Pain_Graphs

June 8, 2020

1 Informes y predicciones de COVID-19 en España

Actualizado diariamente, este documento se visualiza mejor aquí.

Indice

1.1 Section ??

1.2 2. Comparativas y predicciones

Comparativas de dos dimensiones	Comparativas por comunidades	Comparativas individuales	Predicciones
Section ??	Section ??	Section ??	Section ??
Section ??	Section ??	Section ??	Section ??
Section ??	Section ??	Section ??	Section ??
	Section ??	Section ??	Section ??
		Section ??	Section ??

1.3 Section ??

```python
[1]: # Cargamos datos
     import Loading_data
     from matplotlib import pyplot as plt
     import warnings
     warnings.filterwarnings('ignore')
     from IPython.display import display, HTML

     def Insertar_Enlace(cell_name):
         display(HTML('<a id="'+ cell_name +'"></a>'))
```

```
Insertar_Enlace('DatosMadrid')

COMUNIDAD_A_CONSIDERAR = 'Madrid'
comunidad = Loading_data.Get_Comunidad(COMUNIDAD_A_CONSIDERAR)
comunidad.head(10)
```

<IPython.core.display.HTML object>

[1]:   Lugar Casos Casos hoy absoluto \
     Fecha
     2020-06-05 Madrid 69423   187
     2020-06-04 Madrid 69236   124
     2020-06-03 Madrid 69112   152
     2020-06-02 Madrid 68960   108
     2020-06-01 Madrid 68852   22
     2020-05-31 Madrid 68830   90
     2020-05-30 Madrid 68740   143
     2020-05-29 Madrid 68597   146
     2020-05-28 Madrid 68451   185
     2020-05-27 Madrid 68266   200

                 Casos hoy variacion respecto ayer Casos hoy porcentaje \
     Fecha
     2020-06-05   63   0.002694
     2020-06-04   -28   0.001791
     2020-06-03   44   0.002199
     2020-06-02   86   0.001566
     2020-06-01   -68   0.000320
     2020-05-31   -53   0.001308
     2020-05-30   -3   0.002080
     2020-05-29   -39   0.002128
     2020-05-28   -15   0.002703
     2020-05-27   66   0.002930

                 Fallecidos Fallecidos hoy absoluto \
     Fecha
     2020-06-05   8691   0
     2020-06-04   8691   0
     2020-06-03   8691   0
     2020-06-02   8691   0
     2020-06-01   8691   0
     2020-05-31   8691   0
     2020-05-30   8691   0
     2020-05-29   8691   0
     2020-05-28   8691   0
     2020-05-27   8691   0
```

```
            Fallecidos hoy variacion respecto ayer  Fallecidos hoy porcentaje  \
Fecha
2020-06-05                                      0                          0.0
2020-06-04                                      0                          0.0
2020-06-03                                      0                          0.0
2020-06-02                                      0                          0.0
2020-06-01                                      0                          0.0
2020-05-31                                      0                          0.0
2020-05-30                                      0                          0.0
2020-05-29                                      0                          0.0
2020-05-28                                      0                          0.0
2020-05-27                                     -5                          0.0


            Tasa Mortalidad  Curados  Curados hoy absoluto  \
Fecha
2020-06-05         0.125189        0                   0.0
2020-06-04         0.125527        0                   0.0
2020-06-03         0.125752        0                   0.0
2020-06-02         0.126030        0                   0.0
2020-06-01         0.126227        0                   0.0
2020-05-31         0.126268        0                   0.0
2020-05-30         0.126433        0                   0.0
2020-05-29         0.126697        0                   0.0
2020-05-28         0.126967        0                   0.0
2020-05-27         0.127311        0                   0.0


            Casos excluidos curados  \
Fecha
2020-06-05                    69423
2020-06-04                    69236
2020-06-03                    69112
2020-06-02                    68960
2020-06-01                    68852
2020-05-31                    68830
2020-05-30                    68740
2020-05-29                    68597
2020-05-28                    68451
2020-05-27                    68266


            Proporcion Curados hoy absoluto / Casos hoy absoluto   UCI  \
Fecha
2020-06-05                                                  0.0   3551
2020-06-04                                                  0.0   3550
2020-06-03                                                  0.0   3546
2020-06-02                                                  0.0   3546
2020-06-01                                                  0.0   3544
```

```
2020-05-31                                           0.0      3544
2020-05-30                                           0.0      3544
2020-05-29                                           0.0      3544
2020-05-28                                           0.0      3544
2020-05-27                                           0.0      3544

            Hospitalizados
Fecha
2020-06-05           42079
2020-06-04           42068
2020-06-03           42041
2020-06-02           42041
2020-06-01           42017
2020-05-31           42014
2020-05-30           42011
2020-05-29           41993
2020-05-28           41972
2020-05-27           41945
```

```python
[2]: import pandas as pd


def Get_Dimensions_All_CCAA(Atributos,media_movil ):
    array = []
    dias_a_considerar = 4 if media_movil else 1
    for ca in COMUNIDADES:

        comunidad = Loading_data.Get_Comunidad(ca).head(dias_a_considerar)
        comunidad = comunidad.reset_index() # Resets the index, makes factor a
 ↪column
        if media_movil : comunidad = pd.DataFrame(comunidad.mean(axis=0)).T
        temp_dict = {}
        temp_dict['Lugar'] = ca
        for attr in Atributos:
            temp_dict[attr] = comunidad[attr].iloc[0]
        array.append(temp_dict)

    return pd.DataFrame.from_records(array)
```

```python
[3]: import scipy.stats as spstats
from matplotlib import pyplot as plt


def Print_Two_Cordinates_CCAA(df, add_LR=False):
    fig,ax = plt.subplots()
    fig.set_figheight(8)
    fig.set_figwidth(8)
```

```python
        ax.axhline(y=0, color='blue')
        ax.axvline(x=0, color='blue')

        for k,d in df.groupby('Lugar'):
            ax.scatter(d[df.columns[1]], d[df.columns[2]], label=k)

        plt.legend(bbox_to_anchor=(0, 1), loc='upper left', ncol=1)

        if add_LR:
            slope, intercept, r_value, p_value, std_err = spstats.linregress(df[df.
 ↪columns[1]], df[df.columns[2]])
            plt.plot(df[df.columns[1]], intercept + slope*df[df.columns[1]], 'r',␣
 ↪label='fitted line')
            #.format(round(slope, 2),round(intercept, 2),round(r_value, 2))
            note2add = f"""slope: {slope:12.4f}\nintercept: {intercept:8.2f}\nr2:␣
 ↪{r_value**2:15.4f}"""
            plt.annotate(note2add,xy=(0.7,0.3), xycoords='figure fraction')

        ax.set_xlabel(df.columns[1])
        ax.set_ylabel(df.columns[2])
        ax.set_title(df.columns[1]+ ' VS. ' + df.columns[2])

        return plt
```

```python
[4]: import numpy as np
     import seaborn as sns

     from Loading_data import Get_Comunidades_List as comunidades
     COMUNIDADES = comunidades()

     def Get_Single_Dimension(dimension ):
         df = pd.DataFrame()
         df_tmp = pd.DataFrame()
         array = []
         #
         for ca in COMUNIDADES:
             df_tmp = Loading_data.Get_Comunidad(ca)
             new = df_tmp[[dimension]].copy()
             new.rename(columns={dimension: ca}, inplace=True)
             array.append(new)
         #
         df =  pd.concat(array, axis=1)
         return df

     def plot_violin(dimension):
         """ Muestra la distribucion logaritmica por comunidades, de una dimension"""
         df = Get_Single_Dimension(dimension)
```

```python
    # Ordenamos comunidades
    s = df.sum()
    df = df[s.sort_values(ascending=False).index[:]]

    # Pasamos a logaritmo
    df2 = np.log(df)
    df2.replace(-np.inf,  np.nan, inplace=True)
    display(HTML("<h2>Comparativa de distribucion de '" +dimension+ "', en cada␣
↪CC.AA </h2>"))
    display(HTML("Distribuciones convertidas a logaritmos neperianos, para␣
↪facilitar la comparación."))

    # primer grafico
    f, ax = plt.subplots()
    f.set_size_inches( 16, 10)
    f.suptitle("Comunidades con más, " + dimension.lower())
    sns.violinplot(data=df2.iloc[:,:-7])

    #segundo grafico
    f, ax = plt.subplots()
    f.set_size_inches( 16, 10)
    f.suptitle("Comunidades con menos, " + dimension.lower()+".")
    sns.violinplot(data=df2.iloc[:,7:])
    return df

dimension = 'Fallecidos hoy absoluto'
df = plot_violin(dimension)
```

```
<IPython.core.display.HTML object>
```

```
<IPython.core.display.HTML object>
```

Comunidades con más, fallecidos hoy absoluto

Madrid · Cataluña · Castilla La Mancha · Castilla y León · País Vasco · Andalucía · C. Valenciana · Aragón · Galicia · Extremadura · Navarra
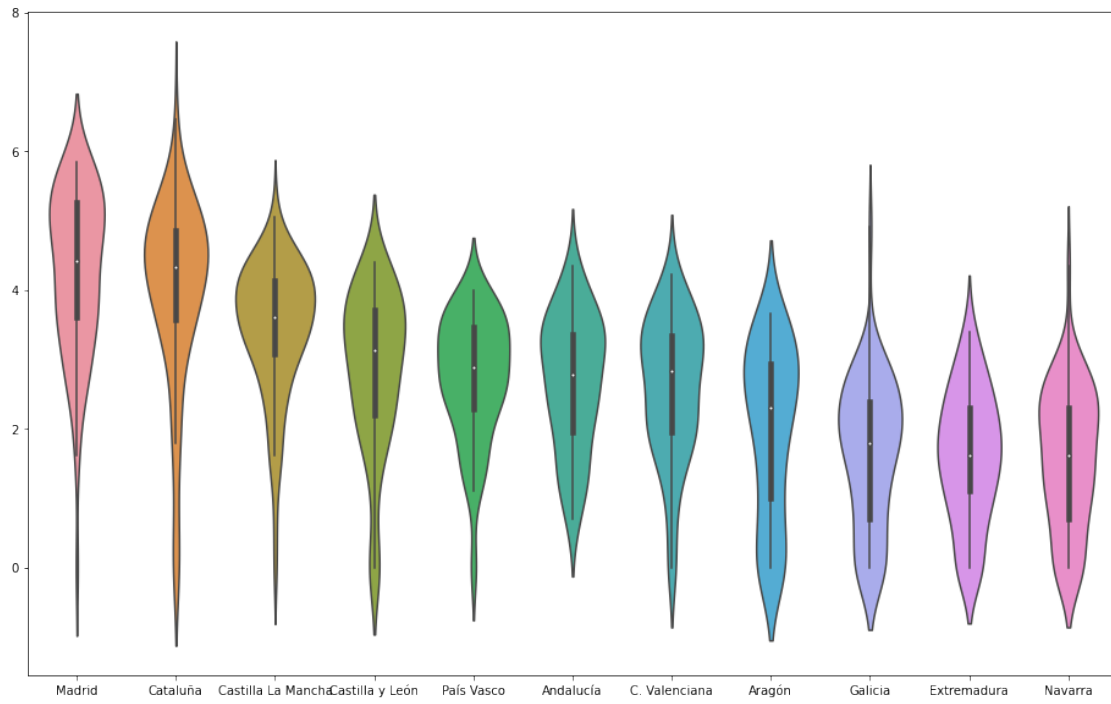
Comunidades con menos, fallecidos hoy absoluto.

Aragón · Galicia · Extremadura · Navarra · La Rioja · Asturias · Baleares · Cantabria · Canarias · Murcia · Ceuta y Melilla
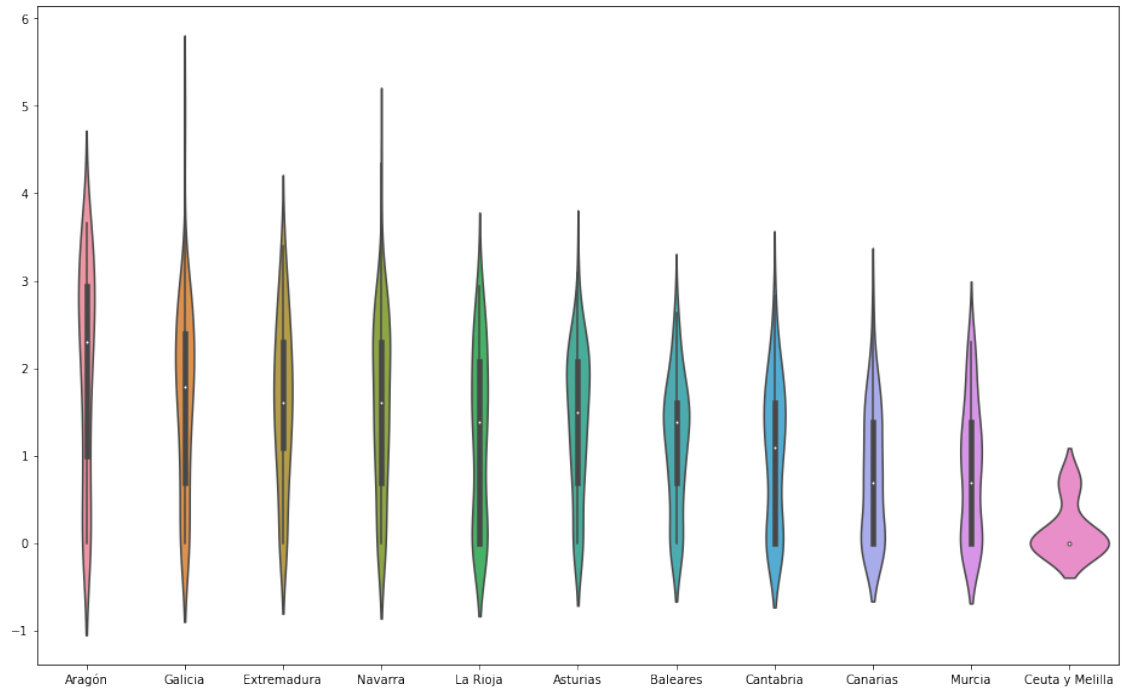
```
[5]: df
```

```
[5]:              Madrid  Cataluña  Castilla La Mancha  Castilla y León  País Vasco  \
     Fecha
     2020-06-05        0         0                   0                0           0
     2020-06-04        0         0                   0                3           0
     2020-06-03        0         0                   0                1           0
     2020-06-02        0         0                   0                0           0
     2020-06-01        0         0                   0                0           0
     ...             ...       ...                 ...              ...         ...
     2020-03-11       10         0                   0                0           0
     2020-03-10       13         2                   0                0           1
     2020-03-09        6         1                   0                0           5
     2020-03-06        1         0                   0                0          -1
     2020-03-05        0         0                   0                0           0

                 Andalucía  C. Valenciana  Aragón  Galicia  Extremadura  Navarra  \
     Fecha
     2020-06-05          0              0       0        0            0        0
     2020-06-04          0              0       0        0            0        0
     2020-06-03          0              0       0        0            0        0
     2020-06-02          0              0       0        0            0        0
     2020-06-01          0              0       0        0            0        0
     ...               ...            ...     ...      ...          ...      ...
     2020-03-11          0              0       1        0            0        0
     2020-03-10          0              0       2        0            0        0
     2020-03-09          0              0       0        0            0        0
     2020-03-06          0              0       1        0            0        0
     2020-03-05          0              0       0        0            0        0

                 La Rioja  Asturias  Baleares  Cantabria  Canarias  Murcia  \
     Fecha
     2020-06-05         0         1         0          0         0       0
     2020-06-04         1         1         0          0         0       0
     2020-06-03         0         0         0          0         0       0
     2020-06-02         0         0         0          0         0       0
     2020-06-01         0         0         0          0         0       0
     ...              ...       ...       ...        ...       ...     ...
     2020-03-11         1         0         0          0         0       0
     2020-03-10         1         0         0          0         0       0
     2020-03-09        -1         0         0          0         0       0
     2020-03-06         1         0         0          0         0       0
     2020-03-05         0         0         0          0         0       0

                 Ceuta y Melilla
```

```
Fecha
2020-06-05                    0
2020-06-04                    0
2020-06-03                    0
2020-06-02                    0
2020-06-01                    0
…                             …
2020-03-11                    0
2020-03-10                    0
2020-03-09                    0
2020-03-06                    0
2020-03-05                    0

[89 rows x 18 columns]
```

```
[6]: import Loading_data

     from Loading_data import Get_Comunidades_List as comunidades
     COMUNIDADES = comunidades()

     def Comparar_Dos_Dimensiones(Atributos, media_movil=False, add_LR=False ):
         """ Compara dos dimensiones de atributos, Ma indica si hacerlo con la media␣
      ↪movil"""

         df = Get_Dimensions_All_CCAA(Atributos,media_movil )
         df = df.sort_values(by=[df.columns[1],df.columns[2]])
         plt = Print_Two_Cordinates_CCAA(df, add_LR)
         plt.show()
         print(  'Total: '  + df.columns[1], df[df.columns[1]].sum() )
         print(  'Total: '  + df.columns[2], df[df.columns[2]].sum() )
         display(HTML(df.set_index('Lugar').to_html(index=True)))
         return
```

```
[7]: Insertar_Enlace("Comparativa_Casos_Fallecidos")
     Comparar_Dos_Dimensiones(['Casos', 'Fallecidos'],add_LR=True )
```

