\_data = city\_data\_resample('M').agg(('AverageTemperature': 'mean'))

Processing cities: 64% 2241/3490 [56:33<31:51, 1.53s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_di super().\_\_init\_\_(\*\*kwargs) // Just/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters. warn('Non-invertible starting MA parameters found. Processing cities: 64%| | 2242/3490 [56:41<.109:42, 3.35s/it]</p>
Processing cities: 64%| | 2242/3490 [56:45<.109:42, 3.35s/it]</p>

Processing cities: 64%| | 2242/3490 [56:45<.109:42, 3.35s/it]</p>

Processing cities: 64%| | 2242/3490 [56:45<.109:42, 3.35s/it]</p>

Processing cities: 64%| | 2242/3490 [56:45<.109:42, 3.35s/it]</p>

Processing cities: 64%| | 2242/3490 [56:45<.109:42, 3.35s/it]</p>

Processing cities: 64%| | 2242/3490 [56:45<.109:42, 3.35s/it]</p>

Processing cities: 64%| | 2242/3490 [56:45<.109:40]</p>

Processing cities: 64%| | 2242/3490 [56:45

Processing cities: 64%| | 2242/3490 [56:45

Processing cities: 64%| | 2242/3490 [56 warn('Non-stationary starting autoregressive parameters'
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
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/usr/local/lib/python3.11/dist-packages/statsmodels/base/model.py:607: ConvergenceWarning: Maximum Likelihood optimization failed to converge. Check mle\_retvals warnings.warn("Maximum Likelihood optimization failed to **- 0s** 10ms/step | 2220/3490 [56:53<1:02:04, 3.00s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city\_data = city\_data.resample('M').agg({'AverageTemperature': 'mean'})
| 2256/3490 [56:56<17:25, 1.18it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an 'input\_shape'/'input\_di super().\_\_init\_\_(\*\*kwargs) Processing cities: 64%

/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters

// Just/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.

warn('Non-invertible starting MA parameters found.

Processing cities: 65%

Processing cities:

- **0s** 10ms/step

| \(\frac{2\text{Loo}}{3\text{49}}\) | \(\frac{5\text{49}}{2\text{49}}\) | \(\frac{5\text{49}}{2\text{49}}\) | \(\frac{5\text{49}}{2\text{49}}\) | \(\frac{5\text{51}}{2\text{49}}\) | \(\frac{2\text{59}}{3\text{49}}\) | \(\frac{5\text{51}}{2\text{49}}\) | \(\frac{2\text{59}}{3\text{49}}\) | \(\frac{5\text{51}}{2\text{49}}\) | \(\frac{5\text{51}}{2\text{

13/13

Processing cities: 65% 225/3490 [57:04<1:02:43, 3.055/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city\_data = city\_data.resample('M').agg({'AverageTemperature': 'mean'})

Processing cities: 65% 225/3490 [57:05<36:24, 1.775/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_di super().\_\_init\_(\*\*kwargs)

city\_data = city\_data\_resample('M').agg({'AverageTemperature': 'mean'})

Processing cities: 65% | 2280/3490 [57:30<3:21, 1.51it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape'/ input\_dim super().\_\_init\_\_(\*\*kwargs)

2260/3490 [57:12<1:03:46, 3.11s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M

| | 2269/3490 [57:18:14:47, 1.38it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_dim

/ 2270/3490 [57:24<47:01, 2.31s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME'

/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:9/8: Userwarning: Processing cities: 65% 2281/3490 [57:37<48:12, 2.39s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME' = city\_data.resample('M').agg({'AverageTemperature': 'mean'})
cities: 66%| | 2297/3490 [57:47<11:05, 1.79it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_dim /usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:966: UserWarning: Non-stationary starting autoregressive parameters found. Using zeros as starting parameters. warn('Non-stationary starting autoregressive parameters'
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters. warn('Non-invertible starting MA parameters found.'
/usr/local/lib/python3.11/dist-packages/statsmodels/base/model.py:607: ConvergenceWarning: Maximum Likelihood optimization failed to converge. Check mle\_retvals warnings.warn("Maximum Likelihood optimization failed to " 15/15 — 0s 9ms/step Processing cities: 66% 2298/3490 [57:55<59:01, 2.97s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME' city\_data = city\_data.resample('M').agg({'AverageTemperature': | 2299/3490 [57:56:44:34, 2.25s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_dim Processing cities: 66% super().\_\_init\_\_(\*\*kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters. warn('Non-invertible starting MA parameters found.'
/usr/local/lib/python3.11/dist-packages/statsmodels/base/model.py:607: ConvergenceWarning: Maximum Likelihood optimization failed to converge. Check mle\_retvals warnings.warn("Maximum Likelihood optimization failed to " wainings. Waining in Parallular Tracellow by polimization faired to 12/12 ————— 0s 10ms/step

Processing cities: 66%| | 2319/3490 [58:22<1:02:05, 3.18s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city\_data = city\_data.resample('M').agg(('AverageTemperature': 'mean')) Processing cities: 67% | 2327/3490 [58:26<13:40, 1.42it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `inp super().\_\_init\_\_(\*\*kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters. | 2327/3490 [58:26<13:40, 1.42it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_di /usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters. 20/20 Os 7ms/step

Processing cities: 68% 358/3490 [58:59<54:33, 2.89s/it]<a href="https://documents.org/linear-align: red and will be removed in a future version, please use 'ME' city\_data = city\_data.resample('M').agg({'AverageTemperature': 'mean'})

Processing cities: 68% 388/3490 [59:17<10:16, 1.79it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_di super().\_\_init\_\_(\*\*kwargs) Justical (National August)

(visr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:966: UserWarning: Non-stationary starting autoregressive parameters found. Using zeros as starting parameters. warn('Non-invertible starting MA parameters found.'

Warn('Non-invertible starting MA parameters found.'

Warn('Non-invertible starting MA parameters found.' - 0s 9ms/step Processing cities: 68% 2390/3490 [59:24<46:22, 2.53s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME' 13/13 — 6s 10ms/step
Processing cities: 69%| | 2394/3490 [59:33<57:58, 3.17s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME' city\_data = city\_data.resample('M').agg({'AverageTemperature': 'mean'})
Processing cities: 69%| | 2404/3490 [59:39<11:16, 1.60it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_di super().\_init\_\_(\*\*kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa 2418/3490 [59:54<10:13, 1.75it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/ input\_di warn('Non-invertible starting MA parameters found. 8/13 — 0s 10ms/step 13/13

13/13 — % 19mm/step % 19mm/step % 19mm/step with a state of the state /Usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:966: UserWarning: Non-stationary starting autoregressive parameters found. Using zeros as starting parameters.

warn('Non-stationary starting autoregressive parameters' 
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.

warn('Non-invertible starting MA parameters found.'

10/10 — 0s 13ms/step

Processing cities: 70%| 2433/3490 [1:00:14<41:40, 2.37s/it]</br>
| 2434/3400 [1:00:14]</br>

| 2444/3490 [1:00:21<13:05, 1.33it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/` super().\_\_init\_\_(\*\*kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:966: UserWarning: Non-stationary starting autoregressive parameters found. Using zeros as starting parameters. 70%| 1.00:21x13:05, 1.33it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_d

warn('Non-stationary starting autoregressive parameters'
/usr/local/lib/python3.11/dist-packages/statsmodels/base/model.py:607: ConvergenceWarning: Maximum Likelihood optimization failed to converge. Check mle\_retvals

warnings.warn("Maximum Likelihood optimization failed to

Processing cities: 70%| super().\_\_init\_\_(\*\*kwargs) 2460/3490 [1:00:37<10:46, 1.59it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_d

/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters. warn('Non-invertible starting MA parameters found.'
/usr/local/lib/python3.11/dist-packages/statsmodels/base/model.py:607: ConvergenceWarning: Maximum Likelihood optimization failed to converge. Check mle\_retvals

warnings.warn("Maximum Likelihood optimization failed to 15/15 -0s 9ms/step

Processing cities: 71% | | 2461/3490 [1:00:49<1:09:25, 4.05s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'city\_data = city\_data.resample('M').agg(('AverageTemperature': 'mean')) Processing cities: 71%| | 2466/3490 [1:00:52<19:19, 1.13s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_d super().\_\_init\_\_(\*\*kwargs)

**0s** 14ms/step 14/14 14/14 — 68 14ms/step
Processing cities: 71% | 12467/3490 [1:00:58<44:47, 2.63s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME city\_data = city\_data.resample('M').agg(('AverageTemperature': 'mean'})
Processing cities: 71% | 2469/3490 [1:01:00:58<44:47, 2.63s/it]</pre>
| 2469/3490 [1:01:00<30:16, 1.78s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape'/`input\_d super(').\_\_init\_(\*\*kwargs) /usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.

warn('Non-invertible starting MA parameters found.
//12 ----- 0s 11ms/step 12/12 -

12/12 — 08 lims/step
Processing cities: 71% | 2470/3490 [1:01:06<53:21, 3.14s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME city\_data = city\_data.resample('M').agg({'AverageTemperature': 'mean'})
Processing cities: 71% | 2472/3490 [1:01:07<30:53, 1.82s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape'/`input\_d super().\_init\_\_(\*\*kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:966: UserWarning: Non-stationary starting autoregressive parameters found. Using zeros as starting parameters.

warn('Non-invertible starting MA parameters found.'

