Marmara Fayı – Deprem Etkileşimleri (2000–2025) Veri Analizi

Bu çalışma, Python ile Veri Analizi ödevi kapsamında hazırlanmıştır.

In [3]:
```
import pandas as pd
```

1-) Veri setini pandas dataFrame ile okuyunuz.

In [7]:
```
df = pd.read_csv(r'C:\Users\USER\Desktop\Son Yarıyıl\Python ile Veri Analizi\marmara_faults_earthquakes_2000_2025.csv')
```

In [9]:
```
kabaoglu_DF = df.copy()
```

2-)DataFrame verileri ile ilgili özet bilgileri ekranda gösteriniz.

In [11]:
```
kabaoglu_DF.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 21605 entries, 0 to 21604
Data columns (total 23 columns):
 #   Column                    Non-Null Count  Dtype  
---  ------                    --------------  -----  
 0   Date                      21605 non-null  object 
 1   Latitude                  21605 non-null  float64
 2   Longitude                 21605 non-null  float64
 3   Depth_km                  21605 non-null  float64
 4   Magnitude_ML              21605 non-null  float64
 5   Location                  21605 non-null  object 
 6   Nearest_Fault             21605 non-null  object 
 7   Fault_Length_km           21605 non-null  float64
 8   Fault_Width_m             21605 non-null  float64
 9   Fault_Depth_m             21605 non-null  float64
 10  Fault_Type                21605 non-null  object 
 11  Length_km                 21605 non-null  float64
 12  Seismogenic_Depth_km      21605 non-null  float64
 13  Slip_Rate_mm_per_yr       21605 non-null  float64
 14  Max_Surface_Slip_m        21605 non-null  float64
 15  Recurrence_Interval_yr    21605 non-null  float64
 16  Last_Event_Year           21605 non-null  float64
 17  Last_Event_Mw             21605 non-null  float64
 18  Elapsed_Time_yr           21605 non-null  float64
 19  Slip_Deficit_m            21605 non-null  float64
 20  Normalized_Slip_m_per_km  21605 non-null  float64
 21  Moment_Potential_Nm       21605 non-null  float64
 22  Mw_Potential              21605 non-null  float64
dtypes: float64(19), object(4)
memory usage: 3.8+ MB
```

3-) pandas kütüphanesi versiyonu bulunuz.

In [13]:
```
pd.__version__
```

Out[13]:
```
'2.2.2'
```

4-) Install edilen kütüphaneleri listeleyiniz.

In [15]:
```
!pip list
```

```
Package                           Version
--------------------------------- ------------------
absl-py                           2.1.0
aext-assistant                    4.1.0
aext-assistant-server             4.1.0
aext-core                         4.1.0
aext-core-server                  4.1.0
aext-panels                       4.1.0
aext-panels-server                4.1.0
aext-project-filebrowser-server   4.1.0
aext-share-notebook               4.1.0
aext-share-notebook-server        4.1.0
aext-shared                       4.1.0
aext-toolbox                      4.1.0
aiobotocore                       2.12.3
aiohappyeyeballs                  2.4.0
aiohttp                           3.10.5
aioitertools                      0.7.1
aiosignal                         1.2.0
alabaster                         0.7.16
alembic                           1.13.3
altair                            5.0.1
anaconda-anon-usage               0.4.4
anaconda-catalogs                 0.2.0
anaconda-cli-base                 0.4.2
anaconda-client                   1.13.0
anaconda-cloud-auth               0.7.2
anaconda-navigator                2.6.3
anaconda-project                  0.11.1
annotated-types                   0.6.0
anyio                             4.2.0
appdirs                           1.4.4
archspec                          0.2.3
argon2-cffi                       21.3.0
argon2-cffi-bindings              21.2.0
arrow                             1.2.3
astroid                           2.14.2
astropy                           6.1.3
astropy-iers-data                 0.2024.9.2.0.33.23
asttokens                         2.0.5
astunparse                        1.6.3
```

```
async-lru                     2.0.4
atomicwrites                  1.4.0
attrs                         23.1.0
Automat                       20.2.0
autopep8                      2.0.4
Babel                         2.11.0
bcrypt                        3.2.0
beautifulsoup4                4.12.3
binaryornot                   0.4.4
black                         24.8.0
bleach                        4.1.0
blinker                       1.6.2
bokeh                         3.6.0
boltons                       23.0.0
botocore                      1.34.69
Bottleneck                    1.3.7
Brotli                        1.0.9
cachetools                    5.3.3
certifi                       2025.1.31
cffi                          1.17.1
chardet                       4.0.0
charset-normalizer            3.3.2
click                         8.1.7
cloudpickle                   3.0.0
colorama                      0.4.6
colorcet                      3.1.0
comm                          0.2.1
conda                         24.11.3
conda-build                   24.9.0
conda-content-trust           0.2.0
conda_index                   0.5.0
conda-libmamba-solver         24.9.0
conda-pack                    0.7.1
conda-package-handling        2.3.0
conda_package_streaming       0.10.0
conda-repo-cli                1.0.114
conda-token                   0.5.0+1.g2209e04
constantly                    23.10.4
contourpy                     1.2.0
cookiecutter                  2.6.0
cryptography                  43.0.0
```

cssselect	1.2.0
cycler	0.11.0
cytoolz	0.12.2
dask	2024.8.2
dask-expr	1.1.13
datashader	0.16.3
debugpy	1.6.7
decorator	5.1.1
defusedxml	0.7.1
diff-match-patch	20200713
dill	0.3.8
distributed	2024.8.2
distro	1.9.0
docstring-to-markdown	0.11
docutils	0.18.1
et-xmlfile	1.1.0
executing	0.8.3
fastjsonschema	2.16.2
filelock	3.13.1
flake8	7.0.0
Flask	3.0.3
flatbuffers	25.2.10
fonttools	4.51.0
frozendict	2.4.2
frozenlist	1.4.0
fsspec	2024.6.1
gast	0.6.0
gensim	4.3.3
gitdb	4.0.7
GitPython	3.1.43
google-pasta	0.2.0
greenlet	3.0.1
grpcio	1.70.0
h11	0.14.0
h5py	3.11.0
HeapDict	1.0.1
holoviews	1.19.1
httpcore	1.0.2
httpx	0.27.0
hvplot	0.11.0
hyperlink	21.0.0

```
idna                            3.7
imagecodecs                     2023.1.23
imageio                         2.33.1
imagesize                       1.4.1
imbalanced-learn                0.12.3
importlib-metadata              7.0.1
incremental                     22.10.0
inflection                      0.5.1
iniconfig                       1.1.1
intake                          2.0.7
intervaltree                    3.1.0
ipykernel                       6.28.0
ipython                         8.27.0
ipython-genutils                0.2.0
ipywidgets                      7.8.1
isort                           5.13.2
itemadapter                     0.3.0
itemloaders                     1.1.0
itsdangerous                    2.2.0
jaraco.classes                  3.2.1
jedi                            0.19.1
jellyfish                       1.0.1
Jinja2                          3.1.4
jmespath                        1.0.1
joblib                          1.4.2
json5                           0.9.6
jsonpatch                       1.33
jsonpointer                     2.1
jsonschema                      4.23.0
jsonschema-specifications       2023.7.1
jupyter                         1.1.1
jupyter_client                  8.6.0
jupyter-console                 6.6.3
jupyter_core                    5.7.2
jupyter-events                  0.10.0
jupyter-lsp                     2.2.0
jupyter_server                  2.14.1
jupyter_server_terminals        0.4.4
jupyterlab                      4.2.5
jupyterlab-pygments             0.1.2
jupyterlab_server               2.27.3
```

```
jupyterlab-widgets                1.0.0
keras                             3.8.0
keyring                           24.3.1
kiwisolver                        1.4.4
lazy_loader                       0.4
lazy-object-proxy                 1.10.0
lckr_jupyterlab_variableinspector 3.1.0
libarchive-c                      5.1
libclang                          18.1.1
libmambapy                        1.5.8
linkify-it-py                     2.0.0
llvmlite                          0.43.0
lmdb                              1.4.1
locket                            1.0.0
lxml                              5.2.1
lz4                               4.3.2
Mako                              1.2.3
Markdown                          3.4.1
markdown-it-py                    2.2.0
MarkupSafe                        2.1.3
matplotlib                        3.9.2
matplotlib-inline                 0.1.6
mccabe                            0.7.0
mdit-py-plugins                   0.3.0
mdurl                             0.1.0
menuinst                          2.1.2
mistune                           2.0.4
mkl_fft                           1.3.10
mkl_random                        1.2.7
mkl-service                       2.4.0
ml-dtypes                         0.4.1
more-itertools                    10.3.0
mpmath                            1.3.0
msgpack                           1.0.3
multidict                         6.0.4
multipledispatch                  0.6.0
mypy                              1.11.2
mypy-extensions                   1.0.0
namex                             0.0.8
navigator-updater                 0.5.1
nb_conda_kernels                  2.5.2
```

nbclient	0.8.0
nbconvert	7.16.4
nbformat	5.10.4
nest-asyncio	1.6.0
networkx	3.3
nltk	3.9.1
notebook	7.2.2
notebook_shim	0.2.3
numba	0.60.0
numexpr	2.8.7
numpy	1.26.4
numpydoc	1.7.0
opencv-python	4.11.0.86
openpyxl	3.1.5
opt_einsum	3.4.0
optree	0.14.0
overrides	7.4.0
packaging	24.1
pandas	2.2.2
pandocfilters	1.5.0
panel	1.5.2
param	2.1.1
paramiko	2.8.1
parsel	1.8.1
parso	0.8.3
partd	1.4.1
pathspec	0.10.3
patsy	0.5.6
pexpect	4.8.0
pickleshare	0.7.5
pillow	10.4.0
pip	24.2
pkce	1.0.3
pkginfo	1.10.0
platformdirs	3.10.0
plotly	5.24.1
pluggy	1.0.0
ply	3.11
prometheus-client	0.14.1
prompt-toolkit	3.0.43
Protego	0.1.16

protobuf	4.25.3
psutil	5.9.0
ptyprocess	0.7.0
pure-eval	0.2.2
py-cpuinfo	9.0.0
pyarrow	16.1.0
pyasn1	0.4.8
pyasn1-modules	0.2.8
pycodestyle	2.11.1
pycosat	0.6.6
pycparser	2.21
pyct	0.5.0
pycurl	7.45.3
pydantic	2.8.2
pydantic_core	2.20.1
pydantic-settings	2.6.1
pydeck	0.8.0
PyDispatcher	2.0.5
pydocstyle	6.3.0
pyerfa	2.0.1.4
pyflakes	3.2.0
Pygments	2.15.1
PyJWT	2.8.0
pylint	2.16.2
pylint-venv	3.0.3
pyls-spyder	0.4.0
PyNaCl	1.5.0
pyodbc	5.1.0
pyOpenSSL	24.2.1
pyparsing	3.1.2
PyQt5	5.15.10
PyQt5-sip	12.13.0
PyQtWebEngine	5.15.6
PySocks	1.7.1
pytest	7.4.4
python-dateutil	2.9.0.post0
python-dotenv	0.21.0
python-json-logger	2.0.7
python-lsp-black	2.0.0
python-lsp-jsonrpc	1.1.2
python-lsp-server	1.10.0

python-slugify	5.0.2
pytoolconfig	1.2.6
pytz	2024.1
pyviz_comms	3.0.2
PyWavelets	1.7.0
pywin32	305.1
pywin32-ctypes	0.2.2
pywinpty	2.0.10
PyYAML	6.0.1
pyzmq	25.1.2
QDarkStyle	3.2.3
qstylizer	0.2.2
QtAwesome	1.3.1
qtconsole	5.5.1
QtPy	2.4.1
queuelib	1.6.2
readchar	4.0.5
referencing	0.30.2
regex	2024.9.11
requests	2.32.3
requests-file	1.5.1
requests-toolbelt	1.0.0
rfc3339-validator	0.1.4
rfc3986-validator	0.1.1
rich	13.7.1
rope	1.12.0
rpds-py	0.10.6
Rtree	1.0.1
ruamel.yaml	0.18.6
ruamel.yaml.clib	0.2.8
ruamel-yaml-conda	0.17.21
s3fs	2024.6.1
scikit-image	0.24.0
scikit-learn	1.5.1
scipy	1.13.1
Scrapy	2.11.1
seaborn	0.13.2
semver	3.0.2
Send2Trash	1.8.2
sentry-sdk	2.18.0
service-identity	18.1.0

```
setuptools                      75.1.0
shellingham                     1.5.0
sip                             6.7.12
six                             1.16.0
smart-open                      5.2.1
smmap                           4.0.0
sniffio                         1.3.0
snowballstemmer                 2.2.0
sortedcontainers                2.4.0
soupsieve                       2.5
Sphinx                          7.3.7
sphinxcontrib-applehelp         1.0.2
sphinxcontrib-devhelp           1.0.2
sphinxcontrib-htmlhelp          2.0.0
sphinxcontrib-jsmath            1.0.1
sphinxcontrib-qthelp            1.0.3
sphinxcontrib-serializinghtml   1.1.10
spyder                          5.5.1
spyder-kernels                  2.5.0
SQLAlchemy                      2.0.34
stack-data                      0.2.0
statsmodels                     0.14.2
streamlit                       1.37.1
sympy                           1.13.2
tables                          3.10.1
tabulate                        0.9.0
tblib                           1.7.0
tenacity                        8.2.3
tensorboard                     2.18.0
tensorboard-data-server         0.7.2
tensorflow                      2.18.0
tensorflow_intel                2.18.0
termcolor                       2.5.0
terminado                       0.17.1
text-unidecode                  1.3
textdistance                    4.2.1
threadpoolctl                   3.5.0
three-merge                     0.1.1
tifffile                        2023.4.12
tinycss2                        1.2.1
tldextract                      5.1.2
```

```
toml                            0.10.2
tomli                           2.0.1
tomlkit                         0.11.1
toolz                           0.12.0
tornado                         6.4.1
tqdm                            4.66.5
traitlets                       5.14.3
truststore                      0.8.0
Twisted                         23.10.0
twisted-iocpsupport             1.0.2
typer                           0.9.0
typing_extensions               4.11.0
tzdata                          2023.3
uc-micro-py                     1.0.1
ujson                           5.10.0
unicodedata2                    15.1.0
Unidecode                       1.3.8
urllib3                         2.2.3
w3lib                           2.1.2
watchdog                        4.0.1
wcwidth                         0.2.5
webencodings                    0.5.1
websocket-client                1.8.0
Werkzeug                        3.0.3
whatthepatch                    1.0.2
wheel                           0.44.0
widgetsnbextension              3.6.6
win-inet-pton                   1.1.0
wrapt                           1.14.1
xarray                          2023.6.0
xlwings                         0.32.1
xyzservices                     2022.9.0
yapf                            0.40.2
yarl                            1.11.0
zict                            3.0.0
zipp                            3.17.0
zope.interface                  5.4.0
zstandard                       0.23.0
```

5-) Python Yazılımın Versiyonunu bulunuz.

In [17]:
```
import sys
print(sys.version)
```

```
3.12.7 | packaged by Anaconda, Inc. | (main, Oct  4 2024, 13:17:27) [MSC v.1929 64 bit (AMD64)]
```

6-) Veri setindeki ilk 5 veriyi listeleyiniz.

In [19]:
```
print(df.head())
```

```
         Date  Latitude  Longitude  Depth_km  Magnitude_ML  \
0  2025-04-23   40.8394    28.4000     15.05           2.5
1  2025-04-23   40.8442    28.3108      5.23           2.6
2  2025-04-23   40.8353    28.3511      6.97           2.0
3  2025-04-23   40.8567    28.3014     14.58           3.5
4  2025-04-23   40.8467    28.4094      8.33           2.8

                                        Location           Nearest_Fault  \
0  Marmara Denizi - [20.67 km] Büyükçekmece (İsta...  Kuzey Anadolu Fay Zonu
1  Marmara Denizi - [24.05 km] Büyükçekmece (İsta...  Kuzey Anadolu Fay Zonu
2  Marmara Denizi - [22.91 km] Büyükçekmece (İsta...  Kuzey Anadolu Fay Zonu
3     Marmara Denizi - [23.07 km] Silivri (İstanbul)  Kuzey Anadolu Fay Zonu
4  Marmara Denizi - [19.63 km] Büyükçekmece (İsta...  Kuzey Anadolu Fay Zonu

   Fault_Length_km  Fault_Width_m  Fault_Depth_m  ... Slip_Rate_mm_per_yr  \
0             10.0            2.0            3.0  ...                 7.5
1             10.0            2.0            3.0  ...                 7.5
2             10.0            2.0            3.0  ...                 7.5
3             10.0            2.0            3.0  ...                 7.5
4             10.0            2.0            3.0  ...                 7.5

   Max_Surface_Slip_m  Recurrence_Interval_yr  Last_Event_Year  Last_Event_Mw  \
0                 5.0                   550.0           1999.0            7.4
1                 5.0                   550.0           1999.0            7.4
2                 5.0                   550.0           1999.0            7.4
3                 5.0                   550.0           1999.0            7.4
4                 5.0                   550.0           1999.0            7.4

   Elapsed_Time_yr  Slip_Deficit_m  Normalized_Slip_m_per_km  \
0             26.0           0.195                  0.004167
1             26.0           0.195                  0.004167
2             26.0           0.195                  0.004167
3             26.0           0.195                  0.004167
4             26.0           0.195                  0.004167

   Moment_Potential_Nm  Mw_Potential
0         1.053000e+20      2.648286
1         1.053000e+20      2.648286
2         1.053000e+20      2.648286
3         1.053000e+20      2.648286
4         1.053000e+20      2.648286
```

```
[5 rows x 23 columns]
```

7-) Veri setindeki son 5 veriyi listeleyiniz.

In [21]:
```
print(df.tail())
```

```
            Date  Latitude  Longitude  Depth_km  Magnitude_ML  \
21600  2000-04-30     40.56      29.21       3.8           2.7
21601  2000-04-30     40.02      28.89       1.0           2.9
21602  2000-04-29     40.90      30.49       5.7           2.6
21603  2000-04-28     40.37      29.14      10.4           3.2
21604  2000-04-23     39.56      26.11      13.8           3.2

                Location           Nearest_Fault  Fault_Length_km  \
21600     Merkez (Yalova)  Kuzey Anadolu Fay Zonu             25.0
21601    Orhaneli (Bursa)           Orhaneli Fayı             15.0
21602   Söğütlü (Sakarya)  Kuzey Anadolu Fay Zonu             19.0
21603      Gemlik (Bursa)  Kuzey Anadolu Fay Zonu             10.0
21604  Ayvacık (Çanakkale)              Troya Fayı              6.0

       Fault_Width_m  Fault_Depth_m  ... Slip_Rate_mm_per_yr  \
21600            2.0            3.7  ...                 7.5
21601            4.0            3.0  ...                 2.5
21602            2.7            1.5  ...                 7.5
21603            2.0            3.0  ...                 7.5
21604            2.0            4.5  ...                 1.5

       Max_Surface_Slip_m  Recurrence_Interval_yr  Last_Event_Year  \
21600            5.000000              550.000000      1999.000000
21601            1.433333              700.000000      1855.000000
21602            5.000000              550.000000      1999.000000
21603            5.000000              550.000000      1999.000000
21604            0.800000              566.666667      1910.333333

       Last_Event_Mw  Elapsed_Time_yr  Slip_Deficit_m  \
21600            7.4        26.000000           0.195
21601            6.9       170.000000           0.425
21602            7.4        26.000000           0.195
21603            7.4        26.000000           0.195
21604            7.2       114.666667           0.172

       Normalized_Slip_m_per_km  Moment_Potential_Nm  Mw_Potential
21600                  0.004167         1.053000e+20      2.648286
21601                  0.047778         5.100000e+18      1.771713
21602                  0.004167         1.053000e+20      2.648286
21603                  0.004167         1.053000e+20      2.648286
21604                  0.022857         2.347800e+18      1.547107
```

```
[5 rows x 23 columns]
```

8-) Veri setindeki bütün verileri listeleyiniz.

In [23]:
```
print(df)
```

```
             Date  Latitude  Longitude  Depth_km  Magnitude_ML  \
0      2025-04-23   40.8394    28.4000     15.05           2.5
1      2025-04-23   40.8442    28.3108      5.23           2.6
2      2025-04-23   40.8353    28.3511      6.97           2.0
3      2025-04-23   40.8567    28.3014     14.58           3.5
4      2025-04-23   40.8467    28.4094      8.33           2.8
...           ...       ...        ...       ...           ...
21600  2000-04-30   40.5600    29.2100      3.80           2.7
21601  2000-04-30   40.0200    28.8900      1.00           2.9
21602  2000-04-29   40.9000    30.4900      5.70           2.6
21603  2000-04-28   40.3700    29.1400     10.40           3.2
21604  2000-04-23   39.5600    26.1100     13.80           3.2

                                            Location  \
0      Marmara Denizi - [20.67 km] Büyükçekmece (İsta...
1      Marmara Denizi - [24.05 km] Büyükçekmece (İsta...
2      Marmara Denizi - [22.91 km] Büyükçekmece (İsta...
3         Marmara Denizi - [23.07 km] Silivri (İstanbul)
4      Marmara Denizi - [19.63 km] Büyükçekmece (İsta...
...                                                  ...
21600                                 Merkez (Yalova)
21601                                Orhaneli (Bursa)
21602                              Söğütlü (Sakarya)
21603                                 Gemlik (Bursa)
21604                              Ayvacık (Çanakkale)

                Nearest_Fault  Fault_Length_km  Fault_Width_m  Fault_Depth_m  \
0      Kuzey Anadolu Fay Zonu             10.0            2.0            3.0
1      Kuzey Anadolu Fay Zonu             10.0            2.0            3.0
2      Kuzey Anadolu Fay Zonu             10.0            2.0            3.0
3      Kuzey Anadolu Fay Zonu             10.0            2.0            3.0
4      Kuzey Anadolu Fay Zonu             10.0            2.0            3.0
...                       ...              ...            ...            ...
21600  Kuzey Anadolu Fay Zonu             25.0            2.0            3.7
21601           Orhaneli Fayı             15.0            4.0            3.0
21602  Kuzey Anadolu Fay Zonu             19.0            2.7            1.5
21603  Kuzey Anadolu Fay Zonu             10.0            2.0            3.0
21604              Troya Fayı              6.0            2.0            4.5

       ... Slip_Rate_mm_per_yr  Max_Surface_Slip_m  Recurrence_Interval_yr  \
0      ...                 7.5            5.000000              550.000000
```

```
1      ...                7.5           5.000000             550.000000
2      ...                7.5           5.000000             550.000000
3      ...                7.5           5.000000             550.000000
4      ...                7.5           5.000000             550.000000
...    ...                ...                ...                    ...
21600  ...                7.5           5.000000             550.000000
21601  ...                2.5           1.433333             700.000000
21602  ...                7.5           5.000000             550.000000
21603  ...                7.5           5.000000             550.000000
21604  ...                1.5           0.800000             566.666667

       Last_Event_Year  Last_Event_Mw  Elapsed_Time_yr  Slip_Deficit_m  \
0          1999.000000            7.4        26.000000           0.195
1          1999.000000            7.4        26.000000           0.195
2          1999.000000            7.4        26.000000           0.195
3          1999.000000            7.4        26.000000           0.195
4          1999.000000            7.4        26.000000           0.195
...                ...            ...              ...             ...
21600      1999.000000            7.4        26.000000           0.195
21601      1855.000000            6.9       170.000000           0.425
21602      1999.000000            7.4        26.000000           0.195
21603      1999.000000            7.4        26.000000           0.195
21604      1910.333333            7.2       114.666667           0.172

       Normalized_Slip_m_per_km  Moment_Potential_Nm  Mw_Potential
0                      0.004167         1.053000e+20      2.648286
1                      0.004167         1.053000e+20      2.648286
2                      0.004167         1.053000e+20      2.648286
3                      0.004167         1.053000e+20      2.648286
4                      0.004167         1.053000e+20      2.648286
...                         ...                  ...           ...
21600                  0.004167         1.053000e+20      2.648286
21601                  0.047778         5.100000e+18      1.771713
21602                  0.004167         1.053000e+20      2.648286
21603                  0.004167         1.053000e+20      2.648286
21604                  0.022857         2.347800e+18      1.547107

[21605 rows x 23 columns]
```

9-) Veri setindeki nümerik alanları listeleyiniz.

