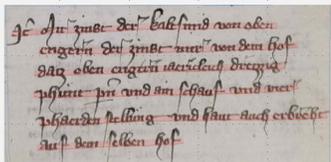


INITIAL SITUATION

Tabular Data Source

filename	pfadname	doi_nr	parent
metadaten_82005.23.01.txt	./metadaten_82005.23.01.txt	82005.23.01_1	82005.23.01_0
82005.23.01_Brixental	82005.23.01_Brixental	82005.23.01_1	82005.23.01_0
82005.23.01_Deckblatt	82005.23.01_Brixental/01_Deckblatt	82005.23.01_2	82005.23.01_1
82005.23.01_Deckblatt_pdfa.pdf	82005.23.01_Brixental/01_Deckblatt	82005.23.01_3	82005.23.01_1
82005.23.01_Brixental/02_Bericht	82005.23.01_Brixental/02_Bericht	82005.23.01_4	82005.23.01_1
82005.23.01_Brixental_Bericht_pdfa.pdf	82005.23.01_Brixental/02_Bericht/82005.23.01_5	82005.23.01_5	82005.23.01_4
82005.23.01_Brixental/03_Zusammenfassung	82005.23.01_Brixental/03_Zusammenfassung	82005.23.01_6	82005.23.01_1
01_Technischer_Gesamtplan.jpeg	82005.23.01_Brixental/03_Zusammenfassung	82005.23.01_7	82005.23.01_1

Annotated Text



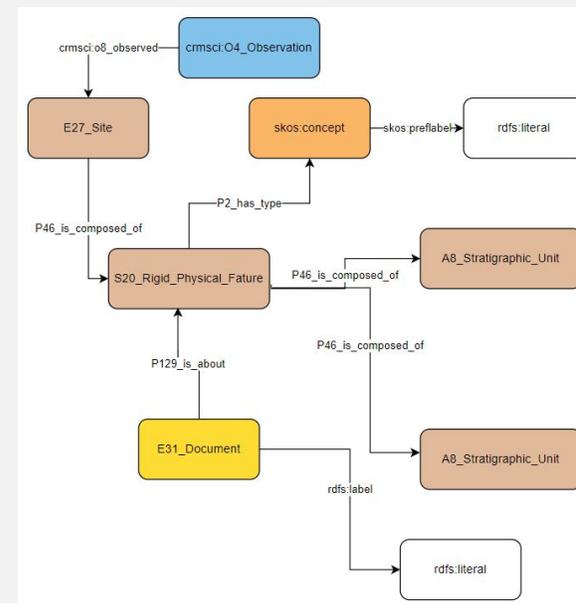
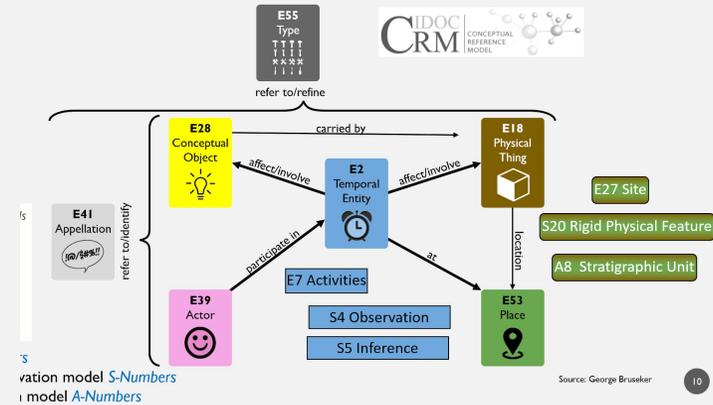
- Person
- Possession
- Place
- Time-span
- Levies
- Granted rights

Item mir zinst der Kaltsmid von Oben
 Engern der zinst mir von dem hof
 dacz Oben Engern jaerleich dreizzig
 phunt perner und ain schauf und vier
 phaerden stellung und haut auch erbreht
 auf dem selben hof

Database

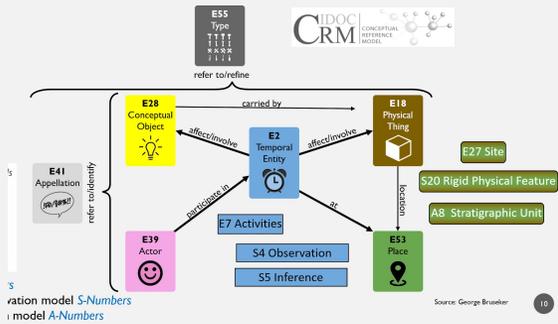
art_id	title	authors
1	Erste Erstiegung des Grossen Geiger.	Issler, Richard
2	Bergsteigen in den ostlichen Zillertaler Al.	Hofler, Horst
3	Skitouren in den Osttizer Alpen. 1948 bis ...	Weiss, Rudolf
4	Karwendel - Abenteuer für Generationen...	Wagner, Helmut

MAPPING



GOAL

MAPPING



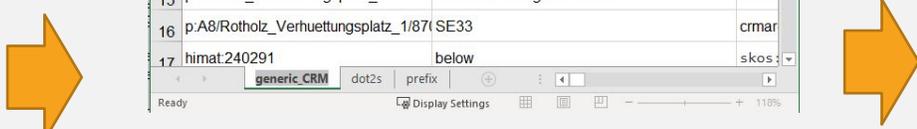
DELIMITED TEXT FILES WITH IDENTIFIERS

Generic sample data

ID of Domain	Domain label	Class
13	p:S20/Rotholz_Verhuettungsplatz	Smelting site Rotholz close to Ruine crm:E
14	p:Rotholz_Verhuettungsplatz_1	Rotholz smelting site Trench-1 crmsc
15	p:Rotholz_Verhuettungsplatz_1	Rotholz smelting site Trench-1 crmsc
16	p:A8/Rotholz_Verhuettungsplatz_1/871 SE33	Rotholz smelting site Trench-1 crmar
17	himat:240291	below skos:

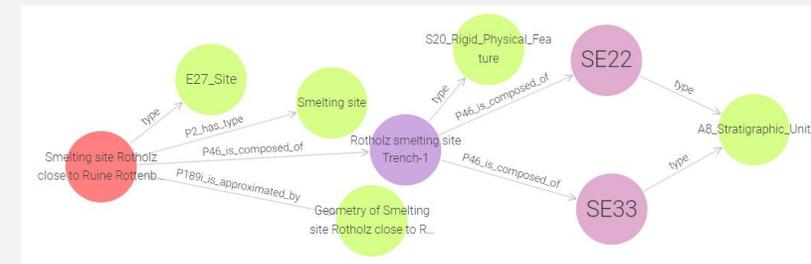
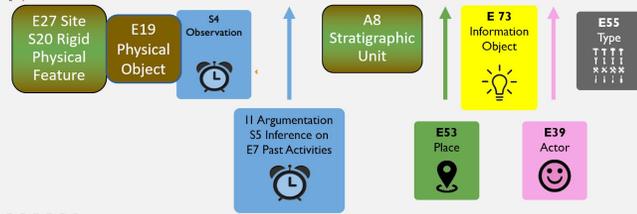
RDF

subject	predicate	object
http://uibk.ac.at/ORD/S20/Rotholz_Verhuettungsplatz	http://www.cidoc-crm.org/cidoc-crm/P189I_is_approximated_by	http://uibk.ac.at/ORD/geometry/Rotholz_Verhuettungsplatz
http://uibk.ac.at/ORD/S20/Rotholz_Verhuettungsplatz	http://www.cidoc-crm.org/cidoc-crm/P2_has_type	http://uibk.ac.at/uibk_himat/E55/240207
http://uibk.ac.at/ORD/S20/Rotholz_Verhuettungsplatz	http://www.cidoc-crm.org/cidoc-crm/P3_has_note	'castle wood'
http://uibk.ac.at/ORD/S20/Rotholz_Verhuettungsplatz	http://www.cidoc-crm.org/cidoc-crm/P46Is_composed_of	http://uibk.ac.at/ORD/Rotholz_Verhuettungsplatz_1
http://uibk.ac.at/ORD/S20/Rotholz_Verhuettungsplatz	rdf:type	http://www.cidoc-crm.org/cidoc-crm/E27_Site
http://uibk.ac.at/ORD/S20/Rotholz_Verhuettungsplatz	rdf:type	http://www.cidoc-crm.org/cidoc-crm/E27_Site
http://uibk.ac.at/ORD/S20/Rotholz_Verhuettungsplatz	rdfs:label	'Smelting site Rotholz close to Ruine Rottenburg'



Complete Project data

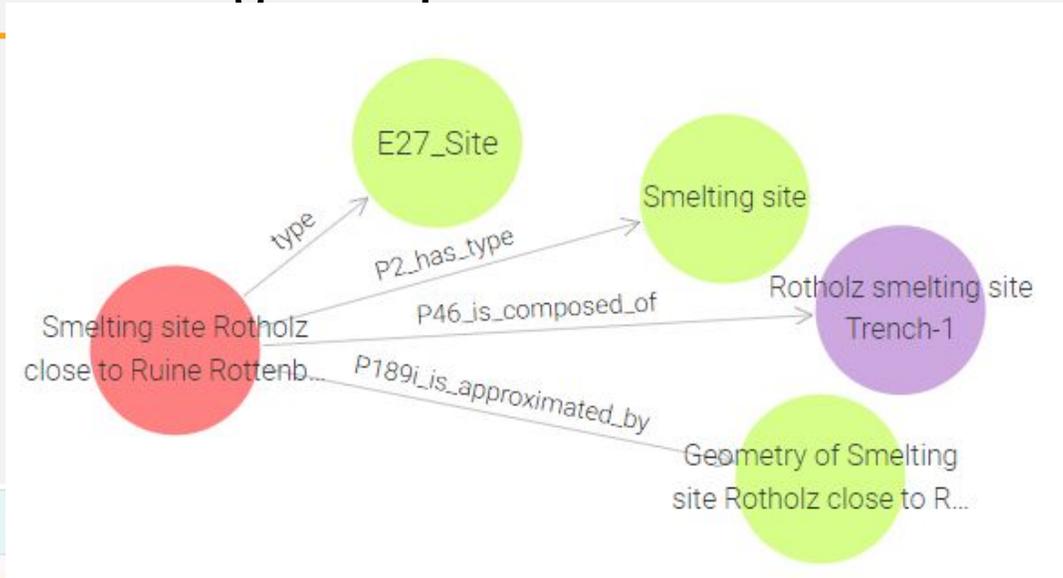
S20_id	E18_class	S20_parent_id_p46	E41_S20	ing_e4	E41_S20_en	E42_S2G5	E42_S2	S4_id
1	Verhuettungsplatz in der N de				Smelting site Rotholz close to Ruine Rottenb			p:87002.15.01 p:87002.16.01
2	p:Rotholz_Verhuettun crm:E27_Site				Rotholz smelting site Trench-1			p:87002.15.01 p:87002.16.01
3	p:Rotholz_Verhuettun crmsci:S20_Rigid_p:Rotholz_Verhuett; Rotholz Verhuettungsplat de				Rotholz smelting site Trench-2			p:87002.15.01 p:87002.16.01
4	p:Rotholz_Verhuettun crmsci:S20_Rigid_p:Rotholz_Verhuett; Rotholz Verhuettungsplat de				Rotholz smelting site Trench-3			p:87002.17.01



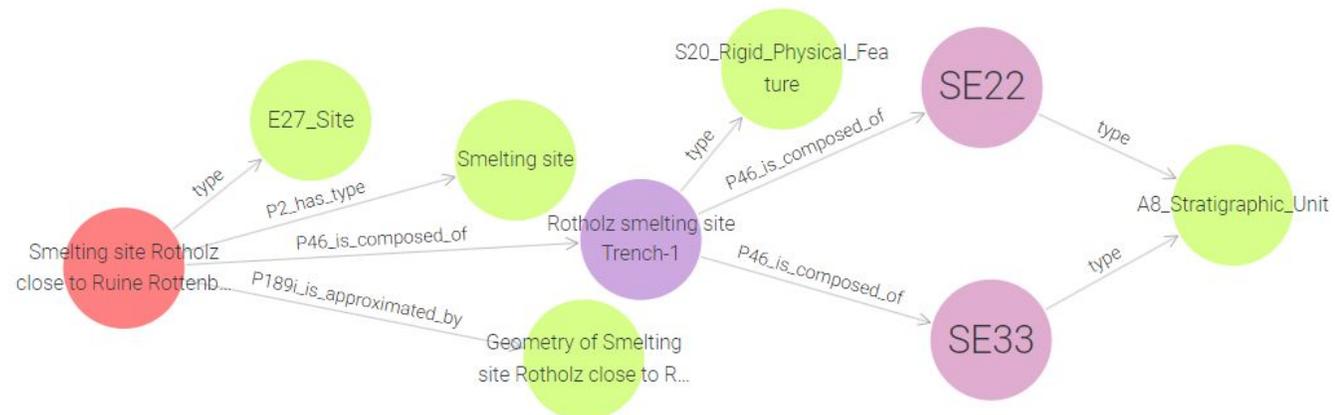
RDF – RESOURCE DESCRIPTION FRAMEWORK -> Knowledge Graph

- Identifiers as URIs
- Data Structure of Triples (Subject, Predicate Object)
- Prefix to shorten URIs
- Creation of Knowledge Graph (Network through triples)

<https://www.w3.org/RDF/>



subject	predicate	object
http://uibk.ac.at/ORD/S20/Rotholz_Verhuettungsplatz	http://www.cidoc-crm.org/cidoc-crm/P189i_is_approximated_by	http://uibk.ac.at/ORD/geometry/Rotholz_verhuettungsplatz
http://uibk.ac.at/ORD/S20/Rotholz_Verhuettungsplatz	http://www.cidoc-crm.org/cidoc-crm/P2_has_type	http://uibk.ac.at/uibk_himat/E55/240207
http://uibk.ac.at/ORD/S20/Rotholz_Verhuettungsplatz	http://www.cidoc-crm.org/cidoc-crm/P3_has_note	"castle wood"
http://uibk.ac.at/ORD/S20/Rotholz_Verhuettungsplatz	http://www.cidoc-crm.org/cidoc-crm/P46_is_composed_of	http://uibk.ac.at/ORD/S20/Rotholz_Verhuettungsplatz
http://uibk.ac.at/ORD/S20/Rotholz_Verhuettungsplatz	rdf:type	http://www.cidoc-crm.org/cidoc-crm/E27_Site
http://uibk.ac.at/ORD/S20/Rotholz_Verhuettungsplatz	rdf:type	http://www.cidoc-crm.org/cidoc-crm/Smelting_site
http://uibk.ac.at/ORD/S20/Rotholz_Verhuettungsplatz	rdfs:label	Smelting site Rotholz close to Ruine Rottenb...



1. Introduction

2. Handbook and Data Structure

3. Software Installation

4. Ontologies and Modeling

5. RDF Creation Pipeline

5.1. Create utf8 tab delimited structured data from a spreadsheet or from a database

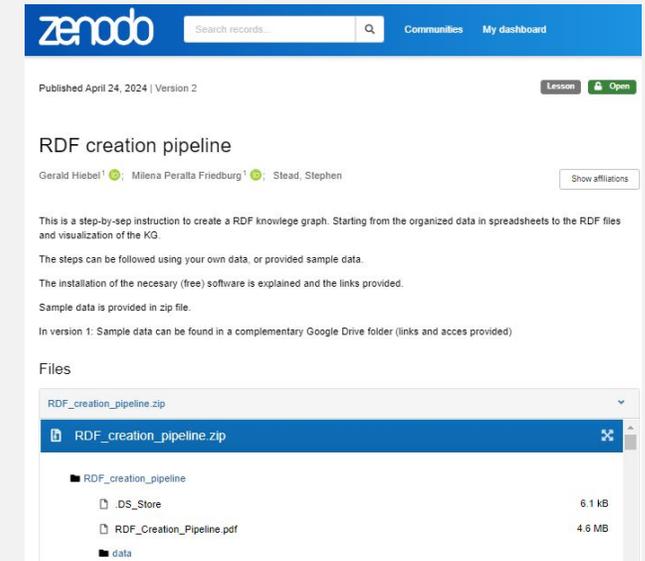
5.2. Create conceptual model based CIDOC CRM

5.3. Load data into Database (Postgres)

5.4. Query / transform data & create URI identifiers (SQL)

5.5. Import in RDF creation software (Ontotext Refine) and create/apply model

6. Create RDF/RDFstar/Named Graphs with SPARQL (GraphDB)



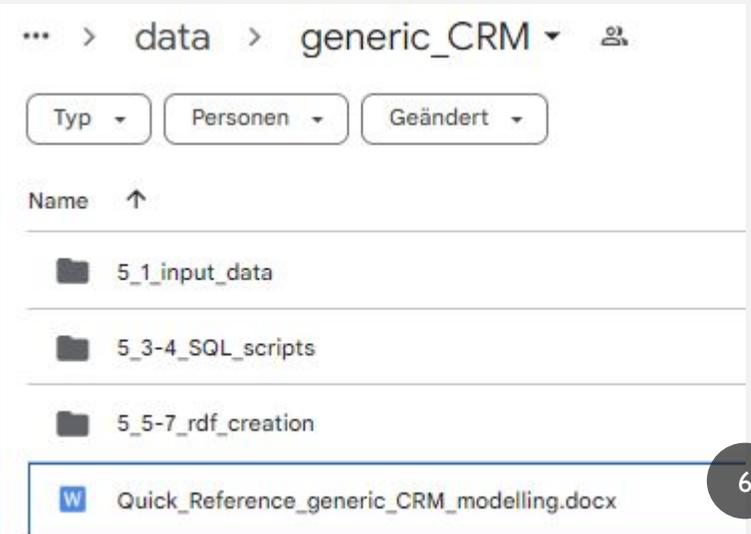
DOI: [10.5281/zenodo.7808036](https://doi.org/10.5281/zenodo.7808036)

<https://doi.org/10.5281/zenodo.11058162>

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3. SOFTWARE INSTALLATION

Download the software for your operating system with the links provided. It is recommended to install the latest stable version available.

3.1. Texteditor

Windows: Notepad++

<https://notepad-plus-plus.org/downloads/>

Mac/Windows: Sublime

<https://www.sublimetext.com/download>

3.2. Postgres

<https://www.postgresql.org/download/>

3.2.1. Install PostGIS

Start “Application Stack Builder”.

3.3. GraphDB

GraphDB is a triple store that allows the storage, query and navigation of RDF Data.

For the GraphDB there is a free version which needs registration with ontotext.

<https://www.ontotext.com/products/graphdb/graphdb-free/>

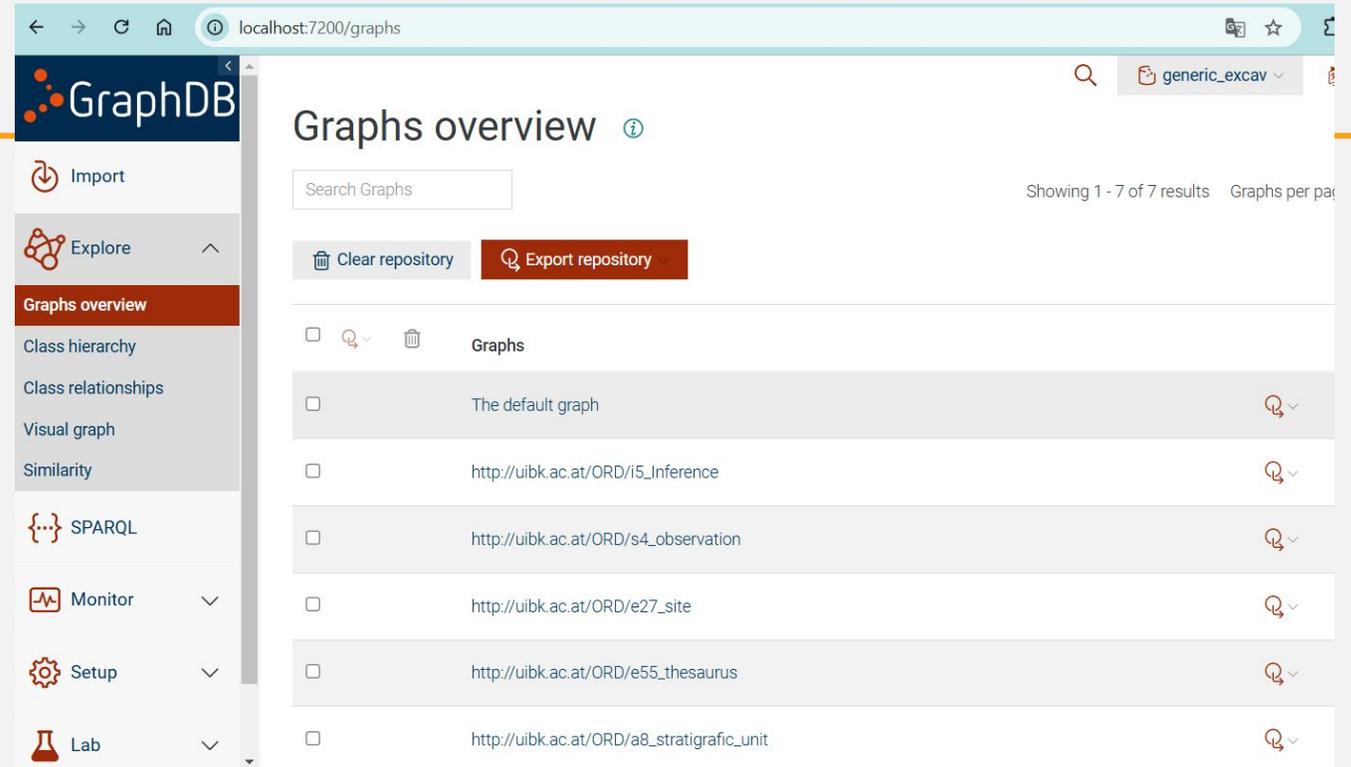
3.4. Ontotext Refine

Ontotext Refine is a software that enables the creation of RDF data.

<https://www.ontotext.com/products/ontotext-refine/>

EXPLORE DATA IN GRAPHDB

Open GraphDB



Download sample data from:

https://drive.google.com/open?id=1CTIDG3rInVhnrXKpWBEJS2XZ58sIC5G5&usp=drive_fs

Download RDF Creation Guideline

https://drive.google.com/open?id=1mlHc3Uhu8qFKhB2OyyUK4Y4bXaMSZFgo&usp=drive_fs

Load Data in Repository as described in „5.7. Load Data in Triple Store“

Explore Data as described in „6.2. Data access and visualization”

NAVIGATE IN DATA

localhost:7200/resource?uri=http:%2F%2Fuibk.ac.at%2FORD%2Fe27_site&role=context

e27_site

Source: http://uibk.ac.at/ORD/e27_site

Explicit only Show Blank Nodes Download

localhost:7200/resource?uri=http:%2F%2Fuibk.ac.at%2FORD%2FS20%2FRotholz_Verhuettungsplatz&role=subject

Smelting site Rotholz close to Ruine Rottenburg

Source: http://uibk.ac.at/ORD/S20/Rotholz_Verhuettungsplatz

Explicit only Show Blank Nodes Download as Visual graph

Filter query results Compact view Hide row numbers

	subject	predicate	object	context
1	ord:Rotholz_Verhuettungsplatz_1	rdf:type		
2	ord:Rotholz_Verhuettungsplatz_1	rdfs:label		
3	ord:S20/Rotholz_Verhuettungsplatz	crm:P189i_is_approximated_by		
4	ord:S20/Rotholz_Verhuettungsplatz	crm:P2_has_type		
5	ord:S20/Rotholz_Verhuettungsplatz	crm:P46_is_composed_of		
6	ord:S20/Rotholz_Verhuettungsplatz	crm:P89_falls_within		
7	ord:S20/Rotholz_Verhuettungsplatz	rdf:type		
8	ord:S20/Rotholz_Verhuettungsplatz	rdfs:label		
9	ord:geometry/Rotholz_Verhuettungsplatz	rdfs:label		

Filter query results Compact view Hide row numbers

	subject	predicate	object	context
1	ord:S20/Rotholz_Verhuettungsplatz	crm:P189i_is_approximated_by	ord:geometry/Rotholz_Verhuettungsplatz	ord:e27_site
2	ord:S20/Rotholz_Verhuettungsplatz	crm:P2_has_type	himat:E55/240207	ord:e27_site
3	ord:S20/Rotholz_Verhuettungsplatz	crm:P46_is_composed_of	ord:Rotholz_Verhuettungsplatz_1	ord:e27_site
4	ord:S20/Rotholz_Verhuettungsplatz	crm:P89_falls_within	https://sws.geonames.org/2762859	ord:e27_site
5	ord:S20/Rotholz_Verhuettungsplatz	rdf:type	crm:E27_Site	ord:e27_site
6	ord:S20/Rotholz_Verhuettungsplatz	rdf:type	crm:E27_Site	ord:i5_Inference
7	ord:S20/Rotholz_Verhuettungsplatz	rdf:type	crm:E27_Site	ord:s4_observation
8	ord:S20/Rotholz_Verhuettungsplatz	rdfs:label	"Smelting site Rotholz close to Ruine Rottenburg"@en	ord:e27_site
9	ord:S20/Rotholz_Verhuettungsplatz	rdfs:label	"Smelting site Rotholz close to Ruine Rottenburg"@en	ord:i5_Inference
10	ord:S20/Rotholz_Verhuettungsplatz	rdfs:label	"Smelting site Rotholz close to Ruine Rottenburg"@en	ord:s4_observation

VISUAL GRAPH

The screenshot displays the GraphDB Visual Graph interface. The browser address bar shows the URL: localhost:7200/graphs-visualizations?uri=http:%2F%2Fuibk.ac.at%2FORD%2FS20%2FRotholz_Verhuettung... The interface includes a sidebar with navigation options: Import, Explore, Graphs overview, Class hierarchy, Class relationships, Visual graph (selected), Similarity, SPARQL, Monitor, Setup, and Lab. The main area shows a central node 'Smelting site Rotholz close to Ruine Rottenb...' with several outgoing relationships:

- Unterrinntal** (pink node) connected via *P8_looks_like*
- 1300: Activity at Smelting site Rotholz ...** (cyan node) connected via *P8_looks_like*
- E27_Site** (yellow-green node) connected via *type*
- Inference: Mining at Smelting site Rotholz ...** (blue node) connected via *J4L_is_subject_of*
- 2017: BDA measure** (orange node) connected via *O8_observed*
- 02_Bericht_TeilA from 87002.17.01 at the Ro...** (purple node) connected via *P129_is_about*
- Geometry of Smelting site Rotholz close to R...** (light green node) connected via *P189L_is_approximated_by*
- Smelting site** (purple node) connected via *P2_has_type*
- Rotholz smelting site Trench-1** (green node) connected via *P46_is_composed_of*

At the bottom, the footer text reads: GraphDB 10.8.0 • RDF4J 4.3.14 • Connectors 16.2.12 • Workbench 2.8.0 • © 2002–2024 Ontotext AD. All rights reserved. mouse and keyboard act...

