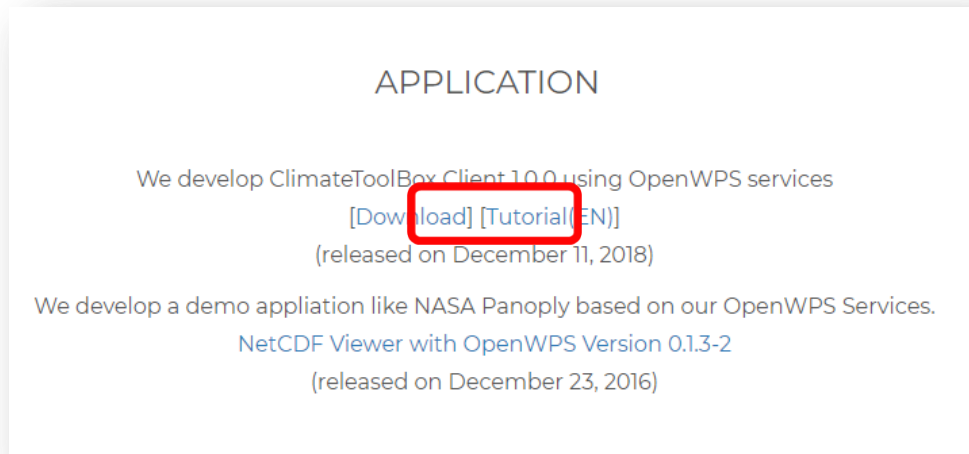


ClimateToolBox Client Manual

ClimateToolBox

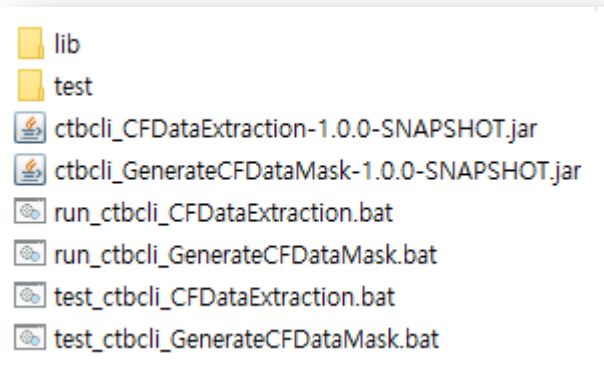
(1) Connect to OpenWPS homepage (<http://openwps.apcc21.org>)



• Program requirement

- JRE: 1.5 or above
- OS: Windows or Linux

(2) Download and Extract download file (ClimateToolBox_Client_1.0.0.zip)



- lib folder: libraries for running the programs
- test folder: sample data for test
- run_ctbcli_CFDDataExtraction.bat: ctbcli_CFDDataExtraction program execution file
- run_ctbcli_GenerateCFDataMask.bat: ctbcli_GenerateCFDataMask program execution file
- test_ctbcli_CFDDataExtraction.bat: ctbcli_CFDDataExtraction program execution test file
- test_ctbcli_GenerateCFDataMask.bat: ctbcli_GenerateCFDataMask program test file

ctbcli_GenerateCFDataMask

- **Program:** ctbcli_GenerateCFDataMask
- **Version:** 1.0.0
- **Description:** This program generates mask data using CF metadata and user-defined AOI (Area Of Interest) and and save it in netCDF format or CSV format

Parameter	Description
i	An input filename or A folder saved input files
g	User-defined spatial data with GeoJSON format
m	Mask generation method using user-defined spatial data <ul style="list-style-type: none">• RectInterPy, PtInExpMBR, PtInMBR, PtInPy (Ref. to https://openwps.apcc21.org/)
r	Spatial resolution if non-gridded climate data
f	Mask data save format <ul style="list-style-type: none">• nc: NetCDF• csv: CSV
o	Save filename (if 'I' parameter is the folder, this option is ignore)
v	Variable name that you want to extract data) (if this option is empty, this option would be set to the first variable expect the main variables such as lat, lon, time, etc.)