In [25]:
```
numeric_columns = df.select_dtypes(include=['number']).columns
print(numeric_columns)
```

```
Index(['Latitude', 'Longitude', 'Depth_km', 'Magnitude_ML', 'Fault_Length_km',
       'Fault_Width_m', 'Fault_Depth_m', 'Length_km', 'Seismogenic_Depth_km',
       'Slip_Rate_mm_per_yr', 'Max_Surface_Slip_m', 'Recurrence_Interval_yr',
       'Last_Event_Year', 'Last_Event_Mw', 'Elapsed_Time_yr', 'Slip_Deficit_m',
       'Normalized_Slip_m_per_km', 'Moment_Potential_Nm', 'Mw_Potential'],
      dtype='object')
```

10-) Veri setindeki nümerik olmayan alanların frekans dağılımını analiz ediniz.

In [27]:
```
categorical_columns = df.select_dtypes(exclude=['number'])

for col in categorical_columns.columns:
    print(f"Frekans dağılımı - {col}:")
    print(df[col].value_counts())
    print("\n")
```

```
Frekans dağılımı - Date:
Date
2017-02-07    124
2025-04-23    104
2017-02-06    104
2014-05-24     94
2010-11-01     70
             ...
2007-08-12      1
2019-05-21      1
2007-08-14      1
2019-05-20      1
2000-04-23      1
Name: count, Length: 5989, dtype: int64


Frekans dağılımı - Location:
Location
Tavşanlı (Kütahya)                                          4273
Domaniç (Kütahya)                                           1465
Ayvacık (Çanakkale)                                         1370
Biga (Çanakkale)                                             655
Dursunbey (Balıkesir)                                        552
                                                            ...
Marmara Denizi - [29.55 km] Erdek (Balıkesir)                  1
Marmara Denizi - [09.05 km] Merkez (Yalova)                    1
Ege Denizi - [06.15 km] Ayvacık (Çanakkale)                    1
Marmara Denizi - Gemlik Körfezi - [06.11 km] Armutlu (Yalova)  1
Marmara Denizi - [15.54 km] Erdek (Balıkesir)                  1
Name: count, Length: 5071, dtype: int64


Frekans dağılımı - Nearest_Fault:
Nearest_Fault
Orhaneli Fayı                       7281
Kuzey Anadolu Fay Zonu              4616
Kuzey Anadolu Fay Zonu Ganos Fayı   2446
Troya Fayı                          2341
Havran-Balıkesir Fayı               1086
Manyas Fay Zonu                      767
Eskişehir Fay Zonu                   763
```

```
Yenice-Gönen Fay Zonu                  638
Bekten Fayı                            605
Kuzey Anadolu Fay Zonu Ulubat Fayı     536
Mustafakemalpaşa Fayı                  449
Yenimahalle Fayı                        77
Name: count, dtype: int64


Frekans dağılımı - Fault_Type:
Fault_Type
strike-slip                    7700
strike-slip + thrust           7281
oblique / uncertain            2341
strike-slip + transpression    1086
normal (listric)                767
left-lateral mixed              763
strike-slip + minor thrust      605
strike-slip + minor vertical    536
strike-slip + minor normal      449
small strike-slip                77
Name: count, dtype: int64
```

11-) System Kütüphanesi versiyonunu bulunuz.

In [29]:
```
print(sys.version)
```

```
3.12.7 | packaged by Anaconda, Inc. | (main, Oct  4 2024, 13:17:27) [MSC v.1929 64 bit (AMD64)]
```

12-) Veri setindeki toplam veri sayısını bulunuz.

In [31]:
```
total_rows = df.shape[0]
print(f"Veri setindeki toplam veri sayısı: {total_rows}")
```

```
Veri setindeki toplam veri sayısı: 21605
```

13-) Veri setindeki toplam sütun sayısını bulunuz.

In [33]:
```
total_columns = df.shape[1]
```

```
print(f"Veri setindeki toplam sütun sayısı: {total_columns}")
```

```
Veri setindeki toplam sütun sayısı: 23
```

14-) Veri setindeki sütun isimlerini bulunuz.

In [35]:
```
column_names = df.columns
print(f"Veri setindeki sütun isimleri: {column_names}")
```

```
Veri setindeki sütun isimleri: Index(['Date', 'Latitude', 'Longitude', 'Depth_km', 'Magnitude_ML', 'Location',
       'Nearest_Fault', 'Fault_Length_km', 'Fault_Width_m', 'Fault_Depth_m',
       'Fault_Type', 'Length_km', 'Seismogenic_Depth_km',
       'Slip_Rate_mm_per_yr', 'Max_Surface_Slip_m', 'Recurrence_Interval_yr',
       'Last_Event_Year', 'Last_Event_Mw', 'Elapsed_Time_yr', 'Slip_Deficit_m',
       'Normalized_Slip_m_per_km', 'Moment_Potential_Nm', 'Mw_Potential'],
      dtype='object')
```

15-) Veri setindeki eksik verileri bulunuz.

In [37]:
```
missing_data = df.isnull().sum()
missing_columns = missing_data[missing_data > 0]
print(f"Eksik verisi olan sütunlar:\n{missing_columns}")
```

```
Eksik verisi olan sütunlar:
Series([], dtype: int64)
```

16-) Her bir sütundaki eksik veri sayısını bulunuz.

In [39]:
```
missing_data = df.isnull().sum()
print(f"Her bir sütundaki eksik veri sayısı:\n{missing_data}")
```

```
Her bir sütundaki eksik veri sayısı:
Date                        0
Latitude                    0
Longitude                   0
Depth_km                    0
Magnitude_ML                0
Location                    0
Nearest_Fault               0
Fault_Length_km             0
Fault_Width_m               0
Fault_Depth_m               0
Fault_Type                  0
Length_km                   0
Seismogenic_Depth_km        0
Slip_Rate_mm_per_yr         0
Max_Surface_Slip_m          0
Recurrence_Interval_yr      0
Last_Event_Year             0
Last_Event_Mw               0
Elapsed_Time_yr             0
Slip_Deficit_m              0
Normalized_Slip_m_per_km    0
Moment_Potential_Nm         0
Mw_Potential                0
dtype: int64
```

17-) Bütün sütunlardaki toplam eksik veri sayısını bulunuz.

In [43]:
```
total_missing_data = df.isnull().sum().sum()
print(f"Veri setindeki toplam eksik veri sayısı: {total_missing_data}")
```

```
Veri setindeki toplam eksik veri sayısı: 0
```

18-) Eksik verilerin yerine "0 - sıfır" yazınız.

In [45]:
```
df_filled = df.fillna(0)
print(df_filled)
```

```
             Date  Latitude  Longitude  Depth_km  Magnitude_ML  \
0      2025-04-23   40.8394    28.4000     15.05           2.5
1      2025-04-23   40.8442    28.3108      5.23           2.6
2      2025-04-23   40.8353    28.3511      6.97           2.0
3      2025-04-23   40.8567    28.3014     14.58           3.5
4      2025-04-23   40.8467    28.4094      8.33           2.8
...           ...       ...        ...       ...           ...
21600  2000-04-30   40.5600    29.2100      3.80           2.7
21601  2000-04-30   40.0200    28.8900      1.00           2.9
21602  2000-04-29   40.9000    30.4900      5.70           2.6
21603  2000-04-28   40.3700    29.1400     10.40           3.2
21604  2000-04-23   39.5600    26.1100     13.80           3.2

                                          Location  \
0      Marmara Denizi - [20.67 km] Büyükçekmece (İsta...
1      Marmara Denizi - [24.05 km] Büyükçekmece (İsta...
2      Marmara Denizi - [22.91 km] Büyükçekmece (İsta...
3         Marmara Denizi - [23.07 km] Silivri (İstanbul)
4      Marmara Denizi - [19.63 km] Büyükçekmece (İsta...
...                                                  ...
21600                                Merkez (Yalova)
21601                               Orhaneli (Bursa)
21602                             Söğütlü (Sakarya)
21603                                Gemlik (Bursa)
21604                           Ayvacık (Çanakkale)

                Nearest_Fault  Fault_Length_km  Fault_Width_m  Fault_Depth_m  \
0      Kuzey Anadolu Fay Zonu             10.0            2.0            3.0
1      Kuzey Anadolu Fay Zonu             10.0            2.0            3.0
2      Kuzey Anadolu Fay Zonu             10.0            2.0            3.0
3      Kuzey Anadolu Fay Zonu             10.0            2.0            3.0
4      Kuzey Anadolu Fay Zonu             10.0            2.0            3.0
...                       ...              ...            ...            ...
21600  Kuzey Anadolu Fay Zonu             25.0            2.0            3.7
21601          Orhaneli Fayı              15.0            4.0            3.0
21602  Kuzey Anadolu Fay Zonu             19.0            2.7            1.5
21603  Kuzey Anadolu Fay Zonu             10.0            2.0            3.0
21604              Troya Fayı              6.0            2.0            4.5

       ... Slip_Rate_mm_per_yr  Max_Surface_Slip_m  Recurrence_Interval_yr  \
0      ...                 7.5            5.000000              550.000000
```

```
1      ...                7.5           5.000000             550.000000
2      ...                7.5           5.000000             550.000000
3      ...                7.5           5.000000             550.000000
4      ...                7.5           5.000000             550.000000
...    ...                ...                ...                    ...
21600  ...                7.5           5.000000             550.000000
21601  ...                2.5           1.433333             700.000000
21602  ...                7.5           5.000000             550.000000
21603  ...                7.5           5.000000             550.000000
21604  ...                1.5           0.800000             566.666667

       Last_Event_Year  Last_Event_Mw  Elapsed_Time_yr  Slip_Deficit_m  \
0          1999.000000            7.4        26.000000           0.195
1          1999.000000            7.4        26.000000           0.195
2          1999.000000            7.4        26.000000           0.195
3          1999.000000            7.4        26.000000           0.195
4          1999.000000            7.4        26.000000           0.195
...                ...            ...              ...             ...
21600      1999.000000            7.4        26.000000           0.195
21601      1855.000000            6.9       170.000000           0.425
21602      1999.000000            7.4        26.000000           0.195
21603      1999.000000            7.4        26.000000           0.195
21604      1910.333333            7.2       114.666667           0.172

       Normalized_Slip_m_per_km  Moment_Potential_Nm  Mw_Potential
0                      0.004167         1.053000e+20      2.648286
1                      0.004167         1.053000e+20      2.648286
2                      0.004167         1.053000e+20      2.648286
3                      0.004167         1.053000e+20      2.648286
4                      0.004167         1.053000e+20      2.648286
...                         ...                  ...           ...
21600                  0.004167         1.053000e+20      2.648286
21601                  0.047778         5.100000e+18      1.771713
21602                  0.004167         1.053000e+20      2.648286
21603                  0.004167         1.053000e+20      2.648286
21604                  0.022857         2.347800e+18      1.547107

[21605 rows x 23 columns]
```

In [47]:
```
df_cleaned = df.dropna()
```

```
print(df_cleaned)
```

```
             Date  Latitude  Longitude  Depth_km  Magnitude_ML  \
0      2025-04-23   40.8394    28.4000     15.05           2.5
1      2025-04-23   40.8442    28.3108      5.23           2.6
2      2025-04-23   40.8353    28.3511      6.97           2.0
3      2025-04-23   40.8567    28.3014     14.58           3.5
4      2025-04-23   40.8467    28.4094      8.33           2.8
...           ...       ...        ...       ...           ...
21600  2000-04-30   40.5600    29.2100      3.80           2.7
21601  2000-04-30   40.0200    28.8900      1.00           2.9
21602  2000-04-29   40.9000    30.4900      5.70           2.6
21603  2000-04-28   40.3700    29.1400     10.40           3.2
21604  2000-04-23   39.5600    26.1100     13.80           3.2

                                          Location  \
0      Marmara Denizi - [20.67 km] Büyükçekmece (İsta...
1      Marmara Denizi - [24.05 km] Büyükçekmece (İsta...
2      Marmara Denizi - [22.91 km] Büyükçekmece (İsta...
3         Marmara Denizi - [23.07 km] Silivri (İstanbul)
4      Marmara Denizi - [19.63 km] Büyükçekmece (İsta...
...                                                  ...
21600                                Merkez (Yalova)
21601                               Orhaneli (Bursa)
21602                             Söğütlü (Sakarya)
21603                                Gemlik (Bursa)
21604                            Ayvacık (Çanakkale)

               Nearest_Fault  Fault_Length_km  Fault_Width_m  Fault_Depth_m  \
0      Kuzey Anadolu Fay Zonu             10.0            2.0            3.0
1      Kuzey Anadolu Fay Zonu             10.0            2.0            3.0
2      Kuzey Anadolu Fay Zonu             10.0            2.0            3.0
3      Kuzey Anadolu Fay Zonu             10.0            2.0            3.0
4      Kuzey Anadolu Fay Zonu             10.0            2.0            3.0
...                       ...              ...            ...            ...
21600  Kuzey Anadolu Fay Zonu             25.0            2.0            3.7
21601          Orhaneli Fayı              15.0            4.0            3.0
21602  Kuzey Anadolu Fay Zonu             19.0            2.7            1.5
21603  Kuzey Anadolu Fay Zonu             10.0            2.0            3.0
21604             Troya Fayı               6.0            2.0            4.5

       ... Slip_Rate_mm_per_yr  Max_Surface_Slip_m  Recurrence_Interval_yr  \
0      ...                 7.5            5.000000              550.000000
```

```
1      ...                7.5           5.000000             550.000000
2      ...                7.5           5.000000             550.000000
3      ...                7.5           5.000000             550.000000
4      ...                7.5           5.000000             550.000000
...    ...                ...                ...                    ...
21600  ...                7.5           5.000000             550.000000
21601  ...                2.5           1.433333             700.000000
21602  ...                7.5           5.000000             550.000000
21603  ...                7.5           5.000000             550.000000
21604  ...                1.5           0.800000             566.666667

       Last_Event_Year  Last_Event_Mw  Elapsed_Time_yr  Slip_Deficit_m  \
0          1999.000000            7.4        26.000000           0.195
1          1999.000000            7.4        26.000000           0.195
2          1999.000000            7.4        26.000000           0.195
3          1999.000000            7.4        26.000000           0.195
4          1999.000000            7.4        26.000000           0.195
...                ...            ...              ...             ...
21600      1999.000000            7.4        26.000000           0.195
21601      1855.000000            6.9       170.000000           0.425
21602      1999.000000            7.4        26.000000           0.195
21603      1999.000000            7.4        26.000000           0.195
21604      1910.333333            7.2       114.666667           0.172

       Normalized_Slip_m_per_km  Moment_Potential_Nm  Mw_Potential
0                      0.004167         1.053000e+20      2.648286
1                      0.004167         1.053000e+20      2.648286
2                      0.004167         1.053000e+20      2.648286
3                      0.004167         1.053000e+20      2.648286
4                      0.004167         1.053000e+20      2.648286
...                         ...                  ...           ...
21600                  0.004167         1.053000e+20      2.648286
21601                  0.047778         5.100000e+18      1.771713
21602                  0.004167         1.053000e+20      2.648286
21603                  0.004167         1.053000e+20      2.648286
21604                  0.022857         2.347800e+18      1.547107

[21605 rows x 23 columns]
```

19-) Eksik verileri dataFrame'den çıkarınız.

In [49]:
```
df_cleaned = df.dropna(axis=1)
print(df_cleaned)
```

```
             Date  Latitude  Longitude  Depth_km  Magnitude_ML  \
0      2025-04-23   40.8394    28.4000     15.05           2.5
1      2025-04-23   40.8442    28.3108      5.23           2.6
2      2025-04-23   40.8353    28.3511      6.97           2.0
3      2025-04-23   40.8567    28.3014     14.58           3.5
4      2025-04-23   40.8467    28.4094      8.33           2.8
...           ...       ...        ...       ...           ...
21600  2000-04-30   40.5600    29.2100      3.80           2.7
21601  2000-04-30   40.0200    28.8900      1.00           2.9
21602  2000-04-29   40.9000    30.4900      5.70           2.6
21603  2000-04-28   40.3700    29.1400     10.40           3.2
21604  2000-04-23   39.5600    26.1100     13.80           3.2

                                          Location  \
0      Marmara Denizi - [20.67 km] Büyükçekmece (İsta...
1      Marmara Denizi - [24.05 km] Büyükçekmece (İsta...
2      Marmara Denizi - [22.91 km] Büyükçekmece (İsta...
3         Marmara Denizi - [23.07 km] Silivri (İstanbul)
4      Marmara Denizi - [19.63 km] Büyükçekmece (İsta...
...                                                  ...
21600                                Merkez (Yalova)
21601                               Orhaneli (Bursa)
21602                             Söğütlü (Sakarya)
21603                                Gemlik (Bursa)
21604                           Ayvacık (Çanakkale)

               Nearest_Fault  Fault_Length_km  Fault_Width_m  Fault_Depth_m  \
0      Kuzey Anadolu Fay Zonu             10.0            2.0            3.0
1      Kuzey Anadolu Fay Zonu             10.0            2.0            3.0
2      Kuzey Anadolu Fay Zonu             10.0            2.0            3.0
3      Kuzey Anadolu Fay Zonu             10.0            2.0            3.0
4      Kuzey Anadolu Fay Zonu             10.0            2.0            3.0
...                       ...              ...            ...            ...
21600  Kuzey Anadolu Fay Zonu             25.0            2.0            3.7
21601          Orhaneli Fayı              15.0            4.0            3.0
21602  Kuzey Anadolu Fay Zonu             19.0            2.7            1.5
21603  Kuzey Anadolu Fay Zonu             10.0            2.0            3.0
21604             Troya Fayı               6.0            2.0            4.5

       ... Slip_Rate_mm_per_yr  Max_Surface_Slip_m  Recurrence_Interval_yr  \
0      ...                 7.5            5.000000              550.000000
```

```
1      ...                7.5           5.000000             550.000000
2      ...                7.5           5.000000             550.000000
3      ...                7.5           5.000000             550.000000
4      ...                7.5           5.000000             550.000000
...    ...                ...                ...                    ...
21600  ...                7.5           5.000000             550.000000
21601  ...                2.5           1.433333             700.000000
21602  ...                7.5           5.000000             550.000000
21603  ...                7.5           5.000000             550.000000
21604  ...                1.5           0.800000             566.666667

       Last_Event_Year  Last_Event_Mw  Elapsed_Time_yr  Slip_Deficit_m  \
0          1999.000000            7.4        26.000000           0.195
1          1999.000000            7.4        26.000000           0.195
2          1999.000000            7.4        26.000000           0.195
3          1999.000000            7.4        26.000000           0.195
4          1999.000000            7.4        26.000000           0.195
...                ...            ...              ...             ...
21600      1999.000000            7.4        26.000000           0.195
21601      1855.000000            6.9       170.000000           0.425
21602      1999.000000            7.4        26.000000           0.195
21603      1999.000000            7.4        26.000000           0.195
21604      1910.333333            7.2       114.666667           0.172

       Normalized_Slip_m_per_km  Moment_Potential_Nm  Mw_Potential
0                      0.004167         1.053000e+20      2.648286
1                      0.004167         1.053000e+20      2.648286
2                      0.004167         1.053000e+20      2.648286
3                      0.004167         1.053000e+20      2.648286
4                      0.004167         1.053000e+20      2.648286
...                         ...                  ...           ...
21600                  0.004167         1.053000e+20      2.648286
21601                  0.047778         5.100000e+18      1.771713
21602                  0.004167         1.053000e+20      2.648286
21603                  0.004167         1.053000e+20      2.648286
21604                  0.022857         2.347800e+18      1.547107

[21605 rows x 23 columns]
```

20-) Tekrarlı verilerin sayısını bulunuz.

