In [29]:
```
import numpy as np
import pandas as pd
import matplotlib.pyplot as plt
import statsmodels.api as sm
from mpl_toolkits.mplot3d import Axes3D #3d plots
from sklearn.neighbors import NearestNeighbors
import os
import math #math fun
```

In [7]:
```
data = pd.read_csv('/home/tincho/Desktop/TP/osc15-EST-01.csv',decimal=",")
```

In [8]:
```
data.head()
```

Out[8]:

	Tiempo	Unnamed: 1	Velocidad	Unnamed: 3	R	Unnamed: 5	T	Unnamed: 7
0	3	2.238806e+09	30	2079692300624	26914	57	9107	59
1	4	2.985075e+09	29	8882077304442	26914	57	9075	75
2	5	3.731343e+09	29	5691104985314	26830	73	9043	91
3	6	4.477612e+09	29	2507059352231	26914	57	9012	7
4	7	5.223881e+09	28	933022379768	27249	93	9012	7

In [9]:
```
type(data)
```

Out[9]:
```
pandas.core.frame.DataFrame
```

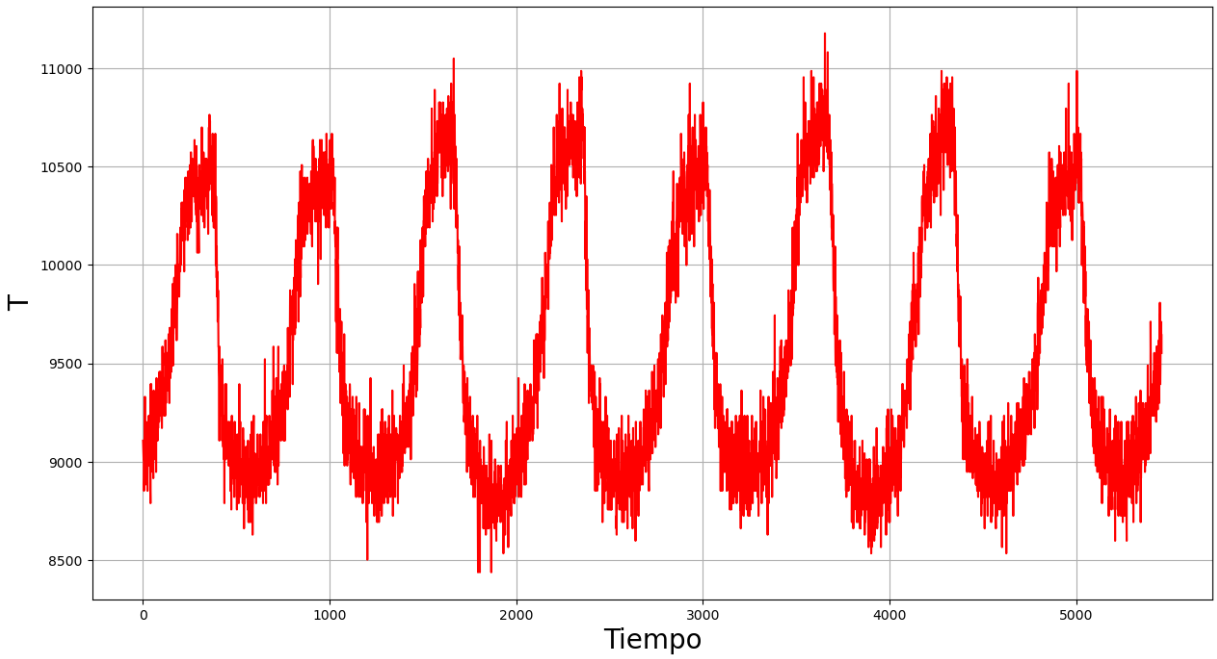
In [10]:
```
data.columns
```

Out[10]:
```
Index(['Tiempo', 'Unnamed: 1', 'Velocidad', 'Unnamed: 3', 'R', 'Unnamed: 5',
       'T', 'Unnamed: 7'],
      dtype='object')
```

In [12]:
```
datosNP=data.to_numpy()
```

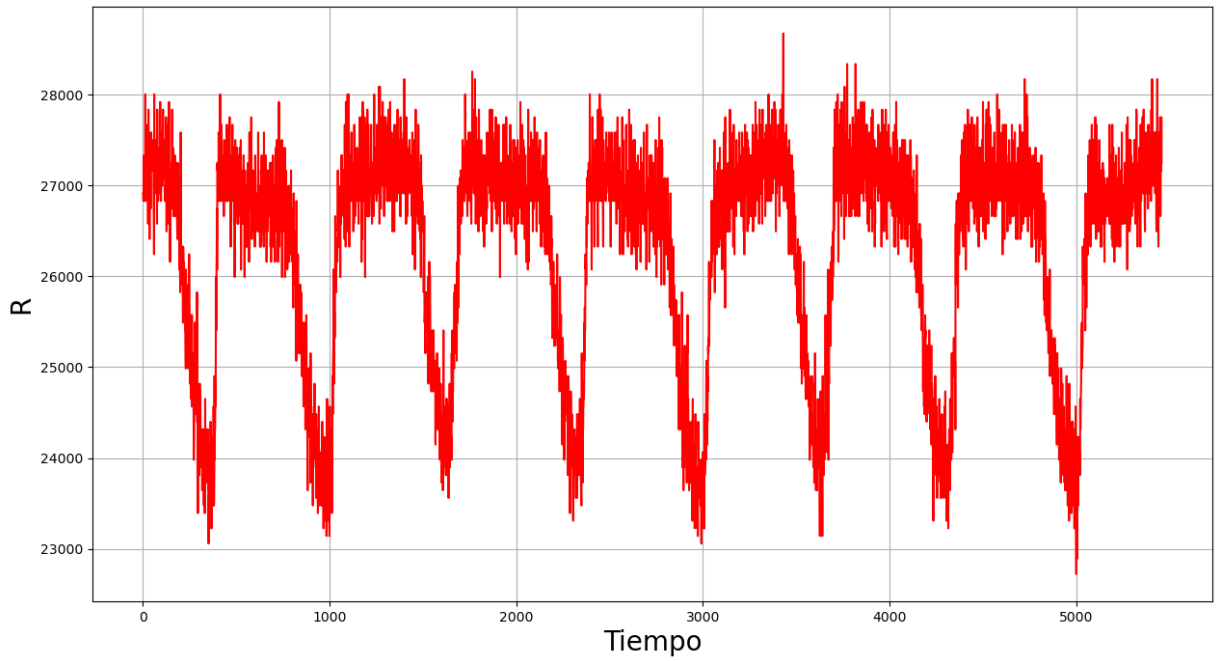
In [13]:
```
Tiempo=np.float64(datosNP[:,0])
Velocidad=np.float64(datosNP[:,2])
R=np.float64(datosNP[:,4])
T=np.float64(datosNP[:,6])
```

In [14]:
```
plt.figure(figsize=(15,8),)
plt.xlabel('Tiempo', fontsize=20)
plt.ylabel('T', fontsize=20)
plt.plot(T, color = 'red')
plt.grid()
plt.show()
```



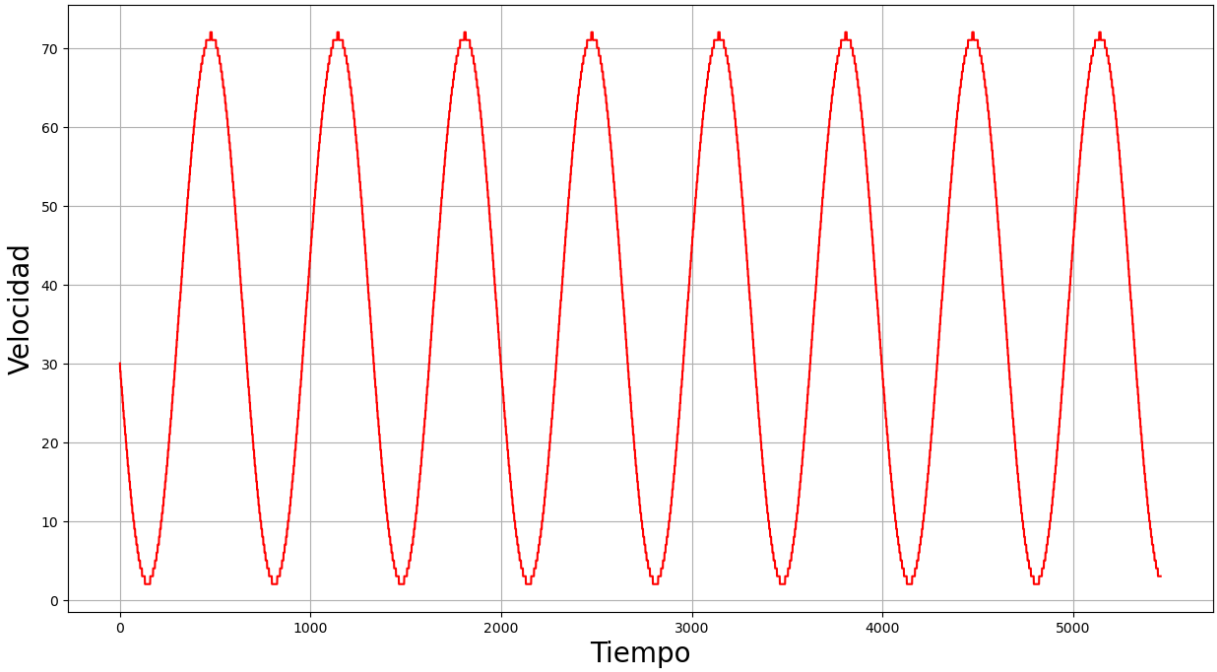
In [15]:

```
plt.figure(figsize=(15,8),)
plt.xlabel('Tiempo', fontsize=20)
plt.ylabel('R', fontsize=20)
plt.plot(R, color = 'red')
plt.grid()
plt.show()
```



In [16]:

```
plt.figure(figsize=(15,8),)
plt.xlabel('Tiempo', fontsize=20)
plt.ylabel('Velocidad', fontsize=20)
plt.plot(Velocidad, color = 'red')
plt.grid()
plt.show()
```



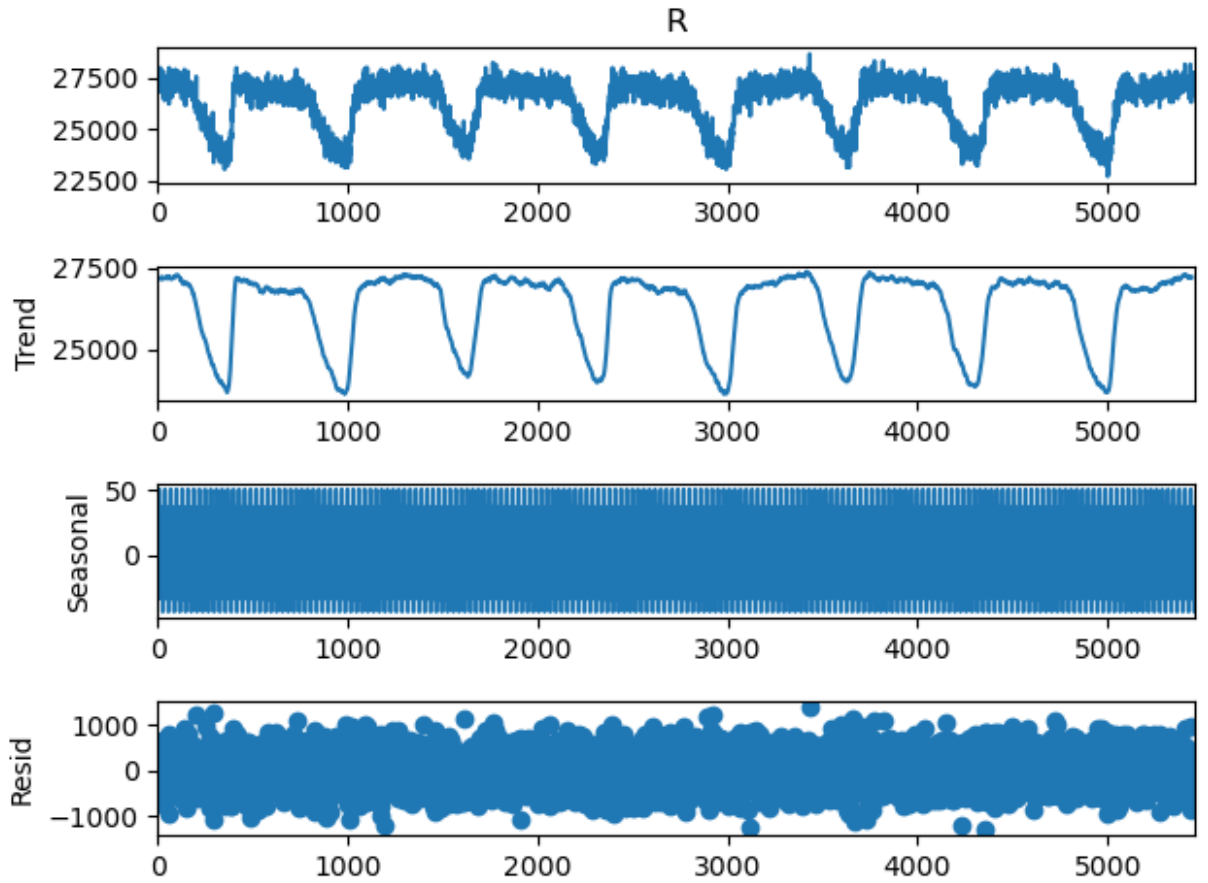
In [ ]:

In [17]:

```
descomposicion = sm.tsa.seasonal_decompose(data['R'],model='additive', freq=3
fig = descomposicion.plot()

plt.show()
```

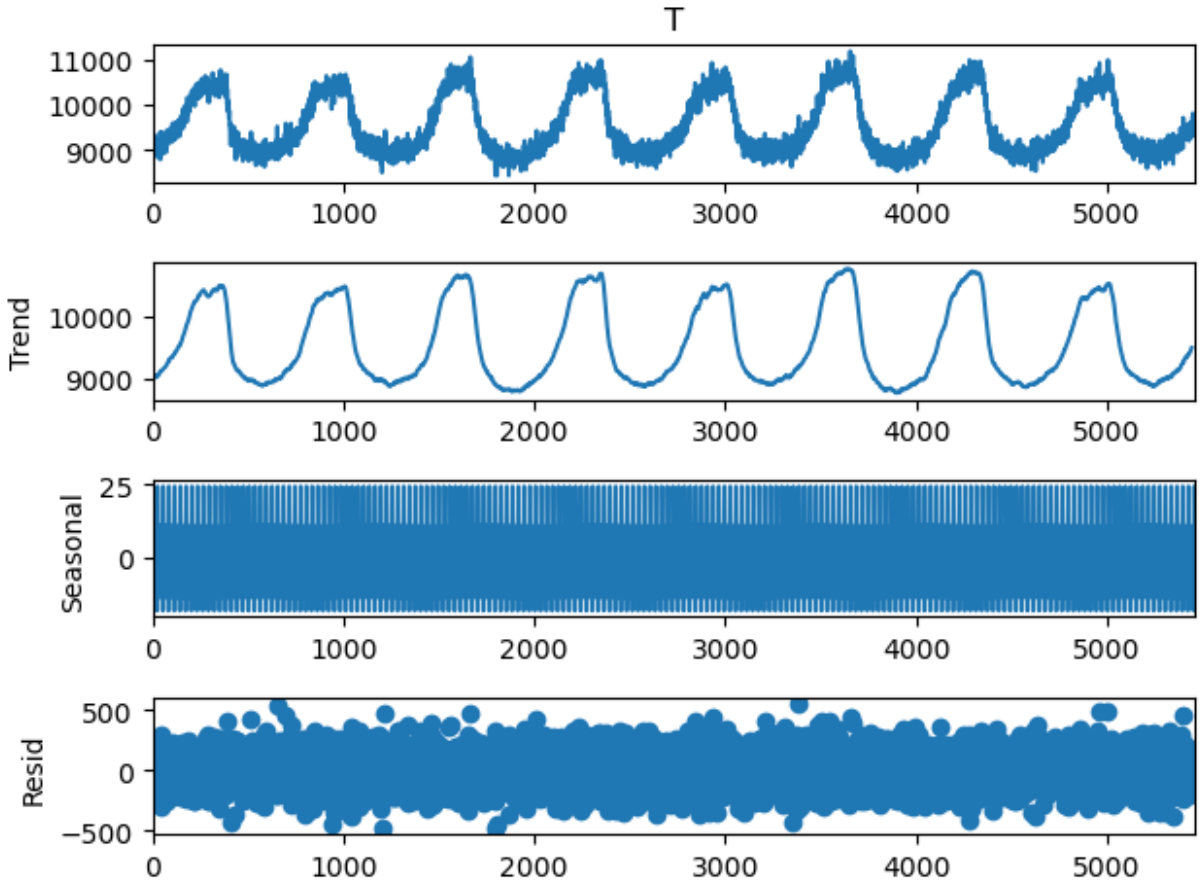
```
<ipython-input-17-0277df16f28a>:1: FutureWarning: the 'freq'' keyword is depr
ecated, use 'period' instead
  descomposicion = sm.tsa.seasonal_decompose(data['R'],model='additive', freq
=30)
```



In [18]:
```
descomposicion = sm.tsa.seasonal_decompose(data['T'],model='additive', freq=3
fig = descomposicion.plot()

plt.show()
```

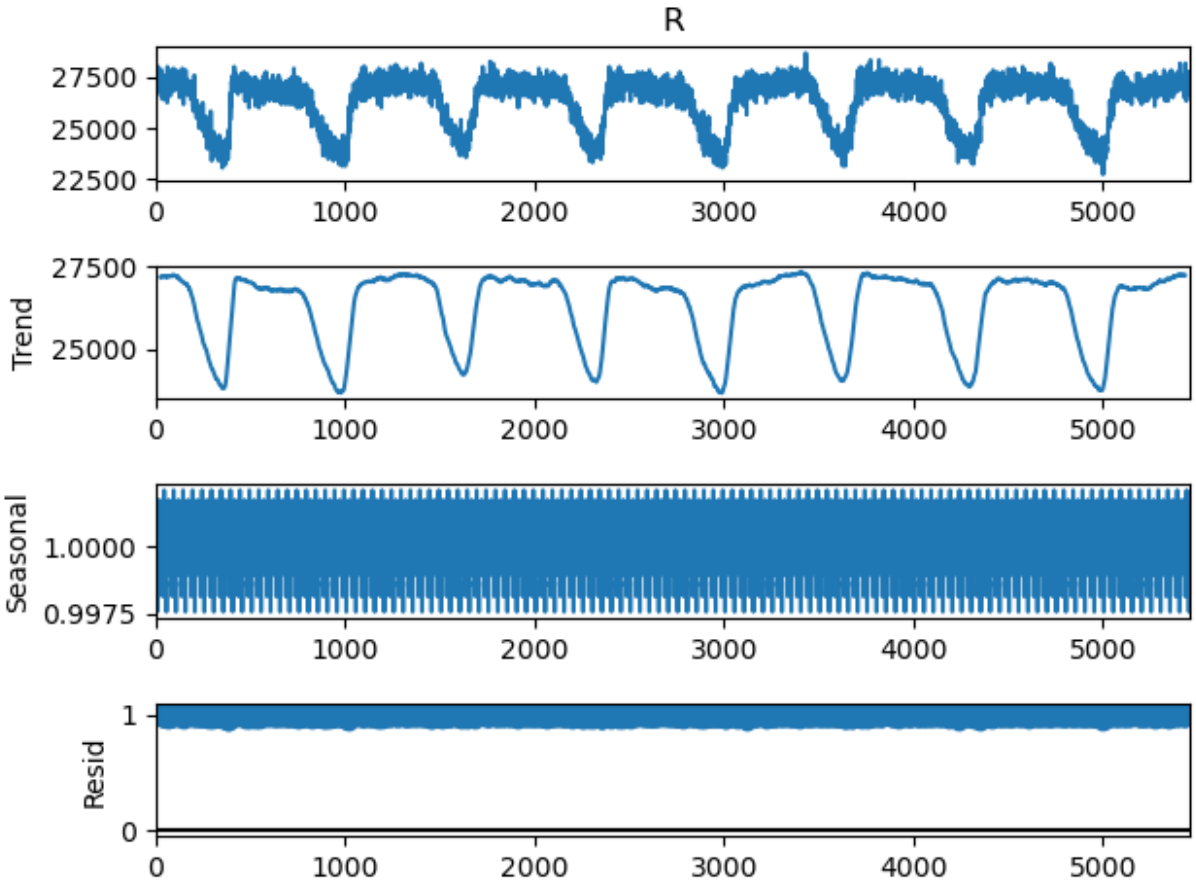
```
<ipython-input-18-4a04ca33172b>:1: FutureWarning: the 'freq'' keyword is depr
ecated, use 'period' instead
  descomposicion = sm.tsa.seasonal_decompose(data['T'],model='additive', freq
=30)
```



In [19]:
```
descomposicion = sm.tsa.seasonal_decompose(data['R'],model='multiplicative',
fig = descomposicion.plot()

plt.show()
```

```
<ipython-input-19-736007f64a96>:1: FutureWarning: the 'freq'' keyword is depr
ecated, use 'period' instead
  descomposicion = sm.tsa.seasonal_decompose(data['R'],model='multiplicativ
e', freq=50)
```

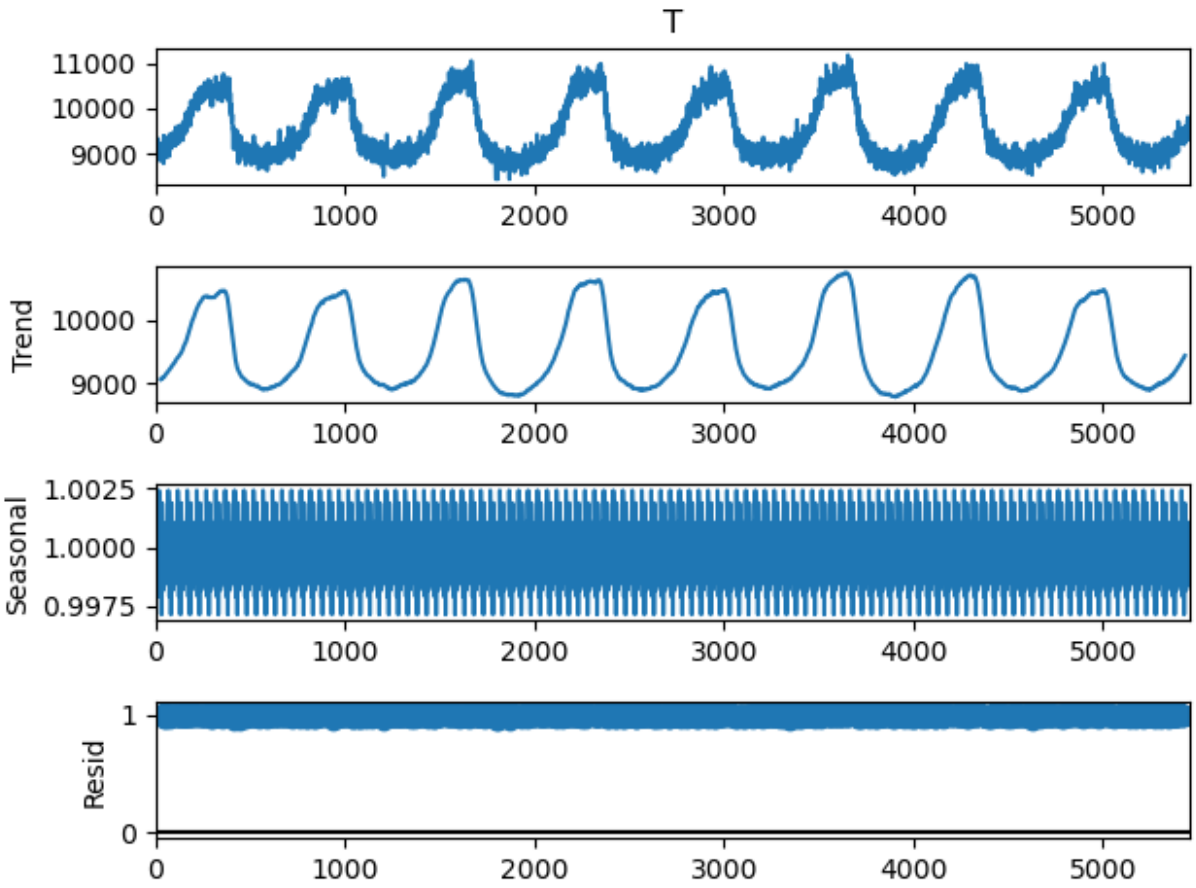


In [20]:

```
descomposicion = sm.tsa.seasonal_decompose(data['T'],model='multiplicative',
fig = descomposicion.plot()

plt.show()
```

```
<ipython-input-20-b1fe48a7cb01>:1: FutureWarning: the 'freq'' keyword is depr
ecated, use 'period' instead
  descomposicion = sm.tsa.seasonal_decompose(data['T'],model='multiplicativ
e', freq=50)
```



In [ ]:

In [23]:

In [ ]:

In [26]:

In [ ]:

In [ ]: