繪圖軟體應用 第14周(12/11)

M_Map

Netcdf : Network Common Data Form

https://www.google.com/search?q=Netcdf&spell=1&sa=X&ved=2ahUKEwjFuKD59azmAhWXy4sBHV4_AL4QBSgAegQICxAp&biw=1280&bih=913

```
clear;clc
lookfor netcdf %查詢函式說明書
```

```
nccreate                      - Create variable in NetCDF file.
ncdisp                        - Display contents of a NetCDF source in command window.
ncinfo                        - Return information about a NetCDF source.
ncread                        - Read variable data from a NetCDF source.
ncreadatt                     - Read attribute value from a NetCDF source.
ncwrite                       - Write data to NetCDF file.
ncwriteatt                    - Write attribute to NetCDF file.
ncwriteschema                 - Add NetCDF schema definitions to NetCDF file.
```

到 ftp://140.121.165.44/pub/graphic_class/

選取

ssc.nc

和

2012070200_2012070300_daily-ifremer-L3-MWF-GLO-20120704102056-01.0.nc

```
help ncdisp
```

```
 ncdisp Display contents of a NetCDF source in command window.

     ncdisp(FILENAME) displays the groups, dimensions, variable definitions
     and all attributes in the NetCDF file FILENAME as text in the command
     window.

     ncdisp(OPENDAP_URL) displays information from an OPeNDAP NetCDF data
     source.

     ncdisp(SOURCE, LOCATION) displays information about the variable or
     group specified by the string LOCATION in SOURCE, which can either be
     a filename or an OPeNDAP URL. Set LOCATION to '/' to display entire
     file contents.

     ncdisp(SOURCE, LOCATION, MODESTR) displays the contents of the
     LOCATION according to the value of MODESTR. Valid values for MODESTR
     are:

      'min'  - display variable definitions only.

      'full' - display dimensions, attributes and variable definitions.
               This is the default value.


     Example: Visually inspect a NetCDF file.
        ncdisp('example.nc');
```

```
 Example: Visually inspect a NetCDF file, hide the attributes.
    ncdisp('example.nc','/','min');

 Example: Visually inspect the full details of a variable.
    ncdisp('example.nc','peaks');


 See also ncinfo, ncread, ncreadatt, ncwrite, netcdf.

Documentation for ncdisp
```

```
ncdisp('sss.nc') %顯示內容
```

```
Source:
           C:\00781035\sss.nc
Format:
           classic
Global Attributes:
           Title        = 'sea surface salinity (SSS)'
           Comments     = 'Aquarius SSS objectively interpolated onto a regular 0.5x0.5 grid'
           Week         = 'Julian 22 - 28, 2015'
           Institution  = 'IPRC'
           DataSource   = 'Aquarius L2 V4.0'
           Notes        = 'http://iprc.soest.hawaii.edu/users/oleg/oisss/glb/Technical_Notes.pdf'
           CreationDate = '2015/08/20 14:08:56'
           CreatedBy    = 'oleg'
Dimensions:
           time      = 1
           latitude  = 360
           longitude = 720
Variables:
    time
           Size:       1x1
           Dimensions: time
           Datatype:   single
           Attributes:
                       long_name = 'first day of the week over which Aquarius data have been collected'
                       units     = 'Julian days since December 31, 2010'
                       axis      = 'T'
    latitude
           Size:       360x1
           Dimensions: latitude
           Datatype:   single
           Attributes:
                       long_name = 'latitude'
                       units     = 'degrees_north'
                       axis      = 'Y'
    longitude
           Size:       720x1
           Dimensions: longitude
           Datatype:   single
           Attributes:
                       long_name = 'longitude'
                       units     = 'degrees_east'
                       axis      = 'X'
    sss
           Size:       720x360x1
           Dimensions: longitude,latitude,time
           Datatype:   single
           Attributes:
                       long_name  = 'sea surface salinity'
                       units      = 'psu'
                       _FillValue = -9999
```

Dimensions:

time = 1

latitude = 360

longitude = 720

Size: 720x360x1

Dimensions: longitude,latitude,time

Datatype: single

Attributes:

long_name = 'sea surface salinity'

units = 'psu'

