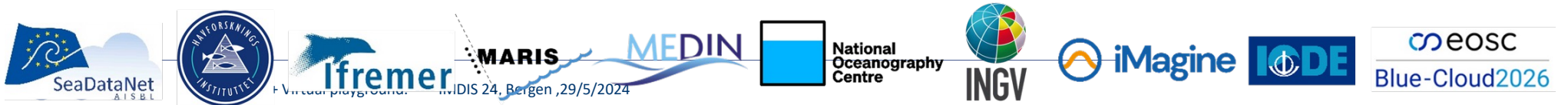


27-29 May 2024 



# International conference on Marine Data and Information Systems





**OGS**

# Eurofleets+ Virtual Playground

**Paolo Diviaco and Alessandro Busato**  
National Institute of Oceanography and Applied Geophysics





is an alliance of European marine research infrastructures to meet the evolving needs of the research and industrial communities

JRA WP3 T3.1.4 aim is to extend the notion of VRE towards that of a Virtual Playground (VP)

...what is a VRE?

VRE = Virtual Research Environment.

(Wikipedia)

...a VRE is an online system helping researchers **collaborate.**

Synonyms such as: Collaboratory, Collaborative e-research...

...What is collaboration? **Collaboration** addresses situations in which people work together on a shared goal,  
**Cooperation** involves working with others to help them achieve their individual goals.

...What is a shared goal? **A shared goal override differences among people and require their cooperation as superordinate (Social psychology, from 'I' to 'we')**

Problems to consider:

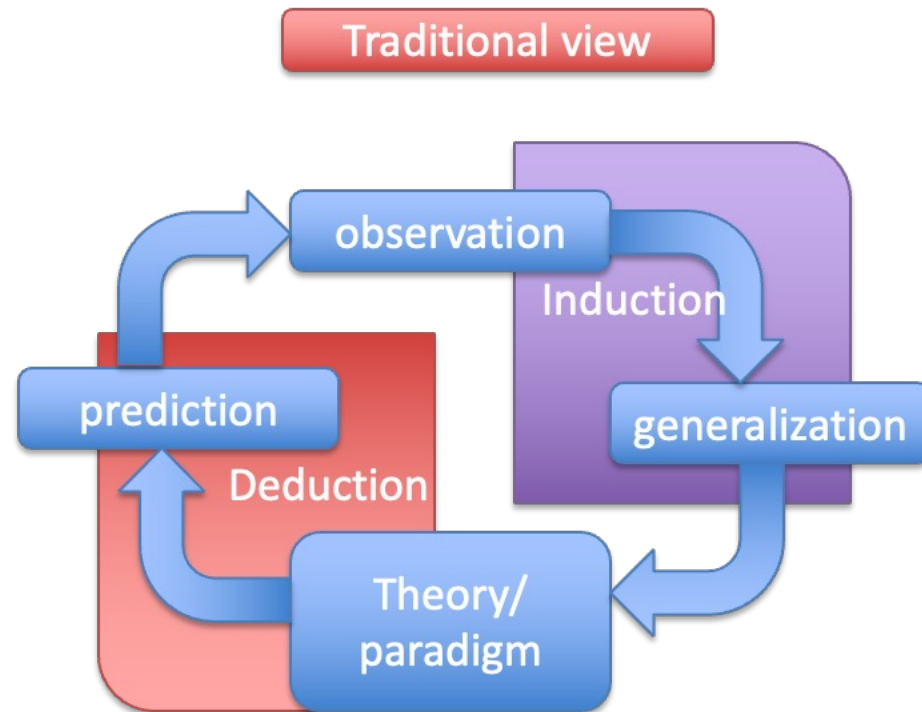
...Can we override differences in scientific research?

... Where do differences come from?