Warn('Non-invertible starting MA parameters found.'

/usr/local/lib/python3.11/dist-packages/statsmodels/base/model.py:607: ConvergenceWarning: Maximum Likelihood optimization failed to converge. Check mle\_retvals warnings.warn("Maximum Likelihood optimization failed to
/13 \_\_\_\_\_\_ 0s 10ms/step

Processing cities: 71% | 12473/490 [1:01:15<1:00:51, 3.59s/it]</p>
Forcessing cities: 71% | 12473/490 [1:01:15<1:00:51, 3.59s/it]</p>
city\_data = city\_data.resample('M').agg({'AverageTemperature': 'mean'})
/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape'/`input\_dim` argument to a layer. When using Sequential models, prefer using an `input\_shape'/input\_dim` argument to a layer. super(), init (\*\*kwargs)

/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.

Stai 14/14 • 0s 10ms/step 14/14 — 68 l0ms/step
Processing cities: 71% | 12474/3490 [1:01:21<1:12:58, 4.31s/it]</ri>
Processing cities: 71% | 2474/3490 [1:01:21<1:12:58, 4.31s/it]</p>
city\_data = city\_data.resample('M').agg({'AverageTemperature': 'mean'})
Processing cities: 71% | 2478/3490 [1:01:24<29:02, 1.72s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_super().\_\_init\_\_(\*\*kwargs)</p> 'M').agg({'AverageTemperature': 'mean'})
| 2478/3490 [1:01:24<29:02, 1.72s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_d /usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting paramete warn('Non-invertible starting MA parameters found 8/13 —————— 0s 12ms/step 13/13 المراحة المرا Processing cities: 71% | 2486/3490 [1:01:35<13:25, 1.25it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `in super().\_\_init\_\_(\*\*kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters. 71%| | 2486/3490 [1:01:35<13:25, 1.25it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/ input\_d warn('Non-invertible starting MA parameters found.'

13/13 — 0s 10ms/step

Processing cities: 71%| 2487/3490 [1:01:42<44:23, 2.66s/it]</p>
Processing cities: 71% | 2487/3490 [1:01:42<44:23, 2.66s/it]</p>
From the starting MA parameters found.'
13/13 — 0s 10ms/step
Processing cities: 71% | 2487/3490 [1:01:42<44:23, 2.66s/it]</p>
From the starting MA parameters found.' Processing cities: 71% | 2487/3496 [1:01:24:42.5, 2:00s/1](a) pto remove in a future version, please use in city\_data = city\_d Processing cities: 71% | 2490/3490 [1:01:52<1:02:59, 3.78s/it]</ri> Processing cities: /lx| \_\_\_\_\_\_\_\_ | 2499/3490 [1:01:5241:02:59, 3.785/t]{\alphabetase use city\_data = city\_data.ecsample('M').agg('AverageTemperature': 'mean'})

Processing cities: 71%| \_\_\_\_\_\_\_ | 2495/3490 [1:01:55<18:10, 1.10s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape'/`input\_super().\_\_init\_\_(\*\*kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.

warn('Non-invertible starting MA parameters found.' | 2496/3490 [1:02:03<56:13, 3.39s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M /usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters. warn('Non-invertible starting MA parameters found. 13/13 **- 0s** 11ms/step Processing cities: 72%| | 2498/3490 [1:02:10<59:54, 3.62s/it]</p>
ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city\_data = city\_data.resample('M').agg(('AverageTemperature': 'mean')) /usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_dim` argument to a layer. When using Sequential models, prefer using an super().\_\_init\_\_(\*\*kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters. warn('Non-invertible starting MA parameters found. 3/13 \_\_\_\_\_\_ 0s 11ms/step 13/13 | 2499/3490 [1:02:17<1:17:30, 4.69s/it]</ri>
| Processing cities: 72%| | 2500/3490 [1:02:18<56:55, 3.45s/it] / usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/ input\_shape` | 2500/3490 [1:02:18<56:55, 3.45s/it] / usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape` | 2500/3490 [1:02:18<56:55, 3.45s/it] / usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape` | 2500/3490 [1:02:18<56:55, 3.45s/it] / usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape` | 2500/3490 [1:02:18<56:55, 3.45s/it] / usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape` | 2500/3490 [1:02:18<56:55, 3.45s/it] / usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape` | 2500/3490 [1:02:18<56:55, 3.45s/it] / usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape` | 2500/3490 [1:02:18<56:55, 3.45s/it] / usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape` | 2500/3490 [1:02:18<56:55, 3.45s/it] / usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape` | 2500/3490 [1:02:18<56:55, 3.45s/it] / usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.python3.11/dist-packages/keras/src/layers/rnn/rnn.python3.11/dist-packages/keras/src/layers/rnn/rnn.python3.11/dist-packages/keras/src/layers/rnn/rnn.python3.11/dist-packages/keras/src/layers/rnn/rnn.python3.11/dist-packages/keras/src/layers/rnn/rnn.python3.11/dist-packages/keras/src/layers/rnn/rnn.python3.11/dist-packages/keras/src/layers/rnn/rnn.python3.11/dist-packages/keras/src/layers/rnn/rnn.python3.11/dist-packages/keras/src/layers/rnn/rnn.python3.11/dist-packa /usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters. 13/13 | 2501/3490 [1:02:24<1:11:02, 4.31s/it]</td>
 | 2501/3490 [1:02:24<1:11:02, 4. super() init (\*\*kwargs) super().\_\_init\_\_("\*wwargs)
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/usr/local/lib/python3.11/dist-packages/statsmodels/base/model.py:607: ConvergenceWarning: Maximum Likelihood optimization failed to converge. Check mle\_retvals warnings.warn("Maximum Likelihood optimization failed to 

14/14 - 98 14ms/step
Processing cities: 72% | 258/3490 [1:02:40<1:39:36, 6.06s/it]</ri>
Processing cities: 72% | 259/3490 [1:02:40<1:39:36, 6.06s/it]</ri>
Processing citi

super().\_\_init\_\_(\*\*kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
warn('Non-invertible starting MA parameters found.'

20/20 -- **0s** 7ms/step

20/20 — 98 /ms/step 98 /ms/ste

warn('Non-invertible starting MA parameters found.'

warn('Non-invertible starting MA parameters found.'

// Usr/local/lib/python3.11/dist-packages/statsmodels/base/model.py:607: ConvergenceWarning: Maximum Likelihood optimization failed to converge. Check mle\_retvals warnings.warn("Maximum Likelihood optimization failed to "

- **0s** 18ms/step Processing cities: 72%

| 2518/3490 [1:03:05<53:23, 3.30s/it]</rr>
ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M Processing cities: /2%| | 2518/3499 [1:03:05<3:23, 3.30s/l](Apptnon-input-/-328040eed3ic>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city\_data = city

20/20 — 08 10ms/step
Processing cities: 72%| | 2523/3490 [1:03:16<56:39, 3.52s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city\_data = city\_data.resample('M').agg({'AverageTemperature': 'mean'})
Processing cities: 73%| | 2537/3490 [1:03:24<09:09, 1.74it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_super().\_\_init\_\_(\*\*kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.

warn('Non-invertible starting MA parameters found.