_FillValue = -9999

```
ncinfo('sss.nc')
```

```
ans = struct with fields:
      Filename: 'C:\00781035\sss.nc'
          Name: '/'
    Dimensions: [1×3 struct]
     Variables: [1×4 struct]
    Attributes: [1×8 struct]
        Groups: []
        Format: 'classic'
```

```
% clear;clc
help ncread % Read variable data from a NetCDF source.
```

```
 ncread Read variable data from a NetCDF source.

     VARDATA = ncread(FILENAME,VARNAME) reads data from the variable
     VARNAME in the NetCDF file FILENAME.

     VARDATA = ncread(OPENDAP_URL,VARNAME) reads data from the variable
     VARNAME from an OPeNDAP NetCDF data source.

     VARDATA = ncread(SOURCE,VARNAME,START,COUNT)
     VARDATA = ncread(SOURCE,VARNAME,START,COUNT,STRIDE) reads data from
     VARNAME beginning at the location given by START from SOURCE, which
     can either be a filename or an OPeNDAP URL. For an N-dimensional
     variable START is a vector of 1-based indices of length N specifying
     the starting location. COUNT is also a vector of length N specifying
     the number of elements to read along corresponding dimensions. If a
     particular element of COUNT is Inf, data is read until the end of that
     dimension. The optional argument STRIDE specifies the inter-element
     spacing along each dimension. STRIDE defaults to a vector of ones.

     The MATLAB datatype of VARDATA will be the closest type to the
     corresponding NetCDF datatype. VARDATA will be of type double, if at
```

```
least one of '_FillValue', 'scale_factor' and 'add_offset' variable
attribute is present. The following attribute conventions are applied
in sequence to VARDATA if the corresponding attribute exists for this
variable:

   1. Values in VARDATA equal to the '_FillValue' attribute value are
      replaced with NaNs. If '_FillValue' attribute does not exist,
      ncread will query the library for the variable's fill value.
   2. VARDATA is multiplied by the value of 'scale_factor' attribute.
   3. The value of the 'add_offset' attribute is added to VARDATA.


Example: Read and display the 'peaks' data in the example file.
   ncdisp('example.nc','peaks');
   peaksData  = ncread('example.nc','peaks');
   peaksDesc  = ncreadatt('example.nc','peaks','description');
   surf(double(peaksData));
   title(peaksDesc);

Example: Subsample the 'peaks' data by a factor of 2.
   subsetdata = ncread('example.nc','peaks',...
                       [1 1], [Inf Inf], [2 2]);
   surf(double(subsetdata));


See also ncdisp, ncreadatt, ncinfo, ncwrite, netcdf.

Documentation for ncread
```

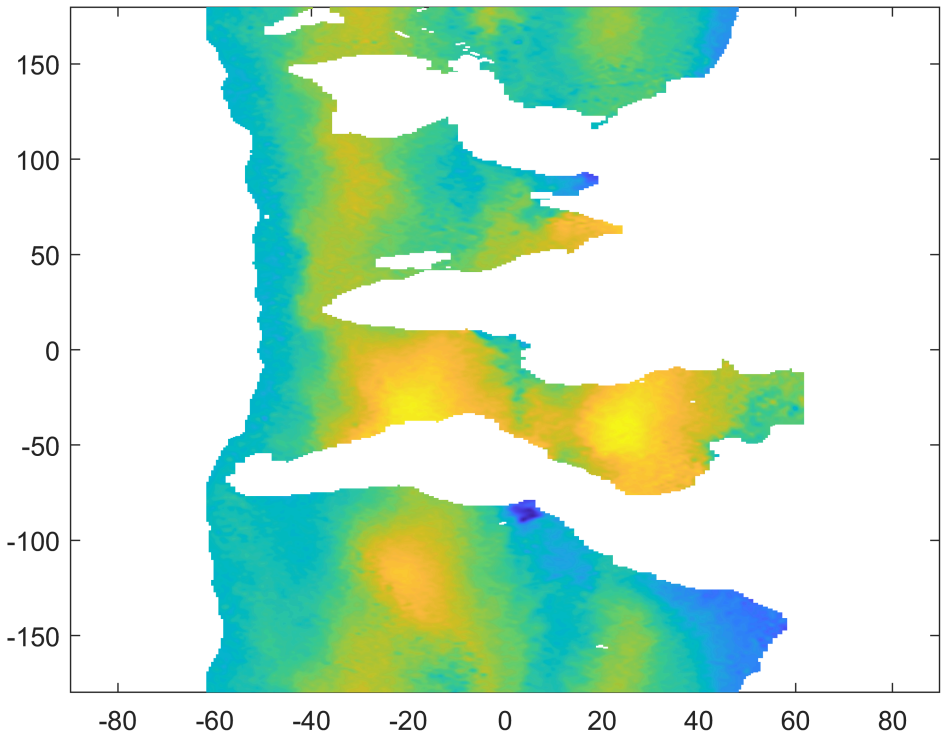
```
lon = ncread('sss.nc','longitude'); %一個大小是720的行向量
lon(1)
```

```
ans = single

    -179.7500
```

