In Situ Thematic Assembly Centre for Marine Service

Training of Trainers

C. Troupin, I. Serra, J. Tintoré (SOCIB)
Context of the workshops
REQ-GEN- 17: produce the training material dedicated to the current operational version of his products at the date of the training session.
Statement of work (Task 4.4)

**REQ-GEN- 17:** produce the training material dedicated to the current operational version of his products at the date of the training session.

**REQ-GEN- 18:** training material = presentations + user-friendly animated tutorial
Statement of work (Task 4.4)

REQ-GEN- 17: produce the training material dedicated to the current operational version of his products at the date of the training session.

REQ-GEN- 18: training material = presentations + user-friendly animated tutorial

REQ-GEN- 19: Up-to-date training material delivered by the Contractor each year as defined in the CMS communication plan.
REQ-GEN-17: produce the training material dedicated to the current operational version of his products at the date of the training session.

REQ-GEN-18: training material = presentations + user-friendly animated tutorial

REQ-GEN-19: Up-to-date training material delivered by the Contractor each year as defined in the CMS communication plan.

REQ-GEN-20: appoint an expert to give 1 training/year. Training modules: 2-3 hours (presentation + exercises).
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REQ-GEN- 18: training material = presentations + user-friendly animated tutorial

REQ-GEN- 19: Up-to-date training material delivered by the Contractor each year as defined in the CMS communication plan.

REQ-GEN- 20: appoint an expert to give 1 training/year. Training modules: 2-3 hours (presentation + exercises).

REQ-GEN- 21: notify the trainer’s name and function no more than ten days after the notification of the training session.
Statement of work (Task 4.4)

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REQ-GEN- 20: appoint an expert to give 1 training/year.
Training modules: 2-3 hours (presentation + exercises).

REQ-GEN- 21: notify the trainer’s name and function no more than ten days after the notification of the training session.

REQ-GEN- 22: sessions dedicated either to a region or to a marine/maritime issue (e.g. an area of benefit).
Statement of work (Task 4.4)

REQ-GEN- 17: produce the training material dedicated to the current operational version of his products at the date of the training session.

REQ-GEN- 18: training material = presentations + user-friendly animated tutorial

REQ-GEN- 19: Up-to-date training material delivered by the Contractor each year as defined in the CMS communication plan.

REQ-GEN- 20: appoint an expert to give 1 training/year. Training modules: 2-3 hours (presentation + exercises).

REQ-GEN- 21: notify the trainer’s name and function no more than ten days after the notification of the training session.

REQ-GEN- 22: sessions dedicated either to a region or to a marine/maritime issue (e.g. an area of benefit).

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)

10-11 December 2015: CMEMS Regional User Training Workshop dedicated to the Atlantic European South West Shelf Ocean (RUTW/IBI)
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
### 3h30

#### COPERNICUS MARINE SERVICE

Powering Business Solutions in the North West Shelf Seas

**TRAINING WORKSHOP**

<table>
<thead>
<tr>
<th>Time</th>
<th>Dur.</th>
<th>Event</th>
<th>Location</th>
</tr>
</thead>
<tbody>
<tr>
<td>08:30</td>
<td>00:30</td>
<td>Registration</td>
<td>Meeting Room</td>
</tr>
<tr>
<td>09:00</td>
<td>03:30</td>
<td>Training for non-experienced users: From registration to download</td>
<td>Meeting Room 1</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>David BAZIN (Mercator Océan - Service Desk) and Marc TRESSOL (Mercator Océan – Opérations)</strong></td>
<td></td>
</tr>
<tr>
<td>09:00</td>
<td>03:30</td>
<td>European North West Shelf Seas MFC (Model Products: physics and biogeochemicals): Practical Exercises</td>
<td>Meeting Room 2</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Marina TONANI (UK Met Office) and Monme BUTENSCHON (PML)</strong></td>
<td></td>
</tr>
<tr>
<td>09:00</td>
<td>03:30</td>
<td>Wind, Ice and Temperature at Sea Surface /Observation Products: Practical Exercises</td>
<td>Meeting Room 3</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Ad STOFFELEN (KNMI)</strong></td>
<td></td>
</tr>
<tr>
<td>09:00</td>
<td>03:30</td>
<td>In Situ/Observation Products: Practical Exercises</td>
<td>Meeting Room 4</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Susanne TAMM (BSH)</strong></td>
<td></td>
</tr>
<tr>
<td>09:00</td>
<td>03:30</td>
<td>Ocean Colour/Observation Products: Practical Exercises</td>
<td>Meeting Room 5</td>
</tr>
<tr>
<td></td>
<td></td>
<td><strong>Benjamin TAYLOR (PML)</strong></td>
<td></td>
</tr>
<tr>
<td>12:30</td>
<td></td>
<td><strong>End of Day 2</strong></td>
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</tbody>
</table>
North West Shelf Sea workshop

3h30 → repeated session ≈ 45 minutes

<table>
<thead>
<tr>
<th>Time</th>
<th>Dur.</th>
<th>Wednesday 01 June 2016 AM</th>
<th>Meeting Room</th>
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<td>Registration</td>
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<td></td>
</tr>
</tbody>
</table>
Feedback from users and from trainers

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

**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

CMEMS INSTAC NoteBooks

Contains the material for the training courses organised in the frame of the In Situ component of the Copernicus Marine Environment Monitoring Service (CMEMS).
Content of the repository: Presentations

- CMEMS_INSTAC_IBI_Training_Intro.pptx: support for presentation during RUTW/IBI Training
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
2. dynamically typed
3. object-oriented
4. high-level

instructions executed directly

type checking at run-time

classes, objects, methods, ...

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?

**IP[y]**: IPython

*Interactive Computing*
What is an IPython notebook?

**IP[y]:** IPython
Interactive Computing

**Python:** high-level programming language
https://www.python.org/
What is an IPython notebook?

**IP**y: **IPython**

Interactive Computing

**Python:** high-level programming language

[https://www.python.org/](https://www.python.org/)

**IPython:** command shell for interactive computing

What is an IPython notebook?

**IP[y]**: IPython

*Interactive Computing*

**Python**: high-level programming language

https://www.python.org/

**IPython**: command shell for interactive computing

http://ipython.org/

**IPython notebook**: web-based interactive computational environment combining code, text, figures, ...

http://ipython.org/notebook.html
Structure of a notebook

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 downloaded a file from CMEMS. We define the directory and the file name. datafile have to be adapted according to your case.

```python
In [1]:
datafile = "~/home/ctroupin/DataOcean/MyOcean/INSTITU_MED_NRT_OBSERVATIONS_013_035/history/mooring/IR_TS_M0_61198.nc"
```

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

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

where the first argument 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

```python
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: 2791
site_code: wmo_platform_code: 61198
source: Mooring Observation
history: 2015-08-02T11:20:44Z: Creation
data_mode: R
quality_control_indicator: 6
```
1. Reading a local file

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

```python
In [1]:
datafile = "~/home/cisregina/MyOcean/INSITU_MED_NRT_OBSERVATIONS_013_035/history/mooring/TR_TS_MO_61198.nc"
```

To read the file we need the `netCDF4` library for python.

```python
In [2]:
import netCDF4
ds = netCDF4.Dataset(datafile, 'r')
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where the first argument of the files and 'r' indicates that it's open for reading ("w" would be used for writing). it contains all the information about the dataset:

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1.1 Metadata

```python
In [3]:
d
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
- data_update: 2015-08-02T11:20:44Z
- institution: Puertos del Estado (Spain)
- institution_edmo_code: 2702
- site_code: wmo platform code: 61198
- source: Mooring Observation
- history: 2015-08-02T11:20:44Z: Creation
data node: R
- quality_control_indicator: 6

Run current cell
Structure of a notebook

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 downloaded a file from CMEMS. We define the directory and the file name. datfile have to be adapted according to your case.

In [1]:
```python
datafile = '/home/citeseen/DeepOcean/Ocean/INSTITUTIONAL_OBSERVATIONS_013_035/history/mooring/TR_TS_M0_61598.nc'
```
To read the file we need the netCDF4 interface for python.

In [2]:
```python
import netCDF4
ds = netCDF4.Dataset(datafile, 'r')
```
where the first argument of the files and 'r' indicates that it's open for reading (r'w' would be used for writing). ds contains all the information about the dataset:
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- Dimensions
- Variables

1.1 Metadata

In [3]:
```
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: 61598
- date_update: 2015-08-02T11:20:44Z
- institution: Puertos del Estado (Spain)
- institution_edmo_code: 2702
- site_code: wmo platform code: 61598
- source: Mooring observation
- history: 2015-08-02T11:20:44Z: Creation data
- node: R
- quality_control_indicator: 6
1. Reading a local file

Let's assume we have downloaded a file from CMEMS. We define the directory and the file name. `datfile` have to be adapted according to your case.