# Scientific method

**Induction:** the truth of the premises does not guarantee the truth of its conclusions.

**Deduction** within a closed system, changes the configuration of knowledge, cannot discover anything new



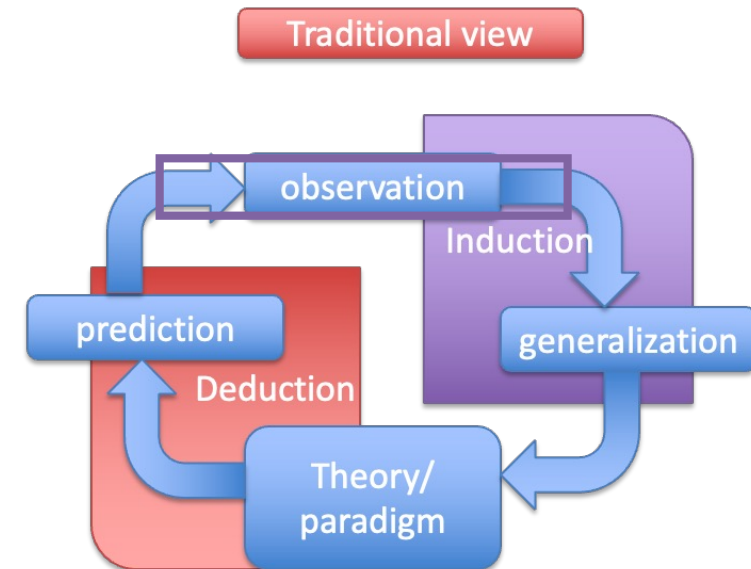
## Theory-Ladenness (cognitive issues)

Pierre Duhem (Duhem, & Wiener, 1954),

- Experiment is not a simple observation,
- It is interpretation within a theoretical context.
- It is not possible to isolate observations from theoretical assumptions

(Bruner, & Postman, 1949; Warren, 1970)

- Motivations and expectations change observations.
- Ambiguous figures are interpreted so that observers see what they want to see
- Social relations can further complicate this.





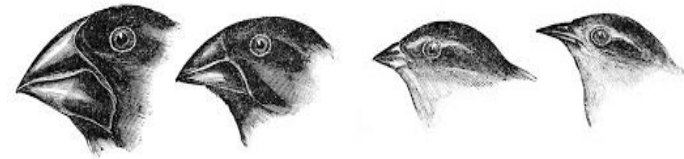
Thomas Kuhn

Logic → Socio-logic

A **paradigm** is what members of a scientific community share (Tradition, beliefs, myths, framework within which solutions are provided, context)

Kuhn argues that rival paradigms are **incommensurable**—that is, it is not possible to understand one paradigm through the conceptual framework and terminology of another rival paradigm

Scientists live in isolated communities (...as animal species) that **evolve separately** (...like squirrels on different sides of a canyon)



Contemporary epistemology describe researchers gathering incommunities that resemble **tribes**, where they grow and adopt the tribe's cognitive models

## Examples of VRE



The Swarm Virtual Research Environment (VRE)  
cloud service + JupyterLab.+ curated set of Python software and ready-to-use  
Jupyter notebooks



Cloud service + JupyterLab.+ Catalogue of Python scripts



Cloud service + WebODV + DIVA + Jupyter



## Summing up

- Current  
VRE
- DATA (sharable or accessible from somewhere) +
  - Computing power (somewhere) +
  - Scripting (generally Jupyter notebook)

How does current VRE implementations handle collaboration ?

- **Sharing data (files)**
- **Sharing workflows**

... this assumes researchers know how to use data and workflows and what they mean

## Does current VRE implementations override differences -> collaboration ?

- We (humbly) think they do not
- Because they do not enter meaning
- Paradigms remain separate, they are not overridden

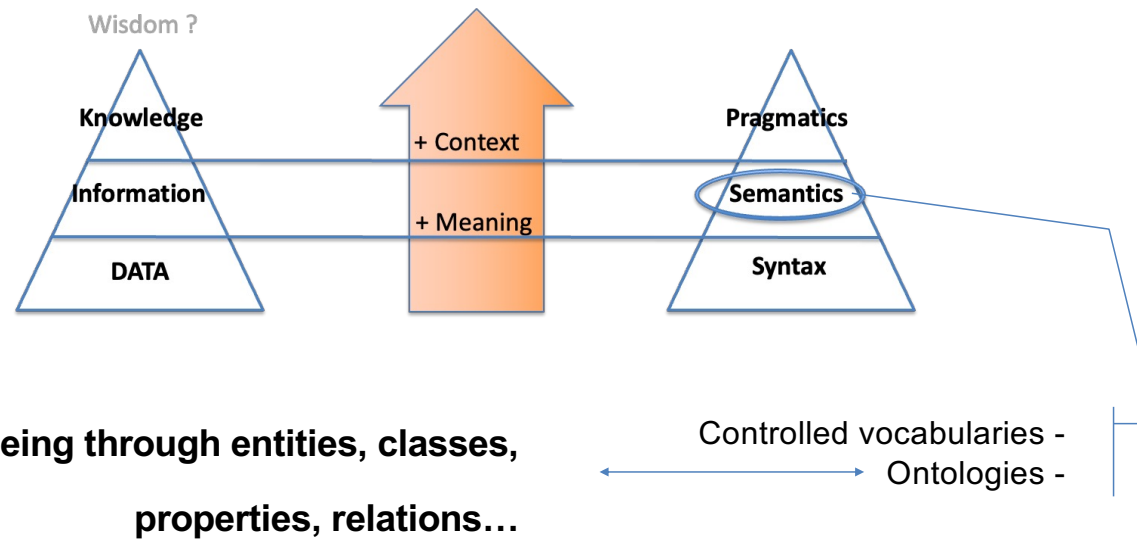
→ Then current VRE implementation practices do not actually aim at collaboration