In [51]:
```
duplicate_count = df.duplicated().sum()
print(f"Veri setindeki tekrarlı verilerin sayısı: {duplicate_count}")
```

```
Veri setindeki tekrarlı verilerin sayısı: 2
```

In [53]:
```
pip install ydata-profiling
```

```
Collecting ydata-profiling
  Downloading ydata_profiling-4.16.1-py2.py3-none-any.whl.metadata (22 kB)
Requirement already satisfied: scipy<1.16,>=1.4.1 in c:\users\user\anaconda3\lib\site-packages (from ydata-profiling) (1.13.1)
Requirement already satisfied: pandas!=1.4.0,<3.0,>1.1 in c:\users\user\anaconda3\lib\site-packages (from ydata-profiling) (2.
2.2)
Requirement already satisfied: matplotlib<=3.10,>=3.5 in c:\users\user\anaconda3\lib\site-packages (from ydata-profiling) (3.9.
2)
Requirement already satisfied: pydantic>=2 in c:\users\user\anaconda3\lib\site-packages (from ydata-profiling) (2.8.2)
Requirement already satisfied: PyYAML<6.1,>=5.0.0 in c:\users\user\anaconda3\lib\site-packages (from ydata-profiling) (6.0.1)
Requirement already satisfied: jinja2<3.2,>=2.11.1 in c:\users\user\anaconda3\lib\site-packages (from ydata-profiling) (3.1.4)
Collecting visions<0.8.2,>=0.7.5 (from visions[type_image_path]<0.8.2,>=0.7.5->ydata-profiling)
  Downloading visions-0.8.1-py3-none-any.whl.metadata (11 kB)
Requirement already satisfied: numpy<2.2,>=1.16.0 in c:\users\user\anaconda3\lib\site-packages (from ydata-profiling) (1.26.4)
Collecting htmlmin==0.1.12 (from ydata-profiling)
  Downloading htmlmin-0.1.12.tar.gz (19 kB)
  Preparing metadata (setup.py): started
  Preparing metadata (setup.py): finished with status 'done'
Collecting phik<0.13,>=0.11.1 (from ydata-profiling)
  Downloading phik-0.12.4-cp312-cp312-win_amd64.whl.metadata (5.6 kB)
Requirement already satisfied: requests<3,>=2.24.0 in c:\users\user\anaconda3\lib\site-packages (from ydata-profiling) (2.32.3)
Requirement already satisfied: tqdm<5,>=4.48.2 in c:\users\user\anaconda3\lib\site-packages (from ydata-profiling) (4.66.5)
Requirement already satisfied: seaborn<0.14,>=0.10.1 in c:\users\user\anaconda3\lib\site-packages (from ydata-profiling) (0.13.
2)
Collecting multimethod<2,>=1.4 (from ydata-profiling)
  Downloading multimethod-1.12-py3-none-any.whl.metadata (9.6 kB)
Requirement already satisfied: statsmodels<1,>=0.13.2 in c:\users\user\anaconda3\lib\site-packages (from ydata-profiling) (0.1
4.2)
Collecting typeguard<5,>=3 (from ydata-profiling)
  Downloading typeguard-4.4.2-py3-none-any.whl.metadata (3.8 kB)
Collecting imagehash==4.3.1 (from ydata-profiling)
  Downloading ImageHash-4.3.1-py2.py3-none-any.whl.metadata (8.0 kB)
Collecting wordcloud>=1.9.3 (from ydata-profiling)
  Downloading wordcloud-1.9.4-cp312-cp312-win_amd64.whl.metadata (3.5 kB)
Collecting dacite>=1.8 (from ydata-profiling)
  Downloading dacite-1.9.2-py3-none-any.whl.metadata (17 kB)
Requirement already satisfied: numba<=0.61,>=0.56.0 in c:\users\user\anaconda3\lib\site-packages (from ydata-profiling) (0.60.
0)
Requirement already satisfied: PyWavelets in c:\users\user\anaconda3\lib\site-packages (from imagehash==4.3.1->ydata-profiling)
(1.7.0)
Requirement already satisfied: pillow in c:\users\user\anaconda3\lib\site-packages (from imagehash==4.3.1->ydata-profiling) (1
0.4.0)
```

```
Requirement already satisfied: MarkupSafe>=2.0 in c:\users\user\anaconda3\lib\site-packages (from jinja2<3.2,>=2.11.1->ydata-pr
ofiling) (2.1.3)
Requirement already satisfied: contourpy>=1.0.1 in c:\users\user\anaconda3\lib\site-packages (from matplotlib<=3.10,>=3.5->ydat
a-profiling) (1.2.0)
Requirement already satisfied: cycler>=0.10 in c:\users\user\anaconda3\lib\site-packages (from matplotlib<=3.10,>=3.5->ydata-pr
ofiling) (0.11.0)
Requirement already satisfied: fonttools>=4.22.0 in c:\users\user\anaconda3\lib\site-packages (from matplotlib<=3.10,>=3.5->yda
ta-profiling) (4.51.0)
Requirement already satisfied: kiwisolver>=1.3.1 in c:\users\user\anaconda3\lib\site-packages (from matplotlib<=3.10,>=3.5->yda
ta-profiling) (1.4.4)
Requirement already satisfied: packaging>=20.0 in c:\users\user\anaconda3\lib\site-packages (from matplotlib<=3.10,>=3.5->ydata
-profiling) (24.1)
Requirement already satisfied: pyparsing>=2.3.1 in c:\users\user\anaconda3\lib\site-packages (from matplotlib<=3.10,>=3.5->ydat
a-profiling) (3.1.2)
Requirement already satisfied: python-dateutil>=2.7 in c:\users\user\anaconda3\lib\site-packages (from matplotlib<=3.10,>=3.5->
ydata-profiling) (2.9.0.post0)
Requirement already satisfied: llvmlite<0.44,>=0.43.0dev0 in c:\users\user\anaconda3\lib\site-packages (from numba<=0.61,>=0.5
6.0->ydata-profiling) (0.43.0)
Requirement already satisfied: pytz>=2020.1 in c:\users\user\anaconda3\lib\site-packages (from pandas!=1.4.0,<3.0,>1.1->ydata-p
rofiling) (2024.1)
Requirement already satisfied: tzdata>=2022.7 in c:\users\user\anaconda3\lib\site-packages (from pandas!=1.4.0,<3.0,>1.1->ydata
-profiling) (2023.3)
Requirement already satisfied: joblib>=0.14.1 in c:\users\user\anaconda3\lib\site-packages (from phik<0.13,>=0.11.1->ydata-prof
iling) (1.4.2)
Requirement already satisfied: annotated-types>=0.4.0 in c:\users\user\anaconda3\lib\site-packages (from pydantic>=2->ydata-pro
filing) (0.6.0)
Requirement already satisfied: pydantic-core==2.20.1 in c:\users\user\anaconda3\lib\site-packages (from pydantic>=2->ydata-prof
iling) (2.20.1)
Requirement already satisfied: typing-extensions>=4.6.1 in c:\users\user\anaconda3\lib\site-packages (from pydantic>=2->ydata-p
rofiling) (4.11.0)
Requirement already satisfied: charset-normalizer<4,>=2 in c:\users\user\anaconda3\lib\site-packages (from requests<3,>=2.24.0-
>ydata-profiling) (3.3.2)
Requirement already satisfied: idna<4,>=2.5 in c:\users\user\anaconda3\lib\site-packages (from requests<3,>=2.24.0->ydata-profi
ling) (3.7)
Requirement already satisfied: urllib3<3,>=1.21.1 in c:\users\user\anaconda3\lib\site-packages (from requests<3,>=2.24.0->ydata
-profiling) (2.2.3)
Requirement already satisfied: certifi>=2017.4.17 in c:\users\user\anaconda3\lib\site-packages (from requests<3,>=2.24.0->ydata
-profiling) (2025.1.31)
Requirement already satisfied: patsy>=0.5.6 in c:\users\user\anaconda3\lib\site-packages (from statsmodels<1,>=0.13.2->ydata-pr
ofiling) (0.5.6)
Requirement already satisfied: colorama in c:\users\user\anaconda3\lib\site-packages (from tqdm<5,>=4.48.2->ydata-profiling)
```

```
(0.4.6)
Requirement already satisfied: attrs>=19.3.0 in c:\users\user\anaconda3\lib\site-packages (from visions<0.8.2,>=0.7.5->visions
[type_image_path]<0.8.2,>=0.7.5->ydata-profiling) (23.1.0)
Requirement already satisfied: networkx>=2.4 in c:\users\user\anaconda3\lib\site-packages (from visions<0.8.2,>=0.7.5->visions
[type_image_path]<0.8.2,>=0.7.5->ydata-profiling) (3.3)
Collecting puremagic (from visions<0.8.2,>=0.7.5->visions[type_image_path]<0.8.2,>=0.7.5->ydata-profiling)
  Downloading puremagic-1.29-py3-none-any.whl.metadata (5.8 kB)
Requirement already satisfied: six in c:\users\user\anaconda3\lib\site-packages (from patsy>=0.5.6->statsmodels<1,>=0.13.2->yda
ta-profiling) (1.16.0)
Downloading ydata_profiling-4.16.1-py2.py3-none-any.whl (400 kB)
Downloading ImageHash-4.3.1-py2.py3-none-any.whl (296 kB)
Downloading dacite-1.9.2-py3-none-any.whl (16 kB)
Downloading multimethod-1.12-py3-none-any.whl (10 kB)
Downloading phik-0.12.4-cp312-cp312-win_amd64.whl (666 kB)
   ---------------------------------------- 0.0/666.4 kB ? eta -:--:--
   ------------------------------ -------- 524.3/666.4 kB 16.4 MB/s eta 0:00:01
   ---------------------------------------- 666.4/666.4 kB 3.7 MB/s eta 0:00:00
Downloading typeguard-4.4.2-py3-none-any.whl (35 kB)
Downloading visions-0.8.1-py3-none-any.whl (105 kB)
Downloading wordcloud-1.9.4-cp312-cp312-win_amd64.whl (301 kB)
Downloading puremagic-1.29-py3-none-any.whl (43 kB)
Building wheels for collected packages: htmlmin
  Building wheel for htmlmin (setup.py): started
  Building wheel for htmlmin (setup.py): finished with status 'done'
  Created wheel for htmlmin: filename=htmlmin-0.1.12-py3-none-any.whl size=27091 sha256=ceb78d674fddeabd1cbc3be25c5d15f73ef1515
f7d220db73705996a605282bd
  Stored in directory: c:\users\user\appdata\local\pip\cache\wheels\5f\d4\d7\4189b07b5902ee9f3ce0dbb14909fbe8037c39d6c63ffd49c9
Successfully built htmlmin
Installing collected packages: puremagic, htmlmin, typeguard, multimethod, dacite, imagehash, wordcloud, visions, phik, ydata-p
rofiling
Successfully installed dacite-1.9.2 htmlmin-0.1.12 imagehash-4.3.1 multimethod-1.12 phik-0.12.4 puremagic-1.29 typeguard-4.4.2
visions-0.8.1 wordcloud-1.9.4 ydata-profiling-4.16.1
Note: you may need to restart the kernel to use updated packages.
```

21-) ydata_profiling kütüphanesini kullanarak dataFrame'deki veriler hakkında "html" olarak,

otomatik veri analizi yapan bir rapor hazırlayınız.

In [55]:
```
from ydata_profiling import ProfileReport
profile = ProfileReport(df, title="Veri Seti Raporu", explorative=True)
```

```
# Raporu HTML formatında kaydetme
profile.to_file("veri_seti_raporu.html")

print("Rapor başarıyla oluşturuldu!")
```

Upgrade to ydata-sdk

Improve your data and profiling with ydata-sdk, featuring data quality scoring, redundancy detection, outlier identification, text validation, and synthetic data generation.

```
Summarize dataset:   0%|          | 0/5 [00:00<?, ?it/s]
  0%|          | 0/23 [00:00<?, ?it/s]
  4%|▍         | 1/23 [00:00<00:09,  2.27it/s]
 26%|██▌       | 6/23 [00:00<00:01, 12.53it/s]
100%|██████████| 23/23 [00:00<00:00, 32.89it/s]
Generate report structure:   0%|          | 0/1 [00:00<?, ?it/s]
Render HTML:   0%|          | 0/1 [00:00<?, ?it/s]
Export report to file:   0%|          | 0/1 [00:00<?, ?it/s]
Rapor başarıyla oluşturuldu!
```

22-) CSV dosyası olarak link'ten alınan dataFrame'i herhangi bir dizine dataFrame olarak

kopyalayınız.

In [59]:
```
import requests
import pandas as pd

# CSV dosyasının linki
url = r'https://www.kaggle.com/datasets/umutalkn/marmara-fault-earthquake-interactions-20002025'  # Buraya CSV dosyasının URL'

# CSV dosyasını indir
response = requests.get(url)

# İndirilen dosyayı bir dizine kaydet
file_path = r'C:\Users\USER\Desktop\marmara-fault-earthquake-interactions.csv'  # Dosyanın kaydedileceği dizin ve dosya adı

# Dosyayı kaydet
with open(file_path, "wb") as file:
    file.write(response.content)
```

```
print("CSV dosyası indirildi ve kaydedildi.")
```

```
CSV dosyası indirildi ve kaydedildi.
```

23-) DataFrame'deki herhangi bir sütunu ekrana alınız ve veri tipini sorgulayınız.

In [63]:
```
column_data = df['Latitude']

print(column_data.head())
print(f"Veri tipi: {column_data.dtype}")
```

```
0    40.8394
1    40.8442
2    40.8353
3    40.8567
4    40.8467
Name: Latitude, dtype: float64
Veri tipi: float64
```

24-) Sütunun Class'ını sorgulayınız.

In [65]:
```
column_data = df['Latitude']
print(f"Sütunun sınıfı: {type(column_data)}")
```

```
Sütunun sınıfı: <class 'pandas.core.series.Series'>
```

25-) DataFrame'de "loc " deyimi kullanarak indeks etiketi ile sorgu yapınız.

In [67]:
```
rows_data = df.loc[[0, 1]]
print(rows_data)
```

```
         Date  Latitude  Longitude  Depth_km  Magnitude_ML  \
0  2025-04-23   40.8394    28.4000     15.05           2.5
1  2025-04-23   40.8442    28.3108      5.23           2.6

                                        Location          Nearest_Fault  \
0  Marmara Denizi - [20.67 km] Büyükçekmece (İsta...  Kuzey Anadolu Fay Zonu
1  Marmara Denizi - [24.05 km] Büyükçekmece (İsta...  Kuzey Anadolu Fay Zonu

   Fault_Length_km  Fault_Width_m  Fault_Depth_m  ... Slip_Rate_mm_per_yr  \
0             10.0            2.0            3.0  ...                 7.5
1             10.0            2.0            3.0  ...                 7.5

   Max_Surface_Slip_m  Recurrence_Interval_yr  Last_Event_Year  Last_Event_Mw  \
0                 5.0                   550.0           1999.0            7.4
1                 5.0                   550.0           1999.0            7.4

   Elapsed_Time_yr  Slip_Deficit_m  Normalized_Slip_m_per_km  \
0             26.0           0.195                  0.004167
1             26.0           0.195                  0.004167

   Moment_Potential_Nm  Mw_Potential
0         1.053000e+20      2.648286
1         1.053000e+20      2.648286

[2 rows x 23 columns]
```

26-) DataFrame'de "iloc " deyimi kullanarak indeks numarası ile sorgu yapınız.

In [69]:
```
row_data = df.iloc[0]
print(row_data)
```

```
Date                                                          2025-04-23
Latitude                                                         40.8394
Longitude                                                           28.4
Depth_km                                                           15.05
Magnitude_ML                                                         2.5
Location                    Marmara Denizi - [20.67 km] Büyükçekmece (İsta...
Nearest_Fault                                          Kuzey Anadolu Fay Zonu
Fault_Length_km                                                     10.0
Fault_Width_m                                                        2.0
Fault_Depth_m                                                        3.0
Fault_Type                                                    strike-slip
Length_km                                                          1200.0
Seismogenic_Depth_km                                                15.0
Slip_Rate_mm_per_yr                                                  7.5
Max_Surface_Slip_m                                                   5.0
Recurrence_Interval_yr                                             550.0
Last_Event_Year                                                   1999.0
Last_Event_Mw                                                        7.4
Elapsed_Time_yr                                                     26.0
Slip_Deficit_m                                                     0.195
Normalized_Slip_m_per_km                                        0.004167
Moment_Potential_Nm                    10530000000000000000.0
Mw_Potential                                                     2.648286
Name: 0, dtype: object
```

27-) Satır ve sütunu birlikte seçerek "loc" deyimi ile sorgu yazınız.

In [71]:
```
row_columns = df.loc[0, ['Latitude', 'Longitude']]
print(row_columns)
```

```
Latitude     40.8394
Longitude       28.4
Name: 0, dtype: object
```

28-) loc () deyimini kullanarak dataFrame'de "Dilimleme - Slicing" işlemi yapınız.

In [73]:
```
slicing_data = df.loc[0:5, 'Latitude':'Longitude']
print(slicing_data)
```

```
   Latitude  Longitude
0   40.8394    28.4000
1   40.8442    28.3108
2   40.8353    28.3511
3   40.8567    28.3014
4   40.8467    28.4094
5   40.8483    28.3342
```

29-) DataFrame'de filtreleme işlemi yapınız.

In [75]:
```
filtered_df = df[df['Magnitude_ML'] > 5]
print(filtered_df)
```

	Date	Latitude	Longitude	Depth_km	Magnitude_ML	\
101	2025-04-23	40.8369	28.3267	6.99	5.9	
102	2025-04-23	40.8600	28.2444	6.92	6.2	
629	2023-12-04	40.4269	28.8319	8.98	5.1	
1915	2019-09-26	40.8818	28.2140	7.97	5.8	
3499	2017-02-12	39.5336	26.1700	7.00	5.3	
3801	2017-02-07	39.5140	26.1161	11.92	5.2	
3867	2017-02-06	39.5275	26.1373	9.83	5.3	
3910	2017-02-06	39.5423	26.1318	8.86	5.3	
5739	2014-05-24	40.3951	26.3058	6.98	5.3	
8230	2012-06-07	40.8628	27.9043	26.96	5.1	
9647	2011-07-25	40.8195	27.7498	6.97	5.1	
11263	2010-11-03	40.3997	26.3147	28.90	5.1	
14983	2008-12-28	40.3287	26.0069	2.94	5.1	
16939	2006-10-24	40.4221	28.9937	7.89	5.2	
16958	2006-10-20	40.2519	27.9792	16.70	5.2	
21304	2003-07-06	40.4900	26.2500	11.60	5.2	

	Location	\
101	Marmara Denizi - [23.88 km] Büyükçekmece (İsta...	
102	Marmara Denizi - [23.16 km] Silivri (İstanbul)	
629	Marmara Denizi - Gemlik Körfezi - [04.73 km] M...	
1915	Marmara Denizi - [21.07 km] Silivri (İstanbul)	
3499	Ayvacık (Çanakkale)	
3801	Ayvacık (Çanakkale)	
3867	Ayvacık (Çanakkale)	
3910	Ayvacık (Çanakkale)	
5739	Ege Denizi - Saros Körfezi - [08.21 km] Eceaba...	
8230	Marmara Denizi - [12.14 km] Marmaraereğlisi (T...	
9647	Marmara Denizi - [20.08 km] Marmara (Balıkesir)	
11263	Ege Denizi - Saros Körfezi - [08.41 km] Eceaba...	
14983	Ege Denizi - [12.51 km] Gökçeada (Çanakkale)	
16939	Marmara Denizi - Gemlik Körfezi - [05.09 km] A...	
16958	Bandırma (Balıkesir)	
21304	Ege Denizi - Saros Körfezi - [14.04 km] Enez (...	

	Nearest_Fault	Fault_Length_km	Fault_Width_m	\
101	Kuzey Anadolu Fay Zonu	10.0	2.0	
102	Kuzey Anadolu Fay Zonu Ganos Fayı	15.0	2.0	
629	Kuzey Anadolu Fay Zonu	10.0	2.0	
1915	Kuzey Anadolu Fay Zonu Ganos Fayı	15.0	2.0	

```
3499              Kuzey Anadolu Fay Zonu            27.0            4.0
3801              Kuzey Anadolu Fay Zonu            27.0            4.0
3867              Kuzey Anadolu Fay Zonu            27.0            4.0
3910                          Troya Fayı             6.0            2.0
5739                          Troya Fayı            11.0            2.0
8230   Kuzey Anadolu Fay Zonu Ganos Fayı            15.0            2.0
9647   Kuzey Anadolu Fay Zonu Ganos Fayı            15.0            5.0
11263                         Troya Fayı            11.0            2.0
14983                         Troya Fayı            11.0            2.0
16939             Kuzey Anadolu Fay Zonu            10.0            2.0
16958                    Manyas Fay Zonu            15.0            5.0
21304             Kuzey Anadolu Fay Zonu            11.0            2.0

       Fault_Depth_m  ... Slip_Rate_mm_per_yr  Max_Surface_Slip_m  \
101              3.0  ...                 7.5                 5.0
102              2.0  ...                 5.0                 5.5
629              3.0  ...                 7.5                 5.0
1915             2.0  ...                 5.0                 5.5
3499             4.0  ...                 7.5                 5.0
3801             4.0  ...                 7.5                 5.0
3867             4.0  ...                 7.5                 5.0
3910             4.5  ...                 1.5                 0.8
5739             3.0  ...                 1.5                 0.8
8230             2.0  ...                 5.0                 5.5
9647             2.0  ...                 5.0                 5.5
11263            3.0  ...                 1.5                 0.8
14983            3.0  ...                 1.5                 0.8
16939            3.0  ...                 7.5                 5.0
16958            2.0  ...                 0.8                 0.5
21304            3.0  ...                 7.5                 5.0

       Recurrence_Interval_yr  Last_Event_Year  Last_Event_Mw  \
101                550.000000      1999.000000            7.4
102                400.000000      1912.000000            7.4
629                550.000000      1999.000000            7.4
1915               400.000000      1912.000000            7.4
3499               550.000000      1999.000000            7.4
3801               550.000000      1999.000000            7.4
3867               550.000000      1999.000000            7.4
3910               566.666667      1910.333333            7.2
5739               566.666667      1910.333333            7.2
```

```
8230              400.000000      1912.000000            7.4
9647              400.000000      1912.000000            7.4
11263             566.666667      1910.333333            7.2
14983             566.666667      1910.333333            7.2
16939             550.000000      1999.000000            7.4
16958             600.000000      1964.000000            6.8
21304             550.000000      1999.000000            7.4

       Elapsed_Time_yr  Slip_Deficit_m  Normalized_Slip_m_per_km  \
101          26.000000          0.1950                  0.004167
102         113.000000          0.5650                  0.115789
629          26.000000          0.1950                  0.004167
1915        113.000000          0.5650                  0.115789
3499         26.000000          0.1950                  0.004167
3801         26.000000          0.1950                  0.004167
3867         26.000000          0.1950                  0.004167
3910        114.666667          0.1720                  0.022857
5739        114.666667          0.1720                  0.022857
8230        113.000000          0.5650                  0.115789
9647        113.000000          0.5650                  0.115789
11263       114.666667          0.1720                  0.022857
14983       114.666667          0.1720                  0.022857
16939        26.000000          0.1950                  0.004167
16958        61.000000          0.0488                  0.013158
21304        26.000000          0.1950                  0.004167

       Moment_Potential_Nm  Mw_Potential
101           1.053000e+20      2.648286
102           1.207688e+19      2.021303
629           1.053000e+20      2.648286
1915          1.207688e+19      2.021303
3499          1.053000e+20      2.648286
3801          1.053000e+20      2.648286
3867          1.053000e+20      2.648286
3910          2.347800e+18      1.547107
5739          2.347800e+18      1.547107
8230          1.207688e+19      2.021303
9647          1.207688e+19      2.021303
11263         2.347800e+18      1.547107
14983         2.347800e+18      1.547107
16939         1.053000e+20      2.648286
```

```
16958         6.675840e+17      1.183004
21304         1.053000e+20      2.648286

[16 rows x 23 columns]
```

30-) DataFrame'de indeksi sıfırlayınız.

In [77]:
```
df_reset = df.reset_index(drop=True)
print(df_reset)
```

```
             Date  Latitude  Longitude  Depth_km  Magnitude_ML  \
0      2025-04-23   40.8394    28.4000     15.05           2.5
1      2025-04-23   40.8442    28.3108      5.23           2.6
2      2025-04-23   40.8353    28.3511      6.97           2.0
3      2025-04-23   40.8567    28.3014     14.58           3.5
4      2025-04-23   40.8467    28.4094      8.33           2.8
...           ...       ...        ...       ...           ...
21600  2000-04-30   40.5600    29.2100      3.80           2.7
21601  2000-04-30   40.0200    28.8900      1.00           2.9
21602  2000-04-29   40.9000    30.4900      5.70           2.6
21603  2000-04-28   40.3700    29.1400     10.40           3.2
21604  2000-04-23   39.5600    26.1100     13.80           3.2

                                          Location  \
0      Marmara Denizi - [20.67 km] Büyükçekmece (İsta...
1      Marmara Denizi - [24.05 km] Büyükçekmece (İsta...
2      Marmara Denizi - [22.91 km] Büyükçekmece (İsta...
3         Marmara Denizi - [23.07 km] Silivri (İstanbul)
4      Marmara Denizi - [19.63 km] Büyükçekmece (İsta...
...                                                  ...
21600                                Merkez (Yalova)
21601                               Orhaneli (Bursa)
21602                             Söğütlü (Sakarya)
21603                                Gemlik (Bursa)
21604                           Ayvacık (Çanakkale)

               Nearest_Fault  Fault_Length_km  Fault_Width_m  Fault_Depth_m  \
0      Kuzey Anadolu Fay Zonu             10.0            2.0            3.0
1      Kuzey Anadolu Fay Zonu             10.0            2.0            3.0
2      Kuzey Anadolu Fay Zonu             10.0            2.0            3.0
3      Kuzey Anadolu Fay Zonu             10.0            2.0            3.0
4      Kuzey Anadolu Fay Zonu             10.0            2.0            3.0
...                       ...              ...            ...            ...
21600  Kuzey Anadolu Fay Zonu             25.0            2.0            3.7
21601          Orhaneli Fayı              15.0            4.0            3.0
21602  Kuzey Anadolu Fay Zonu             19.0            2.7            1.5
21603  Kuzey Anadolu Fay Zonu             10.0            2.0            3.0
21604             Troya Fayı               6.0            2.0            4.5

       ... Slip_Rate_mm_per_yr  Max_Surface_Slip_m  Recurrence_Interval_yr  \
0      ...                 7.5            5.000000              550.000000
```

```
1      ...                7.5           5.000000             550.000000
2      ...                7.5           5.000000             550.000000
3      ...                7.5           5.000000             550.000000
4      ...                7.5           5.000000             550.000000
...    ...                ...                ...                    ...
21600  ...                7.5           5.000000             550.000000
21601  ...                2.5           1.433333             700.000000
21602  ...                7.5           5.000000             550.000000
21603  ...                7.5           5.000000             550.000000
21604  ...                1.5           0.800000             566.666667

       Last_Event_Year  Last_Event_Mw  Elapsed_Time_yr  Slip_Deficit_m  \
0          1999.000000            7.4        26.000000           0.195
1          1999.000000            7.4        26.000000           0.195
2          1999.000000            7.4        26.000000           0.195
3          1999.000000            7.4        26.000000           0.195
4          1999.000000            7.4        26.000000           0.195
...                ...            ...              ...             ...
21600      1999.000000            7.4        26.000000           0.195
21601      1855.000000            6.9       170.000000           0.425
21602      1999.000000            7.4        26.000000           0.195
21603      1999.000000            7.4        26.000000           0.195
21604      1910.333333            7.2       114.666667           0.172

       Normalized_Slip_m_per_km  Moment_Potential_Nm  Mw_Potential
0                      0.004167         1.053000e+20      2.648286
1                      0.004167         1.053000e+20      2.648286
2                      0.004167         1.053000e+20      2.648286
3                      0.004167         1.053000e+20      2.648286
4                      0.004167         1.053000e+20      2.648286
...                         ...                  ...           ...
21600                  0.004167         1.053000e+20      2.648286
21601                  0.047778         5.100000e+18      1.771713
21602                  0.004167         1.053000e+20      2.648286
21603                  0.004167         1.053000e+20      2.648286
21604                  0.022857         2.347800e+18      1.547107

[21605 rows x 23 columns]
```

31-) dataFrame'e yeni bir sütun ilave ediniz.

