



BEeS

The LifeWatch ERIC Biodiversity & Ecosystem eScience Conference

Seville
22-24/05/23



Threats and challenges to biodiversity and ecosystem conservation from an eScience perspective



UNIVERSITÀ
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Building up collective knowledge through semantics

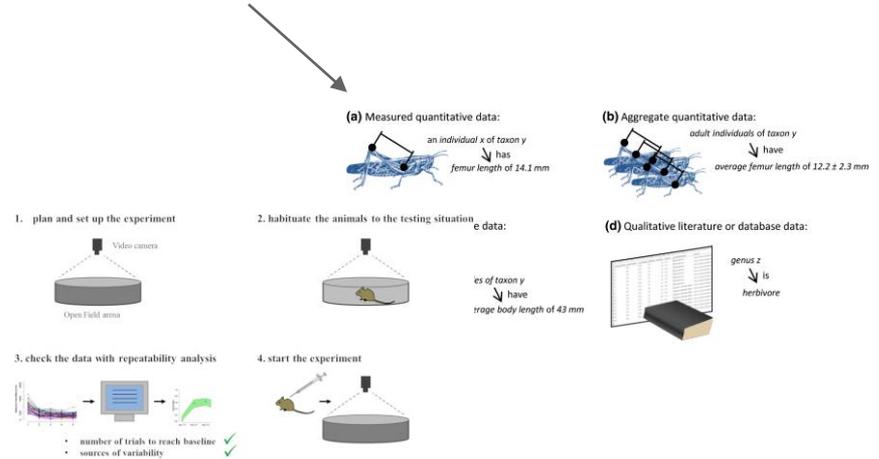
Martina Pulieri, Lucia Vaira, Cristina Di Muri, Jessica Titocci, Andrea Tarallo, Alberto Basset, Nicola Fiore, Ilaria Rosati

Biodiversity and ecosystems domain is turning into a **data-intensive** discipline with **high data variability** in structure and semantics.

Date	Time	NO3_N_Conc	NO3_N_Conc_Flag
20081011	1300	0.013	
20081011	1330	0.016	
20081011	1400		M1
20081011	1430	0.018	
20081011	1500	0.004	

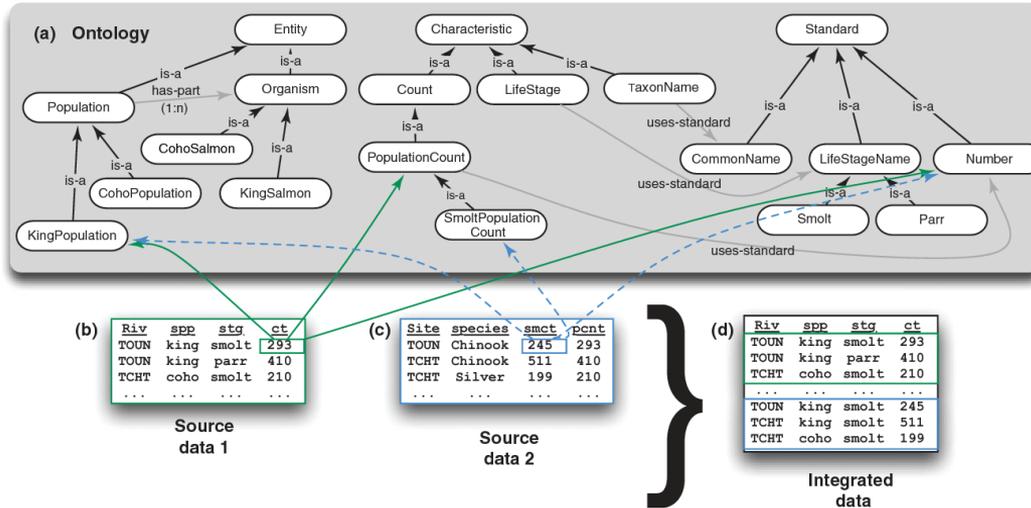
Site	Trans.	Sp.	Dist.	Ht.	Area	Crabs
bird	1	hya	0.55	0.46	1260	2
bird	1	hya	5.90	0.44	2630	4
bird	1	hya	19.35	0.13	190	0
bird	2	hya	3.55	0.32	5030	6
bird	2	hya	18.20	0.58	17670	18
bird	2	hya	29.75	0.15	310	1
south	1	hya	4.15	0.08	20	0
south	1	hya	15.00	0.34	4420	7
south	1	hya	20.05	0.45	6360	7
south	2	hya	12.30	0.40	1260	2
...