MODELLING WITH DRAW.IO

Open draw.io on browser: <https://app.diagrams.net/>

Download **diagrams.net Libraries** from

https://github.com/chin-rcip/diagrams.net_libraries

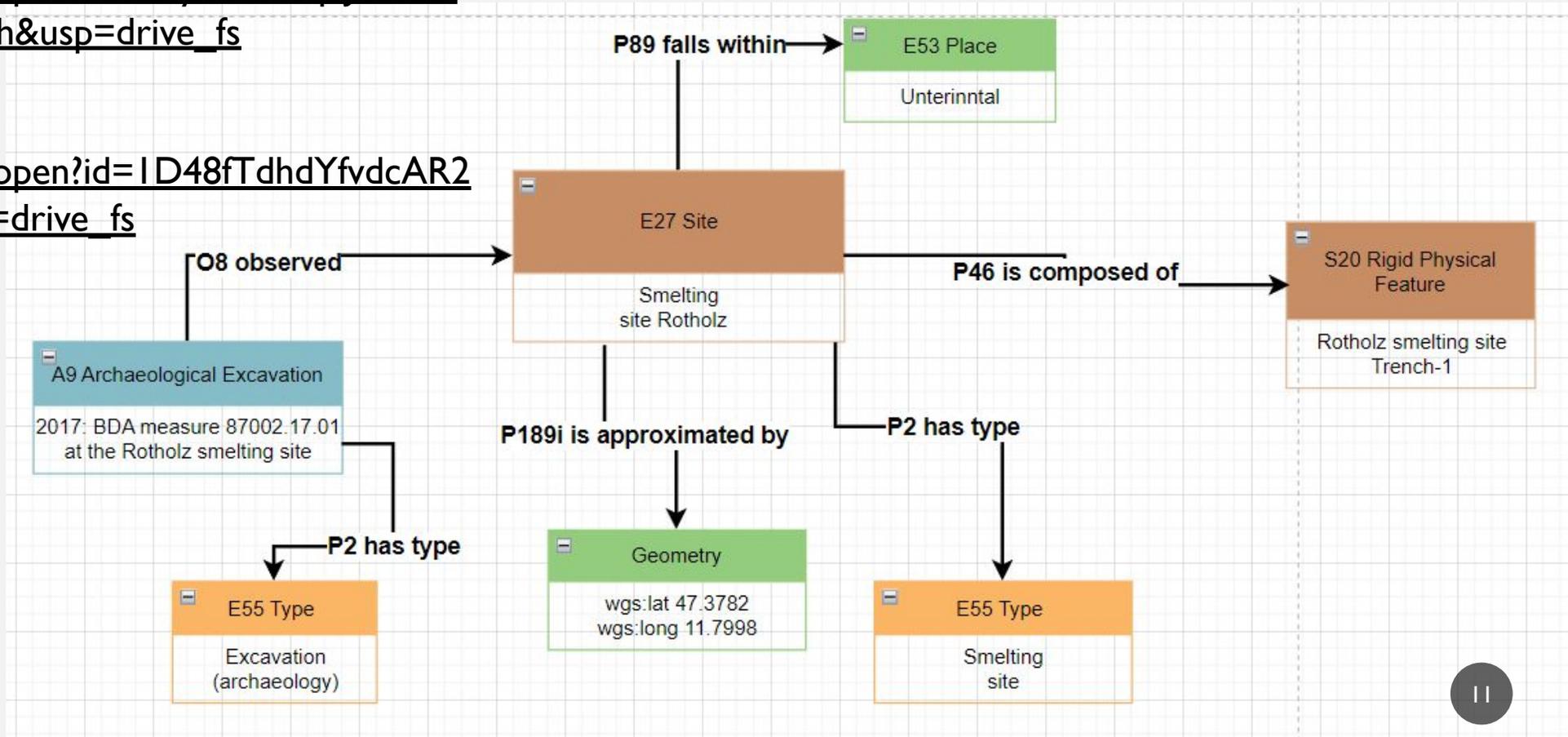
or zip file:

https://drive.google.com/open?id=ICyoFQUlq2JdBNDMc-C5O9AfBZGWqvRRh&usp=drive_fs

https://drive.google.com/open?id=ID48fTdhdYfvdcAR2zgfmd5Kn9Yk4Rgio&usp=drive_fs

E27 example (right):

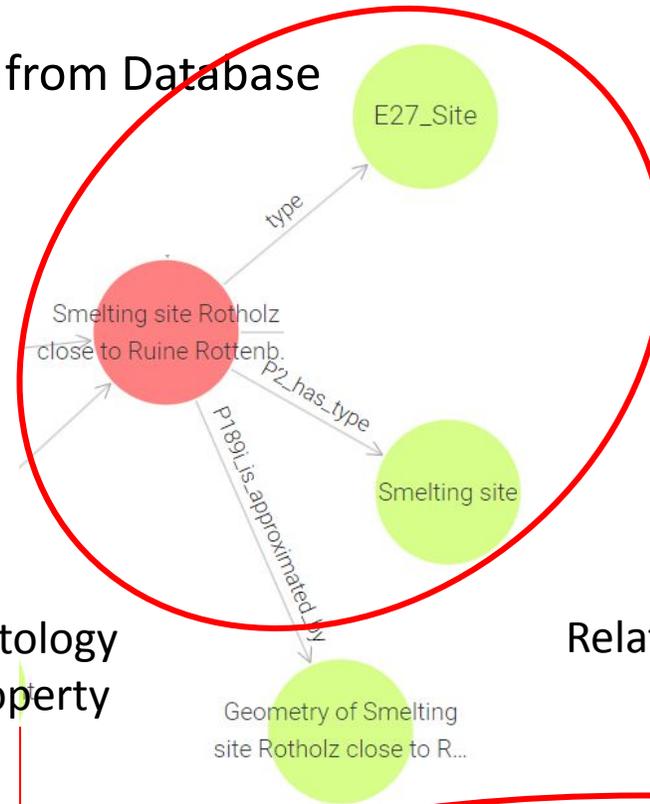
https://drive.google.com/open?id=ID48fTdhdYfvdcAR2zgfmd5Kn9Yk4Rgio&usp=drive_fs



5.1 Data Entry in Spreadsheet (Excel, Open Office, gsheet) or from Database

sheet: prefix

prefix	uri
p	http://uibk.ac.at/ORD/
crm	http://www.cidoc-crm.org/cidoc-crm/
crmsci	http://www.cidoc-crm.org/extensions/crmsci/
crminf	http://www.cidoc-crm.org/extensions/crminf/
crmarchaeo	http://www.cidoc-crm.org/extensions/crmarchaeo/
geo	http://www.opengis.net/ont/geosparql#
aat	http://vocab.getty.edu/aat/
skos	http://www.w3.org/2004/02/skos/core#
himat	http://uibk.ac.at/uibk_himat/E55/



Instance Identifiers

Instance Labels

Ontology classes

Ontology property

Related Instance

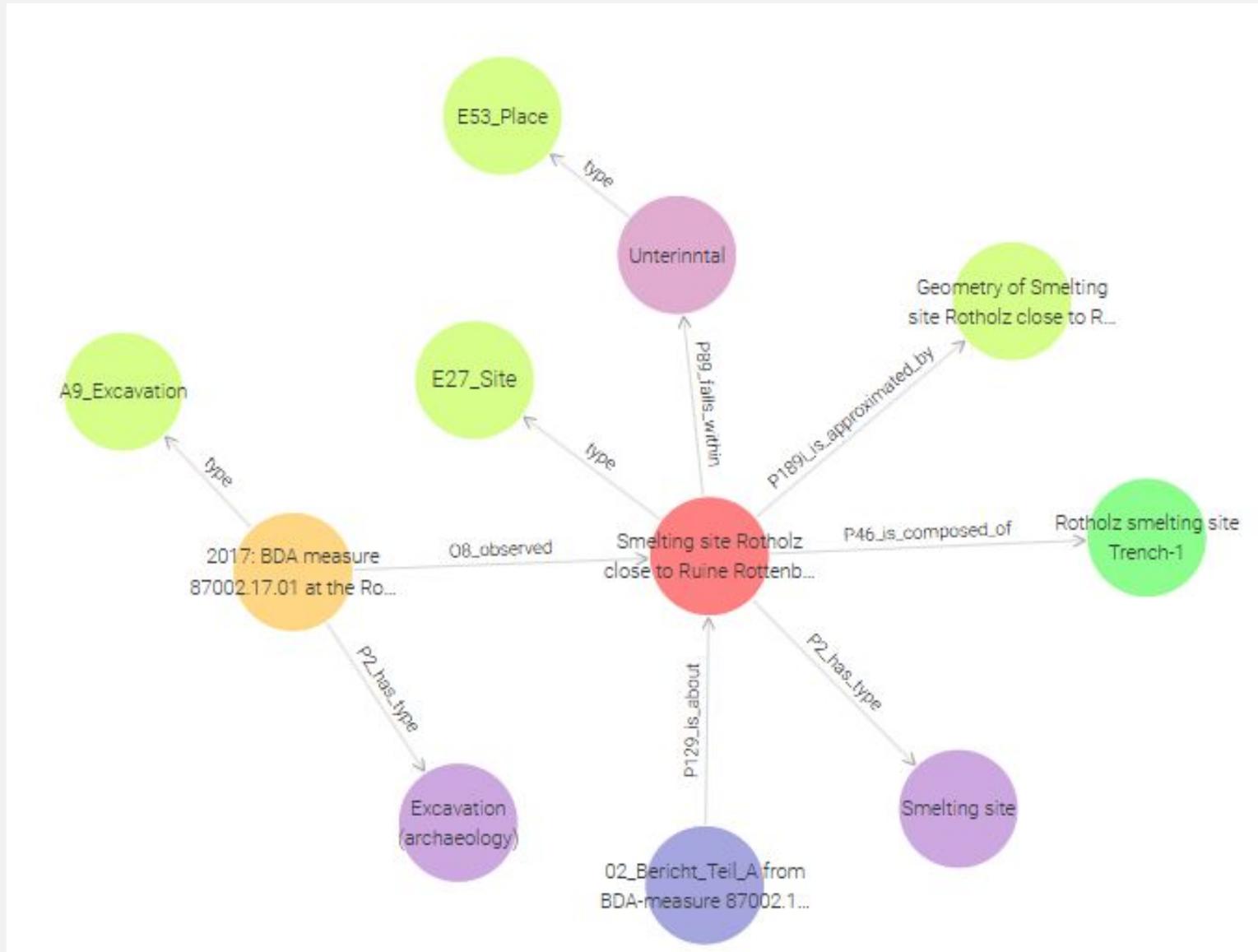
ID of Domain	Domain label	Class of domain	p3_has_note	Property	Id of the range	Range Label	Class of the range
p:S20/Rotholz_Verhuettungsplatz	Smelting site Rotholz close to Ruine Rottenburg	crm:i27_Site	castle wood	crm:P2_has_type	himat:240207	Smelting site	skos:Concept
p:S20/Rotholz_Verhuettungsplatz	Smelting site Rotholz close to Ruine Rottenburg	crm:E27_Site	castle wood	crm:P189i_is_approximated_by	p:geometry/Rotholz_Verhuettungsplatz	Geometry of Smelting site Rotholz close to Ruine Rottenburg	geo:Geometry
p:geometry/Rotholz_Verhuettungsplatz	Geometry of Smelting site Rotholz close to Ruine Rottenburg	geo:Geometry		wgs:lat	47.3782072025272	47.3782072025272	xsd:float
p:geometry/Rotholz_Verhuettungsplatz	Geometry of Smelting site Rotholz close to Ruine Rottenburg	geo:Geometry		wgs:long	11.7998739193025	11.7998739193025	xsd:float

MODELLING WITH EXCEL: GENERIC_EXCAV_SAMPLE.XLSX

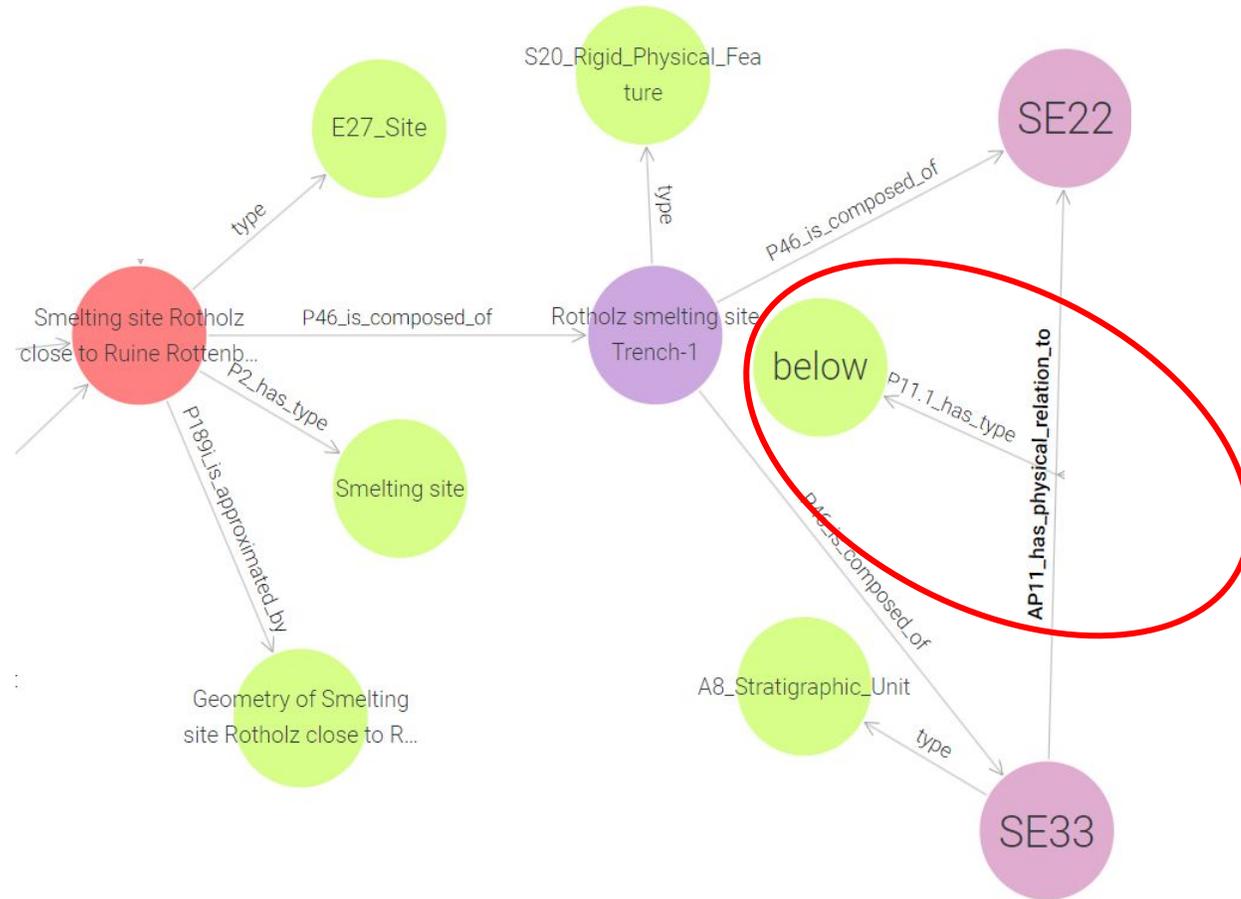
ID of Domain	Domain label	Class of domain	p3_has	Property	Id of the range	Range Label	Class of the range
p:S20/Rotholz_Verhuett	Smelting site Rotholz clos	crm:E27_Site		crm:P2_has_type	himat:240207	Smelting site	skos:Concept
p:S20/Rotholz_Verhuett	Smelting site Rotholz clos	crm:E27_Site		crm:P89_falls_within	gn:2762859	Unterinntal	crm:E53_Place
p:S20/Rotholz_Verhuett	Smelting site Rotholz clos	crm:E27_Site		crm:P189i_is_approximated	p:geometry/Rotholz_V	Geometry of Smelting	geo:Geometry
p:geometry/Rotholz_Ver	Geometry of Smelting site	geo:Geometry		wgs:lat	47.3782072025272	47.3782072025272	xsd:float
p:geometry/Rotholz_Ver	Geometry of Smelting site	geo:Geometry		wgs:long	11.7998739193025	11.7998739193025	xsd:float
p:S20/Rotholz_Verhuett	Smelting site Rotholz clos	crm:E27_Site		crm:P46_is_composed_of	p:Rotholz_Verhuettur	Rotholz smelting site	crmsci:S20_Rigid_P
p:E19/Rotholz_Verhuett	Plate slag	crm:E19_Physical_Object		crm:P2_has_type	himat:240211	Flat slag	skos:Concept
p:E19/Rotholz_Verhuett	Plate slag	crm:E19_Physical_Object		crm:P45_consists_of	himat:175537	Copper	skos:Concept
p:A7/E19/Rotholz_Verhu	Embedding of Plate slag	crmarchaeo:A7_Em	Cut enls	crmarchaeo:AP18_is_embec	p:E19/Rotholz_Verhuett	Plate slag	crm:E19_Physical_C
p:A7/E19/Rotholz_Verhu	Embedding of Plate slag	crmarchaeo:A7_Embeddin		crmarchaeo:AP19_is_embec	p:A8/Rotholz_Verhuett	SE 36	crmarchaeo:A8_Stre
p:A7/E19/Rotholz_Verhu	Embedding of Plate slag	crmarchaeo:A7_Embeddin		crmarchaeo:AP17_is_found	p:S19/Rotholz_Verhuett	Encounter of Plate slag	crmsci:S19_Encoun
p:S19/Rotholz_Verhuett	Encounter of Plate slag	crmsci:S19_Encounter_Eve		crmsci:O21_encountered_at	p:Rotholz_Verhuettur	Rotholz smelting site	crmsci:S20_Rigid_P
p:S19/Rotholz_Verhuett	Encounter of Plate slag	crmsci:S19_Encounter_Eve		crm:P14_carried_out_by	orcid:0000-0003-3134	Markus Staudt	crm:E21_Person
p:Rotholz_Verhuettungs	Rotholz smelting site Tre	crmsci:S20_Rigid_Physical		crm:P46_is_composed_of	p:A8/Rotholz_Verhuett	SE33	crmarchaeo:A8_Stre
p:Rotholz_Verhuettungs	Rotholz smelting site Tre	crmsci:S20_Rigid_Physical		crm:P46_is_composed_of	p:A8/Rotholz_Verhuett	SE22	crmarchaeo:A8_Stre
p:Rotholz_Verhuettungs	Rotholz smelting site Tre	crmsci:S20_Rigid_Physical		crm:P46_is_composed_of	p:A8/Rotholz_Verhuett	SE 36	crmarchaeo:A8_Stre
p:A8/Rotholz_Verhuett	SE33	crmarchaeo:A8_Stratigraph		crmarchaeo:AP11_has_physi	p:A8/Rotholz_Verhuett	SE22	crmarchaeo:A8_Stre
p:S4/87002.17.01	2017: BDA measure 8700	crmarchaeo:A9_Excavation		crmsci:O8_observed	p:S20/Rotholz_Verhuett	Smelting site Rotholz	crm:E27_Site
p:S4/87002.17.01	2017: BDA measure 8700	crmarchaeo:A9_Excavation		crm:P2_has_type	himat:175410	Excavation (archaeolo	skos:Concept
p:10.5281/zenodo.5244	02_Bericht_Teil_A from	crm:E31_Document		crm:P129_is_about	p:S20/Rotholz_Verhuett	Smelting site Rotholz	crm:E27_Site

https://docs.google.com/spreadsheets/d/IntVfZniMyWA_GoRErKYAazqlcoDJ2Pqi?rtpof=true&usp=drive_fs

EXCAVATION (A9) & SITE (E27)



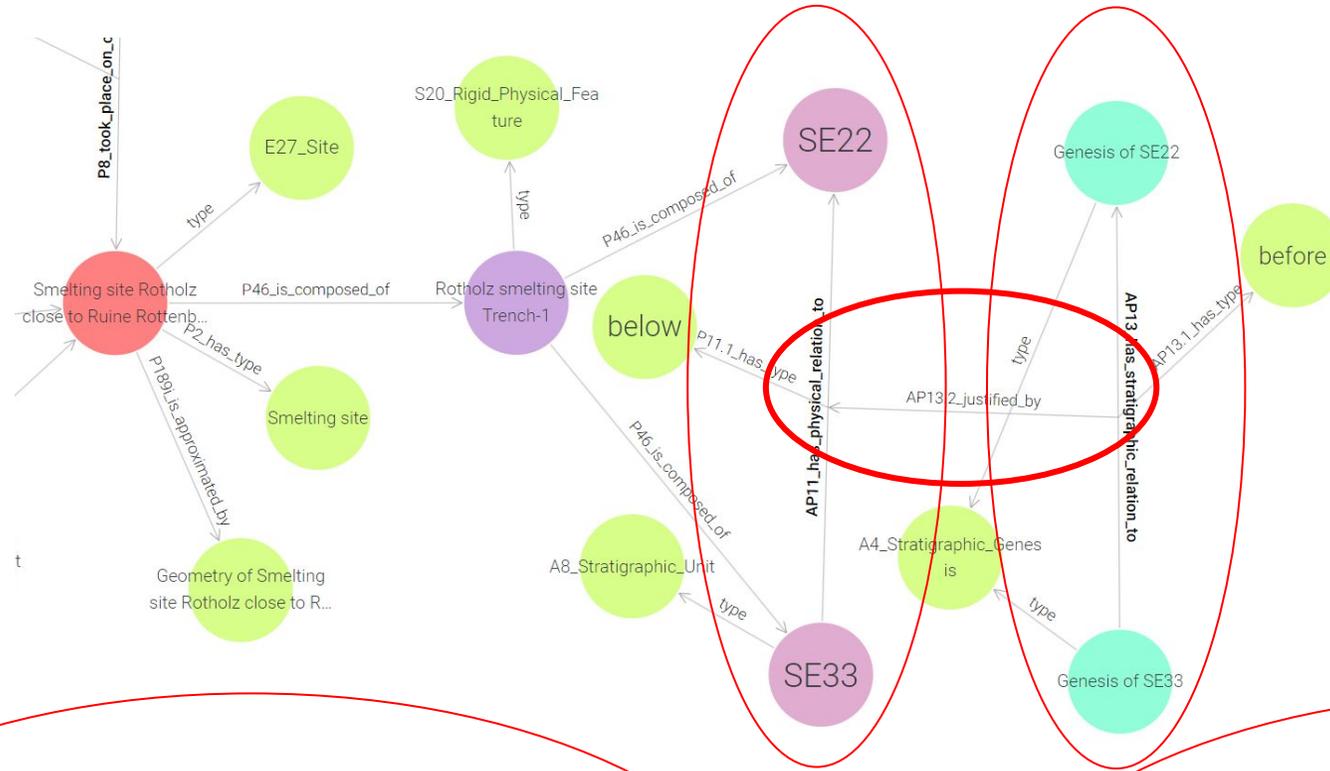
5.1 dot 1 properties in sheet: generic_Excav_Sample



sheet: generic_CRM

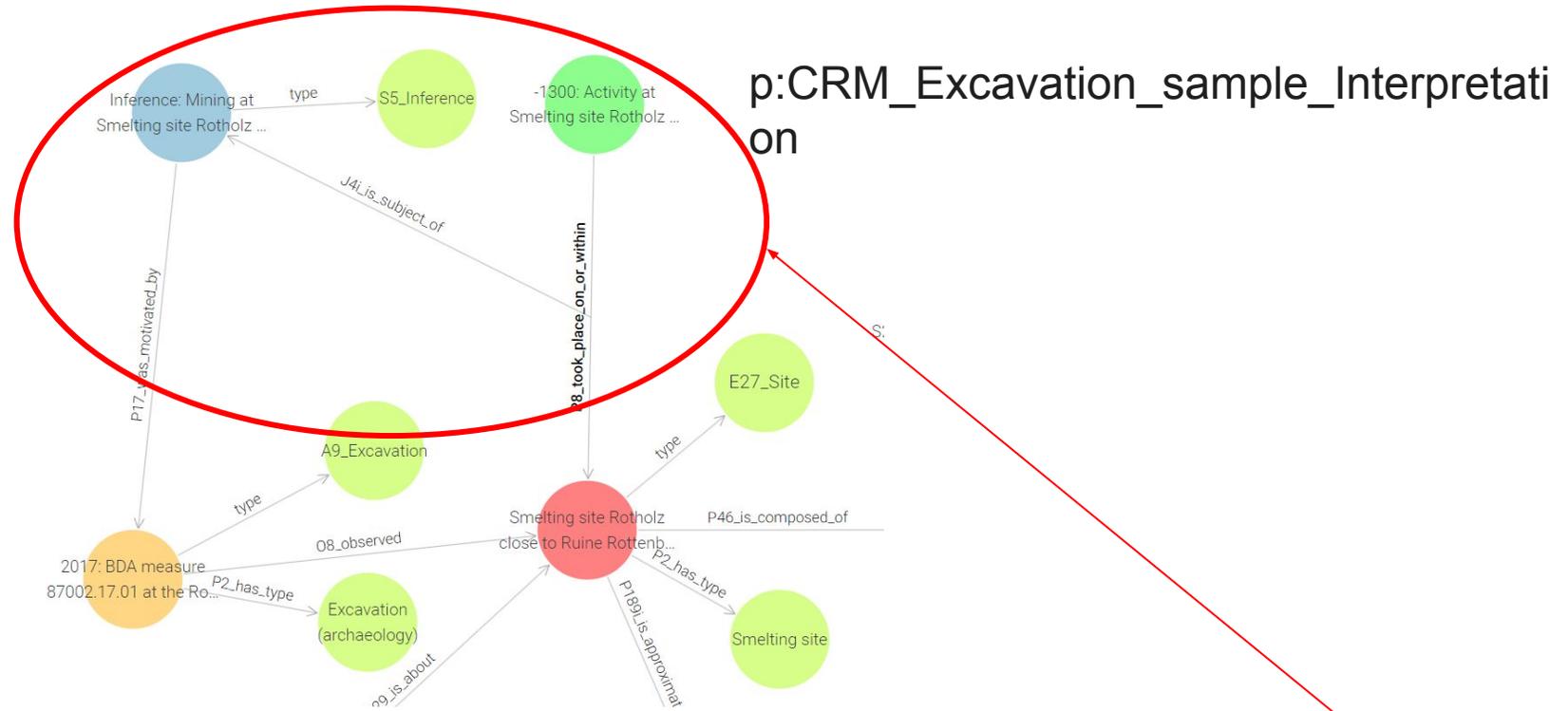
ID of Domain	Domain label	Class of domain	Property	Id of the range	Range Label	Class of the range	Dot one	Dot one target
p:S20/Rotholz_Verhuettungsplatz	Smelting site Rotholz close to Ruine Rottenb...	crm:E27_Site	crm:P46_is_composed_of	p:Rotholz_Verhuettungsplatz_1	Rotholz smelting site Trench-1	crmsci:S20_Rigid_Physical_Feature		
p:Rotholz_Verhuettungsplatz_1	Rotholz smelting site Trench-1	crmsci:S20_Rigid_Physic	crm:P46_is_composed_of	p:A8/Rotholz_Verhuettungsplatz	SE33	crmarchaeo:A8_Stratigraphic_Unit		
p:Rotholz_Verhuettungsplatz_1	Rotholz smelting site Trench-1	crmsci:S20_Rigid_Physic	crm:P46_is_composed_of	p:A8/Rotholz_Verhuettungsplatz	SE22	crmarchaeo:A8_Stratigraphic_Unit		
p:A8/Rotholz_Verhuettungsplatz_1/87	SE33	crmarchaeo:A8_Stratigrap	crmarchaeo:AP11_has_physical_re	p:A8/Rotholz_Verhuettungsplatz	SE22	crmarchaeo:A8_Stratigrap	crmarchaeo:AP11.1_has	himat:240291
himat:240291	below	skos:Concept						

5.1 Data Entry in Spreadsheet: dot 2 properties



ID of Domain	Property	Id of the range	dot2_property	ID of Domain	Property	Id of the range	I4_Proposition_S et
p:A4/Rotholz_Verhuettungsplatz_1/87002.15.01/Ausgrabungen_33	crmarchaeo:AP13_has_stratigraphic_relation_to	p:A4/Rotholz_Verhuettungsplatz_1/87002.15.01/Ausgrabungen__Rotholz_Verhuettungsplatz_2/87002.15.01/Ausgrabungen_22	crmarchaeo:AP13.2_justified_by	p:A8/Rotholz_Verhuettungsplatz_1/87002.15.01/Ausgrabungen_33	crmarchaeo:AP11_has_physical_relation_to	p:A8/Rotholz_Verhuettungsplatz_1/87002.15.01/Ausgrabungen__Rotholz_Verhuettungsplatz_2/87002.15.01/Ausgrabungen_22	p:CRM_Excavation_sample_Interpretation

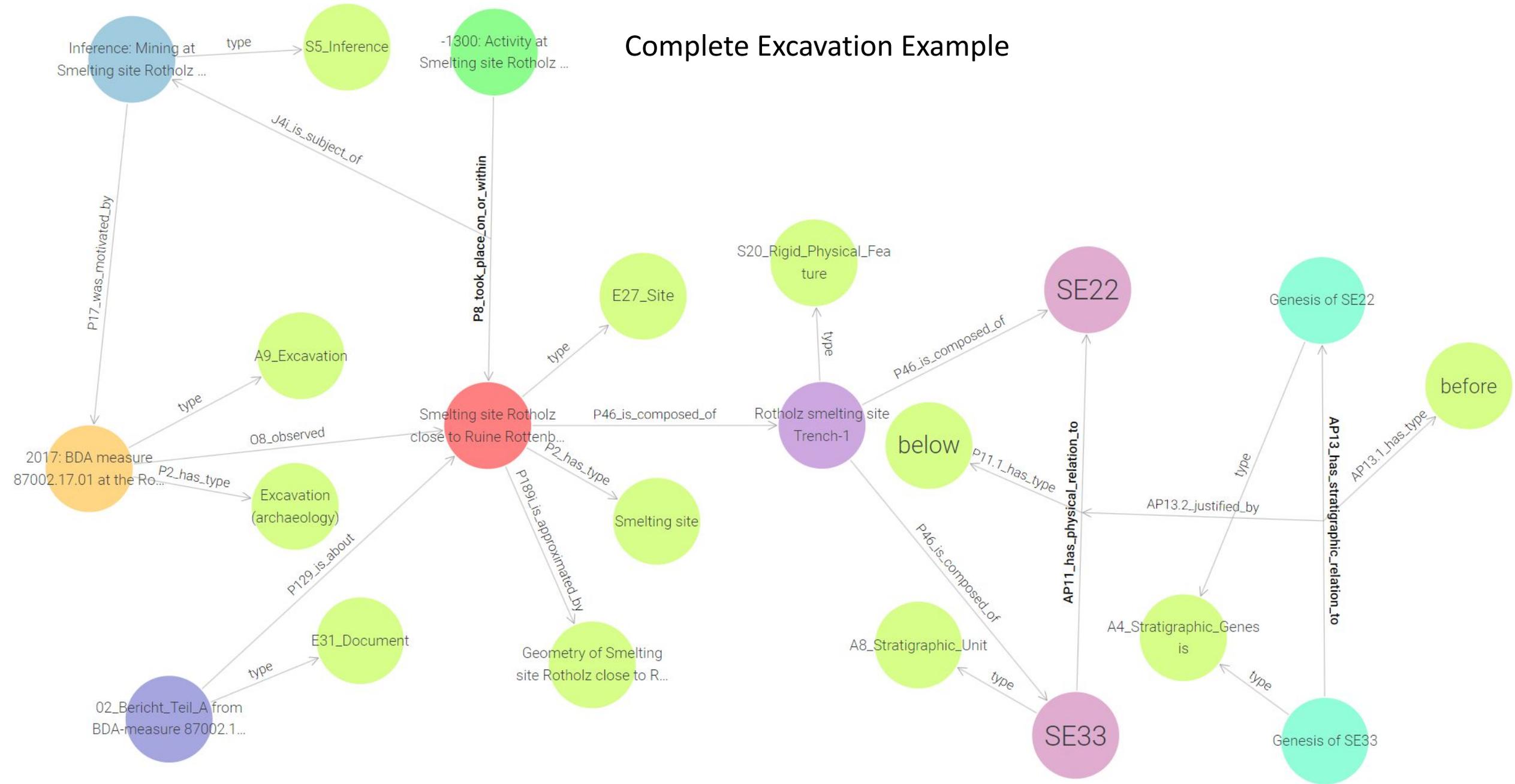
5.1 using dot 1 properties and named graphs (I4 Proposition Sets) for Argumentation



sheet: generic_CRM

ID of Domain	Domain label	Class of domain	Property	Id of the range	Range Label	Class of the range	Dot one	Dot one target	I4 Proposition_Set
p:S20/Rotholz_Verhuettungsplatz	Smelting site Rotholz close to Ruine	crm:E27_Site	crm:P2_has_type	himat:240207	Smelting site	skos:Concept			p:CRM_Excavation_sample
p:S4/87002.17.01	2017: BDA measure 87002.17.01 at the Ro...	crm:archaeo:A9_Excavation	crm:sci:O8_observed	p:S20/Rotholz_Verhuettungsplatz	Smelting site Rotholz close to Ruine	crm:E27_Site			p:CRM_Excavation_sample
p:10/5281/zenodo.5244735_3	02_Bericht_Teil_A from BDA-measure 8700...	crm:E31_Document	crm:P129_is_about	p:S20/Rotholz_Verhuettungsplatz	Smelting site Rotholz close to Ruine	crm:E27_Site			p:CRM_Excavation_sample
p:E2/Rotholz_Verhuettungsplatz/him	-1300: Activity at Smelting site Rotholz close	crm:E7_Activity	crm:P8_took_place_on_or_within	p:S20/Rotholz_Verhuettungsplatz	Smelting site Rotholz close to Ruine	crm:E27_Site	crminf:J4i_p:11/Rotholz_Verhuettungsplatz		p:CRM_Excavation_sample_ Interpretation
p:I1/Rotholz_Verhuettungsplatz/him	Inference: Mining at Smelting site Rotholz close	crm:sci:S5_Inference	crm:P17_was_motivated_by	p:S4/87002.17.01	2017: BDA measure 87002.17.01 at the Ro...	crm:archaeo:A9_Excavation			p:CRM_Excavation_sample_ Interpretation
p:E2/Rotholz_Verhuettungsplatz/him	-1300: Activity at Smelting site Rotholz close	crm:E7_Activity	crm:P82a_begin_of_the_begin		-1300	-1300 xsd:gYear			p:CRM_Excavation_sample_ Interpretation
p:E2/Rotholz_Verhuettungsplatz/him	-1300: Activity at Smelting site Rotholz close	crm:E7_Activity	crm:P82b_end_of_the_end		-801	-801 xsd:gYear			p:CRM_Excavation_sample_ Interpretation

Complete Excavation Example



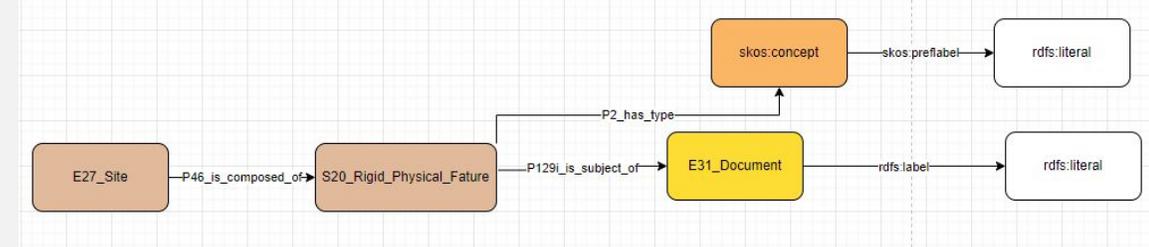
RDF CREATION PIPELINE

EXCEL-> TXT FILE-> DATABASE-> ONTOTEXT REFINE-> GRAPHDB (SPARQL)

5.1. Data Entry in Spreadsheet

ID of Domain	Domain label	Class of domain	p3_has_note	Property
p:S20/Rotholz_Verhuettungspl	Smelting site Rotholz close to Rui	crm:E27_Site	castle wood	crm:P2_has_type
p:S20/Rotholz_Verhuettungspl	Smelting site Rotholz close to Rui	crm:E27_Site	castle wood	crm:P189i_is_approximated_by
p:geometry/Rotholz_Verhuettungspl	Geometry of Smelting site Rotholz	geo:Geometry		wgs:lat
p:geometry/Rotholz_Verhuettungspl	Geometry of Smelting site Rotholz	geo:Geometry		wgs:long
p:S4/87002.17.01	2017: BDA measure 87002.17.01 at the R	crmarchaeo:A9_Excavation		crm:sc:O8_observed
p:S4/87002.17.01	2017: BDA measure 87002.17.01 at the R	crmarchaeo:A9_Excavation		crm:P2_has_type
p:10.5281/zenodo.5244755_02_Bericht_Teil_A	from BDA-measure 87002.17.01 at the R	crm:E31_Document		crm:P129i_is_about
p:E2/Rotholz_Verhuettungspl -1300: Activity at Smelting site Rotholz	cl	crm:E7_Activity		crm:P8_took_place_on_or_within
p:11/Rotholz_Verhuettungspl -1300: Activity at Smelting site Rotholz	cl	crm:sc:S5_Inference		crm:P17_was_motivated_by
p:E2/Rotholz_Verhuettungspl -1300: Activity at Smelting site Rotholz	cl	crm:E7_Activity		crm:P82a_begin_of_the_begin

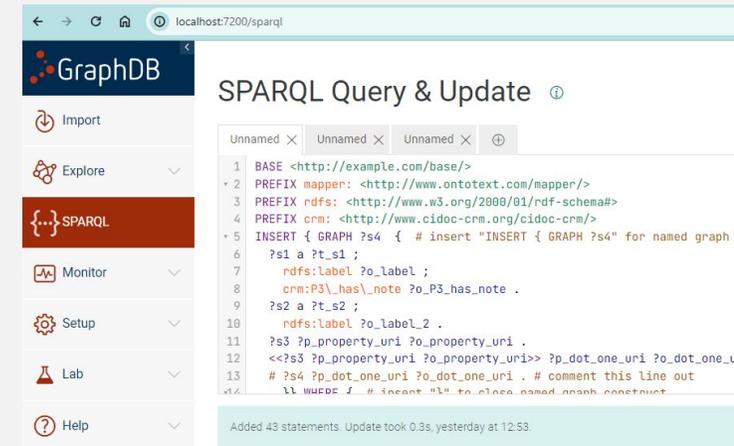
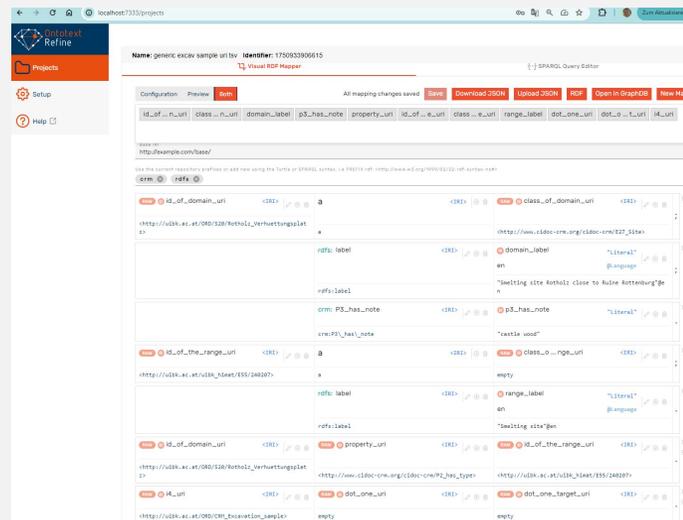
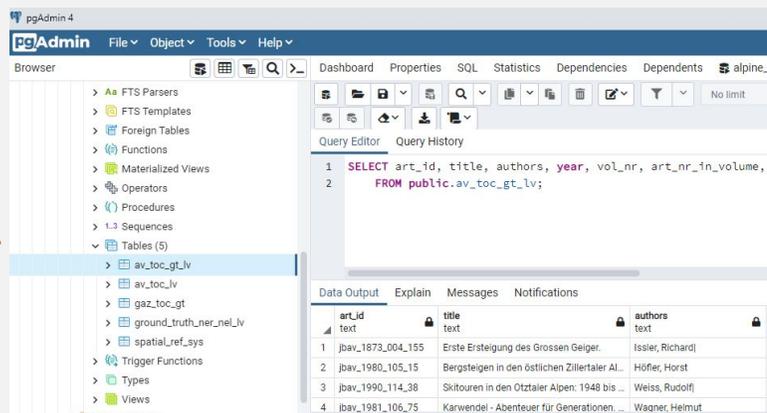
5.2. Conceptual Mapping



5.3-4. Identifier creation / Joins in Database (Postgres)

5.5-6. Put Conceptual Mapping to RDF Modelling (Ontotext-Refine)

5.7 SPARQL in Triple Store (GraphDB) to insert in named graph and create RDFstar



QUICK GUIDE - GENERIC EXCAV SAMPLE RDF CREATION WORKFLOW

- Guide at:
- https://docs.google.com/document/d/1oHcd2ADP6nisj0oeUm-7QLLj87jt0gGf?rtpof=true&usp=drive_fs
- A detailed description of the RDF Creation workflow you can find at:
- https://drive.google.com/open?id=1mlHc3Uhu8qFKhB2OyyUK4Y4bXaMSZFgo&usp=drive_fs
- There are three steps, the numbering relates to the extensive RDF Creation workflow above.
- 5.1.1. Input Data creation with Excel and export to Text files
- 5.3.4. Run SQL Scripts in Postgres
- 5.5.7 RDF Creation with Ontotext Refine and GraphDB
- All the files for Generic CRM creation are in:
- <https://drive.google.com/drive/folders/1mxy9SzFo6tiYCCzJ0D-B9RVRHaljsaBT?usp=sharing>

QUICK GUIDE - 5.1.1. INPUT DATA CREATION

Files for Data input:

https://drive.google.com/open?id=1myg11NX8EgsUkhSrhCt9xSE2VrtBAAYG&usp=drive_fs

- Create Excel
- Copy sheets in tab separated text files UTF8 encoding. Easiest: mark exact area of excel and copy to notepad++(windows)/sublime(mac)
- Put textfiles in local directory under
- Windows on C:
 - e.g. C:\generic_CRM\5_1_input_data\txt\generic_excav_sample.tsv
- Mac on /tmp (mac, you have to make hidden directories visible):
 - on mac change permissions of files with “chmod 777 *.tsv”

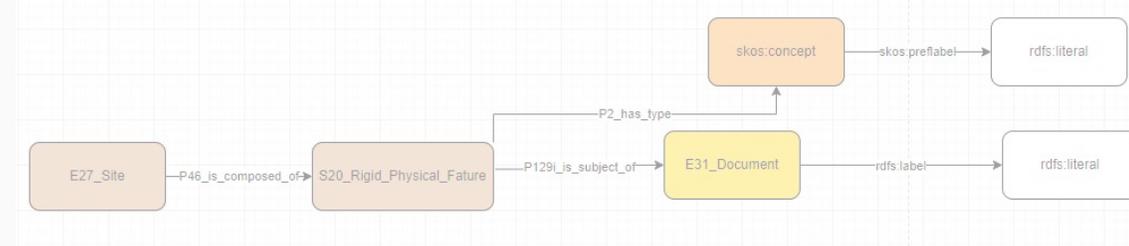
RDF CREATION PIPELINE

EXCEL-> TXT FILE-> DATABASE-> ONTOTEXTREFINE-> GRAPHDB(SPARQL)

5.1. Data Entry in Spreadsheet (Excel)

	A	B	C	D	E	F	G	H	I	J	K	L	
1	E15_project	i15_institution	i15_provenance	E39	S20_id	S20_parent_id	E41_S20	E55_E7_past	E55_S20	E53 (Datenerze	E53_katgem_n_3_katgem_nari3		
2	ORD	uibk_himat	S20_ORD-Ur Staudt		Rotholz_Verhuettungsplat	Rotholz_Verl	175784@Vei	240207@Vei	BEV		87002	Buch in Tirol 1:	
3	ORD	uibk_himat	S20_ORD-Ur Staudt		Rotholz_Verl	Rotholz_Verl	Rotholz_Verl	175784@Vei	240207@Vei	BEV		87002	Buch in Tirol 1:
4	ORD	uibk_himat	S20_ORD-Ur Staudt		Rotholz_Verl	Rotholz_Verl	Rotholz_Verl	175784@Vei	240207@Vei	BEV		87002	Buch in Tirol 1:
5	ORD	uibk_himat	S20_ORD-Ur Staudt		Rotholz_Verl	Rotholz_Verl	Rotholz_Verl	175784@Vei	240207@Vei	BEV		87002	Buch in Tirol 1:
6													
7													
8													

5.2. Conceptual Mapping



5.3-4. Identifier creation / Joins in Database (Postgres)

```
SELECT art_id, title, authors, year, vol_nr, art_nr_in_volume, FROM public.av_toc_gt_lv;
```

art_id	title	authors
1	Erste Besteigung des Grossen Geiger.	Issler, Richard
2	Bergsteigen in den ostlichen Zillertaler Al...	Höfner, Horst
3	Skitouren in den Osttaler Alpen: 1948 bis ...	Weiss, Rudolf
4	Karwendel - Abenteuer für Generationen. ...	Wagner, Helmut

5.5-6. Put Conceptual Mapping to RDF Modelling (Ontotext-Refine)

Visual RDF Mapper configuration showing mappings between domain URIs and range URIs. The configuration includes a table with columns for domain URI, class URI, domain label, property URI, class URI, range label, domain URI, and range URI. The table contains several rows of mappings, such as `http://www.cidoc-crm.org/cidoc-crm/P3_has_note` mapping to `skos:concept`.

5.7 SPARQL in Triple Store (GraphDB) to insert in named graph and create RDFstar

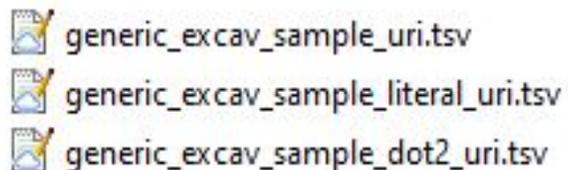
```
SPARQL Query & Update
```

```
1 BASE <http://example.com/base/>
2 PREFIX mapper: <http://www.ontotext.com/mapper/>
3 PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
4 PREFIX crm: <http://www.cidoc-crm.org/cidoc-crm/>
5 INSERT { GRAPH ?s4 { # insert "INSERT { GRAPH ?s4" for named graph
6 ?s1 a ?t_s1 ;
7 rdfs:label ?o_label ;
8 crm:P3_has_note ?o_P3_has_note .
9 ?s2 a ?t_s2 ;
10 rdfs:label ?o_label_2 .
11 ?s3 ?p_property_uri ?o_property_uri .
12 <<?s3 ?p_property_uri ?o_property_uri>> ?p_dot_one_uri ?o_dot_one_...
13 # ?s4 ?p_dot_one_uri ?o_dot_one_uri . # comment this line out
14 !! WROTE !! # insert ?s4 to place named graph construct
```

Added 43 statements. Update took 0.3s, yesterday at 12:53.

QUICK GUIDE - 5.3.4. RUN SQL SCRIPTS IN POSTGRES

- https://drive.google.com/open?id=1mzhkJfLUJKLC9cRZGS6moAinIpOt8ps4&usp=drive_fs
- Start postgres
- Import files with 5_3_3_create_generic_excav_sample_DB.sql:
- https://drive.google.com/open?id=1nxDK5dGPPqero2OBYXKHFS4uFC7iA9DT&usp=drive_fs
- make sure to change the path in the COPY FROM statement to the path where you put your text files.
- Create URI files with 5_4_3_create_generic_excav_sample_uri_files.sql
- https://drive.google.com/open?id=1ny-CNUq_v4MGVxmdjFGTqqSOjdujZy3O&usp=drive_fs
- make sure to change the path in the COPY TO statement to a local path that exists on your drive.
- Depending on your data 1-3 files have to be created (depending if you have more literal values than label and p3, then you need [generic_CRM_literal_uri.tsv](#) or if you have dot2 properties then you need generic_CRM_dot2_uri.tsv) :



```
generic_excav_sample_uri.tsv
generic_excav_sample_literal_uri.tsv
generic_excav_sample_dot2_uri.tsv
```

RDF CREATION PIPELINE

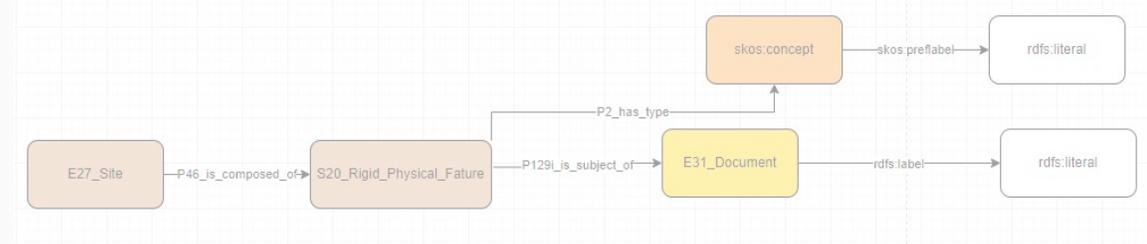
EXCEL-> TXT FILE-> DATABASE-> ONTOTEXTREFINE-> GRAPHDB(SPARQL)

5.1. Data Entry in Spreadsheet (Excel)

	A	B	C	D	E	F	G	H	I	J	K	L	
1	E15_project	15_institution	01_provenanc	E39	S20_id	S20_parent_id	E41_S20	E55_E7_past	E55_S20	E53 (Datenerze	S3_katgem_n_3_katgem_nari3		
2	ORD	uibk_himat	S20_ORD-Ur	Staudt	Rotholz_Verhuettungsplat	Rotholz_Verl	175784@Vei	240207@Vei	BEV		87002	Buch in Tirol 1:	
3	ORD	uibk_himat	S20_ORD-Ur	Staudt	Rotholz_Verl	Rotholz_Verl	Rotholz_Verl	175784@Vei	240207@Vei	BEV		87002	Buch in Tirol 1:
4	ORD	uibk_himat	S20_ORD-Ur	Staudt	Rotholz_Verl	Rotholz_Verl	Rotholz_Verl	175784@Vei	240207@Vei	BEV		87002	Buch in Tirol 1:
5	ORD	uibk_himat	S20_ORD-Ur	Staudt	Rotholz_Verl	Rotholz_Verl	Rotholz_Verl	175784@Vei	240207@Vei	BEV		87002	Buch in Tirol 1:
6													
7													
8													



5.2. Conceptual Mapping



5.3-4. Identifier creation / Joins in Database (Postgres)

```

    1 SELECT art_id, title, authors, year, vol_nr, art_nr_in_volume,
    2 FROM public.av_toc_gt_lv;
  
```

art_id	title	authors
1	Erste Besteigung des Grossen Geiger.	Issler, Richard
2	Bergsteigen in den östlichen Zillertaler Al...	Höfner, Horst
3	Skitouren in den Osttaler Alpen: 1948 bis ...	Weiss, Rudolf
4	Karwendel - Abenteuer für Generationen ...	Wagner, Helmut



5.5-6. Put Conceptual Mapping to RDF Modelling (Ontotext-Refine)

Configuration: generic excel sample uri for Identifier: 175093300615

```

    <http://uibk.ac.at/ORD/S20/Rotholz_Verhuettungsplat
    >
    <http://www.cidoc-crm.org/cidoc-crm/P2_S5a>
    <http://uibk.ac.at/ORD/S20/Rotholz_Verhuettungsplat
    >
    <http://uibk.ac.at/ORD/S20/Rotholz_Verhuettungsplat
    >
    <http://uibk.ac.at/ORD/S20/Rotholz_Verhuettungsplat
    >
    <http://uibk.ac.at/ORD/S20/Rotholz_Verhuettungsplat
    >
    <http://uibk.ac.at/ORD/S20/Rotholz_Verhuettungsplat
    >
  
```



5.7 SPARQL in Triple Store (GraphDB) to insert in named graph and create RDFstar

```

    1 BASE <http://example.com/base/>
    2 PREFIX mapper: <http://www.ontotext.com/mapper/>
    3 PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
    4 PREFIX crm: <http://www.cidoc-crm.org/cidoc-crm/>
    5 INSERT { GRAPH ?s4 { # insert "INSERT { GRAPH ?s4" for named graph
    6 ?s1 a ?t_s1 ;
    7 rdfs:label ?o_label ;
    8 crm:P3_has_note ?o_P3_has_note .
    9 ?s2 a ?t_s2 ;
    10 rdfs:label ?o_label_2 .
    11 ?s3 ?p_property_uri ?o_property_uri .
    12 <<?s3 ?p_property_uri ?o_property_uri>> ?p_dot_one_uri ?o_dot_one_
    13 # ?s4 ?p_dot_one_uri ?o_dot_one_uri . # comment this line out
    14 !! WUDDER I # insert ?s4 to place named graph construct
  
```

Added 43 statements. Update took 0.3s, yesterday at 12:53.

QUICK GUIDE - 5.5.7 RDF CREATION

- Start GraphDB
- Start ontotext refine
- Create a new project / load uri text file (e.g. generic_excav_sample_uri.tsv) you created with postgres:
- https://drive.google.com/open?id=1n7A2Ytk6pvr8fOwu-QnnueBADKO7AlyS&usp=drive_fs
- Go to RDF mapping / load json model
- generic_uri_mapping.json for generic_excav_sample_uri.tsv
- generic_literal_mapping.json for generic_excav_sample_literal.tsv
- generic_dot2_mapping.json for generic_excav_sample_dot2.tsv
- From dir:
- https://drive.google.com/open?id=1n2WOCNEAKcesXJI4WjMjyWhCs3c8YSv&usp=drive_fs
- See the rest of the instructions with screenshots from page 3 of the quick guide:
- https://docs.google.com/document/d/1oHcd2ADP6nisj0oeUm-7QLLJ87jt0gGf?rtpof=true&usp=drive_fs

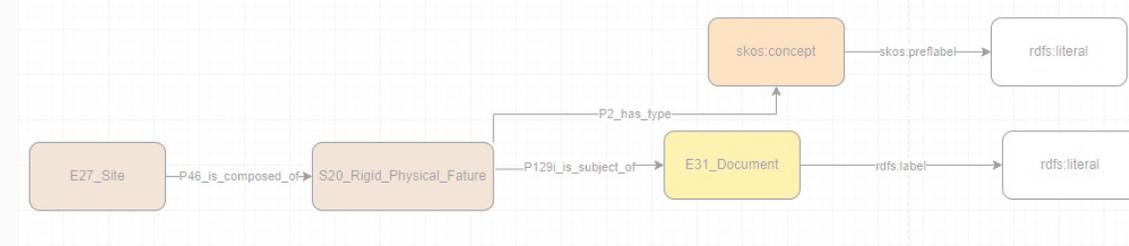
RDF CREATION PIPELINE

EXCEL-> TXT FILE-> DATABASE-> ONTOTEXT REFINE-> GRAPHDB (SPARQL)

5.1. Data Entry in Spreadsheet (Excel)

	A	B	C	D	E	F	G	H	I	J	K	L	
1	E15_project	15_institution	01_provenanc	E39	S20_id	S20_parent_id	E41_S20	E55_E7_past	E55_S20	E53 (Datenerze	S3_katgem_n_3_katgem_nari3		
2	ORD	uibk_himat	S20_ORD-Ur	Staudt	Rotholz_Verhuettungsplat	Rotholz_Verl	175784@Vei	240207@Vei	BEV		87002	Buch in Tirol 1:	
3	ORD	uibk_himat	S20_ORD-Ur	Staudt	Rotholz_Verl	Rotholz_Verl	Rotholz_Verl	175784@Vei	240207@Vei	BEV		87002	Buch in Tirol 1:
4	ORD	uibk_himat	S20_ORD-Ur	Staudt	Rotholz_Verl	Rotholz_Verl	Rotholz_Verl	175784@Vei	240207@Vei	BEV		87002	Buch in Tirol 1:
5	ORD	uibk_himat	S20_ORD-Ur	Staudt	Rotholz_Verl	Rotholz_Verl	Rotholz_Verl	175784@Vei	240207@Vei	BEV		87002	Buch in Tirol 1:
6													
7													
8													

5.2. Conceptual Mapping



5.3-4. Identifier creation / Joins in Database (Postgres)

```

    1 SELECT art_id, title, authors, year, vol_nr, art_nr_in_volume,
    2 FROM public.av_toc_gt_lv;
  
```

art_id	title	authors
1	Erste Besteigung des Grossen Geiger.	Issler, Richard
2	Bergsteigen in den östlichen Zillertaler Al.	Höfner, Horst
3	Skitouren in den Osttaler Alpen: 1948 bis ...	Weiss, Rudolf
4	Karwendel - Abenteuer für Generationen ...	Waagner, Helmut

5.5-6. Put Conceptual Mapping to RDF Modelling (Ontotext-Refine)

Configuration page for Visual RDF Mapper showing mappings between source and target classes and properties.

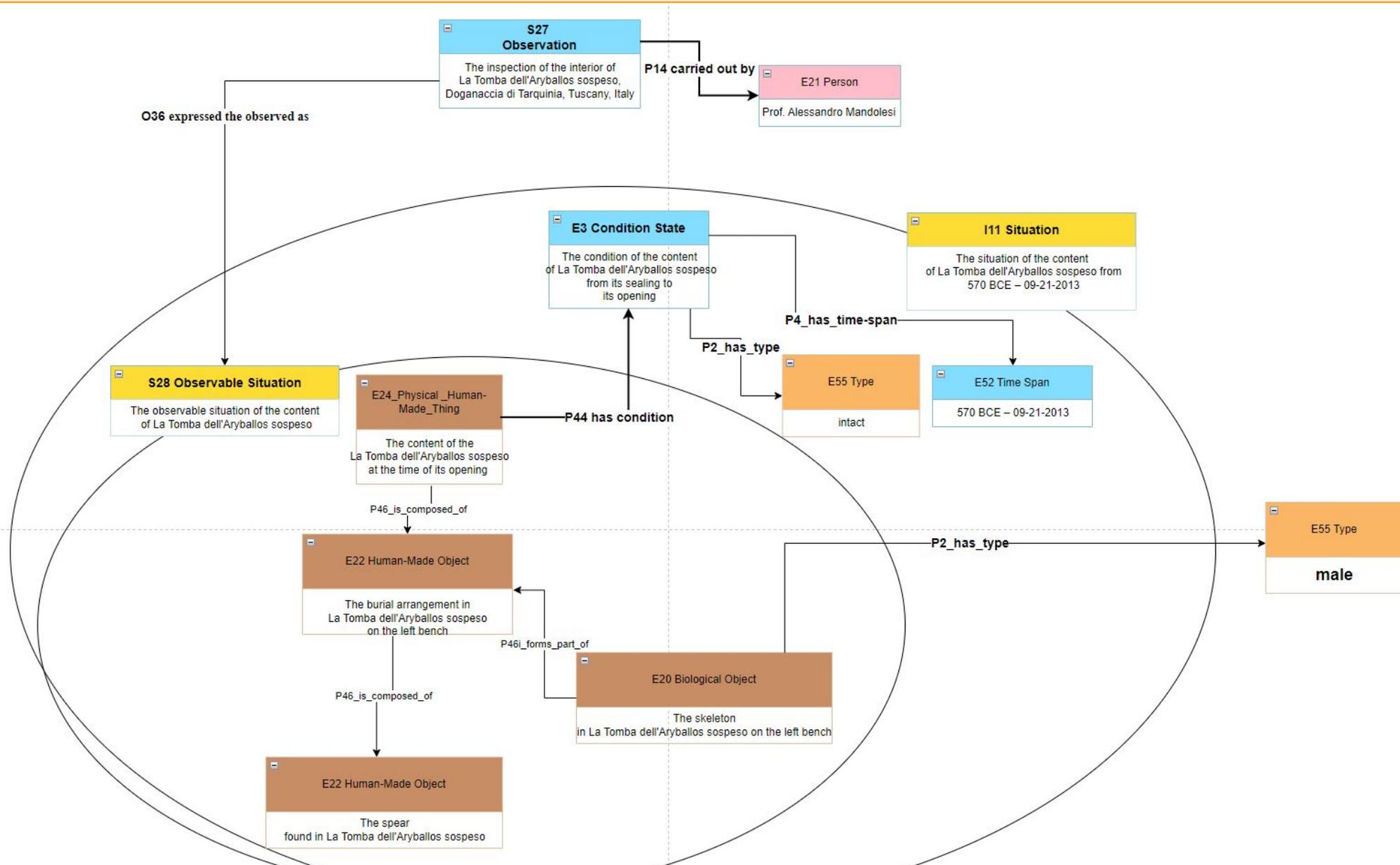
5.7 SPARQL in Triple Store (GraphDB) to insert in named graph and create RDFstar

```

    1 BASE <http://example.com/base/>
    2 PREFIX mapper: <http://www.ontotext.com/mapper/>
    3 PREFIX rdfs: <http://www.w3.org/2000/01/rdf-schema#>
    4 PREFIX crm: <http://www.cidoc-crm.org/cidoc-crm/>
    5 INSERT { GRAPH ?s4 { # insert "INSERT { GRAPH ?s4" for named graph
    6 ?s1 a ?t_s1 ;
    7 rdfs:label ?o_label ;
    8 crm:P3_has_note ?o_P3_has_note .
    9 ?s2 a ?t_s2 ;
    10 rdfs:label ?o_label_2 .
    11 ?s3 ?p_property_uri ?o_property_uri .
    12 <<?s3 ?p_property_uri ?o_property_uri>> ?p_dot_one_uri ?o_dot_one_uri
    13 # ?s4 ?p_dot_one_uri ?o_dot_one_uri . # comment this line out
    14 } }
  
```

Added 43 statements. Update took 0.3s, yesterday at 12:53.

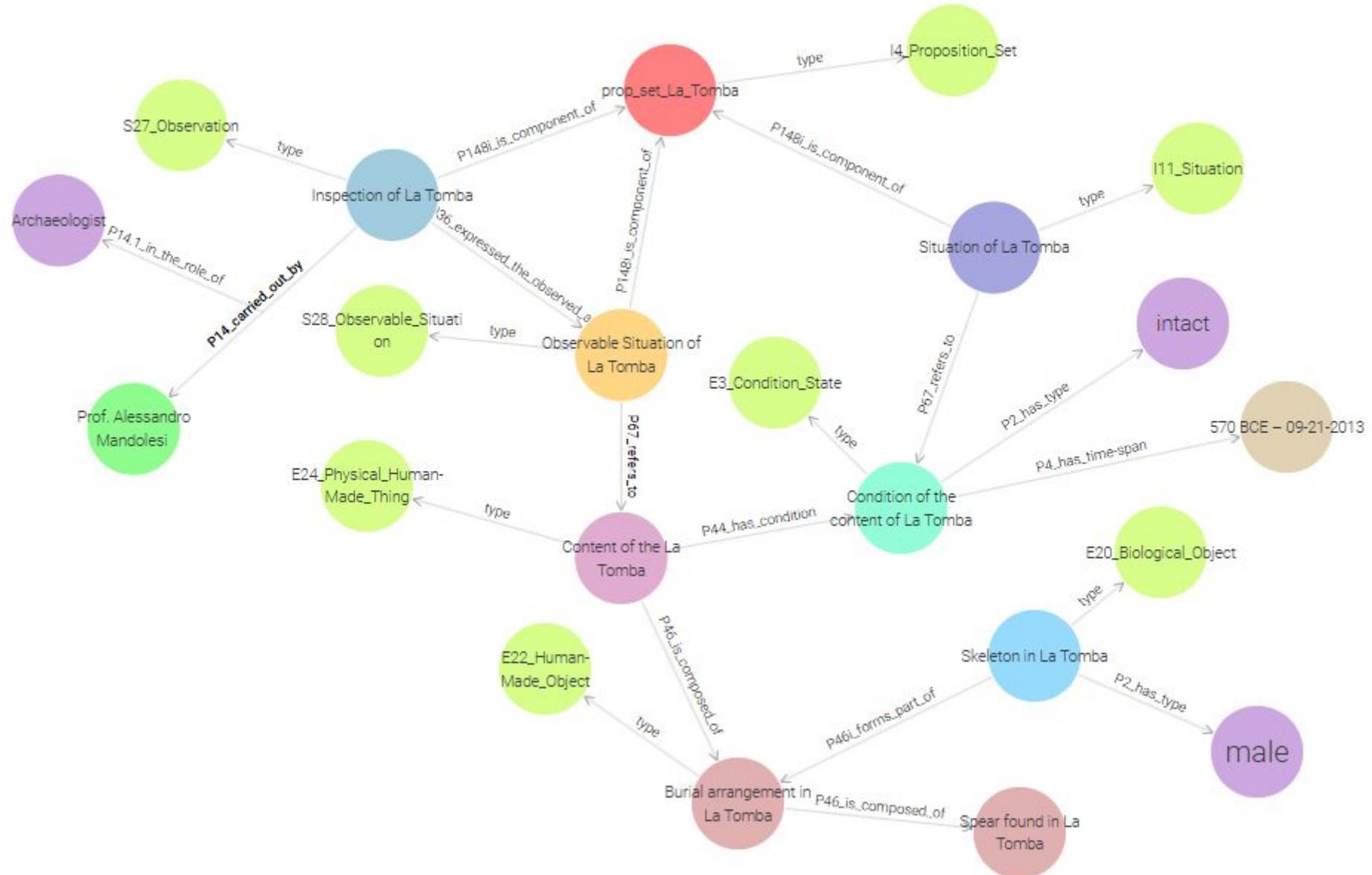
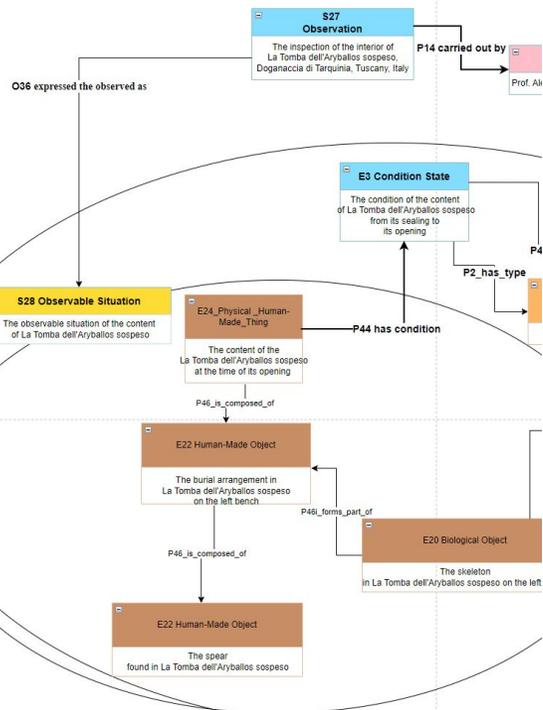
TEST CLASSES: S27 OBSERVATION, S28 OBSERVABLE SITUATION, I11 SITUATION,



CREATE SPREADSHEET FOR: S27 OBSERVATION, S28 OBSERVABLE SITUATION, I11 SITUATION,

ID of Domain	Domain label	Class of domain	p3_has_note	Property	Id of the range	Range Label	Class of the range	Dot one	Dot one target	I4_Proposition_Set
p:inspection	Inspection of La Tomba	crmsci:S27_Observation	The inspection	crm:P14_carried_out_by	p:Mandolesi	Prof. Alessandro Mandolesi	crm:E21_Person	crm:P14_i_in_the_role_	p:archaeologist	p:inspection
p:archaeologist	Archaeologist	skos:Concept		skos:broader	p:role_type	Person role	skos:Concept			p:inspection
p:inspection	Inspection of La Tomba	crmsci:S27_Observation		crmsci:Q36_expressed_the_observ	p:obs_situation_La_Tomba	Observable Situation of La Tomba	crmsci:S28_Observable_Situation			p:inspection
p:obs_situation_La_Tomba	Observable Situation of La Tomba	crmsci:S28_Observable_Situation		crm:P67_refers_to	p:content_of_the_La_Tomba		crm:E24_Physical_Human-Made_Thing			p:inspection
p:content_of_the_La_Tomba	Content of the La Tomba	crm:E24_Physical_Human-Made_Thing	The content of	crm:P46_is_composed_of	p:burial_arrangement	Burial arrangement in La Tomba	crm:E22_Human-Made_Object			p:obs_situation_La_Tomba
p:burial_arrangement	Burial arrangement in La Tomba	crm:E22_Human-Made_Object	The burial arrangement	crm:P46_is_composed_of	p:spear	Spear found in La Tomba	crm:E22_Human-Made_Object			p:obs_situation_La_Tomba
p:skeleton	Skeleton in La Tomba	crm:E20_Biological_Object	The skeleton in	crm:P46i_forms_part_of	p:burial_arrangement	Burial arrangement in La Tomba	crm:E22_Human-Made_Object			p:obs_situation_La_Tomba
p:skeleton	Skeleton in La Tomba	crm:E20_Biological_Object	The skeleton in	crm:P2_has_type	p:male	male	skos:Concept			p:prop_set_La_Tomba
p:content_of_the_La_Tomba	Content of the La Tomba	crm:E24_Physical_Human-Made_Thing		crm:P44_has_condition	p:condition		crm:E3_Condition_State			p:situation_La_Tomba
p:condition	Condition of the content of	crm:E3_Condition_State	The condition	crm:P2_has_type	p:intact	intact	skos:Concept			p:situation_La_Tomba
p:intact	intact	skos:Concept		skos:broader	p:condition_type	condition	skos:Concept			p:situation_La_Tomba
p:condition	Condition of the content of	crm:E3_Condition_State		crm:P4_has_time-span	p:condition_time	570 BCE – 09-21-2013	crm:E52_Time_Span			p:situation_La_Tomba
p:situation_La_Tomba	Situation of La Tomba	crminf:I11_Situation		crm:P67_refers_to	p:condition		crm:E3_Condition_State			p:situation_La_Tomba
p:inspection	Inspection of La Tomba	crmsci:S27_Observation		crm:P148i_is_component_of	p:prop_set_La_Tomba		crminf:I4_Proposition_Set			p:prop_set_La_Tomba
p:obs_situation_La_Tomba	Observable Situation of La Tomba	crmsci:S28_Observable_Situation		crm:P148i_is_component_of	p:prop_set_La_Tomba		crminf:I4_Proposition_Set			p:prop_set_La_Tomba
p:situation_La_Tomba	Situation of La Tomba	crminf:I11_Situation		crm:P148i_is_component_of	p:prop_set_La_Tomba		crminf:I4_Proposition_Set			p:prop_set_La_Tomba

TEST CLASSES: S27 OBSERVATION, S28 OBSERVABLE SITUATION, I11 SITUATION,



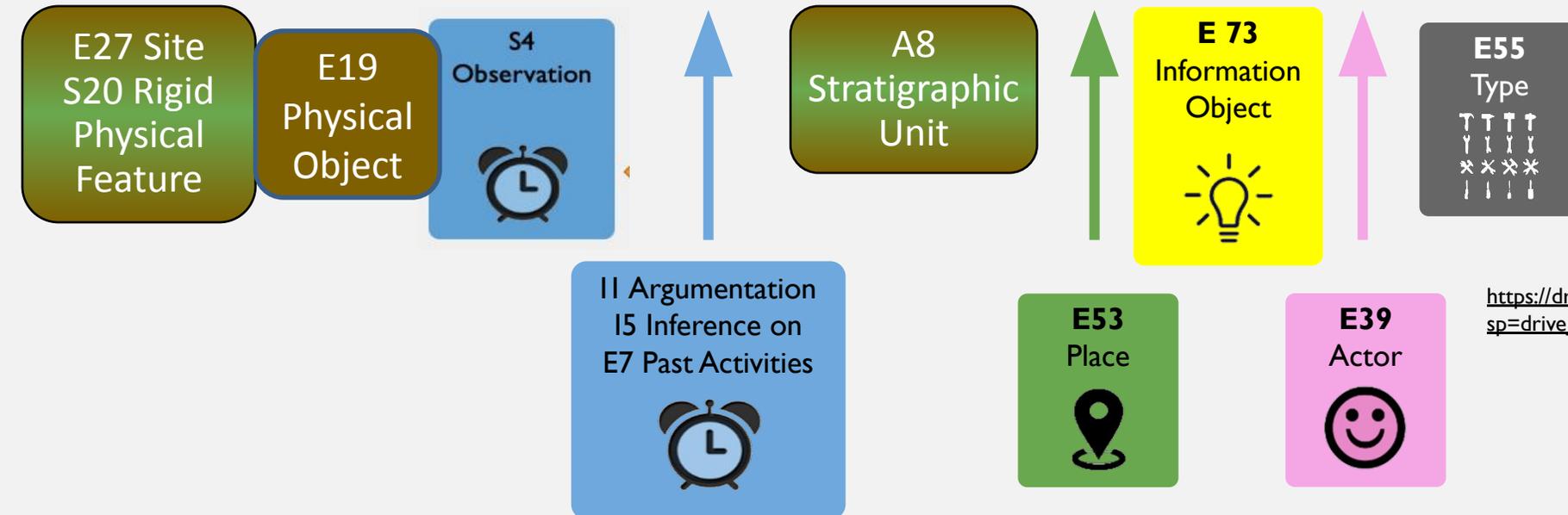
DIFFERENT INPUT DATA STRUCTURE- COMPLETE EXCAVATION DATA IN 9 TABLES

CRM_Excavation_sample.xlsx - Excel

File Home Insert Page Layout Formulas Data Review View Help Acrobat

	A	B	C	D	E	F	G	H	I
1	S20_id	E18_class	S20_parent_id_p46	E41_S20	ang_e4	E41_S20_en	E42_S2055_E42_S2		S4_id
2	p:Rotholz_Verhuettun	crm:E27_Site		Verhüttungsplatz in der N de		Smelting site Rotholz close to	Ruine Rottenb		p:87002.15.01 p:87002.16.01
3	p:Rotholz_Verhuettun	crmsci:S20_Rigid	p:Rotholz_Verhuettu	Rotholz Verhuettungsplat: de		Rotholz smelting site Trench-1			p:87002.15.01 p:87002.16.01
4	p:Rotholz_Verhuettun	crmsci:S20_Rigid	p:Rotholz_Verhuettu	Rotholz Verhuettungsplat: de		Rotholz smelting site Trench-2			p:87002.15.01 p:87002.16.01
5	p:Rotholz_Verhuettun	crmsci:S20_Rigid	p:Rotholz_Verhuettu	Rotholz Verhuettungsplat: de		Rotholz smelting site Trench-3			p:87002.17.01
6									

S20_Feature | E19_Object | S4_Observation | I1_Argumentation | A8_Stratigraphic_Unit | E53_Place | E73_Inf_Obj | E39_Actor | E55_Type | E55_hier | prefix | Field description



https://drive.google.com/open?id=1s77_-Gz6QkSjwjl1vvT-87Pi4GgRIFjs&usp=drive_fs

RELATIONS BETWEEN TABLES THROUGH IDENTIFIERS

E27 Site / S20 Rigid Physical Feature

S20_id	E19_class	S20_parent_id	E41_S20	ing_e4	E41_S20_en	E42_S20	E42_S20	S4_id
p:Rotholz_Verhuettun	crm:E27_Site		Verhüttungsp					
p:Rotholz_Verhuettun	crmsci:S20_Rigid	p:Rotholz_Verhuettun	Rotholz Verhu					
p:Rotholz_Verhuettun	crmsci:S20_Rigid	p:Rotholz_Verhuettun	Rotholz Verhu					
p:Rotholz_Verhuettun	crmsci:S20_Rigid	p:Rotholz_Verhuettun	Rotholz Verhu					

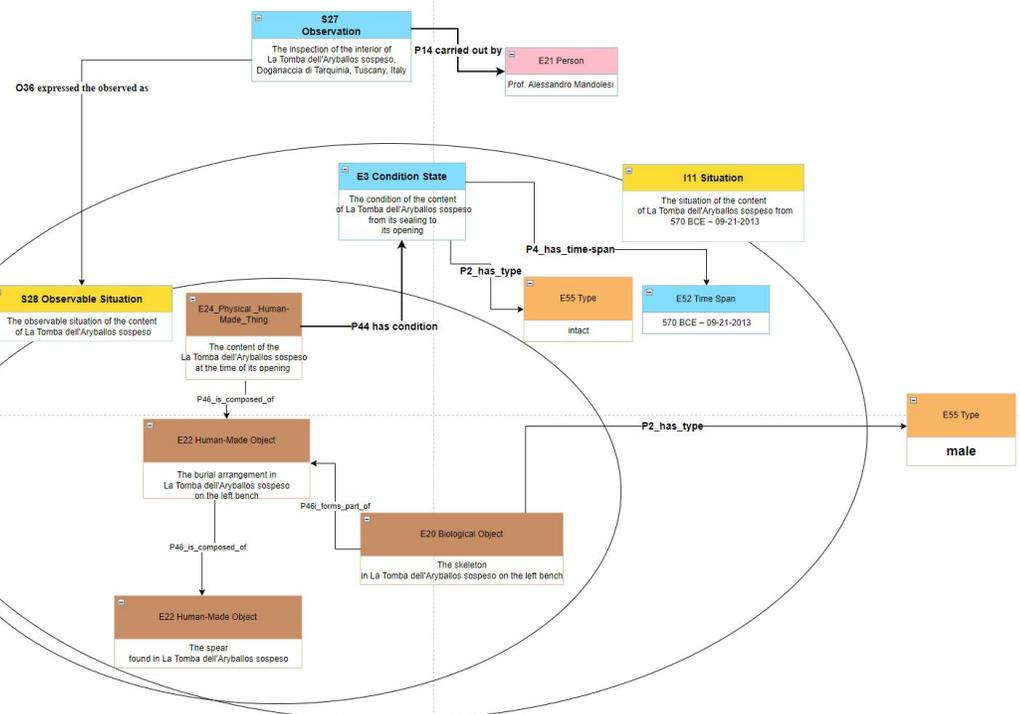
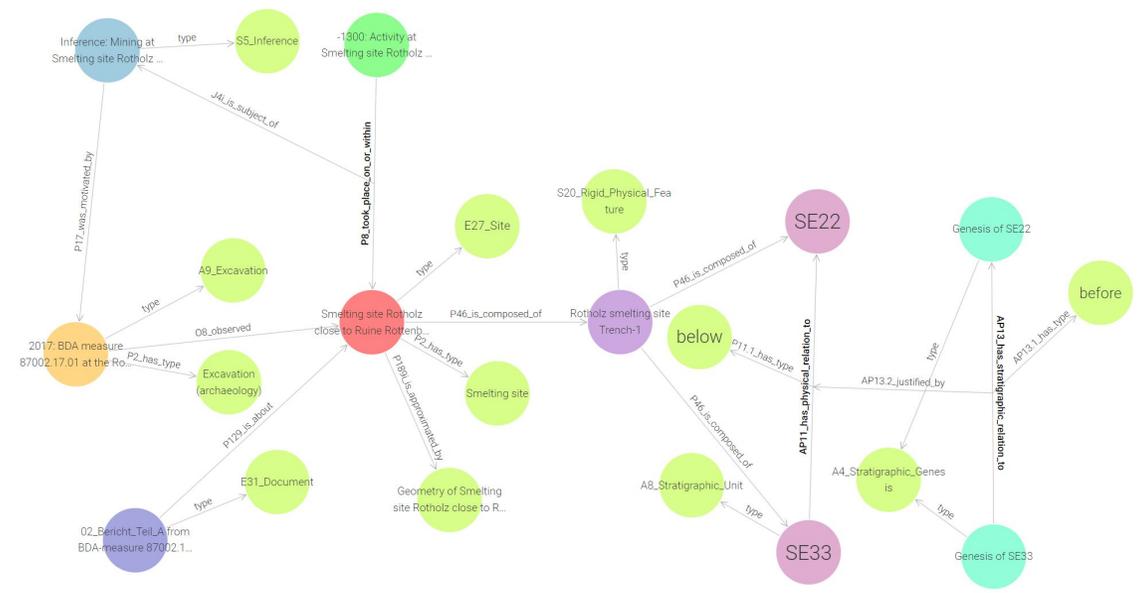
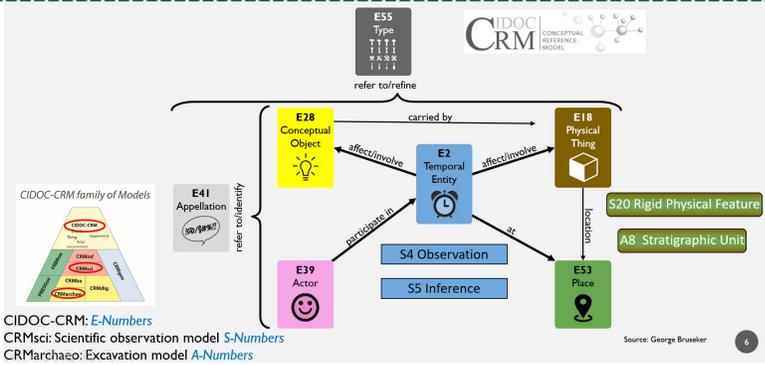
A8 Stratigraphic Unit

a8_id	a8_class	a8_p3_en	s20_id	e73_id_p1
p:Rotholz_Verhuettun	crmarchaeo:A8_Stratigra	Slipped sandstone layer	p:Rotholz_Ver	p:10.5281,
p:Rotholz_Verhuettun	crmarchaeo:A8_Stratigra	Slipped sandstone layer	p:Rotholz_Ver	p:10.5281,
p:Rotholz_Verhuettun	crmarchaeo:A8_Stratigra	Loamy-brown layer with H.K.	p:Rotholz_Ver	p:10.5281,
p:Rotholz_Verhuettun	crmarchaeo:A8_Stratigra	Loamy-brown layer with H.K.	p:Rotholz_Ver	p:10.5281,
p:Rotholz_Verhuettun	crmarchaeo:A8_Stratigra	Loamy-brown layer with H.K.	p:Rotholz_Ver	p:10.5281,

E19 Physical Object

E19_id	e19_class	E41_E19	lang_e4	E41_E19_e	s20_id	A8_id
p:Rotholz_Verhu	crm:E19_Physic	Schrotku	de	Shot? (hemap	p:Rotholz_Verhuettun	p:Rotholz_Ver
p:Rotholz_Verhu	crm:E19_Physic	Fahlerz (de	Pale ore (ma	p:Rotholz_Verhuettun	p:Rotholz_Ver
p:Rotholz_Verhu	crm:E19_Physic	Div.	de	Div.	p:Rotholz_Verhuettun	p:Rotholz_Ver
p:Rotholz_Verhu	crm:E19_Physic	Div.	de	Div.	p:Rotholz_Verhuettun	p:Rotholz_Ver
p:Rotholz_Verhu	crm:E19_Physic	Div.	de	Div.	p:Rotholz_Verhuettun	p:Rotholz_Ver
p:Rotholz_Verhu	crm:E19_Physic	Div.	de	Div.	p:Rotholz_Verhuettun	p:Rotholz_Ver

ID of Domain	Domain label	Class of domain	Property
p:S20/Rotholz_Verhuettungsplatz	Smelting site Rotholz close to Ruine	crm:E27_Site	crm:P46_is_composed_of
p:Rotholz_Verhuettungsplatz_1	Rotholz smelting site Trench-1	crmsci:S20_Rigid_Physic	crm:P46_is_composed_of
p:Rotholz_Verhuettungsplatz_1	Rotholz smelting site Trench-1	crmsci:S20_Rigid_Physic	crm:P46_is_composed_of
p:A8/Rotholz_Verhuettungsplatz_1/87/SE33		crmarchaeo:A8_Stratigraph	crmarchaeo:AP11_has_phys
himat:240291	below	skos:Concept	



key