16/16 — 0s 8ms/step

Processing cities: 73%| | | 2538/3490 [1:03:32<43:10, 2.72s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city\_data = city\_data.resample('M').agg({'AverageTemperature': 'mean'}) Processing cities: 73% | 2541/3490 [1:03:34<20:29, 1.30s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_super(). init (\*\*kwargs)

super().\_\_init\_\_(\*\*kwargs)

/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.

warm Non-Invertible Starting map parameters round.
/usr/local/lib/python3.11/dist-packages/statsmodels/base/model.py:607: ConvergenceWarning: Maximum Likelihood optimization failed to converge. Check mle\_retvals
warnings.warn("Maximum Likelihood optimization failed to "

Processing cities: 73% | | 2542/3490 [1:03:40<44:16, 2.80s/it]</td>
 | 2542/3490 [1:03:40<36:02, 2.28s/it]</td>
 | 2542/3490 [1:03:41<36:02, 2.28s/it]</td>
 | 2542/3490 [1:03:40<36:02, 2.28

super().\_\_init\_\_("~kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
warn('Non-invertible starting MA parameters found.'

13/13 · - 0s 10ms/step

Processing cities: 73%| | 2544/3490 [1:03:48<55:47, 3.54s/it]<a href="mailto:dipython-input-7-328d46eed31c>:26">dipython-input-7-328d46eed31c>:26</a>: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city\_data = city\_data.resample('M').agg({'AverageTemperature': 'mean'})

Processing cities: 73%| | 2545/3490 [1:03:48<41:36, 2.64s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_

Processing cities: 73% [ 2545/3490 [1:03:48<41:36, 2.64s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an i super().\_\_init\_\_(\*\*kwargs)
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/usr/local/lib/python3.11/dist-packages/statsmodels/base/model.py:607: ConvergenceWarning: Maximum Likelihood optimization failed to converge. Check mle\_retvals warnings.warn("Maximum Likelihood optimization failed to "

15/15 — 0s 10ms/step

13/15 — 98 Lums/Step

98 Lums/Step

1 2546/3490 [1:03:57<1:08:26, 4.35s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use city\_data = city\_data.resample('M').agg({'AverageTemperature': 'mean'})

74%| | 12576/3490 [1:04:14<08:35, 1.77it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_ Processing cities:

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/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
    warn('Non-invertible starting MA parameters found.

3/13 ______ 0s 11ms/step
13/13
Processing cities: 74%||
super().__init__(**kwa
 Justical National (1) in the control of the control
Processing cities: 74%| super().__init__(**kwargs)
                                              74% 1888/3490 [1:04:34<13:10, 1.14it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape` / `input_
 super().__init__(**kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
warn('Non-invertible starting MA parameters found.

12/12 ______ 0s 11ms/step
 Processing cities: 74% | | 2589/3490 [1:04:40<37:08, 2.47s/it]</p>
Processing Cities. 74% 3673-456 [1.04.40437.05, 2.47/s] [1.7] righty full-rapid resource and will be removed in a future vercity, data = city, data.resample('M').agg('AverageTemperature': 'mean'))

Processing cities: 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% | 74% |
                                                         resample('M').agg({'AverageTemperature': 'mean'})
| 2593/3490 [1:04:43<15:48, 1.06s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_
 13/13 -
                                                            - 0s 10ms/step
Processing cities: 74% | | 2594/3490 [1:04:50<42:29, 2.85s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city_data = city_data.resample('M').agg(('AverageTemperature': 'mean'))
rotessing titles. 74. [37.254/34950 [1.04.3042.43, 2.053/1/tpythoni-liput-/-22040eeu317.20. Futurewaining. M 15 depretated and wall be removed an a future version, please use m city_data_resample('M').agg(('AverageTemperature': 'mean'))

Processing cities: 74% [37.254/1.04.5042.43] | 2596/3490 [1:04:51<24:57, 1.68s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_super().__init__(**kwargs) | (Varylocal/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
| 2612/3490 [1:05:15<11:23, 1.28it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an 'i super().__init__(**kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
                                                                     2012/3490 [1:05:15<11:23, 1.28it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_
Processing cities: 75%| | 2613/3490 [1:05:23<44:02, 3.01s/it]</td>
3.01s/it]
ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city_data = city_data = csty_data 
 Justical Nation Manager (N. 1997) Applied to the parameters found. Using zeros as starting parameters found.
     warn('Non-invertible starting MA parameters found.
 13/13 -
                                                            - 0s 10ms/step
Processing cities: 75% | | 2615/3490 [1:05:30<49:24, 3.39s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city_data = city_data.resample('M').agg(('AverageTemperature': 'mean'))
| 2639/3490 [1:05:44<08:01, 1.77it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_d super().__init__(**kwargs)
super().__init__(**kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
warn('Non-stationary starting autoregressive parameters'
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
     warn('Non-invertible starting MA parameters found
 13/13
                                                            - 0s 10ms/step
13/13 — 68 ldms/step
Processing cities: 768|| | 2642/3490 [1:06:01<56:37, 4.01s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME city_data = city_data.resample('M').agg({'AverageTemperature': 'mean'})
Processing cities: 768|| | 2643/3490 [1:06:02<41:54, 2.97s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_d super()._init__(**kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
warn('Non-invertible starting MA parameters found.'

20/20 — 0s 7ms/step

Processing cities: 76x| | | | 2644/3490 [1:06:104:03:14, 4.49s/it]</br>
ricty_data = city_data.resample('M').agg(('AverageTemperature': 'mean'))

//usr/local/lib/python3.11/dist-packages/kara/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape'/input_dim` argument to a layer. When using Sequential models, prefer using an `super()_init_(**kwargs)
Processing cities: 76% | | 2645/3490 [1:06:17<1:12:49, 5.17s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'city_data = city_data.resample('M').agg({'AverageTemperature': 'mean'})

Processing cities: 76% | | 2660/3490 [1:06:26<11:13, 1.23it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_d
                           init__(**kwargs)
    super()
 // Just/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
      warn('Non-invertible starting MA parameters found.
13/13
                                                            - 0s 11ms/step
| 2662/3490 [1:06:33<26:07, 1.89s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rmm/rmm.py.200. 03cmm/rmm.py.200. 03cmm/rmm.
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                                                            - 0s 12ms/step
    Processing cities: 77% [ 2670/3490 [1:06:44<10:44, 1.27it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `in super().__init__(**kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
                                                                              2670/3490 [1:06:44<10:44, 1.27it/s/]usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/ input_
    warn('Non-invertible starting MA parameters found.'
3/13 ______ 0s 11ms/step
L201/3490 [1:00:32<42:35, 3.12s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city_data = city_data.resample('M').agg(('AverageTemperature': 'mean'))
Processing cities: 77% (1909) | 2672/3490 [1:06:53<32:02, 2.35s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_super().__init__(**kwargs)
 Processing cities: 77%| | | 2671/3490 [1:06:52<42:35, 3.12s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M
// Just/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters. warn('Non-invertible starting MA parameters found.'

