

A RELAXED APPROACH TO HANDLING SEMANTICS IN DATA MANAGEMENT

Paolo Diviacco

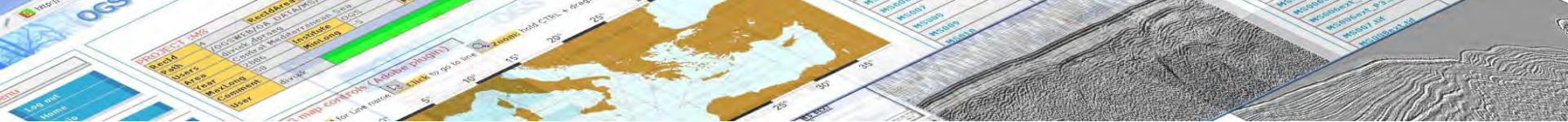
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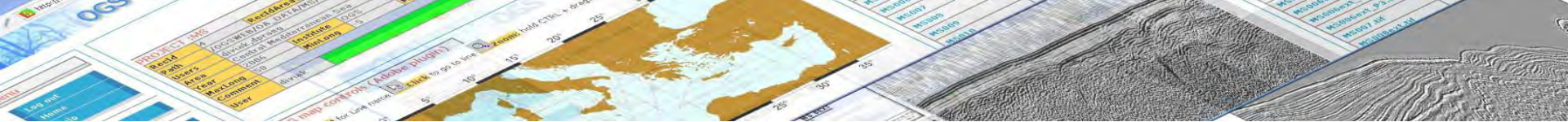
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Relaxed = free from tension and **anxiety**

Cartesian anxiety:

- Notion that Western civilization has suffered from a longing for **ontological certainty**
- Scientific methods should be able to lead us to a **firm and unchanging knowledge** of the world around us.
- The term is named after Descartes because of his well-known emphasis on "mind" as different from "body", "self" as different from "other"



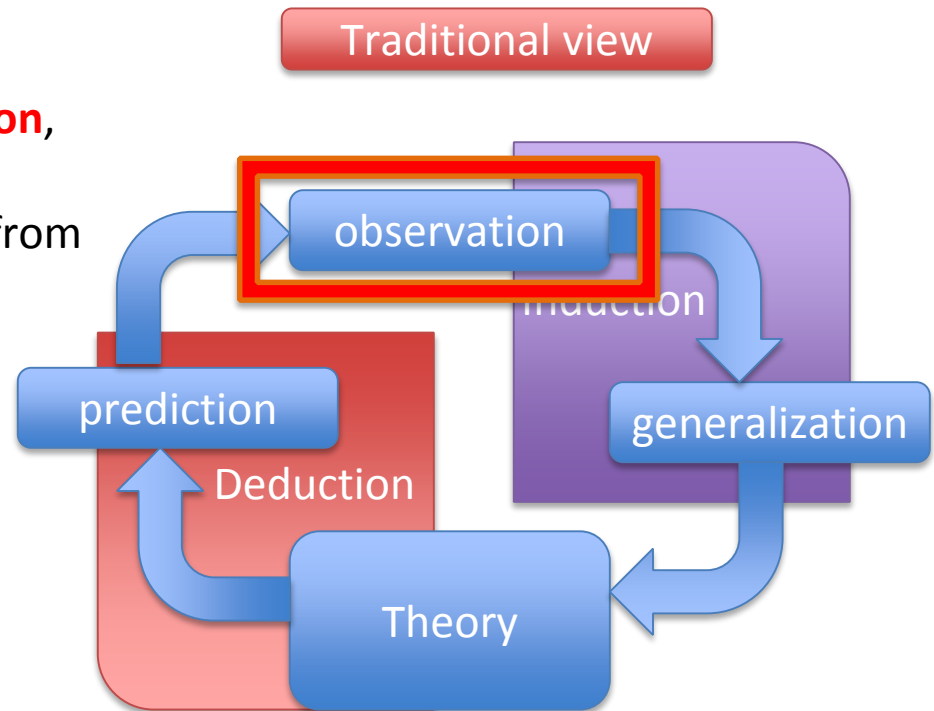
Can science provide firm and unchanging knowledge?

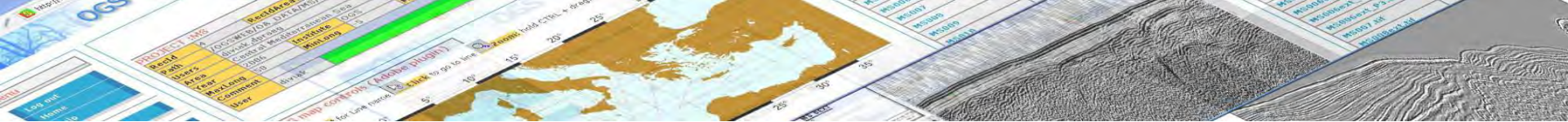
The answer is: no

Experiment is not simply an observation,

it is an **interpretation** of observations from within a theoretical framework.

(from Kant to Hanson)