```
<IPython.core.display.HTML object>
```

Casos VS. Fallecidos

slope: 0.1134
intercept: -10.83
r2: 0.9625
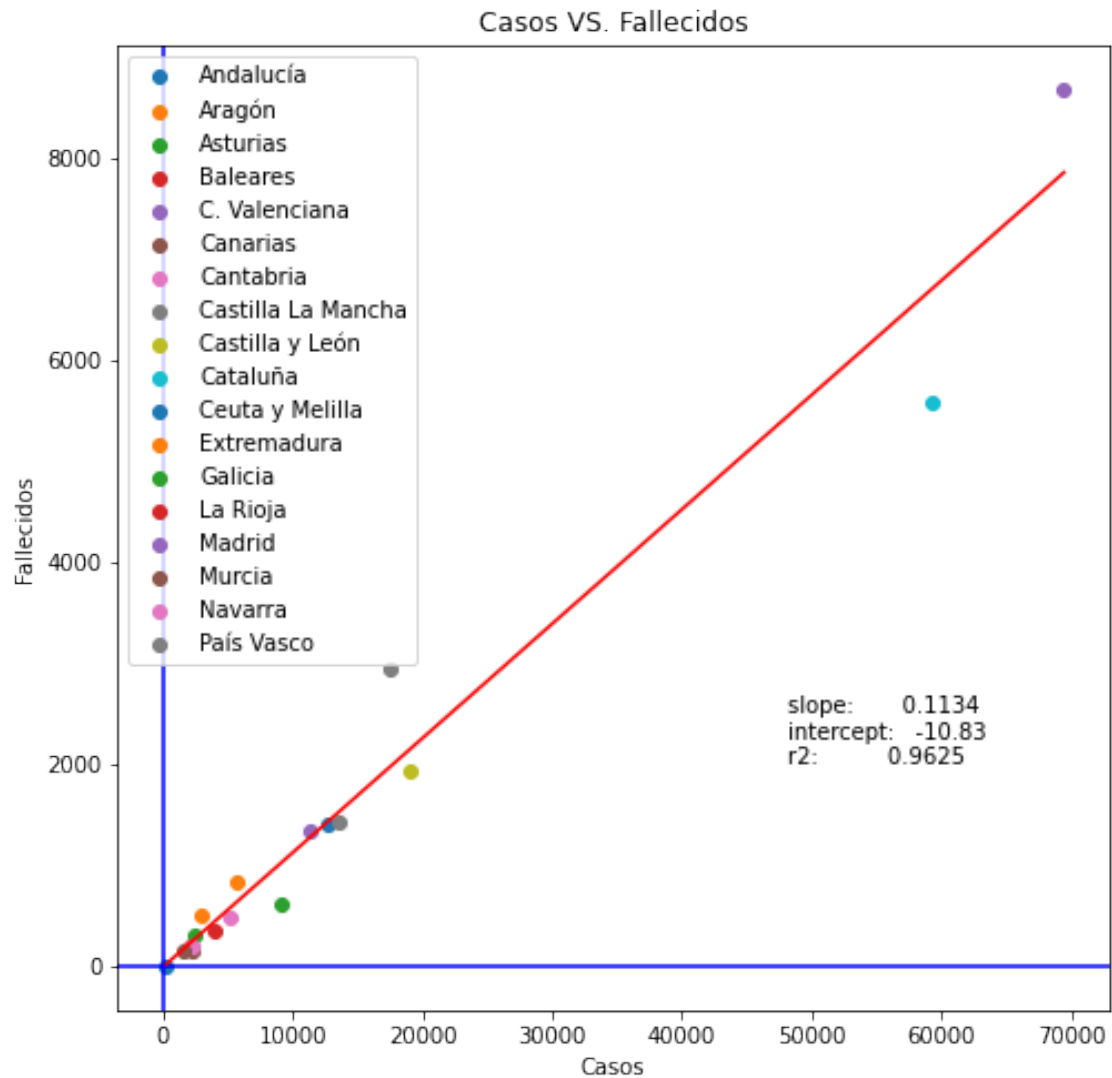
```
Total: Casos 240978
Total: Fallecidos 27134

<IPython.core.display.HTML object>
```

[8]: Insertar_Enlace("Comparativa_Casos_Fallecidos_Hoy")

Comparar_Dos_Dimensiones(['Casos hoy absoluto', 'Fallecidos hoy␣
 ↪absoluto'],add_LR=True)

```
<IPython.core.display.HTML object>
```

Casos hoy absoluto VS. Fallecidos hoy absoluto

slope: -0.0005
intercept: 0.06
r2:   0.0101
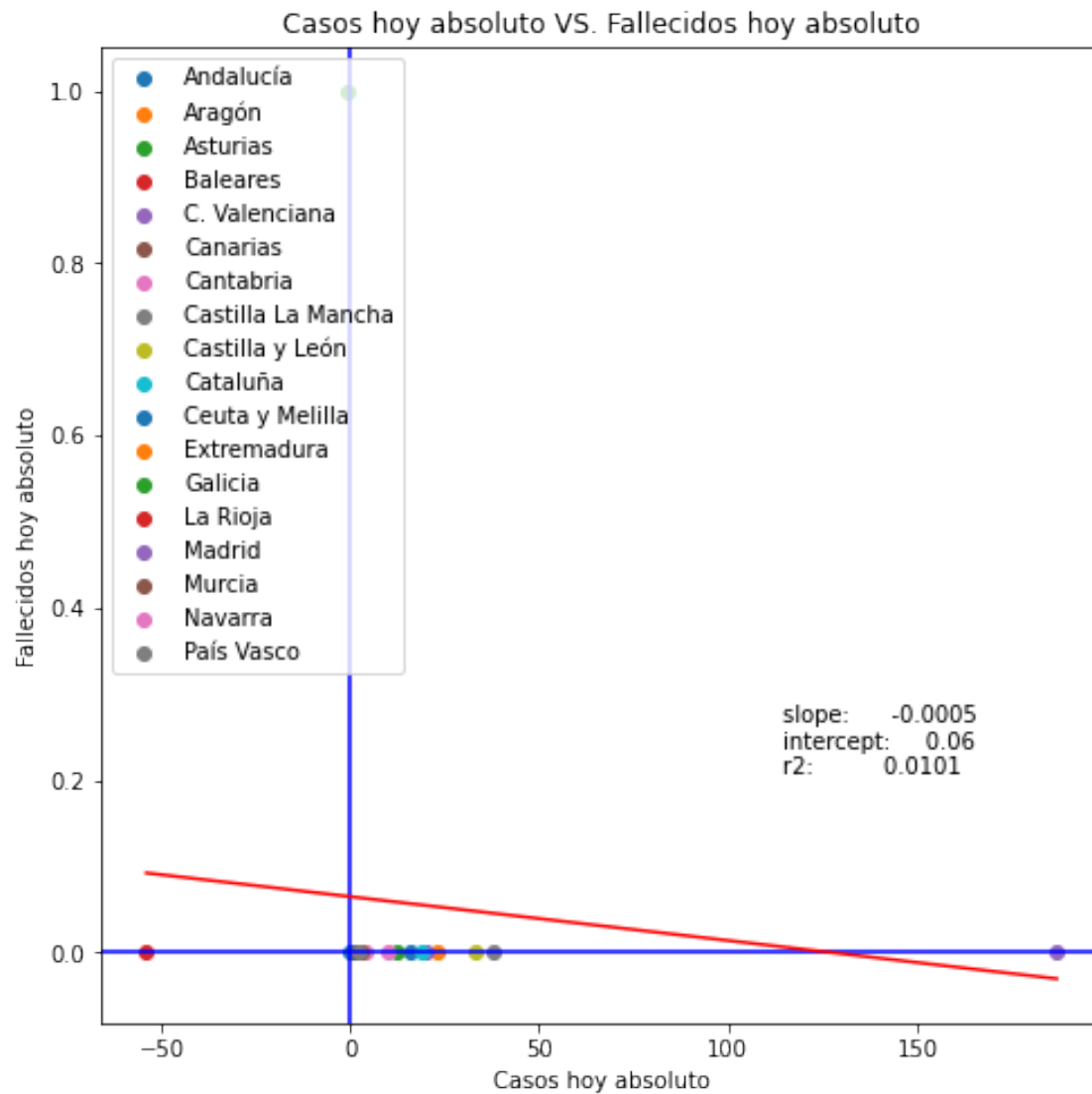
Total: Casos hoy absoluto 318
Total: Fallecidos hoy absoluto 1

<IPython.core.display.HTML object>

[9]: Insertar_Enlace("Comparativa_Casos_Fallecidos_Variacion_Diaria")

Comparar_Dos_Dimensiones(['Casos hoy variacion respecto ayer', 'Fallecidos hoy␣
↪variacion respecto ayer'])

<IPython.core.display.HTML object>

Casos hoy variacion respecto ayer VS. Fallecidos hoy variacion respecto ayer
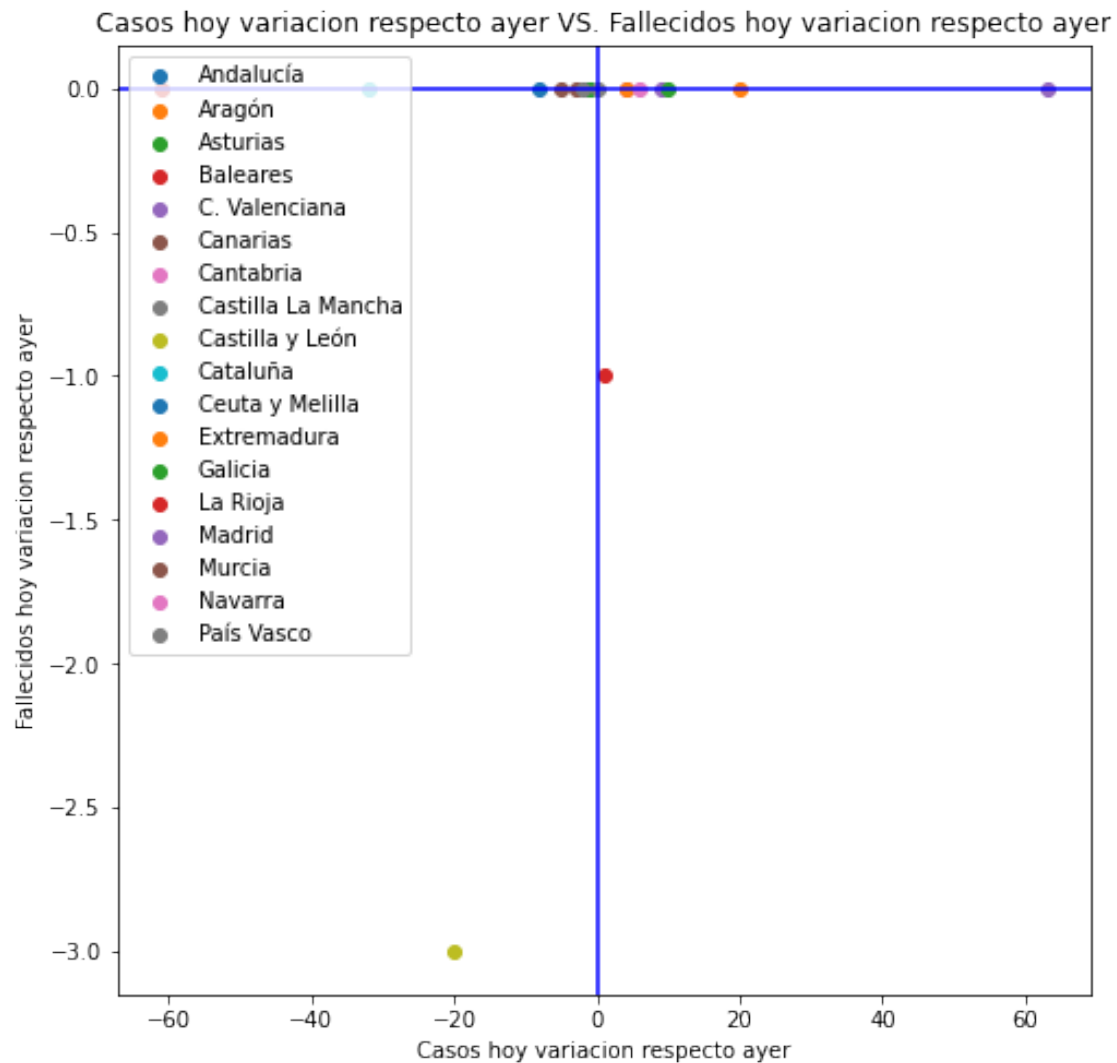
```
Total: Casos hoy variacion respecto ayer -16
Total: Fallecidos hoy variacion respecto ayer -4

<IPython.core.display.HTML object>
```

[10]:
```python
# Cargamos datos
import pandas as pd
import Loading_data

from Loading_data import Get_Comunidades_List as comunidades
COMUNIDADES = comunidades()

def Get_Dimension_CCAA(Dimension,include_nation=False):
    def Do_Stuff_to_DF(df):
```

```
        df = df.sort_values(by='Fecha')
        # df = df.reset_index() # Resets the index, makes factor a column
        df = df[df["Casos"] >= 100]
        return df

    dimension_df = pd.DataFrame()
    for ca in COMUNIDADES:
        df = Loading_data.Get_Comunidad(ca)
        df = Do_Stuff_to_DF(df)
        dimension_df[ca] = df[Dimension]
    if include_nation:
        df = Loading_data.Get_Nacion()
        df = Do_Stuff_to_DF(df)
        dimension_df['TOTAL'] = df[Dimension]

    return dimension_df
```

[11]:
```
from matplotlib import pyplot as plt
import matplotlib.dates as mdates
from IPython.display import display, HTML
import pandas as pd

import numpy as np


def compare_charts_median(Dimension,df):
    short_df = df.tail(1)
    short_df = short_df.T
    short_df = short_df.sort_values(by=(short_df.columns[0]))
    short_df.columns = [Dimension]

    #mean_y = short_df.median(axis=1)[0]
    #mean_y= df.tail(1).T.median().values[0]
    median_y= df.tail(1).T.drop(axis=0,labels=(['TOTAL'] if 'TOTAL' in short_df.
 ↪index else [])).median().values[0]
    x = short_df.index
    y = short_df[Dimension]

    plt.figure(figsize = (10, 5))
    plt.scatter(x, y, c= "red", alpha = 0.5)
    plt.title(Dimension + " by region")
    color = 'blue'
    plt.xticks(rotation=90)
    plt.axhline(median_y, c = color, alpha = 0.5, lw = 1)
    plt.annotate('Median ' + Dimension+ ' is {}'.format(round(median_y, 2)),
            xy=(8.5, median_y),
            xycoords='data',
```

```python
            xytext=(-50, 50),
            textcoords='offset points',
            arrowprops=dict(arrowstyle="->", color = "k", alpha = 0.5),
            color = color)
    return

def compare_charts_time(Dimension,df):
    fig = plt.figure(figsize=(8, 6), dpi=80)
    for ca in df.columns:
        plt.plot(df[ca])
    plt.legend(df.columns)

    plt.gca().xaxis.set_major_formatter(mdates.DateFormatter('%Y-%m-%d'))
    plt.gca().xaxis.set_major_locator(mdates.DayLocator(interval=7))

    fig.suptitle('Comparativa de: '+Dimension, fontsize=20)
    plt.show()
    return

def Report_Location(Dimension,include_nation=False):
    # Ger Data
    df = Get_Dimension_CCAA(Dimension,include_nation)
    # Compare chart
    compare_charts_time(Dimension,df)
    # Compare median chart
    compare_charts_median(Dimension,df)

    with pd.option_context("display.max_rows", 1000):
        display(HTML(df.to_html()))
    return
```

```python
[12]:  Insertar_Enlace("Comunidades_Fallecidos")
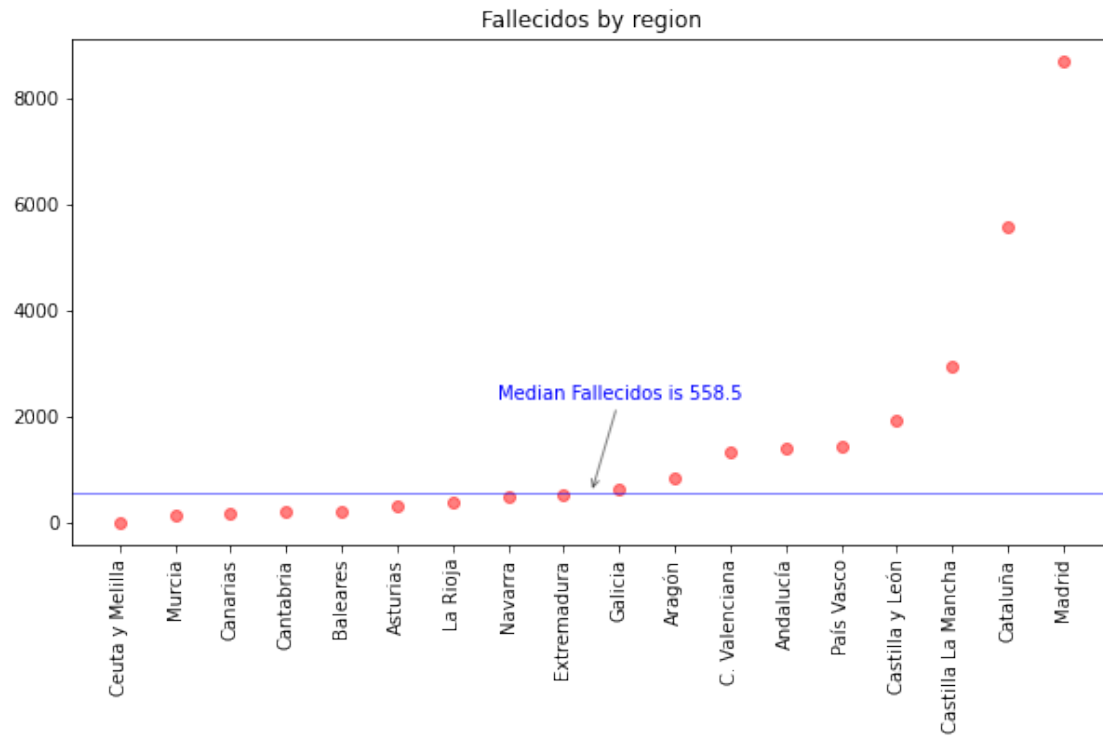       Report_Location("Fallecidos")
```

