TerraLID metadata profile for Lead Isotope Data in Archaeology

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Introduction

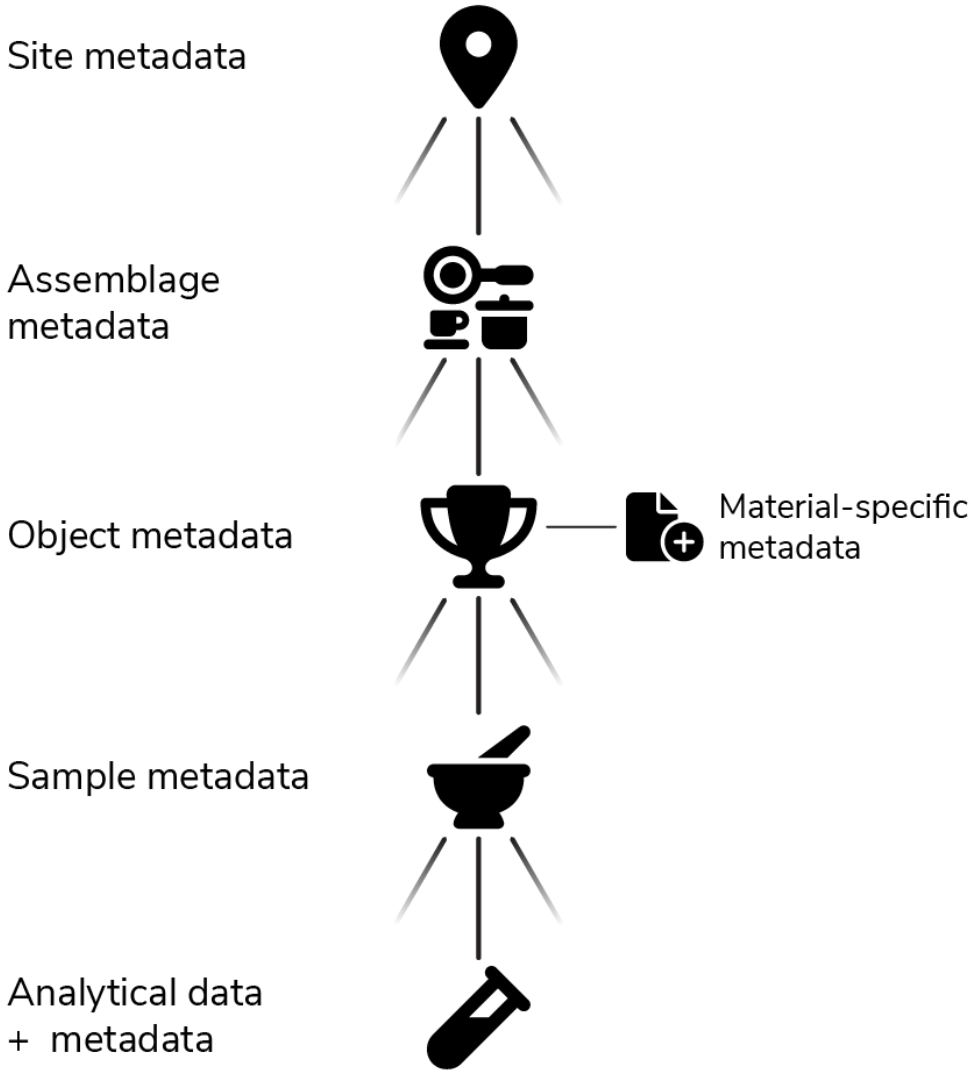
The TerraLID metadata profile comprehensively describes lead isotope data, their analytical background, and their geological and/or archaeological context. It aims to optimise lead isotope data for future reuse regardless of the original motivation for their measurement and the collection of the objects and samples.

In this regard, the TerraLID metadata profile does not only serve as a data model for the TerraLID database but also aims to become a widely agreed upon community-centred reporting format for lead isotope data. When adopted by large parts of the community, the TerraLID metadata profile makes it easy to combine data from different sources, even if they are not included in the TerraLID database.

A particular challenge for the TerraLID Team during the design of the metadata profile was finding a good balance between the information regarded as essential by modern-day standards and remaining inclusive to old data. To achieve this aim, mandatory metadata was kept to a minimum even though many others might be regarded as pivotal metadata nowadays.

1. Structure

Efficient structuring of information as well as easy extensibility were the major technical considerations in the design of the TerraLID metadata profile. As a result, the metadata are organised in modules, which are linked in a series of one-to-many relationships: A site can yield many assemblages, which again can include many objects. Multiple samples can be taken from the same object and each sample can be analysed multiple times.



The general structure of the TerraLID metadata profile, highlighting the different modules and their relation to each other.
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While this seems to follow a natural hierarchy, it is possible to e.g. link an object or analysis directly to a site. Similarly, although single objects must be recorded as single-object assemblages to include their stratigraphic information, an object can also be directly linked to a site if e.g. stratigraphic information cannot be provided. An assemblage for the object can be defined at a later stage and serve as link between site and object, for example, when a second object from the same finds complex is added.

The TerraLID metadata profile uses controlled vocabularies wherever sensible to improve searchability of the database and to decrease curation effort. The TerraLID Team is aware that these vocabularies may not yet include all terms relevant for your needs. You are therefore strongly encouraged to reach out to us with suggestions for additional terms to be included in the vocabularies.

2. Extensibility

Another advantage of the modularity is the uncomplicated extensibility of the TerraLID metadata profile. For example, information specific for different materials is recorded in different modules. These material-specific modules extend the information recorded for all objects. Additional modules for other material types can be defined and easily included in the TerraLID metadata profile. The same applies for specific object types made of the same material: For coins, the same information like for all other metal items is recorded in addition to information specific for coins, such as their denomination.

The same applies to analytical data. While lead isotope analyses are currently the only analytical method for which a full set of metadata exists, support for other analytical methods can be easily included in TerraLID through the inclusion of the respective modules.

3. Community participation

The initial draft of the TerraLID metadata profile was developed from 2024 to 2025 by the TerraLID Regional and Material Editors during their monthly meetings with support by the TerraLID Core Team. In accordance with TerraLID's community-driven development, this draft is currently discussed by the entire community. Learn more about how to join the discussion and provide feedback.

Sites

TerraLID ID

ID and name: SI0 terralid_site_id
Provided by: TerraLID system
Obligation: mandatory
Occurrences: 1
Definition: The ID of the site in the TerraLID database.
Allowed values and other constraints: t.b.d.
Example: t.b.d.

1. Site name

ID and name: SI1 site_name
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The name of the locality/site or "unknown". Details about the locality should be provided in `SI5.3 Description`. If the locality belongs to a cluster and/or site complex, enter its name in `SI9 Keywords`.
Allowed values and other constraints: free text. If the site is unknown, value is "unknown" and `SI2 Project name` must be provided.
Example: Agrileza

2. Project name

ID and name: SI2 project_name
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: The name of the project.
Allowed values and other constraints: free text. Must be provided if `SI1 Site name` has value "unknown".
Example: The Dreamland University Archaeometallurgy project.

3. Project context

ID and name: SI3 project_context
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: A brief summary of the main aims and objectives of the research (or alternative process). May include a

link e.g. the project's webpage.
Allowed values and other constraints: free text
Example: Excavation of an ore washing site.

4. Site identifier

ID and name: SI4 site_pid
Provided by: Data provider
Obligation: recommended
Occurrences: 0–n
Definition: The site's persistent identifier in one or more of the data infrastructures listed in `SI4.2 Type`.

with the two subproperties:

4.1 Value

ID and name: SI4.1 site_pid_value
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The value of the persistent identifier.
Allowed values and other constraints: valid persistent identifier according to the associated data infrastructure in `SI4.2 Type`.
Example: Q129256661

4.2 Type

ID and name: SI4.2 site_pid_type
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The name of the data infrastructure.
Allowed values and other constraints: controlled vocabulary

5. Geolocation

ID and name: SI5 site_geolocation
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: Information about the (approximate) location of the object or site it was found. All coordinates must be given in the WGS 84 coordinate system and as decimal numbers. If the exact site location is unknown or must not be revealed, a polygon or boundary box must be used to delineate an area of sufficient precision around the site location.

Subproperties of Geolocation are:

5.1 Point

ID and name: SI5.1 site_geolocation_point
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: A point location in space.

with the two subproperties:

5.1.1 Longitude

ID and name: SI5.1.1 site_geolocation_point_longitude
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The longitudinal dimension of a point.
Allowed values and other constraints: decimal number, between -180 and 180
Example: 7.21685

5.1.2 Latitude

ID and name: SI5.1.2 site_geolocation_point_latitude
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The latitudinal dimension of a point.
Allowed values and other constraints: decimal number, between -90 and 90
Example: 51.48867

5.2 Boundary box

ID and name: SI5.2 site_geolocation_box
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: The spatial limits of a box.

with the four subproperties:

5.2.1 Western boundary

ID and name: SI5.2.1 site_geolocation_box_west
Provided by: data provider
Obligation: mandatory
Occurrences: 1

Definition: The western longitudinal dimension of the box.
Allowed values and other constraints: decimal number, between -180 and 180
Example: 21.02

5.2.2 Eastern boundary

ID and name: SI5.2.2 site_geolocation_box_east
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The eastern longitudinal dimension of the box.
Allowed values and other constraints: decimal number, between -180 and 180
Example: 21.05

5.2.3 Southern boundary

ID and name: SI5.2.3 site_geolocation_box_south
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The southern latitudinal dimension of the box.
Allowed values and other constraints: decimal number, between -90 and 90
Example: 40.23

5.2.4 Northern boundary

ID and name: SI5.2.4 site_geolocation_box_north
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The northern latitudinal dimension of the box.
Allowed values and other constraints: decimal number, between -90 and 90
Example: 40.53

5.3 Description

ID and name: SI5.3 site_geolocation_description
Provided by: data provider
Obligation: optional
Occurrences: 0–1
Definition: Further information about the site such as a description. If the site's exact location cannot be given, this must include a reasoning why and information about the level of precision.
Allowed values and other constraints: free text
Example: Entire valley given to obfuscate exact location of site as protection against illicit excavations; Area of Saudi-Arabia recorded as location because more precise information not available.

5.4 Polygon

ID and name: SI5.4 site_geolocation_polygon
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: A drawn polygon area, defined by a set of points and lines connecting the points in a closed chain. At least four points must be recorded. The last point must be identical with the first point to close the polygon.

with the subproperty:

5.4.1 Polygon point data

ID and name: SI5.4.1 site_geolocation_polygon_point
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: A point marking an edge of the polygon.

with the two subproperties

5.4.1.1 LONGITUDE

ID and name: SI5.4.1.1 site_geolocation_polygon_point_longitude
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The longitudinal dimension of a point.
Allowed values and other constraints: decimal number, between -180 and 180
Example: 7.21685

5.4.1.2 LATITUDE

ID and name: SI5.4.1.2 site_geolocation_polygon_point_latitude
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The latitudinal dimension of a point.
Allowed values and other constraints: decimal number, between -90 and 90
Example: 51.48867

6. Registry

ID and name: SI6 site_registry
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The entry of the site in the registry of the local authority (e.g., heritage authority, geological survey).

with the two subproperties:

6.1 Registry ID

ID and name: SI6.1 site_registry_id
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: The site's identifier in the registry of the local authority.
Allowed values and other constraints: free text
Example: t.b.d.

6.2 Registry name

ID and name: SI6.2 site_registry_name
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The name of the registry of the local authority.
Allowed values and other constraints: free text
Example: t.b.d.

7. Dating

ID and name: SI7 site_date
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: The time period represented by the site.

with the eight subproperties:

7.1 Persistent identifier

ID and name: B3.1 date_pid
Provided by: data provider
Obligation: recommended
Occurrences: 0–n

with the two subproperties:

7.1.1 VALUE

ID and name: B3.1.1 date_pid_value
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The value of the persistent identifier.