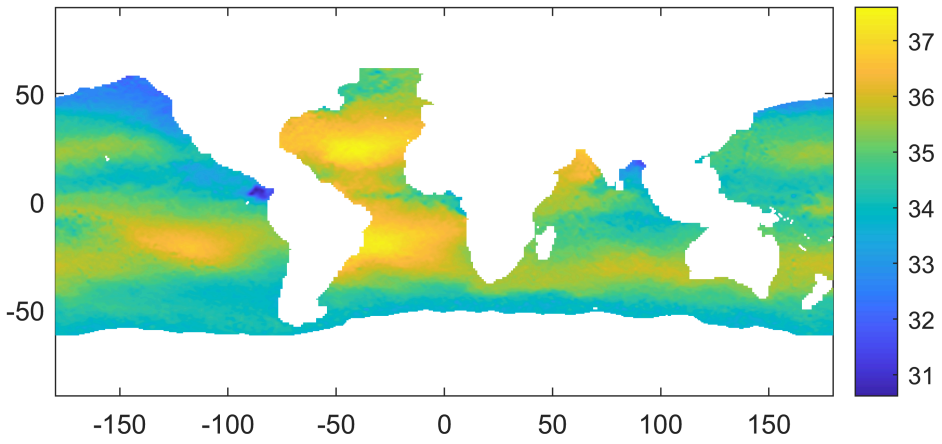
```
lat = ncread('sss.nc','latitude');%一個大小是360的行向量
lat(end)
```

```
ans = single

    89.7500
```

```
sss = ncread('sss.nc','sss');
figure(1)
pcolor(lat,lon,sss);shading interp
```




```
[xlat,ylon] = meshgrid(lat,lon);
figure(2)
pcolor(ylon,xlat,sss);shading interp;axis('image');
colorbar;
```



到 ftp://140.121.165.44/pub/graphic_class/

選取

sample_2016.nc

```
clear;clc
ncdisp('sample_2016.nc') %顯示內容
```

```
Source:
           C:\00781035\sample_2016.nc
Format:
           classic
Global Attributes:
           title               = 'AVHRR PATHFINDER SEA SURFACE TEMPERATURE'
           temporal_resolution = 'Five Day Average'
           spatial_resolution  = '0.5 degree'
           creation_date       = 'Thu Aug 15 10:40:39 2002'
           originating_center  = 'NASA JPL PO.DAAC'
           WOCE_Version        = '3.0-PF4.1'
           Conventions         = 'COARDS/WOCE'
Dimensions:
           time      = 1
           depth     = 1
           latitude  = 360
           longitude = 720
Variables:
    woce_date
           Size:       1x1
```

```
       Dimensions: time
       Datatype:   int32
       Attributes:
                   long_name      = 'WOCE date'
                   units          = 'yyyymmdd'
                   data_min       = 19900101
                   data_max       = 19900105
                   FORTRAN_format = 'I8'
                   time_interval  = 'five days'
woce_time
       Size:       1x1
       Dimensions: time
       Datatype:   single
       Attributes:
                   long_name      = 'WOCE time'
                   units          = 'hhmmss.dd UTC'
                   data_min       = 0
                   data_max       = 235959
                   FORTRAN_format = 'F9.2'
time
       Size:       1x1
       Dimensions: time
       Datatype:   single
       Attributes:
                   long_name      = 'time'
                   units          = 'days since 1990-01-01 00:00:00'
                   data_min       = 0
                   data_max       = 4
                   FORTRAN_format = 'I4'
                   time_interval  = 'five days'
latitude
       Size:       360x1
       Dimensions: latitude
       Datatype:   single
       Attributes:
                   long_name          = 'latitude'
                   units              = 'degrees_N'
                   data_min           = -66.75
                   data_max           = 66.75
                   valid_min          = -89.75
                   valid_max          = 89.75
                   FORTRAN_format     = 'F6.2'
                   spatial_resolution = '0.5 degree'
longitude
       Size:       720x1
       Dimensions: longitude
       Datatype:   single
       Attributes:
                   long_name          = 'longitude'
                   units              = 'degrees_E'
                   data_min           = 0.25
                   data_max           = 359.75
                   valid_min          = 0.25
                   valid_max          = 359.75
                   FORTRAN_format     = 'F6.2'
                   spatial_resolution = '0.5 degree'
depth
       Size:       1x1
       Dimensions: time
       Datatype:   single
       Attributes:
                   long_name      = 'depth'
                   units          = 'meters'
                   positive       = 'down'
                   data_min       = 0
```

```
                    data_max       = 0
                    FORTRAN_format = 'F3.0'
    sst
           Size:       720x360
           Dimensions: longitude,latitude
           Datatype:   int16
           Attributes:
                    long_name      = 'sea surface temperature'
                    units          = 'degree C'
                    data_min       = -2.84
                    data_max       = 32.1
                    valid_min      = -3
                    valid_max      = 36
                    FORTRAN_format = 'f6.3'
                    _FillValue     = 327.67
                    missing_value  = 327.66
                    scale_factor   = 0.01
                    add_offset     = 0
                    instrument     = 'AVHRR'
                    comment        = 'land = 327.66'
    bin_count
           Size:       720x360
           Dimensions: longitude,latitude
           Datatype:   int8
           Attributes:
                    long_name      = 'number of data points per bin'
                    units          = 'number of data points per bin'
                    data_min       = 0
                    data_max       = 4
                    valid_min      = 0
                    valid_max      = 5
                    FORTRAN_format = 'I2'
```

```
lat2 = ncread('sample.nc','latitude');
lon2 = ncread('sample.nc','longitude');
```