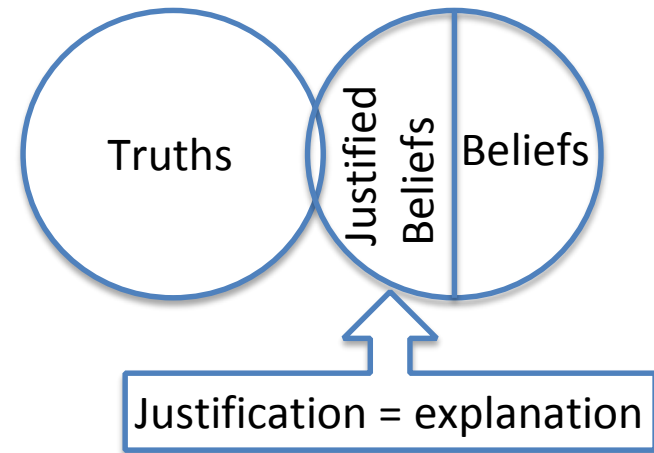
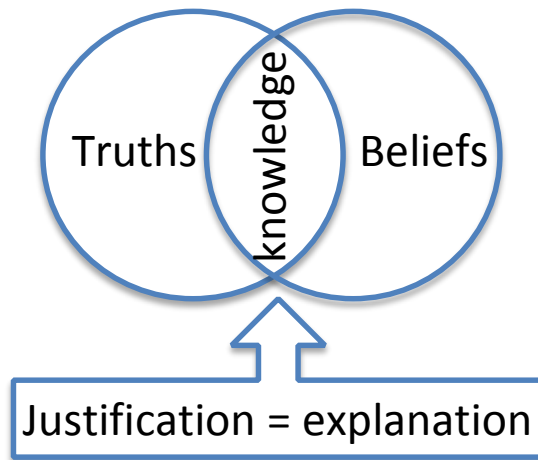


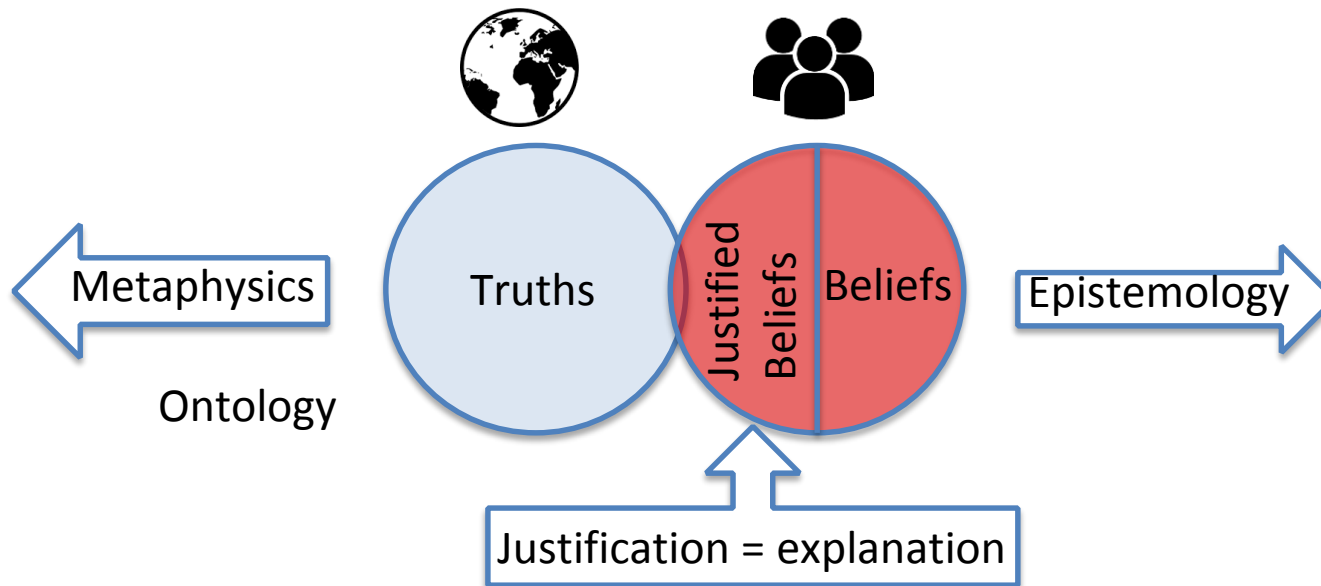
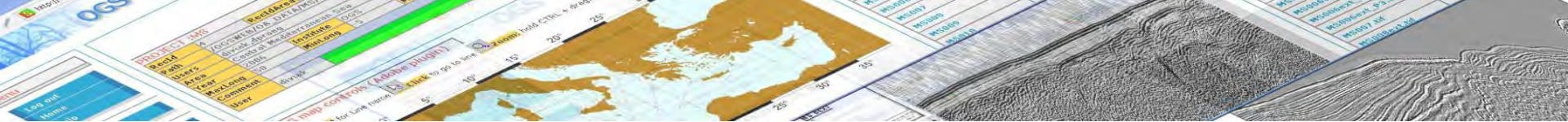


For example ISO19156 (O&M) Observation is an action whose result is an **estimate** of some property of a feature-of-interest obtained through the use of a specific procedure (Cox, 2006)

Estimate = to form an approximate **judgment or opinion** regarding the worth, amount, size, weight, etc.

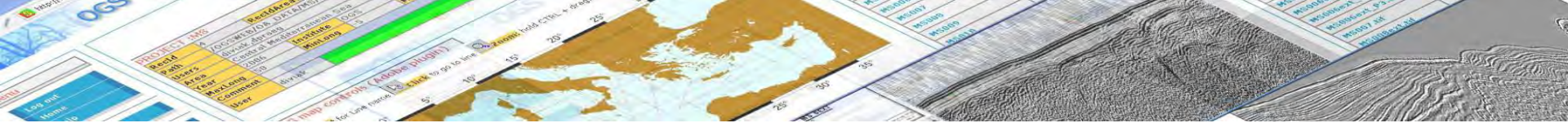
Procedure → framework (knowledge of x is shaped by prior knowledge of x)





The truth is, notwithstanding Justification: It is metaphysic = ontological

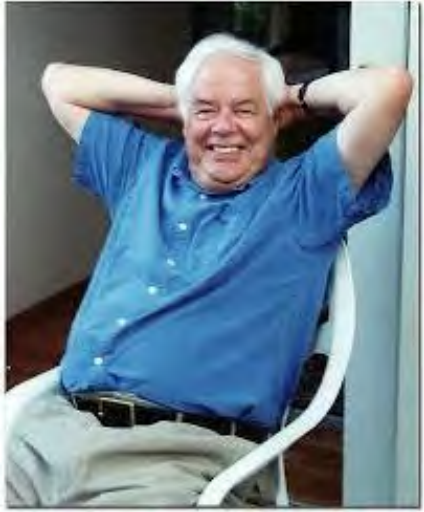
Beliefs + Justification = Epistemic



Why all this stuff about ontology and nothing about epistemology?



American Pragmatism



Richard McKay **R**orty
(New York, 4/10/1931 – Palo Alto, 8/6/2007)

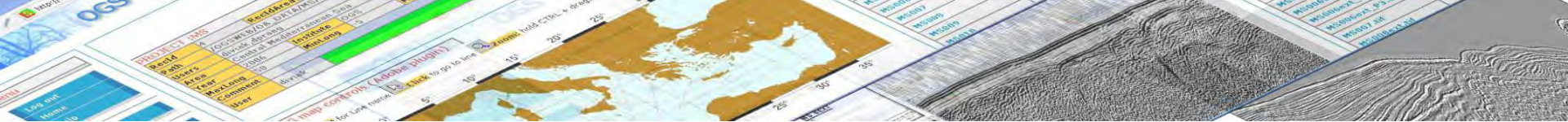
The word is out there, but descriptions of the word are not.

Only descriptions of the world can be true or false.
In Rorty's vision, problems of Epistemology are dissolved simply because they do not exist. In practice his approach tries to neglect completely Epistemology and focus on Ontology



...HE LOOKS VERY RELAXED
... HIS IDEAS ARE CONTROVERSI
AL





This could explain why we use the term ontology

Mis-interpretation:

...let's pretend that the use of a concept is truth (metaphysically) → We then can call this ontology

...but actually Rorty was more radical: “we do not have reasons to justify some sets of ideas or theories over against others”

Everything is context dependent.

“Meaning” → “Usage = context dependent meaning”

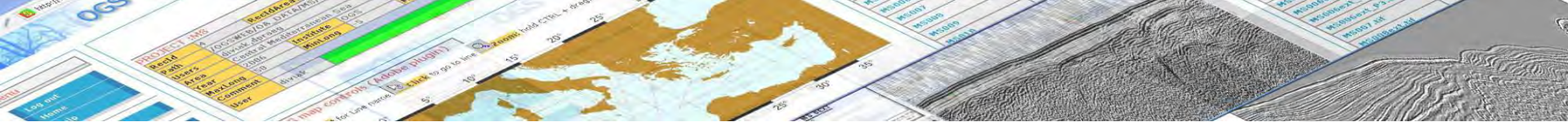
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Semantics → Pragmatics

Usage = beliefs approved by a linguistic community

Usage is an unstable and contingent process based on agreement





Can agreement be possible?

Christopher Tollefsen distinguish:

Coercion (implying some degree of violence)

Coordination = 1) each partner has different aim
2) mutual benefit

Cooperation= 1) each partner has the same goal

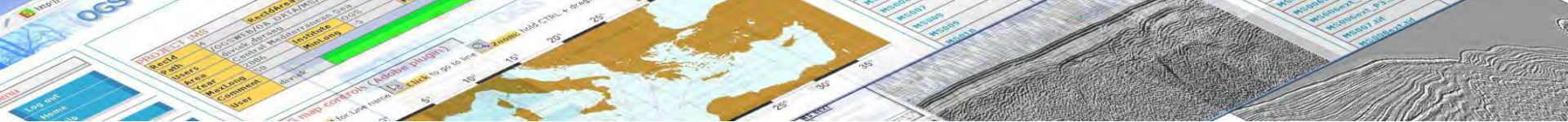
A genuine community exists only with cooperation

All sociology of science invoke **Incommensurability** between paradigms
=researchers from different backgrounds (and sometimes even inside same domain but different schools) cannot understand each other

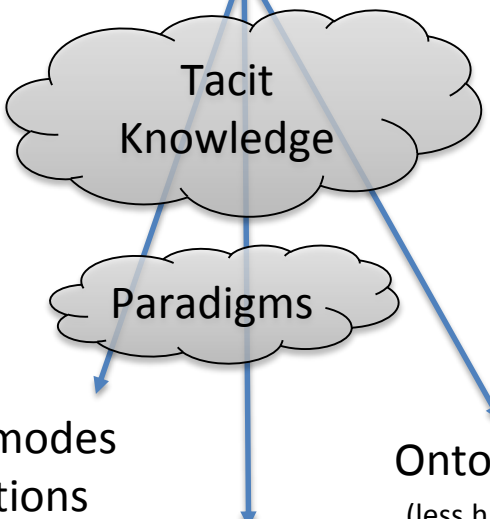
Tacit knowledge: “we know more than we can tell” (Polany 1958) things in your mind that you are not able to formalize.

...not to consider the **socio-economic issues** (funding, reputational system etc...)





Formalization



Verbal modes
Descriptions
(too human)

Ontologies
(less human)

Graphs/maps

(ok...and can accommodate Different visions)

Maps can show multiple paths
between two places

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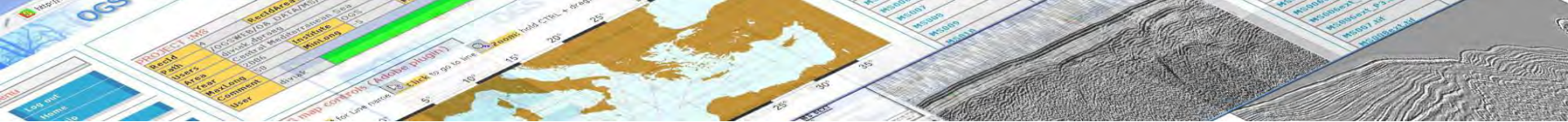
Representation =

description, portrayal, depiction of something
prone to

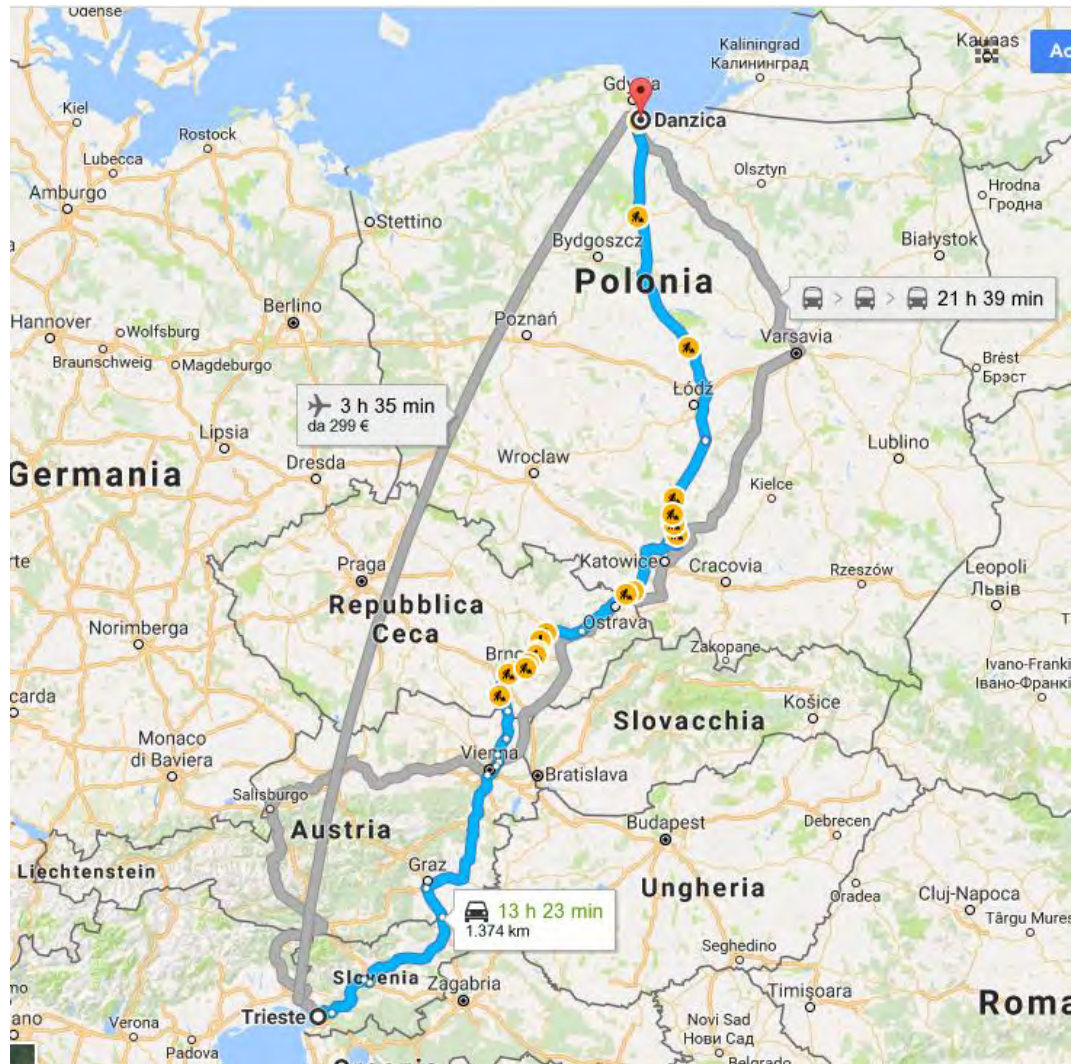
Omission = neglecting some possible factor

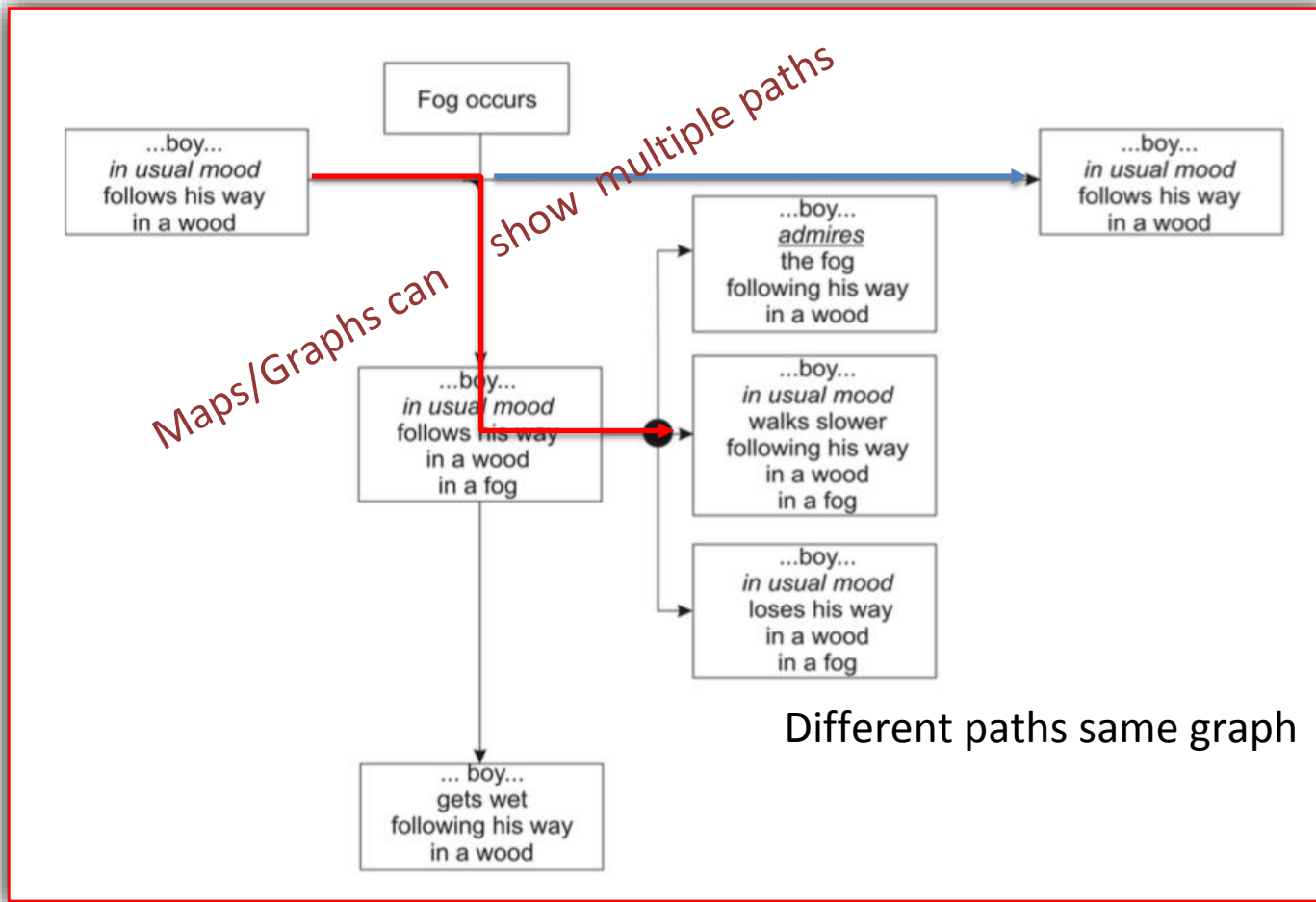
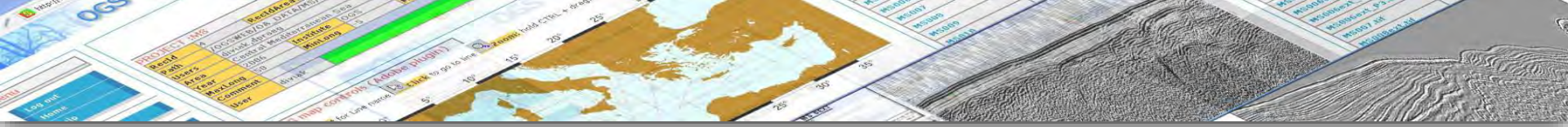
Commission deliberately change factors

**Strictly speaking representations
are generally false but can be
useful**

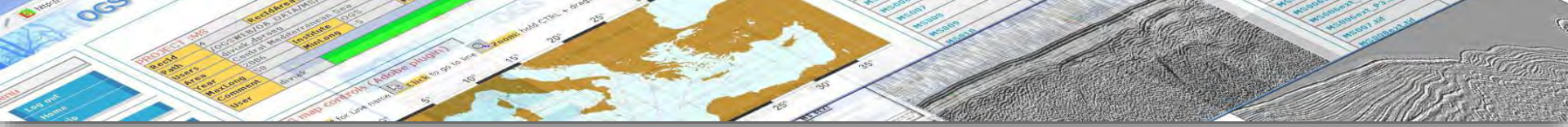


Maps can show multiple paths between two places

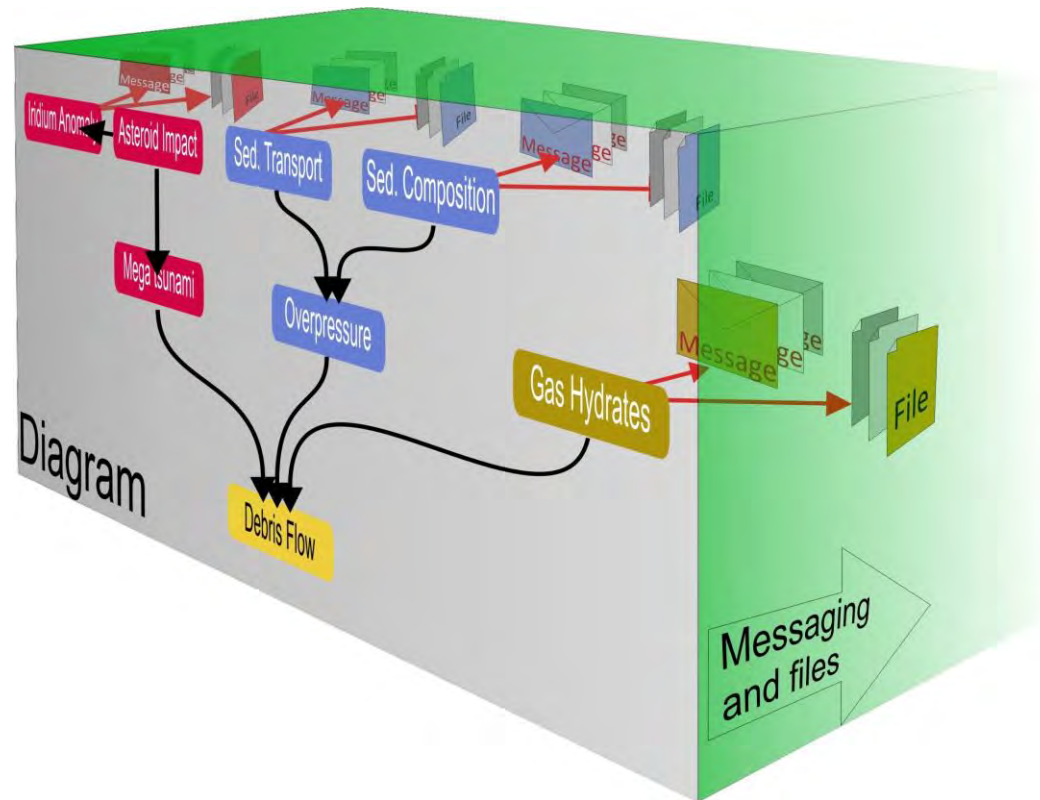


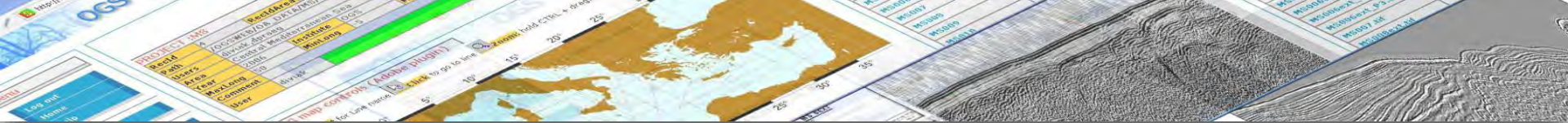


Courtesy: Pshenichny C. A., 2008 "The Event Bush as a Potential Complex Methodology of Conceptual Modelling in the Geosciences"



Data access using a graph





1010010 →

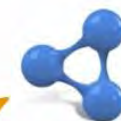
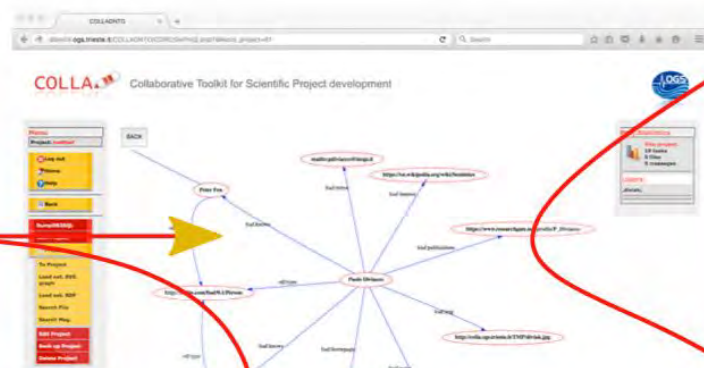


Formalization (RDF)

Plot it as graph

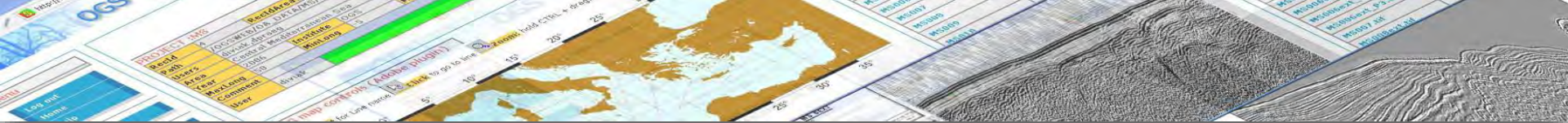
People use the graph

People access data

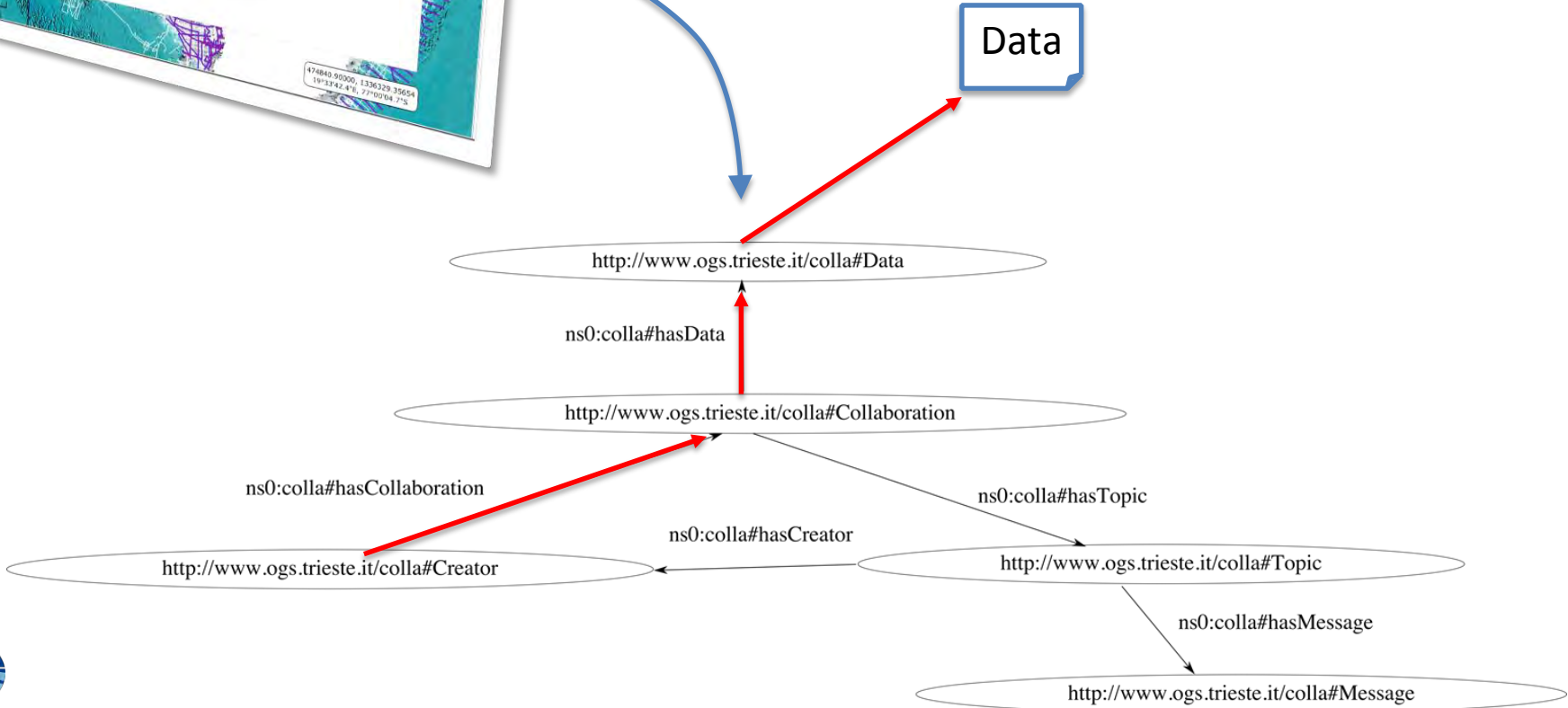


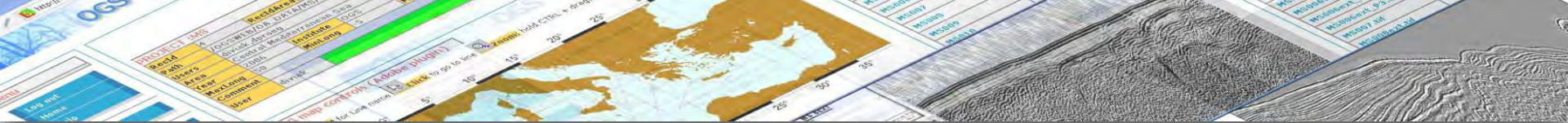
Linked data





Data





ns0:colla#hasCollaboration

ns0:colla#hasTopic

ns0:colla#hasCreator

http://www.ogs.trieste.it/colla#Creator

http://www.ogs.trieste.it/colla#Topic

hasCollaboration

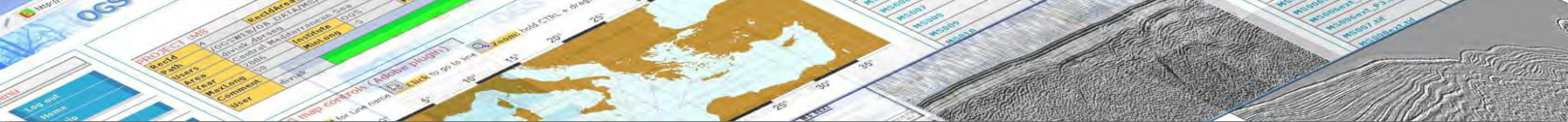
abusato@ogs.trieste.it (user)

feedback

474840.90000, 1336329.35654
19°33'42.4"E, 77°00'04.7"S

500 km
200 mi





window

ns0:colla#hasCollaboration ns0:colla#hasTopic

http://www.ogs.trieste.it/colla#Creator http://www.ogs.trieste.it/colla#Topic

abusato@ogs.trieste.it hasCollaboration

abusato@ogs.trieste.it
abusato@ogs.trieste.it

Detailed description: This screenshot shows a web application window titled 'window'. It displays a diagram with nodes and relationships. The nodes are 'http://www.ogs.trieste.it/colla#Creator' and 'http://www.ogs.trieste.it/colla#Topic'. The relationships are 'ns0:colla#hasCollaboration' and 'ns0:colla#hasTopic'. Below the diagram, there is a dropdown menu with 'abusato@ogs.trieste.it' selected, and a text input field. To the right, there is a label 'hasCollaboration' and another dropdown menu. At the bottom left, the email 'abusato@ogs.trieste.it' is repeated twice.

window

ns0:colla#hasData

http://www.ogs.trieste.it/colla#Collaboration

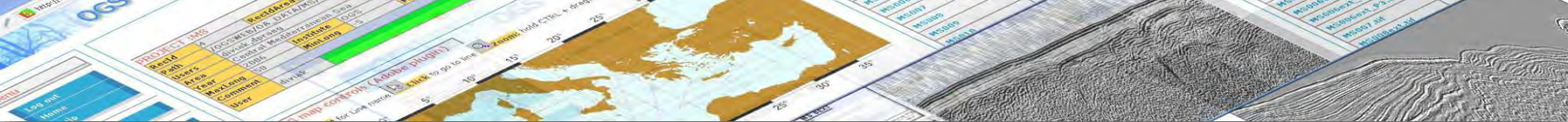
Penisola antartica hasData

GA (collaboration)
Penisola antartica (collaboration)

IT88RS/IT88A-01.sgy

Detailed description: This screenshot shows a web application window titled 'window'. It displays a diagram with nodes and relationships. The nodes are 'http://www.ogs.trieste.it/colla#Collaboration' and 'IT88RS/IT88A-01.sgy'. The relationship is 'ns0:colla#hasData'. Below the diagram, there is a dropdown menu with 'Penisola antartica' selected, and a text input field. To the right, there is a label 'hasData' and another dropdown menu. At the bottom right, the file path 'IT88RS/IT88A-01.sgy' is displayed.





sdlsnew.ogs.trieste.it/cache/Index.jsp

Project view reset

Filter: Q

▼ project	IT88RS	
▼ dataset	IT88A-01	
file	IT88A-01.sgy	
▶ dataset	IT88A-02	
▶ dataset	IT88A-03	
▶ dataset	IT88A-04	
▶ dataset	IT88A-05	

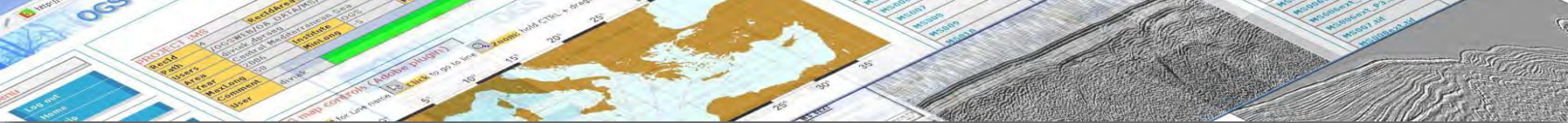
sdlsnew.ogs.trieste.it/cache/ijp_viewer.jsp?content=IT88RS/IT88A-01.sgy&project=IT88RS

Welcome undefined undefined(guest@ogs.trieste.it)

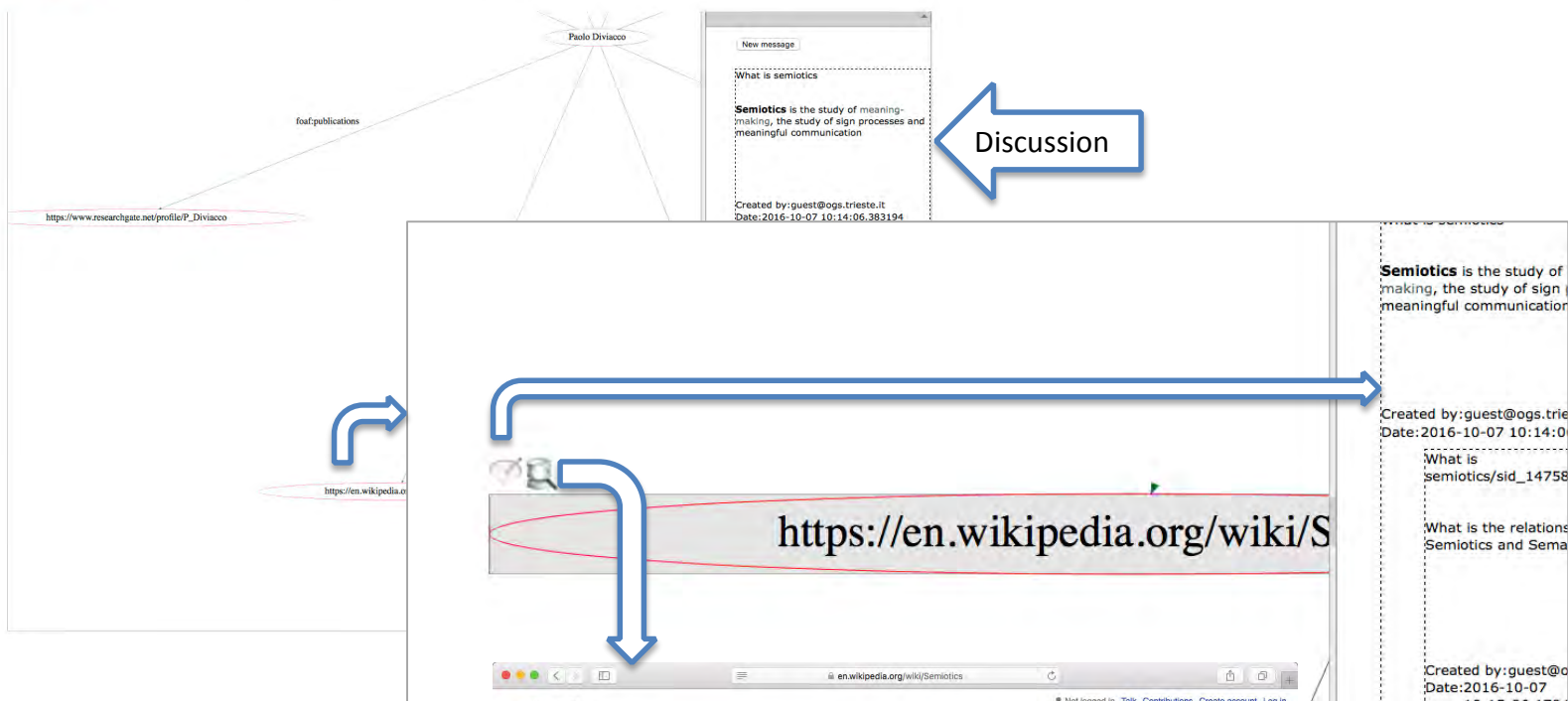
Image Filters

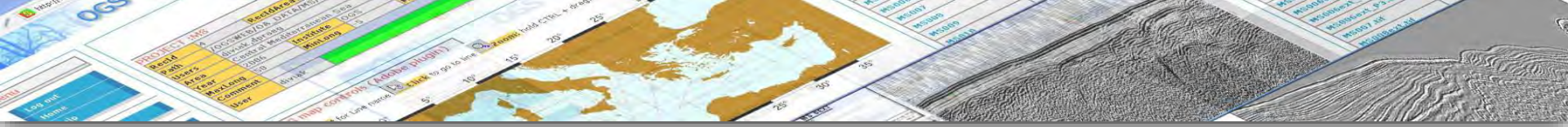
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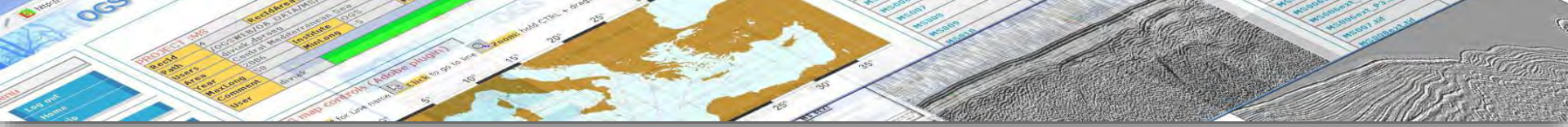
COLLA Collaborative Toolkit for Scientific Project development





Conclusions:

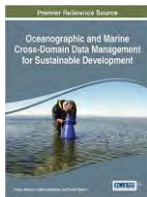
- Machine-to-machine communication relies on explicit knowledge (...probably)
- Human-to-human collaboration is based on problematic knowledge sharing
- Knowledge sharing can benefit from its representation using maps
- Knowledge representation using maps can be done using RDF
- We developed a tool that allow to use such RDF graphs to be used to support collaboration and data, information and knowledge sharing



THANK YOU FOR YOUR ATTENTION

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References



Diviacco, P., Leadbetter, A., Graves, H., 2016, “Oceanographic and Marine Cross-Domain Data Management for Sustainable Development” IGI-Global, DOI: 10.4018/978-1-5225-0700-0