12/12 _______ 0s 12ms/step
Processing cities: 77% | | | 2673/3490 [1:06:59<47:46, 3.51s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city_data = city_data.resample('M').agg({'AverageTemperature': 'mean'})
Processing cities: 77% | | 2686/3490 [1:07:07<08:07, 1.65it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_super()._init_(**kwargs)
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/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
    warn('Non-invertible starting MA parameters found.
13/13
                                                            - 0s 10ms/step
Processing cities: 77% | | 2687/3490 [1:07:13<29:12, 2.18s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city_data = city_data.resample('M').agg({'AverageTemperature': 'mean'})
/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_dim` argument to a layer. When using Sequential models, prefer using an `input_shape`/`input_dim` argument to a layer. When using Sequential models, prefer using an `input_shape`/`input_dim` argument to a layer. When using Sequential models, prefer using an `input_shape`/`input_dim` argument to a layer. When using Sequential models, prefer using an `input_shape`/`input_dim` argument to a layer. When using Sequential models, prefer using an `input_shape`/`input_dim` argument to a layer. When using Sequential models, prefer using an `input_shape`/`input_dim` argument to a layer. When using Sequential models, prefer using an `input_shape`/`input_dim` argument to a layer. When using Sequential models, prefer using an `input_shape`/`input_dim` argument to a layer. When using Sequential models, prefer using an `input_shape`/`input_dim` argument to a layer. When using Sequential models, prefer using an `input_shape`/`input_dim` argument to a layer. When using Sequential models, prefer using an `input_shape`/`input_dim` argument to a layer. When using Sequential models, prefer using an `input_shape`/`input_dim` argument to a layer. When using Sequential models, prefer using a sequential models, prefer using an `input_shape`/`input_dim` argument to a layer. When using Sequential models, prefer using a sequential mo
super().__init__(**kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
    warn('Non-invertible starting MA parameters found.
```

Processing cities: 77% | | | 2688/3490 [1:07:20<48:45, 3.65s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city\_data = city\_data.resample('M').agg(('AverageTemperature': 'mean'))
// (usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_dim` argument to a layer. When using Sequential models, prefer using an `super().\_\_init\_\_("\*kwargs)

- **0s** 11ms/step

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/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:966: UserWarning: Non-stationary starting autoregressive parameters found. Using zeros as starting parameters.
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/usr/iocal/lib/python3.11/gist-packages/statismodes/stat/statespace/sarimax.py:9/8: Userwarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.

warn('Non-invertible starting MA parameters found.'

13/13 — 0s 10ms/step

Processing cities: 77% | 2692/3490 [1:07:34<47:26, 3.57s/it]</p>

**City_data = city_data.resample('M').agg(('AverageTemperature': 'mean'))

**Processing cities: 77% | 2693/3490 [1:07:35<35:19, 2.66s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_super().__init__(**kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:966: UserWarning: Non-stationary starting autoregressive parameters found. Using zeros as starting parameters.
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/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
es 10ms/step

Processing cities: 77%| 2694/3490 [1:07:43<57:35, 4.34s/it]</p>

Processing cities: 77%| 2694/3490 [1:07:43<57:35, 4.34s/it]</p>
    super().__init__(**kwargs)
13/13
                                                 0s 10ms/step
Processing cities: 77%| | 2696/3490 [1:07:50<53:21, 4.03s/it]</ri>
// Processing cities: 77%| | 2696/3490 [1:07:50<53:21, 4.03s/it]</pre>
// iput-of-active data = city_data.resample('M').agg({'AverageTemperature': 'mean'})
// usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape'/input_dim` argument to a layer. When using Sequential models, prefer using an `input_shape'/input_dim` argument to a layer.
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13/13
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Processing cities: 77% | | 2697/3490 [1:07:57<1:05:00, 4.92s/it]</ri>
| 2697/3490 [1:07:57<1:05:00, 4.92s/it]</p>
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/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input shape`/ input dim` argument to a layer. When using Sequential models, prefer using an
    super()
                      init
                               (**kwargs)
//usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
    warn('Non-invertible starting MA parameters found
12/12
                                                - 0s 11ms/step
| 2698/3490 [1:08:02<1:07:44, 5.13s/it]</ri>
| 2698/3490 [1:08:02<1:07:44, 5.13s/it]</ri>
| 2702/3490 [1:08:05<23:31, 1.79s/it]</ri>
| 2702/3490 [1:08:05<23:31, 1.79s/it]</ri>
                      _init__(**kwargs)
    super()
//usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
   warn('Non-invertible starting MA parameters found.'

2/12 — 0s 12ms/step
rocessing cities: 77½ 12mm | 2703/3490 [1:08:11<41:35, 3.17s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city_data = city_data.resample('M').agg({'AverageTemperature': 'mean'})
Processing cities: 77%
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14/14 — 0s lams/step
Processing cities: 77%| | lams/step
Processing cities: 77%| | lams/step
Processing cities: 77%| | lams/step
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13/13 -
                                                - 0s 10ms/step
Processing cities: 78% | | 2705/3490 [1:08:25<1:04:36, 4.94s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use city_data = city_data.resample('M').agg({'AverageTemperature': 'mean'})
/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_dim` argument to a layer. When using Sequential models, prefer using an
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Processing cities: 78%| super().__init__(**kwargs)
                                                          | 2712/3490 [1:08:43<28:11, 2.17s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_
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12/12 — 0s 11ms/step

Processing cities: 78%| | | 2717/3490 [1:08:58<40:43, 3.16s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city_data = city_data.resample('M').agg({'AverageTemperature': 'mean'})
Processing cities: 78%| | 2719/3490 [1:09:00<23:31, 1.83s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_super().__init__(**kwargs)
super().__init__(**kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameter
    warn('Non-invertible starting MA parameters found.
Warn('Non-Invertible starting MA parameters found.'

3/13 — 0s Ibms/step

Processing cities: 78%| | 2720/3490 [1:09:05<38:30, 3.00s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city_data = city_data.resample('M').agg(('AverageTemperature': 'mean'))

Processing cities: 78%| | 2721/3490 [1:09:06<29:02, 2.27s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_super().__init__(**kwargs)

//usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:966: UserWarning: Non-stationary starting autoregressive parameters found. Using zeros as starting parameters.
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    warn('Non-invertible starting MA parameters found.
15/15
                                                - 0s 9ms/step
/usr/local/lib/python3.11/dist-packages/statsmodes/stat/statespace/sarimax.py:9/8: Userwarning: Non-invertible starting MA parameters found. Using Zeros as Starting parameters.

warn('Non-invertible starting MA parameters found.'

13/13 — 0s 15ms/step

Processing cities: 78%| | 2723/3490 [1:09:21<1:02:32, 4.89s/it]<a href="https://ipython-input-7-328d46eed31c>:26">ipython-input-7-328d46eed31c>:26</a>: FutureWarning: 'M' is deprecated and will be removed in a future version, please use city_data = city_data.resample('M').agg({'AverageTemperature': 'mean'})

Processing cities: 78%| | 2728/3490 [1:09:24<16:45, 1.32s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_super().__init__(**kwargs)
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/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
```

warn('Mon-invertible starting MA parameters found.'
3/13 \_\_\_\_\_\_\_ 0s 10ms/step
rocessing cities: 78% | 2729/3490 [1:09:30<33:19, 2.63s/it]</p>
rocessing cities: 78% | 2729/3490 [1:09:30<33:19, 2.63s/it]</p>
city\_data = city\_data.resample('M').agg(('AverageTemperature': 'mean'))

| 2730/3490 [1:09:30<25:25, 2.01s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/input\_

space/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as

| 2730/3490 [1:09:30<25:25, 2.01s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/` super().\_\_init\_\_(\*\*kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:966: UserWarning: Non-stationary starting autoregressive parameters found. Using zeros as starting parameters.

13/13

Processing cities: 78%

warn('Non-stationary starting autoregressive parameters' /usr/local/lib/python3.11/dist-packages/statsmodels/tsa/stat

warn('Non-invertible starting MA parameters found. 15/15 - **0s** 9ms/step Processing cities: 78% | 731/3490 [1:09:38:46:25, 3.67s/it]cipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city\_data = city\_data.resample('M').agg({'AverageTemperature': 'mean'}) city\_data = city\_data.resample(`M').agg({'Average!emperature : 'mean })
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Warn('Non-invertible starting MA parameters found.' 13/13 -• **0s** 16ms/step Processing cities: 78% | 732/3490 [1:09:44<57:13, 4.53s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city\_data = city\_data.resample('M').agg({'AverageTemperature': 'mean'}) /usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_dim` argument to a layer. When using Sequential models, prefer using an super().\_init\_\_(\*\*kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters. warn('Non-invertible starting MA parameters found.'
//usr/local/lib/python3.11/dist-packages/statsmodels/base/model.py:607: ConvergenceWarning: Maximum Likelihood optimization failed to converge. Check mle\_retvals warnings.warn("Maximum Likelihood optimization failed to 12/12 • **0s** 12ms/step Processing cities: 79% | 2742/3490 [1:10:06<15:03, 1.21s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape'/super()\_\_init\_\_(\*\*kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:966: UserWarning: Non-stationary starting autoregressive parameters found. Using zeros as starting parameters. | 2742/3490 [1:10:06c15:03, 1.21s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_ warn('Non-invertible starting MA parameters found.'

