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In Situ Thematic Assembly Centre for Copernicus Marine Service

Training of Trainers

C. Troupin, I. Serra, J. Tintoré (SOCIB)

Context of the workshops

Statement of work (Task 4.4)

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REQ-GEN- 23: report 15 days after the training session as lessons learned of the session.

2015 workshops

3-4 December 2015: CMEMS Regional User and Training Workshop dedicated to the Mediterranean Sea **(RUTW/MED)**
http://marine.copernicus.eu/web/99-next-sessions.php?item=2576

10-11 December 2015: CMEMS Regional User Training Workshop dedicated to the Atlantic European South West Shelf Ocean **(RUTW/IBI)**
http://marine.copernicus.eu/web/99-next-sessions.php?item=2577

Configuration (rooms, attendance, schedules)

Mediterranean Sea workshop

- All the general training courses **(1h30)** in the same auditorium
- Training for advanced users in smaller room
- Computer only available in the small rooms + weak Wifi signal
- Attendance: 20-30 participants
  (vs. 40-50 in the morning session)
- Not very active participants…

Link to the RUTW/MED program

IBI workshop

- Introductory presentations **(30 minutes)** in the same auditorium (useful)
- Specific rooms for the individual sessions (good)
- No computer available for participants
- Attendance: 10 persons for the exercises
- Active participants…

Link to the RUTW/IBI program

North West Shelf Sea workshop

3h30

Time	Dur.	COPERNICUS MARINE SERVICE Powering Business Solutions in the North West Shelf Seas **TRAINING WORKSHOP** **Wednesday 01 June 2016 AM**	***Meeting Room***
08:30	*00:30*	*Registration*	
09:00	03:30	Training for non-experienced users: From registration to download **David BAZIN (Mercator Océan - Service Desk) and Marc TRESSOL (Mercator Océan – Opérations)**	Meeting Room 1
09:00	03:30	*European North West Shelf Seas MFC (Model Products: physics and biogeochemicals): Practical Exercises* **Marina TONANI (UK Met Office) and Momme BUTENSCHON (PML)**	Meeting Room 2
09:00	03:30	*Wind, Ice and Temperature at Sea Surface /Observation Products: Practical Exercises* **Ad STOFFELEN (KNMI)**	Meeting Room 3
09:00	03:30	*In Situ/Observation Products: Practical Exercises* **Susanne TAMM (BSH)**	Meeting Room 4
09:00	03:30	*Ocean Colour/Observation Products: Practical Exercises* **Benjamin TAYLOR (PML)**	Meeting Room 5
12:30	***End of Day 2***		

North West Shelf Sea workshop

3h30 → repeated session ≈ 45 minutes

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Feedback from users and from trainers

MED	IBI
Weak WiFi signal Low involvement of the public NetCDF should be presented in advance	WiFi OK Smaller groups, better participation Data access is not straightforward FTP seen as obsolete Suggestion to present on the screen a common exercise Necessary to deal with wide range of users

Overall: IBI format more successful

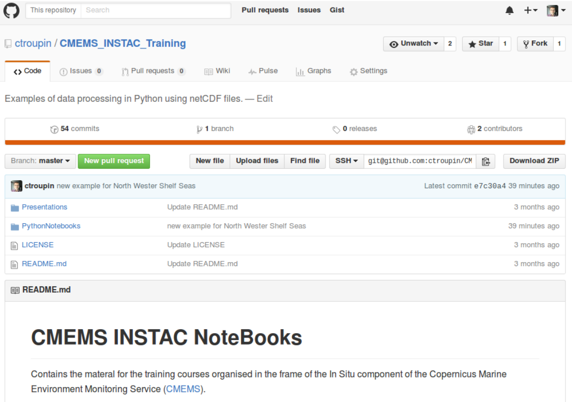
Reports available in the cloud (TRAINING MATERIALS and REPORTS)

Description of the available material

https://github.com/ctroupin/CMEMS_INSTAC_Training

Presentation supports

jupyter notebooks distributed in github
https://github.com/ctroupin/CMEMS_INSTAC_Training



Content of the repository: Presentations

- `CMEMS_INSTAC_IBI_Training_Intro.pptx`: support for presentation during RUTW/IBI Training
- `CMEMS_INSTAC_Med_Training.pdf`: support for presentation during RUTW/MED Training (Presentation + exercises in Ocean Data View and Python).