```
In [1]:
datfile = "~/home/cstrcpy/Data/MyOcean/INSTU_MED_NRT_OBSERVATIONS_013_035/history/mooring/TR_TS_M0_01198.nc"
```

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

```
In [2]:
import netCDF4

ds = netCDF4.Dataset(datfile, 'r')
```

where the first argument of the files and 'r' indicates that it's open for reading ("r" would be used for writing). `ds` contains all the information about the dataset:

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- Dimensions
- Variables

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```
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: 01198
  date_update: 2015-08-02T11:20:44Z
  institution: Puertos del Estado (Spain)
  institution_edmo_code: edm01
  site_code:
    wmo_platform_code: 61198
    source: Mooring Observation
    history: 2013-08-02T11:20:44Z: Creation
data_mode: R
  quality_control_indicator: 6
```
Structure of a notebook

1. Reading a local file

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

```python
In [1]: datafile = "~/home/croppedi/DataOcean/MyOcean/INSITU_MED_MRT_OBSERVATIONS_013_035/history/mooring/TR_TS_MO_0198.nc"

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

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

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```python
In [3]: ds
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format_version: 1.2
platform code: 6198
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institution: Puertos del Estado (Spain)
institution_eemo_code: 2702
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Structure of a notebook

1. Reading a local file

Let's assume we have downloaded 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/citroupin/DataOcean1/MyOcean/INSITU_MED_MRT_OBSERVATIONS_013_035/history/mooring/TR_TS_M0_61108.nc'
```

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

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

where the first argument of the files and 'r' indicates that it's open for reading ('w' would be used for writing). ds 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: 61108
  date_update: 2015-08-02T11:29:44Z
  institution: Puertos del Estado (Spain)
  institution_edmo_code: 2701
  site_code:
  wmo_platform_code: 61108
  source: Mooring Observation
  history: 2015-08-02T11:29:44Z: Creation
data_mode: R
  quality_control_indicator: 6
```
Exercises for ODV

Described in CMEMS_INSTAC_Med_Training.pdf
Exercises for ODV

Described in CMEMS_INSTAC_Med_Training.pdf

1. Time series (e.g. mooring data)
Exercises for ODV

Described in CMEMS_INSTAC_Med_Training.pdf

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

Proposed scheme:

1. Importance, peculiarities of in situ data vs. models, satellites, . . .
2. Ocean complexity scales, processes, . . .
Adaptation of the presentations

Proposed scheme:

1. Importance, peculiarities of in situ data vs. models, satellites, ...
2. Ocean complexity scales, processes, ...
3. Multi-platform observation (local examples)
Adaptation of the presentations

Proposed scheme:

1. Importance, peculiarities of in situ data vs. models, satellites, ...
2. Ocean complexity scales, processes, ...
3. Multi-platform observation (local examples
types, resolution, ...
4. Available data
Adaptation of the presentations

Proposed scheme:

1. Importance, peculiarities of in situ data vs. models, satellites, . . .
2. Ocean complexity scales, processes, . . .
3. Multi-platform observation (local examples types, resolution, . . .
4. Available data flags
5. Quality control
Adaptation of the presentations

Proposed scheme:

1. Importance, peculiarities of in situ data vs. models, satellites, . . .
2. Ocean complexity scales, processes, . . .
3. Multi-platform observation (local examples
4. Available data types, resolution, . . .
5. Quality control flags
6. Organisation of INSTAC figure with regions
Adaptation of the presentations

Proposed scheme:

1. Importance, peculiarities of in situ data vs. models, satellites, . . .
2. Ocean complexity scales, processes, . . .
3. Multi-platform observation (local examples)
4. Available data types, resolution, . . .
5. Quality control flags
6. Organisation of INSTAC figure with regions
7. How to the data live demonstration
Proposed scheme:

1. Importance, peculiarities of in situ data vs. models, satellites, . . .
2. Ocean complexity scales, processes, . . .
3. Multi-platform observation (local examples
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
Adaptation of the presentations

Proposed scheme:

1. Importance, peculiarities of in situ data vs. models, satellites, …
2. Ocean complexity scales, processes, …
3. Multi-platform observation (local examples types, resolution, …
4. Available data flags
5. Quality control figure with regions
6. Organisation of INSTAC live demonstration
7. How to the data roles, providers, data flow
8. Structure of index files
9. Organisation of the region
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 → 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!

OH PLEASE

NOT ANOTHER TRAINING COURSE