Warn('Non-invertible starting MA parameters found.' 13/13 **- 0s** 12ms/step Processing cities: 79% | 1243/3490 [1:10:16<49:23, 3.97s/it]<a href="https://example('M').agg(('AverageTemperature': 'mean')">https://example('M').agg(('AverageTemperature': 'mean'))</a> Processing cities: 79% [ 2746/3490 [1:10:18<21:21, 1.72s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `in super().\_\_init\_\_(\*\*kwargs)
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/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_dim` argument to a layer. When using Sequential models, prefer using an `input\_shape`/`input\_dim` argument to a layer. When using Sequential models, prefer using an `input\_shape`/`input\_dim` argument to a layer. When using Sequential models, prefer using an `input\_shape`/`input\_dim` argument to a layer. When using Sequential models, prefer using an `input\_shape`/`input\_dim` argument to a layer. When using Sequential models, prefer using an `input\_shape`/`input\_dim` argument to a layer. When using Sequential models, prefer using an `input\_shape`/`input\_dim` argument to a layer. When using Sequential models, prefer using an `input\_shape`/`input\_dim` argument to a layer. When using Sequential models, prefer using an `input\_shape`/`input\_dim` argument to a layer. When using Sequential models, prefer using an `input\_shape`/`input\_dim` argument to a layer. When using Sequential models, prefer using an `input\_shape`/`input\_dim` argument to a layer. When using Sequential models, prefer using an `input\_shape`/`input\_dim` argument to a layer. When using Sequential models, prefer using an `input\_shape`/`input\_dim` argument to a layer. When using Sequential models, prefer using an `input\_shape`/`input\_dim` argument to a layer. When using Sequential models, prefer using an `input\_shape`/`input\_dim` argument to a layer. When using Sequential models, prefer using a sequential models are `input\_shape`/`input\_dim` argument to a layer. When using Sequential models are `input\_shape`/`input\_dim` argument to a layer. When using Sequential models are `input\_shape`/`input\_dim` argument to a layer. When using Sequential models are `input\_shape super().\_\_init\_\_(\*\*kwargs)
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/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters. /USF/local/lib/python3.11/dist-packages/statsmodels/base/model.py:607: ConvergenceWarning: Maximum Likelihood optimization failed to converge. Check mle\_retvals 14/14 — 68 llms/step
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/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_dim` argument to a layer. When using Sequential models, prefer using an 'input\_shape'/ input\_dim' argument to a layer. When using Sequential models, prefer using an 'input\_shape'/ input\_dim' argument to a layer. When using Sequential models, prefer using an 'input\_shape'/ input\_dim' argument to a layer. When using Sequential models, prefer using an 'input\_shape'/ input\_dim' argument to a layer. When using Sequential models, prefer using an 'input\_shape'/ input\_dim' argument to a layer. When using Sequential models, prefer using an 'input\_shape'/ input\_dim' argument to a layer. When using Sequential models, prefer using an 'input\_shape'/ input\_dim' argument to a layer. When using Sequential models, prefer using an 'input\_shape'/ input\_dim' argument to a layer. When using Sequential models, prefer using an 'input\_shape'/ input\_dim' argument to a layer. When using Sequential models, prefer using an 'input\_shape'/ input\_dim' argument to a layer. When using Sequential models, prefer using a sequential models are the sequential models a super().\_\_init\_\_(\*\*kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.

20/20 — 05 7ms/step

Processing cities: 80%| | 2801/3490 [1:11:56<56:29, 4.92s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME city\_data = city\_data.resample('M').agg(('AverageTemperature': 'mean')) | 2803/3490 [1:11:57<30:54, 2.70s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_d super().\_\_init\_\_(\*\*kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.

warn('Non-invertible starting MA parameters found.'
3/13 \_\_\_\_\_\_\_\_ 0s 15ms/step

rocessing cities: 80% | 12804/3490 [1:12:05<47:28, 4.15s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME

city\_data = city\_data.resample('M').agg({'AverageTemperature': 'mean'})

3/13 — 0s 12ms/step

rocessing cities: 81%| | 2811/3490 [1:12:14<29:34, 2.61s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME city\_data = city\_data.resample('M').agg({'AverageTemperature': 'mean'})

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/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.

| 2810/3490 [1:12:08<11:07, 1.02it/s/]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_d

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warn('Non-invertible starting MA parameters found

13/13 -Processing cities:

13/13 -

Processing cities: 81% 2812/3490 [1:12:22<46:00, 4.07s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME warn('Non-invertible starting MA parameters found.'8/13 \_\_\_\_\_\_\_ 0s 15ms/step Processing cities: 81% | 2813/3490 [1:12:30<58:28, 5:18s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME rotessing cities: 0.8% | 2815/3490 [1:12:331.32:10, 3.183/lt]/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_d super().\_\_init\_\_(\*\*kwargs) Juper().\_\_init\_\_(``kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
warn('Non-invertible starting MA parameters found.' - 0s 10ms/step Processing cities: 81% | | 2816/3490 [1:12:37<43:04, 3.84s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME city\_data = city\_data.resample('M').agg({'AverageTemperature': 'mean'})
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13/13 \_\_\_\_\_\_\_ 0s 11ms/step 13/13 — 68 llms/step
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5/15 — 0s 9ms/step

Oncessing cities: 81½ 1 1 2844/3490 [1:13:25<29:50, 2.77s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city\_data = city\_data.resample('M').agg({'AverageTemperature': 'mean'}) Processing cities: 81% city\_data = city\_data\_resample('M').agg({'AverageTemperature': 'mean'})
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| 2859/3490 [1:13:48<06:45, 1.56it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape'/`input\_super().\_\_init\_\_(\*\*kwargs) 2848/3490 [1:13:41<38:25, 3.59s/it]</ri>

/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters. warn('Non-invertible starting MA parameters found.

13/13 **- 0s** 10ms/step

Processing cities: 82% | | 2860/3490 [1:13:54<23:52, 2.27s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city\_data = city\_data.resample('M').agg(('AverageTemperature': 'mean')) Processing cities: 84% [1.14:30x05:14, 1.82it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape'/super().\_\_init\_\_(\*\*kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:966: UserWarning: Non-stationary starting autoregressive parameters found. Using zeros as starting parameters. 2919/3490 [1:14:30<05:14, 1.82it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input shape`/`input

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13/13 -- **0s** 10ms/step

Processing cities: 84% | 2925/3490 [1:14:37<23:48, 2.51s/it]<pre>
| 2920/3490 [1:14:37<23:48, 2.51s/it]</pre>
| 2920/3490 [1:14:37<23:48, 2.51s/it]</pre>
| 2925/3490 [1:14:40<08:16, 1.14it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_ 12/12 -• **0s** 11ms/step

Processing cities: 84% | | 2928/3490 [1:14:49<30:16, 3.22s/it]<a href="https://example('M').agg({'AverageTemperature': 'mean'})" | 2928/3490 [1:14:50<17:24, 1.86s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape'/`input\_ Processing cities: 84%

/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters. warn('Non-invertible starting MA parameters found.'
/usr/local/lib/python3.11/dist-packages/statsmodels/base/model.py:607: ConvergenceWarning: Maximum Likelihood optimization failed to converge. Check mle\_retvals

warnings. warn("Maximum Likelihood optimization failed to "

5/15 — 0s 10ms/step

rocessing cities: 84% | 12929/4490 [1:14:57<31:54, 3.41s/it]</p>
city\_data = city\_data.resample('M').agg({'AverageTemperature': 'mean')} Processing cities: Processing cities: 84%| super().\_\_init\_\_(\*\*kwargs) | 2944/3490 [1:15:86<09:07, 1.77it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_

super().\_\_init\_\_(\*\*kWargs)
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/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.

Processing cities: 84%| | 2945/3490 [1:15:14<25:39, 2.825/it]</pre>
| 2945/3490 [1:15:14<25:39, 2.825/it]</pre>
| 2945/3490 [1:15:14<25:39, 2.825/it]</pre>
| 2945/3490 [1:15:14<25:39, 2.825/it]</pre>
| 2945/3490 [1:15:15<3:39, 2.825/it]</pre>
| 2945/3490 [1:15:14<25:39, 2.825/it]</pre>

/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters. warn('Non-invertible starting MA parameters found.'
/usr/local/lib/python3.11/dist-packages/statsmodels/base/model.py:607: ConvergenceWarning: Maximum Likelihood optimization failed to converge. Check mle\_retvals

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warnings.warn("Maximum Likelinood optimization failed to "

16/16 — 0s smy/step

Processing cities: 84%| | 2947/3490 [1:15:22<32:39, 3.61s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city\_data = city\_data.resample('M').agg(('AverageTemperature': 'mean'))

Processing cities: 85%| | 2958/3490 [1:15:29<05:36, 1.58it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_super().\_\_init\_\_(\*\*kwargs)

//usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.

warn('Non-invertible starting MA parameters found.