Allowed values and other constraints: The period's persistent identifier in one or more of the data infrastructures listed in `B3.1.2 Type`.
Example: 99152/p0qhb66vvth

7.1.2 TYPE

ID and name: B3.1.2 date_pid_type
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The name of the data infrastructure.
Allowed values and other constraints: controlled vocabulary

7.2 Date type

ID and name: B3.2 date_type
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: Is this an archaeological or geological age? Archaeological dates must be given in calendar years, with BCE dates as negative values. Geological dates must be given in million years.
Allowed values and other constraints: geological, archaeological
Example: archaeological

7.3 Absolute Date

ID and name: B3.3 date_absolute
Provided by: data provider, API
Obligation: recommended
Occurrences: 0–1
Definition: The absolute date of a point in time or period in years before or after common era. Values in BCE are reported as negative values. If the absolute date is given with an uncertainty such as 450 +/- 50 BC, start and end date mark the lower and upper limit of the date range, i.e. -500 and -400.

with the four subproperties:

7.3.1 START

ID and name: B3.3.1 date_absolute_start
Provided by: data provider, API
Obligation: mandatory
Occurrences: 1
Definition: The oldest possible date of the period.
Allowed values and other constraints: integer
Example: -15

7.3.2 END

ID and name: B3.3.2 date_absolute_end
Provided by: data provider, API

Obligation: recommended
Occurrences: 0–1
Definition: The youngest possible date of the period.
Allowed values and other constraints: integer
Example: 15

7.3.3 DATING METHOD

ID and name: B3.3.3 date_absolute_method
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: The method used to determine the absolute date.
Allowed values and other constraints: controlled vocabulary

7.3.4 UNIT OF DATE

ID and name: B3.3.4 date_absolute_unit
Provided by: TerraLID system
Obligation: mandatory
Occurrences: 1
Definition: The unit of the date.
Allowed values and other constraints: a, Ma
Example: a

7.4 Relative Date

ID and name: B3.4 date_relative
Provided by: data provider, API
Obligation: recommended
Occurrences: 0–1
Definition: The relative date of a point in time or period.

with the two subproperties:

7.4.1 CHRONOLOGICAL UNIT

ID and name: B3.4.1 date_relative_period
Provided by: data provider, API
Obligation: mandatory
Occurrences: 1
Definition: The relative date expressed as a chronological unit.
Allowed values and other constraints: controlled vocabulary

7.4.2 DATING METHOD

ID and name: B3.4.2 date_relative_method
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n

Definition: The method used to determine the relative date.
Allowed values and other constraints: controlled vocabulary

7.5 Cultural unit

ID and name: B3.5 date_archaeo_cultural
Provided by: data provider
Obligation: optional
Occurrences: 0–n
Definition: Relevant cultural and user created labels for the relative date of the item.
Allowed values and other constraints: free text, only available if `B3.2 Date type` = "archaeological".
Example: Roman

7.6 Orogenesis

ID and name: B3.6 date_geol_orogensis
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: The relative date expressed as anorogenic event.
Allowed values and other constraints: controlled vocabulary, only available if `B3.2 Date type` = "geological".

7.7 Definition of chronological unit

ID and name: B3.7 date_relative_reference
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: The reference defining the relative date or period.

with the five subproperties:

7.7.1 Persistent Identifier

ID and name: B5.1 relation_pid
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: The persistent identifier or TerraLID ID associated with a resource or related research output. If referring to another entity in the TerraLID database, the TerraLID identifier must be used.

with the two subproperties:

7.7.1.1 Value

ID and name: B5.1.1 relation_pid_value
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: Value of the persistent identifier or TerraLID ID.

Allowed values and other constraints: valid persistent identifier according to the options listed in `B5.1.2 Type`.
Example: 10.60510/ICDP5054ESYI201

7.7.1.2 Type

ID and name: B5.1.2 relation_pid_type
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The type of the identifier.
Allowed values and other constraints: controlled vocabulary

7.7.2 Full reference

ID and name: B5.2 relation_text
Provided by: data provider, API (DOI)
Obligation: recommended
Occurrences: 0–1
Definition: The full reference of a publication.
Allowed values and other constraints: free text
Example: Palinkaš, L. A., 1985, Lead isotope patterns in galenas from some selected ore deposits in Croatia and NW Bosnia, Geološki Vjesnik, 38, 175–89.

7.7.3 Kind of relation

ID and name: B5.3 relation_kind
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: Relationship between item and the research output.
Allowed values and other constraints: controlled vocabulary

7.7.4 Type of resource

ID and name: B5.4 relation_resource
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: Type of resource or research output.
Allowed values and other constraints: controlled vocabulary

7.7.5 Additional details

ID and name: B5.5 relation_detail
Provided by: data provider
Obligation: optional
Occurrences: 0–n
Definition: Additional information about the relation, e.g., if the related work addresses a specific aspect of the item (e.g., the geological setting).

Allowed values and other constraints: free text
Example: Information about the dating of the site.

8. Site type

ID and name: SI8 site_type
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: The type of the site, geological or how it was used by humans.
Allowed values and other constraints: controlled vocabulary

9. Keywords

ID and name: SI9 site_keywords
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: Keywords to further characterise the site. This includes any overarching complexes or clusters the site is part of.
Allowed values and other constraints: free text
Example: ore beneficiation, Laurion

10. Project dates

ID and name: SI10 project_date
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The date of the investigation or project in which the site was/is studied.

with the two subproperties:

10.1 Start date

ID and name: SI10.1 project_date_start
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: Start date of the investigation or project in which the site was studied and sampled.
Allowed values and other constraints: date formatted as YYYY-MM-DD
Example: 1980-01-15

10.2 End date

ID and name: SI10.2 project_date_end
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: End date of the investigation or project in which the site was/is studied and sampled, if known. Leave empty if investigation is still ongoing at the time of data entry.
Allowed values and other constraints: date formatted as YYYY-MM-DD
Example: 2000-04-20

11. Relations

ID and name: SI11 site_relation
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: Information about related entities, including assemblages belonging to the site, and other research output such as publications providing relevant information about the site. This includes any literature from which information about the site was extracted.

with the five subproperties:

11.1 Persistent Identifier

ID and name: B5.1 relation_pid
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: The persistent identifier or TerraLID ID associated with a resource or related research output. If referring to another entity in the TerraLID database, the TerraLID identifier must be used.

with the two subproperties:

11.1.1 VALUE

ID and name: B5.1.1 relation_pid_value
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: Value of the persistent identifier or TerraLID ID.
Allowed values and other constraints: valid persistent identifier according to the options listed in `B5.1.2 Type`.
Example: 10.60510/ICDP5054ESYI201

11.1.2 TYPE

ID and name: B5.1.2 relation_pid_type
Provided by: data provider
Obligation: mandatory
Occurrences: 1

Definition: The type of the identifier.
Allowed values and other constraints: controlled vocabulary

11.2 Full reference

ID and name: B5.2 relation_text
Provided by: data provider, API (DOI)
Obligation: recommended
Occurrences: 0–1
Definition: The full reference of a publication.
Allowed values and other constraints: free text
Example: Palinkaš, L. A., 1985, Lead isotope patterns in galenas from some selected ore deposits in Croatia and NW Bosnia, Geološki Vjesnik, 38, 175–89.

11.3 Kind of relation

ID and name: B5.3 relation_kind
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: Relationship between item and the research output.
Allowed values and other constraints: controlled vocabulary

11.4 Type of resource

ID and name: B5.4 relation_resource
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: Type of resource or research output.
Allowed values and other constraints: controlled vocabulary

11.5 Additional details

ID and name: B5.5 relation_detail
Provided by: data provider
Obligation: optional
Occurrences: 0–n
Definition: Additional information about the relation, e.g., if the related work addresses a specific aspect of the item (e.g., the geological setting).
Allowed values and other constraints: free text
Example: Information about the dating of the site.

Assemblages

TerraLID ID

ID and name: AS0 terralid_assemblage_id
Provided by: TerraLID system
Obligation: mandatory
Occurrences: 1
Definition: The ID of the assemblage in the TerraLID database.
Allowed values and other constraints: t.b.d.
Example: t.b.d.

1. Assemblage type

ID and name: AS1 assemblage_type
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: The type of assemblage. This can be either a finds complex in an archaeological site (e.g. hoard, workshop, mining gallery) or a geological feature (e.g. gossan, alteration zone, fault zone).
Allowed values and other constraints: controlled vocabulary

2. Investigation type

ID and name: AS2 assemblage_investigation
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: The type of investigation leading to the discovery of the assemblage.
Allowed values and other constraints: controlled vocabulary

3. Investigation unit

ID and name: AS3 assemblage_investigation_unit
Provided by: data provider
Obligation: optional
Occurrences: 0–n
Definition: The unit according to the recording system of the investigation in which the assemblage was found.

with the two subproperties:

3.1 Type

ID and name: AS3.1 assemblage_investigation_unit_type
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The type of the unit.
Allowed values and other constraints: controlled vocabulary

3.2 Identifier

ID and name: AS3.2 assemblage_investigation_unit_value
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The identifier of the unit.
Allowed values and other constraints: free text
Example: 13; A1-B2

4. Stratigraphy

ID and name: AS4 assemblage_stratigraphy
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: Information about the stratigraphic position of the assemblage within the locality.

with the four subproperties:

4.1 Unit

ID and name: AS4.1 assemblage_stratigraphy_unit
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The locality or project-specific identifier of the stratigraphic unit from which the assemblage was collected.
Allowed values and other constraints: free text
Example: host rock, pit 13

4.2 Site diagram

ID and name: AS4.2 assemblage_stratigraphy_diagram
Provided by: data provider

Obligation: optional
Occurrences: 0–1
Definition: Image or drawing of site that makes exact location of assemblage clear.
Allowed values and other constraints: file path
Example: t.b.d.

4.3 Context

ID and name: AS4.3 assemblage_stratigraphy_context
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: Information about whether the material was disturbed during deposition or in a later event.
Allowed values and other constraints: controlled vocabulary

4.4 Description

ID and name: AS4.4 assemblage_stratigraphy_description
Provided by: data provider
Obligation: optional
Occurrences: 0–1
Definition: Additional information about the stratigraphic context not covered elsewhere.
Allowed values and other constraints: free text
Example: Traces of extensive rodent activity indicate mixing with material from overlying stratigraphic units.

5. Assemblage depth

ID and name: AS5 assemblage_depth
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: The relative depth of the assemblage.

with the three subproperties:

5.1 Reference point

ID and name: AS5.1 assemblage_depth_reference
Provided by: data provider
Obligation: mandatory
Occurrences: 0–1
Definition: The reference point for the depth measurement of the assemblage.
Allowed values and other constraints: free text
Example: Top of infilling

5.2 Value

ID and name: AS5.2 assemblage_depth_value
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The depth value of the assemblage measured from the reference point.
Allowed values and other constraints: decimal number
Example: 5.6

5.3 Unit

ID and name: AS5.3 assemblage_depth_unit
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: SI unit of the depth value of the assemblage.
Allowed values and other constraints: controlled vocabulary

6. Relations

ID and name: AS6 assemblage_relation
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: Information about related entities, including the object(s) belonging to the assemblage, and other research output such as publications providing relevant information about the assemblage. This includes any literature from which information about the assemblage was extracted.

with the five subproperties:

6.1 Persistent Identifier

ID and name: B5.1 relation_pid
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: The persistent identifier or TerraLID ID associated with a resource or related research output. If referring to another entity in the TerraLID database, the TerraLID identifier must be used.

with the two subproperties:

6.1.1 VALUE

ID and name: B5.1.1 relation_pid_value
Provided by: data provider

Obligation: mandatory
Occurrences: 1
Definition: Value of the persistent identifier or TerraLID ID.
Allowed values and other constraints: valid persistent identifier according to the options listed in `B5.1.2 Type`.
Example: 10.60510/ICDP5054ESYI201

6.1.2 TYPE

ID and name: B5.1.2 relation_pid_type
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The type of the identifier.
Allowed values and other constraints: controlled vocabulary

6.2 Full reference

ID and name: B5.2 relation_text
Provided by: data provider, API (DOI)
Obligation: recommended
Occurrences: 0–1
Definition: The full reference of a publication.
Allowed values and other constraints: free text
Example: Palinkaš, L. A., 1985, Lead isotope patterns in galenas from some selected ore deposits in Croatia and NW Bosnia, Geološki Vjesnik, 38, 175–89.