In [79]:
```
df['New_Column'] = 'New Value'
print(df)
```

```
             Date  Latitude  Longitude  Depth_km  Magnitude_ML  \
0      2025-04-23   40.8394    28.4000     15.05           2.5
1      2025-04-23   40.8442    28.3108      5.23           2.6
2      2025-04-23   40.8353    28.3511      6.97           2.0
3      2025-04-23   40.8567    28.3014     14.58           3.5
4      2025-04-23   40.8467    28.4094      8.33           2.8
...           ...       ...        ...       ...           ...
21600  2000-04-30   40.5600    29.2100      3.80           2.7
21601  2000-04-30   40.0200    28.8900      1.00           2.9
21602  2000-04-29   40.9000    30.4900      5.70           2.6
21603  2000-04-28   40.3700    29.1400     10.40           3.2
21604  2000-04-23   39.5600    26.1100     13.80           3.2

                                          Location  \
0      Marmara Denizi - [20.67 km] Büyükçekmece (İsta...
1      Marmara Denizi - [24.05 km] Büyükçekmece (İsta...
2      Marmara Denizi - [22.91 km] Büyükçekmece (İsta...
3         Marmara Denizi - [23.07 km] Silivri (İstanbul)
4      Marmara Denizi - [19.63 km] Büyükçekmece (İsta...
...                                                  ...
21600                                Merkez (Yalova)
21601                               Orhaneli (Bursa)
21602                             Söğütlü (Sakarya)
21603                                Gemlik (Bursa)
21604                            Ayvacık (Çanakkale)

               Nearest_Fault  Fault_Length_km  Fault_Width_m  Fault_Depth_m  \
0      Kuzey Anadolu Fay Zonu             10.0            2.0            3.0
1      Kuzey Anadolu Fay Zonu             10.0            2.0            3.0
2      Kuzey Anadolu Fay Zonu             10.0            2.0            3.0
3      Kuzey Anadolu Fay Zonu             10.0            2.0            3.0
4      Kuzey Anadolu Fay Zonu             10.0            2.0            3.0
...                       ...              ...            ...            ...
21600  Kuzey Anadolu Fay Zonu             25.0            2.0            3.7
21601          Orhaneli Fayı              15.0            4.0            3.0
21602  Kuzey Anadolu Fay Zonu             19.0            2.7            1.5
21603  Kuzey Anadolu Fay Zonu             10.0            2.0            3.0
21604             Troya Fayı               6.0            2.0            4.5

       ... Max_Surface_Slip_m  Recurrence_Interval_yr  Last_Event_Year  \
0      ...           5.000000              550.000000      1999.000000
```

```
1      ...           5.000000              550.000000      1999.000000
2      ...           5.000000              550.000000      1999.000000
3      ...           5.000000              550.000000      1999.000000
4      ...           5.000000              550.000000      1999.000000
...    ...                ...                     ...             ...
21600  ...           5.000000              550.000000      1999.000000
21601  ...           1.433333              700.000000      1855.000000
21602  ...           5.000000              550.000000      1999.000000
21603  ...           5.000000              550.000000      1999.000000
21604  ...           0.800000              566.666667      1910.333333

       Last_Event_Mw  Elapsed_Time_yr  Slip_Deficit_m  \
0                7.4        26.000000           0.195
1                7.4        26.000000           0.195
2                7.4        26.000000           0.195
3                7.4        26.000000           0.195
4                7.4        26.000000           0.195
...              ...              ...             ...
21600            7.4        26.000000           0.195
21601            6.9       170.000000           0.425
21602            7.4        26.000000           0.195
21603            7.4        26.000000           0.195
21604            7.2       114.666667           0.172

       Normalized_Slip_m_per_km  Moment_Potential_Nm  Mw_Potential  New_Column
0                      0.004167         1.053000e+20      2.648286   New Value
1                      0.004167         1.053000e+20      2.648286   New Value
2                      0.004167         1.053000e+20      2.648286   New Value
3                      0.004167         1.053000e+20      2.648286   New Value
4                      0.004167         1.053000e+20      2.648286   New Value
...                         ...                  ...           ...         ...
21600                  0.004167         1.053000e+20      2.648286   New Value
21601                  0.047778         5.100000e+18      1.771713   New Value
21602                  0.004167         1.053000e+20      2.648286   New Value
21603                  0.004167         1.053000e+20      2.648286   New Value
21604                  0.022857         2.347800e+18      1.547107   New Value

[21605 rows x 24 columns]
```

32-) DataFrame'den bir sütunu geçici olarak siliniz.

In [81]:
```
df_temp = df.drop('New_Column', axis=1)
print(df_temp)
```

```
             Date  Latitude  Longitude  Depth_km  Magnitude_ML  \
0      2025-04-23   40.8394    28.4000     15.05           2.5
1      2025-04-23   40.8442    28.3108      5.23           2.6
2      2025-04-23   40.8353    28.3511      6.97           2.0
3      2025-04-23   40.8567    28.3014     14.58           3.5
4      2025-04-23   40.8467    28.4094      8.33           2.8
...           ...       ...        ...       ...           ...
21600  2000-04-30   40.5600    29.2100      3.80           2.7
21601  2000-04-30   40.0200    28.8900      1.00           2.9
21602  2000-04-29   40.9000    30.4900      5.70           2.6
21603  2000-04-28   40.3700    29.1400     10.40           3.2
21604  2000-04-23   39.5600    26.1100     13.80           3.2

                                            Location  \
0      Marmara Denizi - [20.67 km] Büyükçekmece (İsta...
1      Marmara Denizi - [24.05 km] Büyükçekmece (İsta...
2      Marmara Denizi - [22.91 km] Büyükçekmece (İsta...
3         Marmara Denizi - [23.07 km] Silivri (İstanbul)
4      Marmara Denizi - [19.63 km] Büyükçekmece (İsta...
...                                                  ...
21600                                 Merkez (Yalova)
21601                                Orhaneli (Bursa)
21602                              Söğütlü (Sakarya)
21603                                 Gemlik (Bursa)
21604                              Ayvacık (Çanakkale)

                Nearest_Fault  Fault_Length_km  Fault_Width_m  Fault_Depth_m  \
0      Kuzey Anadolu Fay Zonu             10.0            2.0            3.0
1      Kuzey Anadolu Fay Zonu             10.0            2.0            3.0
2      Kuzey Anadolu Fay Zonu             10.0            2.0            3.0
3      Kuzey Anadolu Fay Zonu             10.0            2.0            3.0
4      Kuzey Anadolu Fay Zonu             10.0            2.0            3.0
...                       ...              ...            ...            ...
21600  Kuzey Anadolu Fay Zonu             25.0            2.0            3.7
21601           Orhaneli Fayı             15.0            4.0            3.0
21602  Kuzey Anadolu Fay Zonu             19.0            2.7            1.5
21603  Kuzey Anadolu Fay Zonu             10.0            2.0            3.0
21604              Troya Fayı              6.0            2.0            4.5

       ... Slip_Rate_mm_per_yr  Max_Surface_Slip_m  Recurrence_Interval_yr  \
0      ...                 7.5            5.000000              550.000000
```

```
1      ...                7.5           5.000000             550.000000
2      ...                7.5           5.000000             550.000000
3      ...                7.5           5.000000             550.000000
4      ...                7.5           5.000000             550.000000
...    ...                ...                ...                    ...
21600  ...                7.5           5.000000             550.000000
21601  ...                2.5           1.433333             700.000000
21602  ...                7.5           5.000000             550.000000
21603  ...                7.5           5.000000             550.000000
21604  ...                1.5           0.800000             566.666667

       Last_Event_Year  Last_Event_Mw  Elapsed_Time_yr  Slip_Deficit_m  \
0          1999.000000            7.4        26.000000           0.195
1          1999.000000            7.4        26.000000           0.195
2          1999.000000            7.4        26.000000           0.195
3          1999.000000            7.4        26.000000           0.195
4          1999.000000            7.4        26.000000           0.195
...                ...            ...              ...             ...
21600      1999.000000            7.4        26.000000           0.195
21601      1855.000000            6.9       170.000000           0.425
21602      1999.000000            7.4        26.000000           0.195
21603      1999.000000            7.4        26.000000           0.195
21604      1910.333333            7.2       114.666667           0.172

       Normalized_Slip_m_per_km  Moment_Potential_Nm  Mw_Potential
0                      0.004167         1.053000e+20      2.648286
1                      0.004167         1.053000e+20      2.648286
2                      0.004167         1.053000e+20      2.648286
3                      0.004167         1.053000e+20      2.648286
4                      0.004167         1.053000e+20      2.648286
...                         ...                  ...           ...
21600                  0.004167         1.053000e+20      2.648286
21601                  0.047778         5.100000e+18      1.771713
21602                  0.004167         1.053000e+20      2.648286
21603                  0.004167         1.053000e+20      2.648286
21604                  0.022857         2.347800e+18      1.547107

[21605 rows x 23 columns]
```

33-) DataFrame'den bir sütunu kalıcı olarak siliniz.

In [83]:
```
df.drop('New_Column', axis=1, inplace=True)
print(df)
```

```
             Date  Latitude  Longitude  Depth_km  Magnitude_ML  \
0      2025-04-23   40.8394    28.4000     15.05           2.5
1      2025-04-23   40.8442    28.3108      5.23           2.6
2      2025-04-23   40.8353    28.3511      6.97           2.0
3      2025-04-23   40.8567    28.3014     14.58           3.5
4      2025-04-23   40.8467    28.4094      8.33           2.8
...           ...       ...        ...       ...           ...
21600  2000-04-30   40.5600    29.2100      3.80           2.7
21601  2000-04-30   40.0200    28.8900      1.00           2.9
21602  2000-04-29   40.9000    30.4900      5.70           2.6
21603  2000-04-28   40.3700    29.1400     10.40           3.2
21604  2000-04-23   39.5600    26.1100     13.80           3.2

                                            Location  \
0      Marmara Denizi - [20.67 km] Büyükçekmece (İsta...
1      Marmara Denizi - [24.05 km] Büyükçekmece (İsta...
2      Marmara Denizi - [22.91 km] Büyükçekmece (İsta...
3         Marmara Denizi - [23.07 km] Silivri (İstanbul)
4      Marmara Denizi - [19.63 km] Büyükçekmece (İsta...
...                                                  ...
21600                                 Merkez (Yalova)
21601                                Orhaneli (Bursa)
21602                              Söğütlü (Sakarya)
21603                                 Gemlik (Bursa)
21604                              Ayvacık (Çanakkale)

                Nearest_Fault  Fault_Length_km  Fault_Width_m  Fault_Depth_m  \
0      Kuzey Anadolu Fay Zonu             10.0            2.0            3.0
1      Kuzey Anadolu Fay Zonu             10.0            2.0            3.0
2      Kuzey Anadolu Fay Zonu             10.0            2.0            3.0
3      Kuzey Anadolu Fay Zonu             10.0            2.0            3.0
4      Kuzey Anadolu Fay Zonu             10.0            2.0            3.0
...                       ...              ...            ...            ...
21600  Kuzey Anadolu Fay Zonu             25.0            2.0            3.7
21601           Orhaneli Fayı             15.0            4.0            3.0
21602  Kuzey Anadolu Fay Zonu             19.0            2.7            1.5
21603  Kuzey Anadolu Fay Zonu             10.0            2.0            3.0
21604              Troya Fayı              6.0            2.0            4.5

       ... Slip_Rate_mm_per_yr  Max_Surface_Slip_m  Recurrence_Interval_yr  \
0      ...                 7.5            5.000000              550.000000
```

```
1      ...                7.5           5.000000             550.000000
2      ...                7.5           5.000000             550.000000
3      ...                7.5           5.000000             550.000000
4      ...                7.5           5.000000             550.000000
...    ...                ...                ...                    ...
21600  ...                7.5           5.000000             550.000000
21601  ...                2.5           1.433333             700.000000
21602  ...                7.5           5.000000             550.000000
21603  ...                7.5           5.000000             550.000000
21604  ...                1.5           0.800000             566.666667

       Last_Event_Year  Last_Event_Mw  Elapsed_Time_yr  Slip_Deficit_m  \
0          1999.000000            7.4        26.000000           0.195
1          1999.000000            7.4        26.000000           0.195
2          1999.000000            7.4        26.000000           0.195
3          1999.000000            7.4        26.000000           0.195
4          1999.000000            7.4        26.000000           0.195
...                ...            ...              ...             ...
21600      1999.000000            7.4        26.000000           0.195
21601      1855.000000            6.9       170.000000           0.425
21602      1999.000000            7.4        26.000000           0.195
21603      1999.000000            7.4        26.000000           0.195
21604      1910.333333            7.2       114.666667           0.172

       Normalized_Slip_m_per_km  Moment_Potential_Nm  Mw_Potential
0                      0.004167         1.053000e+20      2.648286
1                      0.004167         1.053000e+20      2.648286
2                      0.004167         1.053000e+20      2.648286
3                      0.004167         1.053000e+20      2.648286
4                      0.004167         1.053000e+20      2.648286
...                         ...                  ...           ...
21600                  0.004167         1.053000e+20      2.648286
21601                  0.047778         5.100000e+18      1.771713
21602                  0.004167         1.053000e+20      2.648286
21603                  0.004167         1.053000e+20      2.648286
21604                  0.022857         2.347800e+18      1.547107

[21605 rows x 23 columns]
```

34-) DataFrame hakkında genel bilgiyi ekranda listeleyiniz.

In [85]:
```
df.info()
```

```
<class 'pandas.core.frame.DataFrame'>
RangeIndex: 21605 entries, 0 to 21604
Data columns (total 23 columns):
 #   Column                    Non-Null Count  Dtype  
---  ------                    --------------  -----  
 0   Date                      21605 non-null  object 
 1   Latitude                  21605 non-null  float64
 2   Longitude                 21605 non-null  float64
 3   Depth_km                  21605 non-null  float64
 4   Magnitude_ML              21605 non-null  float64
 5   Location                  21605 non-null  object 
 6   Nearest_Fault             21605 non-null  object 
 7   Fault_Length_km           21605 non-null  float64
 8   Fault_Width_m             21605 non-null  float64
 9   Fault_Depth_m             21605 non-null  float64
 10  Fault_Type                21605 non-null  object 
 11  Length_km                 21605 non-null  float64
 12  Seismogenic_Depth_km      21605 non-null  float64
 13  Slip_Rate_mm_per_yr       21605 non-null  float64
 14  Max_Surface_Slip_m        21605 non-null  float64
 15  Recurrence_Interval_yr    21605 non-null  float64
 16  Last_Event_Year           21605 non-null  float64
 17  Last_Event_Mw             21605 non-null  float64
 18  Elapsed_Time_yr           21605 non-null  float64
 19  Slip_Deficit_m            21605 non-null  float64
 20  Normalized_Slip_m_per_km  21605 non-null  float64
 21  Moment_Potential_Nm       21605 non-null  float64
 22  Mw_Potential              21605 non-null  float64
dtypes: float64(19), object(4)
memory usage: 3.8+ MB
```

In [87]:
```
pip install pyjanitor
```

```
Collecting pyjanitor
  Downloading pyjanitor-0.31.0-py3-none-any.whl.metadata (6.1 kB)
Collecting natsort (from pyjanitor)
  Downloading natsort-8.4.0-py3-none-any.whl.metadata (21 kB)
Collecting pandas_flavor (from pyjanitor)
  Downloading pandas_flavor-0.7.0-py3-none-any.whl.metadata (6.7 kB)
Requirement already satisfied: multipledispatch in c:\users\user\anaconda3\lib\site-packages (from pyjanitor) (0.6.0)
Requirement already satisfied: scipy in c:\users\user\anaconda3\lib\site-packages (from pyjanitor) (1.13.1)
Requirement already satisfied: six in c:\users\user\anaconda3\lib\site-packages (from multipledispatch->pyjanitor) (1.16.0)
Requirement already satisfied: pandas>=0.23 in c:\users\user\anaconda3\lib\site-packages (from pandas_flavor->pyjanitor) (2.2.
2)
Requirement already satisfied: xarray in c:\users\user\anaconda3\lib\site-packages (from pandas_flavor->pyjanitor) (2023.6.0)
Requirement already satisfied: numpy<2.3,>=1.22.4 in c:\users\user\anaconda3\lib\site-packages (from scipy->pyjanitor) (1.26.4)
Requirement already satisfied: python-dateutil>=2.8.2 in c:\users\user\anaconda3\lib\site-packages (from pandas>=0.23->pandas_f
lavor->pyjanitor) (2.9.0.post0)
Requirement already satisfied: pytz>=2020.1 in c:\users\user\anaconda3\lib\site-packages (from pandas>=0.23->pandas_flavor->pyj
anitor) (2024.1)
Requirement already satisfied: tzdata>=2022.7 in c:\users\user\anaconda3\lib\site-packages (from pandas>=0.23->pandas_flavor->p
yjanitor) (2023.3)
Requirement already satisfied: packaging>=21.3 in c:\users\user\anaconda3\lib\site-packages (from xarray->pandas_flavor->pyjani
tor) (24.1)
Downloading pyjanitor-0.31.0-py3-none-any.whl (215 kB)
Downloading natsort-8.4.0-py3-none-any.whl (38 kB)
Downloading pandas_flavor-0.7.0-py3-none-any.whl (8.4 kB)
Installing collected packages: natsort, pandas_flavor, pyjanitor
Successfully installed natsort-8.4.0 pandas_flavor-0.7.0 pyjanitor-0.31.0
Note: you may need to restart the kernel to use updated packages.
```

35-) Pyjanitor Kütüphanesi ile veri temizleme işlemi yapınız.

In [91]:
```
df = df.drop(columns=['Longitude', 'Depth_km'])

print(df)
```

```
             Date  Latitude  Magnitude_ML  \
0      2025-04-23   40.8394           2.5
1      2025-04-23   40.8442           2.6
2      2025-04-23   40.8353           2.0
3      2025-04-23   40.8567           3.5
4      2025-04-23   40.8467           2.8
...           ...       ...           ...
21600  2000-04-30   40.5600           2.7
21601  2000-04-30   40.0200           2.9
21602  2000-04-29   40.9000           2.6
21603  2000-04-28   40.3700           3.2
21604  2000-04-23   39.5600           3.2

                                          Location  \
0      Marmara Denizi - [20.67 km] Büyükçekmece (İsta...
1      Marmara Denizi - [24.05 km] Büyükçekmece (İsta...
2      Marmara Denizi - [22.91 km] Büyükçekmece (İsta...
3         Marmara Denizi - [23.07 km] Silivri (İstanbul)
4      Marmara Denizi - [19.63 km] Büyükçekmece (İsta...
...                                                  ...
21600                                Merkez (Yalova)
21601                               Orhaneli (Bursa)
21602                             Söğütlü (Sakarya)
21603                                Gemlik (Bursa)
21604                            Ayvacık (Çanakkale)

               Nearest_Fault  Fault_Length_km  Fault_Width_m  Fault_Depth_m  \
0      Kuzey Anadolu Fay Zonu             10.0            2.0            3.0
1      Kuzey Anadolu Fay Zonu             10.0            2.0            3.0
2      Kuzey Anadolu Fay Zonu             10.0            2.0            3.0
3      Kuzey Anadolu Fay Zonu             10.0            2.0            3.0
4      Kuzey Anadolu Fay Zonu             10.0            2.0            3.0
...                       ...              ...            ...            ...
21600  Kuzey Anadolu Fay Zonu             25.0            2.0            3.7
21601          Orhaneli Fayı              15.0            4.0            3.0
21602  Kuzey Anadolu Fay Zonu             19.0            2.7            1.5
21603  Kuzey Anadolu Fay Zonu             10.0            2.0            3.0
21604             Troya Fayı               6.0            2.0            4.5

                Fault_Type  Length_km  ...  Slip_Rate_mm_per_yr  \
0              strike-slip     1200.0  ...                  7.5
```

```
1              strike-slip     1200.0  ...                 7.5
2              strike-slip     1200.0  ...                 7.5
3              strike-slip     1200.0  ...                 7.5
4              strike-slip     1200.0  ...                 7.5
...                    ...        ...  ...                 ...
21600          strike-slip     1200.0  ...                 7.5
21601  strike-slip + thrust       30.0  ...                 2.5
21602          strike-slip     1200.0  ...                 7.5
21603          strike-slip     1200.0  ...                 7.5
21604   oblique / uncertain       35.0  ...                 1.5

       Max_Surface_Slip_m  Recurrence_Interval_yr  Last_Event_Year  \
0                5.000000              550.000000      1999.000000
1                5.000000              550.000000      1999.000000
2                5.000000              550.000000      1999.000000
3                5.000000              550.000000      1999.000000
4                5.000000              550.000000      1999.000000
...                   ...                     ...              ...
21600            5.000000              550.000000      1999.000000
21601            1.433333              700.000000      1855.000000
21602            5.000000              550.000000      1999.000000
21603            5.000000              550.000000      1999.000000
21604            0.800000              566.666667      1910.333333

       Last_Event_Mw  Elapsed_Time_yr  Slip_Deficit_m  \
0                7.4        26.000000           0.195
1                7.4        26.000000           0.195
2                7.4        26.000000           0.195
3                7.4        26.000000           0.195
4                7.4        26.000000           0.195
...              ...              ...             ...
21600            7.4        26.000000           0.195
21601            6.9       170.000000           0.425
21602            7.4        26.000000           0.195
21603            7.4        26.000000           0.195
21604            7.2       114.666667           0.172

       Normalized_Slip_m_per_km  Moment_Potential_Nm  Mw_Potential
0                      0.004167         1.053000e+20      2.648286
1                      0.004167         1.053000e+20      2.648286
2                      0.004167         1.053000e+20      2.648286
```

```
3                    0.004167        1.053000e+20      2.648286
4                    0.004167        1.053000e+20      2.648286
...                       ...                 ...           ...
21600                0.004167        1.053000e+20      2.648286
21601                0.047778        5.100000e+18      1.771713
21602                0.004167        1.053000e+20      2.648286
21603                0.004167        1.053000e+20      2.648286
21604                0.022857        2.347800e+18      1.547107

[21605 rows x 21 columns]
```

36-) Pandas Kütüphanesi versiyonunu bulunuz.

In [93]:
```
print(pd.__version__)
```

```
2.2.2
```

37-) Matplotlib kütüphanesi versiyonunu bulunuz.

In [97]:
```
import matplotlib

print(matplotlib.__version__)
```

```
3.9.2
```

38-) Datasetteki min, max, mean, count değerlerini bulunuz.