到 ftp://140.121.165.44/pub/graphic_class/

選取

extract_wind.m (羅老師自己的使用範例)

到 ftp://140.121.165.44/pub/graphic_class/

選取

mexnc_install.docx 解說

到M_Map下載最新版

Announcing M_Map v1.4k!

點擊 zip archive 下載

#m_map######Matlab#####

####m_map1.4######

C:\Program Files\MATLAB\R2019b

##################

gshhs_c.b#gshhs_f.b#gshhs_h.b#gshhs_i.b#gshhs_l.b

ftp://140.121.165.44/pub/graphic_class/m_map/

###C:\Program Files\MATLAB\R2019b\m_map1.4\m_map\private

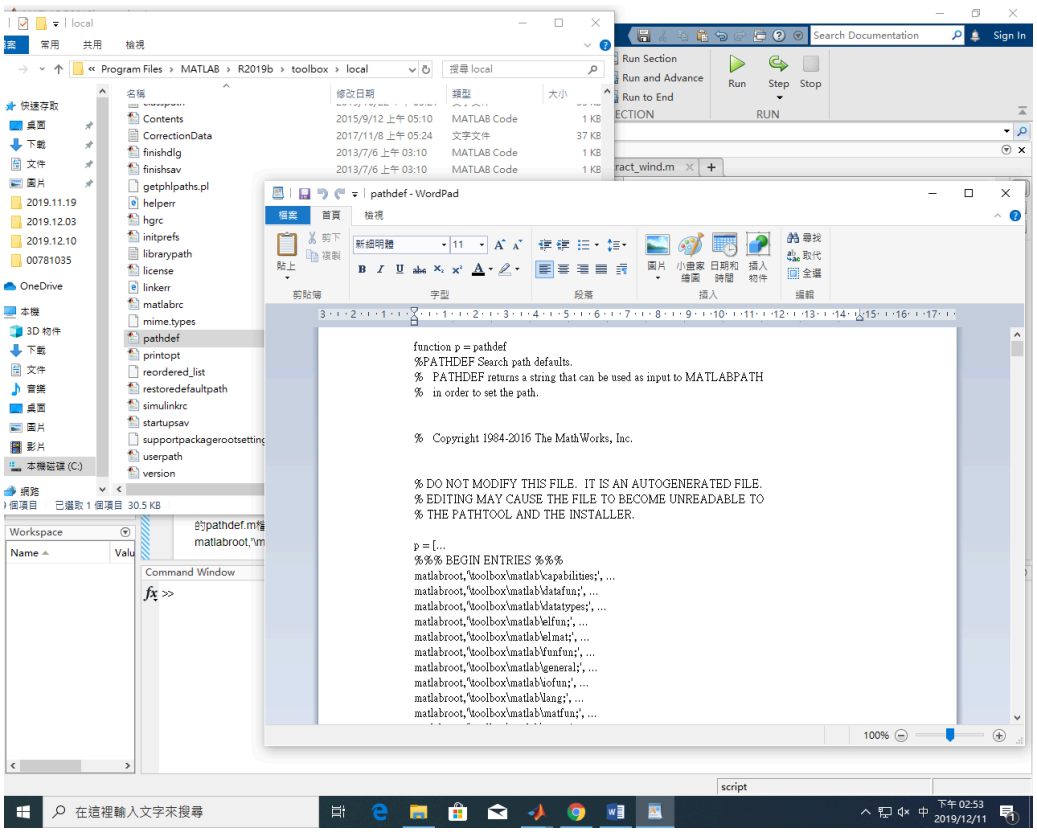
將以上5個檔案放到C:\00781035\m_map1.4.zip\m_map\private

```
clear;clc
help m_coast
```

```
m_coast not found.

Use the Help browser search field to search the documentation, or
type "help help" for help command options, such as help for methods.
```

##C:\Program Files\MATLAB\R2019b\toolbox\local\

#pathdef.m#####m_map#######matlabroot,'\m_map1.4\m_map;', ...




```
clear;clc
```

```
help m_coast
```