1st CMEMS MED User & Training Workshop
In Situ TAC

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SOCIB

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SOCIB Balearic Islands
Coastal Observing
and Forecasting
System

How to work with the data?

Quick inspection: ncdump

Home page: https://www.unidata.ucar.edu/software/netcdf/docs/netcdf/ncdump.html

What is does: text representation of a netCDF dataset (header information, variables, . . .)

ncdump applied on a file

```
ncdump −h 20140628_d−OC_CNR−L3−CHL−MedOC3_A_1KM−MED−DT−v02.nc

netcdf \20140628_d−OC_CNR−L3−CHL−MedOC3_A_1KM−MED−DT−v02 {
dimensions:
time = 1 ;
lat = 1580 ;
lon = 3308 ;
variables:
int time(time) ;
time:long_name = "reference time" ;
time:standard_name = "time" ;
time:axis = "T" ;
time:calendar = "Gregorian" ;
time:units = "seconds since 1981−01−01 00:00:00" ;
...
"SUBSAMP=1\n" ,
"OUTMODE=0\n" ,
"" ;
}
```

Ferret

Home page: http://www.ferret.noaa.gov/Ferret/

What is does: visualization and analysis environment

Ferret to get basic info on file

```
ctroupin@SCBD046 ~/Desktop $ ferret_c
  NOAA/PMEL TMAP
  FERRET v6.62
  Linux(gfortran) 2.6.9−89.0.20.ELsmp − 07/06/13
  25−Nov−15  12:23

yes? SET DATA 20140628_d−OC_CNR−L3−CHL−MedOC3_A_1KM−MED−DT−v02.nc
yes? SHOW DATA
       currently SET data sets:
    1> 20140628_d−OC_CNR−L3−CHL−MedOC3_A_1KM−MED−DT−v02.nc  (default)
 name       title                           I        J        K        L
 CHL        Mediterranean Sea Daily Chlorop  1:3308   1:1580   ...      1:1
 QI         Quality Index of Mediterranean   1:3308   1:1580   ...      1:1

yes?
```

ncview

**Home page:**   http://meteora.ucsd.edu/~pierce/ncview_home_page.html

What it does: quick visualisation of 3-4D fields

ncbrowse

Home page: http://www.epic.noaa.gov/java/ncBrowse/
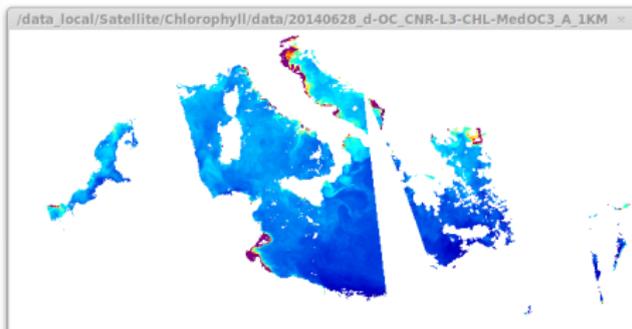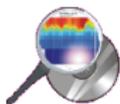
What is does: interactive graphical display

Panoply

Home page: http://www.giss.nasa.gov/tools/panoply/
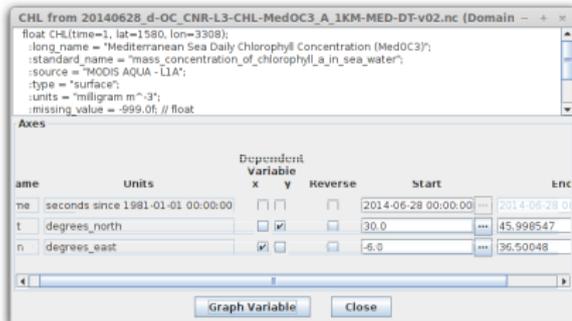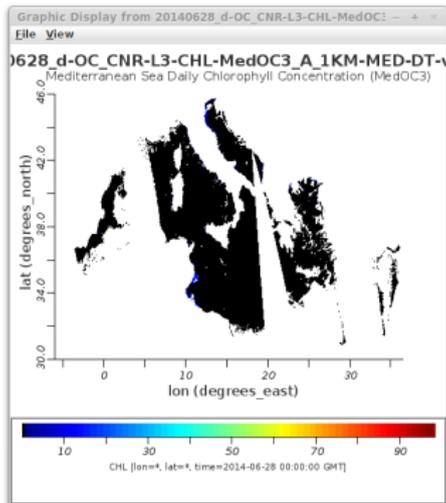
What is does: plot, slice, combine, overlay, ...
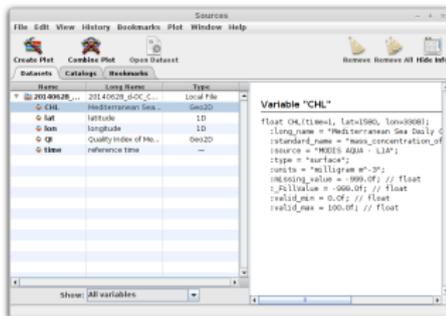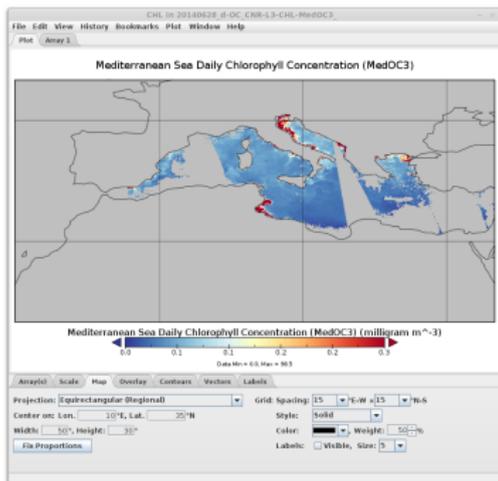
cdo – Climate Data Operators

