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In Situ Thematic Assembly Centre for Gernicus Marine Service Training of Trainers

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

CMEMS INSTAC 2nd Plenary Meeting





Context of the workshops

CMEMS INSTAC 2nd Plenary Meeting





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





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





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





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





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





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- 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**)

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)

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- ► 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





- 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

COPERNICUS MARINE SERVICE Powering Business Solutions in the North West Shelf Seas

TRAINING WORKSHOP

Time	Dur.	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

$3h30 \rightarrow$ 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

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

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Ctroupin / CMEMS_INSTAC_	Training requests () () Wiki 🗛 Pulse	🕢 Unw	atch ▼ 2 ★ Star 1 ÿ Fork 1
Examples of data processing in Py	thon using netCDF files. — Edit		
34 commits	∥⁄ 1 branch	🚫 0 releases	a contributors
Branch: master - New pull request	New file Upload files	Find file SSH - git@github.c	om:ctroupin/CM
ctroupin new example for North We	ster Shelf Seas		Latest commit e7c30a4 39 minutes ago
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CMEMS IN SITU



- 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:

IN SITU

- 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





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

doc, support, packages





Why Python?

🛃 Like (1.4K 😏 Tweet Rinzt 🖬 Store (595



JavaScript Java C# PHP HTML CSS SQL Objective-C Ruby XML Swift Mattab Perl Scala Delph PowerShel Haskell XSLT Assembly Go Groovy Nginx AWK PLSQL Clojure ColdFusion Lua TypeScript E# Makefile CoffeeScript ActionScript Cuda Arduino CMake Prolog Erlang SAS Scheme Dart AppleScript Cucumbe TCI. OCaml Rust Max OML GLSL XPages VHDL XOuery Smarty Diff LLVM Puppet Racket ANTLR Aspect] Verillog Common List Emacs Lisp Elbdr AutoHotkey Pascal PLpgSQL Autolt Stata Bison NetLogo RobotFramework NSIS Mask Ada Coo FreeMarke Smalltalk HaXe Vala Self Apex Rebol

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

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What is an IPython notebook?

IP[y]: IPython Interactive Computing

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IP[y]: IPython Interactive Computing

Python: high-level programming language https://www.python.org/

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Python: high-level programming language https://www.python.org/

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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





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quality control indicator: 6

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- · Metadata (global attributes)
- Dimensions
- Variables

1.1 Metadata

In [3]: ds

Run current cell Add a new cell Select type of cell Code cell > Text cell

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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
- 2. CORA product

(e.g. mooring data) (complete data set)



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- 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

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Proposed scheme:

1. Importance, peculiarities of in situ data

vs. models, satellites, ...





Proposed scheme:

- 1. Importance, peculiarities of in situ data
- 2. Ocean complexity

vs. models, satellites, ...

scales, processes, ...



Proposed scheme:

CMEMS

- 1. Importance, peculiarities of in situ data
- 2. Ocean complexity
- 3. Multi-platform observation

vs. models, satellites, ... scales, processes, ... (local examples



Proposed scheme:

- 1. Importance, peculiarities of in situ data
- 2. Ocean complexity
- 3. Multi-platform observation
- 4. Available data

vs. models, satellites, ... scales, processes, ... (local examples types, resolution, ...



Proposed scheme:

- 1. Importance, peculiarities of in situ data
- 2. Ocean complexity
- 3. Multi-platform observation
- 4. Available data
- 5. Quality control

vs. models, satellites, ... scales, processes, ... (local examples types, resolution, ... flags



Proposed scheme:

- 1. Importance, peculiarities of in situ data
- 2. Ocean complexity
- 3. Multi-platform observation
- 4. Available data
- 5. Quality control
- 6. Organisation of INSTAC

vs. models, satellites, ... scales, processes, ... (local examples types, resolution, ... flags figure with regions



Proposed scheme:

- 1. Importance, peculiarities of in situ data
- 2. Ocean complexity
- 3. Multi-platform observation
- 4. Available data
- 5. Quality control
- 6. Organisation of INSTAC
- 7. How to the data

vs. models, satellites, ... scales, processes, ... (local examples types, resolution, ... flags figure with regions live demonstration



Proposed scheme:

IN SITU

- 1. Importance, peculiarities of in situ data
- 2. Ocean complexity
- 3. Multi-platform observation
- 4. Available data
- 5. Quality control
- 6. Organisation of INSTAC
- 7. How to the data
- 8. Structure of index files

vs. models, satellites, ... scales, processes, ... (local examples types, resolution, ... flags figure with regions live demonstration



Proposed scheme:

IN SITU

- 1. Importance, peculiarities of in situ data
- 2. Ocean complexity
- 3. Multi-platform observation
- 4. Available data
- 5. Quality control
- 6. Organisation of INSTAC
- 7. How to the data
- 8. Structure of index files
- 9. Organisation of the region

vs. models, satellites, ... scales, processes, ... (local examples types, resolution, ... flags figure with regions live demonstration

roles, providers, data flow





Time series:

1. Find a long time series from a mooring





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





CORA:

1. Follow steps of the presentation





CORA:

- 1. Follow steps of the presentation
- 2. Modify region

 $(Properties \rightarrow Domain)$





CORA:

- 1. Follow steps of the presentation
- 2. Modify region
- 3. Generate new figures

 $(Properties \rightarrow Domain)$





1. Select 1 or 2 examples

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





- 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!



