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DEVOIR INF312: SERIE TEMPORELLE

1- Étude production de bière

In [ ]:
```
import numpy as np
import matplotlib.pyplot as plt
import pandas as pd

filepath_1 = "dataset/monthly-beer-production-in-austr.csv"
df  = pd.read_csv(filepath_1, nrows=500);
```

2- Moyenne, Variance et Ecart-type

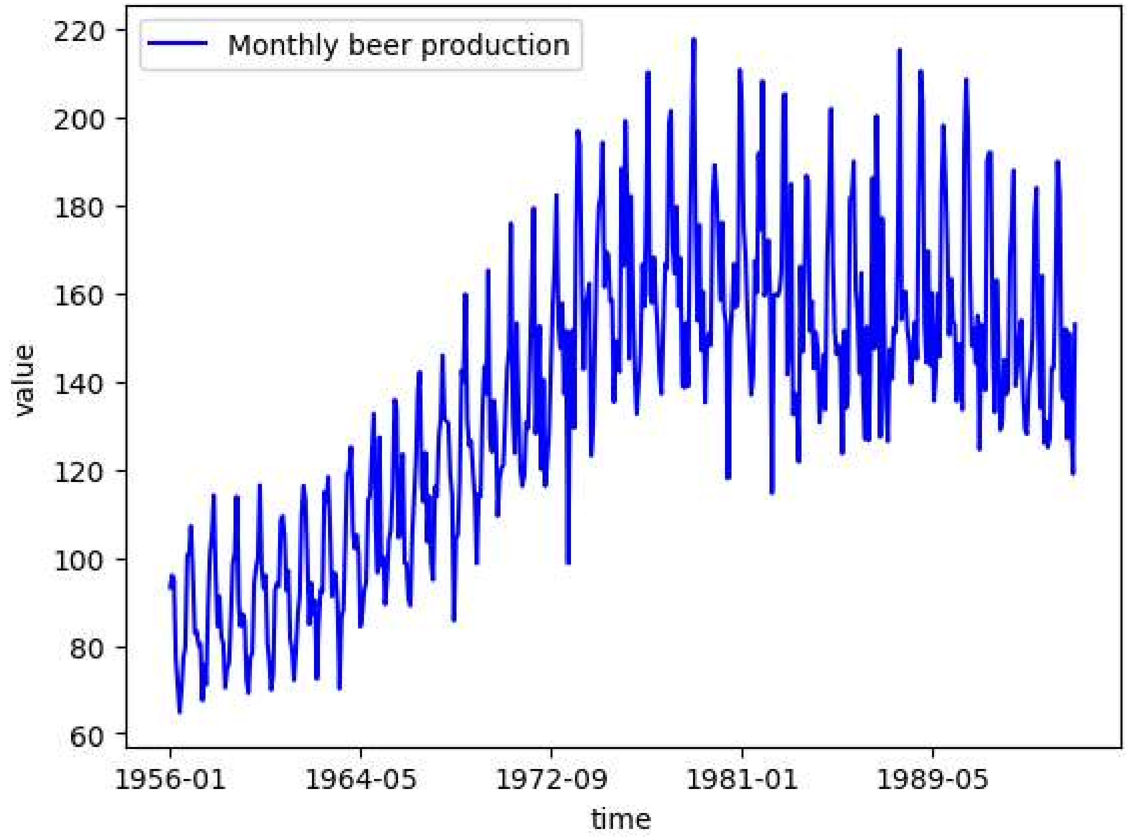
In [ ]:
```
mean_1 = df['Monthly beer production'].mean()
var_1 = df['Monthly beer production'].var()
ect_1 = df['Monthly beer production'].std()
print(f"moyenne: {mean_1}\nVarieance: {var_1}\nEcart-type: {ect_1}")
```

```
moyenne: 136.3953781512605
Varieance: 1138.3015364882797
Ecart-type: 33.738724583011134
```

3- Représentation

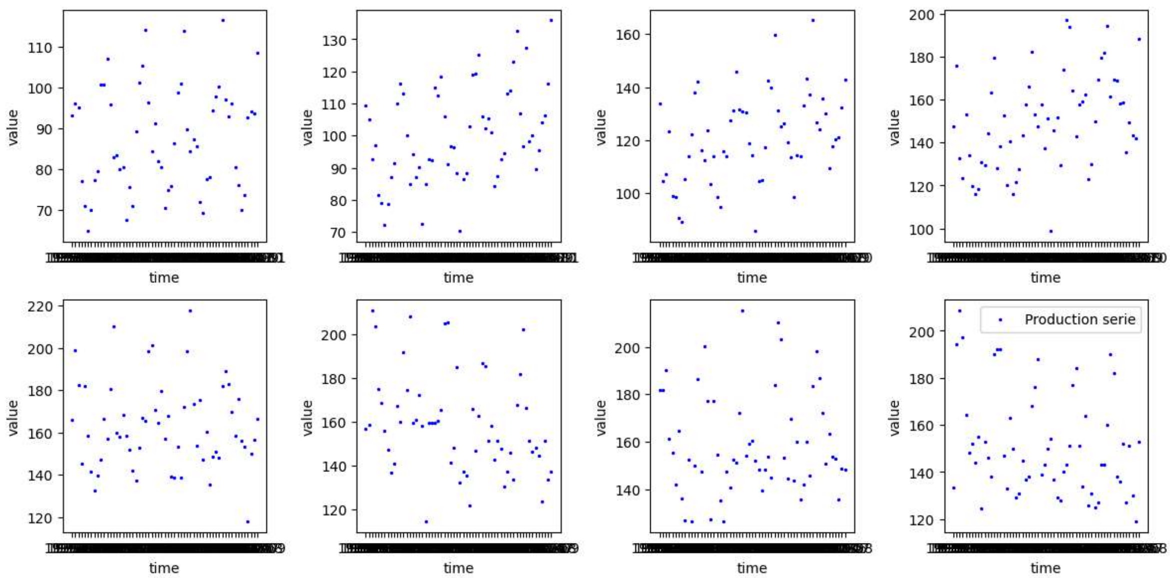
In [ ]:
```
plt.figure(figsize=(12,6))
df.plot(x='Month', y='Monthly beer production', c='b')
plt.xlabel("time")
plt.ylabel("value")
# plt.title("Temporal serie for prooduction")
plt.show()
```

```
<Figure size 1200x600 with 0 Axes>
```