In [99]:
```
statistics = df.describe()

print(statistics)
```

```
           Latitude  Magnitude_ML  Fault_Length_km  Fault_Width_m  \
count  21605.000000  21605.000000     21605.000000   21605.000000
mean      40.044204      2.611132        16.268757       3.446420
std        0.446887      0.379102         9.030674       1.404102
min       39.500000      2.000000         4.000000       1.000000
25%       39.669500      2.400000        12.000000       2.000000
50%       39.863900      2.600000        12.000000       4.000000
75%       40.410000      2.800000        20.000000       4.000000
max       41.495100      6.200000       150.000000      15.000000

       Fault_Depth_m     Length_km  Seismogenic_Depth_km  Slip_Rate_mm_per_yr  \
count   21605.000000  21605.000000          21605.000000         21605.000000
mean        3.090678    295.590859             13.813901             3.799171
std         0.868809    474.014082              1.015848             2.181270
min         1.300000      6.000000             11.000000             0.800000
25%         3.000000     30.000000             13.333333             2.500000
50%         3.000000     38.000000             13.333333             2.500000
75%         3.500000     75.000000             15.000000             5.000000
max        10.000000   1200.000000             15.000000             7.500000

       Max_Surface_Slip_m  Recurrence_Interval_yr  Last_Event_Year  \
count        21605.000000            21605.000000     21605.000000
mean             2.781078              585.931497      1901.251346
std              1.821280              115.120716        79.266920
min              0.500000              250.000000      1650.000000
25%              1.433333              550.000000      1855.000000
50%              1.433333              600.000000      1910.333333
75%              5.000000              700.000000      1964.000000
max              5.500000              750.000000      2008.000000

       Last_Event_Mw  Elapsed_Time_yr  Slip_Deficit_m  \
count   21605.000000     21605.000000    21605.000000
mean        7.092886       123.748654        0.370720
std         0.292022        79.266920        0.226238
min         5.000000        17.000000        0.041367
25%         6.900000        61.000000        0.195000
50%         7.000000       114.666667        0.425000
75%         7.400000       170.000000        0.425000
max         7.400000       375.000000        1.250000

       Normalized_Slip_m_per_km  Moment_Potential_Nm  Mw_Potential
```

```
count              21605.000000         2.160500e+04  21605.000000
mean                   0.044596         2.880710e+19      1.982979
std                    0.041890         4.047530e+19      0.412434
min                    0.004167         8.935200e+16      0.600736
25%                    0.013158         5.100000e+18      1.771713
50%                    0.047778         5.100000e+18      1.771713
75%                    0.047778         1.781250e+19      2.133817
max                    0.311111         1.053000e+20      2.648286
```

39-) "pd.pivot.table()" metodunu kullanarak, dataFrame'deki bir sütundan tek indeksli "pivot table" oluşturunuz.

In [103…

```
pivot_table = pd.pivot_table(df, values='Magnitude_ML', index='Fault_Length_km', aggfunc='mean')

print(pivot_table)
```

```
                   Magnitude_ML
Fault_Length_km
4.0                    2.583333
6.0                    2.500801
7.0                    2.587773
8.0                    2.552727
9.0                    2.627500
10.0                   2.604015
11.0                   2.630950
12.0                   2.660503
13.0                   2.619512
14.0                   2.611111
15.0                   2.618661
16.0                   2.613244
19.0                   2.579596
20.0                   2.575422
21.0                   2.644118
22.0                   2.462069
23.0                   2.629412
23.6                   2.652381
23.7                   2.714286
25.0                   2.557981
26.0                   2.566723
27.0                   2.565984
28.0                   2.733333
30.0                   2.587481
32.0                   2.602049
40.0                   2.658065
48.0                   2.564286
50.0                   2.622430
150.0                  2.350000
```

40-) "pd.pivot.table()" metodunu kullanarak, dataFrame'deki birden fazla sütundan çok indeksli

"pivot table" oluşturunuz.

In [105…

```
pivot_table = pd.pivot_table(df, values='Magnitude_ML', index=['Fault_Length_km', 'Seismogenic_Depth_km'], aggfunc='mean')

print(pivot_table)
```

Fault_Length_km	Seismogenic_Depth_km	Magnitude_ML
4.0	15.000000	2.583333
6.0	13.000000	2.500801
7.0	15.000000	2.587773
8.0	11.000000	2.498507
	13.333333	2.526077
	14.333333	2.619847
	15.000000	2.613131
9.0	15.000000	2.627500
10.0	11.000000	2.597248
	12.000000	2.490909
	13.333333	2.554867
	15.000000	2.615167
11.0	13.000000	2.611384
	15.000000	2.735928
12.0	11.000000	2.440000
	13.333333	2.660665
13.0	15.000000	2.619512
14.0	15.000000	2.611111
15.0	12.000000	2.642797
	13.333333	2.622669
	15.000000	2.611212
16.0	15.000000	2.613244
19.0	13.333333	2.581971
	15.000000	2.546667
20.0	11.000000	2.595842
	13.333333	2.526848
	14.000000	2.606250
	15.000000	2.602000
21.0	15.000000	2.644118
22.0	13.000000	2.462500
	15.000000	2.461538
23.0	15.000000	2.629412
23.6	15.000000	2.652381
23.7	15.000000	2.714286
25.0	14.000000	2.733333
	15.000000	2.556738
26.0	12.000000	2.615254
	15.000000	2.519000
27.0	15.000000	2.565984

```
28.0            15.000000               2.733333
30.0            14.000000               2.567581
                15.000000               2.595962
32.0            14.333333               2.600211
                15.000000               2.664286
40.0            15.000000               2.658065
48.0            13.000000               2.564286
50.0            13.333333               2.645833
                14.000000               2.609329
150.0           15.000000               2.350000
```

41-) Pivot_table'da "aggfunc=np.sum" fonksiyonunu kullanınız.

In [109…

```
import numpy as np
pivot_table = pd.pivot_table(df, values='Magnitude_ML', index=['Fault_Length_km', 'Seismogenic_Depth_km'], aggfunc=np.sum)

print(pivot_table)
```

Fault_Length_km	Seismogenic_Depth_km	Magnitude_ML
4.0	15.000000	15.5
6.0	13.000000	3433.6
7.0	15.000000	592.6
8.0	11.000000	167.4
	13.333333	1055.9
	14.333333	343.2
	15.000000	258.7
9.0	15.000000	210.2
10.0	11.000000	283.1
	12.000000	191.8
	13.333333	288.7
	15.000000	3517.4
11.0	13.000000	2339.8
	15.000000	456.9
12.0	11.000000	12.2
	13.333333	18087.2
13.0	15.000000	214.8
14.0	15.000000	634.5
15.0	12.000000	1247.4
	13.333333	1631.3
	15.000000	4867.3
16.0	15.000000	1361.5
19.0	13.333333	1074.1
	15.000000	76.4
20.0	11.000000	1186.3
	13.333333	649.4
	14.000000	41.7
	15.000000	260.2
21.0	15.000000	89.9
22.0	13.000000	39.4
	15.000000	32.0
23.0	15.000000	44.7
23.6	15.000000	55.7
23.7	15.000000	19.0
25.0	14.000000	8.2
	15.000000	1081.5
26.0	12.000000	771.5
	15.000000	755.7
27.0	15.000000	2632.7

```
28.0            15.000000                8.2
30.0            14.000000             1029.6
                15.000000             2442.8
32.0            14.333333             1232.5
                15.000000               37.3
40.0            15.000000               82.4
48.0            13.000000              143.6
50.0            13.333333              508.0
                14.000000              895.0
150.0           15.000000                4.7
```

```
C:\Users\USER\AppData\Local\Temp\ipykernel_13884\1606527201.py:2: FutureWarning: The provided callable <function sum at 0x00000
2670B0B7380> is currently using DataFrameGroupBy.sum. In a future version of pandas, the provided callable will be used directl
y. To keep current behavior pass the string "sum" instead.
  pivot_table = pd.pivot_table(df, values='Magnitude_ML', index=['Fault_Length_km', 'Seismogenic_Depth_km'], aggfunc=np.sum)
```

42-) dataFrame'i CSV dosyası olarak kaydediniz.

In [111…

```
file_path = r'C:\Users\USER\Desktop\output_file.csv'

df.to_csv(file_path, index=False)

print(f"DataFrame başarıyla {file_path} olarak kaydedildi.")
```

```
DataFrame başarıyla C:\Users\USER\Desktop\output_file.csv olarak kaydedildi.
```

43-) dataFrame'i excel dosyası olarak kaydediniz.

In [113…

```
file_path = r'C:\Users\USER\Desktop\output_file.xlsx'
df.to_excel(file_path, index=False)

print(f"DataFrame başarıyla {file_path} olarak kaydedildi.")
```

```
DataFrame başarıyla C:\Users\USER\Desktop\output_file.xlsx olarak kaydedildi.
```

44-) dataFrame'i html dosyası olarak kaydediniz.

In [115…

```
file_path = r'C:\Users\USER\Desktop\output_file.html'
df.to_html(file_path, index=False)

print(f"DataFrame başarıyla {file_path} olarak kaydedildi.")
```

```
DataFrame başarıyla C:\Users\USER\Desktop\output_file.html olarak kaydedildi.
```

45-) dataFrame'i JSON dosyası olarak kaydediniz.

In [117…
```
file_path = r'C:\Users\USER\Desktop\output_file.json'

df.to_json(file_path, orient='records', lines=True)

print(f"DataFrame başarıyla {file_path} olarak kaydedildi.")
```

```
DataFrame başarıyla C:\Users\USER\Desktop\output_file.json olarak kaydedildi.
```

46-) dataFrame'i txt dosya olarak kaydediniz.

In [119…
```
file_path = r'C:\Users\USER\Desktop\output_file.txt'
df.to_csv(file_path, sep='\t', index=False)

print(f"DataFrame başarıyla {file_path} olarak kaydedildi.")
```

```
DataFrame başarıyla C:\Users\USER\Desktop\output_file.txt olarak kaydedildi.
```

47-) dataFrame'deki bir sütunu küçükten büyüğe sıralayınız.

In [121…
```
df_sorted = df.sort_values(by='Magnitude_ML', ascending=True)

print(df_sorted)
```

```
            Date  Latitude  Magnitude_ML  \
6497  2013-08-16   39.6798           2.0
8352  2012-05-17   39.5132           2.0
2769  2017-08-05   40.2345           2.0
2773  2017-07-31   39.5461           2.0
2776  2017-07-28   39.6816           2.0
...          ...       ...           ...
3867  2017-02-06   39.5275           5.3
5739  2014-05-24   40.3951           5.3
1915  2019-09-26   40.8818           5.8
101   2025-04-23   40.8369           5.9
102   2025-04-23   40.8600           6.2

                                          Location  \
6497                              Tavşanlı (Kütahya)
8352                            Altıeylül (Balıkesir)
2769                                  Nilüfer (Bursa)
2773                              Ayvacık (Çanakkale)
2776                               Karesi (Balıkesir)
...                                              ...
3867                              Ayvacık (Çanakkale)
5739  Ege Denizi - Saros Körfezi - [08.21 km] Eceaba...
1915     Marmara Denizi - [21.07 km] Silivri (İstanbul)
101   Marmara Denizi - [23.88 km] Büyükçekmece (İsta...
102      Marmara Denizi - [23.16 km] Silivri (İstanbul)

                        Nearest_Fault  Fault_Length_km  Fault_Width_m  \
6497                       Orhaneli Fayı             12.0            4.0
8352               Havran-Balıkesir Fayı              8.0            3.5
2769  Kuzey Anadolu Fay Zonu Ulubat Fayı              7.0            2.0
2773              Kuzey Anadolu Fay Zonu             27.0            4.0
2776               Havran-Balıkesir Fayı             19.0            3.5
...                                  ...              ...            ...
3867              Kuzey Anadolu Fay Zonu             27.0            4.0
5739                         Troya Fayı             11.0            2.0
1915   Kuzey Anadolu Fay Zonu Ganos Fayı             15.0            2.0
101               Kuzey Anadolu Fay Zonu             10.0            2.0
102    Kuzey Anadolu Fay Zonu Ganos Fayı             15.0            2.0

      Fault_Depth_m                   Fault_Type  Length_km  ...  \
6497            3.0         strike-slip + thrust       30.0  ...
```

```
8352            3.5   strike-slip + transpression       75.0  ...
2769            3.0  strike-slip + minor vertical       50.0  ...
2773            4.0                   strike-slip     1200.0  ...
2776            3.5   strike-slip + transpression       75.0  ...
...             ...                           ...        ...  ...
3867            4.0                   strike-slip     1200.0  ...
5739            3.0           oblique / uncertain       35.0  ...
1915            2.0                   strike-slip       47.5  ...
101             3.0                   strike-slip     1200.0  ...
102             2.0                   strike-slip       47.5  ...

      Slip_Rate_mm_per_yr  Max_Surface_Slip_m  Recurrence_Interval_yr  \
6497                  2.5            1.433333              700.000000
8352                  2.5            1.433333              600.000000
2769                  3.5            3.000000              650.000000
2773                  7.5            5.000000              550.000000
2776                  2.5            1.433333              600.000000
...                   ...                 ...                     ...
3867                  7.5            5.000000              550.000000
5739                  1.5            0.800000              566.666667
1915                  5.0            5.500000              400.000000
101                   7.5            5.000000              550.000000
102                   5.0            5.500000              400.000000

      Last_Event_Year  Last_Event_Mw  Elapsed_Time_yr  Slip_Deficit_m  \
6497      1855.000000            6.9       170.000000          0.4250
8352      1898.000000            6.9       127.000000          0.3175
2769      1855.000000            7.0       170.000000          0.5950
2773      1999.000000            7.4        26.000000          0.1950
2776      1898.000000            6.9       127.000000          0.3175
...               ...            ...              ...             ...
3867      1999.000000            7.4        26.000000          0.1950
5739      1910.333333            7.2       114.666667          0.1720
1915      1912.000000            7.4       113.000000          0.5650
101       1999.000000            7.4        26.000000          0.1950
102       1912.000000            7.4       113.000000          0.5650

      Normalized_Slip_m_per_km  Moment_Potential_Nm  Mw_Potential
6497                  0.047778         5.100000e+18      1.771713
8352                  0.019111         9.525000e+18      1.952577
2769                  0.060000         1.338750e+19      2.051133
```

```
2773                0.004167        1.053000e+20      2.648286
2776                0.019111        9.525000e+18      1.952577
...                      ...                 ...           ...
3867                0.004167        1.053000e+20      2.648286
5739                0.022857        2.347800e+18      1.547107
1915                0.115789        1.207688e+19      2.021303
101                 0.004167        1.053000e+20      2.648286
102                 0.115789        1.207688e+19      2.021303

[21605 rows x 21 columns]
```

48-)dataFrame'deki bir sütunu büyükten küçüğe sıralayınız.

In [123…

```
df_sorted_desc = df.sort_values(by='Magnitude_ML', ascending=False)

print(df_sorted_desc)
```

```
            Date  Latitude  Magnitude_ML  \
102   2025-04-23   40.8600           6.2
101   2025-04-23   40.8369           5.9
1915  2019-09-26   40.8818           5.8
3499  2017-02-12   39.5336           5.3
3867  2017-02-06   39.5275           5.3
...          ...       ...           ...
6067  2013-10-29   40.1705           2.0
2693  2017-10-02   39.8106           2.0
502   2024-02-12   40.2864           2.0
503   2024-02-12   40.2989           2.0
1176  2021-12-20   40.6345           2.0

                                          Location  \
102      Marmara Denizi - [23.16 km] Silivri (İstanbul)
101   Marmara Denizi - [23.88 km] Büyükçekmece (İsta...
1915     Marmara Denizi - [21.07 km] Silivri (İstanbul)
3499                               Ayvacık (Çanakkale)
3867                               Ayvacık (Çanakkale)
...                                                ...
6067        Ege Denizi - [10.15 km] Eceabat (Çanakkale)
2693                          Mustafakemalpaşa (Bursa)
502                                  Biga (Çanakkale)
503                                  Biga (Çanakkale)
1176    Marmara Denizi - [11.07 km] Marmara (Balıkesir)

                        Nearest_Fault  Fault_Length_km  Fault_Width_m  \
102   Kuzey Anadolu Fay Zonu Ganos Fayı             15.0            2.0
101             Kuzey Anadolu Fay Zonu             10.0            2.0
1915  Kuzey Anadolu Fay Zonu Ganos Fayı             15.0            2.0
3499            Kuzey Anadolu Fay Zonu             27.0            4.0
3867            Kuzey Anadolu Fay Zonu             27.0            4.0
...                                ...              ...            ...
6067                        Troya Fayı             11.0            2.0
2693             Mustafakemalpaşa Fayı             20.0            4.0
502             Kuzey Anadolu Fay Zonu             10.0            5.0
503             Kuzey Anadolu Fay Zonu             10.0            5.0
1176  Kuzey Anadolu Fay Zonu Ganos Fayı             15.0            3.0

      Fault_Depth_m                 Fault_Type  Length_km  ...  \
102             2.0                strike-slip       47.5  ...
```

```
101            3.0                strike-slip     1200.0  ...
1915           2.0                strike-slip       47.5  ...
3499           4.0                strike-slip     1200.0  ...
3867           4.0                strike-slip     1200.0  ...
...            ...                        ...        ...  ...
6067           3.0        oblique / uncertain       35.0  ...
2693           2.3  strike-slip + minor normal       47.5  ...
502            1.5                strike-slip     1200.0  ...
503            1.5                strike-slip     1200.0  ...
1176           1.5                strike-slip       47.5  ...

      Slip_Rate_mm_per_yr  Max_Surface_Slip_m  Recurrence_Interval_yr  \
102                   5.0            5.500000              400.000000
101                   7.5            5.000000              550.000000
1915                  5.0            5.500000              400.000000
3499                  7.5            5.000000              550.000000
3867                  7.5            5.000000              550.000000
...                   ...                 ...                     ...
6067                  1.5            0.800000              566.666667
2693                  2.5            1.433333              750.000000
502                   7.5            5.000000              550.000000
503                   7.5            5.000000              550.000000
1176                  5.0            5.500000              400.000000

      Last_Event_Year  Last_Event_Mw  Elapsed_Time_yr  Slip_Deficit_m  \
102       1912.000000            7.4       113.000000          0.5650
101       1999.000000            7.4        26.000000          0.1950
1915      1912.000000            7.4       113.000000          0.5650
3499      1999.000000            7.4        26.000000          0.1950
3867      1999.000000            7.4        26.000000          0.1950
...               ...            ...              ...             ...
6067      1910.333333            7.2       114.666667          0.1720
2693      1650.000000            7.0       375.000000          0.9375
502       1999.000000            7.4        26.000000          0.1950
503       1999.000000            7.4        26.000000          0.1950
1176      1912.000000            7.4       113.000000          0.5650

      Normalized_Slip_m_per_km  Moment_Potential_Nm  Mw_Potential
102                   0.115789         1.207688e+19      2.021303
101                   0.004167         1.053000e+20      2.648286
1915                  0.115789         1.207688e+19      2.021303
```

```
3499                0.004167        1.053000e+20      2.648286
3867                0.004167        1.053000e+20      2.648286
...                      ...                 ...           ...
6067                0.022857        2.347800e+18      1.547107
2693                0.030175        1.781250e+19      2.133817
502                 0.004167        1.053000e+20      2.648286
503                 0.004167        1.053000e+20      2.648286
1176                0.115789        1.207688e+19      2.021303

[21605 rows x 21 columns]
```

49-) dataFrame'deki iki sütunu küçükten büyüğe sıralayınız.

In [133…

```
df_sorted = df.sort_values(by=['Magnitude_ML'], ascending=True)
print(df_sorted)
```

```
            Date  Latitude  Magnitude_ML  \
6497  2013-08-16   39.6798           2.0
8352  2012-05-17   39.5132           2.0
2769  2017-08-05   40.2345           2.0
2773  2017-07-31   39.5461           2.0
2776  2017-07-28   39.6816           2.0
...          ...       ...           ...
3867  2017-02-06   39.5275           5.3
5739  2014-05-24   40.3951           5.3
1915  2019-09-26   40.8818           5.8
101   2025-04-23   40.8369           5.9
102   2025-04-23   40.8600           6.2

                                          Location  \
6497                              Tavşanlı (Kütahya)
8352                            Altıeylül (Balıkesir)
2769                                  Nilüfer (Bursa)
2773                              Ayvacık (Çanakkale)
2776                               Karesi (Balıkesir)
...                                              ...
3867                              Ayvacık (Çanakkale)
5739  Ege Denizi - Saros Körfezi - [08.21 km] Eceaba...
1915     Marmara Denizi - [21.07 km] Silivri (İstanbul)
101   Marmara Denizi - [23.88 km] Büyükçekmece (İsta...
102      Marmara Denizi - [23.16 km] Silivri (İstanbul)

                        Nearest_Fault  Fault_Length_km  Fault_Width_m  \
6497                       Orhaneli Fayı             12.0            4.0
8352               Havran-Balıkesir Fayı              8.0            3.5
2769  Kuzey Anadolu Fay Zonu Ulubat Fayı              7.0            2.0
2773              Kuzey Anadolu Fay Zonu             27.0            4.0
2776               Havran-Balıkesir Fayı             19.0            3.5
...                                  ...              ...            ...
3867              Kuzey Anadolu Fay Zonu             27.0            4.0
5739                          Troya Fayı             11.0            2.0
1915   Kuzey Anadolu Fay Zonu Ganos Fayı             15.0            2.0
101               Kuzey Anadolu Fay Zonu             10.0            2.0
102    Kuzey Anadolu Fay Zonu Ganos Fayı             15.0            2.0

      Fault_Depth_m                    Fault_Type  Length_km  ...  \
6497            3.0          strike-slip + thrust       30.0  ...
```

```
8352            3.5   strike-slip + transpression       75.0  ...
2769            3.0  strike-slip + minor vertical       50.0  ...
2773            4.0                   strike-slip     1200.0  ...
2776            3.5   strike-slip + transpression       75.0  ...
...             ...                           ...        ...  ...
3867            4.0                   strike-slip     1200.0  ...
5739            3.0           oblique / uncertain       35.0  ...
1915            2.0                   strike-slip       47.5  ...
101             3.0                   strike-slip     1200.0  ...
102             2.0                   strike-slip       47.5  ...

      Slip_Rate_mm_per_yr  Max_Surface_Slip_m  Recurrence_Interval_yr  \
6497                  2.5            1.433333              700.000000
8352                  2.5            1.433333              600.000000
2769                  3.5            3.000000              650.000000
2773                  7.5            5.000000              550.000000
2776                  2.5            1.433333              600.000000
...                   ...                 ...                     ...
3867                  7.5            5.000000              550.000000
5739                  1.5            0.800000              566.666667
1915                  5.0            5.500000              400.000000
101                   7.5            5.000000              550.000000
102                   5.0            5.500000              400.000000

      Last_Event_Year  Last_Event_Mw  Elapsed_Time_yr  Slip_Deficit_m  \
6497      1855.000000            6.9       170.000000          0.4250
8352      1898.000000            6.9       127.000000          0.3175
2769      1855.000000            7.0       170.000000          0.5950
2773      1999.000000            7.4        26.000000          0.1950
2776      1898.000000            6.9       127.000000          0.3175
...               ...            ...              ...             ...
3867      1999.000000            7.4        26.000000          0.1950
5739      1910.333333            7.2       114.666667          0.1720
1915      1912.000000            7.4       113.000000          0.5650
101       1999.000000            7.4        26.000000          0.1950
102       1912.000000            7.4       113.000000          0.5650

      Normalized_Slip_m_per_km  Moment_Potential_Nm  Mw_Potential
6497                  0.047778         5.100000e+18      1.771713
8352                  0.019111         9.525000e+18      1.952577
2769                  0.060000         1.338750e+19      2.051133
```

```
2773                0.004167        1.053000e+20      2.648286
2776                0.019111        9.525000e+18      1.952577
...                      ...                 ...           ...
3867                0.004167        1.053000e+20      2.648286
5739                0.022857        2.347800e+18      1.547107
1915                0.115789        1.207688e+19      2.021303
101                 0.004167        1.053000e+20      2.648286
102                 0.115789        1.207688e+19      2.021303

[21605 rows x 21 columns]
```

50-) dataFrame'deki iki sütunu büyükten küçüğe sıralayınız.

In [137…

```
df_sorted_multiple_desc = df.sort_values(by=['Magnitude_ML', 'Latitude'], ascending=[False, False])
print(df_sorted_multiple_desc)
```

```
            Date  Latitude  Magnitude_ML  \
102   2025-04-23   40.8600           6.2
101   2025-04-23   40.8369           5.9
1915  2019-09-26   40.8818           5.8
5739  2014-05-24   40.3951           5.3
3910  2017-02-06   39.5423           5.3
...          ...       ...           ...
7490  2012-12-19   39.5027           2.0
5459  2014-06-09   39.5018           2.0
7780  2012-09-30   39.5017           2.0
4255  2016-07-30   39.5010           2.0
8318  2012-05-24   39.5003           2.0

                                            Location  \
102      Marmara Denizi - [23.16 km] Silivri (İstanbul)
101   Marmara Denizi - [23.88 km] Büyükçekmece (İsta...
1915     Marmara Denizi - [21.07 km] Silivri (İstanbul)
5739  Ege Denizi - Saros Körfezi - [08.21 km] Eceaba...
3910                               Ayvacık (Çanakkale)
...                                                ...
7490                               Bigadiç (Balıkesir)
5459                             Altıeylül (Balıkesir)
7780                               Bigadiç (Balıkesir)
4255                             Dursunbey (Balıkesir)
8318                             Altıeylül (Balıkesir)

                        Nearest_Fault  Fault_Length_km  Fault_Width_m  \
102   Kuzey Anadolu Fay Zonu Ganos Fayı             15.0            2.0
101              Kuzey Anadolu Fay Zonu             10.0            2.0
1915  Kuzey Anadolu Fay Zonu Ganos Fayı             15.0            2.0
5739                         Troya Fayı             11.0            2.0
3910                         Troya Fayı              6.0            2.0
...                                 ...              ...            ...
7490              Havran-Balıkesir Fayı              8.0            3.5
5459              Havran-Balıkesir Fayı              8.0            3.5
7780              Havran-Balıkesir Fayı              8.0            3.5
4255                     Orhaneli Fayı             12.0            4.0
8318              Havran-Balıkesir Fayı              8.0            3.5

      Fault_Depth_m                  Fault_Type  Length_km  ...  \
102             2.0                 strike-slip       47.5  ...
```

```
101            3.0                 strike-slip     1200.0  ...
1915           2.0                 strike-slip       47.5  ...
5739           3.0          oblique / uncertain       35.0  ...
3910           4.5          oblique / uncertain       35.0  ...
...            ...                          ...        ...  ...
7490           3.5  strike-slip + transpression       75.0  ...
5459           3.5  strike-slip + transpression       75.0  ...
7780           3.5  strike-slip + transpression       75.0  ...
4255           3.0        strike-slip + thrust       30.0  ...
8318           3.5  strike-slip + transpression       75.0  ...

      Slip_Rate_mm_per_yr  Max_Surface_Slip_m  Recurrence_Interval_yr  \
102                   5.0            5.500000              400.000000
101                   7.5            5.000000              550.000000
1915                  5.0            5.500000              400.000000
5739                  1.5            0.800000              566.666667
3910                  1.5            0.800000              566.666667
...                   ...                 ...                     ...
7490                  2.5            1.433333              600.000000
5459                  2.5            1.433333              600.000000
7780                  2.5            1.433333              600.000000
4255                  2.5            1.433333              700.000000
8318                  2.5            1.433333              600.000000

      Last_Event_Year  Last_Event_Mw  Elapsed_Time_yr  Slip_Deficit_m  \
102       1912.000000            7.4       113.000000          0.5650
101       1999.000000            7.4        26.000000          0.1950
1915      1912.000000            7.4       113.000000          0.5650
5739      1910.333333            7.2       114.666667          0.1720
3910      1910.333333            7.2       114.666667          0.1720
...               ...            ...              ...             ...
7490      1898.000000            6.9       127.000000          0.3175
5459      1898.000000            6.9       127.000000          0.3175
7780      1898.000000            6.9       127.000000          0.3175
4255      1855.000000            6.9       170.000000          0.4250
8318      1898.000000            6.9       127.000000          0.3175

      Normalized_Slip_m_per_km  Moment_Potential_Nm  Mw_Potential
102                   0.115789         1.207688e+19      2.021303
101                   0.004167         1.053000e+20      2.648286
1915                  0.115789         1.207688e+19      2.021303
```

```
5739                0.022857        2.347800e+18      1.547107
3910                0.022857        2.347800e+18      1.547107
...                      ...                 ...           ...
7490                0.019111        9.525000e+18      1.952577
5459                0.019111        9.525000e+18      1.952577
7780                0.019111        9.525000e+18      1.952577
4255                0.047778        5.100000e+18      1.771713
8318                0.019111        9.525000e+18      1.952577

[21605 rows x 21 columns]
```

51-)dataFrame'deki 5 veriyi tesadüfi olarak listeleyiniz.

In [139…

```
df_random_sample = df.sample(n=5)
print(df_random_sample)
```

```
            Date  Latitude  Magnitude_ML              Location  \
15633  2008-05-24   40.3237           2.8   Bandırma (Balıkesir)
14695  2009-03-26   39.6282           3.4  Dursunbey (Balıkesir)
19031  2005-04-23   39.7070           2.3     Tavşanlı (Kütahya)
6463   2013-08-24   40.0318           2.5      Gönen (Balıkesir)
15773  2008-04-11   39.6732           2.6      Ezine (Çanakkale)

              Nearest_Fault  Fault_Length_km  Fault_Width_m  Fault_Depth_m  \
15633       Manyas Fay Zonu             26.0            5.0            3.0
14695  Mustafakemalpaşa Fayı             20.0            4.0            2.3
19031         Orhaneli Fayı             12.0            4.0            3.0
6463   Yenice-Gönen Fay Zonu             20.0            3.0            2.5
15773            Troya Fayı              6.0            2.0            4.5

                     Fault_Type  Length_km  ...  Slip_Rate_mm_per_yr  \
15633           normal (listric)       38.0  ...             0.800000
14695  strike-slip + minor normal       47.5  ...             2.500000
19031       strike-slip + thrust       30.0  ...             2.500000
6463                  strike-slip       47.5  ...             2.433333
15773        oblique / uncertain       35.0  ...             1.500000

       Max_Surface_Slip_m  Recurrence_Interval_yr  Last_Event_Year  \
15633            0.500000              600.000000      1964.000000
14695            1.433333              750.000000      1650.000000
19031            1.433333              700.000000      1855.000000
6463             4.300000              250.000000      1953.000000
15773            0.800000              566.666667      1910.333333

       Last_Event_Mw  Elapsed_Time_yr  Slip_Deficit_m  \
15633            6.8        61.000000          0.0488
14695            7.0       375.000000          0.9375
19031            6.9       170.000000          0.4250
6463             7.4        72.000000          0.1752
15773            7.2       114.666667          0.1720

       Normalized_Slip_m_per_km  Moment_Potential_Nm  Mw_Potential
15633                  0.013158         6.675840e+17      1.183004
14695                  0.030175         1.781250e+19      2.133817
19031                  0.047778         5.100000e+18      1.771713
6463                   0.090526         2.746260e+18      1.592494
15773                  0.022857         2.347800e+18      1.547107
```

```
[5 rows x 21 columns]
```

In [155…
```
pip install matplotlib seaborn
```

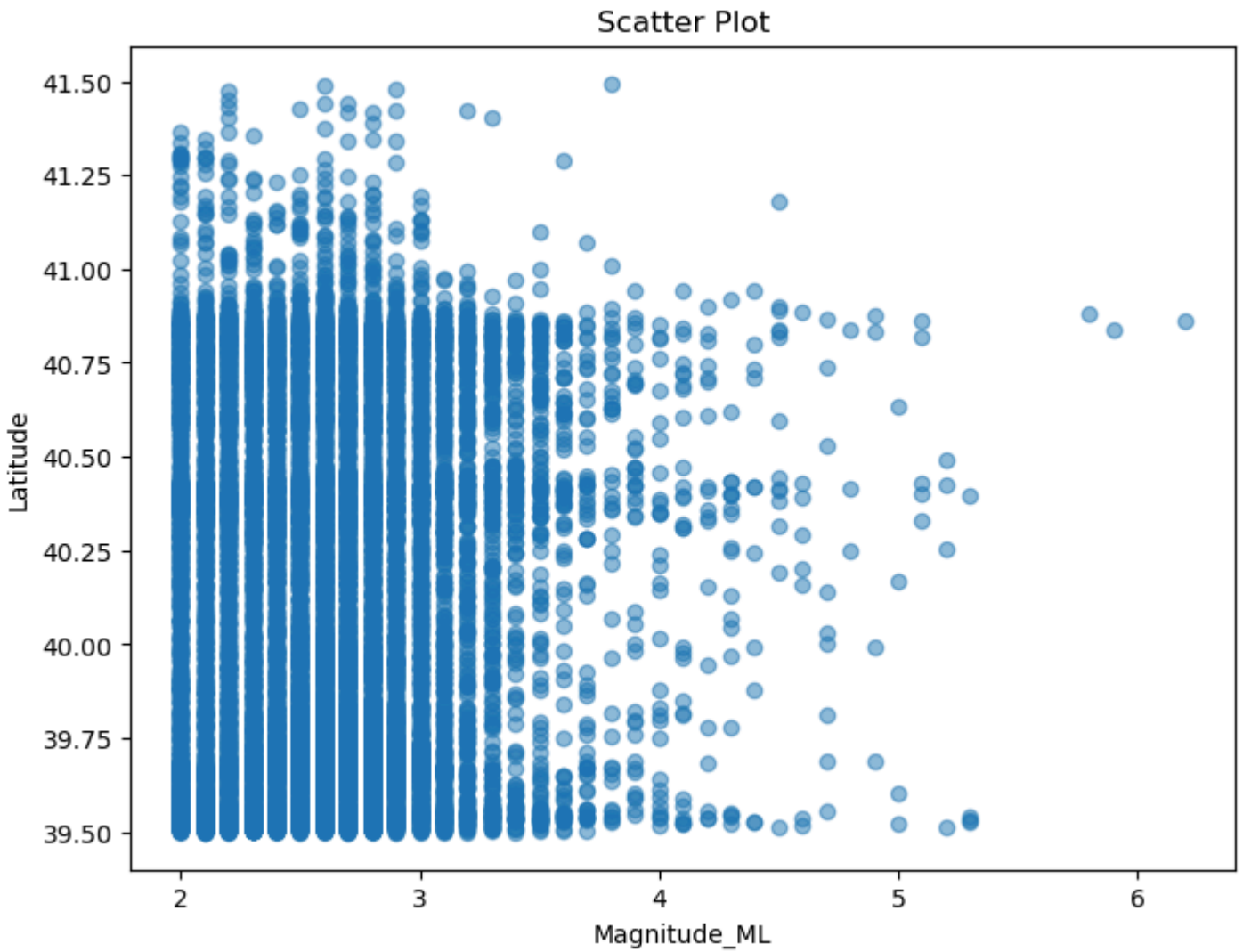
```
Requirement already satisfied: matplotlib in c:\users\user\anaconda3\lib\site-packages (3.9.2)
Requirement already satisfied: seaborn in c:\users\user\anaconda3\lib\site-packages (0.13.2)
Requirement already satisfied: contourpy>=1.0.1 in c:\users\user\anaconda3\lib\site-packages (from matplotlib) (1.2.0)
Requirement already satisfied: cycler>=0.10 in c:\users\user\anaconda3\lib\site-packages (from matplotlib) (0.11.0)
Requirement already satisfied: fonttools>=4.22.0 in c:\users\user\anaconda3\lib\site-packages (from matplotlib) (4.51.0)
Requirement already satisfied: kiwisolver>=1.3.1 in c:\users\user\anaconda3\lib\site-packages (from matplotlib) (1.4.4)
Requirement already satisfied: numpy>=1.23 in c:\users\user\anaconda3\lib\site-packages (from matplotlib) (1.26.4)
Requirement already satisfied: packaging>=20.0 in c:\users\user\anaconda3\lib\site-packages (from matplotlib) (24.1)
Requirement already satisfied: pillow>=8 in c:\users\user\anaconda3\lib\site-packages (from matplotlib) (10.4.0)
Requirement already satisfied: pyparsing>=2.3.1 in c:\users\user\anaconda3\lib\site-packages (from matplotlib) (3.1.2)
Requirement already satisfied: python-dateutil>=2.7 in c:\users\user\anaconda3\lib\site-packages (from matplotlib) (2.9.0.post
0)
Requirement already satisfied: pandas>=1.2 in c:\users\user\anaconda3\lib\site-packages (from seaborn) (2.2.2)
Requirement already satisfied: pytz>=2020.1 in c:\users\user\anaconda3\lib\site-packages (from pandas>=1.2->seaborn) (2024.1)
Requirement already satisfied: tzdata>=2022.7 in c:\users\user\anaconda3\lib\site-packages (from pandas>=1.2->seaborn) (2023.3)
Requirement already satisfied: six>=1.5 in c:\users\user\anaconda3\lib\site-packages (from python-dateutil>=2.7->matplotlib)
(1.16.0)
Note: you may need to restart the kernel to use updated packages.
```

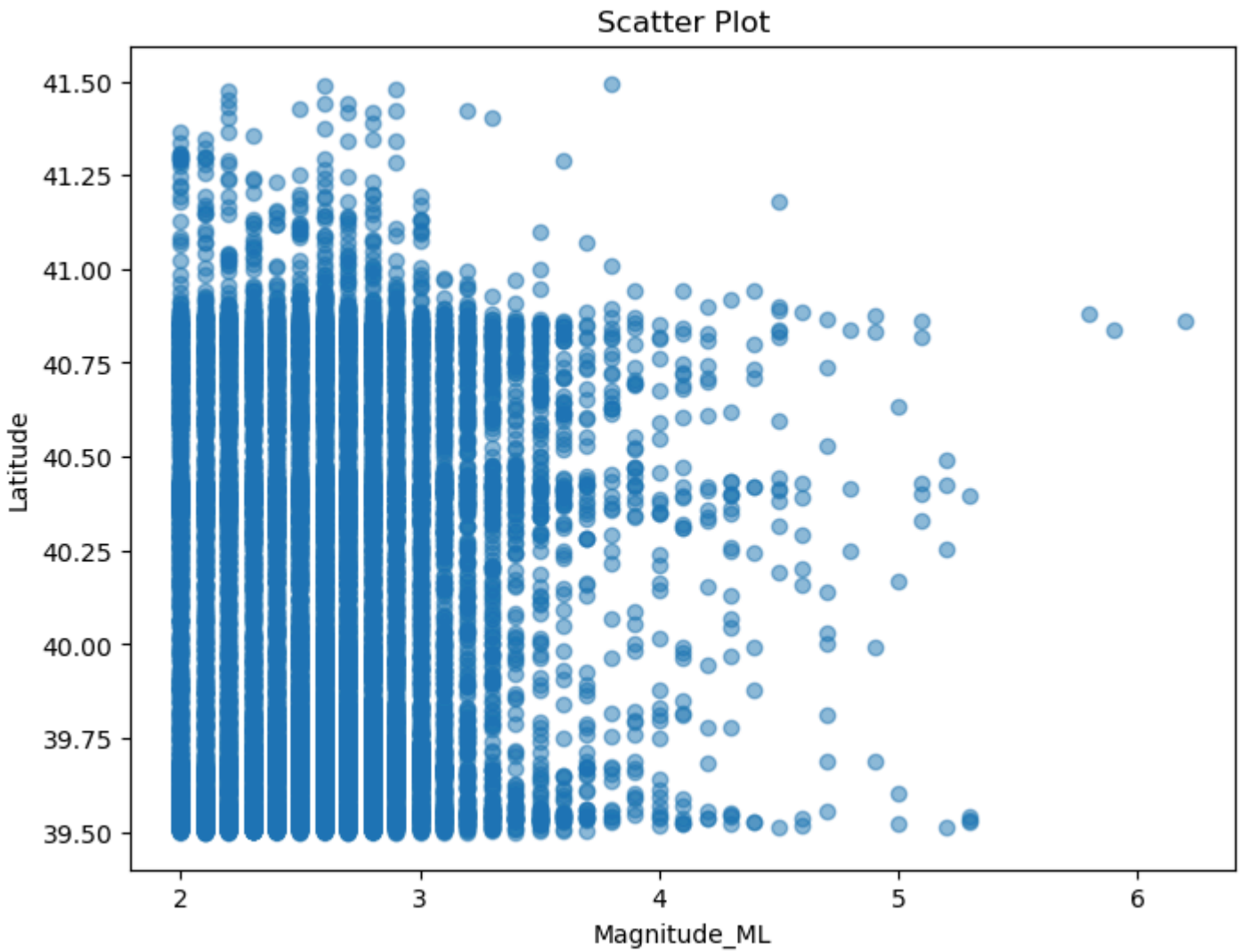
Veri seti ile ilgili olarak, Scatter plot Histogram,Bar chart ,Pie chart ,Heat Map grafiklerini çiziniz. ,Seaborn Kütüphanesi kullanarak "Stripplot grafiğini" ve ,"Swarmplot" grafiğini çiziniz.

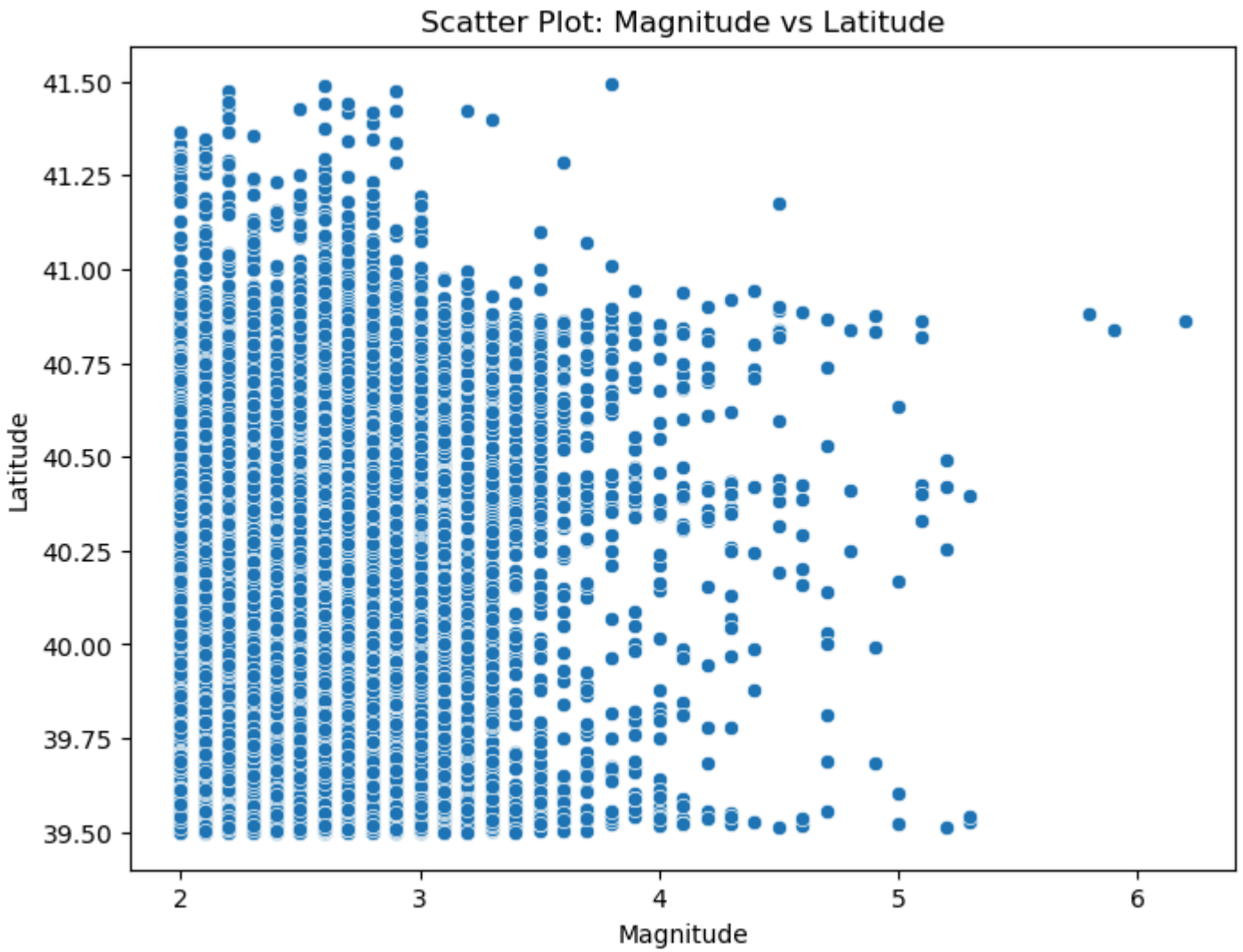
In [157…
```
import seaborn as sns
import matplotlib.pyplot as plt

# Scatter plot
plt.figure(figsize=(8, 6))
sns.scatterplot(data=df, x='Magnitude_ML', y='Latitude')
plt.title('Scatter Plot: Magnitude vs Latitude')
plt.xlabel('Magnitude')
plt.ylabel('Latitude')
plt.show()
```

```
<Figure size 800x600 with 0 Axes>
```