6.3 Kind of relation

ID and name: B5.3 relation_kind
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: Relationship between item and the research output.
Allowed values and other constraints: controlled vocabulary

6.4 Type of resource

ID and name: B5.4 relation_resource
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: Type of resource or research output.
Allowed values and other constraints: controlled vocabulary

6.5 Additional details

ID and name: B5.5 relation_detail
Provided by: data provider
Obligation: optional

Occurrences: 0–n

Definition: Additional information about the relation, e.g., if the related work addresses a specific aspect of the item (e.g., the geological setting).

Allowed values and other constraints: free text

Example: Information about the dating of the site.

Objects

TerraLID ID

ID and name: O0 terralid_object_id
Provided by: TerraLID system
Obligation: mandatory
Occurrences: 1
Definition: The ID of the object in the TerraLID database.
Allowed values and other constraints: t.b.d.
Example: t.b.d.

1. Collectors

ID and name: O1 object_collectors
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: Details of the creator(s), excavator(s), or other person(s) intellectually responsible for the sample collection.

with the nine subproperties:

1.1 Role

ID and name: B1.1 person_role
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: The role in which the person is related to the linked information.
Allowed values and other constraints: controlled vocabulary
Example: Author

1.2 First names

ID and name: B1.2 person_name_first
Provided by: data provider, API (ORCID ID)
Obligation: recommended
Occurrences: 0–1
Definition: The first and middle name(s) of the person.
Allowed values and other constraints: free text
Example: Jane

1.3 Last Name

ID and name: B1.3 person_name_last
Provided by: data provider, API (ORCID ID)
Obligation: mandatory
Occurrences: 1
Definition: The last name of the person.
Allowed values and other constraints: free text
Example: Doe

1.4 Persistent Identifier

ID and name: B1.4 person_pid
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: Persistent identifier(s) assigned to the person.

with the two subproperties:

1.4.1 VALUE OF PERSISTENT IDENTIFIER

ID and name: B1.4.1 person_pid_value
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: A persistent identifier assigned to the analysed material.
Allowed values and other constraints: Valid persistent identifier according to B1.4.2 Type of persistent identifier
Example: 0000–0001–2345–678X

1.4.2 TYPE OF PERSISTENT IDENTIFIER

ID and name: B1.4.2 person_pid_type
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The type of the persistent identifier.
Allowed values and other constraints: controlled vocabulary

1.5 Affiliation name

ID and name: B1.5 person_affiliation_name
Provided by: data provider, API (ORCID ID, ROR ID)
Obligation: mandatory
Occurrences: 1–n
Definition: The name of the person's affiliation.
Allowed values and other constraints: free text
Example: Institute of Time Travels

1.6 ROR ID

ID and name: B1.6 person_affiliation_ror
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: The ROR of the person's affiliation.
Allowed values and other constraints: is valid ROR ID
Example: 09af7gtg53

1.7 Address

ID and name: B1.7 person_affiliation_address
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: The address of the person's affiliation.
Allowed values and other constraints: free text
Example: Teleporter Avenue 123, Ankh–Morpok, United States of Humanities

1.8 Mail address

ID and name: B1.8 person_mail
Provided by: data provider, API (ORCID ID)
Obligation: recommended
Occurrences: 0–n
Definition: The mail address of the person.
Allowed values and other constraints: is valid mail address
Example: jane.doe@timetravels.int

1.9 Website

ID and name: B1.9 person_url
Provided by: data provider, API (ORCID ID)
Obligation: optional
Occurrences: 0–1
Definition: The URL of a person.
Allowed values and other constraints: is valid URL
Example: https://www.timetravels.int/members/jane–doe

2. Contributors

ID and name: O2 object_contributors
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: Individuals or organizations who have contributed to the resource.

with the nine subproperties:

2.1 Role

ID and name: B1.1 person_role
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: The role in which the person is related to the linked information.
Allowed values and other constraints: controlled vocabulary
Example: Author

2.2 First names

ID and name: B1.2 person_name_first
Provided by: data provider, API (ORCID ID)
Obligation: recommended
Occurrences: 0–1
Definition: The first and middle name(s) of the person.
Allowed values and other constraints: free text
Example: Jane

2.3 Last Name

ID and name: B1.3 person_name_last
Provided by: data provider, API (ORCID ID)
Obligation: mandatory
Occurrences: 1
Definition: The last name of the person.
Allowed values and other constraints: free text
Example: Doe

2.4 Persistent Identifier

ID and name: B1.4 person_pid
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: Persistent identifier(s) assigned to the person.

with the two subproperties:

2.4.1 VALUE OF PERSISTENT IDENTIFIER

ID and name: B1.4.1 person_pid_value
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: A persistent identifier assigned to the analysed material.
Allowed values and other constraints: Valid persistent identifier according to B1.4.2 Type of persistent identifier
Example: 0000–0001–2345–678X

2.4.2 TYPE OF PERSISTENT IDENTIFIER

ID and name: B1.4.2 person_pid_type
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The type of the persistent identifier.
Allowed values and other constraints: controlled vocabulary

2.5 Affiliation name

ID and name: B1.5 person_affiliation_name
Provided by: data provider, API (ORCID ID, ROR ID)
Obligation: mandatory
Occurrences: 1–n
Definition: The name of the person's affiliation.
Allowed values and other constraints: free text
Example: Institute of Time Travels

2.6 ROR ID

ID and name: B1.6 person_affiliation_ror
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: The ROR of the person's affiliation.
Allowed values and other constraints: is valid ROR ID
Example: 09af7gtg53

2.7 Address

ID and name: B1.7 person_affiliation_address
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: The address of the person's affiliation.
Allowed values and other constraints: free text
Example: Teleporter Avenue 123, Ankh–Morpok, United States of Humanities

2.8 Mail address

ID and name: B1.8 person_mail
Provided by: data provider, API (ORCID ID)
Obligation: recommended
Occurrences: 0–n
Definition: The mail address of the person.
Allowed values and other constraints: is valid mail address
Example: jane.doe@timetravels.int

2.9 Website

ID and name: B1.9 person_url
Provided by: data provider, API (ORCID ID)
Obligation: optional
Occurrences: 0–1
Definition: The URL of a person.
Allowed values and other constraints: is valid URL
Example: https://www.timetravels.int/members/jane–doe

3. Object title

ID and name: O3 object_title
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: Name of the object to make it distinguishable.
Allowed values and other constraints: free text
Example: Coin 231 of hoard from the northwest palace in Atlantis

4. Object description

ID and name: O4 object_description
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: (Detailed) description of the object. Should include information about the object and its collection not captured in other properties. For example, the primary reason for object collection or selection in terms of analytics.
Allowed values and other constraints: free text
Example: Galena-rich sediment from the washing pit.

5. Object identifiers

ID and name: O5 object_identifiers
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: Identifiers associated with the object. At least one identifier must be provided.

with the three subproperties:

5.1 Persistent Identifier

ID and name: O5.1 object_pid
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: Persistent identifier(s) assigned to the object.

with the two subproperties:

5.1.1 Value of persistent identifier

ID and name: O5.1.1 object_pid_value
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The persistent identifier assigned to the object.
Allowed values and other constraints: Valid persistent identifier according to `O5.1.2 Type of persistent identifier`
Example: 10.60510/ABCD123EF4567

5.1.2 Type of persistent identifier

ID and name: O5.1.2 object_pid_type
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The type of a persistent identifier that was assigned to the object.
Allowed values and other constraints: controlled vocabulary

5.2 Value of other identifier

ID and name: O5.2 object_id_value
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: Identifier by which the object is identified in a catalogue, database or comparable records (e.g., of the excavation catalogue or records of a laboratory).
Allowed values and other constraints: free text
Example: AG-01

5.3 Type of other identifier

ID and name: O5.3 object_id_type
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: The name of the catalogue, database or comparable records to which the ID refers. Mandatory if `O5.2 Value of other identifier` is provided.

Allowed values and other constraints: free text
Example: catalogue in the final excavation report

6. Date of collection

ID and name: O6 object_collection_date
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: Collection date of the object.
Allowed values and other constraints: date formatted as YYYY-MM-DD
Example: 1990-06-08

7. Collection method

ID and name: O7 object_collection_method
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: How the object was collected or obtained.
Allowed values and other constraints: controlled vocabulary

8. Object housing

ID and name: O8 object_housing
Provided by: data provider
Obligation: recommended
Occurrences: 1–n
Definition: The material in which the object is currently stored or was stored at any time after its collection. At least the current state should be recorded.

with the two subproperties:

8.1 Housing material

ID and name: O8.1 object_housing_material
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The material the object was or is stored in at the stage in its life cycle recorded in `O8.2 Stage of Storage`.
Allowed values and other constraints: controlled vocabulary

8.2 Stage of Storage

ID and name: O8.2 object_housing_stage
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The stage of the object's life cycle when the object was stored in the material recorded in `O8.1 Housing material`.
Allowed values and other constraints: controlled vocabulary

9. Object photo

ID and name: O9 object_photo
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: Photograph of the object, preferably at the time of collection. For guidance on photographs, see e.g. L. J. Fisher (2009), Photography for Archaeologists Part II: Artefact recording (BAJR Practical Guide Series 26).
Allowed values and other constraints: file path
Example: t.b.d.

10. Object weight

ID and name: O10 object_weight
Provided by: data provider
Obligation: optional
Occurrences: 0–1
Definition: The weight of the object at the point of collection, before analysis.

with the three subproperties:

10.1 Value

ID and name: O10.1 object_weight_value
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The value of the weight.
Allowed values and other constraints: decimal number
Example: 120.3

10.2 Unit

ID and name: O10.2 object_weight_unit
Provided by: data provider
Obligation: mandatory

Occurrences: 1
Definition: SI unit in which the weight is given.
Allowed values and other constraints: controlled vocabulary

10.3 Weight condition

ID and name: O10.3 object_weight_condition
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: Additional information about state of object at the time the weight was measured to give a better idea how representative the measured weight is.
Allowed values and other constraints: free text
Example: dry sandy material adhering to object

11. Object dimensions

ID and name: O11 object_dimension
Provided by: data provider
Obligation: optional
Occurrences: 0–1
Definition: The dimensions of the object.

with the four subproperties:

11.1 Height

ID and name: O11.1 object_dimension_height
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: The height of the object.
Allowed values and other constraints: decimal number
Example: 3.52

11.2 Length

ID and name: O11.2 object_dimension_length
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: The length of the object.
Allowed values and other constraints: decimal number
Example: 10.30

11.3 Width

ID and name: O11.3 object_dimension_width
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: The width of the object.
Allowed values and other constraints: decimal number
Example: 2.42

11.4 Unit of Dimensions

ID and name: O11.4 object_dimension_unit
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: Unit in which the dimension(s) of the object are provided.
Allowed values and other constraints: controlled vocabulary

12. Material

ID and name: O12 object_material
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The material the object is made of.
Allowed values and other constraints: controlled vocabulary. This property determines which material-specific metadata will be additionally recorded.

13. Bulk Pb concentration

ID and name: O13 object_bulk_chemistry_pb
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: The bulk lead concentration of the object.

with the eight subproperties:

13.1 Analytical method

ID and name: B4.1 chemistry_method
Provided by: data provider
Obligation: mandatory

Occurrences: 1
Definition: The method used to determine the chemical composition.
Allowed values and other constraints: controlled vocabulary

13.2 Analysed compound

ID and name: B4.2 chemistry_compound
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: The analysed chemical compound (chemical element or oxide).
Allowed values and other constraints: controlled vocabulary, not available if a mass spectrometric-method is recorded in `B4.1 Analytical method`.