Max-Planck-Institut CDO
für Meteorologie

Home page: https://code.zmaw.de/projects/cdo

What is does: manipulate (merging, averaging) netCDF files (+other formats)

Examples: ► Basic info (min, max, avg, size, ...):

```
cdo info input.nc
```

► Compute standard deviation:

```
cdo fldstd input.nc output.nc
```

NCO – netCDF Operators

Home page: http://nco.sourceforge.net/

What is does: command line operations on netCDF files

Examples:
- Average variable over domain:

```
ncwa -O -a lon,lat input.nc output.nc
```

- Extract subregion:

```
ncks -d lon,13.,18.0 -d lat,33.0,36.0
input.nc output.nc
```

ODV – Ocean Data View

Ocean Data View

Home page: http://odv.awi.de/en/home/

What is does: interactive exploration, analysis and visualization of
oceanographic data
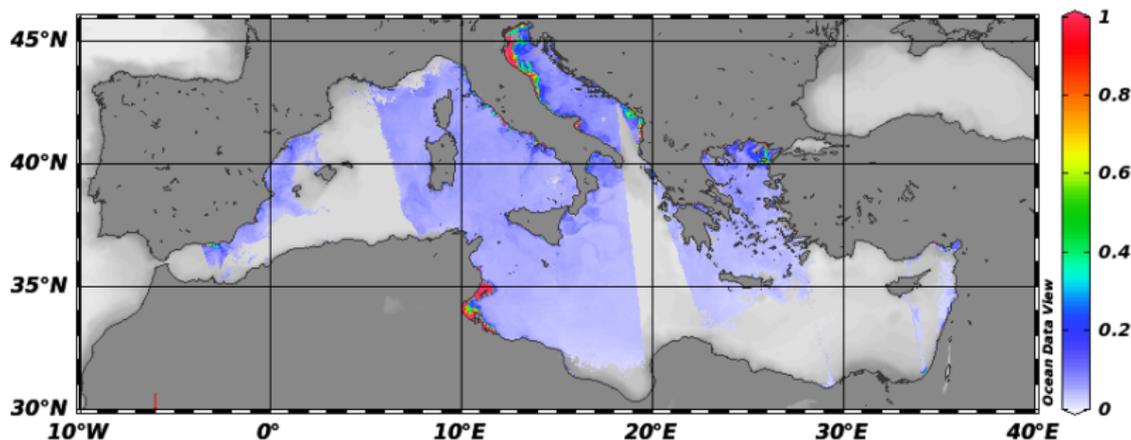
Python

Python interface to the netCDF C library:
http://unidata.github.io/netcdf4-python/

Example with ipython

```
In [1]: import netCDF4
In [2]: nc = netCDF4.Dataset('20140628_d-OC_CNR-L3-CHL-MedOC3_A_1KM-MED-DT-v02.nc')
In [3]: print nc
<type 'netCDF4._netCDF4.Dataset'>
root group (NETCDF3_CLASSIC data model, file format UNDEFINED):
    Conventions: CF-1.4
    title: dataset-oc-med-chl-modis_a-l3-chl_1km_daily-rt-v02
    references: R.Santoleri,G. Volpe, S. Marullo and B. Buongiorno Nardelli (2008),
    ...
In [4]: CHL = nc.variables['CHL'][:]
In [5]: nc.close()
```

Octave / Matlab

High-level functions to read/write data from/to a netCDF file:

http://octave.sourceforge.net/netcdf/overview.html

http://es.mathworks.com/help/matlab/network-common-data-form.html

Example with Octave

```octave
nc = netcdf('input.nc','r');              % open netcdf file in read-only

CHL = nc{'CHL'}(:);                       % retrieve variable
CHL_units = nc{'CHL'}.units;              % retrieve the attribute units
CHL_valid_range = nc{'CHL'}.valid_range;  % retrieve the attribute valid_range
global_history = nc.history;              % retrieve the global attribute history
```