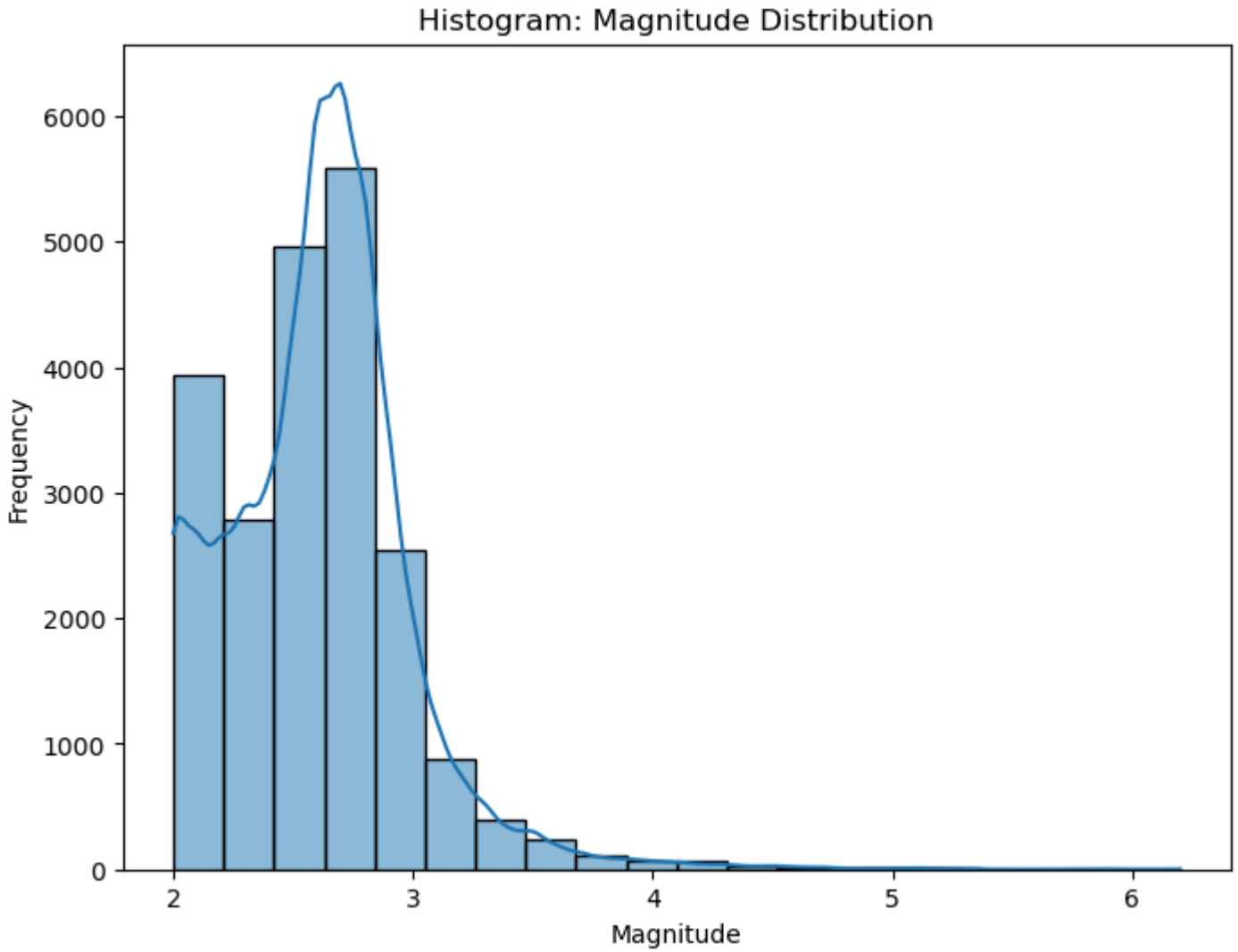

Scatter Plot
Latitude
Magnitude_ML
41.50
41.25
41.00
40.75
40.50
40.25
40.00
39.75
39.50
2
3
4
5
6


Scatter Plot
Latitude
Magnitude_ML
41.50
41.25
41.00
40.75
40.50
40.25
40.00
39.75
39.50
2
3
4
5
6



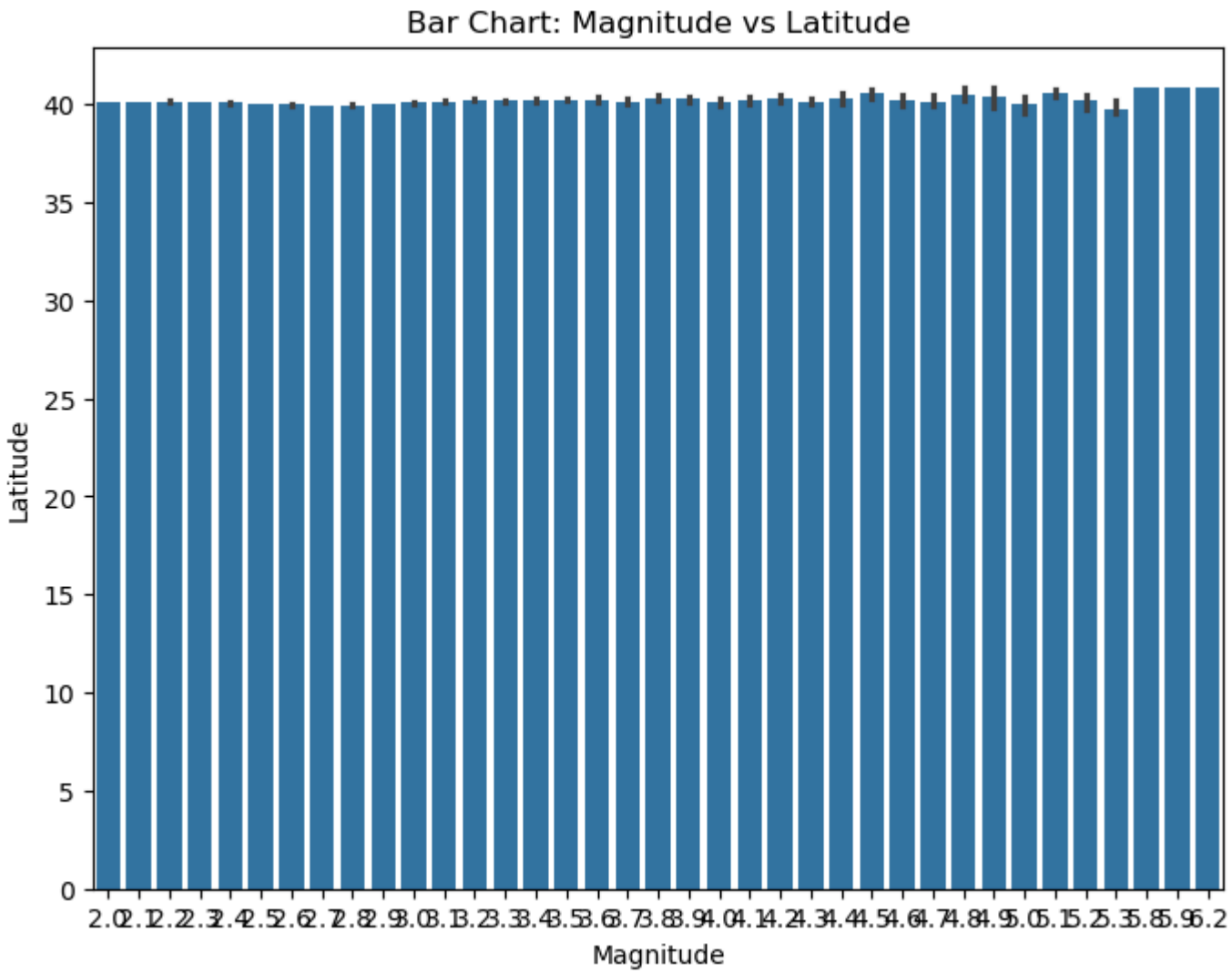
In [159…

```
# Histogram
plt.figure(figsize=(8, 6))
sns.histplot(df['Magnitude_ML'], kde=True, bins=20)
plt.title('Histogram: Magnitude Distribution')
plt.xlabel('Magnitude')
plt.ylabel('Frequency')
plt.show()
```



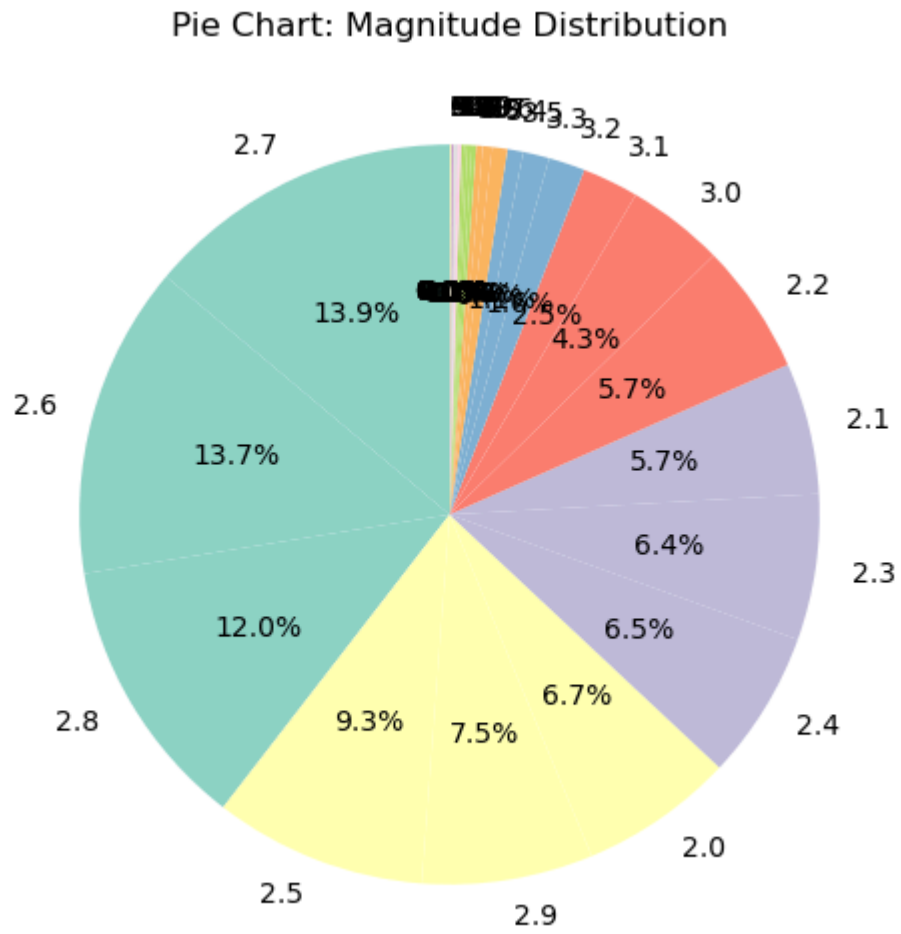
In [161…

```
# Bar chart
plt.figure(figsize=(8, 6))
sns.barplot(x='Magnitude_ML', y='Latitude', data=df)
plt.title('Bar Chart: Magnitude vs Latitude')
plt.xlabel('Magnitude')
plt.ylabel('Latitude')
plt.show()
```



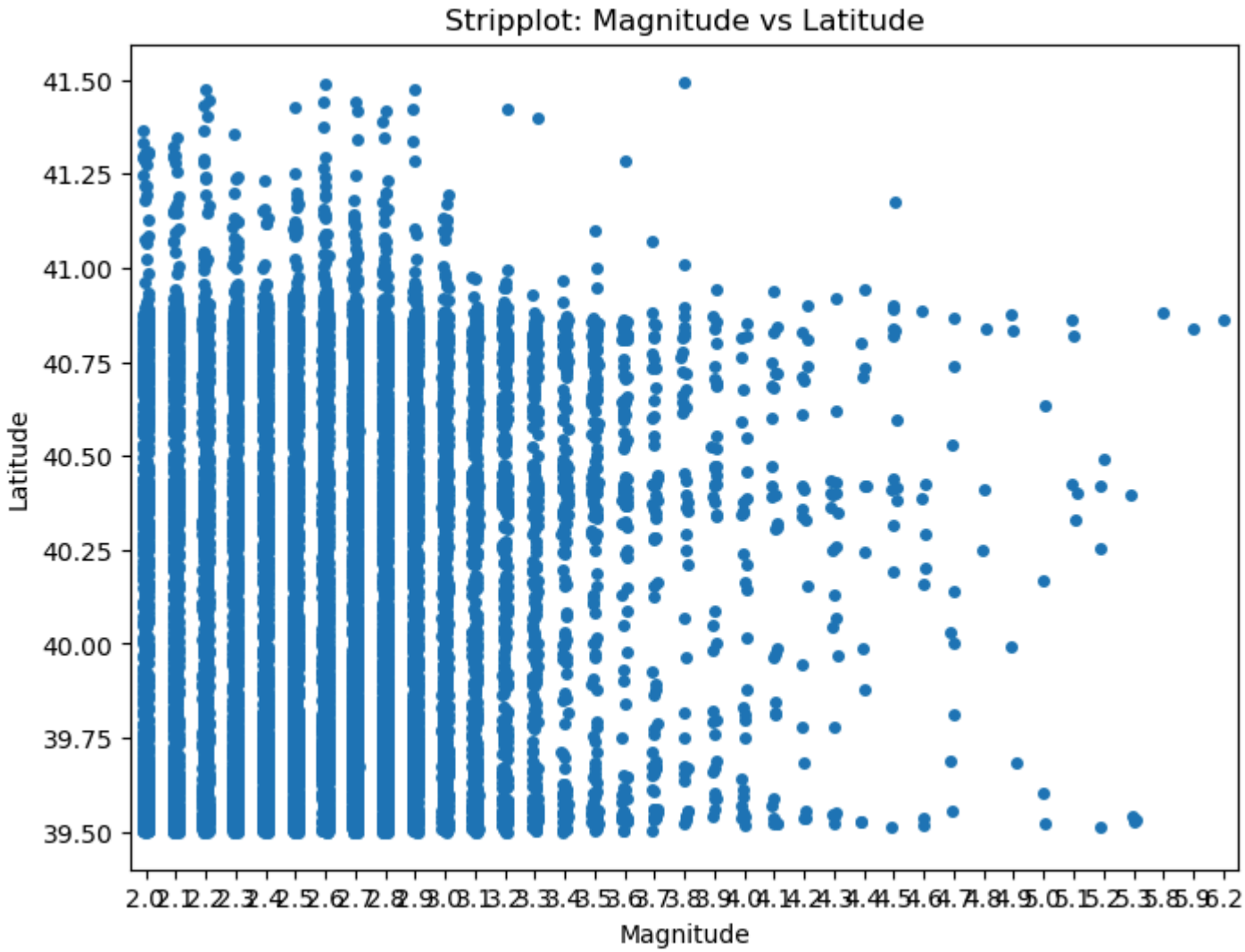
In [163…

```
# Pie chart
magnitude_counts = df['Magnitude_ML'].value_counts()
plt.figure(figsize=(8, 6))
magnitude_counts.plot(kind='pie', autopct='%1.1f%%', startangle=90, cmap='Set3')
plt.title('Pie Chart: Magnitude Distribution')
plt.ylabel('')
plt.show()
```



In [167…
```
# Stripplot
plt.figure(figsize=(8, 6))
sns.stripplot(x='Magnitude_ML', y='Latitude', data=df, jitter=True)
plt.title('Stripplot: Magnitude vs Latitude')
plt.xlabel('Magnitude')
plt.ylabel('Latitude')
plt.show()
```

```
<Figure size 800x600 with 0 Axes>
```



59-) Keras kütüphanesini yükleyiniz.

In [170…
```
pip install keras
```

```
Requirement already satisfied: keras in c:\users\user\anaconda3\lib\site-packages (3.8.0)
Requirement already satisfied: absl-py in c:\users\user\anaconda3\lib\site-packages (from keras) (2.1.0)
Requirement already satisfied: numpy in c:\users\user\anaconda3\lib\site-packages (from keras) (1.26.4)
Requirement already satisfied: rich in c:\users\user\anaconda3\lib\site-packages (from keras) (13.7.1)
Requirement already satisfied: namex in c:\users\user\anaconda3\lib\site-packages (from keras) (0.0.8)
Requirement already satisfied: h5py in c:\users\user\anaconda3\lib\site-packages (from keras) (3.11.0)
Requirement already satisfied: optree in c:\users\user\anaconda3\lib\site-packages (from keras) (0.14.0)
Requirement already satisfied: ml-dtypes in c:\users\user\anaconda3\lib\site-packages (from keras) (0.4.1)
Requirement already satisfied: packaging in c:\users\user\anaconda3\lib\site-packages (from keras) (24.1)
Requirement already satisfied: typing-extensions>=4.5.0 in c:\users\user\anaconda3\lib\site-packages (from optree->keras) (4.1
1.0)
Requirement already satisfied: markdown-it-py>=2.2.0 in c:\users\user\anaconda3\lib\site-packages (from rich->keras) (2.2.0)
Requirement already satisfied: pygments<3.0.0,>=2.13.0 in c:\users\user\anaconda3\lib\site-packages (from rich->keras) (2.15.1)
Requirement already satisfied: mdurl~=0.1 in c:\users\user\anaconda3\lib\site-packages (from markdown-it-py>=2.2.0->rich->kera
s) (0.1.0)
Note: you may need to restart the kernel to use updated packages.
```

60-) Keras kütüphanesinin versiyonunu bulunuz.

In [172…

```
import keras
print(keras.__version__)
```

```
3.8.0
```

61-) CSV dataset'den sadece iki sütunu dataframe'e import ediniz.

In [178…

```
df = pd.read_csv(r'C:\Users\USER\Desktop\Son Yarıyıl\Python ile Veri Analizi\marmara_faults_earthquakes_2000_2025.csv', usecol
print(df)
```

```
       Latitude  Magnitude_ML
0       40.8394           2.5
1       40.8442           2.6
2       40.8353           2.0
3       40.8567           3.5
4       40.8467           2.8
...         ...           ...
21600   40.5600           2.7
21601   40.0200           2.9
21602   40.9000           2.6
21603   40.3700           3.2
21604   39.5600           3.2

[21605 rows x 2 columns]
```

63-) Python Sweetviz Kütüphanesini Keşifsel Veri Analizi yapmak için kullanınız.

In [182…

```
pip install sweetviz
```

```
Collecting sweetviz
  Downloading sweetviz-2.3.1-py3-none-any.whl.metadata (24 kB)
Requirement already satisfied: pandas!=1.0.0,!=1.0.1,!=1.0.2,>=0.25.3 in c:\users\user\anaconda3\lib\site-packages (from sweetv
iz) (2.2.2)
Requirement already satisfied: numpy>=1.16.0 in c:\users\user\anaconda3\lib\site-packages (from sweetviz) (1.26.4)
Requirement already satisfied: matplotlib>=3.1.3 in c:\users\user\anaconda3\lib\site-packages (from sweetviz) (3.9.2)
Requirement already satisfied: tqdm>=4.43.0 in c:\users\user\anaconda3\lib\site-packages (from sweetviz) (4.66.5)
Requirement already satisfied: scipy>=1.3.2 in c:\users\user\anaconda3\lib\site-packages (from sweetviz) (1.13.1)
Requirement already satisfied: jinja2>=2.11.1 in c:\users\user\anaconda3\lib\site-packages (from sweetviz) (3.1.4)
Collecting importlib-resources>=1.2.0 (from sweetviz)
  Downloading importlib_resources-6.5.2-py3-none-any.whl.metadata (3.9 kB)
Requirement already satisfied: MarkupSafe>=2.0 in c:\users\user\anaconda3\lib\site-packages (from jinja2>=2.11.1->sweetviz) (2.
1.3)
Requirement already satisfied: contourpy>=1.0.1 in c:\users\user\anaconda3\lib\site-packages (from matplotlib>=3.1.3->sweetviz)
(1.2.0)
Requirement already satisfied: cycler>=0.10 in c:\users\user\anaconda3\lib\site-packages (from matplotlib>=3.1.3->sweetviz) (0.
11.0)
Requirement already satisfied: fonttools>=4.22.0 in c:\users\user\anaconda3\lib\site-packages (from matplotlib>=3.1.3->sweetvi
z) (4.51.0)
Requirement already satisfied: kiwisolver>=1.3.1 in c:\users\user\anaconda3\lib\site-packages (from matplotlib>=3.1.3->sweetvi
z) (1.4.4)
Requirement already satisfied: packaging>=20.0 in c:\users\user\anaconda3\lib\site-packages (from matplotlib>=3.1.3->sweetviz)
(24.1)
Requirement already satisfied: pillow>=8 in c:\users\user\anaconda3\lib\site-packages (from matplotlib>=3.1.3->sweetviz) (10.4.
0)
Requirement already satisfied: pyparsing>=2.3.1 in c:\users\user\anaconda3\lib\site-packages (from matplotlib>=3.1.3->sweetviz)
(3.1.2)
Requirement already satisfied: python-dateutil>=2.7 in c:\users\user\anaconda3\lib\site-packages (from matplotlib>=3.1.3->sweet
viz) (2.9.0.post0)
Requirement already satisfied: pytz>=2020.1 in c:\users\user\anaconda3\lib\site-packages (from pandas!=1.0.0,!=1.0.1,!=1.0.2,>=
0.25.3->sweetviz) (2024.1)
Requirement already satisfied: tzdata>=2022.7 in c:\users\user\anaconda3\lib\site-packages (from pandas!=1.0.0,!=1.0.1,!=1.0.2,
>=0.25.3->sweetviz) (2023.3)
Requirement already satisfied: colorama in c:\users\user\anaconda3\lib\site-packages (from tqdm>=4.43.0->sweetviz) (0.4.6)
Requirement already satisfied: six>=1.5 in c:\users\user\anaconda3\lib\site-packages (from python-dateutil>=2.7->matplotlib>=3.
1.3->sweetviz) (1.16.0)
Downloading sweetviz-2.3.1-py3-none-any.whl (15.1 MB)
   ---------------------------------------- 0.0/15.1 MB ? eta -:--:--
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```

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- ---------------------------------------- 0.5/15.1 MB 508.0 kB/s eta 0:00:29
-- ---------------------------------------- 0.8/15.1 MB 568.6 kB/s eta 0:00:26
-- ---------------------------------------- 1.0/15.1 MB 636.8 kB/s eta 0:00:23
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--- ---------------------------------------- 1.3/15.1 MB 677.8 kB/s eta 0:00:21
---- ---------------------------------------- 1.6/15.1 MB 710.8 kB/s eta 0:00:20
---- ---------------------------------------- 1.8/15.1 MB 768.4 kB/s eta 0:00:18
----- ---------------------------------------- 2.1/15.1 MB 809.8 kB/s eta 0:00:17
----- ---------------------------------------- 2.1/15.1 MB 809.8 kB/s eta 0:00:17
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----- ---------------------------------------- 2.1/15.1 MB 809.8 kB/s eta 0:00:17
----- ---------------------------------------- 2.1/15.1 MB 809.8 kB/s eta 0:00:17
----- ---------------------------------------- 2.1/15.1 MB 809.8 kB/s eta 0:00:17
------ ---------------------------------------- 2.4/15.1 MB 583.5 kB/s eta 0:00:22
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------ ---------------------------------------- 2.6/15.1 MB 511.8 kB/s eta 0:00:25
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------ ---------------------------------------- 2.6/15.1 MB 511.8 kB/s eta 0:00:25
------- ---------------------------------------- 2.9/15.1 MB 457.1 kB/s eta 0:00:27
-------- ---------------------------------------- 3.1/15.1 MB 485.6 kB/s eta 0:00:25
--------- ---------------------------------------- 3.4/15.1 MB 510.9 kB/s eta 0:00:23
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---------- ---------------------------------------- 3.9/15.1 MB 568.6 kB/s eta 0:00:20
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---------- ---------------------------------------- 3.9/15.1 MB 568.6 kB/s eta 0:00:20
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```

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   ---------- ---------------------------- 4.7/15.1 MB 466.8 kB/s eta 0:00:23
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   ---------- ---------------------------- 5.0/15.1 MB 460.4 kB/s eta 0:00:23
   ---------- ---------------------------- 5.2/15.1 MB 458.6 kB/s eta 0:00:22
   ---------- ---------------------------- 5.5/15.1 MB 473.9 kB/s eta 0:00:21
   ---------- ---------------------------- 6.0/15.1 MB 511.2 kB/s eta 0:00:18
   ---------- ---------------------------- 6.3/15.1 MB 525.7 kB/s eta 0:00:17
   ---------- ---------------------------- 6.6/15.1 MB 543.4 kB/s eta 0:00:16
   ---------- ---------------------------- 7.1/15.1 MB 573.2 kB/s eta 0:00:15
   ---------- ---------------------------- 7.3/15.1 MB 589.8 kB/s eta 0:00:14
   ---------- ---------------------------- 7.3/15.1 MB 589.8 kB/s eta 0:00:14
   ---------- ---------------------------- 7.3/15.1 MB 589.8 kB/s eta 0:00:14
   ---------- ---------------------------- 7.6/15.1 MB 577.8 kB/s eta 0:00:13
   ---------- ---------------------------- 7.6/15.1 MB 577.8 kB/s eta 0:00:13
   ---------- ---------------------------- 7.6/15.1 MB 577.8 kB/s eta 0:00:13
   ---------- ---------------------------- 7.9/15.1 MB 566.4 kB/s eta 0:00:13
   ---------- ---------------------------- 8.4/15.1 MB 596.4 kB/s eta 0:00:12
   ---------- ---------------------------- 8.7/15.1 MB 610.7 kB/s eta 0:00:11
   ---------- ---------------------------- 8.7/15.1 MB 610.7 kB/s eta 0:00:11
   ---------- ---------------------------- 8.7/15.1 MB 610.7 kB/s eta 0:00:11
   ---------- ---------------------------- 8.9/15.1 MB 598.5 kB/s eta 0:00:11
   ---------- ---------------------------- 9.4/15.1 MB 625.3 kB/s eta 0:00:10
   ---------- ---------------------------- 10.0/15.1 MB 652.1 kB/s eta 0:00:08
   ---------- ---------------------------- 10.5/15.1 MB 678.0 kB/s eta 0:00:07
   ---------- ---------------------------- 11.3/15.1 MB 721.2 kB/s eta 0:00:06
   ---------- ---------------------------- 12.1/15.1 MB 762.6 kB/s eta 0:00:05
   ---------- ---------------------------- 13.1/15.1 MB 818.8 kB/s eta 0:00:03
   ---------- ---------------------------- 14.2/15.1 MB 869.2 kB/s eta 0:00:02
   ---------- ----------------------------  14.9/15.1 MB 912.1 kB/s eta 0:00:01
   ---------- ---------------------------- 15.1/15.1 MB 916.5 kB/s eta 0:00:00
Downloading importlib_resources-6.5.2-py3-none-any.whl (37 kB)
Installing collected packages: importlib-resources, sweetviz
```

```
Successfully installed importlib-resources-6.5.2 sweetviz-2.3.1
Note: you may need to restart the kernel to use updated packages.
```

In [184…
```python
import sweetviz as sv
import pandas as pd

df = pd.read_csv((r'C:\Users\USER\Desktop\Son Yarıyıl\Python ile Veri Analizi\marmara_faults_earthquakes_2000_2025.csv'))
report = sv.analyze(df)

report.show_html('eda_report.html')  # Bu, analiz raporunu bir HTML dosyasına kaydeder

report.show_html()
```

```
                                             |          | [  0%]   00:00 -> (? left)
Report eda_report.html was generated! NOTEBOOK/COLAB USERS: the web browser MAY not pop up, regardless, the report IS saved in
your notebook/colab files.
Report SWEETVIZ_REPORT.html was generated! NOTEBOOK/COLAB USERS: the web browser MAY not pop up, regardless, the report IS save
d in your notebook/colab files.
```

64-) Python summarytools Kütüphanesini Keşifsel Veri Analizi yapmak için kullanınız.