13.3 Analysed isotope

ID and name: B4.3 chemistry_icp_isotope
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: The isotope used for quantification of a chemical element.
Allowed values and other constraints: controlled vocabulary, only available if a mass spectrometric-method is recorded in `B4.1 Analytical method`.

13.4 Value

ID and name: B4.4 chemistry_value
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: The concentration of the analysed chemical compound.
Allowed values and other constraints: decimal number
Example: 15.3

13.5 Unit

ID and name: B4.5 chemistry_unit
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: The unit in which the concentration of the analysed chemical compound is given.
Allowed values and other constraints: controlled vocabulary

13.6 Uncertainty type

ID and name: B4.6 chemistry_uncertainty_type
Provided by: data provider
Obligation: recommended
Occurrences: 0–n

Definition: The type of analytical uncertainty.
Allowed values and other constraints: controlled vocabulary

13.7 Confidence level

ID and name: B4.7 chemistry_uncertainty_sigma
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: Sigma value of the reported absolute analytical uncertainty.
Allowed values and other constraints: 1, 2, 3
Example: 2

13.8 Uncertainty value

ID and name: B4.8 chemistry_uncertainty_value
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: Value of the absolute analytical uncertainty.
Allowed values and other constraints: decimal number
Example: 0.3

14. Dating of object

ID and name: O14 object_date
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: The date of the object.

with the eight subproperties:

14.1 Persistent identifier

ID and name: B3.1 date_pid
Provided by: data provider
Obligation: recommended
Occurrences: 0–n

with the two subproperties:

14.1.1 VALUE

ID and name: B3.1.1 date_pid_value
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The value of the persistent identifier.

Allowed values and other constraints: The period's persistent identifier in one or more of the data infrastructures listed in `B3.1.2 Type`.
Example: 99152/p0qhb66vvth

14.1.2 TYPE

ID and name: B3.1.2 date_pid_type
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The name of the data infrastructure.
Allowed values and other constraints: controlled vocabulary

14.2 Date type

ID and name: B3.2 date_type
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: Is this an archaeological or geological age? Archaeological dates must be given in calendar years, with BCE dates as negative values. Geological dates must be given in million years.
Allowed values and other constraints: geological, archaeological
Example: archaeological

14.3 Absolute Date

ID and name: B3.3 date_absolute
Provided by: data provider, API
Obligation: recommended
Occurrences: 0–1
Definition: The absolute date of a point in time or period in years before or after common era. Values in BCE are reported as negative values. If the absolute date is given with an uncertainty such as 450 +/- 50 BC, start and end date mark the lower and upper limit of the date range, i.e. -500 and -400.

with the four subproperties:

14.3.1 START

ID and name: B3.3.1 date_absolute_start
Provided by: data provider, API
Obligation: mandatory
Occurrences: 1
Definition: The oldest possible date of the period.
Allowed values and other constraints: integer
Example: -15

14.3.2 END

ID and name: B3.3.2 date_absolute_end
Provided by: data provider, API

Obligation: recommended
Occurrences: 0–1
Definition: The youngest possible date of the period.
Allowed values and other constraints: integer
Example: 15

14.3.3 DATING METHOD

ID and name: B3.3.3 date_absolute_method
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: The method used to determine the absolute date.
Allowed values and other constraints: controlled vocabulary

14.3.4 UNIT OF DATE

ID and name: B3.3.4 date_absolute_unit
Provided by: TerraLID system
Obligation: mandatory
Occurrences: 1
Definition: The unit of the date.
Allowed values and other constraints: a, Ma
Example: a

14.4 Relative Date

ID and name: B3.4 date_relative
Provided by: data provider, API
Obligation: recommended
Occurrences: 0–1
Definition: The relative date of a point in time or period.

with the two subproperties:

14.4.1 CHRONOLOGICAL UNIT

ID and name: B3.4.1 date_relative_period
Provided by: data provider, API
Obligation: mandatory
Occurrences: 1
Definition: The relative date expressed as a chronological unit.
Allowed values and other constraints: controlled vocabulary

14.4.2 DATING METHOD

ID and name: B3.4.2 date_relative_method
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n

Definition: The method used to determine the relative date.
Allowed values and other constraints: controlled vocabulary

14.5 Cultural unit

ID and name: B3.5 date_archaeo_cultural
Provided by: data provider
Obligation: optional
Occurrences: 0–n
Definition: Relevant cultural and user created labels for the relative date of the item.
Allowed values and other constraints: free text, only available if `B3.2 Date type` = "archaeological".
Example: Roman

14.6 Orogenesis

ID and name: B3.6 date_geol_orogensis
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: The relative date expressed as anorogenic event.
Allowed values and other constraints: controlled vocabulary, only available if `B3.2 Date type` = "geological".

14.7 Definition of chronological unit

ID and name: B3.7 date_relative_reference
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: The reference defining the relative date or period.

with the five subproperties:

14.7.1 Persistent Identifier

ID and name: B5.1 relation_pid
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: The persistent identifier or TerraLID ID associated with a resource or related research output. If referring to another entity in the TerraLID database, the TerraLID identifier must be used.

with the two subproperties:

14.7.1.1 Value

ID and name: B5.1.1 relation_pid_value
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: Value of the persistent identifier or TerraLID ID.

Allowed values and other constraints: valid persistent identifier according to the options listed in `B5.1.2 Type`.
Example: 10.60510/ICDP5054ESYI201

14.7.1.2 Type

ID and name: B5.1.2 relation_pid_type
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The type of the identifier.
Allowed values and other constraints: controlled vocabulary

14.7.2 Full reference

ID and name: B5.2 relation_text
Provided by: data provider, API (DOI)
Obligation: recommended
Occurrences: 0–1
Definition: The full reference of a publication.
Allowed values and other constraints: free text
Example: Palinkaš, L. A., 1985, Lead isotope patterns in galenas from some selected ore deposits in Croatia and NW Bosnia, Geološki Vjesnik, 38, 175–89.

14.7.3 Kind of relation

ID and name: B5.3 relation_kind
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: Relationship between item and the research output.
Allowed values and other constraints: controlled vocabulary

14.7.4 Type of resource

ID and name: B5.4 relation_resource
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: Type of resource or research output.
Allowed values and other constraints: controlled vocabulary

14.7.5 Additional details

ID and name: B5.5 relation_detail
Provided by: data provider
Obligation: optional
Occurrences: 0–n
Definition: Additional information about the relation, e.g., if the related work addresses a specific aspect of the item (e.g., the geological setting).

Allowed values and other constraints: free text
Example: Information about the dating of the site.

15. Keywords

ID and name: O15 object_keywords
Provided by: data provider
Obligation: optional
Occurrences: 0–n
Definition: Keywords to describe aspects of the sample not covered by other metadata.
Allowed values and other constraints: free text
Example: t.b.d.

16. Object contamination

ID and name: O16 object_contamination
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: Information about potential contamination or treatment of the object that might impact the relevance of retrieved information (e.g. by post-depositional processes or conservation treatment).
Allowed values and other constraints: free text
Example: Galvanic restoration of the surface in 1967

17. Status of object

ID and name: O17 object_status
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: Information about the current status of the object and how to access it.

with the two subproperties:

17.1 Institution

ID and name: B2.1 status_institution
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: The institution at which the material is located.

with the five subproperties:

17.1.1 NAME

ID and name: B2.1.1 status_institution_name
Provided by: data provider, API (ROR ID)
Obligation: mandatory
Occurrences: 1
Definition: Name of the institution.
Allowed values and other constraints: free text
Example: Institute of Time Travels

17.1.2 ROR

ID and name: B2.1.2 status_institution_ror
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: ROR of the institution.
Allowed values and other constraints: is valid ROR ID
Example: 09af7gtg53

17.1.3 ADDRESS

ID and name: B2.1.3 status_institution_address
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: Address of the institution.
Allowed values and other constraints: free text
Example: Teleporter Avenue 123, Ankh–Morpok, United States of Humanities

17.1.4 STORAGE LOCATION

ID and name: B2.1.4 status_institution_location
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: Location of the item within the institution.
Allowed values and other constraints: free text
Example: Archive 9, shelf 3, box 1

17.1.5 CONTACT

ID and name: B2.1.5 status_institution_contact
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: Contact information for inquiries about the material. This may include, for example, a mail address or phone number of the respective department within the institution or the identification of a specific contact person as well as constraints on the availability of the point of contact such as opening hours.
Allowed values and other constraints: free text
Example: t.b.d.

17.2 Accessibility

ID and name: B2.2 status_accessibility
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: Is the material accessible to other researchers and do restrictions apply?
Allowed values and other constraints: controlled vocabulary

18. Authenticity of object

ID and name: O18.1 object_authenticity
Provided by: data provider
Obligation: mandatory
Occurrences: 0–1
Definition: The contemporary legal status of an object: whether it is a genuine archaeological object, contemporary imitation, or a modern imitation. For example, authentic numismatic objects were created by an authority that had the rights to do so, while contemporary imitations were not.

with the two subproperties:

18.1 Authenticity type

ID and name: O18.1 object_authenticity_type
Provided by: data provider
Obligation: recommended
Occurrences: 1
Definition: The object's type of authenticity.
Allowed values and other constraints: controlled vocabulary

18.2 Reasoning

ID and name: O18.2 object_authenticity_description
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: Reasoning for the given classification.
Allowed values and other constraints: free text
Example: The zinc content in the brass is higher than can be achieved with Roman technology.

19. Relations

ID and name: O19 object_relation
Provided by: data provider

Obligation: mandatory
Occurrences: 1–n
Definition: Information about related entities, including samples belonging to the object, and other research output such as publications providing relevant information about the object. This includes any literature from which information about the object was extracted.

with the five subproperties:

19.1 Persistent Identifier

ID and name: B5.1 relation_pid
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: The persistent identifier or TerraLID ID associated with a resource or related research output. If referring to another entity in the TerraLID database, the TerraLID identifier must be used.

with the two subproperties:

19.1.1 VALUE

ID and name: B5.1.1 relation_pid_value
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: Value of the persistent identifier or TerraLID ID.
Allowed values and other constraints: valid persistent identifier according to the options listed in `B5.1.2 Type`.
Example: 10.60510/ICDP5054ESYI201

19.1.2 TYPE

ID and name: B5.1.2 relation_pid_type
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The type of the identifier.
Allowed values and other constraints: controlled vocabulary

19.2 Full reference

ID and name: B5.2 relation_text
Provided by: data provider, API (DOI)
Obligation: recommended
Occurrences: 0–1
Definition: The full reference of a publication.
Allowed values and other constraints: free text
Example: Palinkaš, L. A., 1985, Lead isotope patterns in galenas from some selected ore deposits in Croatia and NW Bosnia, Geološki Vjesnik, 38, 175–89.

19.3 Kind of relation

ID and name: B5.3 relation_kind
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: Relationship between item and the research output.
Allowed values and other constraints: controlled vocabulary

19.4 Type of resource

ID and name: B5.4 relation_resource
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: Type of resource or research output.
Allowed values and other constraints: controlled vocabulary

19.5 Additional details

ID and name: B5.5 relation_detail
Provided by: data provider
Obligation: optional
Occurrences: 0–n
Definition: Additional information about the relation, e.g., if the related work addresses a specific aspect of the item (e.g., the geological setting).
Allowed values and other constraints: free text
Example: Information about the dating of the site.

Samples

TerraLID ID

ID and name: S0 terralid_sample_id
Provided by: TerraLID system
Obligation: mandatory
Occurrences: 1
Definition: The ID of the sample in the TerraLID database.
Allowed values and other constraints: t.b.d.
Example: t.b.d.