DEMO: ctbcli_GenerateCFDataMask

- ctbcli_GenerateCFDataMask program test

Parameter	Value
i	D:\merra2\data\prec.nc
g	D:\merra2\b.geojson User-defined AOI
f	nc
o	d:\merra2\prec_mask.nc
r	3.5
m	RectInterPy
v	prec



<http://geojson.io>

b.geojson file

```
b.geojson - 韓国語
파일의 편집(田) 서식(田) 보기(田) 도움말(田)
{
  "type": "FeatureCollection",
  "features": [
    {
      "type": "Feature",
      "properties": {},
      "geometry": {
        "type": "Polygon",
        "coordinates": [
          [
            [ 88.70773315429688,
              23.91345958289083
            ],
            [ 88.68301391601562,
              23.87955917639489
            ],
            [ 88.63494873046875,
              23.866257066593774
            ],
            [ 88.60336303710938,
              23.87453613830371
            ],
            [ 88.57589721679688,
              23.864489477406607
            ],
            [ 88.5727205078125,
              23.84062553449291
            ],
            [ 88.70773315429688,
              23.91345958289083
            ]
          ]
        ]
      }
    }
  ]
}
```

Execution screen

```
Processing D:\merra2\data\prec.nc
Making input parameter data (gClimateMaskJSON data, etc.)...
Connecting to OpenWPS server and sending input parameters...
Writing mask data to d:\merra2\prec_mask.nc...
Complete
```

DEMO: ctbcli_GenerateCFDataMask



- Execution result file

prec_mask.nc

```
dimensions:
  lat = 73
  lon = 144

variables:
  int mask(lat = 73, lon = 144)
    :_FillValue = 0

  float lon(lon = 144)
    :units = "degrees_east"
    :long_name = "longitude"
    :nlon = 144

  float lat(lat = 73)
    :units = "degrees_north"
    :long_name = "latitude"
    :nlat = 73

// global attributes:
:institution = "APEC Climate Center, Busan, Republic of Korea"
:institute_id = "APCC"
:contact = "Seongkyu Lee(geoslegend@apcc21.org)"
```

metadata

Dataset: prec_mask.nc
Variable: mask
Units:

	lon (degrees_east)						
	82.500	85.000	87.500	90.000	92.500	95.000	97.500
-7.500	NaN	NaN	NaN	NaN	NaN	NaN	NaN
-5.000	NaN	NaN	NaN	NaN	NaN	NaN	NaN
-2.500	NaN	NaN	NaN	NaN	NaN	NaN	NaN
0.000	NaN	NaN	NaN	NaN	NaN	NaN	NaN
2.500	NaN	NaN	NaN	NaN	NaN	NaN	NaN
5.000	NaN	NaN	NaN	NaN	NaN	NaN	NaN
7.500	NaN	NaN	NaN	NaN	NaN	NaN	NaN
10.000	NaN	NaN	NaN	NaN	NaN	NaN	NaN
12.500	NaN	NaN	NaN	NaN	NaN	NaN	NaN
15.000	NaN	NaN	NaN	NaN	NaN	NaN	NaN
17.500	NaN	NaN	NaN	NaN	NaN	NaN	NaN
20.000	NaN	NaN	NaN	NaN	NaN	NaN	NaN
22.500	NaN	NaN	1.0	1.0	NaN	NaN	NaN
25.000	NaN	NaN	1.0	1.0	NaN	NaN	NaN
27.500	NaN	NaN	NaN	NaN	NaN	NaN	NaN
30.000	NaN	NaN	NaN	NaN	NaN	NaN	NaN
32.500	NaN	NaN	NaN	NaN	NaN	NaN	NaN
35.000	NaN	NaN	NaN	NaN	NaN	NaN	NaN
37.500	NaN	NaN	NaN	NaN	NaN	NaN	NaN
40.000	NaN	NaN	NaN	NaN	NaN	NaN	NaN
42.500	NaN	NaN	NaN	NaN	NaN	NaN	NaN
45.000	NaN	NaN	NaN	NaN	NaN	NaN	NaN
47.500	NaN	NaN	NaN	NaN	NaN	NaN	NaN
50.000	NaN	NaN	NaN	NaN	NaN	NaN	NaN

mask variable data

ctbcli_CFDataExtraction

- **Program: ctbcli_CFDataExtraction**
- **Version: 1.0.0**
- **Description: This program extracts climate data in user-defined AOI (Area Of Interest) from netCDF data created with CF metadata and saves it in CSV format**

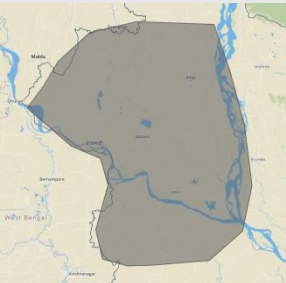
Parameter	Description
mmd	Masking data generation method using user-defined AOI (Area Of Interest) <ul style="list-style-type: none">• always: mask data generation of each file through OpenWPS service• once: mask data generation through OpenWPS service when the first file will be processed
g	User-defined spatial data with GeoJSON format
m	Mask generation method using user-defined spatial data <ul style="list-style-type: none">• RectInterPy, PtInExpMBR, PtInMBR, PtInPy (Ref. to https://openwps.apcc21.org/)
r	Spatial resolution if non-gridded climate data
ffmt	Time data output format <ul style="list-style-type: none">• value: raw data• date(yyyy-MM-dd): data converted 'yyyy-MM-dd' data format• datetime(yyyy-MM-dd HH:mm:ss): data converted 'yyyy-MM-dd HH:mm:ss' data/time format
i	An input filename or A folder saved input files
o	Save filename (if 'I' parameter is the folder, this option is ignore)
v	Variable name that you want to extract data) (if this option is empty, this option would be set to the first variable expect the main variables)