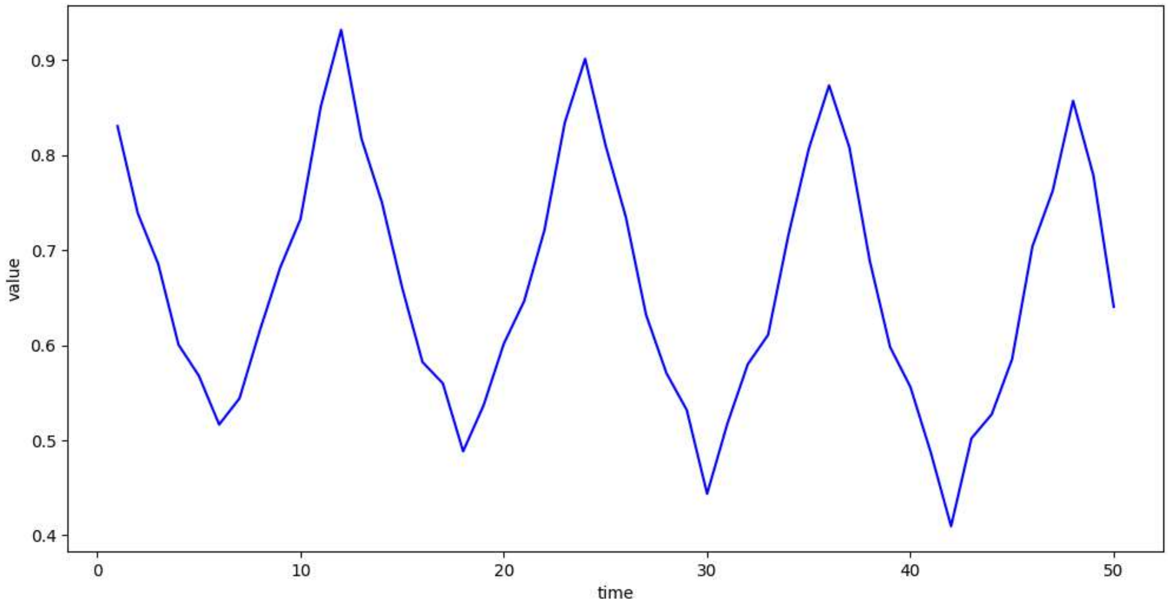
4- Nuage de points

In [ ]:
```
fig_1, axs_1 = plt.subplots(2, 4, figsize=(12, 6))

for i, ax in enumerate(axs_1.flat):
    start_idx = i * len(df['Month'])//8
    end_idx = (i+1)*len(df['Month'])//8
    ax.scatter(df['Month'][start_idx:end_idx], df['Monthly beer production'][sta
    ax.set_xlabel("time")
    ax.set_ylabel("value")

axs_1[-1, -1].legend()
plt.tight_layout()
plt.show()
```



5- Auto-correlations

In [ ]:
```
autocorr = [df['Monthly beer production'].autocorr(lag=lag) for lag in range(1,
lags = range(1, 51)
plt.figure(figsize=(12, 6))
plt.plot(lags, autocorr, c='b', label="Production series")
plt.xlabel("time")
plt.ylabel("value")
# plt.title("Temporal serie for prooduction")
plt.show()
```



1- Étude Bitcoin

In [ ]:
```
filepath_2 = "dataset/BTC-EUR.csv"
df_2  = pd.read_csv(filepath_2, nrows=500);
```

2- Moyenne, variance et Ecart-type

In [ ]:
```
mean_2 = df_2['Close'].mean()
var_2 = df_2['Close'].var()
ect_2 = df_2['Close'].std()
print(f"moyenne: {mean_2}\nVarieance: {var_2}\nEcart-type: {ect_2}")
```