```
<IPython.core.display.HTML object>
```

Comparativa de: Fallecidos

Legend:
- Andalucía
- Aragón
- Asturias
- Baleares
- Canarias
- Cantabria
- Castilla La Mancha
- Castilla y León
- Cataluña
- Ceuta y Melilla
- C. Valenciana
- Extremadura
- Galicia
- Madrid
- Murcia
- Navarra
- País Vasco
- La Rioja

<IPython.core.display.HTML object>

Fallecidos by region

Median Fallecidos is 558.5
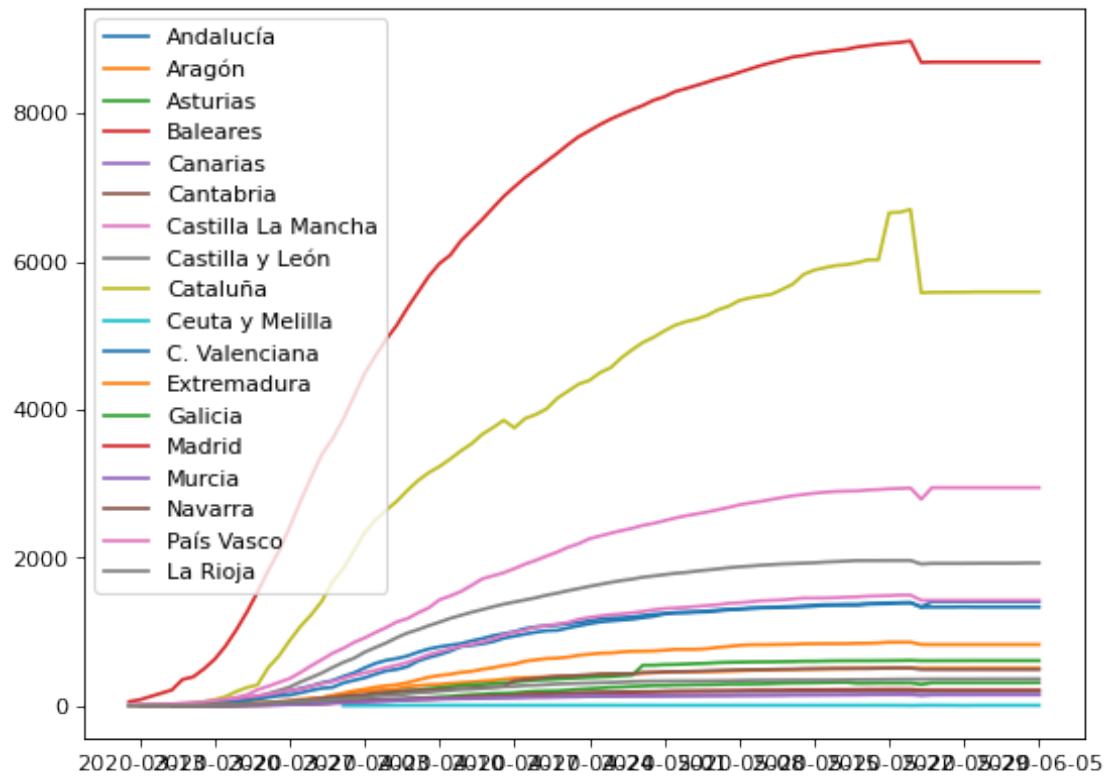
```
[13]: Insertar_Enlace("Comunidades_Fallecidos_Hoy")

      Report_Location("Fallecidos hoy absoluto")
```

<IPython.core.display.HTML object>

Comparativa de: Fallecidos hoy absoluto

<IPython.core.display.HTML object>

Fallecidos hoy absoluto by region
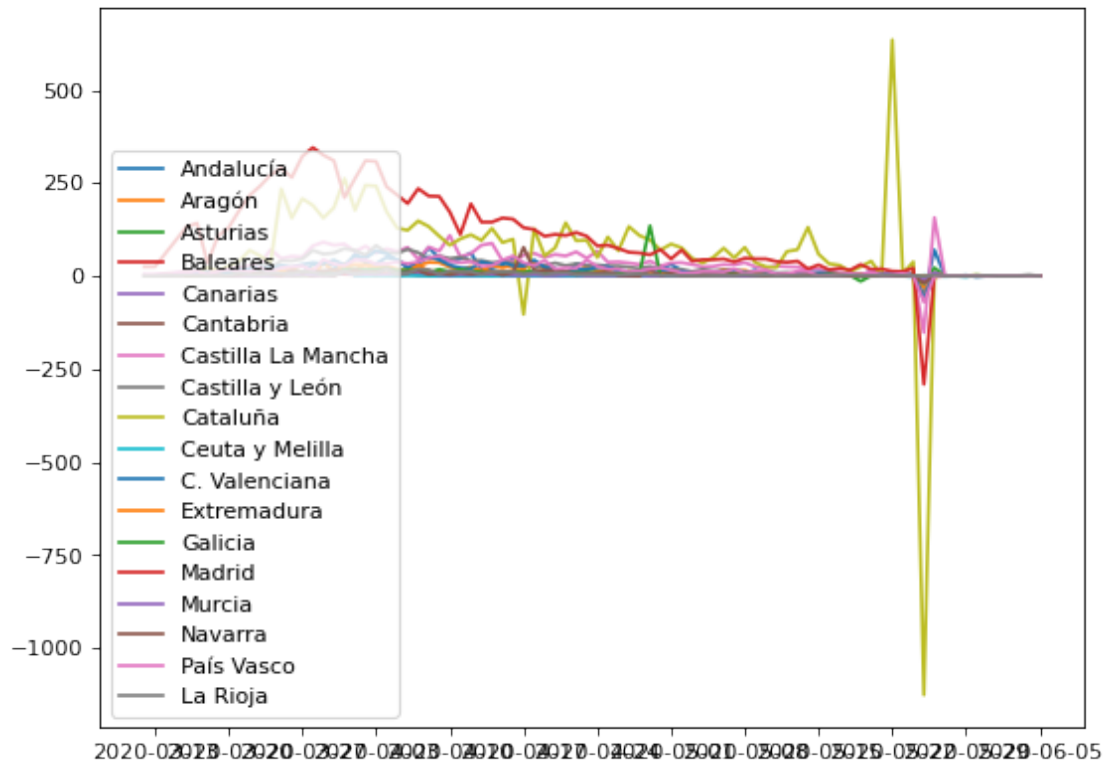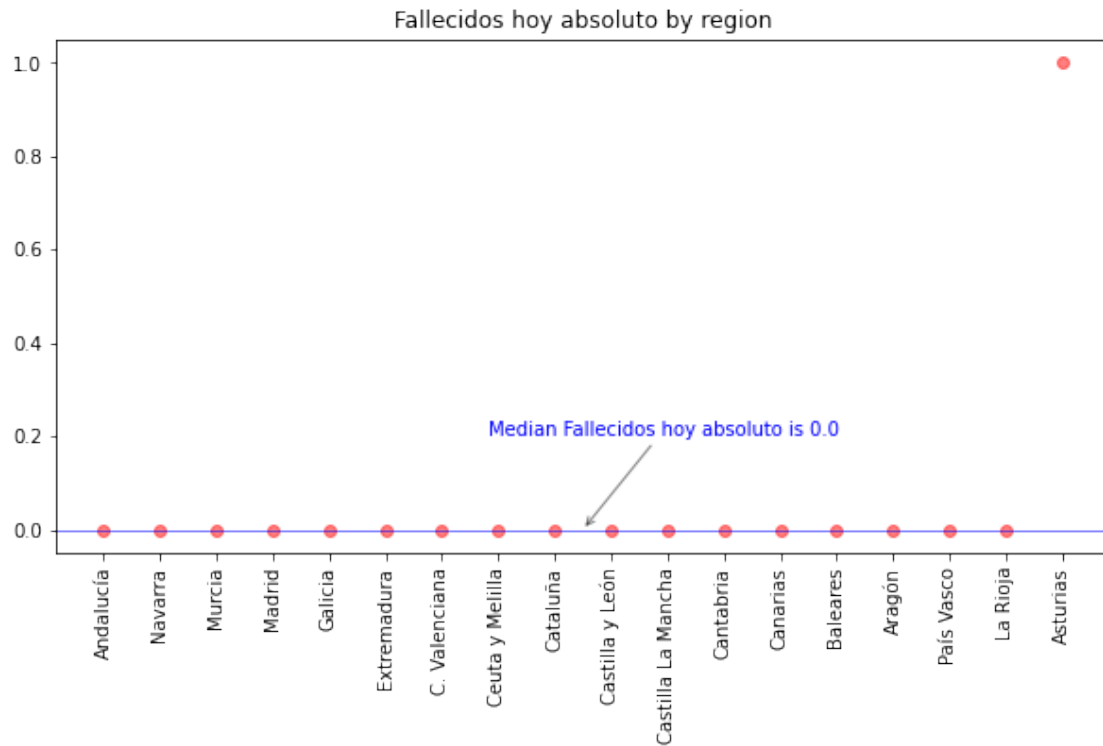

```
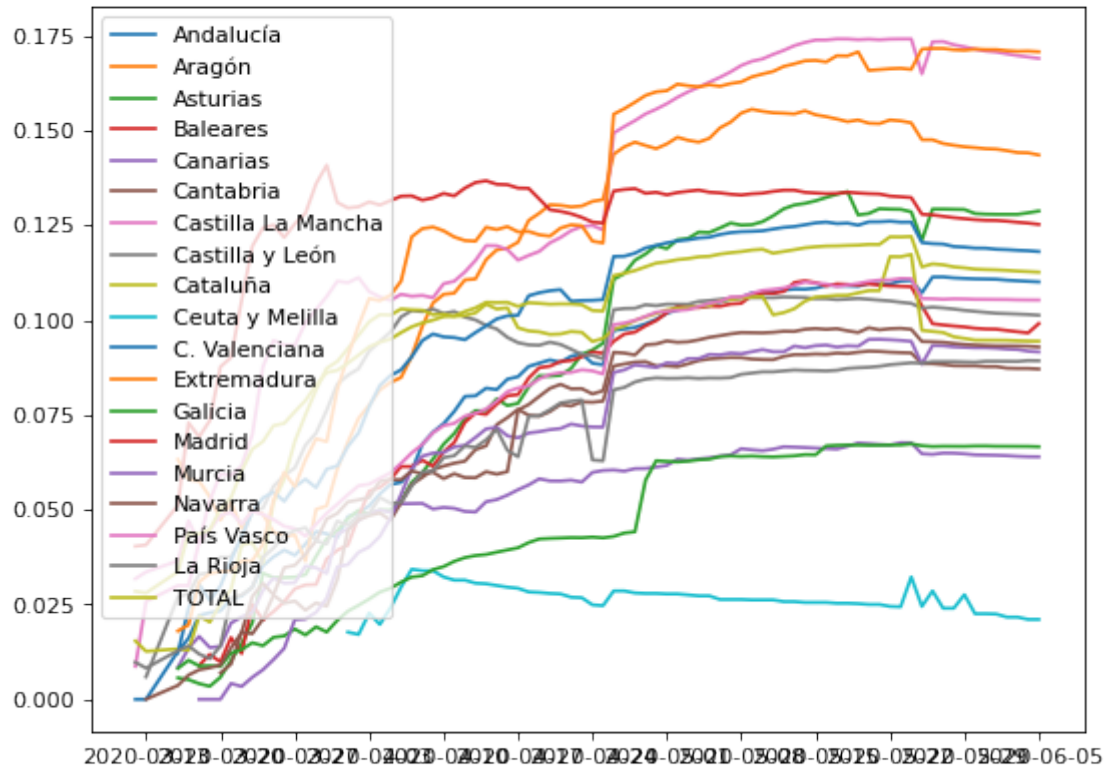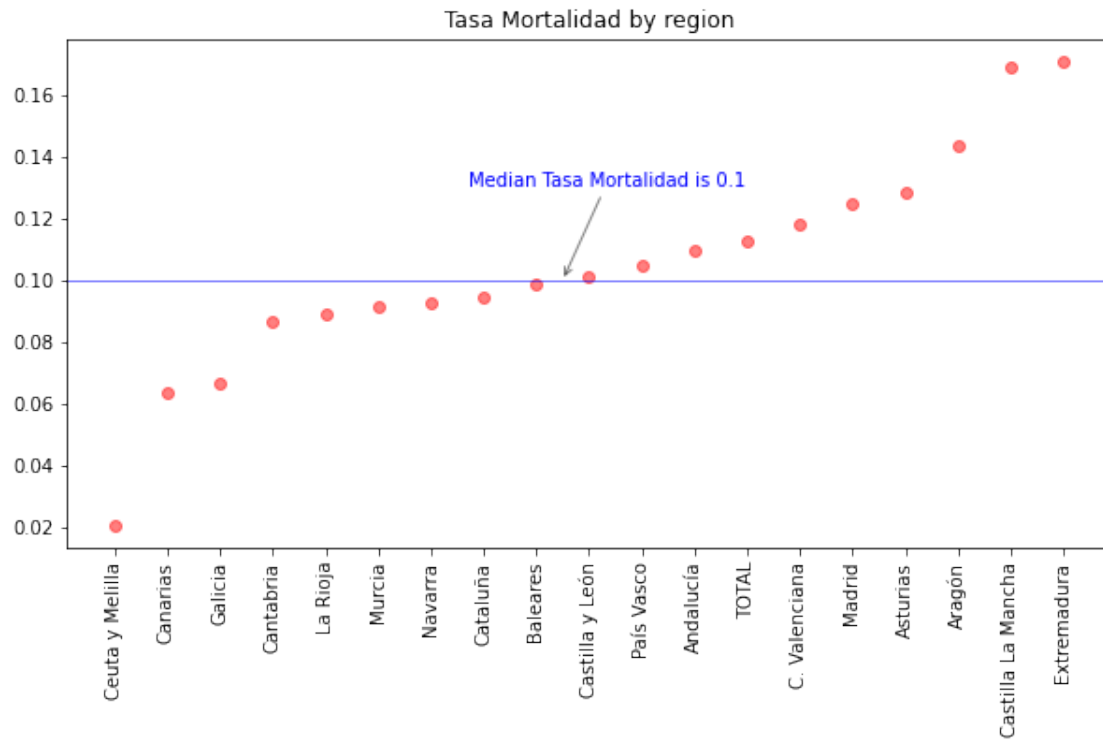[14]:  Insertar_Enlace("Comunidades_Mortalidad")

       Report_Location("Tasa Mortalidad",True)
```

<IPython.core.display.HTML object>

Comparativa de: Tasa Mortalidad


```
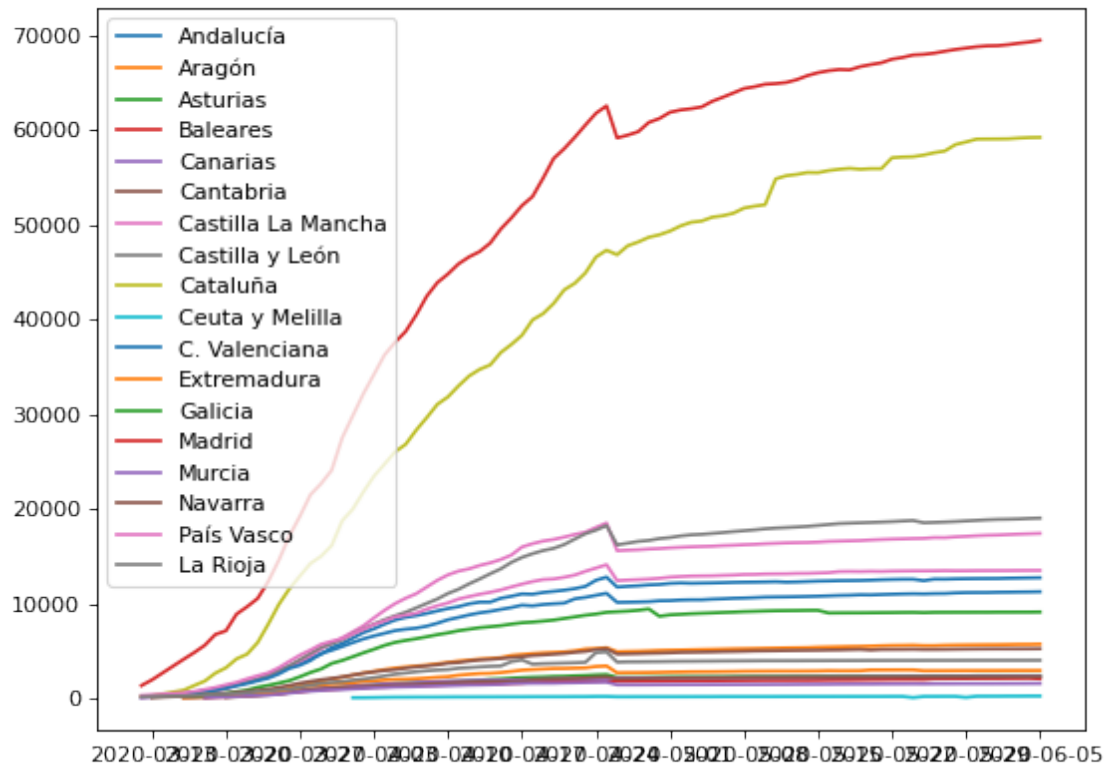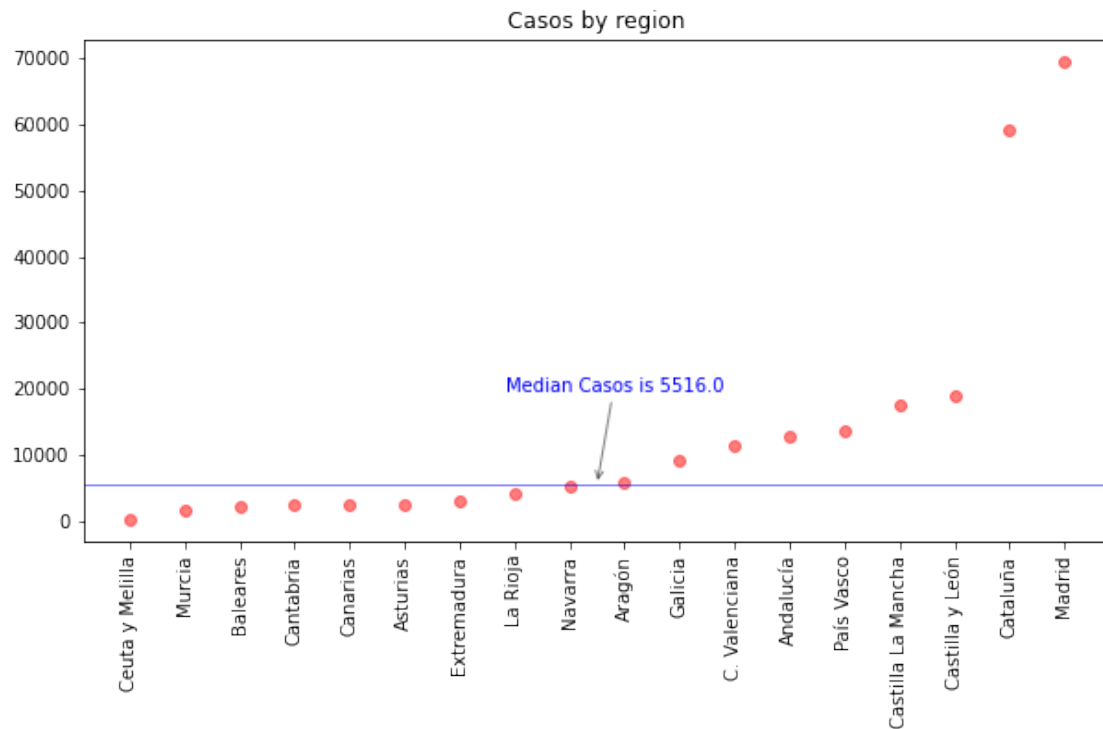<IPython.core.display.HTML object>
```

Tasa Mortalidad by region

Median Tasa Mortalidad is 0.1