1. Sample identifiers

ID and name: S1 sample_identifiers
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: Identifiers assigned to the sample.

with the three subproperties:

1.1 Laboratory ID

ID and name: S1.1 sample_id_lab
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The identifier by which the sample was identified in the lab or publication.
Allowed values and other constraints: free text
Example: 2024/02

1.2 Persistent Identifier

ID and name: S1.2 sample_pid
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: Persistent identifier(s) assigned to the analysed material.

with the two subproperties:

1.2.1 Value of persistent Identifier

ID and name: S1.2.1 sample_pid_value
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: A persistent identifier assigned to the analysed material.
Allowed values and other constraints: valid persistent identifier according to `S1.2.2 Type of persistent identifier`
Example: 10.60510/ICDP5054ESYI201

1.2.2 Type of persistent identifier

ID and name: S1.2.2 sample_pid_type
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: The type of a persistent identifier that was assigned to the sample.
Allowed values and other constraints: controlled vocabulary

2. Objective of sampling

ID and name: S2 sample_objective
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: Short note for which purpose the sample was originally taken.
Allowed values and other constraints: free text
Example: provenance analysis

3. Sampled material

ID and name: S3 sample_material
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: The material that was sampled. This may often be the material recorded at `O12 Material` but can also be different, especially when a heterogeneous material is sampled.
Allowed values and other constraints: controlled vocabulary

4. Sampling location

ID and name: S4 sample_location
Provided by: data provider
Obligation: recommended

Occurrences: 0–1
Definition: Information about where on the object the sample was taken.

with the two subproperties:

4.1 Description of sampling location

ID and name: S4.1 sample_location_description
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: Description of location the sample was taken from.
Allowed values and other constraints: free text
Example: edge of the coin

4.2 Photo of sampling location

ID and name: S4.2 sample_location_photo
Provided by: data provider
Obligation: optional
Occurrences: 0–1
Definition: Photograph of the sample location. File size must be smaller than 2 MB.
Allowed values and other constraints: file path
Example: t.b.d.

5. Sample type

ID and name: S5 sample_type
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The type of the sampled material.
Allowed values and other constraints: controlled vocabulary

6. Sample weight

ID and name: S6 sample_weight
Provided by: data provider
Obligation: optional
Occurrences: 0–1
Definition: The weight of the sample before analysis.

with the two subproperties:

6.1 Value

ID and name: S6.1 sample_weight_value
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The value of the weight.
Allowed values and other constraints: decimal number
Example: 3.25

6.2 Unit

ID and name: S6.2 sample_weight_unit
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: SI unit in which the weight is given.
Allowed values and other constraints: controlled vocabulary

7. Sampling method

ID and name: S7 sample_method
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: The method used to take the sample.
Allowed values and other constraints: controlled vocabulary

8. Sample condition

ID and name: S8 sample_condition
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The state of the sample after analysis.
Allowed values and other constraints: controlled vocabulary

9. Sampling date

ID and name: S9 sample_date
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: Date when the sample was taken.

Allowed values and other constraints: date formatted as YYYY-MM-DD
Example: 2024-02-24

10. Sampling laboratory

ID and name: S10 sample_laboratory
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: Name (and address) of the laboratory, in which the sample was taken.
Allowed values and other constraints: free text
Example: Geochemistry laboratory of the University of Dreamland

11. Sample description

ID and name: S11 sample_description
Provided by: data provider
Obligation: optional
Occurrences: 0–1
Definition: Additional information about the sampling process not captured elsewhere.
Allowed values and other constraints: free text
Example: Sample was drilled with diamond-sputtered steel drill.

12. Bulk Pb concentration

ID and name: S12 sample_chemistry_pb
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: The bulk lead concentration of the sample.

with the eight subproperties:

12.1 Analytical method

ID and name: B4.1 chemistry_method
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The method used to determine the chemical composition.
Allowed values and other constraints: controlled vocabulary

12.2 Analysed compound

ID and name: B4.2 chemistry_compound
Provided by: data provider

Obligation: mandatory
Occurrences: 1–n
Definition: The analysed chemical compound (chemical element or oxide).
Allowed values and other constraints: controlled vocabulary, not available if a mass spectrometric-method is recorded in `B4.1 Analytical method`.

12.3 Analysed isotope

ID and name: B4.3 chemistry_icp_isotope
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: The isotope used for quantification of a chemical element.
Allowed values and other constraints: controlled vocabulary, only available if a mass spectrometric-method is recorded in `B4.1 Analytical method`.

12.4 Value

ID and name: B4.4 chemistry_value
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: The concentration of the analysed chemical compound.
Allowed values and other constraints: decimal number
Example: 15.3

12.5 Unit

ID and name: B4.5 chemistry_unit
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: The unit in which the concentration of the analysed chemical compound is given.
Allowed values and other constraints: controlled vocabulary

12.6 Uncertainty type

ID and name: B4.6 chemistry_uncertainty_type
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: The type of analytical uncertainty.
Allowed values and other constraints: controlled vocabulary

12.7 Confidence level

ID and name: B4.7 chemistry_uncertainty_sigma
Provided by: data provider
Obligation: recommended

Occurrences: 0–n
Definition: Sigma value of the reported absolute analytical uncertainty.
Allowed values and other constraints: 1, 2, 3
Example: 2

12.8 Uncertainty value

ID and name: B4.8 chemistry_uncertainty_value
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: Value of the absolute analytical uncertainty.
Allowed values and other constraints: decimal number
Example: 0.3

13. Sampling person

ID and name: S13 sample_creator
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: Information about the person that took the sample.

with the nine subproperties:

13.1 Role

ID and name: B1.1 person_role
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: The role in which the person is related to the linked information.
Allowed values and other constraints: controlled vocabulary
Example: Author

13.2 First names

ID and name: B1.2 person_name_first
Provided by: data provider, API (ORCID ID)
Obligation: recommended
Occurrences: 0–1
Definition: The first and middle name(s) of the person.
Allowed values and other constraints: free text
Example: Jane

13.3 Last Name

ID and name: B1.3 person_name_last
Provided by: data provider, API (ORCID ID)
Obligation: mandatory
Occurrences: 1
Definition: The last name of the person.
Allowed values and other constraints: free text
Example: Doe

13.4 Persistent Identifier

ID and name: B1.4 person_pid
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: Persistent identifier(s) assigned to the person.

with the two subproperties:

13.4.1 VALUE OF PERSISTENT IDENTIFIER

ID and name: B1.4.1 person_pid_value
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: A persistent identifier assigned to the analysed material.
Allowed values and other constraints: Valid persistent identifier according to B1.4.2 Type of persistent identifier
Example: 0000–0001–2345–678X

13.4.2 TYPE OF PERSISTENT IDENTIFIER

ID and name: B1.4.2 person_pid_type
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The type of the persistent identifier.
Allowed values and other constraints: controlled vocabulary

13.5 Affiliation name

ID and name: B1.5 person_affiliation_name
Provided by: data provider, API (ORCID ID, ROR ID)
Obligation: mandatory
Occurrences: 1–n
Definition: The name of the person's affiliation.
Allowed values and other constraints: free text
Example: Institute of Time Travels

13.6 ROR ID

ID and name: B1.6 person_affiliation_ror
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: The ROR of the person's affiliation.
Allowed values and other constraints: is valid ROR ID
Example: 09af7gtg53

13.7 Address

ID and name: B1.7 person_affiliation_address
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: The address of the person's affiliation.
Allowed values and other constraints: free text
Example: Teleporter Avenue 123, Ankh–Morpok, United States of Humanities

13.8 Mail address

ID and name: B1.8 person_mail
Provided by: data provider, API (ORCID ID)
Obligation: recommended
Occurrences: 0–n
Definition: The mail address of the person.
Allowed values and other constraints: is valid mail address
Example: jane.doe@timetravels.int

13.9 Website

ID and name: B1.9 person_url
Provided by: data provider, API (ORCID ID)
Obligation: optional
Occurrences: 0–1
Definition: The URL of a person.
Allowed values and other constraints: is valid URL
Example: https://www.timetravels.int/members/jane–doe

14. Sample status

ID and name: S14 sample_status
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: Information about the current status of the sample and how to access it.

with the two subproperties:

14.1 Institution

ID and name: B2.1 status_institution
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: The institution at which the material is located.

with the five subproperties:

14.1.1 NAME

ID and name: B2.1.1 status_institution_name
Provided by: data provider, API (ROR ID)
Obligation: mandatory
Occurrences: 1
Definition: Name of the institution.
Allowed values and other constraints: free text
Example: Institute of Time Travels

14.1.2 ROR

ID and name: B2.1.2 status_institution_ror
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: ROR of the institution.
Allowed values and other constraints: is valid ROR ID
Example: 09af7gtg53

14.1.3 ADDRESS

ID and name: B2.1.3 status_institution_address
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: Address of the institution.
Allowed values and other constraints: free text
Example: Teleporter Avenue 123, Ankh–Morpok, United States of Humanities

14.1.4 STORAGE LOCATION

ID and name: B2.1.4 status_institution_location
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: Location of the item within the institution.
Allowed values and other constraints: free text
Example: Archive 9, shelf 3, box 1

14.1.5 CONTACT

ID and name: B2.1.5 status_institution_contact
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: Contact information for inquiries about the material. This may include, for example, a mail address or phone number of the respective department within the institution or the identification of a specific contact person as well as constraints on the availability of the point of contact such as opening hours.
Allowed values and other constraints: free text
Example: t.b.d.

14.2 Accessibility

ID and name: B2.2 status_accessibility
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: Is the material accessible to other researchers and do restrictions apply?
Allowed values and other constraints: controlled vocabulary

15. Relations

ID and name: S15 sample_relation
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: Information about related entities, including analysis made on the sample, and other research output such as publications providing relevant information about the sample. This includes any literature from which information about the sample was extracted.

with the five subproperties:

15.1 Persistent Identifier

ID and name: B5.1 relation_pid
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: The persistent identifier or TerraLID ID associated with a resource or related research output. If referring to another entity in the TerraLID database, the TerraLID identifier must be used.

with the two subproperties:

15.1.1 VALUE

ID and name: B5.1.1 relation_pid_value
Provided by: data provider

Obligation: mandatory
Occurrences: 1
Definition: Value of the persistent identifier or TerraLID ID.
Allowed values and other constraints: valid persistent identifier according to the options listed in `B5.1.2 Type`.
Example: 10.60510/ICDP5054ESYI201

15.1.2 TYPE

ID and name: B5.1.2 relation_pid_type
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The type of the identifier.
Allowed values and other constraints: controlled vocabulary

15.2 Full reference

ID and name: B5.2 relation_text
Provided by: data provider, API (DOI)
Obligation: recommended
Occurrences: 0–1
Definition: The full reference of a publication.
Allowed values and other constraints: free text
Example: Palinkaš, L. A., 1985, Lead isotope patterns in galenas from some selected ore deposits in Croatia and NW Bosnia, Geološki Vjesnik, 38, 175–89.

15.3 Kind of relation

ID and name: B5.3 relation_kind
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: Relationship between item and the research output.
Allowed values and other constraints: controlled vocabulary

15.4 Type of resource

ID and name: B5.4 relation_resource
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: Type of resource or research output.
Allowed values and other constraints: controlled vocabulary

15.5 Additional details

ID and name: B5.5 relation_detail
Provided by: data provider
Obligation: optional

Occurrences: 0–n

Definition: Additional information about the relation, e.g., if the related work addresses a specific aspect of the item (e.g., the geological setting).

Allowed values and other constraints: free text

Example: Information about the dating of the site.

Analyses

TerraLID ID

ID and name: A0 terralid_analysis_id
Provided by: TerraLID system
Obligation: mandatory
Occurrences: 1
Definition: The ID of the analysis in the TerraLID database.
Allowed values and other constraints: t.b.d.
Example: t.b.d.