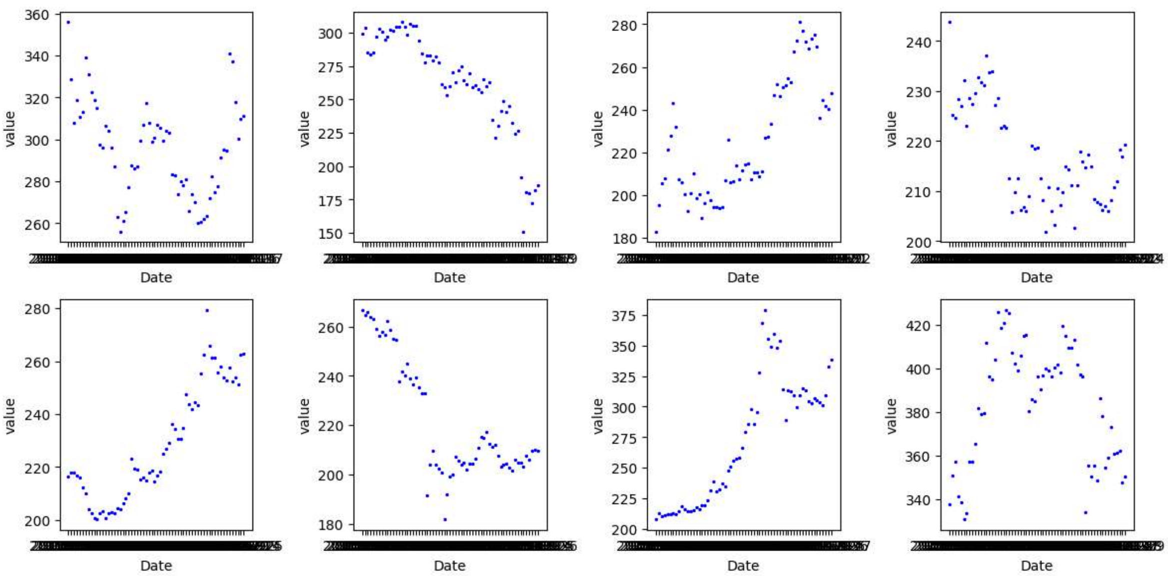
```
moyenne: 263.369604148
Varieance: 3671.2576510383046
Ecart-type: 60.59090402889121
```

3- Représentation

In [ ]:
```
# plt.figure(figsize=(12,6))
df_2.plot(x='Date', y='Close', c='b')
plt.xlabel("Date")
plt.ylabel("value")
# plt.title("Temporal serie for prooduction")
plt.show()
```