Species	Wth.	Dens.
A. hyacinthus	30	6
A. hyacinthus	40	19
A. hyacinthus	20	4
A. hyacinthus	20	4
A. gemmifera	10	3
A. gemmifera	20	1
A. gemmifera	20	2
A. gemmifera	10	3
A. gemmifera	10	1
A. palifera	10	0
...



A challenge for data discovery and integration

Sematic approach



TRENDS in Ecology & Evolution

- Formally annotation of data with semantic resources to specify the meaning of data.
- Reveals relationships between instances and makes them easier to understand
- Unit conversions, alignment and concatenation of semantically compatible variables.

Michener and Jones, 2012. Ecoinformatics: supporting ecology as a data-intensive science (<https://doi.org/10.1016/j.tree.2011.11.016>)

ETL process

Extract

Normalize

Transform

Load

VREs



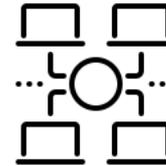
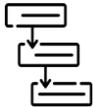
Metadata



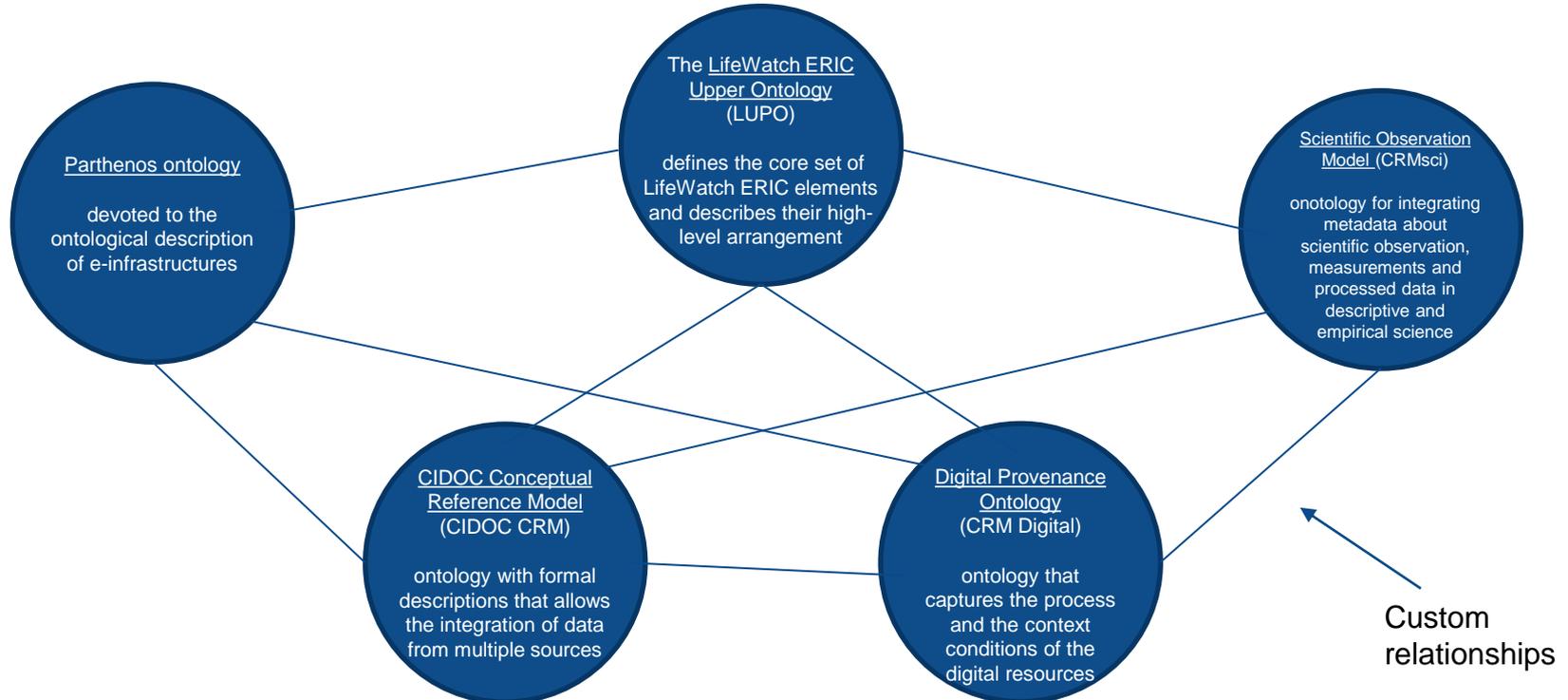
Datasets



Workflows



Semantic model



Annotations



Type 

Right 

Observation 

Design or Procedure 

Annotation x

Annotation for Subject: **E66BDB87-C106-3405-93B3-2066CB873705**

You are logged in as admin, so can view all annotations

Ontology Annotation*

Linguistic Object

Add ontology annotation

Vocabulary Annotation

abstract note x

Add vocabulary annotation

You can View the JSON before you apply changes:

```
{
  "type": "composite",
  "subject": "https://www.lifewatchitaly.eu/volatile_dataset/AS2new520approach%20to%20assessing%20the%20",
  "fields": {
    "AnnotationType": {
      "values": [
        {
          "type": "atomic",
          "value": "http://www.cidoc-crm.org/cidoc-crm/E33_Linguistic_Object",
          "label": "Linguistic Object",
          "errors": []
        }
      ],
      "errors": []
    },
    "vocab": {
      "values": [
        {
          "type": "atomic",
          "value": "http://vocab.getty.edu/aat/300435417",
          "label": "abstract note",
          "errors": []
        }
      ],
      "errors": []
    }
  },
  "errors": []
}
```



Dataset 

My Annotation*: Persistent Dataset 

Simple Search

To use the simple search, type at least two characters in the search box.

Type at least two characters in the search box



Quick search

Title	Type
Atlas of Phytoplankton	Service
Atlas of Phytoplankton	Linguistic Appellation
Atlas of Phytoplankton - https://metadatabase.lifewatch.eu/srv/catalog/search/metadata/3ca7867c-0178-4310-a825-5c8bedaf5465	Linguistic Appellation
It is a catalogue of geometrical models for calculating biovolume and surface area of phytoplankton taxa. It includes illustrative schemes of simple and complex shapes.	Linguistic Object
Other Phytoplankton	BT22_Class
Other Phytoplankton	BT19_Phylum
Phytoplankton	Type
Phytoplankton Data Template	Linguistic Appellation
Phytoplankton Traits Thesaurus	Linguistic Appellation

« 1 2 3 4 5 » Show 9 rows 40 entries

General search

Simple Search

To use the simple search, type at least two characters in the search box.

- PhytoplanktonTORREGUACETO20052006 (Dataset)
- PhytoplanktonMarinemonitoringprojectinBrindisiindustrialarea20142017 (Dataset)
- PhytoplanktonProgettoStrategico20092012Brasil (Dataset)
- PhytoplanktonOtranto2003 (Dataset)
- PhytoplanktonINTERREGIIIItalyGreeceProgram2000 (Dataset)
- PhytoplanktonLagoMaggiore (Dataset)
- PhytoplanktonLagoMaggiore (Linguistic Appellation)
- PhytoplanktonWiserProject2009 (Dataset)

Punctual search

Structured Search

Use the structured search to formulate more complex queries. Start by selecting the kind of resource you wish to find.



Dataset



Service



Person



Organisation



VRE



Observation



Observation ... related to

- Dataset
- Place
- Person
- Type
- Species
- Phylum
- Class
- Order
- Family
- Genus
- Kingdom

cancel

Dataset ... related to

- Right
- Taxon
- Date
- Geographic Description
- Person
- Technique
- Type
- Observation

cancel



Structured Search

Observation > has phylum > Phylum > Arthropoda > OR > AND > remove

Found 80734 matches Displaying the first 1000 results

Grid Table Graph

Filters

-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-
-

2798 From Dataset: Biodiversity of the Presidential Estate of Castelporziano Observation	2799 From Dataset: Biodiversity of the Presidential Estate of Castelporziano Observation	280 From Dataset: Biodiversity of the Presidential Estate of Castelporziano Observation	2800 From Dataset: Biodiversity of the Presidential Estate of Castelporziano Observation
2801 From Dataset: Biodiversity of the Presidential Estate of Castelporziano Observation	281 From Dataset: Biodiversity of the Presidential Estate of Castelporziano Observation	282 From Dataset: Biodiversity of the Presidential Estate of Castelporziano Observation	283 From Dataset: Biodiversity of the Presidential Estate of Castelporziano Observation
284 From Dataset: Biodiversity of the Presidential Estate of Castelporziano Observation	285 From Dataset: Biodiversity of the Presidential Estate of Castelporziano Observation		

1 2 3 4 5 -

Structured Search

 Observation
 >  has phylum
 >  Phylum
 >  Arthropoda
 >  OR
 >  AND
 >  remove

HAS DRY WEIGHT 0 to 125 

[Clear all](#)

Found 57489 matches Displaying the first 1000 results

Grid Table Graph

- | | | | |
|---|---|---|---|
| <p>6459</p> <p>From Dataset:
Macrozoobenthos data collected in the Acquatina lagoon, Apulia, Italy.</p> <p>Observation</p> | <p>6464</p> <p>From Dataset:
Macrozoobenthos data collected in the Acquatina lagoon, Apulia, Italy.</p> <p>Observation</p> | <p>6534</p> <p>From Dataset:
Macrozoobenthos data collected in the Acquatina lagoon, Apulia, Italy.</p> <p>Observation</p> | <p>6548</p> <p>From Dataset:
Macrozoobenthos data collected in the Acquatina lagoon, Apulia, Italy.</p> <p>Observation</p> |
| <p>6551</p> <p>From Dataset:
Macrozoobenthos data collected in the Acquatina lagoon, Apulia, Italy.</p> <p>Observation</p> | <p>6552</p> <p>From Dataset:
Macrozoobenthos data collected in the Acquatina lagoon, Apulia, Italy.</p> <p>Observation</p> | <p>6557</p> <p>From Dataset:
Macrozoobenthos data collected in the Acquatina lagoon, Apulia, Italy.</p> <p>Observation</p> | <p>6566</p> <p>From Dataset:
Macrozoobenthos data collected in the Acquatina lagoon, Apulia, Italy.</p> <p>Observation</p> |
| <p>6570</p> <p>From Dataset:
Macrozoobenthos data collected in the Acquatina lagoon, Apulia, Italy.</p> <p>Observation</p> | <p>6571</p> <p>From Dataset:
Macrozoobenthos data collected in the Acquatina lagoon, Apulia, Italy.</p> <p>Observation</p> | | |

< **1** 2 3 4 5 >

Filters



























▶ has sample size 
 ▼ has dry weight 

0 125

0 125

▶ has locality 
 ▶ took place in country 
 ▶ has species 
 ▶ has phylum 
 ▶ has class 
 ▶ has order 
 ▶ has family 
 ▶ has genus 



Seville, 22-24 May 2023

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Structured Search

Information Graph Outgoing Graph Incoming

Export 

Observation 

Annotations 

Field	Value	
Dataset	MacrozoobenthosAcquatina20072008	Dataset 
Dataset Metadata	Macrozoobenthos data collected in the Acquatina lagoon, Apulia, Italy.	Dataset 
EventDate	20/09/07	Time-Span 
Locality	acquatina	Place 
Attribute	type: eventid, value: c	Attribute Assignment 
	type: parenteventid, value: 4	Attribute Assignment 
order	Isopoda	BT34_Order 
phylum	Arthropoda	BT19_Phylum 
scientificName	Lekanesphaera monodi	BT27_Species 
Class	Malacostraca	BT22_Class 
Family	Sphaeromatidae	BT24_Family 
Ash-free Dry Weight	0.2045952	Dimension 

Structured Search

 Dataset >
  created during >
  Date >
 Year 2010 AD - Year 2020 AD >
 OR >
 AND >
 remove

Found 28 matches Displaying all results

Filters

















- was published during 
- created during 
- created by 
- has associated participant 
- has point of contact 
- has metadata provider 
- has keyword 
- has geographic description 
- has taxon rank 
- has method 
- has sampling 
- has rights 
- refers to project 

Grid Table Graph

<p>Rotifera from Antarctica</p> <p>Dataset</p> <p>Download</p>	<p>Soil moisture data, eLTER - Rollesbroich, Germany, 2011 - 2013</p> <p>Dataset</p>	<p>Atmospheric and soil climate dataset from Puéchabon in natura site for year 2014</p> <p>Dataset</p>	<p>ETC L2 Meteo, Selhausen Juelich, 2018-12-31-2021-10-03</p> <p>Dataset</p>
<p>An individual-based dataset of carbon and nitrogen isotopic data of Callinectes sapidus in invaded Mediterranean waters</p> <p>Dataset, Persistent Dataset</p> <p>Download</p>	<p>A new approach to assessing the space use behaviour of macroinvertebrates by automated video tracking</p> <p>Dataset, Persistent Dataset</p> <p>Download</p>	<p>Benthic macroinvertebrates communities data collected in 3 coastal lagoons located in Apulia, Italy, from 2008 to 2010.</p> <p>Dataset</p> <p>Download</p>	<p>Benthic macroinvertebrate communities data of the Mediterranean and Black Sea lagoons.</p> <p>Dataset</p> <p>Download</p>
<p>Biodiversity data of fauna in Italian terrestrial habitats gathered for the alien species study case of LifeWatch Italy.</p> <p>Dataset</p> <p>Download</p>	<p>Biodiversity data of Italian freshwaters gathered for the alien species study case of LifeWatch Italy.</p> <p>Dataset</p> <p>Download</p>		

Structured Search

Field	Value	Annotations 
Title	Rotifera from Antarctica	Linguistic Appellation 
Abstract	We gathered taxonomic information regarding the occurrence of rotifers in Antarctica and Subantarctica, producing a dataset of 1165 records. For each record, it reports the literature reference, the name of the locality with the coordinates, and the type of habitat, if available.	Linguistic Object 
Creation Date	1910 - 2014	Time-Span 
Publication Date	2015-03-26	Time-Span 
Creator	Diego Fontaneto	Person 
Metadata Provider	Diego Fontaneto	Person 
Contact	Diego Fontaneto	Person 
Keywords	Biodiversity	Type 
	Antarctica	Type 
	Distribution	Type 
Intellectual Rights	Rotifera	Type 
	https://www.lifewatchitaly.eu/rights/190BB690-4102-3218-90B3-8BF88717429 This work is licensed under the Creative Commons Attribution 4.0 International License. To view a copy of this license, visit http://creativecommons.org/licenses/by/4.0/ .	
Method Description	Checklist of rotifers from Antarctica and Subantarctica were previously compiled by de Paggi & Koste (1984), Dartnall & Hollowday (1985), Sudzuki (1988), Kurikova (1991), and Vekhov (1993); Antarctic records are also to be found in Segers (2007) and Iersabek & Leitner (2013). The 'Antarctic Region' in Segers (2007, 2008) and Jersabek & Leitner (2013), however, also included the cool-temperate, ocean-temperate biogeographic provinces (South Atlantic, South Indian and South Pacific islands) and part of the Indian South subtropical province. Velasco-Castrillo et al. (2014) listed the species found south of 60°S, inclusive Maritime Antarctic records from the Antarctic Peninsula and the South Shetland and South Orkney Islands. We started our literature review from the above checklists but, in order to minimize inaccuracies as much as possible, we expanded the literature search through available reference databases (e.g. Google Scholar, Scopus, Web of Science, Zoological Record), and consulted each of the 93 references used in this study.	Design or Procedure 
Entity	Antarctic_rotifers_2014.csv	Dataset 

Structured Search

Format: csv


 File: **Antarcticrotifers2014**

Attribute	Label Attribute	Definition
locality	locality	The specific description of the place.
continent	continent	The name of the continent in which the Location occurs.
scientificName	scientificName	The full scientific name, with authorship and date information if known. When forming part of an Identification, this should be the name in lowest level taxonomic rank that can be determined. This term should not contain identification qualifications, which should instead be supplied in the IdentificationQualifier term.
decimalLatitude	decimalLatitude	The geographic latitude (in decimal degrees, using the spatial reference system given in geodeticDatum) of the geographic center of a Location. Positive values are north of the Equator, negative values are south of it.
habitat	habitat	A category or description of the habitat in which the Event occurred.
verbatimtaxonrank	verbatimtaxonrank	The taxonomic rank of the most specific name in the scientificName as it appears in the original record.
class	class	The full scientific name of the class in which the taxon is classified.
taxonrank	taxonrank	The taxonomic rank of the most specific name in the scientificName.
associatedReferences	associatedReferences	A list (concatenated and separated) of identifiers (publication, bibliographic reference, global unique identifier, URI) of literature associated with the Occurrence.
decimalLongitude	decimalLongitude	The geographic longitude (in decimal degrees, using the spatial reference system given in geodeticDatum) of the geographic center of a Location. Positive values are east of the Greenwich Meridian, negative values are west of it.

SPARQL Queries



Recent Queries **Global Queries** Personal Queries

Search for queries ... ⋮

Test - Test for simple query

My first Query - My first Query

<<

```

1 PREFIX rdf: <http://www.w3.org/1999/02/22-rdf-syntax-ns#>
2 PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
3 SELECT * WHERE {
4   ?sub ?pred ?obj .
5 } LIMIT 10
  
```

Repository: (from context)
Execute
Save

Template	Author	Modified	Actions
My first Query	admin	February 9, 2023 10:23 AM	📄 Copy IRI 🗑️ Delete
Test	admin	February 9, 2023 10:21 AM	📄 Copy IRI 🗑️ Delete

Future implementations

- It's a work in progress...
- Improve the semantic model to better grasp all the facets of the present knowledge
- Perform data harvesting from distributed data centers



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Thank you!



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