Content of the repository: PythonNotebooks

Set of notebooks to:

- Read netCDF files
- Plot time series
- Interpolation observations
- Plot trajectories
- Plot content of index files

What is Python?

Programming language:

1. interpreted — instructions executed directly
2. dynamically typed — type checking at run-time
3. object-oriented — classes, objects, methods, ...
4. high-level — strong abstraction

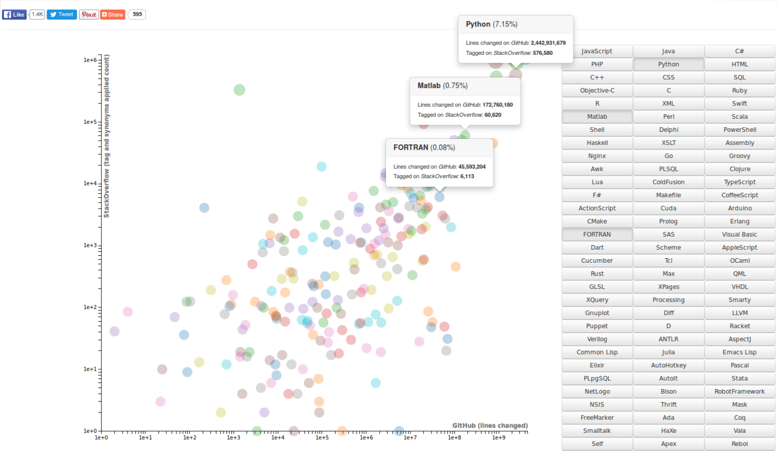
https://www.python.org

Why Python?

1. Simple, easy to learn syntax
2. Open
3. Large user community

doc, support, packages

Why Python?



Source: http://langpop.corger.nl/

What is an IPython notebook?

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IPython: command shell for interactive computing
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IPython notebook: web-based interactive computational environment combining code, text, figures, ...
http://ipython.org/notebook.html

Structure of a notebook

jupyter Read_TimeSeries_1 (autosaved)

File Edit View Insert Cell Kernel Help — Python 2

Markdown — Cell Toolbar: None

The goal is to see how we can read the data contained in a netCDF file. Several possibilities will be examined.

1. Reading a local file

Let's assume we have downlowded a file from CMEMS. We define the directory and the file name. *datafile* have to be adapted according to your case.

In [1]:
```
datafile = "/home/ctroupin/DataOceano/MyOcean/INSITU_MED_NRT_OBSERVATIONS_013_035/history/mooring/IR_TS_MO_61198.nc"
```

To read the file we need the netCDF4 interface for python.

In [2]:
```
import netCDF4
ds = netCDF4.Dataset(datafile, 'r')
```

where the first argurment of the files and '**r**' indicates that it's open for reading ('**w**' would be used for writing). **nc** contains all the information about the dataset:

- Metadata (global attributes)
- Dimensions
- Variables

1.1 Metadata

In [3]:
```
ds
```

Out[3]:
```
<type 'netCDF4._netCDF4.Dataset'>
root group (NETCDF3_CLASSIC data model, file format UNDEFINED):
    data_type: OceanSITES time-series data
    format_version: 1.2
    platform_code: 61198
    date_update: 2015-08-02T11:20:44Z
    institution: Puertos del Estado (Spain)
    institution_edmo_code: 2751
    site_code:
    wmo_platform_code: 61198
    source: Mooring observation
    history: 2015-08-02T11:20:44Z: Creation
    data_mode: R
    quality_control_indicator: 6
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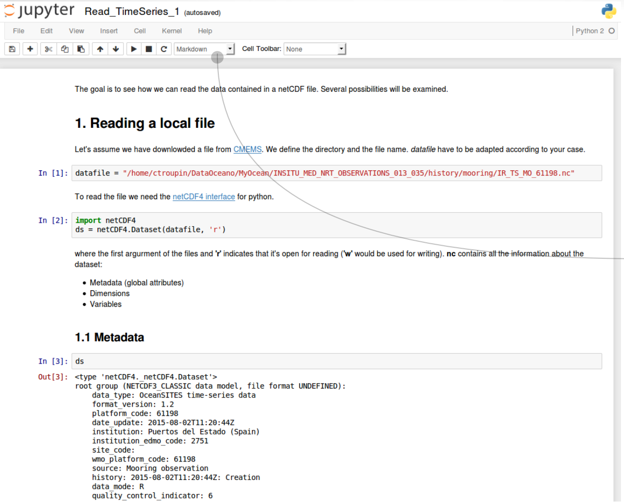

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Text cell

Exercises for ODV

Described in `CMEMS_INSTAC_Med_Training.pdf`

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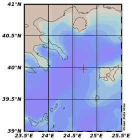
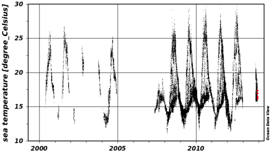
1. Time series (e.g. mooring data)





Exercises for ODV

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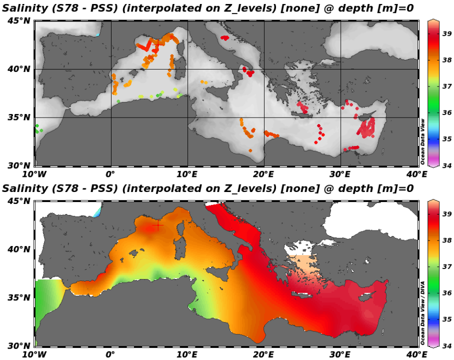
1. Time series (e.g. mooring data)
2. CORA product (complete data set)



Exercises in Python

- `Read_TimeSeries_{1,2,3}.ipynb`: load variables from a netCDF file in different ways (local file, OPEnDAP, CF Python).
- `Read_drifter_data_1.ipynb`: read a netCDF file containing a surface drifter trajectory.
- `Read_drifter_data_2.ipynb`: scatter plot using the data from the previous example.
- `Read_drifter_data_3.ipynb`: creation of a gridded field using the same data.
- `plot_CMEMS_*.ipynb`: reads and represents data from various types of platforms (mooring, research vessel, profiler, drifter).
- `plot_positions_latest_global.ipynb`: plot all the data locations available for a given day in the latest directory.
- `read_CMEMS_indexfile.ipynb`: read the index file and represent the data on a map.

Design
of the new sessions

Adaptation of the presentations

Proposed scheme:

1. Importance, peculiarities of in situ data   vs. models, satellites, . . .

Adaptation of the presentations

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2. Ocean complexity — scales, processes, ...

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4. Available data — types, resolution, . . .

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8. Structure of index files

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4. Available data — types, resolution, ...
5. Quality control — flags
6. Organisation of INSTAC — figure with regions
7. How to the data — live demonstration
8. Structure of index files
9. Organisation of the region — roles, providers, data flow

Modification of the ODV exercises

Time series:

1. Find a long time series from a mooring

Modification of the ODV exercises

Time series:

1. Find a long time series from a mooring
2. Follow steps of the presentation

Modification of the ODV exercises

Time series:

1. Find a long time series from a mooring
2. Follow steps of the presentation
3. Generate new figures

Modification of the ODV exercises

CORA:

1. Follow steps of the presentation

Modification of the ODV exercises

CORA:

1. Follow steps of the presentation
2. Modify region (Properties $\rightarrow$ Domain)

Modification of the ODV exercises

CORA:

1. Follow steps of the presentation
2. Modify region (Properties → Domain)
3. Generate new figures

Modification of the IPython notebooks

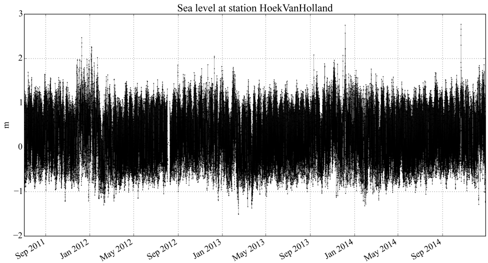
1. Select 1 or 2 examples

Modification of the IPython notebooks

1. Select 1 or 2 examples
2. Adapt with dataset from the region

Modification of the IPython notebooks

1. Select 1 or 2 examples
2. Adapt with dataset from the region
3. Example: sea level at *Hoek Van Holland* station (file `NO_TS_MO_HoekVanHollandTG.nc`)



Now ready to work!