In [1]:
```
pip install pandas
```

```
Requirement already satisfied: pandas in c:\users\samil\anaconda3\lib\site-packages (2.0.3)
Requirement already satisfied: tzdata>=2022.1 in c:\users\samil\anaconda3\lib\site-packages (from pandas) (2023.3)
Requirement already satisfied: numpy>=1.20.3; python_version < "3.10" in c:\users\samil\anaconda3\lib\site-packages (from pandas) (1.24.4)
Requirement already satisfied: python-dateutil>=2.8.2 in c:\users\samil\anaconda3\lib\site-packages (from pandas) (2.8.2)
Requirement already satisfied: pytz>=2020.1 in c:\users\samil\anaconda3\lib\site-packages (from pandas) (2020.1)
Requirement already satisfied: six>=1.5 in c:\users\samil\anaconda3\lib\site-packages (from python-dateutil>=2.8.2->pandas) (1.15.0)
Note: you may need to restart the kernel to use updated packages.
```

In [2]:
```
pip install plotly
```

```
Requirement already satisfied: plotly in c:\users\samil\anaconda3\lib\site-packages (5.18.0)Note: you may need to restart the kernel to use updated packages.
Requirement already satisfied: tenacity>=6.2.0 in c:\users\samil\anaconda3\lib\site-packages (from plotly) (8.2.3)
Requirement already satisfied: packaging in c:\users\samil\anaconda3\lib\site-packages (from plotly) (20.4)
Requirement already satisfied: six in c:\users\samil\anaconda3\lib\site-packages (from packaging->plotly) (1.15.0)
Requirement already satisfied: pyparsing>=2.0.2 in c:\users\samil\anaconda3\lib\site-packages (from packaging->plotly) (2.4.7)
```

In [3]:
```
pip install matplotlib
```

```
Requirement already satisfied: matplotlib in c:\users\samil\anaconda3\lib\site-packages (3.7.4)Note: you may need to restart the kernel to use updated packages.

Requirement already satisfied: importlib-resources>=3.2.0; python_version < "3.10" in c:\users\samil\anaconda3\lib\site-packages (from matplotlib) (6.1.1)
Requirement already satisfied: python-dateutil>=2.7 in c:\users\samil\anaconda3\lib\site-packages (from matplotlib) (2.8.2)
Requirement already satisfied: contourpy>=1.0.1 in c:\users\samil\anaconda3\lib\site-packages (from matplotlib) (1.1.1)
Requirement already satisfied: fonttools>=4.22.0 in c:\users\samil\anaconda3\lib\site-packages (from matplotlib) (4.47.2)
Requirement already satisfied: pillow>=6.2.0 in c:\users\samil\anaconda3\lib\site-packages (from matplotlib) (7.2.0)
Requirement already satisfied: pyparsing>=2.3.1 in c:\users\samil\anaconda3\lib\site-packages (from matplotlib) (2.4.7)
Requirement already satisfied: cycler>=0.10 in c:\users\samil\anaconda3\lib\site-packages (from matplotlib) (0.10.0)
Requirement already satisfied: packaging>=20.0 in c:\users\samil\anaconda3\lib\site-packages (from matplotlib) (20.4)
Requirement already satisfied: kiwisolver>=1.0.1 in c:\users\samil\anaconda3\lib\site-packages (from matplotlib) (1.2.0)
Requirement already satisfied: numpy<2,>=1.20 in c:\users\samil\anaconda3\lib\site-packages (from matplotlib) (1.24.4)
Requirement already satisfied: zipp>=3.1.0; python_version < "3.10" in c:\users\samil\anaconda3\lib\site-packages (from importlib-resources>=3.2.0; python_version < "3.10"->matplotl
ib) (3.1.0)
Requirement already satisfied: six>=1.5 in c:\users\samil\anaconda3\lib\site-packages (from python-dateutil>=2.7->matplotlib) (1.15.0)
```

In [4]:
```
import matplotlib.pyplot as plt
from mpl_toolkits.mplot3d import Axes3D
from matplotlib.animation import FuncAnimation
import pandas as pd
import numpy as np
import matplotlib.pyplot as plt
```

```
C:\Users\Samil\anaconda3\lib\site-packages\pandas\core\computation\expressions.py:20: UserWarning: Pandas requires version '2.7.3' or newer of 'numexpr' (version '2.7.1' currently i
nstalled).
  from pandas.core.computation.check import NUMEXPR_INSTALLED
```

In [18]:
```
raw_dataset=pd.read_csv("Doublet_EAF_35.csv",sep=",")
```

In [19]:
```
 Doublet_EAF_35= raw_dataset.copy()
Doublet_EAF_35.head()
```

Out[19]:

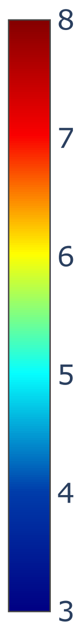
	Date	Longitude	Latitude	Depth	Magnitude
0	08/01/2024 13:19:12	38.7525	38.2842	8.97	4.4
1	07/01/2024 15:58:00	37.2725	38.3222	6.99	3.9
2	06/01/2024 12:10:09	38.5897	38.1694	8.76	4.0
3	05/01/2024 14:03:03	37.4519	38.3753	6.99	3.6
4	30/12/2023 13:26:24	39.0192	38.4564	9.36	4.2

In [20]:
```
Doublet_EAF_35.shape
```

Out[20]:
```
(1821, 5)
```

In [27]:
```
x = Doublet_EAF_35.iloc[:,1].values
y = Doublet_EAF_35.iloc[:,2].values
z = Doublet_EAF_35.iloc[:,3].values
colors = Doublet_EAF_35.iloc[:,4].values
sizes = Doublet_EAF_35.iloc[:,4].values*25
```

In [28]:
```
import plotly.graph_objects as go

# Obtain high-resolution world map data online
fig = go.Figure(go.Choroplethmapbox(
    geojson="https://raw.githubusercontent.com/johan/world.geo.json/master/countries.geo.json",
    locations=["USA", "CAN", "MEX", "RUS", "CHN"],  # Example country codes (USA, Canada, Mexico, Russia, China)
    z=[1, 1, 1, 1, 1],  # Values to be assigned to countries (all set to 1)
    colorscale='Jet',  # Color scale name (Viridis, YlGnBu, Jet, etc.)
    zmin=3,
    zmax=8,
    marker_opacity=0.9,  # Opacity of country borders
    marker_line_width=1,  # Thickness of country borders
))

# Create sample earthquake data
earthquake_data = {
    'Longitude': x,
    'Latitude': y,
    'Magnitude': colors,
}

# Add earthquake data with Scatter plot
fig.add_trace(go.Scattermapbox(
    lat=earthquake_data['Latitude'],
    lon=earthquake_data['Longitude'],
    mode='markers',
    marker=dict(
        size=earthquake_data['Magnitude'] * 2,  # Set point sizes based on Magnitude value
        color=earthquake_data['Magnitude'],  # Set color scale based on Magnitude value
        colorscale='Jet',  # Color scale name (Viridis, YlGnBu, Jet, etc.)
    ),
))

# Specify map layout and style
fig.update_layout(
    mapbox_style="open-street-map",  # Set map style (for other styles: "open-street-map", "stamen-terrain", etc.)
    mapbox_zoom=6,  # Set map zoom level
    mapbox_center={"lat": 37.000, "lon": 37.0000},  # Set map center (center of the USA)
)

# Increase resolution and font size
fig.update_layout(
    width=700,  # Set width to increase resolution
    height=630,  # Set height to increase resolution
    font=dict(
        size=20  # Set font size for English comments
    )
)

# Display the plot
fig.show()
```



In [29]:
```
x = Doublet_EAF_35.iloc[:,1].values
y = Doublet_EAF_35.iloc[:,2].values
z = Doublet_EAF_35.iloc[:,3].values
colors = Doublet_EAF_35.iloc[:,4].values
sizes = Doublet_EAF_35.iloc[:,4].values*15
```

In [30]:
```
import numpy as np
import matplotlib.pyplot as plt
from mpl_toolkits.mplot3d import Axes3D
import ipywidgets as widgets
from ipywidgets import interactive
from IPython.display import display



# İnteraktif işlev

def plot_3d_scatter(elev, azim, zoom, theta):
    fig = plt.figure(figsize=(12, 10))
    ax = fig.add_subplot(111, projection='3d')

    ax.scatter(x, y, z, c=colors, s=sizes, cmap='jet')
    cbar = plt.colorbar(ax.scatter(x, y, z, c=colors, s=sizes, cmap='jet'))
    cbar.set_label('Magnitude')

    ax.view_init(elev=elev, azim=azim)
    ax.set_xlabel('Longitude')
    ax.set_ylabel('Latitude')
    ax.set_zlabel('Depth_km')
    ax.dist = zoom  # Zoom ayarı
    ax.azim = theta  # Maus ile çevirme

    font=dict(
        size=30  # Set font size for English comments
    )
    plt.show()

# İnteraktif widget'ı oluşturma
elev_slider = widgets.IntSlider(min=0, max=180, value=30, description='Elevation:')
azim_slider = widgets.IntSlider(min=0, max=360, value=30, description='Azimuth:')
zoom_slider = widgets.FloatSlider(min=1, max=10, value=5, description='Zoom:')
theta_slider = widgets.IntSlider(min=0, max=360, value=30, description='Theta:')
interactive_plot = interactive(plot_3d_scatter, elev=elev_slider, azim=azim_slider, zoom=zoom_slider, theta=theta_slider)

# Widget'ı görüntüleme
display(interactive_plot)
```

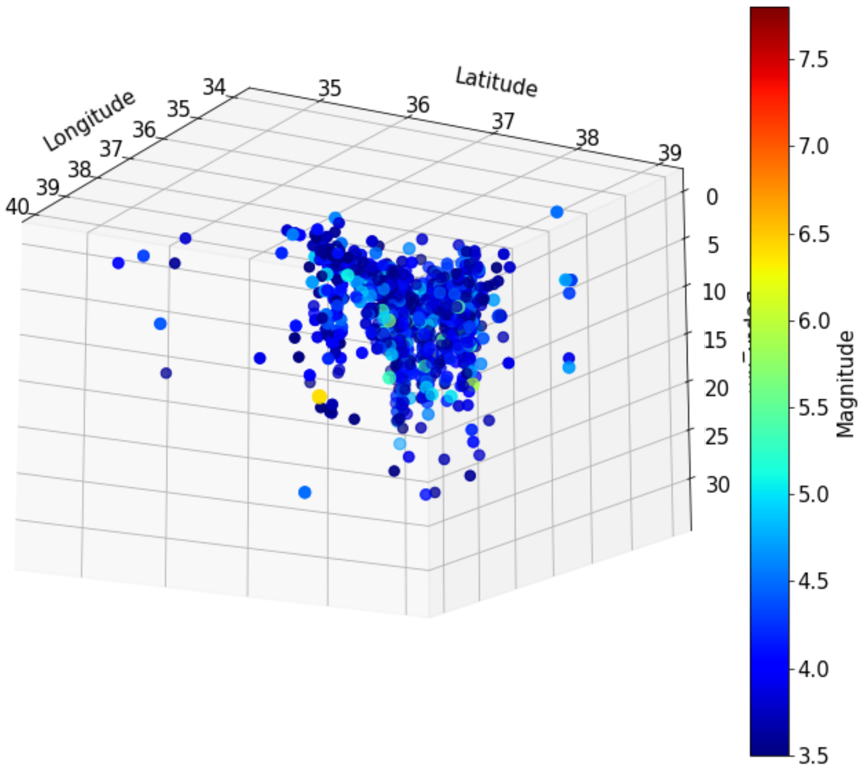
Elevation: 165

Azimuth: 30

Zoom: 9.70

Theta: 30

```
<ipython-input-30-8b920c56285e>:24: MatplotlibDeprecationWarning:

The dist attribute was deprecated in Matplotlib 3.6 and will be removed two minor releases later.
```



In [25]:
```
x = Doublet_EAF_35.iloc[:,1].values
y = Doublet_EAF_35.iloc[:,2].values
z = Doublet_EAF_35.iloc[:,0].values
colors = Doublet_EAF_35.iloc[:,4].values
sizes = Doublet_EAF_35.iloc[:,4].values*7
```

In [26]:
```
z
```

Out[26]:
```
array(['08/01/2024 13:19:12', '07/01/2024 15:58:00',
       '06/01/2024 12:10:09', ..., '06/02/2023 01:26:49',
       '06/02/2023 01:23:16', '06/02/2023 01:17:32'], dtype=object)
```

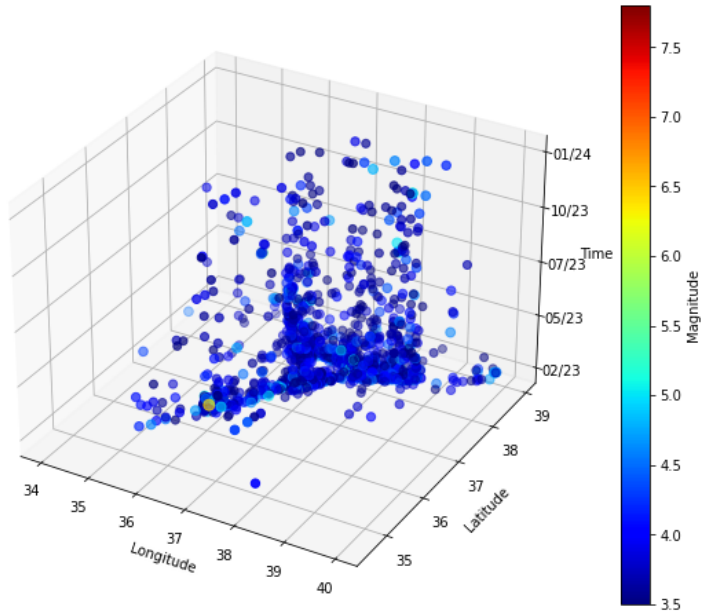
In [14]:
```
from datetime import datetime

# Zaman damgalarını içeren bir liste oluştur
timestamps = z

# Zaman damgalarını saniyeye dönüştür
seconds = [datetime.timestamp(datetime.strptime(timestamp, '%d/%m/%Y %H:%M:%S')) for timestamp in timestamps]

print(seconds) # Saniye cinsinden zaman damgalarını görüntüle
```

```
[1704709152.0, 1704632280.0, 1704532209.0, 1704452583.0, 1703931984.0, 1703891113.0, 1703745245.0, 1703652912.0, 1703544181.0, 1703500670.0, 1703386343.0, 1703172273.0, 17030065
72.0, 1702868845.0, 1702582378.0, 1702416969.0, 1701678003.0, 1701379129.0, 1701124355.0, 1700993608.0, 1700744098.0, 1700740197.0, 1700739968.0, 1700454964.0, 1700430904.0, 170
0315757.0, 1700078325.0, 1700076730.0, 1700049365.0, 1700003667.0, 1699486334.0, 1698672347.0, 1698595709.0, 1698298332.0, 1698097173.0, 1697924927.0, 1697785222.0, 1697783010.
0, 1697779810.0, 1697570056.0, 1697540393.0, 1697473858.0, 1697446261.0, 1697355251.0, 1697311914.0, 1697274130.0, 1697256274.0, 1697251735.0, 1696822133.0, 1696724678.0, 169670
5306.0, 1696661816.0, 1696508598.0, 1696395494.0, 1696312368.0, 1696307118.0, 1696236533.0, 1696196633.0, 1695946458.0, 1695946333.0, 1695871104.0, 1695866493.0, 1695701680.0, 1
695695575.0, 1695636299.0, 1695446541.0, 1695305870.0, 1694786091.0, 1694208004.0, 1694019701.0, 1693820561.0, 1693791013.0, 1693731362.0, 1693585831.0, 1693479994.0, 169327818
4.0, 1693029523.0, 1693024478.0, 1692926556.0, 1692892392.0, 1692844523.0, 1692765627.0, 1692752555.0, 1692699689.0, 1692688652.0, 1692615272.0, 1692504353.0, 1692473214.0, 1692
275106.0, 1692243949.0, 1692185818.0, 1691842699.0, 1691836801.0, 1691836756.0, 1691822569.0, 1691743371.0, 1691678880.0, 1691646494.0, 1691589706.0, 1691557506.0, 1691547023.0,
1691491622.0, 1691384961.0, 1691336938.0, 1691152574.0, 1691027775.0, 1691025345.0, 1690829617.0, 1690806196.0, 1690719197.0, 1690377915.0, 1690368250.0, 1690358117.0, 169032301
1.0, 1690261074.0, 1690260513.0, 1690259598.0, 1690253089.0, 1690227572.0, 1690136531.0, 1690098517.0, 1690026189.0, 1690011431.0, 1689983013.0, 1689969798.0, 1689927804.0, 1689
725147.0, 1689550795.0, 1689431568.0, 1689240741.0, 1688858855.0, 1688744323.0, 1688525712.0, 1688355110.0, 1688282159.0, 1688202252.0, 1688162406.0, 1688087575.0, 1688034882.0,
1688005687.0, 1687950889.0, 1687881725.0, 1687858806.0, 1687820923.0, 1687611819.0, 1687608393.0, 1687594809.0, 1687529686.0, 1687529124.0, 1687433264.0, 1687400462.0, 168738550
5.0, 1687277671.0, 1687274567.0, 1687209270.0, 1687188690.0, 1687126895.0, 1687123818.0, 1687111161.0, 1687091788.0, 1687058523.0, 1687053377.0, 1687028575.0, 1686947374.0, 1686
844831.0, 1686833917.0, 1686818380.0, 1686797257.0, 1686795263.0, 1686793042.0, 1686682912.0, 1686556864.0, 1686484622.0, 1686465656.0, 1686448033.0, 1686270167.0, 1686184721.0,
1686151388.0, 1686103624.0, 1686011489.0, 1685972447.0, 1685957962.0, 1685831495.0, 1685820320.0, 1685777661.0, 1685736440.0, 1685680480.0, 1685587333.0, 1685551600.0, 168546657
1.0, 1685437533.0, 1685434832.0, 1685426715.0, 1685332022.0, 1685317919.0, 1685242279.0, 1685212565.0, 1685148322.0, 1685117110.0, 1685093550.0, 1685046939.0, 1685034996.0, 1685
033946.0, 1685016125.0, 1685000821.0, 1684988493.0, 1684951909.0, 1684859412.0, 1684793566.0, 1684789064.0, 1684781269.0, 1684780371.0, 1684762978.0, 1684760818.0, 1684728802.0,
1684689382.0, 1684684576.0, 1684677447.0, 1684673471.0, 1684665702.0, 1684662373.0, 1684622402.0, 1684563361.0, 1684541010.0, 1684533324.0, 1684473816.0, 1684455281.0, 168413749
2.0, 1684071033.0, 1684055169.0, 1683996885.0, 1683990179.0, 1683975195.0, 1683918767.0, 1683917884.0, 1683916991.0, 1683869784.0, 1683869601.0, 1683806224.0, 1683733176.0, 1683
```

In [15]:
```
seconds
```

Out[15]:
```
[1704709152.0,
 1704632280.0,
 1704532209.0,
 1704452583.0,
 1703931984.0,
 1703891113.0,
 1703745245.0,
 1703652912.0,
 1703544181.0,
 1703500670.0,
 1703386343.0,
 1703172273.0,
 1703006572.0,
 1702868845.0,
 1702582378.0,
 1702416969.0,
 1701678003.0,
 1701379129.0,
 1701124355.0,
```

In [16]:
```
import matplotlib.pyplot as plt
from mpl_toolkits.mplot3d import Axes3D
import numpy as np
from datetime import datetime

# Assuming Doublet_EAF_35F3 is a DataFrame with appropriate columns
x = Doublet_EAF_35.iloc[:, 1].values
y = Doublet_EAF_35.iloc[:, 2].values
z = seconds
colors = Doublet_EAF_35.iloc[:, 4].values
sizes = Doublet_EAF_35.iloc[:, 4].values * 10

fig = plt.figure(figsize=(12, 8))
ax = fig.add_subplot(111, projection='3d')

# Scatter plot
scatter = ax.scatter(x, y, z, c=colors, s=sizes, cmap='jet')

# Colorbar
cbar = plt.colorbar(scatter)
cbar.set_label('Magnitude')

# Labeling axes
ax.set_xlabel('Longitude')
ax.set_ylabel('Latitude')
ax.set_zlabel('Time')

# Formatting time ticks
# Assuming seconds is a list or array of time values
# Adjust the ticks and labels according to your data
time_ticks = np.linspace(min(seconds), max(seconds), 5)
time_labels = [datetime.fromtimestamp(t).strftime('%m/%y') for t in time_ticks]  # Format güncellendi
ax.set_zticks(time_ticks)
ax.set_zticklabels(time_labels)

# Adjust font size
plt.rc('font', size=15)

plt.show()
```


01/24
10/23
07/23
05/23
02/23
Time
34
35
36
37
38
39
40
Longitude
35
36
37
38
39
Latitude
7.5
7.0
6.5
6.0
5.5
5.0
4.5
4.0
3.5
Magnitude

```
In [ ]:
```