1. Laboratory ID

ID and name: A1 analysis_lab_id
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: The ID(s) of the analysis in a laboratory and/or another database.
Allowed values and other constraints: free text
Example: 2024-TR01

2. Analysis type

ID and name: A2 analysis_lia_type
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The type of analysis for measuring the lead isotope composition.
Allowed values and other constraints: controlled vocabulary

3. Preparation protocol

ID and name: A3 analysis_lia_preparation
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: Information about how the sample was prepared for analysis.

with the two subproperties:

3.1 Description

ID and name: A3.1 analysis_lia_preparation_description
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: The way the sample was prepared for analysis.
Allowed values and other constraints: free text
Example: Dissolution with aqua regia at 80°C and evaporation to dryness, followed by dissolution in 2% HNO_3.

3.2 Publication

ID and name: A3.2 analysis_lia_preparation_publication
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: If the preparation protocol was already published, the publication of the protocol.

with the five subproperties:

3.2.1 Persistent Identifier

ID and name: B5.1 relation_pid
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: The persistent identifier or TerraLID ID associated with a resource or related research output. If referring to another entity in the TerraLID database, the TerraLID identifier must be used.

with the two subproperties:

3.2.1.1 VALUE

ID and name: B5.1.1 relation_pid_value
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: Value of the persistent identifier or TerraLID ID.
Allowed values and other constraints: valid persistent identifier according to the options listed in `B5.1.2 Type`.
Example: 10.60510/ICDP5054ESYI201

3.2.1.2 TYPE

ID and name: B5.1.2 relation_pid_type
Provided by: data provider
Obligation: mandatory
Occurrences: 1

Definition: The type of the identifier.
Allowed values and other constraints: controlled vocabulary

3.2.2 Full reference

ID and name: B5.2 relation_text
Provided by: data provider, API (DOI)
Obligation: recommended
Occurrences: 0–1
Definition: The full reference of a publication.
Allowed values and other constraints: free text
Example: Palinkaš, L. A., 1985, Lead isotope patterns in galenas from some selected ore deposits in Croatia and NW Bosnia, Geološki Vjesnik, 38, 175–89.

3.2.3 Kind of relation

ID and name: B5.3 relation_kind
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: Relationship between item and the research output.
Allowed values and other constraints: controlled vocabulary

3.2.4 Type of resource

ID and name: B5.4 relation_resource
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: Type of resource or research output.
Allowed values and other constraints: controlled vocabulary

3.2.5 Additional details

ID and name: B5.5 relation_detail
Provided by: data provider
Obligation: optional
Occurrences: 0–n
Definition: Additional information about the relation, e.g., if the related work addresses a specific aspect of the item (e.g., the geological setting).
Allowed values and other constraints: free text
Example: Information about the dating of the site.

4. Analysed material

ID and name: A4 analysis_lia_material
Provided by: data provider
Obligation: recommended

Occurrences: 0–1
Definition: Capture here if specific materials within a sample are analysed, such as mineral separates or laser ablation of individual mineral species within the same specimen.
Allowed values and other constraints: free text
Example: only malachite analysed

5. Separation protocol

ID and name: A5 analysis_lia_separation
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: Information about the protocol used for the separation of lead from the sample matrix.

with the two subproperties:

5.1 Description

ID and name: A5.1 analysis_lia_separation_description
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: If unpublished, provide description of the protocol used for the separation of lead from the sample matrix. Otherwise, list all deviations from the published protocol.
Allowed values and other constraints: free text
Example: t.b.d.

5.2 Publication

ID and name: A5.2 analysis_lia_separation_publication
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: The publication of the protocol used for separating lead from the sample matrix.

with the five subproperties:

5.2.1 Persistent Identifier

ID and name: B5.1 relation_pid
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: The persistent identifier or TerraLID ID associated with a resource or related research output. If referring to another entity in the TerraLID database, the TerraLID identifier must be used.

with the two subproperties:

5.2.1.1 VALUE

ID and name: B5.1.1 relation_pid_value
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: Value of the persistent identifier or TerraLID ID.
Allowed values and other constraints: valid persistent identifier according to the options listed in `B5.1.2 Type`.
Example: 10.60510/ICDP5054ESYI201

5.2.1.2 TYPE

ID and name: B5.1.2 relation_pid_type
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The type of the identifier.
Allowed values and other constraints: controlled vocabulary

5.2.2 Full reference

ID and name: B5.2 relation_text
Provided by: data provider, API (DOI)
Obligation: recommended
Occurrences: 0–1
Definition: The full reference of a publication.
Allowed values and other constraints: free text
Example: Palinkaš, L. A., 1985, Lead isotope patterns in galenas from some selected ore deposits in Croatia and NW Bosnia, Geološki Vjesnik, 38, 175–89.

5.2.3 Kind of relation

ID and name: B5.3 relation_kind
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: Relationship between item and the research output.
Allowed values and other constraints: controlled vocabulary

5.2.4 Type of resource

ID and name: B5.4 relation_resource
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: Type of resource or research output.
Allowed values and other constraints: controlled vocabulary

5.2.5 Additional details

ID and name: B5.5 relation_detail
Provided by: data provider
Obligation: optional
Occurrences: 0–n
Definition: Additional information about the relation, e.g., if the related work addresses a specific aspect of the item (e.g., the geological setting).
Allowed values and other constraints: free text
Example: Information about the dating of the site.

6. Measurement device

ID and name: A6 analysis_lia_instrument
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: Information about the instrument used to measure the lead isotope composition.

with the three subproperties:

6.1 Instrument type

ID and name: A6.1 analysis_lia_instrument_type
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The type of instrument.
Allowed values and other constraints: controlled vocabulary

6.2 Instrument model

ID and name: A6.2 analysis_lia_instrument_model
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: The manufacturer and model name of the instrument.
Allowed values and other constraints: controlled vocabulary

6.3 Persistent identifier (PIDinst)

ID and name: A6.3 analysis_lia_instrument_pid
Provided by: data provider
Obligation: optional
Occurrences: 0–1
Definition: The full URL of the instrument's PIDinst.

Allowed values and other constraints: is valid PIDinst
Example: http://hdl.handle.net/21.11157/cd5777a9-07c4-4e80-a770-9f294f09894d

7. Analyte Pb concentration

ID and name: A7 analysis_lia_pb_concentration
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: The lead concentration of the analyte.

with the eight subproperties:

7.1 Analytical method

ID and name: B4.1 chemistry_method
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The method used to determine the chemical composition.
Allowed values and other constraints: controlled vocabulary

7.2 Analysed compound

ID and name: B4.2 chemistry_compound
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: The analysed chemical compound (chemical element or oxide).
Allowed values and other constraints: controlled vocabulary, not available if a mass spectrometric-method is recorded in `B4.1 Analytical method`.

7.3 Analysed isotope

ID and name: B4.3 chemistry_icp_isotope
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: The isotope used for quantification of a chemical element.
Allowed values and other constraints: controlled vocabulary, only available if a mass spectrometric-method is recorded in `B4.1 Analytical method`.

7.4 Value

ID and name: B4.4 chemistry_value
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n

Definition: The concentration of the analysed chemical compound.
Allowed values and other constraints: decimal number
Example: 15.3

7.5 Unit

ID and name: B4.5 chemistry_unit
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: The unit in which the concentration of the analysed chemical compound is given.
Allowed values and other constraints: controlled vocabulary

7.6 Uncertainty type

ID and name: B4.6 chemistry_uncertainty_type
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: The type of analytical uncertainty.
Allowed values and other constraints: controlled vocabulary

7.7 Confidence level

ID and name: B4.7 chemistry_uncertainty_sigma
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: Sigma value of the reported absolute analytical uncertainty.
Allowed values and other constraints: 1, 2, 3
Example: 2

7.8 Uncertainty value

ID and name: B4.8 chemistry_uncertainty_value
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: Value of the absolute analytical uncertainty.
Allowed values and other constraints: decimal number
Example: 0.3

8. Mean total intensity of analyte

ID and name: A8 analysis_lia_pb_intensity
Provided by: data provider
Obligation: recommended

Occurrences: 0–1
Definition: The mean total intensity (sum of all isotope signals) during the analysis.

with the two subproperties:

8.1 Value

ID and name: A8.1 analysis_lia_pb_intensity_value
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The value of the mean total intensity.
Allowed values and other constraints: decimal number
Example: 40.5

8.2 Unit

ID and name: A8.2 analysis_lia_pb_intensity_unit
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The SI unit in which the mean total intensity is given.
Allowed values and other constraints: controlled vocabulary

9. Reference materials

ID and name: A9 analysis_lia_standard-pb
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: Information about the reference material(s) for lead isotopes used during the analysis for quality control and/or correction of instrumental fractionation.

with the six subproperties:

9.1 Name of lead isotope reference material

ID and name: A9.1 analysis_lia_standard-pb_name
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: The name of the reference material for lead isotopes.
Allowed values and other constraints: controlled vocabulary

9.2 Publication of lead isotope reference material

ID and name: A9.2 analysis_lia_standard-pb_publication
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: Publication reporting the values of the reference material's lead isotope ratios used for mass bias correction. These are not necessarily the values originally published for the reference material.

with the five subproperties:

9.2.1 Persistent Identifier

ID and name: B5.1 relation_pid
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: The persistent identifier or TerraLID ID associated with a resource or related research output. If referring to another entity in the TerraLID database, the TerraLID identifier must be used.

with the two subproperties:

9.2.1.1 VALUE

ID and name: B5.1.1 relation_pid_value
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: Value of the persistent identifier or TerraLID ID.
Allowed values and other constraints: valid persistent identifier according to the options listed in `B5.1.2 Type`.
Example: 10.60510/ICDP5054ESYI201

9.2.1.2 TYPE

ID and name: B5.1.2 relation_pid_type
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The type of the identifier.
Allowed values and other constraints: controlled vocabulary

9.2.2 Full reference

ID and name: B5.2 relation_text
Provided by: data provider, API (DOI)
Obligation: recommended
Occurrences: 0–1
Definition: The full reference of a publication.
Allowed values and other constraints: free text
Example: Palinkaš, L. A., 1985, Lead isotope patterns in galenas from some selected ore deposits in Croatia and NW Bosnia, Geološki Vjesnik, 38, 175–89.

9.2.3 Kind of relation

ID and name: B5.3 relation_kind
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: Relationship between item and the research output.
Allowed values and other constraints: controlled vocabulary

9.2.4 Type of resource

ID and name: B5.4 relation_resource
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: Type of resource or research output.
Allowed values and other constraints: controlled vocabulary

9.2.5 Additional details

ID and name: B5.5 relation_detail
Provided by: data provider
Obligation: optional
Occurrences: 0–n
Definition: Additional information about the relation, e.g., if the related work addresses a specific aspect of the item (e.g., the geological setting).
Allowed values and other constraints: free text
Example: Information about the dating of the site.