3/13 ———— Os 10ms/step

Processing cities: 85% | | 2959/3490 [1:15:35<19:53, 2.25s/it]</ri>
Processing cities: 85% | | 2970/3490 [1:15:35<19:53, 2.25s/it]</p>
Frocessing cities: 85% | | | 2970/3490 [1:15:42<05:13, 1.66it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape'/input\_d</p> Processing cities: 85%| super().\_\_init\_\_(\*\*kwargs)

Super().\_\_int\_\_('Namaigs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
warn('Non-invertible starting MA parameters found.'

20/20 \_\_\_\_\_\_\_ 0s 7ms/step

Processing cities: 85% | | 2971/3490 [1:15:52<29:23, 3.40s/it]<ip>ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME city\_data = city\_data.resample('M').agg({'AverageTemperature': 'mean'})
Processing cities: 85% | | | 2978/3490 [1:15:56<06:40, 1.28it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_d</p>

```
init (**kwargs)
                                                                ogs 11ms/step
| 2979/3490 [1:16:04<26:11, 3.08s/it]</ri>
 12/12
 Processing cities: 85%
     city_data = city_data.resample('M').agg({'AverageTemperature': 'mean'})
rocessing cities: 85%| | 2983/3490 [1:16:06<09:45, 1.16s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_d
Processing cities: 85% | 2983/3490 [1:16:06<09:45, 1.16s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `in super().__init__(**kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
super().__init__(**kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
warn('Non-invertible starting MA parameters found.'
13/13 — 0s 10ms/step

Processing cities: 86% | 1 | 2985/490 [1:16:19<32:27, 3.86s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME city_data = city_data.resample('M').agg(('AverageTemperature': 'mean'))

Processing cities: 86% | 2991/3490 [1:16:23<07:49, 1.06it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape'/`input_d
| 2991/3490 [1:10:25<07:49, 1.001t/s]/usr/local/lib/pytnon3.11/dist-packages/keras/src/layers/rmm/rmm.py:200: Userwarming: Do not pass an in super().__init__(**kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
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/usr/local/lib/python3.11/dist-packages/statsmodels/base/model.py:607: ConvergenceWarning: Maximum Likelihood optimization failed to converge. Check mle_retvals warnings.warn("Maximum Likelihood optimization failed to "

13/13 _______ 0s 10ms/step
13/13 — 68 lbms/step
Processing cities: 86% | 2992/3490 [1:16:30<23:27, 2.83s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME city_data = city_data.resample('M').agg(('AverageTemperature': 'mean'})
Processing cities: 86% | 2999/3490 [1:16:30<23:27, 2.83s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME city_data = city_data.resample('M').agg(('AverageTemperature': 'mean'})
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Processing cities: 86% | 2999/3490 [1:16:30<23:27, 2.83s/it]</p>
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/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_dim` argument to a layer. When using Sequential models, prefer using an super().__init__(**kwargs)
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warn('Non-stationary starting autoregressive parameters'
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
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/usr/local/lib/python3.11/dist-packages/statsmodels/base/model.py:607: ConvergenceWarning: Maximum Likelihood optimization failed to converge. Check mle_retvals
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12/12 — 0s 11ms/step

Processing cities: 86% | 3001/3490 [1:16:48<33:10, 4.07s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME city_data = city_data.resample('M').agg({'AverageTemperature': 'mean'})

Processing cities: 86% | 3015/3490 [1:16:57<04:48, 1.65it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_super()__init_(**kwargs)
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                                                              - 0s 16ms/step
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11/11 — 68 ams/step
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| 388/3490 [1:17:10<22:43, 2.89s/it]</ri>
| rocessing cities: 86%| | 388/3490 [1:17:10<22:43, 2.89s/it]</ri>
| rocessing cities: 86%| | 388/3490 [1:17:10<22:43, 2.89s/it]</ri>
| rocessing cities: 86%| | 388/3490 [1:17:10<22:43, 2.89s/it]</ri>
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| rocessing cities: 86% | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 | 100 |
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters. warn('Non-invertible starting MA parameters found.'
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Processing cities: 87% | 3022/3490 [1:17:21<28:53, 3.70s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city_data = city_data.resample('M').agg({'AverageTemperature': 'mean'})

Processing cities: 87% | 3027/3490 [1:17:24<08:22, 1.09s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_super().__init__(**kwargs)
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Processing cities: 87% | | 3028/3490 [1:17:32<25:20, 3.29s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city_data = city_data.resample('M').agg(('AverageTemperature': 'mean'})
Processing cities: 87% | | 3031/3490 [1:17:34<11:23, 1.49s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py.zoo. use maining. So not published to not publ
                                              87% 331/3499 [1:17:34:11:23, 1.495/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_
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rocessing cities: 87% | 1982/3490 [1:17:40<21:50, 2.86s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city_data = city_data.resample('M').agg(('AverageTemperature': 'mean'))
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Processing cities: 87%| | 3033/3490 [1:17:40<16:30, 2.17s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_super()._init_(**kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
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Processing cities: 87% | 3035/3490 [1:17:57<39:52, 5.26s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city_data = city_data.resample('M').agg(('AverageTemperature': 'mean'})
Processing cities: 87% | 3041/3490 [1:18:01<08:16, 1.11s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_super().__init__(**kwargs)
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14/14 — 68 9ms/step
Processing cities: 87% | 1342/3490 [1:18:09<24:22, 3.26s/it]</p>
| 3042/3490 [1:18:09<24:22, 3.26s/it]</p>
| 3042/3490 [1:18:09<24:22, 3.26s/it]</p>
| 3045/3490 [1:18:10<10:57, 1.48s/it]</p>
| 3045/3490 [1:18:00<10:57, 1.48s/it]</p>

Processing cities: 87% | | 3046/3490 [1:18:17<22:24, 3.03s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city\_data = city\_data.resample('M').agg(('AverageTemperature': 'mean'))

Processing cities: 88%| | 3064/3490 [1:18:47<24:49, 3.50s/it]<a href="http://www.news.accord.org/linearing-color="http://www.news.accord.org/linearing-col

3053/3490 [1:18:22<06:16, 1.16it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/ input\_

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87%| super().\_\_init\_\_(\*\*kwargs)
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Processing cities:

city\_data = city\_data.resar Processing cities: 88%| super().\_\_init\_\_(\*\*kwargs)

Processing cities: 88%| super().\_\_init\_\_(\*\*kwargs)

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Processing cities: 89%| | | | 3093/3490 [1:19:30<11:54, 1.80s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_ Processing cities: 89/ 3093/3490 [1:19:30<11:54, 1.80s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape'/ super().\_\_init\_\_(\*\*kwargs)
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4/14 — 0s 9ms/step 14/14 | 3106/3490 [1:19:50<16:41, 2.61s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M Processing cities: 89% Processing Citical active data resample('M').agg('AverageTemperature': 'mean'))

Processing cities: 89%| | 3111/3490 [1:19:52<05:37, 1.12it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an 'is super().\_\_init\_\_(\*\*kwargs)

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15/15 \_\_\_\_\_\_\_ 0s 10ms/step 15/15 — 68 lbms/step
Processing cities: 89% | 1212/3490 [1:20:19<22:27, 3.65s/it]</p>
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Processing cities: 90% | 3126/3490 [1:20:30<06:53, 1.15s/it]/usr/local/lib/python3.11/dist-packages/keras/src/lavers/rpn/sps = 1.20:30 (1/10) | 310/3490 [1:20:30<06:53, 1.15s/it]/usr/local/lib/python3.11/dist-packages/keras/src/lavers/rpn/sps = 1.20:30 (1 /usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters. 90% 3132/3490 [1:20:44<23:52, 4.00s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M Processing cities: city\_data = city\_data\_resample('M').agg(('AverageTemperature': 'mean'))

Processing cities: 90%| | 3134/3490 [1:20:45<13:18, 2.24s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_super().\_\_init\_\_(\*\*kwargs) Super().\_\_int\_\_('Namaigs)
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| 3141/3490 [1:21:03<18:40, 3.21s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME Processing cities: 90% city\_data = city\_data\_resample('M').agg(\(\frac{\text{averageTemperature}: \mean'\)}\)
Processing cities: 90%| | 3146/3490 [1:21:06<05:43, 1.00it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_d super().\_\_init\_\_(\*\*kwargs) Processing cities: 90% | | 3147/3490 [1:21:12<14:13, 2.49s/it]<pre>ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME city\_data = city\_data.resample('M').agg(('AverageTemperature': 'mean'))
Processing cities: 90% | | | 3151/3490 [1:21:15<07:09, 1.27s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_d super().\_\_init\_\_(\*\*kwargs)</pre> | 3147/3490 [1:21:12<14:13, 2.49s/it]<a href="mailto:dispersion-input-7-328d46eed31c">it is deprecated and will be removed in a future version, please use 'ME | 3147/3490 [1:21:12<14:13, 2.49s/it]</a> | The content of the content o Super().\_\_init\_\_(\*\*kwargs)
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/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
warn('Non-invertible starting MA parameters found.'
20/20 \_\_\_\_\_\_\_ 0s 7ms/step

| 3162/3490 [1:21:36<13:20, 2.44s/it]</ri>

Processing cities: 91% [ 3161/3490 [1:21:29<04:09, 1.32it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `in super().\_\_init\_\_(\*\*kwargs)
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warn('Non-invertible starting MA parameters found.

91%|

- **0s** 12ms/step

12/12

Processing cities: 91%

city data = city data. Processing cities: 91%| super().\_\_init\_\_(\*\*kwargs)

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rocessing cities: 91% 3165/3490 [1:21:44<17:39, 3.26s/it]<pre>city_data = city_data.resample('M').agg({'AverageTemperature': 'mean'})
Processing cities: 91%
Processing cities: 91%| super().__init__(**kwargs)
                                                     | 3177/3490 [1:21:51<04:08, 1.26it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_d
                                            • 0s 10ms/ster
Processing cities: 91%| | 3178/3490 [1:21:58<13:01, 2.51s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME city_data = city_data.resample('M').agg({'AverageTemperature': 'mean'})

Processing cities: 91%| | 3182/3490 [1:22:00<05:14, 1.02s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_d
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Processing cities: 91%
Processing cities: 92%| super().__init__(**kwargs)
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Processing cities: 92%| super().__init__(**kwargs)
Processing cities: 92%| super().__init__(**kwargs)
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   warn('Non-invertible starting MA parameters found.

1/12 ______ 0s 13ms/step
12/12 -
Processing cities: 92%| | 3225/3490 [1:22:57<17:11, 3.89s/it]</pre>

Processing cities: 92%| | 3225/3490 [1:22:57<17:11, 3.89s/it]</pre>

in a future version, please use 'M city_data = city_data.resample('M').agg(('AverageTemperature': 'mean'))
Processing cities: 93/ 1329/3490 [1:22:59<05:53, 1:35s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_super().__init__(**kwargs)
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/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:966: UserWarning: Non-stationary starting autoregressive parameters found. Using zeros as starting parameters.
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters. warn('Non-invertible starting MA parameters found.'
Warm( NON-Invertible Stating ma parameters round.

13/13 —————— 0s Ilms/step

Processing cities: 93%| | 3230/3490 [1:23:07<15:14, 3.52s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city_data = city_data.resample('M').agg(('AverageTemperature': 'mean'})

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Processing cities: 93%| super().__init__(**kwargs)
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Processing cities: 94%| super().__init__(**kwargs)
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2/12 — 0s 15ms/step

rocessing cities: 94%| 3267/3490 [1:23:50x09:58, 2.69s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city_data = city_data.resample('M').agg('(AverageTemperature': 'mean'))

rocessing cities: 94%| 3267/3490 [1:23:50x09:58, 2.69s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city_data_resample('M').agg('(AverageTemperature': 'mean'))

rocessing cities: 94%| 3267/3490 [1:23:50x09:58, 2.69s/it]
12/12 -
Processing cities: 94%
Processing cities: 94%| super().__init__(**kwargs)
                                                     3276/3490 [1:23:55<02:42, 1.31it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_
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Processing cities: 94% 3277/3490 [1:24:02<09:18, 2.62s/it]<a href="mailto:city_data">city_data</a> = city_data = city_data resample('M').agg(('AverageTemperature': 'mean'))

Processing cities: 94% 3294/3490 [1:24:13<01:55, 1.70it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an 'input_shape'/'input_super().__init__(**kwargs)
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/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
    warn('Non-invertible starting MA parameters found.
15/15 — 0s 9ms/step

Processing cities: 94%| | 3295/3490 [1:24:19<07:31, 2.32s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city_data = city_data.resample('M').agg(('AverageTemperature': 'mean'))

Processing cities: 94%| | 3297/3490 [1:24:21<05:15, 1.63s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_super()._init__(**kwargs)
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Processing cities: 95%| | 3299/3490 [1:24:38<16:36, 5.22s/it]</a>
12/12 -
                                            - 0s 3ms/step
Processing cities: 95%| super().__init__(**kwargs)
                                                   | 3304/3490 [1:24:41<04:08, 1.34s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_
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Processing cities: 95%| | 3305/3490 [1:24:51<11:38, 3.78s/it]</p>
city_data = city_data.resample('M').agg({'AverageTemperature': 'mean'})
Processing cities: 95%| | 3315/3490 [1:24:56<02:06, 1.38it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input_shape`/`input_super().__init_(**kwargs)</p>
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le('M').agg({'AverageTemperature': 'mean'})
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ip parameters found.' Processing cities: 95% city\_data = city\_data\_resample('M').agg(('AverageTemperature': 'mean'))

Processing cities: 95%| 3330/3490 [1:25:44<03:04, 1.15s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_d super().\_\_init\_\_(\*\*kwargs) super().\_\_int\_\_(\_\_\_\_(approximates) / (usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters. warn('Non-invertible starting MA parameters found.' 15/15 - 0s 9ms/step | | 3331/3490 [1:25:52<07:59, 3.01s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME .resample('M').agg({'AverageTemperature': 'mean'})
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Processing cities: 96%| | 3349/3490 [1:26:08<05:09, 2.20s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME city\_data = city\_data.resample('M').agg(('AverageTemperature': 'mean'})
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Forcessing cities: 96%| | 3356/3490 [1:26:45<11:26, 5.13s/it]</p>
city\_data = city\_data.resample('M').agg({'AverageTemperature': 'mean'})
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- 0s 10ms/step

- 3357/3490 [1:26:52<12:34, 5.68s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'ME 13/13 -Processing cities: 96% city\_data = city\_data.resample('M').agg(('AverageTemperature': 'mean'))
rocessing cities: 96%| 3365/3490 [1:26:57<01:46, 1.17it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_ Processing cities: 96%| super().\_\_init\_\_(\*\*kwargs) /usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters. warn('Non-invertible starting MA parameters found. 3/13 \_\_\_\_\_\_\_ 0s 11ms/step /usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters. warn('Non-invertible starting MA parameters found.'

13/13 — 0s 10ms/step

Processing cities: 96%| | 3367/3490 [1:27:10<07:37, 3.72s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city\_data = city\_data.resample('M').agg(('AverageTemperature': 'mean'))

Processing cities: 97% | 3368/3490 [1:27:10<05:38, 2.78s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_super().\_\_init\_\_(\*\*kwargs) /usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters. .... orcessing cities: 97% 13369/3490 [1:27:18<08:19, 4.13s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city\_data = city\_data.resample('M').agg({'AverageTemperature': 'mean'}) Processing cities: 97% Processing cities: 97% | 3372/3490 [1:27:19<03:30, 1.78s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an 'i super().\_\_init\_\_(\*\*kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters. 3372/3490 [1:27:19<03:30, 1.78s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_ warn('Non-invertible starting MA parameters found.'
3/13 — 0s 15ms/step
0 s 15ms/step
0 rocessing cities: 97½ 1 3373/3490 [1:27:27<06:46, 3.48s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city\_data = city\_data.resample('M').agg({'AverageTemperature': 'mean'}) /usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_dim` argument to a layer. When using Sequential models, prefer using an super().\_\_init\_\_(\*\*kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters. Processing cities: 97% | 374/3490 [1:27:33<08:22, 4.33s/it|<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city\_data = city\_data resample('M').agg({'AverageTemperature': 'mean'})

Processing cities: 97%| | 3375/3490 [1:27:34<06:08, 3.21s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_super().\_\_init\_\_(\*\*kwargs) super().\_\_init\_\_(\*\*kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
warn('Non-invertible starting MA parameters found.' - 0s 10ms/step Processing cities: 97% 3376/3490 [1:27:42<08:42, 4.58s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city\_data = city\_data.resar Processing cities: 97%| super().\_\_init\_\_(\*\*kwargs) ('M').agg({'AverageTemperature': 'mean'})
■ | 378/3490 [1:27:43<04:43, 2.53s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_

/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.

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warn(

13/13 super().\_\_init\_\_(\*\*kwargs)
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/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters. 13/13 — 68 lbms/step
Processing cities: 97% | 1383/3490 [1:28:02<09:14, 5.09s/it]</p>
Processing cities: 97% | 1383/3490 [1:28:02<09:14, 5.09s/it]</p>
city\_data = city\_data.resample('M').agg(('AverageTemperature': 'mean'})
Processing cities: 97% | 1385/3490 [1:28:05<03:15, 1.86s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_super().\_\_init\_\_(\*\*kwargs)</p> /usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters. warn('Non-invertible starting MA parameters found.

15/15 ———— 0s 10ms/step Wanning Non-Invertible Stating was parameter's Todino.

9s 10ms/step

Processing cities: 97%| 3386/3490 [1:28:12<05:46, 3.34s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city\_data = city\_data.resample('M').agg('AverageTemperature': 'mean'))

Processing cities: 97%| 3389/3490 [1:28:14<02:32, 1.51s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_super().\_\_init\_\_(\*\*kwargs) /usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters. warn('Non-invertible starting MA parameters found.' // usr/local/lib/python3.11/dist-packages/statsmodels/base/model.py:607: ConvergenceWarning: Maximum Likelihood optimization failed to converge. Check mle\_retvals warnings.warn("Maximum Likelihood optimization failed to "

13/13 \_\_\_\_\_\_\_ 0s 11ms/step super().\_init\_("\*kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
warn('Non-invertible starting MA parameters found.' 13/13 — Os 10ms/step

Processing cities: 97% | 10ms/step

Processing cities: 97% | 3392/3490 [1:28:28<05:11, 3.18s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_super().\_\_init\_\_(\*\*kwargs) //usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters. warn('Non-invertible starting MA parameters found. \text{\text{War/local/lib/python3.11/dist-packages/statsmodels/base/model.py:607: ConvergenceWarning: Maximum Likelihood optimization failed to converge. Check mle\_retvals \text{warnings.warn("Maximum Likelihood optimization failed to " \text{13/13} \text{\text{\text{13/13}}} \text{\text{\text{\text{\$05}}} Os 10ms/step super().\_\_init\_\_(\*\*kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters. warn('Non-invertible starting MA parameters found. Warm( Non-Invertible Starting MM parameters Yound.

4/14 ————— 0s 16ms/step

Processing cities: 97%| | 3395/3490 [1:28:44<07:16, 4.59s/it]</td>
4.59s/it]
<t warn('Non-invertible starting MA parameters found.'

3/13 — \_\_\_\_\_\_ 0s 11ms/step

rocessing cities: 97%| 3399/3490 [1:28:51<04:50, 3.19s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M' city\_data = city\_data\_resample('M').agg({'AverageTemperature': 'mean'})

Processing cities: 98%| | 3409/3490 [1:28:58<00:54, 1.49it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_super().\_\_init\_\_(\*\*kwargs) super().\_\_init\_\_(\*\*kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters. warn('Non-invertible starting MA parameters found.

5/15 \_\_\_\_\_\_\_ 0s 9ms/step warn('Non-invertible starting MA parameters found. 13/13 -- **0s** 11ms/step 13/13 — 98 lims/step
Processing cities: 98% | 13/14/13/490 [1:29:12<05:06, 3.88s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city\_data = city\_data.resample('M').agg(('AverageTemperature': 'mean'))
Processing cities: 98% | 13/17/3490 [1:29:15<01:08, 1.06it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape'/`input\_super'().\_\_init\_\_(\*\*kwargs)
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warn('Non-invertible starting MA parameters found.'

13/13 — 0s 16ms/step

Processing cities: 98%| 3434/3490 [1:29:58<03:46, 4.05s/it]</p>
ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city\_data = city\_data\_resample('M').agg({'AverageTemperature': 'mean'})

Processing cities: 98%| | 3437/3490 [1:30:00<01:33, 1.76s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_super().\_\_init\_\_(\*\*kwargs)

14/14 — 0s 10ms/step
Processing cities: 99% | 3438/3490 [1:30:06<02:43, 3.14s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city\_data = city\_data.resample('M').agg({'AverageTemperature': 'mean'})
Processing cities: 99% | 3439/3490 [1:30:07<02:00, 2.37s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_super().\_\_init\_\_(\*\*kwargs)

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3440/3490 [1:30:14<03:15, 3.92s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M

super().\_\_int\_\_(''Nwargo)
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// User/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters

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99%1

· 0s 9ms/step

15/15

Processing cities:

city\_data.resample( ).agg({'AverageTemperature 3446/3490 [1:38:18:00:41, 1.06it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_ Warm( Non-Invertible Starting ma parameters found.

3/13 — 0s Ilms/step

Processing cities: 99%| 3447/3490 [1:30:25<02:00, 2.80s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city\_data = city\_data.resample('M').agg(('AverageTemperature': 'mean'))

Processing cities: 99%| 3454/3490 [1:30:29<00:26, 1.35it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_super()\_\_init\_\_(\*\*kwargs)

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ities: 99% 3455/3490 [1:30:37<01:41, 2.89s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city\_data = city\_data\_resample('M').agg({'AverageTemperature': 'mean'})

Processing cities: 99% 3457/3490 [1:30:38<00:56, 1.71s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_super().\_\_init\_\_(\*\*kwargs)

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3/13 \_\_\_\_\_\_\_ 0s 10ms/step Processing cities: 99%| | 3461/3490 [1:31:05<02:42, 5.61s/it]<a href="https://docs.no.ni/more.com/resource-based-sector-ba city\_data = city\_data.resar Processing cities: 99%| super().\_\_init\_\_(\*\*kwargs) /usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters. warn('Non-invertible starting MA parameters found.'
/usr/local/lib/python3.11/dist-packages/statsmodels/base/model.py:607: ConvergenceWarning: Maximum Likelihood optimization failed to converge. Check mle\_retvals warnings.warn("Maximum Likelihood optimization failed to 3/13 \_\_\_\_\_\_ 0s 11ms/step Processing cities: 99%| | 3463/3490 [1:31:14<02:25, 5.38s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city\_data = city\_data.resample('M').agg(('AverageTemperature': 'mean'))
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/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters. super().\_\_init\_\_(\*\*kwargs)
/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.
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warn('Non-Invertible starting MA parameters found.'

3/13 — 0s Ilms/step

Processing cities: 100%| 3/475/3490 [1:32:12<01:18, 5.24s/it]<ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city\_data = city\_data.resample('M').agg(('AverageTemperature': 'mean'))

Processing cities: 100%| 3/485/3490 [1:32:18<00:03, 1.34it/s]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_super().\_\_init\_\_(\*\*kwargs)

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Processing cities: 100%| | 3487/3490 [1:32:32<00:11, 3.91s/it]</ri>
Processing cities: 100%| | 3487/3490 [1:32:32<00:11, 3.91s/it]</p>
ipython-input-7-328d46eed31c>:26: FutureWarning: 'M' is deprecated and will be removed in a future version, please use 'M city\_data = city\_data.resample('M').agg({'AverageTemperature': 'mean'})
Processing cities: 100%| | | 3488/3490 [1:32:33<00:05, 2.91s/it]/usr/local/lib/python3.11/dist-packages/keras/src/layers/rnn/rnn.py:200: UserWarning: Do not pass an `input\_shape`/`input\_</p>

/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters. warn('Non-invertible starting MA parameters found.'

13/13 \_\_\_\_\_\_\_\_ 0s 11ms/step

/usr/local/lib/python3.11/dist-packages/statsmodels/tsa/statespace/sarimax.py:978: UserWarning: Non-invertible starting MA parameters found. Using zeros as starting parameters.

warn('Non-invertible starting MA parameters found.

3/13 ———— Os 11ms/step

warn('Non-invertible starting MA parameters found.

**- 0s** 7ms/step

init (\*\*kwargs)

super()

20/20