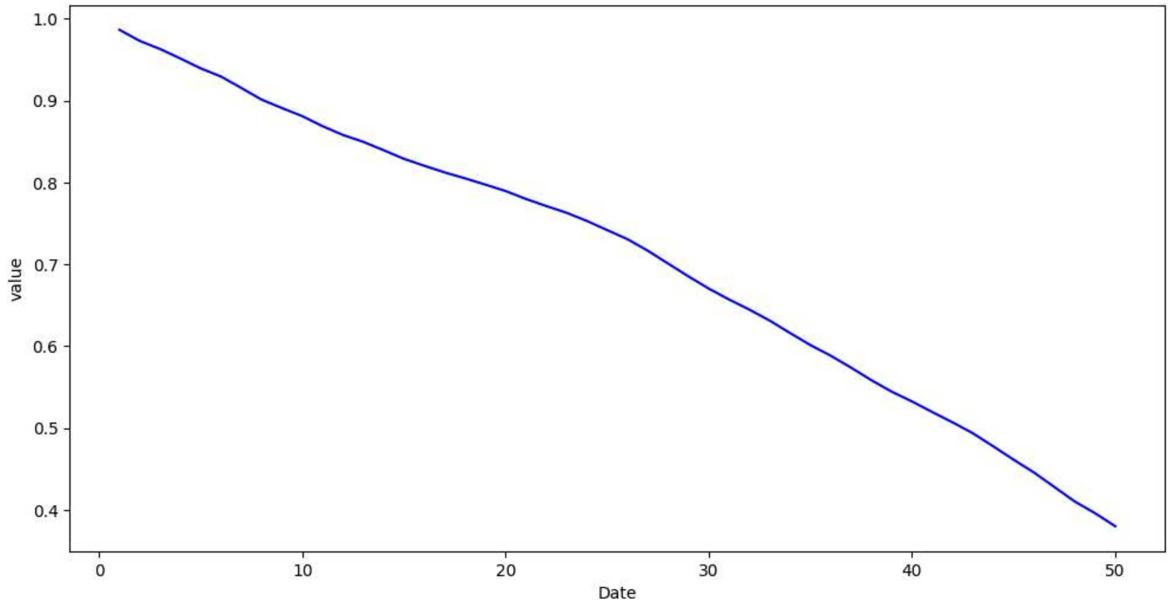
4- <u>Nuage de points</u>

In [ ]:
```
fig_2, axs_2 = plt.subplots(2, 4, figsize=(12, 6))

for i, ax in enumerate(axs_2.flat):
    start_idx = i*len(df_2['Date'])//8
    end_idx = (i+1)*len(df_2['Date'])//8
    ax.scatter(df_2['Date'][start_idx:end_idx], df_2['Close'][start_idx:end_idx]
    ax.set_xlabel("Date")
    ax.set_ylabel("value")
# plt.title("Temporal serie for prooduction")

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



5- Auto-correlation

In [ ]:
```
autocorr = [df_2['Close'].autocorr(lag=lag) for lag in range(1, 51)]
lags = range(1, 51)
plt.figure(figsize=(12, 6))
plt.plot(lags, autocorr, c='b')
plt.xlabel("Date")
plt.ylabel("value")
# plt.title("Temporal serie for prooduction")
plt.show()
```



1- Étude météo

In [ ]:
```
filepath_3 = "dataset/weather_data_kolkata_2015_2020.csv"
df_3  = pd.read_csv(filepath_3, nrows=700);
```

2- Moyenne, variance et Ecart-type

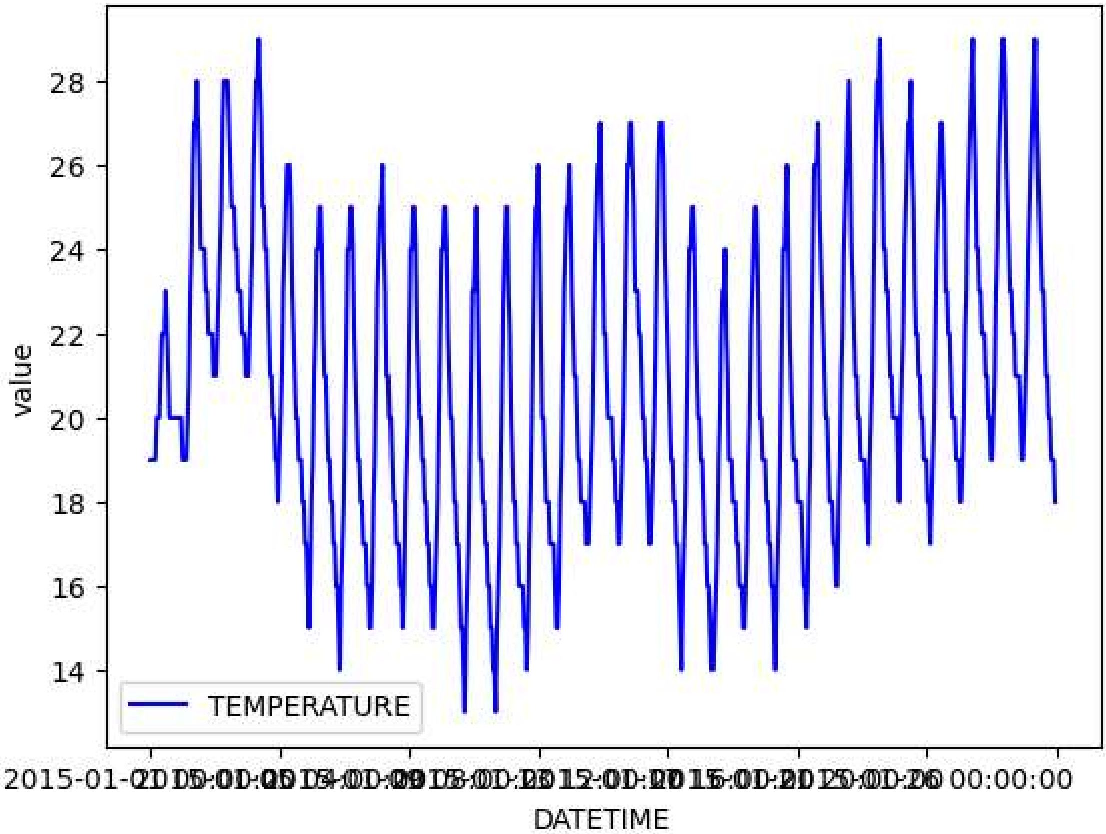
In [ ]:
```
mean_3 = df_3['TEMPERATURE'].mean()
var_3 = df_3['TEMPERATURE'].var()
ect_3 = df_3['TEMPERATURE'].std()
print(f"moyenne: {mean_3}\nVarieance: {var_3}\nEcart-type: {ect_3}")
```

```
moyenne: 20.87857142857143
Varieance: 12.524575924790518
Ecart-type: 3.5390077599223373
```

3- Représentation

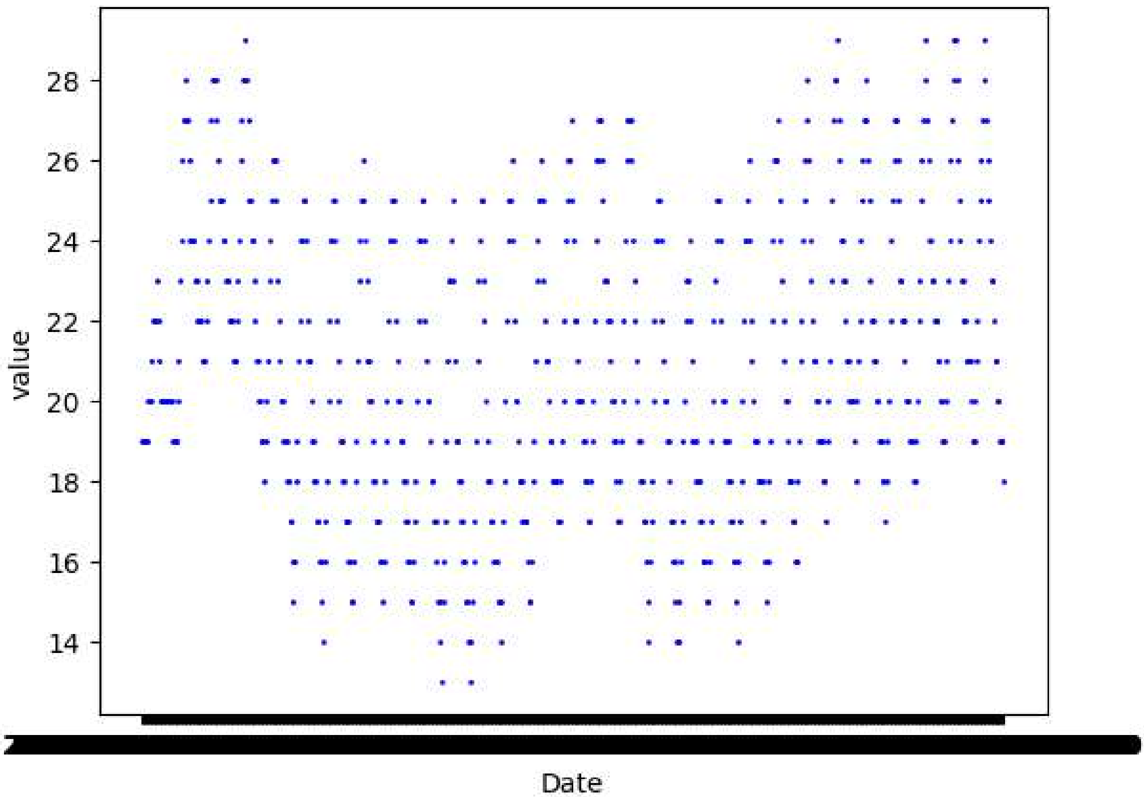
In [ ]:
```
plt.figure(figsize=(12, 6))
df_3.plot(x='DATETIME', y='TEMPERATURE', c='b')
plt.xlabel("DATETIME")
plt.ylabel("value")
# plt.title("Temporal serie for prooduction")
plt.show()
```