DEMO: ctbcli_CFDataExtraction



- ctbcli_CFDataExtraction program data

Parameter	Value
mmd	always
g	D:\merra2\b.geojson User-defined AOI
r	3.5
m	RectInterPy
tfmt	date
i	D:\merra2\data



* if v option is empty, this option will be set to the first variable except the main variables (lat, lon, time, etc.)

- * **File list in the input folder (d:\merra2\data)**

- MERRA2_0.5d_PREC_1980.nc (Non-CF metadata)
- MERRA2_PREC_2015.nc (Non-CF metadata)
- prec.nc (MME – GAUS, CF metadata)
- sst.mnmean.nc (NOAA Extended Reconstructed SST V3 , CF metadata)

실행 화면

```
[1/4] Processing D:\merra2\data\MERRA2_0.5d_PREC_1980.nc
Finding the first variable... Error due to non-CF metadata
Found the first variable: VAR
[ERROR] Unable to parse date string s %Y%m%d.%f
Connecting to OpenWPS server...
Making basis data...
Extracting and saving data in the user-defined region...

[2/4] Processing D:\merra2\data\MERRA2_PREC_2015.nc
Finding the first variable...
Found the first variable: VAR
[ERROR] Unable to parse date string s %Y%m%d.%f
Connecting to OpenWPS server...
Making basis data...
Extracting and saving data in the user-defined region...

[3/4] Processing D:\merra2\data\prec.nc
Finding the first variable...
Found the first variable: prec
Connecting to OpenWPS server...
Making basis data...
Extracting and saving data in the user-defined region...

[4/4] Processing D:\merra2\data\sst.mnmean.nc
Finding the first variable...
Found the first variable: sst
Connecting to OpenWPS server...
Making basis data...
Extracting and saving data in the user-defined region...

Complete
```


DEMO: ctbcli_CFDataExtraction



- Execution result file

MERRA2_0.5d_PREC_1980.nc

```
MERRA2_0.5d_PREC_1980.nc
time,lat,lon,VAR
0.0,23.5,88.5,3.373625E-4
0.0,23.5,89.0,2.7951237E-4
0.0,24.0,88.5,0.003316479
0.0,24.0,89.0,0.002492721
0.0,23.5,88.5,6.2206764
0.0,23.5,89.0,7.479569
0.0,24.0,88.5,6.3814554
0.0,24.0,89.0,8.696343
0.0,23.5,88.5,0.47342968
0.0,23.5,89.0,0.30907366
0.0,24.0,88.5,0.41897443
0.0,24.0,89.0,0.3287093
0.0,23.5,88.5,0.0019309064
0.0,23.5,89.0,0.0015411556
0.0,24.0,88.5,4.5715677E-4
0.0,24.0,89.0,2.893218E-4
0.0,23.5,88.5,0.0073000444
0.0,23.5,89.0,0.0034806456
0.0,24.0,88.5,0.006533328
0.0,24.0,89.0,0.0026544384
0.0,23.5,88.5,1.973764E-8
0.0,23.5,89.0,1.5461362E-8
0.0,24.0,88.5,7.153494E-10
0.0,24.0,89.0,1.1270899E-9
0.0,23.5,88.5,0.0
0.0,23.5,89.0,0.0
0.0,24.0,88.5,0.0
0.0,24.0,89.0,0.0
0.0,23.5,88.5,0.0
0.0,23.5,89.0,0.0
0.0,24.0,88.5,0.0
0.0,24.0,89.0,0.0
```

