

OPeNDAP subsetting with matlab

In this example we will show how to benefit from OPeNDAP subsetting. We will request subsets from worldwide digital elevation maps (DEMs) that are too big to request as a whole: resulting in approx. 500 MB (over 10,000 x 20,000 points) or 2 GB (over 20,000 x 40,000) for respectively a 1 minute or 30 second grids.

Add snctools <http://mexcdf.sourceforge.net/>, shipped with OpenEarthTools

```
run('...\openearthtools\matlab\oetsettings.m')
```

World digital elevation maps: Define data on an opendap server. These are 6 free datasets, which we will compare for the Southern North Sea. Please compare them to non-open datasets such as [GEBCO](#). For details on the processing of the 6 DEM's, please refer to the meta-data in the THREDDS OPeNDAP server provided by USGS/[WHOI](#).

```
url_grid{1} = 'http://geoport.who.i.edu/thredds/dodsC/bathy/etopo1_bed_g2';
url_grid{2} = 'http://geoport.who.i.edu/thredds/dodsC/bathy/etopo2_v2c.nc';
url_grid{3} = 'http://geoport.who.i.edu/thredds/dodsC/bathy/srtm30plus_v1.nc';
url_grid{4} = 'http://geoport.who.i.edu/thredds/dodsC/bathy/srtm30plus_v6';
url_grid{5} = 'http://geoport.who.i.edu/thredds/dodsC/bathy/smith_sandwell_v9.1.nc';
url_grid{6} = 'http://geoport.who.i.edu/thredds/dodsC/bathy/smith_sandwell_v11';

url_line    = 'http://opendap.deltares.nl/thredds/dodsC/opendap/noaa/gshhs/gshhs_i.nc';
```

World vector shoreline: Get line data: 1D vectors are small, so we can get all data

```
nc_dump(url_line)
L.lon    = ncread(url_line,'lon');
L.lat    = ncread(url_line,'lat');
```

Define bounding box

```
boundingbox.lon = [ 0 10];
boundingbox.lat = [50 55];

for i=1:length(url_grid)

    ncfile = url_grid{i}
```

- Get full lat,lon vectors: 1D vectors are small, so we can get all data

```
nc_dump(ncfile)
    G.lon    = ncread(ncfile,'lon' ); % 1D
    G.lat    = ncread(ncfile,'lat' ); % 1D
```

- Find the subset-indices within the bounding box

```
ilon    = find(G.lon > boundingbox.lon(1) & G.lon < boundingbox.lon(2));
ilat    = find(G.lat > boundingbox.lat(1) & G.lat < boundingbox.lat(2));
```

- translate subset-indices to netCDF argument: [start,count,stride]

```
stride  = [1 1]; % additionally specify a stride when the subset is still too big
start   = [min(ilon) min(ilat)]; % netCDF is 0-based, whereas matlab is 1-based
count   = ceil([length(ilon) length(ilat)]./stride); % use ceil to cover at least bounding box area
```

- Request data subset

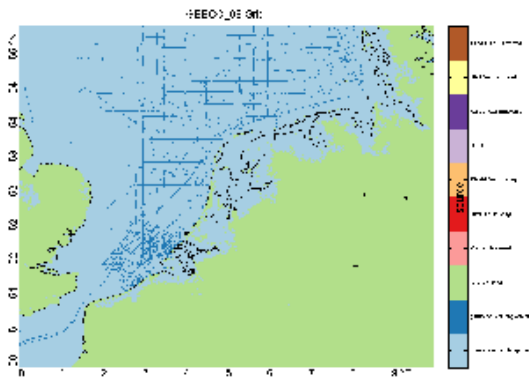
```
G.lat = ncread(ncfile,'lat',start(2),count(2),stride(2)); % 1D
G.lon = ncread(ncfile,'lon',start(1),count(1),stride(1)); % 1D
G.topo = ncread(ncfile,'topo',start(:),count(:),stride(:)); % 2D
G.title = ncreadatt(ncfile,'/','title')
```

- Plot data subset

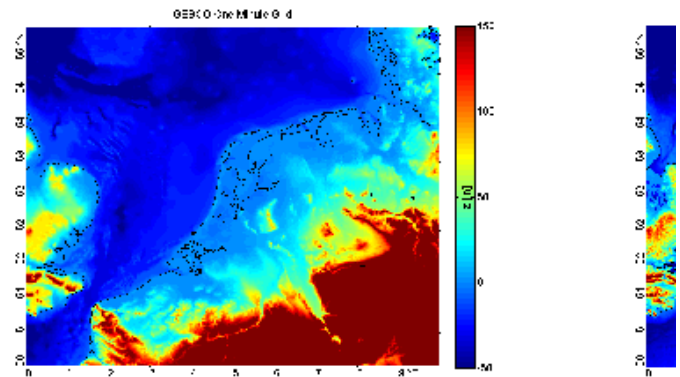
```
figure(i)
pcolorcorcen(G.lon,G.lat,G.topo')
hold on
plot(L.lon,L.lat,'k')
axis([boundingbox.lon boundingbox.lat])
tickmap('ll','texttype','text','dellast',1)
axislat % sets aspect ratio
grid on
clim([-50 150])
title(mktex(G.title))
colorbarwithvtext('z [m]')
print2screensize(mkvar(G.title))
```

```
end
```

Download the code of this Matlab example ([repos,manual download](#)). We also have a script that rewrites the GEBCO 1D vector matrix to a proper 2D lat, lon matrix with the same lay-out as the above OPeNDAP sets. ([repos,manual download](#)).



non-open GEBCO data source for comparison [The GEBCO_08 Grid version 20091120, <http://www.gebco.net>]



non-open GEBCO data for comparison [The GEBCO One Minute Grid, version 2.0, <http://www.gebco.net>]

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