In [186…
```python
pip install summarytools
```

```
Collecting summarytools
  Downloading summarytools-0.3.0-py3-none-any.whl.metadata (3.5 kB)
Requirement already satisfied: pandas>=1.4.0 in c:\users\user\anaconda3\lib\site-packages (from summarytools) (2.2.2)
Requirement already satisfied: ipython>=7.20.0 in c:\users\user\anaconda3\lib\site-packages (from summarytools) (8.27.0)
Requirement already satisfied: numpy>=1.18.5 in c:\users\user\anaconda3\lib\site-packages (from summarytools) (1.26.4)
Requirement already satisfied: matplotlib>=3.3.0 in c:\users\user\anaconda3\lib\site-packages (from summarytools) (3.9.2)
Requirement already satisfied: decorator in c:\users\user\anaconda3\lib\site-packages (from ipython>=7.20.0->summarytools) (5.
1.1)
Requirement already satisfied: jedi>=0.16 in c:\users\user\anaconda3\lib\site-packages (from ipython>=7.20.0->summarytools) (0.
19.1)
Requirement already satisfied: matplotlib-inline in c:\users\user\anaconda3\lib\site-packages (from ipython>=7.20.0->summarytoo
ls) (0.1.6)
Requirement already satisfied: prompt-toolkit<3.1.0,>=3.0.41 in c:\users\user\anaconda3\lib\site-packages (from ipython>=7.20.0
->summarytools) (3.0.43)
Requirement already satisfied: pygments>=2.4.0 in c:\users\user\anaconda3\lib\site-packages (from ipython>=7.20.0->summarytool
s) (2.15.1)
Requirement already satisfied: stack-data in c:\users\user\anaconda3\lib\site-packages (from ipython>=7.20.0->summarytools) (0.
2.0)
Requirement already satisfied: traitlets>=5.13.0 in c:\users\user\anaconda3\lib\site-packages (from ipython>=7.20.0->summarytoo
ls) (5.14.3)
Requirement already satisfied: colorama in c:\users\user\anaconda3\lib\site-packages (from ipython>=7.20.0->summarytools) (0.4.
6)
Requirement already satisfied: contourpy>=1.0.1 in c:\users\user\anaconda3\lib\site-packages (from matplotlib>=3.3.0->summaryto
ols) (1.2.0)
Requirement already satisfied: cycler>=0.10 in c:\users\user\anaconda3\lib\site-packages (from matplotlib>=3.3.0->summarytools)
(0.11.0)
Requirement already satisfied: fonttools>=4.22.0 in c:\users\user\anaconda3\lib\site-packages (from matplotlib>=3.3.0->summaryt
ools) (4.51.0)
Requirement already satisfied: kiwisolver>=1.3.1 in c:\users\user\anaconda3\lib\site-packages (from matplotlib>=3.3.0->summaryt
ools) (1.4.4)
Requirement already satisfied: packaging>=20.0 in c:\users\user\anaconda3\lib\site-packages (from matplotlib>=3.3.0->summarytoo
ls) (24.1)
Requirement already satisfied: pillow>=8 in c:\users\user\anaconda3\lib\site-packages (from matplotlib>=3.3.0->summarytools) (1
0.4.0)
Requirement already satisfied: pyparsing>=2.3.1 in c:\users\user\anaconda3\lib\site-packages (from matplotlib>=3.3.0->summaryto
ols) (3.1.2)
Requirement already satisfied: python-dateutil>=2.7 in c:\users\user\anaconda3\lib\site-packages (from matplotlib>=3.3.0->summa
rytools) (2.9.0.post0)
Requirement already satisfied: pytz>=2020.1 in c:\users\user\anaconda3\lib\site-packages (from pandas>=1.4.0->summarytools) (20
24.1)
Requirement already satisfied: tzdata>=2022.7 in c:\users\user\anaconda3\lib\site-packages (from pandas>=1.4.0->summarytools)
```

```
(2023.3)
Requirement already satisfied: parso<0.9.0,>=0.8.3 in c:\users\user\anaconda3\lib\site-packages (from jedi>=0.16->ipython>=7.2
0.0->summarytools) (0.8.3)
Requirement already satisfied: wcwidth in c:\users\user\anaconda3\lib\site-packages (from prompt-toolkit<3.1.0,>=3.0.41->ipytho
n>=7.20.0->summarytools) (0.2.5)
Requirement already satisfied: six>=1.5 in c:\users\user\anaconda3\lib\site-packages (from python-dateutil>=2.7->matplotlib>=3.
3.0->summarytools) (1.16.0)
Requirement already satisfied: executing in c:\users\user\anaconda3\lib\site-packages (from stack-data->ipython>=7.20.0->summar
ytools) (0.8.3)
Requirement already satisfied: asttokens in c:\users\user\anaconda3\lib\site-packages (from stack-data->ipython>=7.20.0->summar
ytools) (2.0.5)
Requirement already satisfied: pure-eval in c:\users\user\anaconda3\lib\site-packages (from stack-data->ipython>=7.20.0->summar
ytools) (0.2.2)
Downloading summarytools-0.3.0-py3-none-any.whl (12 kB)
Installing collected packages: summarytools
Successfully installed summarytools-0.3.0
Note: you may need to restart the kernel to use updated packages.
```

In [190…

```python
import summarytools as st
import pandas as pd

df = pd.read_csv(r'C:\Users\USER\Desktop\Son Yarıyıl\Python ile Veri Analizi\marmara_faults_earthquakes_2000_2025.csv')

df_summary = st.dfSummary(df)

print(df_summary)

df_summary.to_html('summary_report.html')
```

```
<pandas.io.formats.style.Styler object at 0x000002673ADB2360>
```

66-) DASK kütüphanesini kullanınız.

In [192…

```
pip install dask
```

```
Requirement already satisfied: dask in c:\users\user\anaconda3\lib\site-packages (2024.8.2)
Requirement already satisfied: click>=8.1 in c:\users\user\anaconda3\lib\site-packages (from dask) (8.1.7)
Requirement already satisfied: cloudpickle>=3.0.0 in c:\users\user\anaconda3\lib\site-packages (from dask) (3.0.0)
Requirement already satisfied: fsspec>=2021.09.0 in c:\users\user\anaconda3\lib\site-packages (from dask) (2024.6.1)
Requirement already satisfied: packaging>=20.0 in c:\users\user\anaconda3\lib\site-packages (from dask) (24.1)
Requirement already satisfied: partd>=1.4.0 in c:\users\user\anaconda3\lib\site-packages (from dask) (1.4.1)
Requirement already satisfied: pyyaml>=5.3.1 in c:\users\user\anaconda3\lib\site-packages (from dask) (6.0.1)
Requirement already satisfied: toolz>=0.10.0 in c:\users\user\anaconda3\lib\site-packages (from dask) (0.12.0)
Requirement already satisfied: colorama in c:\users\user\anaconda3\lib\site-packages (from click>=8.1->dask) (0.4.6)
Requirement already satisfied: locket in c:\users\user\anaconda3\lib\site-packages (from partd>=1.4.0->dask) (1.0.0)
Note: you may need to restart the kernel to use updated packages.
```

In [194…

```python
import dask.dataframe as dd

# Dask ile CSV dosyasını yükleyelim
df = dd.read_csv(r'C:\Users\USER\Desktop\Son Yarıyıl\Python ile Veri Analizi\marmara_faults_earthquakes_2000_2025.csv')

df.head()
```

Out[194...

	Date	Latitude	Longitude	Depth_km	Magnitude_ML	Location	Nearest_Fault	Fault_Length_km	Fault_Width_m	Fault_Depth_m
0	2025-04-23	40.8394	28.4000	15.05	2.5	Marmara Denizi - [20.67 km] Büyükçekmece (İsta...	Kuzey Anadolu Fay Zonu	10.0	2.0	3.0
1	2025-04-23	40.8442	28.3108	5.23	2.6	Marmara Denizi - [24.05 km] Büyükçekmece (İsta...	Kuzey Anadolu Fay Zonu	10.0	2.0	3.0
2	2025-04-23	40.8353	28.3511	6.97	2.0	Marmara Denizi - [22.91 km] Büyükçekmece (İsta...	Kuzey Anadolu Fay Zonu	10.0	2.0	3.0
3	2025-04-23	40.8567	28.3014	14.58	3.5	Marmara Denizi - [23.07 km] Silivri (İstanbul)	Kuzey Anadolu Fay Zonu	10.0	2.0	3.0
4	2025-04-23	40.8467	28.4094	8.33	2.8	Marmara Denizi - [19.63 km] Büyükçekmece (İsta...	Kuzey Anadolu Fay Zonu	10.0	2.0	3.0

5 rows × 23 columns

70-) datacleaner kütüphanesini kullanınız.

In [212...

```
pip install datacleaner
```

```
Collecting datacleaner
  Downloading datacleaner-0.1.5.tar.gz (6.5 kB)
  Preparing metadata (setup.py): started
  Preparing metadata (setup.py): finished with status 'done'
Requirement already satisfied: pandas in c:\users\user\anaconda3\lib\site-packages (from datacleaner) (2.2.2)
Requirement already satisfied: scikit-learn in c:\users\user\anaconda3\lib\site-packages (from datacleaner) (1.5.1)
Collecting update_checker (from datacleaner)
  Downloading update_checker-0.18.0-py3-none-any.whl.metadata (2.3 kB)
Requirement already satisfied: numpy>=1.26.0 in c:\users\user\anaconda3\lib\site-packages (from pandas->datacleaner) (1.26.4)
Requirement already satisfied: python-dateutil>=2.8.2 in c:\users\user\anaconda3\lib\site-packages (from pandas->datacleaner)
(2.9.0.post0)
Requirement already satisfied: pytz>=2020.1 in c:\users\user\anaconda3\lib\site-packages (from pandas->datacleaner) (2024.1)
Requirement already satisfied: tzdata>=2022.7 in c:\users\user\anaconda3\lib\site-packages (from pandas->datacleaner) (2023.3)
Requirement already satisfied: scipy>=1.6.0 in c:\users\user\anaconda3\lib\site-packages (from scikit-learn->datacleaner) (1.1
3.1)
Requirement already satisfied: joblib>=1.2.0 in c:\users\user\anaconda3\lib\site-packages (from scikit-learn->datacleaner) (1.
4.2)
Requirement already satisfied: threadpoolctl>=3.1.0 in c:\users\user\anaconda3\lib\site-packages (from scikit-learn->datacleane
r) (3.5.0)
Requirement already satisfied: requests>=2.3.0 in c:\users\user\anaconda3\lib\site-packages (from update_checker->datacleaner)
(2.32.3)
Requirement already satisfied: six>=1.5 in c:\users\user\anaconda3\lib\site-packages (from python-dateutil>=2.8.2->pandas->data
cleaner) (1.16.0)
Requirement already satisfied: charset-normalizer<4,>=2 in c:\users\user\anaconda3\lib\site-packages (from requests>=2.3.0->upd
ate_checker->datacleaner) (3.3.2)
Requirement already satisfied: idna<4,>=2.5 in c:\users\user\anaconda3\lib\site-packages (from requests>=2.3.0->update_checker-
>datacleaner) (3.7)
Requirement already satisfied: urllib3<3,>=1.21.1 in c:\users\user\anaconda3\lib\site-packages (from requests>=2.3.0->update_ch
ecker->datacleaner) (2.2.3)
Requirement already satisfied: certifi>=2017.4.17 in c:\users\user\anaconda3\lib\site-packages (from requests>=2.3.0->update_ch
ecker->datacleaner) (2025.1.31)
Downloading update_checker-0.18.0-py3-none-any.whl (7.0 kB)
Building wheels for collected packages: datacleaner
  Building wheel for datacleaner (setup.py): started
  Building wheel for datacleaner (setup.py): finished with status 'done'
  Created wheel for datacleaner: filename=datacleaner-0.1.5-py3-none-any.whl size=7420 sha256=f17c194cd8a7acbfb99f1c27347172b0c
bc9ebc6025fab166e1d4a860c6dabc2
  Stored in directory: c:\users\user\appdata\local\pip\cache\wheels\24\00\d1\e25f165c81e89905f3b8d50d27cc7d6de54b0679757710d7eb
Successfully built datacleaner
Installing collected packages: update_checker, datacleaner
```

```
Successfully installed datacleaner-0.1.5 update_checker-0.18.0
Note: you may need to restart the kernel to use updated packages.
```

In [218…

```python
import pandas as pd
from datacleaner import autoclean  # clean değil, doğru fonksiyon adı: autoclean

# CSV dosyasını oku
df = pd.read_csv(r'C:\Users\USER\Desktop\Son Yarıyıl\Python ile Veri Analizi\marmara_faults_earthquakes_2000_2025.csv')

# Otomatik veri temizleme
cleaned_df = autoclean(df)

# Temizlenmiş veriyi görüntüle
print(cleaned_df.head())
```

```
   Date  Latitude  Longitude  Depth_km  Magnitude_ML  Location  Nearest_Fault  \
0  5988   40.8394    28.4000     15.05           2.5      4453              3
1  5988   40.8442    28.3108      5.23           2.6      4748              3
2  5988   40.8353    28.3511      6.97           2.0      4655              3
3  5988   40.8567    28.3014     14.58           3.5      4673              3
4  5988   40.8467    28.4094      8.33           2.8      4330              3

   Fault_Length_km  Fault_Width_m  Fault_Depth_m  ...  Slip_Rate_mm_per_yr  \
0             10.0            2.0            3.0  ...                  7.5
1             10.0            2.0            3.0  ...                  7.5
2             10.0            2.0            3.0  ...                  7.5
3             10.0            2.0            3.0  ...                  7.5
4             10.0            2.0            3.0  ...                  7.5

   Max_Surface_Slip_m  Recurrence_Interval_yr  Last_Event_Year  Last_Event_Mw  \
0                 5.0                   550.0           1999.0            7.4
1                 5.0                   550.0           1999.0            7.4
2                 5.0                   550.0           1999.0            7.4
3                 5.0                   550.0           1999.0            7.4
4                 5.0                   550.0           1999.0            7.4

   Elapsed_Time_yr  Slip_Deficit_m  Normalized_Slip_m_per_km  \
0             26.0           0.195                  0.004167
1             26.0           0.195                  0.004167
2             26.0           0.195                  0.004167
3             26.0           0.195                  0.004167
4             26.0           0.195                  0.004167

   Moment_Potential_Nm  Mw_Potential
0         1.053000e+20      2.648286
1         1.053000e+20      2.648286
2         1.053000e+20      2.648286
3         1.053000e+20      2.648286
4         1.053000e+20      2.648286

[5 rows x 23 columns]
```

```
C:\Users\USER\anaconda3\Lib\site-packages\datacleaner\datacleaner.py:77: FutureWarning: A value is trying to be set on a copy o
f a DataFrame or Series through chained assignment using an inplace method.
The behavior will change in pandas 3.0. This inplace method will never work because the intermediate object on which we are set
ting values always behaves as a copy.

For example, when doing 'df[col].method(value, inplace=True)', try using 'df.method({col: value}, inplace=True)' or df[col] = d
f[col].method(value) instead, to perform the operation inplace on the original object.


  input_dataframe[column].fillna(input_dataframe[column].median(), inplace=True)
C:\Users\USER\anaconda3\Lib\site-packages\datacleaner\datacleaner.py:77: FutureWarning: A value is trying to be set on a copy o
f a DataFrame or Series through chained assignment using an inplace method.
The behavior will change in pandas 3.0. This inplace method will never work because the intermediate object on which we are set
ting values always behaves as a copy.

For example, when doing 'df[col].method(value, inplace=True)', try using 'df.method({col: value}, inplace=True)' or df[col] = d
f[col].method(value) instead, to perform the operation inplace on the original object.


  input_dataframe[column].fillna(input_dataframe[column].median(), inplace=True)
C:\Users\USER\anaconda3\Lib\site-packages\datacleaner\datacleaner.py:77: FutureWarning: A value is trying to be set on a copy o
f a DataFrame or Series through chained assignment using an inplace method.
The behavior will change in pandas 3.0. This inplace method will never work because the intermediate object on which we are set
ting values always behaves as a copy.

For example, when doing 'df[col].method(value, inplace=True)', try using 'df.method({col: value}, inplace=True)' or df[col] = d
f[col].method(value) instead, to perform the operation inplace on the original object.


  input_dataframe[column].fillna(input_dataframe[column].median(), inplace=True)
```

71-) Data wrangling(data munging) işlemi yapınız.

In [220…

```python
import pandas as pd

df['Date'] = pd.to_datetime(df['Date'], errors='coerce')

df['Coordinates'] = df['Latitude'].astype(str) + ', ' + df['Longitude'].astype(str)

df['Magnitude_Category'] = pd.cut(df['Magnitude_ML'],
```

```
                                bins=[0, 3, 5, 7, 10],
                                labels=['Low', 'Moderate', 'Strong', 'Major'])

print(df[['Date', 'Coordinates', 'Magnitude_ML', 'Magnitude_Category']].head())
```

```
                        Date       Coordinates  Magnitude_ML  \
0 1970-01-01 00:00:00.000005988     40.8394, 28.4           2.5
1 1970-01-01 00:00:00.000005988  40.8442, 28.3108           2.6
2 1970-01-01 00:00:00.000005988  40.8353, 28.3511           2.0
3 1970-01-01 00:00:00.000005988  40.8567, 28.3014           3.5
4 1970-01-01 00:00:00.000005988  40.8467, 28.4094           2.8

  Magnitude_Category
0                Low
1                Low
2                Low
3           Moderate
4                Low
```

72-) Data cleaning işlemi yapınız.

In [222…

```
print(df.isnull().sum())

df['Date'] = df['Date'].fillna(method='ffill')
df = df.dropna(subset=['Latitude', 'Longitude'])

df = df[df['Depth_km'] >= 0]

print(df[['Depth_km', 'Latitude', 'Longitude']].describe())
```

```
Date                        0
Latitude                    0
Longitude                   0
Depth_km                    0
Magnitude_ML                0
Location                    0
Nearest_Fault               0
Fault_Length_km             0
Fault_Width_m               0
Fault_Depth_m               0
Fault_Type                  0
Length_km                   0
Seismogenic_Depth_km        0
Slip_Rate_mm_per_yr         0
Max_Surface_Slip_m          0
Recurrence_Interval_yr      0
Last_Event_Year             0
Last_Event_Mw               0
Elapsed_Time_yr             0
Slip_Deficit_m              0
Normalized_Slip_m_per_km    0
Moment_Potential_Nm         0
Mw_Potential                0
Coordinates                 0
Magnitude_Category          0
dtype: int64
           Depth_km      Latitude     Longitude
count  21605.000000  21605.000000  21605.000000
mean       8.442685     40.044204     28.334438
std        4.407401      0.446887      1.262688
min        0.710000     39.500000     26.000000
25%        6.940000     39.669500     27.417000
50%        7.000000     39.863900     28.789700
75%        8.830000     40.410000     29.423900
max       83.070000     41.495100     30.500000
C:\Users\USER\AppData\Local\Temp\ipykernel_13884\1624104080.py:3: FutureWarning: Series.fillna with 'method' is deprecated and
will raise in a future version. Use obj.ffill() or obj.bfill() instead.
  df['Date'] = df['Date'].fillna(method='ffill')
```

73-) Data cleansing işlemi yapınız.

In [224…

```
df.columns = [col.strip().replace(' ', '_').lower() for col in df.columns]

df = df.drop_duplicates()

df['fault_length_km'] = df['fault_length_km'].replace(0, np.nan)
df['fault_length_km'] = df['fault_length_km'].fillna(df['fault_length_km'].mean())

print(df.head())
```

```
                          date  latitude  longitude  depth_km  magnitude_ml  \
0 1970-01-01 00:00:00.000005988   40.8394    28.4000     15.05           2.5
1 1970-01-01 00:00:00.000005988   40.8442    28.3108      5.23           2.6
2 1970-01-01 00:00:00.000005988   40.8353    28.3511      6.97           2.0
3 1970-01-01 00:00:00.000005988   40.8567    28.3014     14.58           3.5
4 1970-01-01 00:00:00.000005988   40.8467    28.4094      8.33           2.8

   location  nearest_fault  fault_length_km  fault_width_m  fault_depth_m  \
0      4453              3             10.0            2.0            3.0
1      4748              3             10.0            2.0            3.0
2      4655              3             10.0            2.0            3.0
3      4673              3             10.0            2.0            3.0
4      4330              3             10.0            2.0            3.0

   ...  recurrence_interval_yr  last_event_year  last_event_mw  \
0  ...                   550.0           1999.0            7.4
1  ...                   550.0           1999.0            7.4
2  ...                   550.0           1999.0            7.4
3  ...                   550.0           1999.0            7.4
4  ...                   550.0           1999.0            7.4

   elapsed_time_yr  slip_deficit_m  normalized_slip_m_per_km  \
0             26.0           0.195                  0.004167
1             26.0           0.195                  0.004167
2             26.0           0.195                  0.004167
3             26.0           0.195                  0.004167
4             26.0           0.195                  0.004167

   moment_potential_nm  mw_potential       coordinates  magnitude_category
0         1.053000e+20      2.648286     40.8394, 28.4                 Low
1         1.053000e+20      2.648286  40.8442, 28.3108                 Low
2         1.053000e+20      2.648286  40.8353, 28.3511                 Low
3         1.053000e+20      2.648286  40.8567, 28.3014            Moderate
4         1.053000e+20      2.648286  40.8467, 28.4094                 Low

[5 rows x 25 columns]
```

In [ ]: