```
pip install eccodes
```

```
Requirement already satisfied: eccodes in /usr/local/lib/python3.10/dist-packages (1.7.1)
Requirement already satisfied: numpy in /usr/local/lib/python3.10/dist-packages (from eccodes) (1.25.2)
Requirement already satisfied: attrs in /usr/local/lib/python3.10/dist-packages (from eccodes) (23.2.0)
Requirement already satisfied: cffi in /usr/local/lib/python3.10/dist-packages (from eccodes) (1.16.0)
Requirement already satisfied: findlibs in /usr/local/lib/python3.10/dist-packages (from eccodes) (0.0.5)
Requirement already satisfied: pycparser in /usr/local/lib/python3.10/dist-packages (from cffi->eccodes) (2.22)
```

```
!sudo apt update
!sudo apt install libeccodes-dev
```

```
Get:18 https://r2u.stat.illinois.edu/ubuntu jammy/main amd64 Packages [2,546 kB]
Get:19 http://archive.ubuntu.com/ubuntu jammy-updates/universe amd64 Packages [1,411 kB]
Get:20 http://archive.ubuntu.com/ubuntu jammy-updates/main amd64 Packages [2,299 kB]
Get:21 https://r2u.stat.illinois.edu/ubuntu jammy/main all Packages [8,187 kB]
Fetched 23.3 MB in 4s (5,811 kB/s)
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
46 packages can be upgraded. Run 'apt list --upgradable' to see them.
W: Skipping acquire of configured file 'main/source/Sources' as repository 'https://r2u.stat.illinois.edu/ubuntu jammy InRelease'
Reading package lists... Done
Building dependency tree... Done
Reading state information... Done
The following additional packages will be installed:
  libeccodes-data libeccodes0
The following NEW packages will be installed:
  libeccodes-data libeccodes-dev libeccodes0
0 upgraded, 3 newly installed, 0 to remove and 46 not upgraded.
Need to get 3,076 kB of archives.
After this operation, 60.8 MB of additional disk space will be used.
Get:1 http://archive.ubuntu.com/ubuntu jammy/universe amd64 libeccodes-data all 2.24.2-1 [1,592 kB]
Get:2 http://archive.ubuntu.com/ubuntu jammy/universe amd64 libeccodes0 amd64 2.24.2-1 [614 kB]
Get:3 http://archive.ubuntu.com/ubuntu jammy/universe amd64 libeccodes-dev amd64 2.24.2-1 [870 kB]
Fetched 3,076 kB in 1s (3,495 kB/s)
debconf: unable to initialize frontend: Dialog
debconf: (No usable dialog-like program is installed, so the dialog based frontend cannot be used. at /usr/share/perl5/Debconf/Fr
debconf: falling back to frontend: Readline
debconf: unable to initialize frontend: Readline
debconf: (This frontend requires a controlling tty.)
debconf: falling back to frontend: Teletype
dpkg-preconfigure: unable to re-open stdin:
Selecting previously unselected package libeccodes-data.
(Reading database ... 123576 files and directories currently installed.)
Preparing to unpack .../libeccodes-data_2.24.2-1_all.deb ...
Unpacking libeccodes-data (2.24.2-1) ...
Selecting previously unselected package libeccodes0:amd64.
Preparing to unpack .../libeccodes0_2.24.2-1_amd64.deb ...
Unpacking libeccodes0:amd64 (2.24.2-1) ...
Selecting previously unselected package libeccodes-dev:amd64.
Preparing to unpack .../libeccodes-dev_2.24.2-1_amd64.deb ...
Unpacking libeccodes-dev:amd64 (2.24.2-1) ...
Setting up libeccodes-data (2.24.2-1) ...
Setting up libeccodes0:amd64 (2.24.2-1) ...
Setting up libeccodes-dev:amd64 (2.24.2-1) ...
Processing triggers for libc-bin (2.35-0ubuntu3.4) ...
/sbin/ldconfig.real: /usr/local/lib/libtbbmalloc_proxy.so.2 is not a symbolic link

/sbin/ldconfig.real: /usr/local/lib/libtbbbind_2_5.so.3 is not a symbolic link

/sbin/ldconfig.real: /usr/local/lib/libtbb.so.12 is not a symbolic link

/sbin/ldconfig.real: /usr/local/lib/libtbbbind.so.3 is not a symbolic link

/sbin/ldconfig.real: /usr/local/lib/libtbbbind_2_0.so.3 is not a symbolic link

/sbin/ldconfig.real: /usr/local/lib/libtbbmalloc.so.2 is not a symbolic link
```

```
import cfgrib
```

```
/usr/local/lib/python3.10/dist-packages/gribapi/__init__.py:23: UserWarning: ecCodes 2.31.0 or higher is recommended. You are runnir
  warnings.warn(
```

```
import pandas as pd
```

```
with cfgrib.open_dataset('/content/2007_11ERA5.grib') as ds:
  print(ds)
```

```
<xarray.Dataset>
Dimensions:    (time: 43824, latitude: 1, longitude: 2)
```

```
Coordinates:
    number       int64 ...
  * time         (time) datetime64[ns] 2007-01-01 ... 2011-12-31T23:00:00
    step         timedelta64[ns] ...
    surface      float64 ...
  * latitude     (latitude) float64 72.7
  * longitude    (longitude) float64 37.18 37.43
    valid_time   (time) datetime64[ns] ...
Data variables:
    t2m          (time, latitude, longitude) float32 ...
Attributes:
    GRIB_edition:            1
    GRIB_centre:             ecmf
    GRIB_centreDescription:  European Centre for Medium-Range Weather Forecasts
    GRIB_subCentre:          0
    Conventions:             CF-1.7
    institution:             European Centre for Medium-Range Weather Forecasts
    history:                 2024-07-15T18:11 GRIB to CDM+CF via cfgrib-0.9.1...
```

```python
df=ds.to_dataframe()
```

```python
df.to_csv('intern.csv', index=False)
```

```python
pd.read_csv('intern.csv')
```