→ They provide a (shared) space where people can run (shared) workflows

→ They do not capture/explain what is going on (cannot be used across paradigms, or with new team members..)

How can we override differences -> collaboration ?

...Descending into meaning

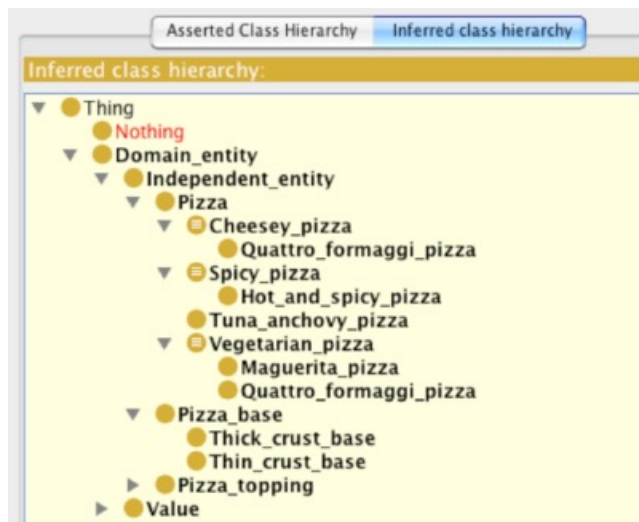


Ontology is the study of being through entities, classes,  
properties, relations...

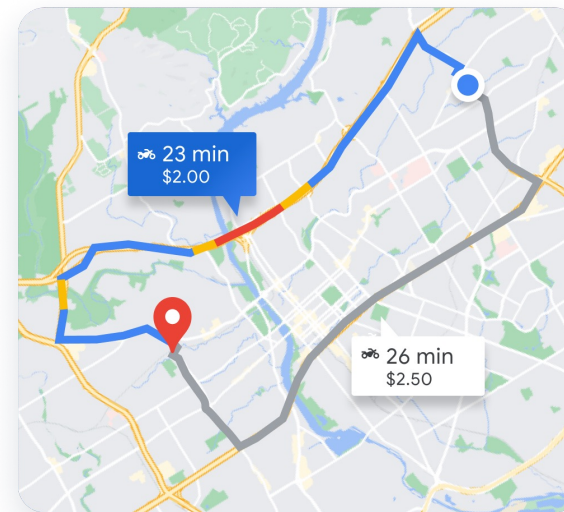
Controlled vocabularies -  
Ontologies -

We can use ontologies as maps of knowledge

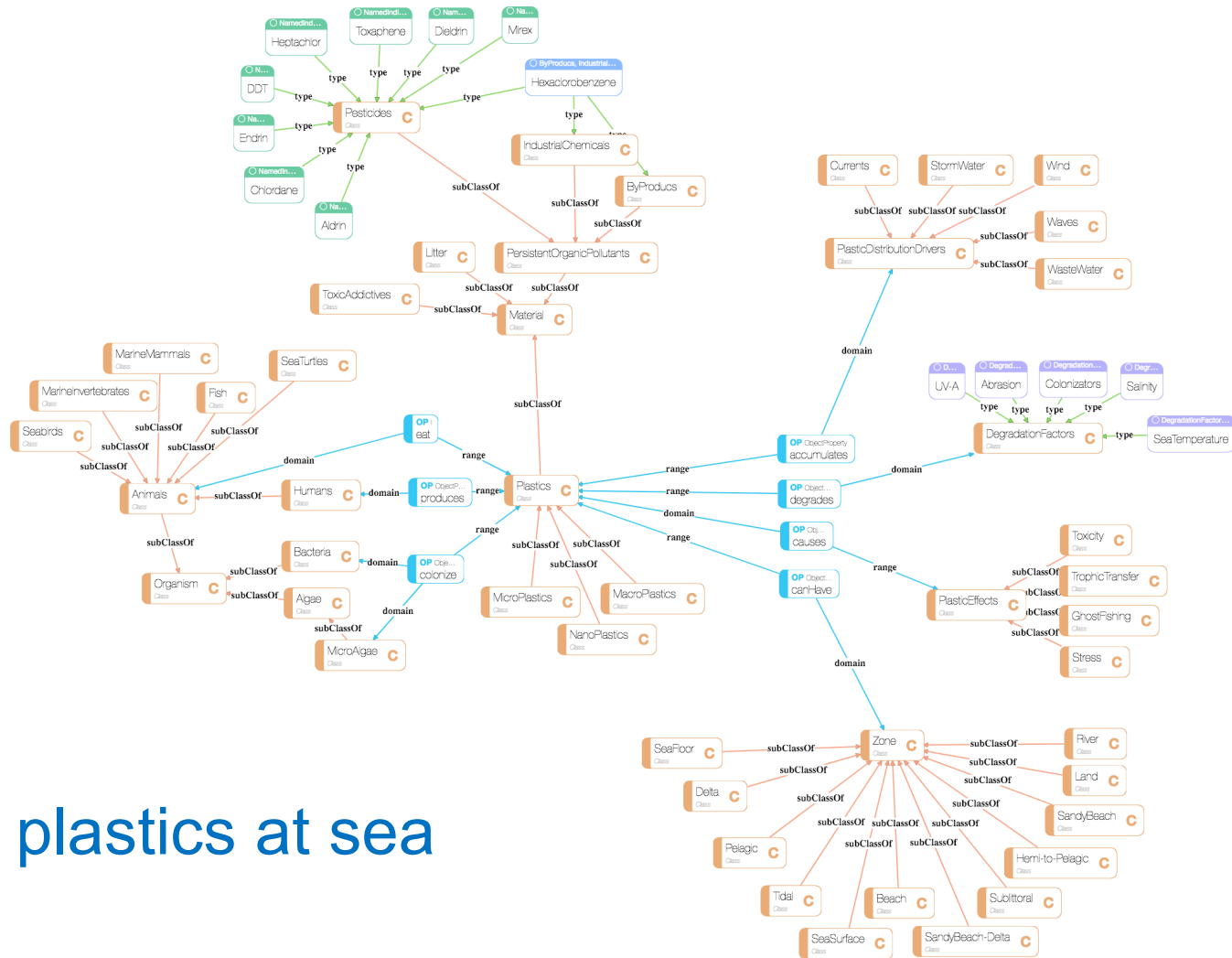
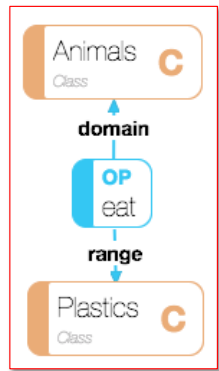
Web ontologies are designed to represent rich and complex knowledge about things, groups of things, and relations between things, such as for example what is a 'pizza'



Suchman (1987) a map is a formal construction that can, but not necessarily does, control activities, as a traveler's map: "does not control the traveler's movements through the world," rather describes how to go from one place to another.



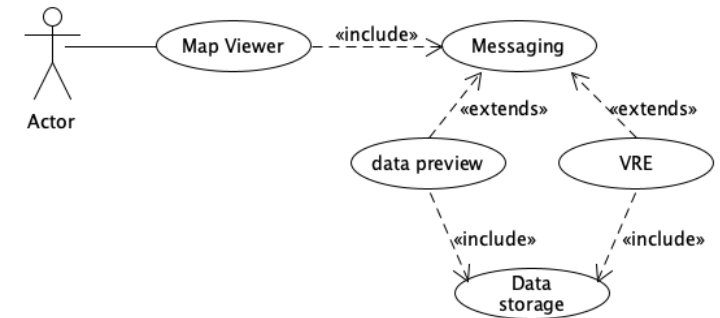
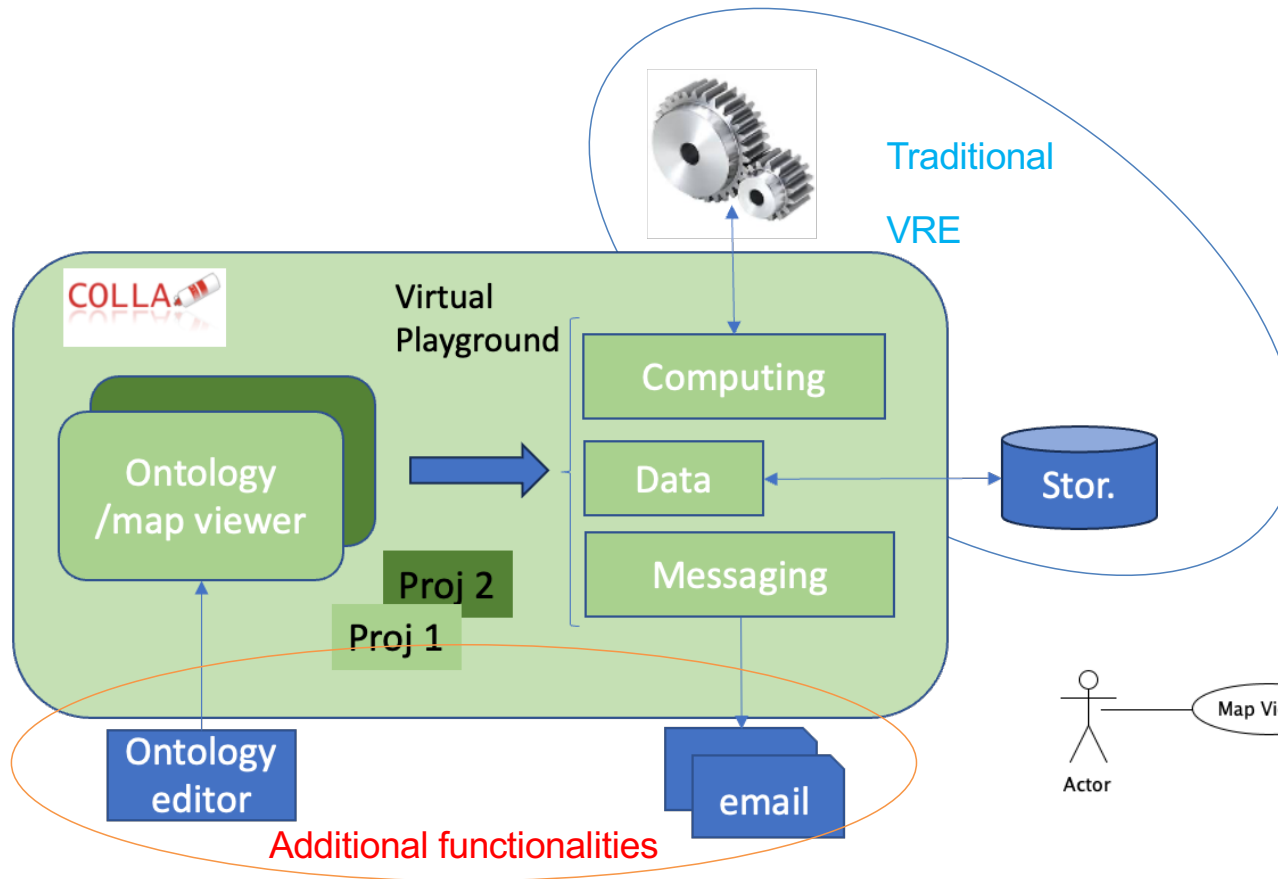
Suchman, L. A. (1987). Plans and situated actions: The problem of human-machine communication. Cambridge, UK: Cambridge University Press.



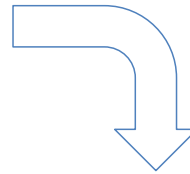
# Ontology of plastics at sea

# Virtual Playground

Collaborative Toolkit for Scientific Project development



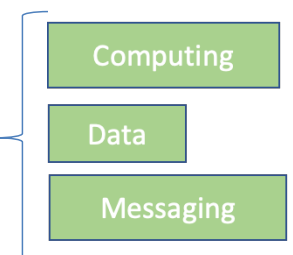
Protégé  
Design  
ontology



COLLA. Use ontology as map

The screenshot shows the COLLA web application interface. At the top, there are logos for COLLA (Collaborative Toolkit for Scientific Project development) and OGS (National Institute of Oceanography and Applied Geophysics). The browser address bar shows 'colla.ogs.it'. The main content area displays an ontology editor for a project named 'Project (TestIMDISNuovo)'. A 'Please Note that:' message is visible, stating that users can define new ontology subsets and that 'Colla\_Tasks' class individuals are ready for discussion. The editor shows a class hierarchy on the left with 'NamedIndividual, Personne' selected. The main view shows the instance 'Alessandro\_Busato' with its IRI and various properties like '\_folder', '\_messages', '\_note', 'email', and 'seeAlso'. A red box highlights the 'seeAlso' property value, which is a URL: 'http://colla.inogs.it#Colla\_Tasks'. An orange arrow points to this URL with the text 'Link to follow'. Below the screenshot, the word 'Ontology' is written in blue.

Link to follow  
Generated automatically



Ontology



# Messaging

COLLA Collaborative Toolkit for Scientific Project development

Home / Projects / Project (TestIMDISNuovo) / Task (Alessandro\_Busato)

Filter by project facets Tree Search

Send Cancel

Subject\* re: test message

Create tag Cited Attachment 0

Paolo Diviacco (2024-05-13 17:02:32)

Hi there  
This is a test message

Paolo Diviacco (2024-05-13 17:02:55)

Seems like it works

COLLA Collaborative Toolkit for Scientific Project development

Home / Projects / Project (SDLSProva) / Task (All tasks)

Filter by project facets Tree Search

Project Team  
Alessandro Busato

Project Statistic  
63 11 1 6

Can handle pretty complex messages trees

Searching "All Mailboxes"

Found 183 results

Colia.diviak.TestIMDISNuovo.Aless... re: test message

COLLA - Collaborative toolkit for Scientific Projects Development Author diviak (Added the following message...)

Author diviak (Added the following message!)

Project TestIMDISNuovo

Task [http://www.semanticweb.org/diviak/ontologies/2024/02/urifiled-ontology-5f/Alessandro\\_Busato](http://www.semanticweb.org/diviak/ontologies/2024/02/urifiled-ontology-5f/Alessandro_Busato)

Subject re: test message

Reply method You can enter the discussion directly via WEB Portal using the link or REPLY to this message

Cited message View cited message published by diviak via WEB Portal

Seems like it works

P

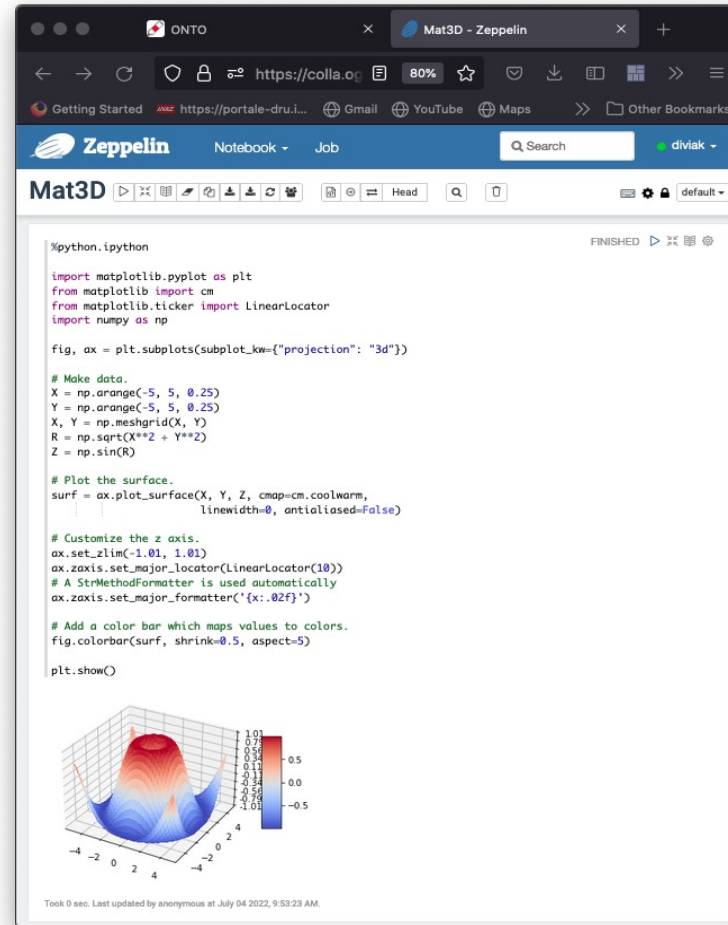
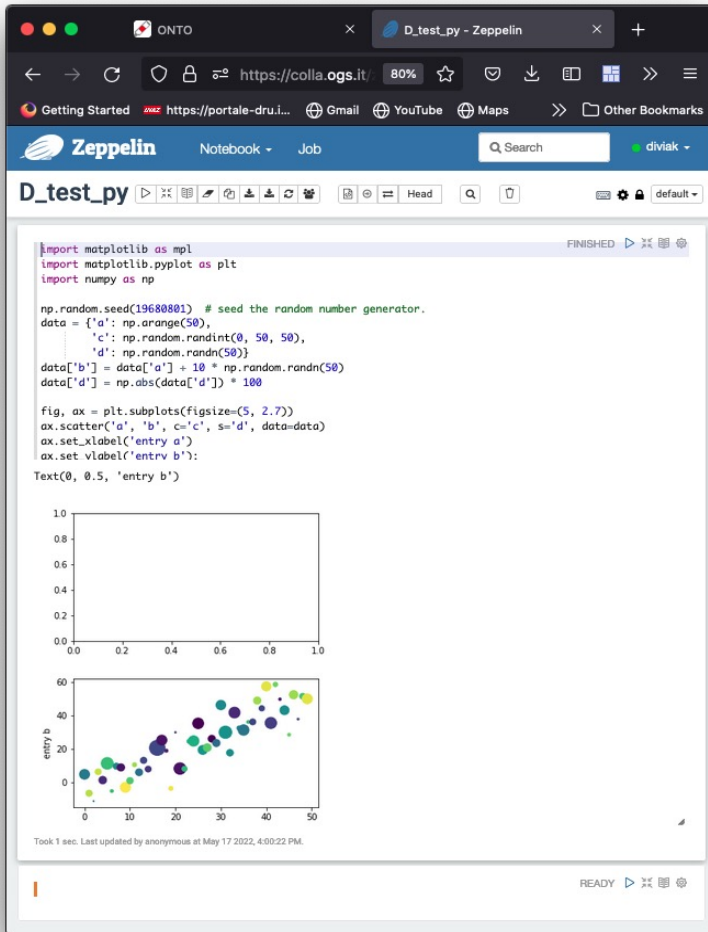
Cited message View cited message published by diviak via WEB Portal

Attachments No attachments!



File manager  
message

The screenshot displays the COLLA web interface. At the top, the browser address bar shows 'colla.ogs.it'. The header includes the COLLA logo (Collaborative Toolkit for Scientific Project development) and the OGS logo (National Institute of Oceanography and Applied Geophysics). A sidebar on the left contains navigation options: Home, Back, Help, Create project, Projects, My Files, Paolo Diviacco, and Logout. The main content area is titled 'Home / File Manager' and shows a file browser interface. The left pane lists a directory tree with folders like 'CitizenScience', 'COCALpapers', 'COLLAdiscussions', 'CORMA', 'EFWorkshop2022', 'Data', and 'depot\_proj112task2'. The right pane shows a grid of image files, including 'inline\_image\_112\_2\_ver\_1.png', 'inline\_image\_112\_2\_ver\_2.png', 'inline\_image\_112\_2\_ver\_4.png', and 'inline\_image\_112\_2\_ver\_5.png'. An 'Open notebook' button is visible. On the right side of the interface, there is a PDF viewer showing a document titled 'RiepMM\_202404\_LG.pdf'. In the foreground, a window displays a data plot with a y-axis from 0 to 1.5 and an x-axis from 1.01 to 1.04, with a scale factor of  $\times 10^4$ . The plot shows multiple overlapping curves that appear to be seismic or geophysical data.



- In order to use seismic data we developed a specific interpreter in order to accommodate some problems with visualization and setting of environmental variables.
- For data processing of seismic data we rely on the CWP Seismic Unix software (<https://cwp.mines.edu/software/>).
- Some parts of the code of the processing software were tuned and recompiled -> specific interpreter called 'su'
- Within Eurofleets+ a workshop using the Virtual Playground took place to test the system and allow participants to get acquainted with the system

The screenshot displays a Zeppelin Notebook interface for a job named 'Su\_in\_filter\_show'. The script code is as follows:

```
export DS_A=Linea_A-207.sgy
echo $DS_A
segypread tape=$DS_A | segyclean | suwind key=fldr min=400 max=410> subset.su
#segypread tape=$DS_A | segyclean | supsimage image=raster perc=1.0 bps=24 > DS_A.ps
sufilter f=10,20,60,100 <subset.su >subsetF.su
supsimage <subsetF.su image=raster perc=98 bps=24 > DS_A.ps
convert DS_A.ps DS_B.png
echo -e "%html <img src='data:image/png;base64,{base64 \"$DS_B.png\"}'>"
```

The execution output shows:

```
Linea_A-207.sgy
1+0 records in
6+1 records out
3240 bytes (3.2 kB, 3.2 KiB) copied, 0.00253489 s, 1.3 MB/s
/data/geoseas/extra/stripped_SU/bin/psimage: bclip=0.560535 wclip=-0.493127
```

Below the code and output, a seismic data visualization is shown, which is a grayscale plot of seismic traces. The x-axis is labeled with values 340, 360, 380, 400, 420, and 440. The y-axis is labeled with values 0, 1, 2, 3, and 4. The plot shows a dense, textured pattern of seismic data.

## Limitations/future work:

- Facilitator advisable
- Ontology built outside Virtual Playground
- Notes can cross tasks/nodes (advantage/disadvantage)
- Visual interactivity (picking seismic velocities and horizons) currently more batch like

# Thank you for your attention

[pdiviacco@ogs.it](mailto:pdiviacco@ogs.it), busato@ogs.it

## References:

- Diviacco, P. (2018). On formalization and representation in collaborative research. Dynamic knowledge representation in scientific domains (pp. 89-97) doi:10.4018/978-1-5225-5261-1.ch004
- **Diviacco, P.**, Leadbetter, A., (2016) Balancing Formalization and Representation in Cross- Domain Data Management for Sustainable Development, DOI: 10.4018/978-1-5225-0700-0.ch002
- **Diviacco, P.** (2016) E-Research: a way of learning together? In Cultural, behavioural, and Social Considerations in Electronic Collaboration, Kok, A. Hyunkyung L.. IGI-Global, DOI: 10.4018/978-1-4666-9556-6.ch011
- **Diviacco, P.**, & Busato, A. (2015). Maps, graphs and annotations as Boundary Objects in Knowledge Networks, Distributed Cognition and Collaborative e-Research. In P. Diviacco, P. Fox, C. Pshenichny, & A. Leadbetter (Eds.), Collaborative Knowledge. Hershey, PA: IGI Global.
- **Diviacco, P.** (2015). Reconciling Knowledge and Collaborative e-Research. In Collaborative Knowledge. Hershey, PA: IGI Global.
- **Diviacco P.**, Pshenichny C, Carniel R., Khrabrykh Z., Shterkun V. Mouromtsev D. Guzman S., Pascolo P. (2015) "Organization of a geophysical information space by using an event-bush-based collaborative tool" Earth Sci Inform, DOI 10.1007/s12145-014-0182-2
- Pshenichny C. Carniel R. and Diviacco P,(2013) " Engineering of Dynamic Knowledge in Exact Sciences: First Results of Application of the Event Bush Method in Physics", in Proceedings of Engineering of Dynamic Knowledge in Exact Sciences: First Results of Application of the Event Bush Method in Physics
- **Diviacco, P.** (2012) Addressing Conflicting Cognitive Models in Collaborative E-Research: A Case Study in Exploration Geophysics" in Collaborative and Distributed E-Research: Innovations in Technologies, Strategies and Applications, IGI Global press, DOI: 10.4018/978-1-4666-0125-3.ch012