```
<Figure size 1200x600 with 0 Axes>
```



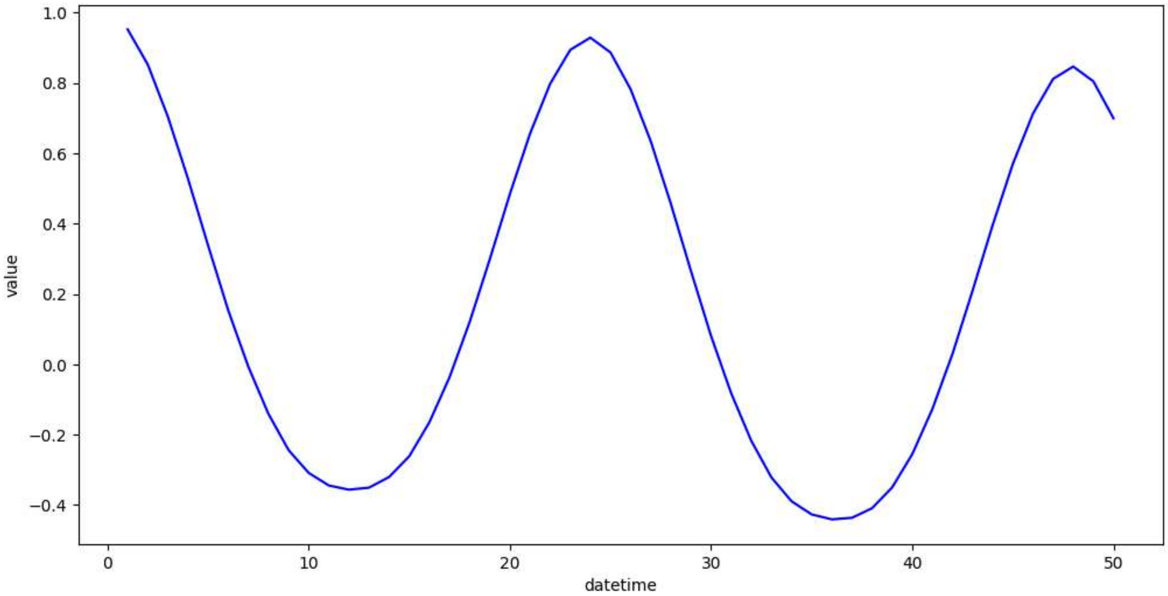
4- Nuage de points

In [ ]:
```python
plt.scatter(df_3['DATETIME'], df_3['TEMPERATURE'], s=1, c='b')
plt.xlabel("Date")
plt.ylabel("value")
# plt.title("Temporal serie for prooduction")
plt.show()
```



5- Auto-correlation

In [ ]:
```
autocorr = [df_3['TEMPERATURE'].autocorr(lag=lag) for lag in range(1, 51)]
lags = range(1, 51)
plt.figure(figsize=(12, 6))
plt.plot(lags, autocorr, c='b')
plt.xlabel("datetime")
plt.ylabel("value")
# plt.title("Temporal serie for prooduction")
plt.show()
```



1- Étude vente panneau solaire

In [ ]:
```
filepath_4 = "dataset/monthly-sunspots.csv"
df_4  = pd.read_csv(filepath_4, nrows=500);
```

2- Moyenne, variance et Ecart-type

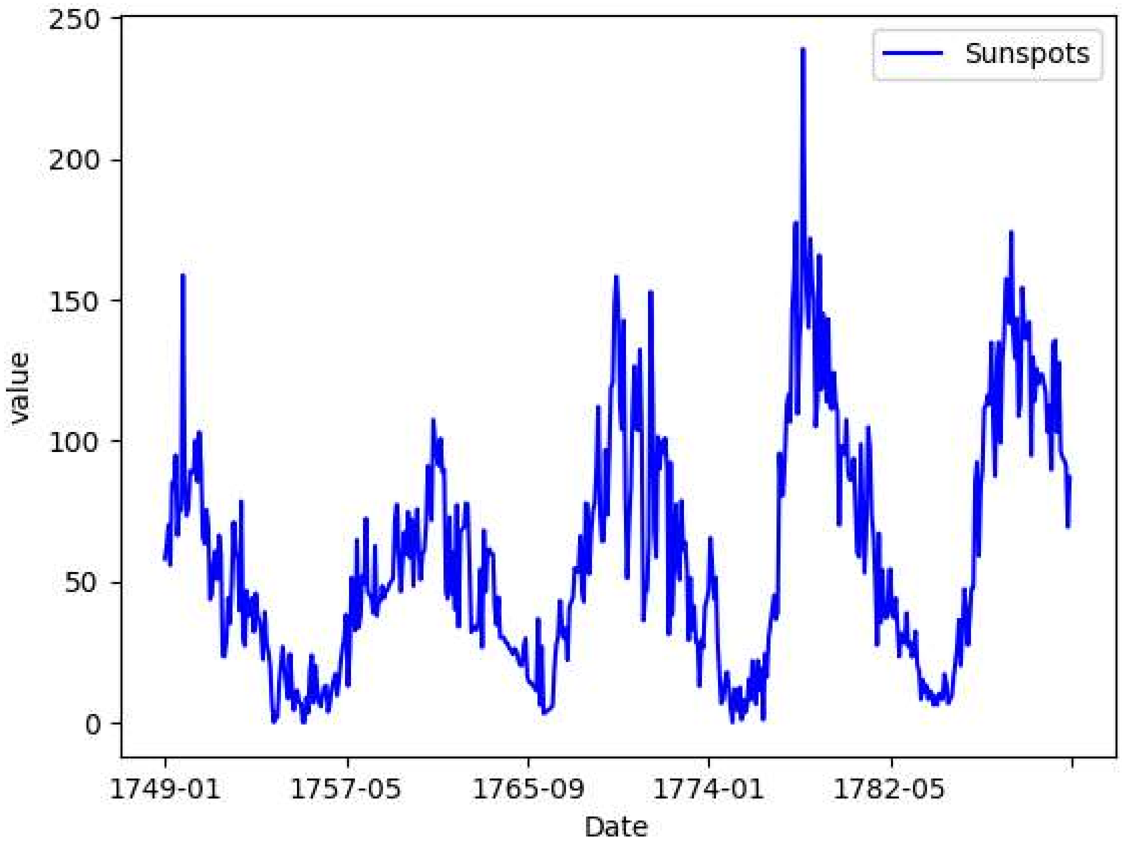
In [ ]:
```
mean_4 = df_4['Sunspots'].mean()
var_4 = df_4['Sunspots'].var()
ect_4 = df_4['Sunspots'].std()
print(f"moyenne: {mean_4}\nVarieance: {var_4}\nEcart-type: {ect_4}")
```