```
[15]:  Insertar_Enlace("Comunidades_Casos")

       Report_Location("Casos")
```

<IPython.core.display.HTML object>

Comparativa de: Casos

Legend:
- Andalucía
- Aragón
- Asturias
- Baleares
- Canarias
- Cantabria
- Castilla La Mancha
- Castilla y León
- Cataluña
- Ceuta y Melilla
- C. Valenciana
- Extremadura
- Galicia
- Madrid
- Murcia
- Navarra
- País Vasco
- La Rioja

<IPython.core.display.HTML object>

Casos by region

Median Casos is 5516.0

```
[16]:  Insertar_Enlace("Curados")

       Report_Location("Curados")
```

<IPython.core.display.HTML object>

Comparativa de: Curados


```
<IPython.core.display.HTML object>
```

Curados by region

Median Curados is 0.0
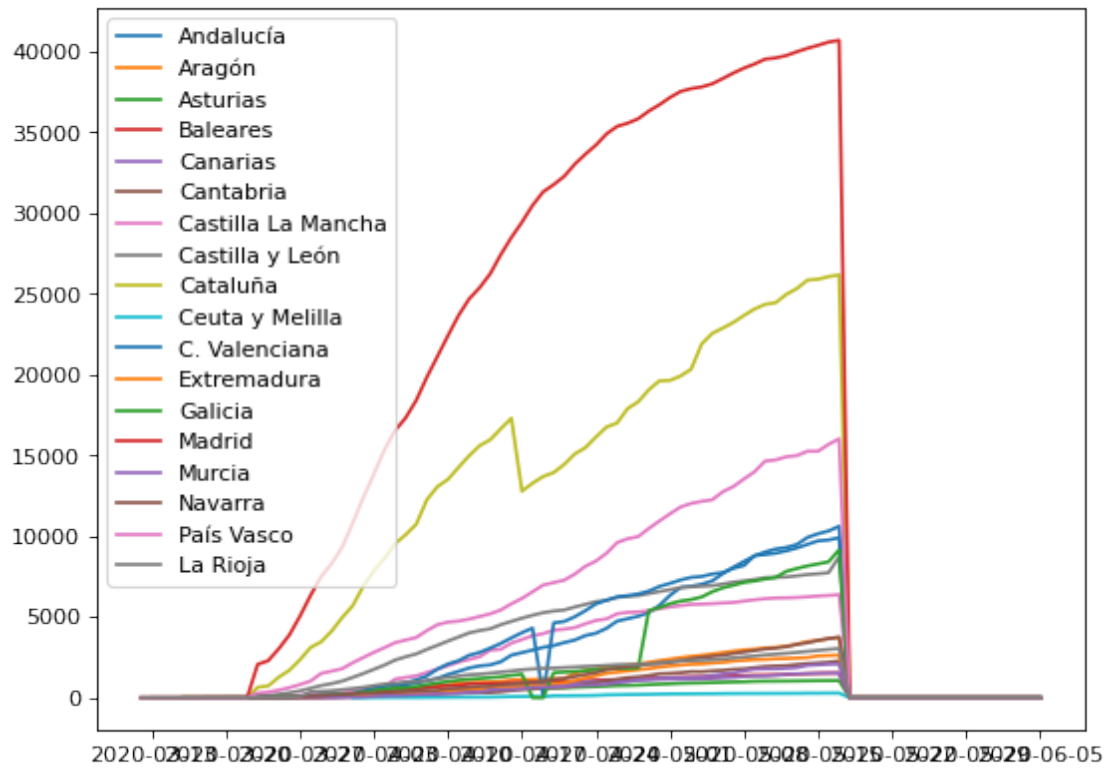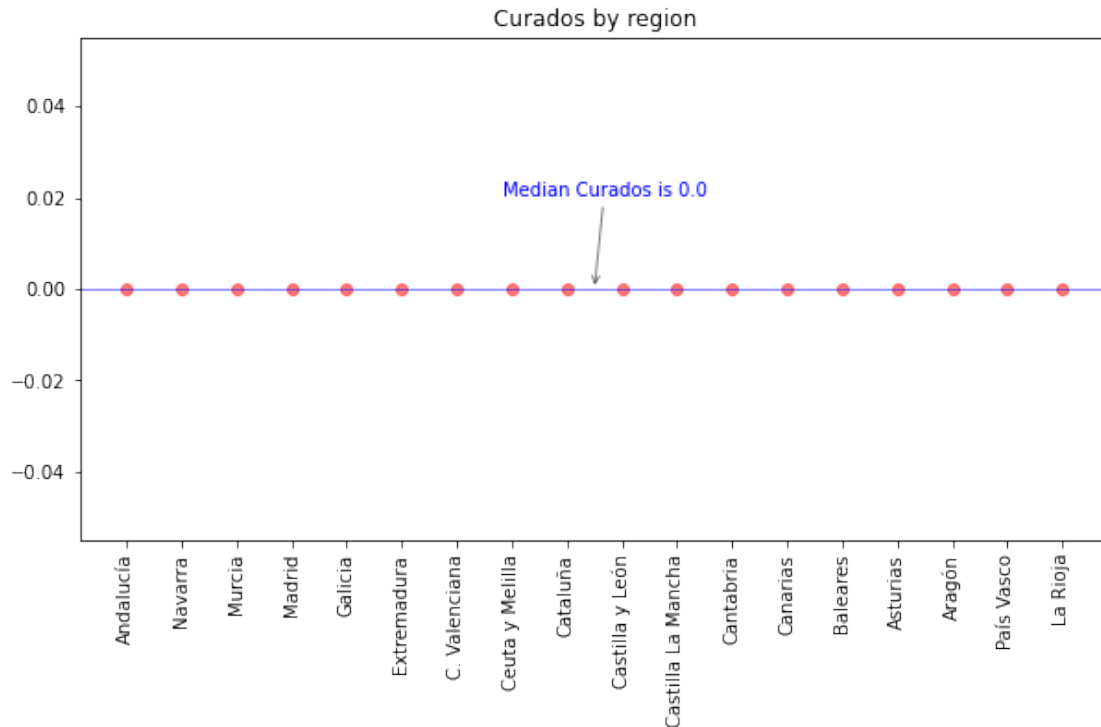
1.4 ¿Hemos alcanzado el pico de la curva?

1.4.1 Casos totales españa, evolucion

```python
# Casos totales españa, evolucion
import Loading_data

MOVING_AVERAGE_WINDOW=4

def get_fallecidos_nacion(window_size=MOVING_AVERAGE_WINDOW):
    Dimension = 'Fallecidos'

    Insertar_Enlace("Pico_España")

    df = Get_Dimension_CCAA(Dimension)

    df['Total Fallecidos'] = df.sum(axis=1)
    df['Total Fallecidos']

    CONVERT_INT_COLUMNS = ['Total Fallecidos']
    for column in CONVERT_INT_COLUMNS :
        df[column] = df[column].fillna(0)
        df[column] = df[column].astype(np.int64)
```

```python
    df['Total Fallecidos hoy absoluto'] = df['Total Fallecidos'] - df['Total␣
 ↪Fallecidos'].shift(1)
    df['MA Total Fallecidos hoy absoluto'] = df['Total Fallecidos hoy␣
 ↪absoluto'].rolling(window=window_size).mean()

    df['Variacion MA Total Fallecidos hoy absoluto'] = df['MA Total Fallecidos␣
 ↪hoy absoluto'] - df['MA Total Fallecidos hoy absoluto'].shift(1)
    return df

df = get_fallecidos_nacion()
df_plt = df[['Total Fallecidos hoy absoluto','MA Total Fallecidos hoy␣
 ↪absoluto']]
fig = plt.figure(figsize=(8, 6), dpi=80)
plt.plot(df_plt, marker='o')
plt.xticks(rotation=90)
plt.gca().xaxis.set_major_formatter(mdates.DateFormatter('%Y-%m-%d'))
plt.gca().xaxis.set_major_locator(mdates.DayLocator(interval=7))
plt.legend(df_plt.columns)
fig.suptitle( "Total fallecidos en España", fontsize=20)

df[['Total Fallecidos',
    'Total Fallecidos hoy absoluto',
    'MA Total Fallecidos hoy absoluto',
    'Variacion MA Total Fallecidos hoy absoluto']]
```

<IPython.core.display.HTML object>

```
[17]:            Total Fallecidos  Total Fallecidos hoy absoluto  \
     Fecha
     2020-03-12                74                            NaN
     2020-03-13               107                           33.0
     2020-03-16               308                          201.0
     2020-03-17               490                          182.0
     2020-03-18               597                          107.0
     …                         …                             …
     2020-06-01             27127                            0.0
     2020-06-02             27127                            0.0
     2020-06-03             27128                            1.0
     2020-06-04             27133                            5.0
     2020-06-05             27134                            1.0


                 MA Total Fallecidos hoy absoluto  \
     Fecha
     2020-03-12                               NaN
     2020-03-13                               NaN
     2020-03-16                               NaN
```

```
2020-03-17                          NaN
2020-03-18                       130.75
…                                     …
2020-06-01                         2.00
2020-06-02                         2.00
2020-06-03                         0.75
2020-06-04                         1.50
2020-06-05                         1.75

            Variacion MA Total Fallecidos hoy absoluto
Fecha
2020-03-12                                         NaN
2020-03-13                                         NaN
2020-03-16                                         NaN
2020-03-17                                         NaN
2020-03-18                                         NaN

…                                                    …
2020-06-01                                       -0.25
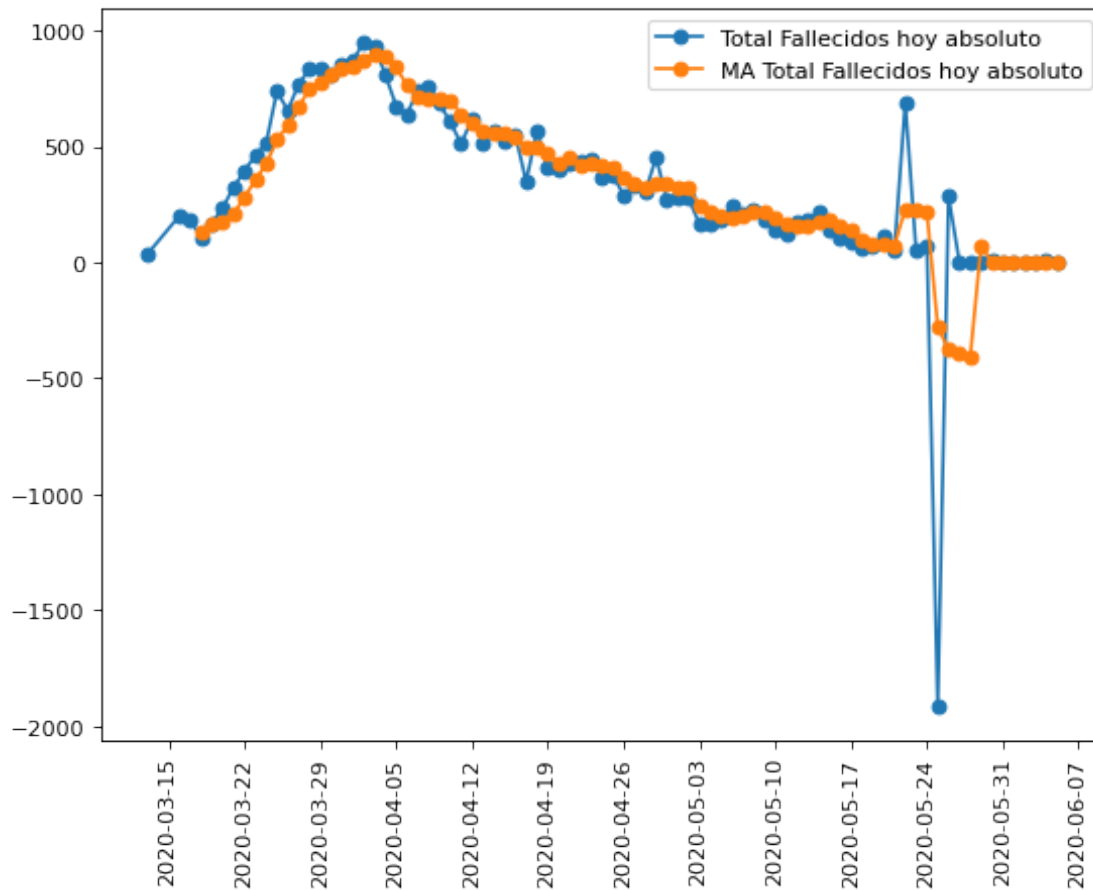2020-06-02                                        0.00
2020-06-03                                       -1.25
2020-06-04                                        0.75
2020-06-05                                        0.25

[84 rows x 4 columns]
```

Total fallecidos en España


```
[18]:  import fbprophet
       def Get_Prediction_Nacion(df,dimension,location='España' , link=None) :
           df = df[[dimension]]
           df = df[df[dimension] > 0]

           df = df.dropna()
           df = df.reset_index()
           df.columns = ['ds','y']


           df_prophet = fbprophet.Prophet(changepoint_prior_scale=0.15)
           df_prophet.fit(df)

           # Make a future dataframe for 2 years
           df_forecast = df_prophet.make_future_dataframe(periods=45, freq='D')
           # Make predictions
```

```python
    df_forecast = df_prophet.predict(df_forecast)
    df_forecast

    df_forecast = df_forecast[df_forecast["yhat"] >= 0]
    df_forecast.loc[df_forecast.yhat_lower < 0, 'yhat_lower'] = 0

    if link is not None:
        Insertar_Enlace(link)

    df_prophet.plot(df_forecast, xlabel = 'Date' )
    plt.title('Predicción de ' + dimension + ", en " + location )

    suma = df_forecast.trend.sum()
    display(HTML(pd.DataFrame(df_forecast).to_html()))

    print ("Prediccion total para " + dimension + " : " + str(suma) )
    return df_forecast


Insertar_Enlace("Prediccion_Fallecidos_España")

prediccion = Get_Prediction_Nacion( df = get_fallecidos_nacion(),
                                    dimension = 'Total Fallecidos hoy absoluto')
```

```
<IPython.core.display.HTML object>


<IPython.core.display.HTML object>


INFO:fbprophet:Disabling yearly seasonality. Run prophet with
yearly_seasonality=True to override this.
INFO:fbprophet:Disabling daily seasonality. Run prophet with
daily_seasonality=True to override this.

<IPython.core.display.HTML object>


Prediccion total para Total Fallecidos hoy absoluto : 28874.763016918456
```

Predicción de Total Fallecidos hoy absoluto, en España
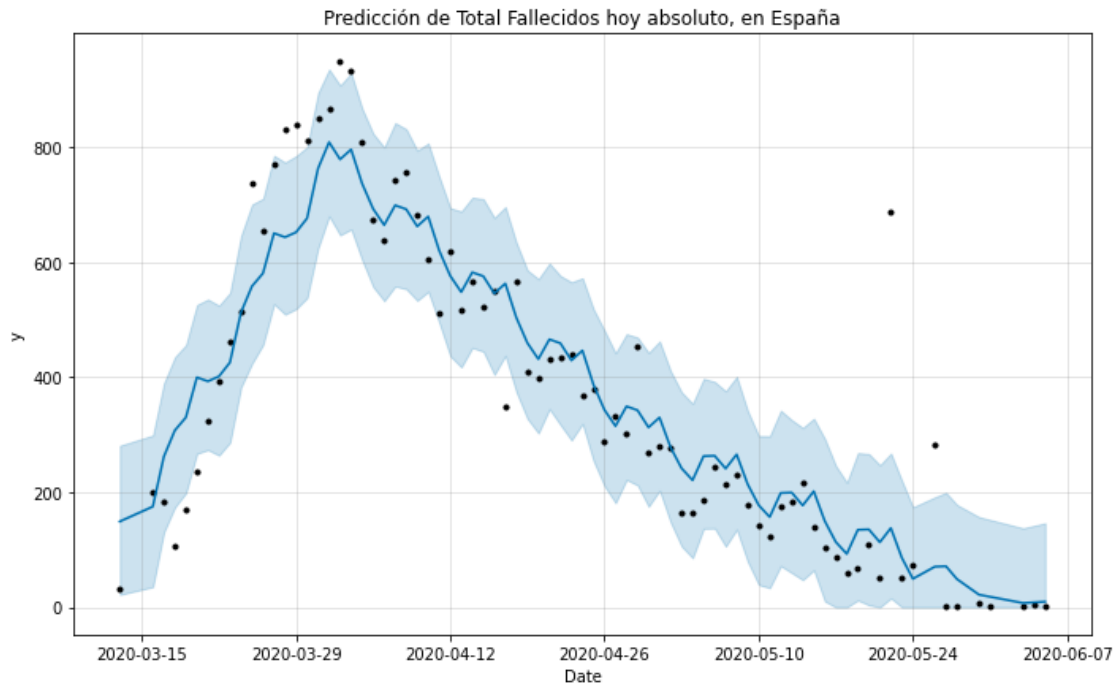
```
[19]: def Get_Predictions_Compare(df,dimension,location='España' , link=None) :
          if link is not None:
              Insertar_Enlace(link)


          display(HTML("<h2>Comparativa de predicciones, hoy contra días pasados, "␣
      ↪+dimension+ " en " +  location+ "</h2>"))


          df = df[[dimension]]
          df = df[df[dimension] > 0]

          df = df.dropna()
          df = df.reset_index()

          df.columns = ['ds','y']

          df_original = df.copy()


          results = pd.DataFrame()
          array_results_temp = []
          for i in range(4):

              if i >= 1 : df = df.iloc[1:]
```

```python
        fecha=max(df.ds)
        fecha_short = str(fecha)[:10]



        df_prophet = fbprophet.Prophet(changepoint_prior_scale=0.15)
        df_prophet.fit(df)

        # Make a future dataframe
        df_forecast = df_prophet.make_future_dataframe(periods=45, freq='D')
        # Make predictions
        df_forecast = df_prophet.predict(df_forecast)
        suma = df_forecast.yhat.sum()

        title_column = "Predicción con los datos de " + fecha_short
        df_forecast[title_column] = df_forecast.yhat

        array_results_temp.append(pd.
→DataFrame(df_forecast[['ds',title_column]]))


    df_1 = pd.merge(array_results_temp[0], array_results_temp[1], how ='outer',␣
→on ='ds')
    df_2 = pd.merge(df_1                   , array_results_temp[2], how ='outer',␣
→on ='ds')
    df_3 = pd.merge(df_2                   , array_results_temp[3], how ='outer',␣
→on ='ds')
    df_4 = pd.merge(df_3                   , df_original           , how ='outer',␣
→on ='ds')
    df_4['datos reales'] = df_4['y']
    del df_4['y']



    df_chart = df_4
    df_chart = df_chart.set_index('ds')
    df_chart = df_chart.head(70).tail(40)

    for c in df_chart.columns:
        df_chart.loc[df_chart[c] < 0, c] = 0

    df_chart.drop(df_chart.loc[df_chart.sum(axis=1)==0].index, inplace=True)
    df_chart.drop(columns=df_chart.columns[df_chart.sum()==0], inplace=True)


    fig = plt.figure(figsize=(8, 6), dpi=80)
    plt.plot(df_chart)
```

```
    plt.title("Predicciones en días anteriores Vs. Datos reales" + dimension␣
 ↪+", en " + location )
    plt.gca().xaxis.set_major_formatter(mdates.DateFormatter('%Y-%m-%d'))
    plt.gca().xaxis.set_major_locator(mdates.DayLocator(interval=7))
    plt.xticks(rotation=90)
    plt.legend(df_chart.columns)




    #print(df_chart)

    print("Las predicciones del total de "+ dimension+  " en " +  location+  ",␣
 ↪cambian dia a dia")
    print(df_chart.sum(axis=0) )

    return df_chart
```

```
[20]: dimension = 'Fallecidos hoy absoluto'
COMUNIDAD_A_CONSIDERAR = 'España'

link="Prediccion_Fallecidos_hoy_absoluto_España"


df = get_fallecidos_nacion()[['Total Fallecidos hoy absoluto']]
df.columns = [ 'Fallecidos hoy absoluto' ]
df.sort_index(inplace=True,ascending=False)

prediccion = Get_Predictions_Compare( df = df,
                                      dimension = dimension,
                                      link = link,
                                      location  = COMUNIDAD_A_CONSIDERAR
                                      )
prediccion
```

```
<IPython.core.display.HTML object>


<IPython.core.display.HTML object>


<IPython.core.display.HTML object>


INFO:fbprophet:Disabling yearly seasonality. Run prophet with
yearly_seasonality=True to override this.
INFO:fbprophet:Disabling daily seasonality. Run prophet with
daily_seasonality=True to override this.
INFO:fbprophet:Disabling yearly seasonality. Run prophet with
yearly_seasonality=True to override this.
```

```
INFO:fbprophet:Disabling daily seasonality. Run prophet with
daily_seasonality=True to override this.
INFO:fbprophet:Disabling yearly seasonality. Run prophet with
yearly_seasonality=True to override this.
INFO:fbprophet:Disabling daily seasonality. Run prophet with
daily_seasonality=True to override this.
INFO:fbprophet:Disabling yearly seasonality. Run prophet with
yearly_seasonality=True to override this.
INFO:fbprophet:Disabling daily seasonality. Run prophet with
daily_seasonality=True to override this.

Las predicciones del total de Fallecidos hoy absoluto en España, cambian dia a
dia
Predicción con los datos de 2020-06-05    11897.539567
Predicción con los datos de 2020-06-04    11836.116703
Predicción con los datos de 2020-06-03    11843.586486
Predicción con los datos de 2020-05-31    11811.418008
datos reales                              11189.000000
dtype: float64
```

[20]:   Predicción con los datos de 2020-06-05 \

```
ds
2020-04-14                          582.224242
2020-04-15                          575.448560
2020-04-16                          545.580085
2020-04-17                          562.757646
2020-04-18                          503.446611
2020-04-19                          459.503110
2020-04-20                          431.318357
2020-04-21                          465.684783
2020-04-22                          458.910934
2020-04-23                          429.044292
2020-04-24                          446.223685
2020-04-25                          386.923228
2020-04-26                          342.990304
2020-04-27                          314.817569
2020-04-28                          349.196015
2020-04-29                          342.432697
2020-04-30                          312.585675
2020-05-01                          329.784688
2020-05-02                          277.948727
2020-05-03                          241.480299
2020-05-04                          220.770275
2020-05-05                          262.621938
2020-05-06                          263.331837
2020-05-07                          240.958472
2020-05-08                          265.631141
2020-05-09                          213.815216
```

```
2020-05-10                                    177.371411
2020-05-11                                    156.686009
2020-05-12                                    198.553152
2020-05-13                                    199.278531
2020-05-14                                    176.911118
2020-05-15                                    201.589742
2020-05-16                                    149.779772
2020-05-17                                    113.337335
2020-05-18                                     92.653301
2020-05-19                                    134.520446
2020-05-20                                    135.245829
2020-05-21                                    112.878418
2020-05-22                                    137.557043
2020-05-23                                     85.747072

                Predicción con los datos de 2020-06-04  \
ds
2020-04-14                                    575.004341
2020-04-15                                    570.120000
2020-04-16                                    539.401778
2020-04-17                                    562.343466
2020-04-18                                    496.797175
2020-04-19                                    452.574676
2020-04-20                                    427.164464
2020-04-21                                    464.088056
2020-04-22                                    459.203951
2020-04-23                                    428.485965
2020-04-24                                    451.432332
2020-04-25                                    385.890720
2020-04-26                                    341.675600
2020-04-27                                    316.272767
2020-04-28                                    353.203738
2020-04-29                                    348.343068
2020-04-30                                    317.648517
2020-05-01                                    340.618170
2020-05-02                                    275.099844
2020-05-03                                    230.905310
2020-05-04                                    212.662854
2020-05-05                                    256.754203
2020-05-06                                    259.048534
2020-05-07                                    235.508984
2020-05-08                                    265.629344
2020-05-09                                    207.273013
2020-05-10                                    170.240473
2020-05-11                                    152.021481
2020-05-12                                    196.136293
2020-05-13                                    198.443172
```

```
2020-05-14                              174.916324
2020-05-15                              205.049387
2020-05-16                              146.694476
2020-05-17                              109.663357
2020-05-18                               91.444525
2020-05-19                              135.559498
2020-05-20                              137.866537
2020-05-21                              114.339695
2020-05-22                              144.472763
2020-05-23                               86.117852

              Predicción con los datos de 2020-06-03  \
ds
2020-04-14                              579.060350
2020-04-15                              572.508599
2020-04-16                              540.870451
2020-04-17                              564.296696
2020-04-18                              499.554638
2020-04-19                              455.441574
2020-04-20                              433.050117
2020-04-21                              468.130640
2020-04-22                              461.579055
2020-04-23                              429.941111
2020-04-24                              453.367561
2020-04-25                              388.625707
2020-04-26                              344.514606
2020-04-27                              322.125112
2020-04-28                              357.209912
2020-04-29                              350.662604
2020-04-30                              319.028898
2020-05-01                              342.460736
2020-05-02                              277.724270
2020-05-03                              233.627012
2020-05-04                              211.251361
2020-05-05                              253.696302
2020-05-06                              254.509135
2020-05-07                              230.235569
2020-05-08                              261.033245
2020-05-09                              203.662618
2020-05-10                              166.922332
2020-05-11                              151.903652
2020-05-12                              194.356911
2020-05-13                              195.178065
2020-05-14                              170.912821
2020-05-15                              201.711971
2020-05-16                              144.342818
2020-05-17                              107.602536
```

```
2020-05-18                               92.583859
2020-05-19                              135.037122
2020-05-20                              135.858276
2020-05-21                              111.593033
2020-05-22                              142.392183
2020-05-23                               85.023030


              Predicción con los datos de 2020-05-31  datos reales
ds
2020-04-14                              579.305102         567.0
2020-04-15                              573.944162         523.0
2020-04-16                              540.465098         551.0
2020-04-17                              564.653543         348.0
2020-04-18                              498.416012         565.0
2020-04-19                              453.937000         410.0
2020-04-20                              432.659435         399.0
2020-04-21                              467.129999         430.0
2020-04-22                              461.769061         435.0
2020-04-23                              428.291747         440.0
2020-04-24                              452.481941         367.0
2020-04-25                              386.252072         378.0
2020-04-26                              341.780721         288.0
2020-04-27                              320.512797         331.0
2020-04-28                              354.993003         301.0
2020-04-29                              349.641707         453.0
2020-04-30                              316.174098         268.0
2020-05-01                              340.373998         281.0
2020-05-02                              274.149339         276.0
2020-05-03                              229.683200         164.0
2020-05-04                              208.418507         164.0
2020-05-05                              250.735583         185.0
2020-05-06                              253.221157         244.0
2020-05-07                              227.590815         213.0
2020-05-08                              259.627982         229.0
2020-05-09                              201.240228         179.0
2020-05-10                              164.610992         143.0
2020-05-11                              151.183204         123.0
2020-05-12                              193.508572         176.0
2020-05-13                              196.002439         184.0
2020-05-14                              170.378689         217.0
2020-05-15                              202.422449         138.0
2020-05-16                              144.040230         104.0
2020-05-17                              107.416531          87.0
2020-05-18                               93.994278          59.0
2020-05-19                              136.320154          69.0
2020-05-20                              138.814528         110.0
2020-05-21                              113.190779          52.0
```

| 2020-05-22 | 145.234538 | 688.0 |
| 2020-05-23 | 86.852320 | 50.0 |

Predicciones en días anteriores Vs. Datos realesFallecidos hoy absoluto, en España
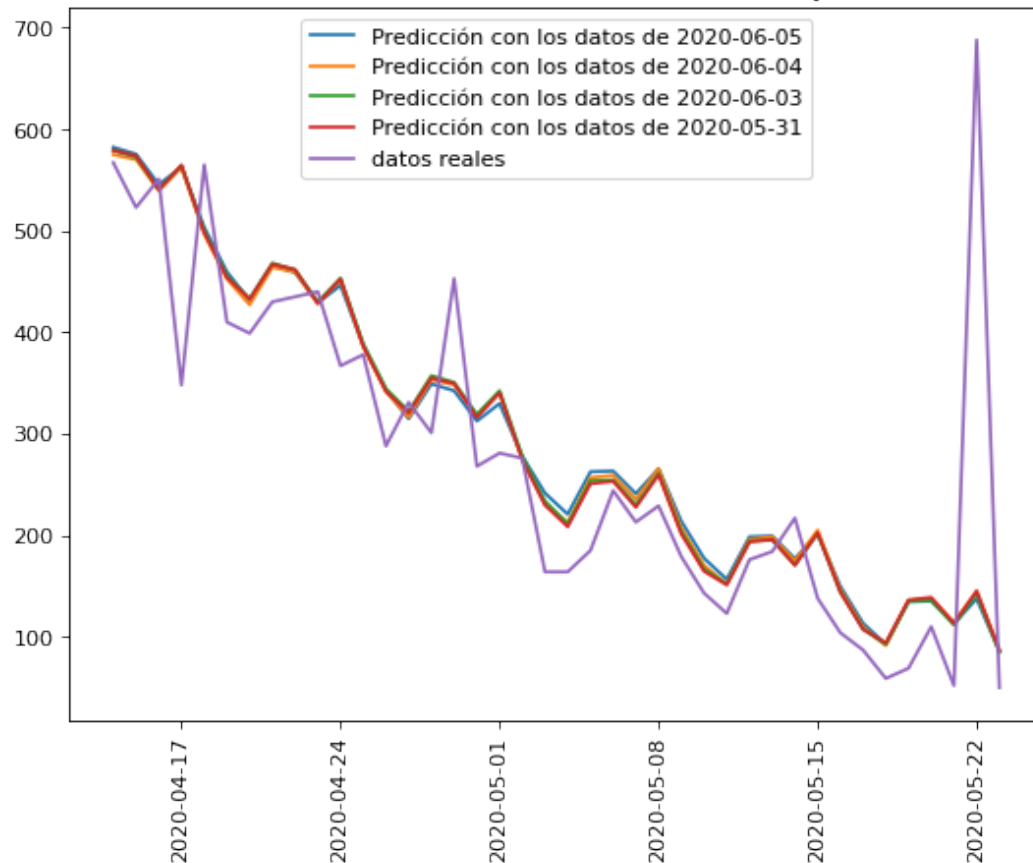

```
[21]: MOVING_AVERAGE_WINDOW = 4
      def␣
      →report_single_location_single_dimension(location,dimension,window_size=MOVING_AVERAGE_WINDO
      ↪

          Dimension = 'Fallecidos'
          labelMa = f'Moving Average ({window_size}) {dimension}'

          df = pd.DataFrame()
          df[dimension] = Get_Dimension_CCAA(dimension)[location]
          df[labelMa] = df[dimension].rolling(window=window_size).mean()

          display(HTML("<h2>Analisis de ''" + dimension +"'', en " + location + "</
      ↪h2>"))
          fig = plt.figure(figsize=(8, 6), dpi=80)
```

```
        plt.plot(df, marker='o')
        plt.title("Gráfico de " + dimension +", en " + location)
        plt.gca().xaxis.set_major_formatter(mdates.DateFormatter('%Y-%m-%d'))
        plt.gca().xaxis.set_major_locator(mdates.DayLocator(interval=7))



        plt.legend(df.columns)
        fig.suptitle( dimension + ' in ' + location, fontsize=20)

        display(HTML(pd.DataFrame(df).to_html()))
        return
```

1.4.2 Casos totales españa, evolucion

```
[22]: dimension = 'Fallecidos hoy absoluto'
      COMUNIDAD_A_CONSIDERAR = 'Madrid'

      Insertar_Enlace("Reporte_Fallecidos_hoy_absoluto_Madrid")

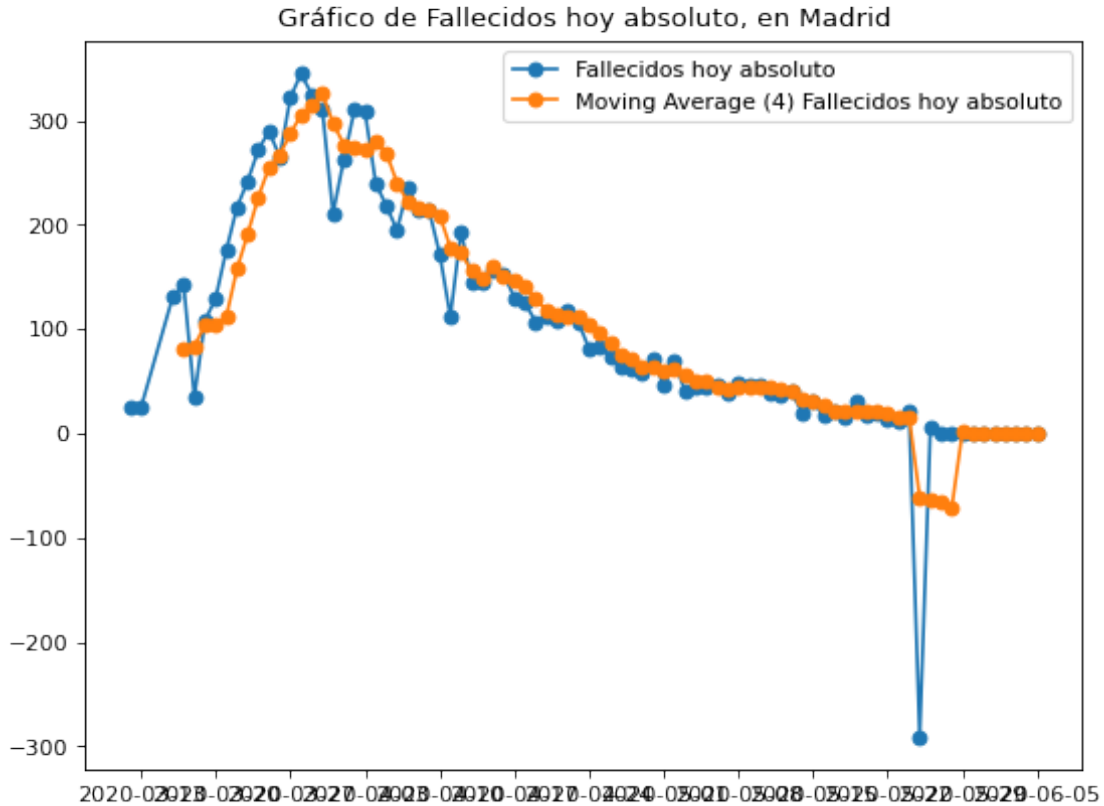      report_single_location_single_dimension(COMUNIDAD_A_CONSIDERAR,dimension,4)
```

```
<IPython.core.display.HTML object>


<IPython.core.display.HTML object>


<IPython.core.display.HTML object>
```

Fallecidos hoy absoluto in Madrid

Gráfico de Fallecidos hoy absoluto, en Madrid


```
[23]: dimension = 'Fallecidos hoy absoluto'
      COMUNIDAD_A_CONSIDERAR = 'Madrid'

      link="Prediccion_Fallecidos_hoy_absoluto_Madrid"

      prediccion = Get_Prediction_Nacion( df = Loading_data.
       ↪Get_Comunidad(COMUNIDAD_A_CONSIDERAR),
                                          dimension = dimension,
                                          link = link,
                                          location  = COMUNIDAD_A_CONSIDERAR
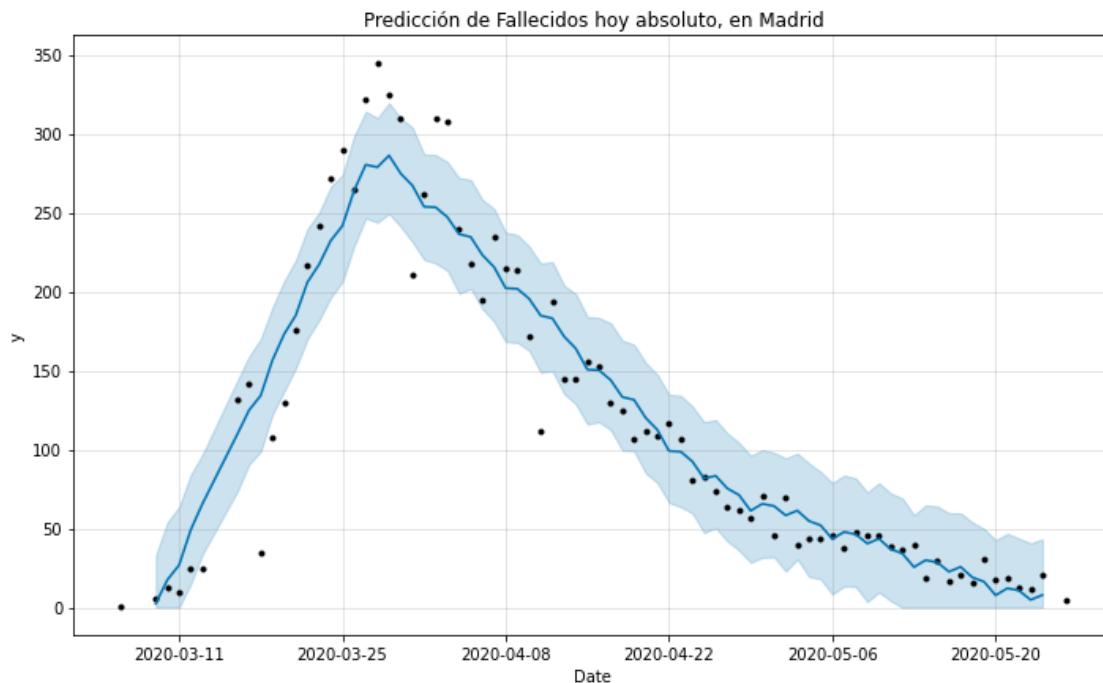                                          )
```

INFO:fbprophet:Disabling yearly seasonality. Run prophet with
yearly_seasonality=True to override this.
INFO:fbprophet:Disabling daily seasonality. Run prophet with
daily_seasonality=True to override this.

<IPython.core.display.HTML object>

```
<IPython.core.display.HTML object>
```

Prediccion total para Fallecidos hoy absoluto : 9027.314200402268


```
[24]: dimension = 'Fallecidos hoy absoluto'
      COMUNIDAD_A_CONSIDERAR = 'Madrid'
      link="Prediccion_Compare_Fallecidos_hoy_absoluto_Madrid"

      df = Loading_data.Get_Comunidad(COMUNIDAD_A_CONSIDERAR)
      prediccion = Get_Predictions_Compare( df = df,
                                            dimension = dimension,
                                            link = link,
                                            location  = COMUNIDAD_A_CONSIDERAR
                                            )
      prediccion
```

```
<IPython.core.display.HTML object>
```

```
<IPython.core.display.HTML object>
```

```
INFO:fbprophet:Disabling yearly seasonality. Run prophet with
yearly_seasonality=True to override this.
INFO:fbprophet:Disabling daily seasonality. Run prophet with
daily_seasonality=True to override this.
```

```
INFO:fbprophet:Disabling yearly seasonality. Run prophet with
yearly_seasonality=True to override this.
INFO:fbprophet:Disabling daily seasonality. Run prophet with
daily_seasonality=True to override this.
INFO:fbprophet:Disabling yearly seasonality. Run prophet with
yearly_seasonality=True to override this.
INFO:fbprophet:Disabling daily seasonality. Run prophet with
daily_seasonality=True to override this.
INFO:fbprophet:Disabling yearly seasonality. Run prophet with
yearly_seasonality=True to override this.
INFO:fbprophet:Disabling daily seasonality. Run prophet with
daily_seasonality=True to override this.

Las predicciones del total de Fallecidos hoy absoluto en Madrid, cambian dia a
dia
Predicción con los datos de 2020-05-26     3505.921985
Predicción con los datos de 2020-05-24     3504.067771
Predicción con los datos de 2020-05-23     3496.654179
Predicción con los datos de 2020-05-22     3495.348031
datos reales                               3277.000000
dtype: float64
```

[24]:   Predicción con los datos de 2020-05-26 \
```
    ds
    2020-04-09                                  201.790011
    2020-04-10                                  195.552844
    2020-04-11                                  184.815203
    2020-04-12                                  183.056038
    2020-04-13                                  171.619473
    2020-04-14                                  164.030593
    2020-04-15                                  150.616153
    2020-04-16                                  150.216847
    2020-04-17                                  143.980997
    2020-04-18                                  133.245770
    2020-04-19                                  131.489019
    2020-04-20                                  120.054868
    2020-04-21                                  112.468940
    2020-04-22                                   99.057452
    2020-04-23                                   98.660200
    2020-04-24                                   92.426405
    2020-04-25                                   81.692136
    2020-04-26                                   83.362048
    2020-04-27                                   75.354559
    2020-04-28                                   71.196082
    2020-04-29                                   61.212046
    2020-04-30                                   65.628350
    2020-05-01                                   64.208111
    2020-05-02                                   58.287399
```

```
2020-05-03                          61.347169
2020-05-04                          54.729539
2020-05-05                          51.959913
2020-05-06                          43.364726
2020-05-07                          47.783664
2020-05-08                          46.366766
2020-05-09                          40.449395
2020-05-10                          43.510499
2020-05-11                          36.894203
2020-05-12                          34.125285
2020-05-13                          25.530807
2020-05-14                          29.950453
2020-05-15                          28.533555
2020-05-16                          22.616184
2020-05-17                          25.677288
2020-05-18                          19.060992

           Predicción con los datos de 2020-05-24  \
ds
2020-04-09                         201.871118
2020-04-10                         195.672429
2020-04-11                         184.952436
2020-04-12                         183.572375
2020-04-13                         171.913139
2020-04-14                         163.628440
2020-04-15                         150.707485
2020-04-16                         150.331574
2020-04-17                         144.133303
2020-04-18                         133.417318
2020-04-19                         132.041263
2020-04-20                         120.389098
2020-04-21                         112.111471
2020-04-22                          99.199919
2020-04-23                          98.833411
2020-04-24                          92.644543
2020-04-25                          81.935659
2020-04-26                          80.566707
2020-04-27                          73.639445
2020-04-28                          70.086720
2020-04-29                          61.897482
2020-04-30                          66.256063
2020-05-01                          64.792284
2020-05-02                          58.812792
2020-05-03                          62.173232
2020-05-04                          55.255116
2020-05-05                          51.711537
2020-05-06                          43.531444
```

```
2020-05-07                                47.897817
2020-05-08                                46.441829
2020-05-09                                40.465579
2020-05-10                                43.829261
2020-05-11                                36.913606
2020-05-12                                33.372489
2020-05-13                                25.194858
2020-05-14                                29.562272
2020-05-15                                28.107325
2020-05-16                                22.131075
2020-05-17                                25.494756
2020-05-18                                18.579102


              Predicción con los datos de 2020-05-23  \
ds
2020-04-09                               202.230638
2020-04-10                               196.023359
2020-04-11                               185.036751
2020-04-12                               181.596038
2020-04-13                               171.728286
2020-04-14                               163.603606
2020-04-15                               150.842875
2020-04-16                               150.472897
2020-04-17                               144.266012
2020-04-18                               133.280002
2020-04-19                               129.839887
2020-04-20                               119.974976
2020-04-21                               111.853139
2020-04-22                                99.097046
2020-04-23                                98.731706
2020-04-24                                92.529460
2020-04-25                                84.530351
2020-04-26                                84.077138
2020-04-27                                77.200821
2020-04-28                                72.067577
2020-04-29                                62.298189
2020-04-30                                66.621004
2020-05-01                                65.106912
2020-05-02                                58.815569
2020-05-03                                60.070122
2020-05-04                                54.899561
2020-05-05                                51.472073
2020-05-06                                43.408441
2020-05-07                                47.735595
2020-05-08                                46.225842
2020-05-09                                39.936847
2020-05-10                                41.193748
```

ds		
2020-05-11	36.023306	
2020-05-12	32.595938	
2020-05-13	24.532425	
2020-05-14	28.859666	
2020-05-15	27.350000	
2020-05-16	21.061006	
2020-05-17	22.317906	
2020-05-18	17.147464	

ds	Predicción con los datos de 2020-05-22	datos reales
2020-04-09	204.102713	214.0
2020-04-10	198.106717	172.0
2020-04-11	185.964283	112.0
2020-04-12	182.621428	194.0
2020-04-13	172.442022	145.0
2020-04-14	164.222118	145.0
2020-04-15	151.367241	156.0
2020-04-16	151.057798	153.0
2020-04-17	145.063882	130.0
2020-04-18	132.923529	125.0
2020-04-19	129.582753	107.0
2020-04-20	119.405425	112.0
2020-04-21	111.187600	109.0
2020-04-22	98.333877	117.0
2020-04-23	98.025588	107.0
2020-04-24	92.035583	81.0
2020-04-25	79.899142	83.0
2020-04-26	81.251700	74.0
2020-04-27	75.767706	64.0
2020-04-28	72.243215	62.0
2020-04-29	64.083549	57.0
2020-04-30	68.469317	71.0
2020-05-01	67.170618	46.0
2020-05-02	59.725482	70.0
2020-05-03	61.080587	40.0
2020-05-04	55.599139	44.0
2020-05-05	52.077195	44.0
2020-05-06	43.921116	46.0
2020-05-07	48.310471	38.0
2020-05-08	47.016000	48.0
2020-05-09	39.575091	46.0
2020-05-10	40.933749	46.0
2020-05-11	35.455855	39.0
2020-05-12	31.937465	37.0
2020-05-13	23.782675	40.0
2020-05-14	28.173318	19.0

2020-05-15	26.878846	30.0
2020-05-16	19.437938	17.0
2020-05-17	20.796596	21.0
2020-05-18	15.318702	16.0

Predicciones en días anteriores Vs. Datos realesFallecidos hoy absoluto, en Madrid
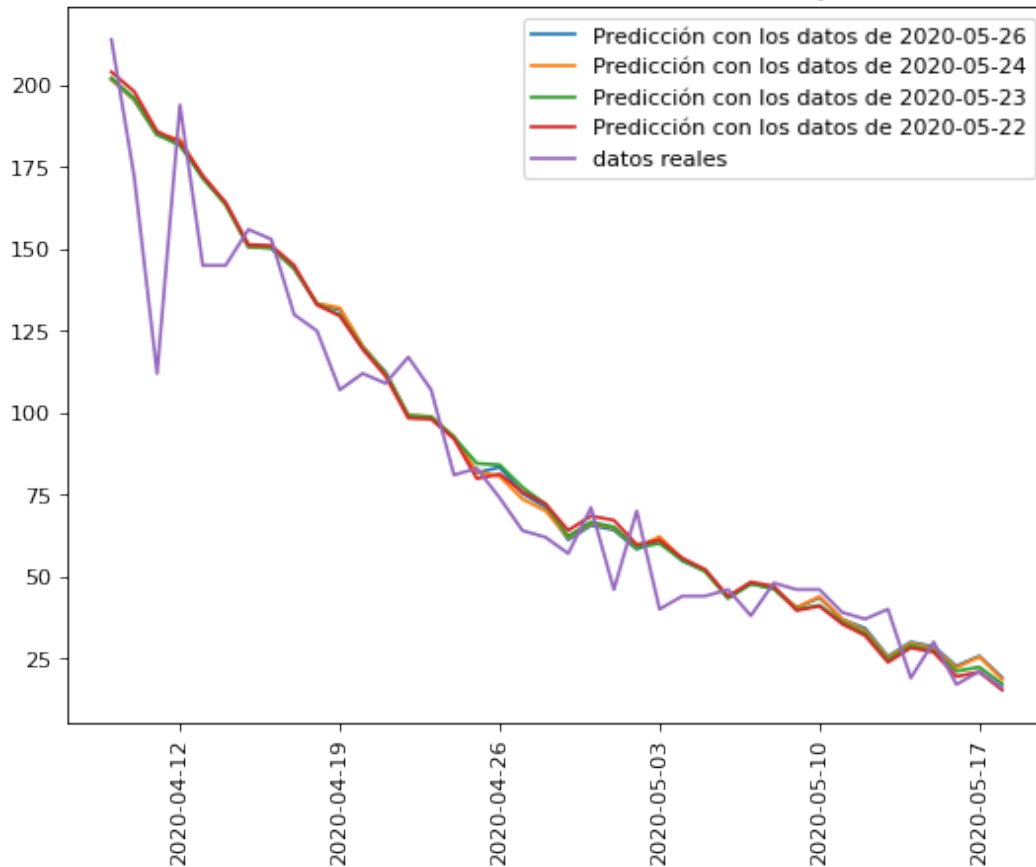

```
[25]: dimension = 'Fallecidos hoy absoluto'
      COMUNIDAD_A_CONSIDERAR = 'Cataluña'

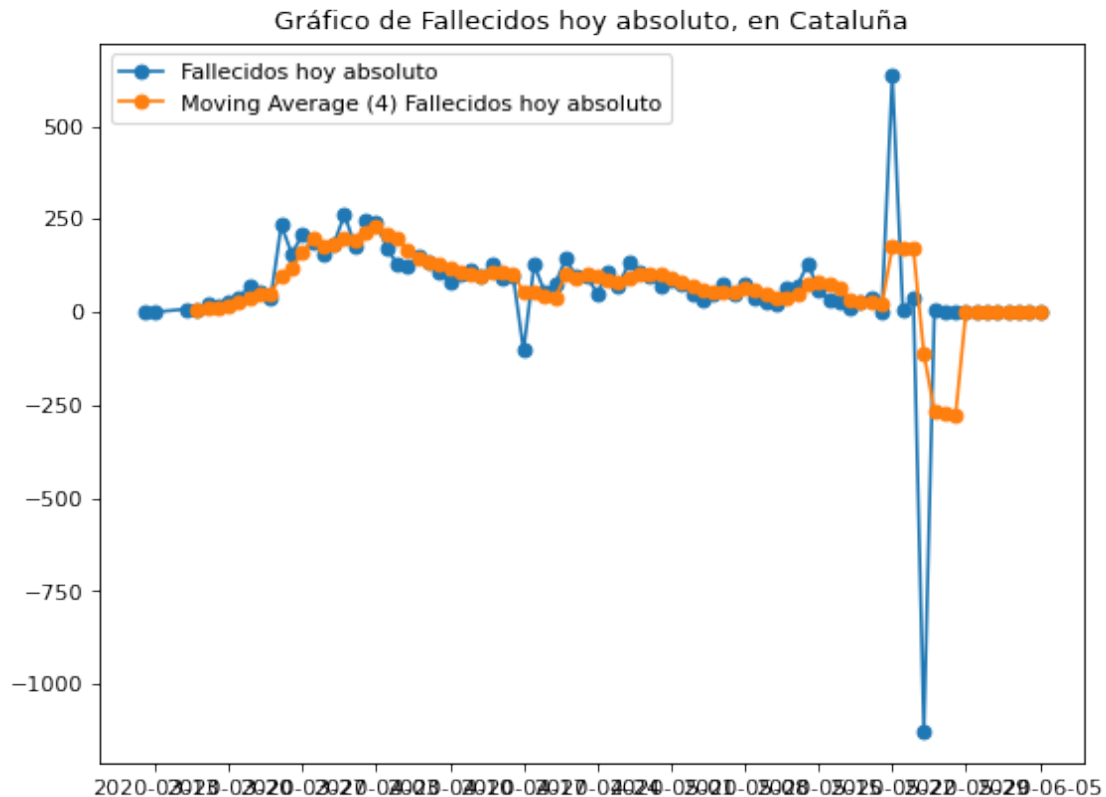      Insertar_Enlace("Reporte_Fallecidos_hoy_absoluto_Cataluña")

      report_single_location_single_dimension(COMUNIDAD_A_CONSIDERAR,dimension)
```

<IPython.core.display.HTML object>

<IPython.core.display.HTML object>

<IPython.core.display.HTML object>

Fallecidos hoy absoluto in Cataluña

Gráfico de Fallecidos hoy absoluto, en Cataluña


```
[26]: dimension = 'Fallecidos hoy absoluto'
      COMUNIDAD_A_CONSIDERAR = 'Cataluña'
      link="Prediccion_Fallecidos_hoy_absoluto_Cataluña"


      prediccion = Get_Prediction_Nacion( df = Loading_data.
       ↪Get_Comunidad(COMUNIDAD_A_CONSIDERAR),
                                          dimension = dimension,
                                          link = link,
                                          location  = COMUNIDAD_A_CONSIDERAR)
```

INFO:fbprophet:Disabling yearly seasonality. Run prophet with
yearly_seasonality=True to override this.
INFO:fbprophet:Disabling daily seasonality. Run prophet with
daily_seasonality=True to override this.

<IPython.core.display.HTML object>

<IPython.core.display.HTML object>

Prediccion total para Fallecidos hoy absoluto : 7706.624052777044

Predicción de Fallecidos hoy absoluto, en Cataluña
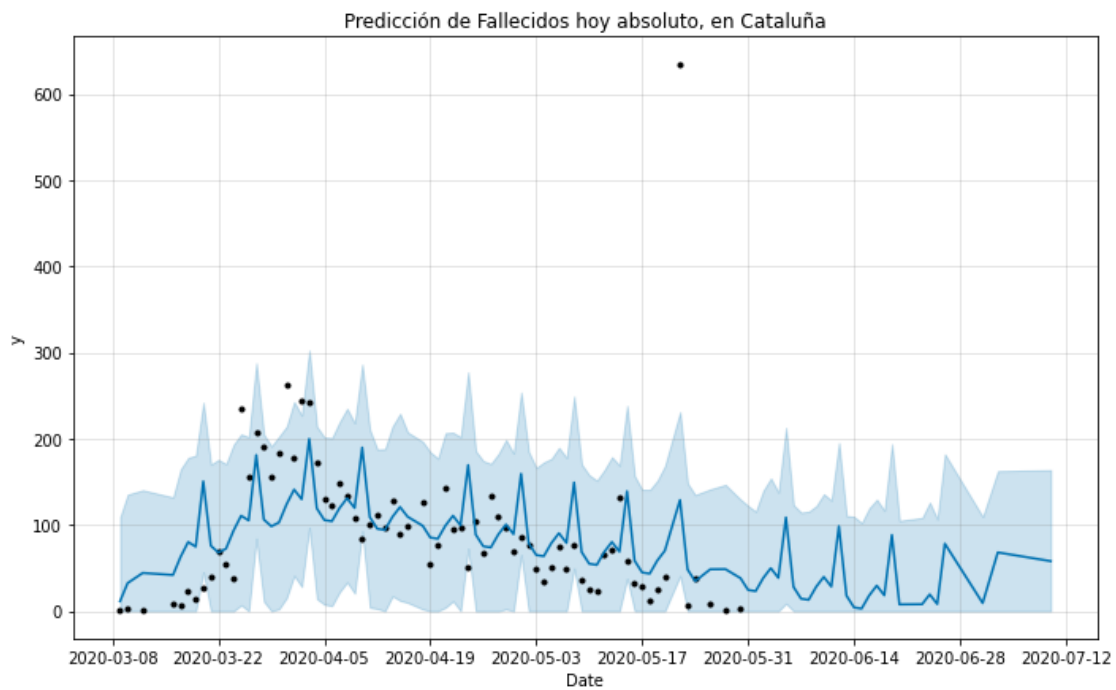
```
[27]:  dimension = 'Fallecidos hoy absoluto'
       report_single_location_single_dimension('Castilla y León',dimension)

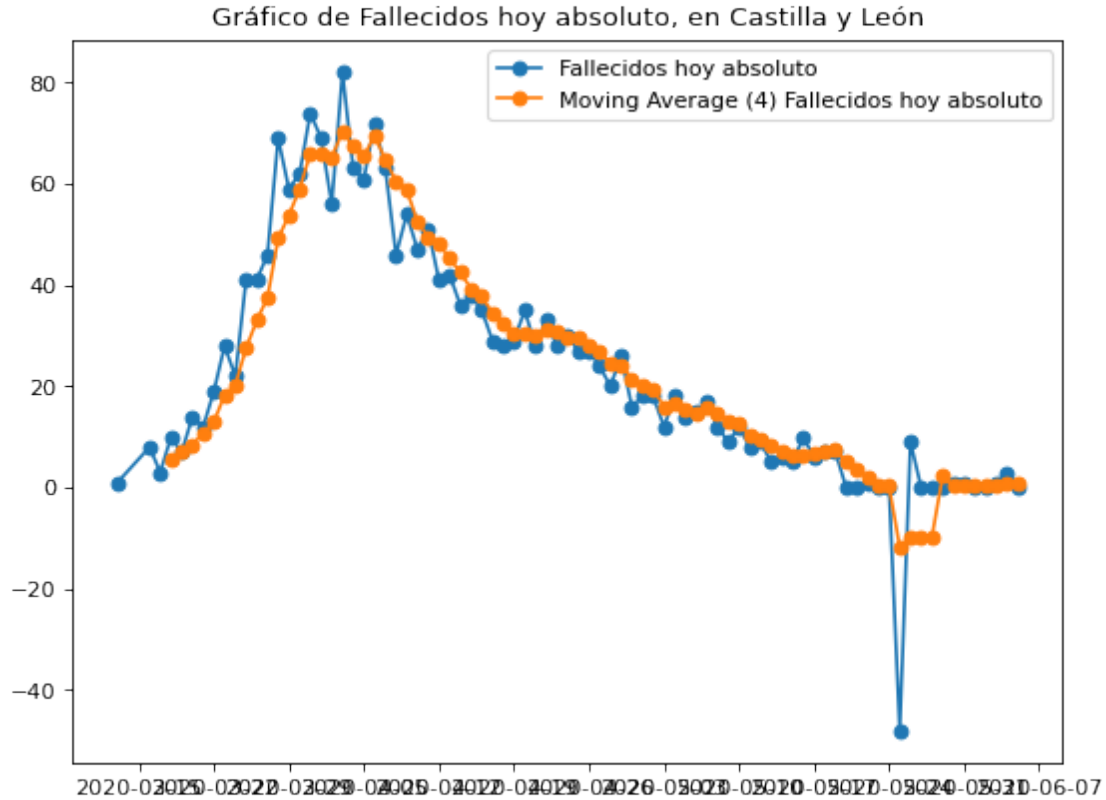       Insertar_Enlace("Reporte_Fallecidos_hoy_absoluto_CyL")
```

<IPython.core.display.HTML object>

<IPython.core.display.HTML object>

<IPython.core.display.HTML object>

Fallecidos hoy absoluto in Castilla y León

Gráfico de Fallecidos hoy absoluto, en Castilla y León


```
[28]: dimension = 'Fallecidos hoy absoluto'
      COMUNIDAD_A_CONSIDERAR = 'Castilla y León'
      link="Prediccion_Fallecidos_hoy_absoluto_CyL"

      prediccion = Get_Prediction_Nacion( df = Loading_data.
       ↪Get_Comunidad(COMUNIDAD_A_CONSIDERAR),
                                          dimension = dimension ,
                                          link = link,
                                          location  = COMUNIDAD_A_CONSIDERAR )
```

INFO:fbprophet:Disabling yearly seasonality. Run prophet with
yearly_seasonality=True to override this.
INFO:fbprophet:Disabling daily seasonality. Run prophet with
daily_seasonality=True to override this.

<IPython.core.display.HTML object>

<IPython.core.display.HTML object>

Prediccion total para Fallecidos hoy absoluto : 1987.2211587713525

Predicción de Fallecidos hoy absoluto, en Castilla y León
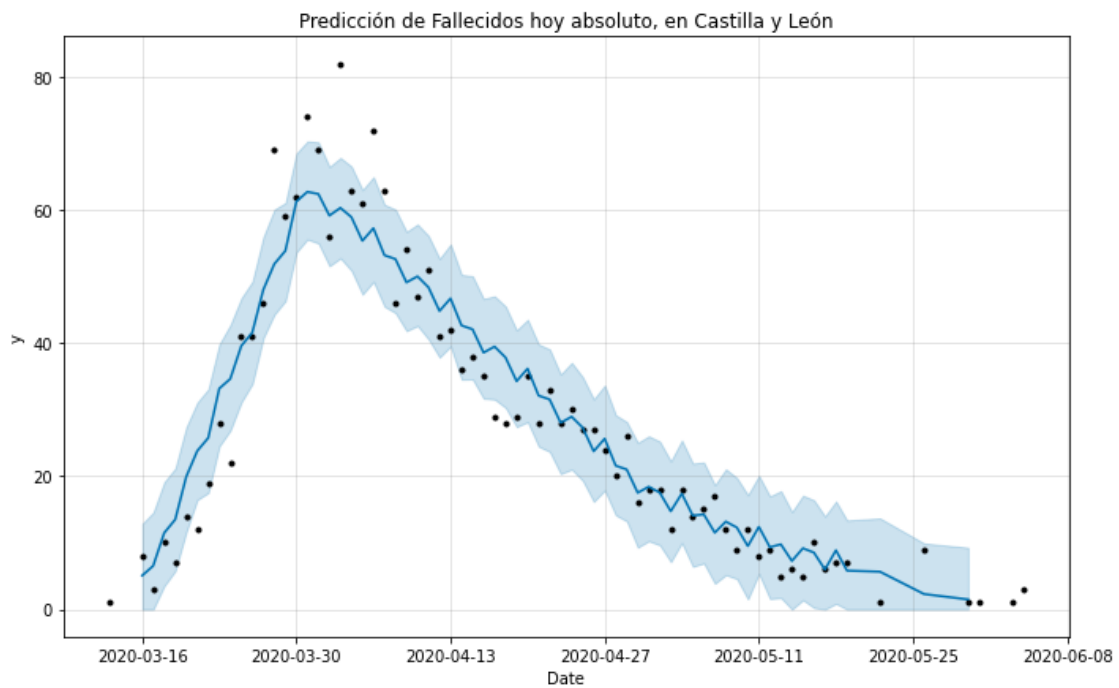
```
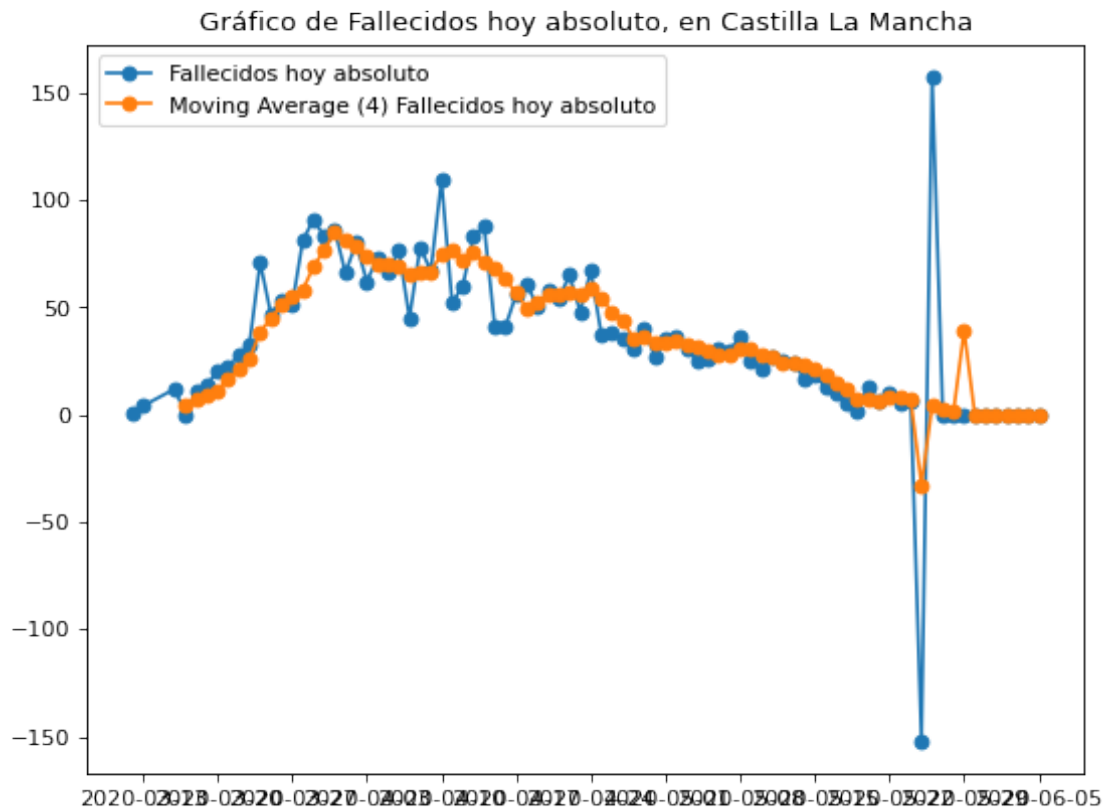[29]: dimension = 'Fallecidos hoy absoluto'
      report_single_location_single_dimension('Castilla La Mancha',dimension)
      Insertar_Enlace("Reporte_Fallecidos_hoy_absoluto_CM")
```

<IPython.core.display.HTML object>

<IPython.core.display.HTML object>

<IPython.core.display.HTML object>

Fallecidos hoy absoluto in Castilla La Mancha

Gráfico de Fallecidos hoy absoluto, en Castilla La Mancha


```
[30]:  dimension = 'Fallecidos hoy absoluto'
       COMUNIDAD_A_CONSIDERAR = 'Castilla La Mancha'
       link="Prediccion_Fallecidos_hoy_absoluto_CM"

       prediccion = Get_Prediction_Nacion( df = Loading_data.
        →Get_Comunidad(COMUNIDAD_A_CONSIDERAR),
                                           dimension = dimension ,
                                           link = link,
                                           location  = COMUNIDAD_A_CONSIDERAR )
```

INFO:fbprophet:Disabling yearly seasonality. Run prophet with
yearly_seasonality=True to override this.
INFO:fbprophet:Disabling daily seasonality. Run prophet with
daily_seasonality=True to override this.

<IPython.core.display.HTML object>

<IPython.core.display.HTML object>

Prediccion total para Fallecidos hoy absoluto : 3179.2353242916706

Predicción de Fallecidos hoy absoluto, en Castilla La Mancha

[31]:
```python
dimension = 'Fallecidos hoy absoluto'
COMUNIDAD_A_CONSIDERAR = 'Castilla La Mancha'
link="Prediccion_Compare_Fallecidos_hoy_absoluto_CM"

df = Loading_data.Get_Comunidad(COMUNIDAD_A_CONSIDERAR)
prediccion = Get_Predictions_Compare( df = df,
                                      dimension = dimension,
                                      link = link,
                                      location  = COMUNIDAD_A_CONSIDERAR
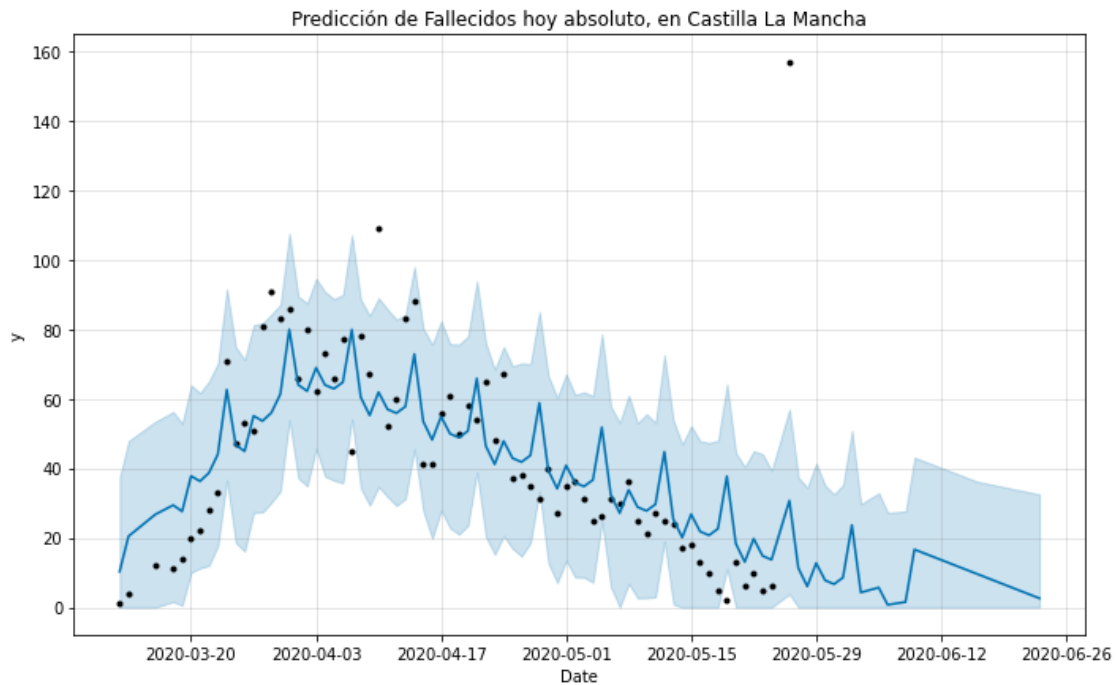                                      )
prediccion
```

<IPython.core.display.HTML object>

<IPython.core.display.HTML object>

INFO:fbprophet:Disabling yearly seasonality. Run prophet with
yearly_seasonality=True to override this.
INFO:fbprophet:Disabling daily seasonality. Run prophet with
daily_seasonality=True to override this.
INFO:fbprophet:Disabling yearly seasonality. Run prophet with
yearly_seasonality=True to override this.

```
INFO:fbprophet:Disabling daily seasonality. Run prophet with
daily_seasonality=True to override this.
INFO:fbprophet:Disabling yearly seasonality. Run prophet with
yearly_seasonality=True to override this.
INFO:fbprophet:Disabling daily seasonality. Run prophet with
daily_seasonality=True to override this.
INFO:fbprophet:Disabling yearly seasonality. Run prophet with
yearly_seasonality=True to override this.
INFO:fbprophet:Disabling daily seasonality. Run prophet with
daily_seasonality=True to override this.

Las predicciones del total de Fallecidos hoy absoluto en Castilla La Mancha,
cambian dia a dia
Predicción con los datos de 2020-05-26     1506.281025
Predicción con los datos de 2020-05-24     1334.306411
Predicción con los datos de 2020-05-23     1338.276538
Predicción con los datos de 2020-05-22     1330.640507
datos reales                               1308.000000
dtype: float64
```

[31]:
```
              Predicción con los datos de 2020-05-26  \
ds
2020-04-14                                 72.880487
2020-04-15                                 53.475360
2020-04-16                                 48.203820
2020-04-17                                 54.890869
2020-04-18                                 49.938951
2020-04-19                                 48.842716
2020-04-20                                 50.732430
2020-04-21                                 65.850194
2020-04-22                                 46.444623
2020-04-23                                 41.172880
2020-04-24                                 47.859726
2020-04-25                                 42.907605
2020-04-26                                 41.811370
2020-04-27                                 43.701084
2020-04-28                                 58.818848
2020-04-29                                 39.413277
2020-04-30                                 34.141534
2020-05-01                                 40.828380
2020-05-02                                 35.876259
2020-05-03                                 34.780024
2020-05-04                                 36.669737
2020-05-05                                 51.787502
2020-05-06                                 32.381931
2020-05-07                                 27.110308
2020-05-08                                 33.797274
2020-05-09                                 28.845274
```

```
2020-05-10                              27.749160
2020-05-11                              29.639175
2020-05-12                              44.757241
2020-05-13                              25.351971
2020-05-14                              20.080529
2020-05-15                              26.767676
2020-05-16                              21.815857
2020-05-17                              20.719923
2020-05-18                              22.609938
2020-05-19                              37.728004
2020-05-20                              18.322734
2020-05-21                              13.051292
2020-05-22                              19.738439
2020-05-23                              14.786620

            Predicción con los datos de 2020-05-24  \
ds
2020-04-14                              63.707229
2020-04-15                              59.072719
2020-04-16                              54.991743
2020-04-17                              61.005644
2020-04-18                              54.230188
2020-04-19                              52.582425
2020-04-20                              53.722275
2020-04-21                              53.660971
2020-04-22                              49.023643
2020-04-23                              44.940573
2020-04-24                              50.952381
2020-04-25                              44.175627
2020-04-26                              42.526566
2020-04-27                              43.665872
2020-04-28                              43.604025
2020-04-29                              38.966629
2020-04-30                              34.883493
2020-05-01                              40.895233
2020-05-02                              34.118479
2020-05-03                              32.469418
2020-05-04                              33.608725
2020-05-05                              33.546877
2020-05-06                              28.909482
2020-05-07                              24.826345
2020-05-08                              30.838086
2020-05-09                              24.061332
2020-05-10                              22.412271
2020-05-11                              23.551577
2020-05-12                              23.489730
2020-05-13                              18.852335
```

```
2020-05-14                                    14.769198
2020-05-15                                    20.780938
2020-05-16                                    14.004184
2020-05-17                                    12.355124
2020-05-18                                    13.494430
2020-05-19                                    13.432582
2020-05-20                                     8.795187
2020-05-21                                     4.712050
2020-05-22                                    10.723791
2020-05-23                                     3.947037


              Predicción con los datos de 2020-05-23  \
ds
2020-04-14                                    65.215850
2020-04-15                                    60.477493
2020-04-16                                    56.312186
2020-04-17                                    62.218689
2020-04-18                                    55.440744
2020-04-19                                    53.278765
2020-04-20                                    54.858851
2020-04-21                                    54.685427
2020-04-22                                    49.946964
2020-04-23                                    45.781648
2020-04-24                                    51.688141
2020-04-25                                    44.910196
2020-04-26                                    42.748217
2020-04-27                                    44.328302
2020-04-28                                    44.154879
2020-04-29                                    39.416416
2020-04-30                                    35.251100
2020-05-01                                    41.157592
2020-05-02                                    34.379648
2020-05-03                                    32.217668
2020-05-04                                    33.797754
2020-05-05                                    33.624331
2020-05-06                                    28.885868
2020-05-07                                    24.720551
2020-05-08                                    30.627044
2020-05-09                                    23.849099
2020-05-10                                    21.687120
2020-05-11                                    23.267206
2020-05-12                                    23.093782
2020-05-13                                    18.355319
2020-05-14                                    14.190003
2020-05-15                                    20.096496
2020-05-16                                    13.318551
2020-05-17                                    11.156572
```

```
2020-05-18                              12.736657
2020-05-19                              12.563234
2020-05-20                               7.824771
2020-05-21                               3.659455
2020-05-22                               9.565947
2020-05-23                               2.788003


           Predicción con los datos de 2020-05-22  datos reales
ds
2020-04-14                              64.458739          88.0
2020-04-15                              59.647266          41.0
2020-04-16                              55.594574          41.0
2020-04-17                              61.635046          56.0
2020-04-18                              54.705032          61.0
2020-04-19                              52.798709          50.0
2020-04-20                              54.366811          58.0
2020-04-21                              54.131992          54.0
2020-04-22                              49.319771          65.0
2020-04-23                              45.266330          48.0
2020-04-24                              51.305895          67.0
2020-04-25                              44.374973          37.0
2020-04-26                              42.467742          38.0
2020-04-27                              44.035612          35.0
2020-04-28                              43.800561          31.0
2020-04-29                              38.988116          40.0
2020-04-30                              34.934450          27.0
2020-05-01                              40.974015          35.0
2020-05-02                              34.043092          36.0
2020-05-03                              32.135861          31.0
2020-05-04                              33.703731          25.0
2020-05-05                              33.468681          26.0
2020-05-06                              28.656235          31.0
2020-05-07                              24.602569          30.0
2020-05-08                              30.642134          36.0
2020-05-09                              23.711212          25.0
2020-05-10                              21.803981          21.0
2020-05-11                              23.371851          27.0
2020-05-12                              23.136800          25.0
2020-05-13                              18.324355          24.0
2020-05-14                              14.270689          17.0
2020-05-15                              20.310254          18.0
2020-05-16                              13.379331          13.0
2020-05-17                              11.472100          10.0
2020-05-18                              13.039970           5.0
2020-05-19                              12.804920           2.0
2020-05-20                               7.992474          13.0
2020-05-21                               3.938809           6.0
```

| 2020-05-22 | 9.978373 | 10.0 |
| 2020-05-23 | 3.047451 | 5.0 |

Predicciones en días anteriores Vs. Datos realesFallecidos hoy absoluto, en Castilla La Mancha
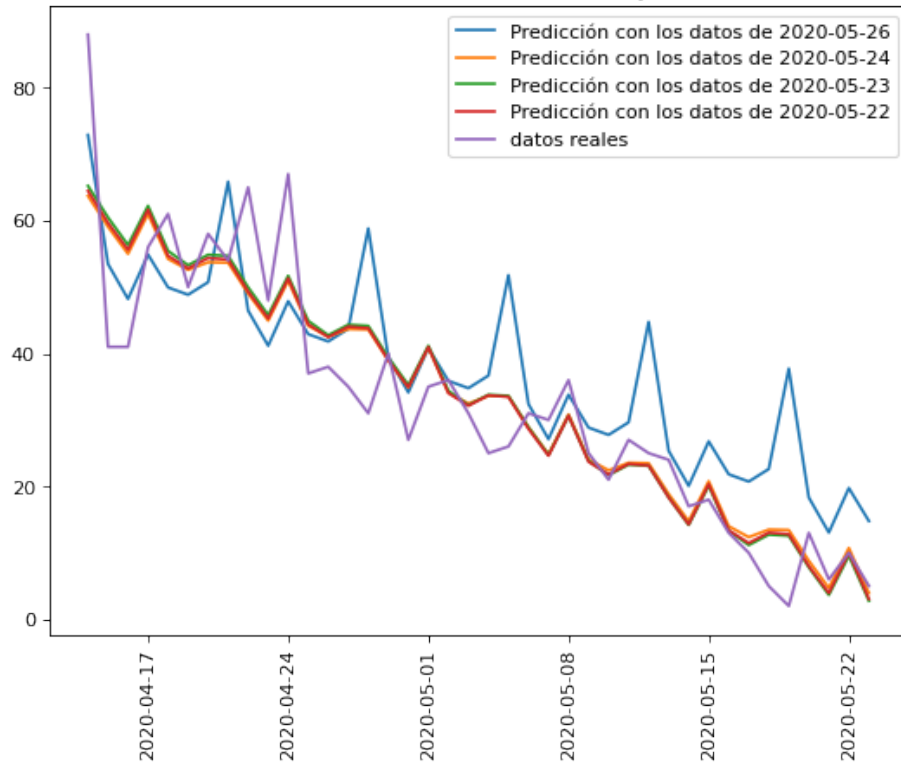

```
[32]:  dimension = 'Hospitalizados'
       COMUNIDAD_A_CONSIDERAR = 'Madrid'
       link="Prediccion_Hospitalizados_Madrid"

       prediccion = Get_Prediction_Nacion( df = Loading_data.
        ↪Get_Comunidad(COMUNIDAD_A_CONSIDERAR),
                                           dimension = dimension ,
                                           link = link,
                                           location  = COMUNIDAD_A_CONSIDERAR )
```

INFO:fbprophet:Disabling yearly seasonality. Run prophet with
yearly_seasonality=True to override this.
INFO:fbprophet:Disabling daily seasonality. Run prophet with
daily_seasonality=True to override this.

<IPython.core.display.HTML object>

<IPython.core.display.HTML object>

Prediccion total para Hospitalizados : 4458071.113367334

Predicción de Hospitalizados, en Madrid
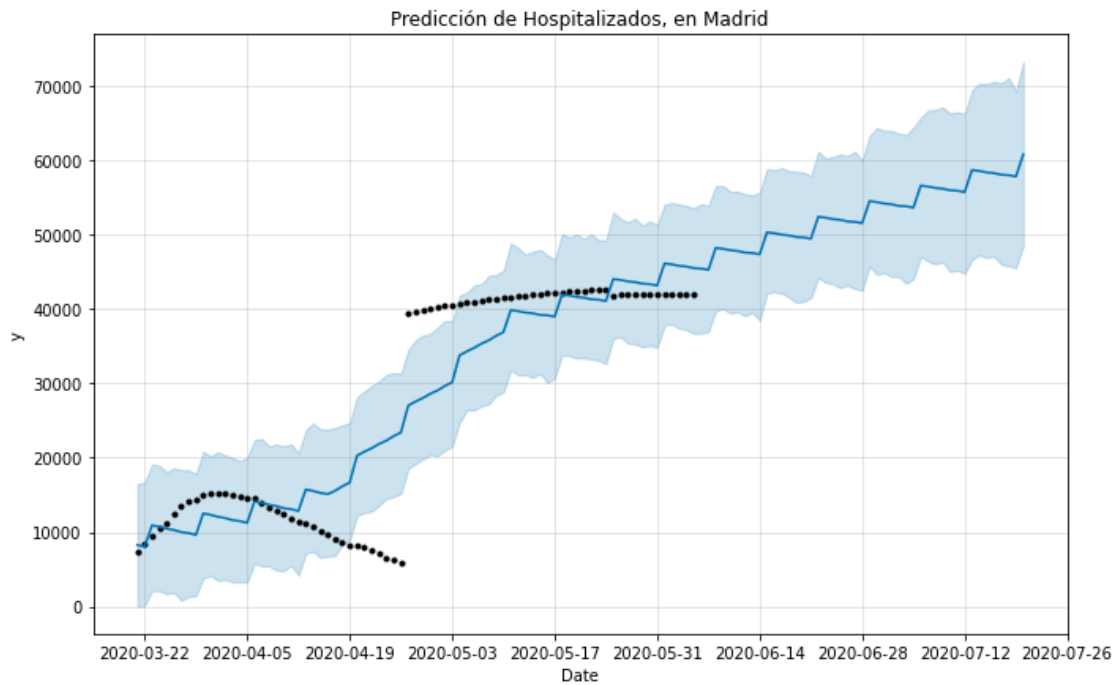
```
[33]: dimension = 'Proporcion Curados hoy absoluto / Casos hoy absoluto'
      report_single_location_single_dimension('Madrid',dimension)
```

<IPython.core.display.HTML object>

<IPython.core.display.HTML object>

Proporcion Curados hoy absoluto / Casos hoy absoluto in Madrid

Gráfico de Proporcion Curados hoy absoluto / Casos hoy absoluto, en Madrid
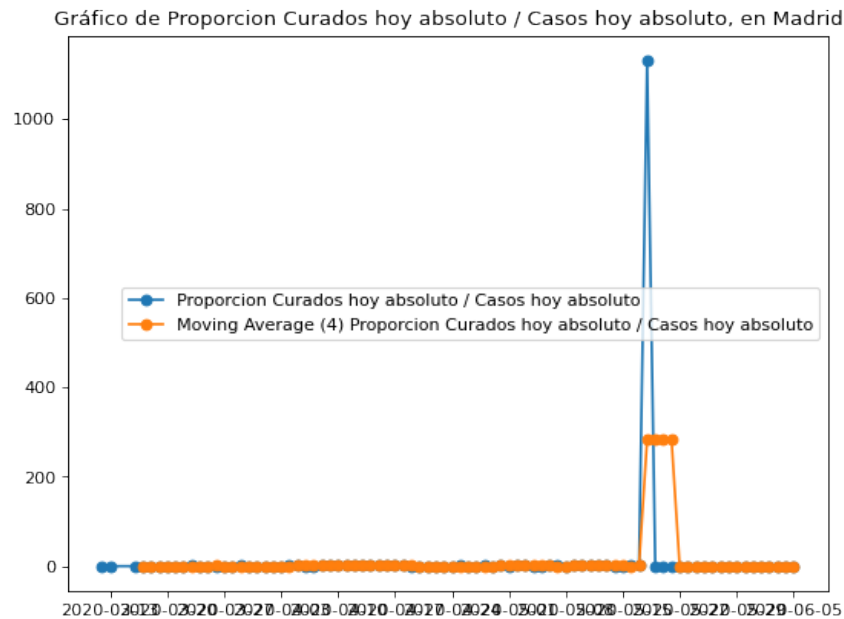
2 ¿ Son reales estas cifras ?

2.0.1 Actualizacion: Con los datos de mortalidad del insituto Carlos III, estas cifras se han quedado pequeñas. Ver notebook "Momo" para mas detalles.

Según reportaje de el mundo :https://www.elmundo.es/madrid/2020/04/07/5e8c427d21efa0b1668b45d6.html

Entre los días 15 y 31 de marzo fallecieron en Madrid capital, "por todas las causas", aunque la mayoría por coronavirus, 5.950 personas, cuando en 2019, en el mismo lapso, murieron 1.100 personas

```python
[34]:  from datetime import datetime
       import warnings
       warnings.filterwarnings('ignore')

       COMUNIDAD_A_CONSIDERAR = 'Madrid'
       comunidad = Loading_data.Get_Comunidad(COMUNIDAD_A_CONSIDERAR)

       Insertar_Enlace("Reales")

       comunidad.head(24).tail(15)['Fallecidos hoy absoluto'].sum()
       comunidad['Fecha'] = comunidad.index

       date1 = datetime.strptime('2020-03-15', '%Y-%m-%d')
       date2 = datetime.strptime('2020-04-01', '%Y-%m-%d')
```

```python
madrid_muertos_segun_sanidad = comunidad.loc[(comunidad['Fecha']>date1) &␣
 ↪(comunidad['Fecha']<date2)]['Fallecidos hoy absoluto'].sum()

display(HTML ("Madrid muertos segun, <b>sanidad</b>, segunda quincena de Marzo:␣
 ↪ <b>" + str(madrid_muertos_segun_sanidad)+"</b>"))

## 

madrid_muertos_segun_interior = 5950 - 1100


display(HTML ("Madrid muertos segun, <b>interior</b>, mismo intervalo: <b>" +␣
 ↪str(madrid_muertos_segun_interior)+"</b>"))


porcentaje_error = (madrid_muertos_segun_interior -␣
 ↪madrid_muertos_segun_sanidad) / madrid_muertos_segun_sanidad


display(HTML ("La diferencia porcentual entre los muertos de sanidad e interior␣
 ↪es de  <b>" + str(porcentaje_error) + "</b>") )

prediccion_muertos = comunidad['Fallecidos hoy absoluto'].sum()*␣
 ↪(1+porcentaje_error)



display(HTML ("El numero de <b>fallecidos en Madrid</b>, hasta ahora es de <b>"␣
 ↪+ str(comunidad['Fallecidos hoy absoluto'].sum()) +
         "</b>, pero con el incremento del <b>" + str(porcentaje_error) +
         "</b> ,la cifra real sería de : <b>" + str(  int(prediccion_muertos))␣
 ↪+ "</b> muertos"
                                        ) )
Dimension = 'Fallecidos hoy absoluto'
df = Get_Dimension_CCAA(Dimension)

df['Total Fallecidos'] = df.sum(axis=1)

total_muertos_españa = int(df['Total Fallecidos'].sum())
prediccion_muertos_españa = total_muertos_españa* (1+porcentaje_error)

display(HTML ("El numero de <b>fallecidos en España</b>, hasta ahora es de <b>"␣
 ↪+ str(total_muertos_españa) +
         "</b>, pero con el incremento del <b>" + str(porcentaje_error) +
         "</b> ,la cifra real sería de : <b>" + str( ␣
 ↪int(prediccion_muertos_españa)) + "</b> muertos"
```

```
                                     ))
```

<IPython.core.display.HTML object>

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```
[35]: from datetime import datetime

      COMUNIDAD_A_CONSIDERAR = 'Madrid'
      #comunidad = Loading_data.Get_Comunidad(COMUNIDAD_A_CONSIDERAR)


      comunidad.head(24).tail(15)['Fallecidos hoy absoluto'].sum()
      comunidad['Fecha'] = comunidad.index

      date1 = datetime.strptime('2020-03-15', '%Y-%m-%d')
      date2 = datetime.strptime('2020-04-01', '%Y-%m-%d')

      comunidad.loc[(comunidad['Fecha']>date1) &␣
       ↪(comunidad['Fecha']<date2)]['Fallecidos hoy absoluto'].sum()
```

[35]: 3522

```
[36]: y = [comunidad['Fallecidos hoy absoluto'].sum(),total_muertos_españa]
      z = [comunidad['Fallecidos hoy absoluto'].sum()* (1+porcentaje_error),␣
       ↪total_muertos_españa* (1+porcentaje_error)]

      X = np.arange(2)

      ax=plt.subplot(111)
      plt.bar(X+0, y,color = 'b', width = 0.25)
      plt.bar(X+0.25, z,color = 'r', width = 0.25)


      ax.set_title("Diferencia entre las cifras de muertos\n para Madrid y España\n␣
       ↪entre los ministerios de Sanidad e Interior")
```

[36]: Text(0.5, 1.0, 'Diferencia entre las cifras de muertos\n para Madrid y España\n entre los ministerios de Sanidad e Interior')

Diferencia entre las cifras de muertos
para Madrid y España
entre los ministerios de Sanidad e Interior