MERRA2_PREC_2015.nc

```
MERRA2_PREC_2015.nc.txt
time,lat,lon,VAR
0.0,23.5,88.75,0.5855854
0.0,24.0,88.75,0.16313292
0.0,23.5,88.75,0.8631046
0.0,24.0,88.75,0.7776418
0.0,23.5,88.75,11.075231
0.0,24.0,88.75,6.1200495
0.0,23.5,88.75,2.5215585
0.0,24.0,88.75,1.8003662
0.0,23.5,88.75,3.933209E-8
0.0,24.0,88.75,3.1102043E-10
0.0,23.5,88.75,0.0
0.0,24.0,88.75,0.0
0.0,23.5,88.75,0.0
0.0,24.0,88.75,0.0
0.0,23.5,88.75,4.3482207E-10
0.0,24.0,88.75,9.225674E-15
0.0,23.5,88.75,9.817969E-7
0.0,24.0,88.75,3.4089796E-6
0.0,23.5,88.75,0.0
0.0,24.0,88.75,0.0
0.0,23.5,88.75,0.0
0.0,24.0,88.75,0.0
0.0,23.5,88.75,4.2915894E-29
0.0,24.0,88.75,2.4416292E-28
0.0,23.5,88.75,7.11311E-28
0.0,24.0,88.75,2.2538126E-27
0.0,23.5,88.75,0.0
0.0,24.0,88.75,0.0
0.0,23.5,88.75,0.0
0.0,24.0,88.75,0.0
0.0,23.5,88.75,0.08470213
0.0,24.0,88.75,0.08808648
```

prec.nc

```
prec.nc.txt - 메모장
time,level,lat,lon,prec
2018-04-15,1.0,22.5,87.5,37.66681
2018-04-15,1.0,22.5,90.0,33.885914
2018-04-15,1.0,25.0,87.5,42.106415
2018-04-15,1.0,25.0,90.0,29.957159
2018-04-15,2.0,22.5,87.5,27.90168
2018-04-15,2.0,22.5,90.0,34.615295
2018-04-15,2.0,25.0,87.5,26.332436
2018-04-15,2.0,25.0,90.0,36.28763
2018-04-15,3.0,22.5,87.5,34.431507
2018-04-15,3.0,22.5,90.0,31.498798
2018-04-15,3.0,25.0,87.5,31.561155
2018-04-15,3.0,25.0,90.0,33.755215
2018-04-15,4.0,22.5,87.5,1.0E20
2018-04-15,4.0,22.5,90.0,1.0E20
2018-04-15,4.0,25.0,87.5,1.0E20
2018-04-15,4.0,25.0,90.0,1.0E20
2018-05-15,1.0,22.5,87.5,29.934845
2018-05-15,1.0,22.5,90.0,32.509693
2018-05-15,1.0,25.0,87.5,36.541203
2018-05-15,1.0,25.0,90.0,38.751804
2018-05-15,2.0,22.5,87.5,34.673492
2018-05-15,2.0,22.5,90.0,37.778774
2018-05-15,2.0,25.0,87.5,28.897585
2018-05-15,2.0,25.0,90.0,30.143185
2018-05-15,3.0,22.5,87.5,35.391666
2018-05-15,3.0,22.5,90.0,29.71154
2018-05-15,3.0,25.0,87.5,34.561214
2018-05-15,3.0,25.0,90.0,31.105013
2018-05-15,4.0,22.5,87.5,1.0E20
2018-05-15,4.0,22.5,90.0,1.0E20
2018-05-15,4.0,25.0,87.5,1.0E20
2018-05-15,4.0,25.0,90.0,1.0E20
```

sst.mnmean.nc

```
sst.mnmean.nc.txt - 메모장
time,lat,lon,sst
1854-01-01,24.0,88.0,32767.0
1854-02-01,24.0,88.0,32767.0
1854-03-01,24.0,88.0,32767.0
1854-04-01,24.0,88.0,32767.0
1854-05-01,24.0,88.0,32767.0
1854-06-01,24.0,88.0,32767.0
1854-07-01,24.0,88.0,32767.0
1854-08-01,24.0,88.0,32767.0
1854-09-01,24.0,88.0,32767.0
1854-10-01,24.0,88.0,32767.0
1854-11-01,24.0,88.0,32767.0
1854-12-01,24.0,88.0,32767.0
1855-01-01,24.0,88.0,32767.0
1855-02-01,24.0,88.0,32767.0
1855-03-01,24.0,88.0,32767.0
1855-04-01,24.0,88.0,32767.0
1855-05-01,24.0,88.0,32767.0
1855-06-01,24.0,88.0,32767.0
1855-07-01,24.0,88.0,32767.0
1855-08-01,24.0,88.0,32767.0
1855-09-01,24.0,88.0,32767.0
1855-10-01,24.0,88.0,32767.0
1855-11-01,24.0,88.0,32767.0
1855-12-01,24.0,88.0,32767.0
1856-01-01,24.0,88.0,32767.0
1856-02-01,24.0,88.0,32767.0
1856-03-01,24.0,88.0,32767.0
1856-04-01,24.0,88.0,32767.0
1856-05-01,24.0,88.0,32767.0
1856-06-01,24.0,88.0,32767.0
1856-07-01,24.0,88.0,32767.0
1856-08-01,24.0,88.0,32767.0
```