```
moyenne: 59.6031999999994
Varieance: 1808.524959679359
Ecart-type: 42.526755809482566
```

3- Représentation

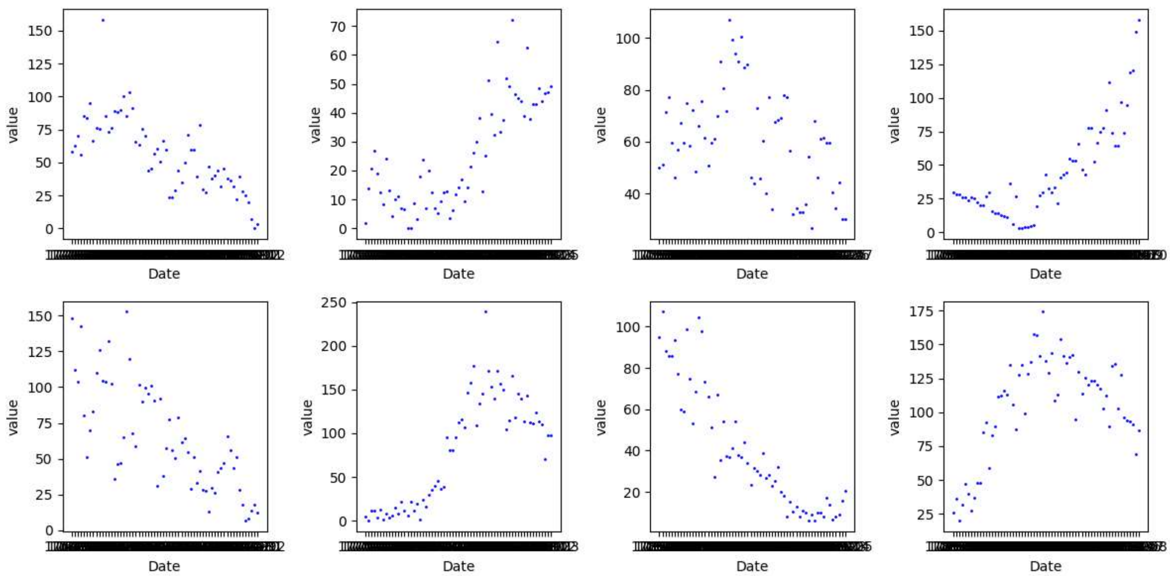
In [ ]:
```
plt.figure(figsize=(12,6))
df_4.plot(x='Date', y='Sunspots', c='b')
plt.xlabel("Date")
plt.ylabel("value")
# plt.title("Temporal serie for prooduction")
plt.show()
```

```
<Figure size 1200x600 with 0 Axes>
```



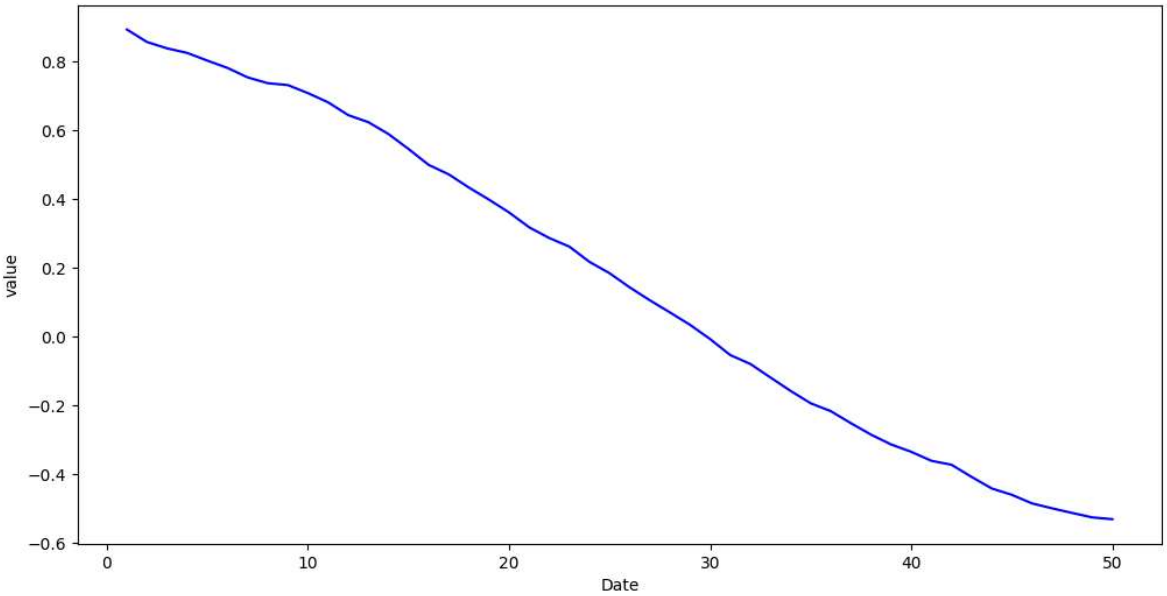
4- Nuage de points

In [ ]:
```
fig_4, axs_4 = plt.subplots(2, 4, figsize=(12, 6))

for i, ax in enumerate(axs_4.flat):
    start_idx = i * len(df_4['Date'])//8
    end_idx = (i+1)*len(df_4['Date'])//8
    ax.scatter(df_4['Date'][start_idx:end_idx], df_4['Sunspots'][start_idx:end_i
    ax.set_xlabel("Date")
    ax.set_ylabel("value")
# plt.title("Temporal serie for prooduction")
plt.tight_layout()
plt.show()
```



5- Auto-correlation

In [ ]:
```
autocorr = [df_4['Sunspots'].autocorr(lag=lag) for lag in range(1, 51)]
lags = range(1, 51)
plt.figure(figsize=(12, 6))
plt.plot(lags, autocorr, c='b')
plt.xlabel("Date")
plt.ylabel("value")
# plt.title("Temporal serie for prooduction")
plt.show()
```



1- Étude production électrique

In [ ]:
```
filepath_5 = "dataset/Electric_Production.csv"
df_5  = pd.read_csv(filepath_5, nrows=500);
```

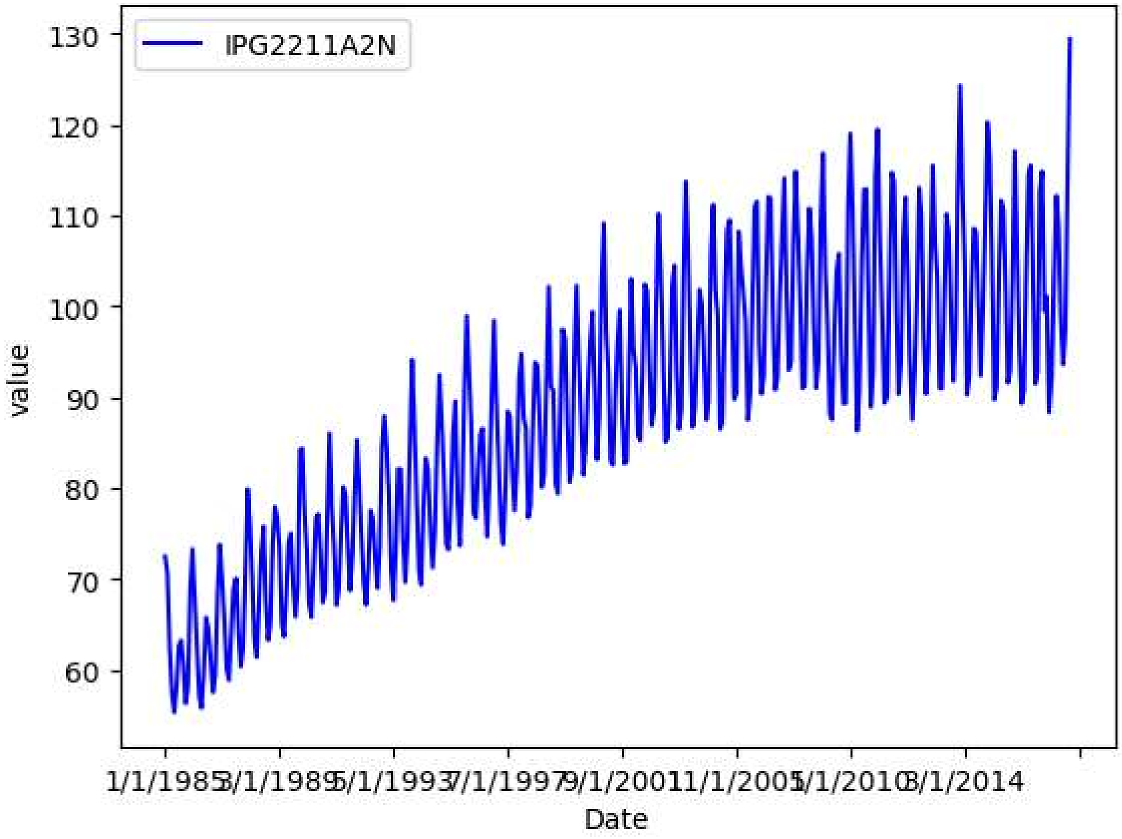
2- Moyenne, variance et Ecart-type

In [ ]:
```
mean_5 = df_5['IPG2211A2N'].mean()
var_5 = df_5['IPG2211A2N'].var()
ect_5 = df_5['IPG2211A2N'].std()
print(f"moyenne: {mean_5}\nVarieance: {var_5}\nEcart-type: {ect_5}")
```

```
moyenne: 88.84721763224182
Varieance: 236.78542489342567
Ecart-type: 15.387833664730902
```

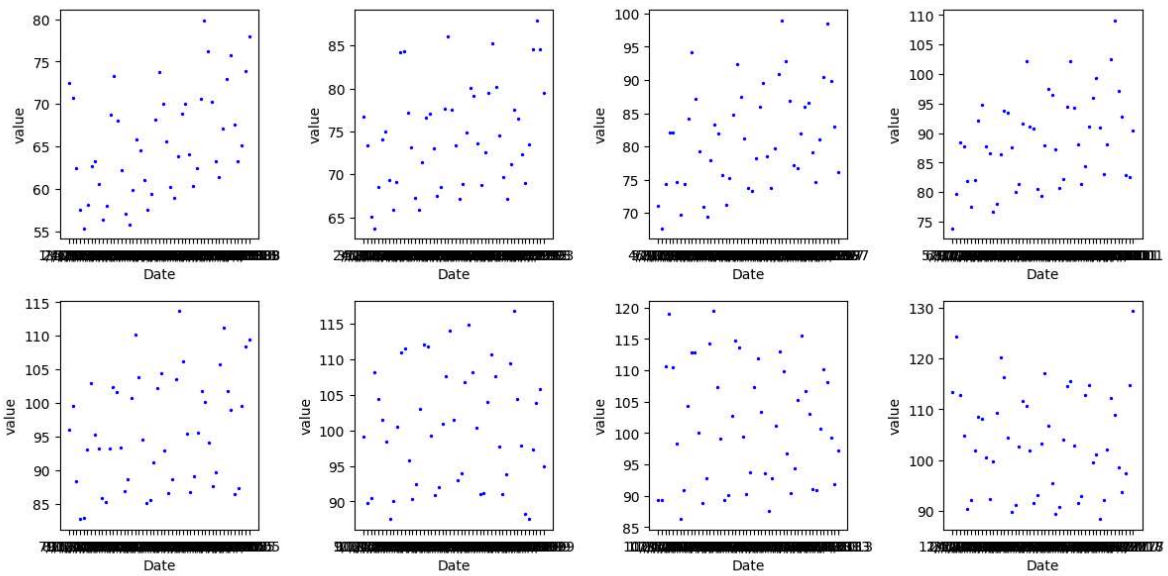
3- Représentation

In [ ]:
```
df_5.plot(x='DATE', y='IPG2211A2N', c='b')
plt.xlabel("Date")
plt.ylabel("value")
# plt.title("Temporal serie for prooduction")
plt.show()
```



4- **Nuage de points**

```
In [ ]: fig_5, axs_5 = plt.subplots(2, 4, figsize=(12, 6))

        for i, ax in enumerate(axs_5.flat):
            start_idx = i * len(df_5['DATE'])//8
            end_idx = (i+1)*len(df_5['DATE'])//8
            ax.scatter(df_5['DATE'][start_idx:end_idx], df_5['IPG2211A2N'][start_idx:end
            ax.set_xlabel("Date")
            ax.set_ylabel("value")

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



5- Auto-correlation

In [ ]:
```
autocorr = [df_5['IPG2211A2N'].autocorr(lag=lag) for lag in range(1, 51)]
lags = range(1, 51)
plt.figure(figsize=(12, 6))
plt.plot(lags, autocorr, c='b')
plt.xlabel("Date")
plt.ylabel("value")
# plt.title("Temporal serie for prooduction")
plt.show()
```