	number	step	surface	valid_time	t2m
0	0	0 days	0.0	2007-01-01 00:00:00	275.00964
1	0	0 days	0.0	2007-01-01 00:00:00	274.89940
2	0	0 days	0.0	2007-01-01 01:00:00	275.16050
3	0	0 days	0.0	2007-01-01 01:00:00	275.06985
4	0	0 days	0.0	2007-01-01 02:00:00	275.26593
...	...	...	...	...	...
87643	0	0 days	0.0	2011-12-31 21:00:00	271.36386
87644	0	0 days	0.0	2011-12-31 22:00:00	271.69763
87645	0	0 days	0.0	2011-12-31 22:00:00	271.67273
87646	0	0 days	0.0	2011-12-31 23:00:00	272.04517
87647	0	0 days	0.0	2011-12-31 23:00:00	271.97128

87648 rows × 5 columns

```python
!pip install xarray
```

```
Requirement already satisfied: xarray in /usr/local/lib/python3.10/dist-packages (2023.7.0)
Requirement already satisfied: numpy>=1.21 in /usr/local/lib/python3.10/dist-packages (from xarray) (1.25.2)
Requirement already satisfied: pandas>=1.4 in /usr/local/lib/python3.10/dist-packages (from xarray) (2.0.3)
Requirement already satisfied: packaging>=21.3 in /usr/local/lib/python3.10/dist-packages (from xarray) (24.1)
Requirement already satisfied: python-dateutil>=2.8.2 in /usr/local/lib/python3.10/dist-packages (from pandas>=1.4->xarray) (2.8.2)
Requirement already satisfied: pytz>=2020.1 in /usr/local/lib/python3.10/dist-packages (from pandas>=1.4->xarray) (2023.4)
Requirement already satisfied: tzdata>=2022.1 in /usr/local/lib/python3.10/dist-packages (from pandas>=1.4->xarray) (2024.1)
Requirement already satisfied: six>=1.5 in /usr/local/lib/python3.10/dist-packages (from python-dateutil>=2.8.2->pandas>=1.4->xarray
```

```python
import xarray as xr
```

```python
ds = xr.open_dataset('/content/2007_11ERA5.grib', engine='cfgrib')
```

```python
print(ds)
```

```
<xarray.Dataset>
Dimensions:      (time: 43824, latitude: 1, longitude: 2)
Coordinates:
    number       int64 ...
  * time         (time) datetime64[ns] 2007-01-01 ... 2011-12-31T23:00:00
    step         timedelta64[ns] ...
    surface      float64 ...
  * latitude     (latitude) float64 72.7
  * longitude    (longitude) float64 37.18 37.43
    valid_time   (time) datetime64[ns] ...
Data variables:
    t2m          (time, latitude, longitude) float32 ...
Attributes:
    GRIB_edition:            1
    GRIB_centre:             ecmf
```

```
        GRIB_centreDescription:   European Centre for Medium-Range Weather Forecasts
        GRIB_subCentre:           0
        Conventions:              CF-1.7
        institution:              European Centre for Medium-Range Weather Forecasts
        history:                  2024-07-15T18:17 GRIB to CDM+CF via cfgrib-0.9.1...
```

Start coding or generate with AI.

```
df=ds.to_dataframe()
```

```
print(df)
```

```
                                        number   step  surface  \
    time                latitude longitude
    2007-01-01 00:00:00 72.7     37.18         0  0 days      0.0
                                 37.43         0  0 days      0.0
    2007-01-01 01:00:00 72.7     37.18         0  0 days      0.0
                                 37.43         0  0 days      0.0
    2007-01-01 02:00:00 72.7     37.18         0  0 days      0.0
    ...                                      ...    ...      ...
    2011-12-31 21:00:00 72.7     37.43         0  0 days      0.0
    2011-12-31 22:00:00 72.7     37.18         0  0 days      0.0
                                 37.43         0  0 days      0.0
    2011-12-31 23:00:00 72.7     37.18         0  0 days      0.0
                                 37.43         0  0 days      0.0

                                          valid_time         t2m
    time                latitude longitude
    2007-01-01 00:00:00 72.7     37.18     2007-01-01 00:00:00  275.009644
                                 37.43     2007-01-01 00:00:00  274.899414
    2007-01-01 01:00:00 72.7     37.18     2007-01-01 01:00:00  275.160492
                                 37.43     2007-01-01 01:00:00  275.069855
    2007-01-01 02:00:00 72.7     37.18     2007-01-01 02:00:00  275.265930
    ...                                                    ...         ...
    2011-12-31 21:00:00 72.7     37.43     2011-12-31 21:00:00  271.363861
    2011-12-31 22:00:00 72.7     37.18     2011-12-31 22:00:00  271.697632
                                 37.43     2011-12-31 22:00:00  271.672729
    2011-12-31 23:00:00 72.7     37.18     2011-12-31 23:00:00  272.045166
                                 37.43     2011-12-31 23:00:00  271.971283

    [87648 rows x 5 columns]
```