9.3 Measured values of lead isotope reference material

ID and name: A9.3 analysis_lia_standard-pb_measured
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: The measured lead isotope ratios of the reference material.

with the seven subproperties:

9.3.1 Name

ID and name: B6.1 lia_ratio_name
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The lead isotope ratio for which the value is reported.
Allowed values and other constraints: 206Pb/204Pb, 207Pb/204Pb, 208Pb/204Pb, 204Pb/206Pb, 207Pb/206Pb,

208Pb/206Pb, 207Pb/208Pb, 206Pb/208Pb
Example: 206Pb/204Pb

9.3.2 Value

ID and name: B6.2 lia_ratio_value
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: Value of the lead isotope ratio.
Allowed values and other constraints: decimal number
Example: 18.59123

9.3.3 Uncertainty

ID and name: B6.3 lia_ratio_uncertainty_type
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: Type of analytical uncertainty for the lead isotope ratio.
Allowed values and other constraints: controlled vocabulary

9.3.4 Confidence level

ID and name: B6.4 lia_ratio_uncertainty_sigma
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: Sigma value of the reported absolute analytical uncertainty.
Allowed values and other constraints: 1, 2, 3
Example: 2

9.3.5 Absolute uncertainty

ID and name: B6.5 lia_ratio_uncertainty_value_absolute
Provided by: data provider, TerraLID system
Obligation: recommended
Occurrences: 0–1
Definition: Value of the reported absolute analytical uncertainty.
Allowed values and other constraints: decimal number
Example: 0.00008

9.3.6 Relative uncertainty

ID and name: B6.6 lia_ratio_uncertainty_value_relative
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: Value of relative analytical uncertainty for the lead isotope ratio in per cent (%). If provided, the TerraLID

system will calculate the corresponding absolute values.
Allowed values and other constraints: decimal number
Example: 0.1

9.3.7 Source

ID and name: B6.7 lia_ratio_source
Provided by: TerraLID system
Obligation: mandatory
Occurrences: 1
Definition: Whether the date was reported in the publication or calculated by the TerraLID system from other published values.
Allowed values and other constraints: original, calculated
Example: original

9.4 Name of thallium isotope reference material

ID and name: A9.4 analysis_lia_standard-tl_name
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: The name of the thallium reference material used during the analysis for quality control and/or correction of instrumental fractionation.
Allowed values and other constraints: controlled vocabulary

9.5 Measured $^{205}Tl/^{203}Tl$ ratio of thallium isotope reference material

ID and name: A9.5 analysis_lia_standard-tl_measured
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: The measured $^{205}Tl/^{203}Tl$ ratio of the reference material.
Allowed values and other constraints: decimal number
Example: 2.38714

9.6 Concentration of the thallium isotope reference material

ID and name: A9.6 analysis_lia_standard-tl_concentration
Provided by: data provider
Obligation: optional
Occurrences: 0–1
Definition: The concentration of the thallium reference material added to the sample in ppb (e.g. ng/g, µg/l).
Allowed values and other constraints: number
Example: 100

10. Mass bias correction model

ID and name: A10 analysis_lia_correction
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: The model(s) used for mass bias correction of the lead isotope data.
Allowed values and other constraints: controlled vocabulary

11. Laboratory

ID and name: A11 analysis_lia_laboratory
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: The laboratory that performed the lead isotope analysis.

with the nine subproperties:

11.1 Role

ID and name: B1.1 person_role
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: The role in which the person is related to the linked information.
Allowed values and other constraints: controlled vocabulary
Example: Author

11.2 First names

ID and name: B1.2 person_name_first
Provided by: data provider, API (ORCID ID)
Obligation: recommended
Occurrences: 0–1
Definition: The first and middle name(s) of the person.
Allowed values and other constraints: free text
Example: Jane

11.3 Last Name

ID and name: B1.3 person_name_last
Provided by: data provider, API (ORCID ID)
Obligation: mandatory
Occurrences: 1
Definition: The last name of the person.

Allowed values and other constraints: free text
Example: Doe

11.4 Persistent Identifier

ID and name: B1.4 person_pid
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: Persistent identifier(s) assigned to the person.

with the two subproperties:

11.4.1 VALUE OF PERSISTENT IDENTIFIER

ID and name: B1.4.1 person_pid_value
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: A persistent identifier assigned to the analysed material.
Allowed values and other constraints: Valid persistent identifier according to B1.4.2 Type of persistent identifier
Example: 0000–0001–2345–678X

11.4.2 TYPE OF PERSISTENT IDENTIFIER

ID and name: B1.4.2 person_pid_type
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The type of the persistent identifier.
Allowed values and other constraints: controlled vocabulary

11.5 Affiliation name

ID and name: B1.5 person_affiliation_name
Provided by: data provider, API (ORCID ID, ROR ID)
Obligation: mandatory
Occurrences: 1–n
Definition: The name of the person's affiliation.
Allowed values and other constraints: free text
Example: Institute of Time Travels

11.6 ROR ID

ID and name: B1.6 person_affiliation_ror
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: The ROR of the person's affiliation.

Allowed values and other constraints: is valid ROR ID
Example: 09af7gtg53

11.7 Address

ID and name: B1.7 person_affiliation_address
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: The address of the person's affiliation.
Allowed values and other constraints: free text
Example: Teleporter Avenue 123, Ankh–Morpok, United States of Humanities

11.8 Mail address

ID and name: B1.8 person_mail
Provided by: data provider, API (ORCID ID)
Obligation: recommended
Occurrences: 0–n
Definition: The mail address of the person.
Allowed values and other constraints: is valid mail address
Example: jane.doe@timetravels.int

11.9 Website

ID and name: B1.9 person_url
Provided by: data provider, API (ORCID ID)
Obligation: optional
Occurrences: 0–1
Definition: The URL of a person.
Allowed values and other constraints: is valid URL
Example: https://www.timetravels.int/members/jane–doe

12. Date of analysis

ID and name: A12 analysis_lia_date
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: The day of the analysis.
Allowed values and other constraints: date formatted as YYYY-MM-DD
Example: 2024-02-24

13. Description

ID and name: A13 analysis_lia_description
Provided by: data provider

Obligation: optional
Occurrences: 0–1
Definition: Additional information about the analytical procedure not captured elsewhere.
Allowed values and other constraints: free text
Example: t.b.d.

14. Lead isotope ratios

ID and name: A14 analysis_lia_ratio
Provided by: data provider, TerraLID system
Obligation: mandatory
Occurrences: 1–n
Definition: Mass-bias corrected lead isotope ratios and analytical uncertainty. The TerraLID system will calculate all ratios not reported in the original publication.

with the seven subproperties:

14.1 Name

ID and name: B6.1 lia_ratio_name
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The lead isotope ratio for which the value is reported.
Allowed values and other constraints: 206Pb/204Pb, 207Pb/204Pb, 208Pb/204Pb, 204Pb/206Pb, 207Pb/206Pb, 208Pb/206Pb, 207Pb/208Pb, 206Pb/208Pb
Example: 206Pb/204Pb

14.2 Value

ID and name: B6.2 lia_ratio_value
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: Value of the lead isotope ratio.
Allowed values and other constraints: decimal number
Example: 18.59123

14.3 Uncertainty

ID and name: B6.3 lia_ratio_uncertainty_type
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: Type of analytical uncertainty for the lead isotope ratio.
Allowed values and other constraints: controlled vocabulary

14.4 Confidence level

ID and name: B6.4 lia_ratio_uncertainty_sigma
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: Sigma value of the reported absolute analytical uncertainty.
Allowed values and other constraints: 1, 2, 3
Example: 2

14.5 Absolute uncertainty

ID and name: B6.5 lia_ratio_uncertainty_value_absolute
Provided by: data provider, TerraLID system
Obligation: recommended
Occurrences: 0–1
Definition: Value of the reported absolute analytical uncertainty.
Allowed values and other constraints: decimal number
Example: 0.00008

14.6 Relative uncertainty

ID and name: B6.6 lia_ratio_uncertainty_value_relative
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: Value of relative analytical uncertainty for the lead isotope ratio in per cent (%). If provided, the TerraLID system will calculate the corresponding absolute values.
Allowed values and other constraints: decimal number
Example: 0.1

14.7 Source

ID and name: B6.7 lia_ratio_source
Provided by: TerraLID system
Obligation: mandatory
Occurrences: 1
Definition: Whether the date was reported in the publication or calculated by the TerraLID system from other published values.
Allowed values and other constraints: original, calculated
Example: original

15. Age model parameters

ID and name: A15 analysis_lia_age_model
Provided by: TerraLID system
Obligation: recommended
Occurrences: 0–n
Definition: Age model parameters calculated from the mass-bias corrected lead isotope ratios.

with the nine subproperties:

15.1 Age model name

ID and name: A15.1 analysis_lia_age_model_name
Provided by: TerraLID system
Obligation: mandatory
Occurrences: 1
Definition: The age model used for calculating the parameters
Allowed values and other constraints: SK75, CR75, AJ84, representing the age models defined by Stacey & Kramers (1975), Cumming & Richards (1975), and Albarède & Juteau (1984), respectively.
Example: SK75

15.2 Model age

ID and name: A15.2 analysis_lia_age_model_Tmod
Provided by: TerraLID system
Obligation: recommended
Occurrences: 0–1
Definition: Value of the model age in million years (Ma).
Allowed values and other constraints: decimal number
Example: 250.54

15.3 Uncertainty of model age

ID and name: A15.3 analysis_lia_age_model_Tmod_uncertainty
Provided by: TerraLID system
Obligation: recommended
Occurrences: 0–1
Definition: Uncertainty of the model age.
Allowed values and other constraints: decimal number
Example: t.b.d.

15.4 Mu

ID and name: A15.4 analysis_lia_age_model_mu
Provided by: TerraLID system
Obligation: recommended
Occurrences: 0–1
Definition: Value of mu (μ).
Allowed values and other constraints: decimal number
Example: 9.86

15.5 Uncertainty of mu

ID and name: A15.5 analysis_lia_age_model_mu_uncertainty
Provided by: TerraLID system
Obligation: recommended
Occurrences: 0–1
Definition: Uncertainty of mu.
Allowed values and other constraints: decimal number
Example: t.b.d.

15.6 Kappa

ID and name: A15.6 analysis_lia_age_model_kappa
Provided by: TerraLID system
Obligation: recommended
Occurrences: 0–1
Definition: Value of kappa (κ).
Allowed values and other constraints: decimal number
Example: 3.92

15.7 Uncertainty of kappa

ID and name: A15.7 analysis_lia_age_model_kappa_uncertainty
Provided by: TerraLID system
Obligation: recommended
Occurrences: 0–1
Definition: Uncertainty of kappa.
Allowed values and other constraints: decimal number
Example: t.b.d.

15.8 Omega

ID and name: A15.8 analysis_lia_age_model_omega
Provided by: TerraLID system
Obligation: recommended
Occurrences: 0–1
Definition: Value of omega (ω).
Allowed values and other constraints: decimal number
Example: t.b.d.

15.9 Uncertainty of omega

ID and name: A15.9 analysis_lia_age_model_omega_uncertainty
Provided by: TerraLID system
Obligation: recommended
Occurrences: 0–1
Definition: Uncertainty of omega.

Allowed values and other constraints: decimal number
Example: t.b.d.

16. Relations

ID and name: A16 analysis_lia_relation
Provided by: data provider
Obligation: recommended
Occurrences: –n
Definition: Information about related entities and other research output such as publications providing relevant information about the analysis. This includes any literature from which information about the analysis was extracted.

with the five subproperties:

16.1 Persistent Identifier

ID and name: B5.1 relation_pid
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: The persistent identifier or TerraLID ID associated with a resource or related research output. If referring to another entity in the TerraLID database, the TerraLID identifier must be used.

with the two subproperties:

16.1.1 VALUE

ID and name: B5.1.1 relation_pid_value
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: Value of the persistent identifier or TerraLID ID.
Allowed values and other constraints: valid persistent identifier according to the options listed in `B5.1.2 Type`.
Example: 10.60510/ICDP5054ESYI201

16.1.2 TYPE

ID and name: B5.1.2 relation_pid_type
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The type of the identifier.
Allowed values and other constraints: controlled vocabulary

16.2 Full reference

ID and name: B5.2 relation_text
Provided by: data provider, API (DOI)
Obligation: recommended

Occurrences: 0–1
Definition: The full reference of a publication.
Allowed values and other constraints: free text
Example: Palinkaš, L. A., 1985, Lead isotope patterns in galenas from some selected ore deposits in Croatia and NW Bosnia, Geološki Vjesnik, 38, 175–89.

16.3 Kind of relation

ID and name: B5.3 relation_kind
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: Relationship between item and the research output.
Allowed values and other constraints: controlled vocabulary

16.4 Type of resource

ID and name: B5.4 relation_resource
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: Type of resource or research output.
Allowed values and other constraints: controlled vocabulary

16.5 Additional details

ID and name: B5.5 relation_detail
Provided by: data provider
Obligation: optional
Occurrences: 0–n
Definition: Additional information about the relation, e.g., if the related work addresses a specific aspect of the item (e.g., the geological setting).
Allowed values and other constraints: free text
Example: Information about the dating of the site.

Ore

1. Ore mineralogy

ID and name: OO1 material_ore_mineralogy
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: The mineralogical composition of the ore.

with the two subproperties:

1.1 Minerals

ID and name: OO1.1 material_ore_mineralogy_mineral
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: The minerals included in the specimen.

with the two subproperties:

1.1.1 Mineral name

ID and name: OO1.1.1 material_ore_mineralogy_mineral_name
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: Name of the mineral approved by the International Mineralogical Association (IMA).
Allowed values and other constraints: controlled vocabulary (IMA list of minerals), retrieved from the Mindat API

1.1.2 Mineral ID

ID and name: OO1.1.2 material_ore_mineralogy_mineral_id
Provided by: Mindat API
Obligation: mandatory
Occurrences: 1
Definition: The Mindat ID of the mineral.
Allowed values and other constraints: Value in the `id` field of a Mindat mineral record.

1.2 Mineral–hosting ore part

ID and name: OO1.2 material_ore_mineral_part
Provided by: data provider
Obligation: mandatory

Occurrences: 1–n
Definition: The part of the ore to which the mineral belongs to.
Allowed values and other constraints: controlled vocabulary

2. Commodity

ID and name: OO2 material_ore_commodity
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: Information about the targeted metal(s) by mining activities through time.

with the two subproperties:

2.1 Targeted metals

ID and name: OO2.1 material_ore_commodity_metal
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: The target metal(s) of the mining activities.
Allowed values and other constraints: controlled vocabulary

2.2 Period of extraction

ID and name: OO2.2 material_ore_commodity_period
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: Period when the mine was exploited for the metals listed in `OO2.1 Targeted metals`.

with the eight subproperties:

2.2.1 Persistent identifier

ID and name: B3.1 date_pid
Provided by: data provider
Obligation: recommended
Occurrences: 0–n

with the two subproperties:

2.2.1.1 VALUE

ID and name: B3.1.1 date_pid_value
Provided by: data provider
Obligation: mandatory
Occurrences: 1

Definition: The value of the persistent identifier.
Allowed values and other constraints: The period's persistent identifier in one or more of the data infrastructures listed in `B3.1.2 Type`.
Example: 99152/p0qhb66vvth

2.2.1.2 TYPE

ID and name: B3.1.2 date_pid_type
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The name of the data infrastructure.
Allowed values and other constraints: controlled vocabulary

2.2.2 Date type

ID and name: B3.2 date_type
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: Is this an archaeological or geological age? Archaeological dates must be given in calendar years, with BCE dates as negative values. Geological dates must be given in million years.
Allowed values and other constraints: geological, archaeological
Example: archaeological

2.2.3 Absolute Date

ID and name: B3.3 date_absolute
Provided by: data provider, API
Obligation: recommended
Occurrences: 0–1
Definition: The absolute date of a point in time or period in years before or after common era. Values in BCE are reported as negative values. If the absolute date is given with an uncertainty such as 450 +/- 50 BC, start and end date mark the lower and upper limit of the date range, i.e. -500 and -400.

with the four subproperties:

2.2.3.1 START

ID and name: B3.3.1 date_absolute_start
Provided by: data provider, API
Obligation: mandatory
Occurrences: 1
Definition: The oldest possible date of the period.
Allowed values and other constraints: integer
Example: -15

2.2.3.2 END

ID and name: B3.3.2 date_absolute_end
Provided by: data provider, API
Obligation: recommended
Occurrences: 0–1
Definition: The youngest possible date of the period.
Allowed values and other constraints: integer
Example: 15

2.2.3.3 DATING METHOD

ID and name: B3.3.3 date_absolute_method
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: The method used to determine the absolute date.
Allowed values and other constraints: controlled vocabulary

2.2.3.4 UNIT OF DATE

ID and name: B3.3.4 date_absolute_unit
Provided by: TerraLID system
Obligation: mandatory
Occurrences: 1
Definition: The unit of the date.
Allowed values and other constraints: a, Ma
Example: a

2.2.4 Relative Date

ID and name: B3.4 date_relative
Provided by: data provider, API
Obligation: recommended
Occurrences: 0–1
Definition: The relative date of a point in time or period.

with the two subproperties:

2.2.4.1 CHRONOLOGICAL UNIT

ID and name: B3.4.1 date_relative_period
Provided by: data provider, API
Obligation: mandatory
Occurrences: 1
Definition: The relative date expressed as a chronological unit.
Allowed values and other constraints: controlled vocabulary

2.2.4.2 DATING METHOD

ID and name: B3.4.2 date_relative_method
Provided by: data provider

Obligation: mandatory
Occurrences: 1–n
Definition: The method used to determine the relative date.
Allowed values and other constraints: controlled vocabulary

2.2.5 Cultural unit

ID and name: B3.5 date_archaeo_cultural
Provided by: data provider
Obligation: optional
Occurrences: 0–n
Definition: Relevant cultural and user created labels for the relative date of the item.
Allowed values and other constraints: free text, only available if `B3.2 Date type` = "archaeological".
Example: Roman

2.2.6 Orogenesis

ID and name: B3.6 date_geol_orogensis
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: The relative date expressed as anorogenic event.
Allowed values and other constraints: controlled vocabulary, only available if `B3.2 Date type` = "geological".

2.2.7 Definition of chronological unit

ID and name: B3.7 date_relative_reference
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: The reference defining the relative date or period.

with the five subproperties:

2.2.7.1 Persistent Identifier

ID and name: B5.1 relation_pid
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: The persistent identifier or TerraLID ID associated with a resource or related research output. If referring to another entity in the TerraLID database, the TerraLID identifier must be used.

with the two subproperties:

2.2.7.1.1 Value

ID and name: B5.1.1 relation_pid_value
Provided by: data provider
Obligation: mandatory

Occurrences: 1
Definition: Value of the persistent identifier or TerraLID ID.
Allowed values and other constraints: valid persistent identifier according to the options listed in `B5.1.2 Type`.
Example: 10.60510/ICDP5054ESYI201

2.2.7.1.2 Type

ID and name: B5.1.2 relation_pid_type
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The type of the identifier.
Allowed values and other constraints: controlled vocabulary

2.2.7.2 Full reference

ID and name: B5.2 relation_text
Provided by: data provider, API (DOI)
Obligation: recommended
Occurrences: 0–1
Definition: The full reference of a publication.
Allowed values and other constraints: free text
Example: Palinkaš, L. A., 1985, Lead isotope patterns in galenas from some selected ore deposits in Croatia and NW Bosnia, Geološki Vjesnik, 38, 175–89.

2.2.7.3 Kind of relation

ID and name: B5.3 relation_kind
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: Relationship between item and the research output.
Allowed values and other constraints: controlled vocabulary

2.2.7.4 Type of resource

ID and name: B5.4 relation_resource
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: Type of resource or research output.
Allowed values and other constraints: controlled vocabulary

2.2.7.5 Additional details

ID and name: B5.5 relation_detail
Provided by: data provider
Obligation: optional
Occurrences: 0–n
Definition: Additional information about the relation, e.g., if the related work addresses a specific aspect of the item

(e.g., the geological setting).
Allowed values and other constraints: free text
Example: Information about the dating of the site.

3. Mineralisation

ID and name: OO3 material_ore_mineralisation
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: Information about the mineralisation of the ore.

with the two subproperties:

3.1 Mineralisation type

ID and name: OO3.1 material_ore_mineralisation_type
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: The type of fabric to which the mineral belongs to.
Allowed values and other constraints: controlled vocabulary

3.2 Mineralisation phase

ID and name: OO3.2 material_ore_mineralisation_phase
Provided by: data provider
Obligation: optional
Occurrences: 0–1
Definition: The relative position in the sequence of events forming the ore deposit with 1 being the earliest mineralisation event.
Allowed values and other constraints: integer
Example: 2

4. Ore chemistry

ID and name: OO4 material_ore_chemistry
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: Information about the chemical composition of the ore.

with the two subproperties:

4.1 Chemical composition

ID and name: OO4.1 material_ore_chemistry_element
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: The chemical composition of the ore.

with the eight subproperties:

4.1.1 Analytical method

ID and name: B4.1 chemistry_method
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The method used to determine the chemical composition.
Allowed values and other constraints: controlled vocabulary

4.1.2 Analysed compound

ID and name: B4.2 chemistry_compound
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: The analysed chemical compound (chemical element or oxide).
Allowed values and other constraints: controlled vocabulary, not available if a mass spectrometric-method is recorded in `B4.1 Analytical method`.

4.1.3 Analysed isotope

ID and name: B4.3 chemistry_icp_isotope
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: The isotope used for quantification of a chemical element.
Allowed values and other constraints: controlled vocabulary, only available if a mass spectrometric-method is recorded in `B4.1 Analytical method`.

4.1.4 Value

ID and name: B4.4 chemistry_value
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: The concentration of the analysed chemical compound.
Allowed values and other constraints: decimal number
Example: 15.3

4.1.5 Unit

ID and name: B4.5 chemistry_unit
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: The unit in which the concentration of the analysed chemical compound is given.
Allowed values and other constraints: controlled vocabulary

4.1.6 Uncertainty type

ID and name: B4.6 chemistry_uncertainty_type
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: The type of analytical uncertainty.
Allowed values and other constraints: controlled vocabulary

4.1.7 Confidence level

ID and name: B4.7 chemistry_uncertainty_sigma
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: Sigma value of the reported absolute analytical uncertainty.
Allowed values and other constraints: 1, 2, 3
Example: 2

4.1.8 Uncertainty value

ID and name: B4.8 chemistry_uncertainty_value
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: Value of the absolute analytical uncertainty.
Allowed values and other constraints: decimal number
Example: 0.3

4.2 Abundance category

ID and name: OO4.2 material_ore_chemistry_category
Provided by: TerraLID system
Obligation: mandatory
Occurrences: 1–n
Definition: The abundance category of each element inferred from the chemical composition.
Allowed values and other constraints: controlled vocabulary

5. Alteration

ID and name: OO5 material_ore_alteration
Provided by: data provider
Obligation: recommended
Occurrences: 1
Definition: The extent of alteration.
Allowed values and other constraints: controlled vocabulary

6. Deposit type

ID and name: OO6 material_ore_deposit
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: The type of the ore deposit.
Allowed values and other constraints: controlled vocabulary

7. Ore district

ID and name: OO7 material_ore_district
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The mining district the ore deposit belongs to.
Allowed values and other constraints: free text
Example: Mitterberg; Laurion; African Copper Belt

8. Access to targeted metal

ID and name: OO8 material_ore_accessibility
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: Information about whether the ore was accessible with pre–industrial mining and/or smelting technology?

with the two subproperties:

8.1 Accessibility

ID and name: OO8.1 material_ore_accessibility
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: Was the ore accessible for pre–industrial societies?

Allowed values and other constraints: yes, no
Example: yes

8.2 Details

ID and name: OO8.2 material_ore_accessibility_detail
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: If `OO8.1 Accessibility` is provided, short explanation for choice.
Allowed values and other constraints: free text
Example: The ore is part of the gossan and can be smelted in prehistoric furnaces.

Glass

1. Production context

ID and name: OG1 material_glass_production_context
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The production context the object is related to.
Allowed values and other constraints: controlled vocabulary

2. Recycling

ID and name: OG2 material_glass_recycling
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: Information about whether the glass was recycled.

with the two subproperties:

2.1 Indication for recycling

ID and name: OG2.1 material_glass_recycling_indicator
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: Does the glass show indicators for recycling?
Allowed values and other constraints: controlled vocabulary

2.2 Indicators

ID and name: OG2.2 material_glass_recycling_reason
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: If `OO2.1 Recycling indicator` is provided, short explanation for choice.
Allowed values and other constraints: free text
Example: mixture of different glass pastes

3. Chemical composition

ID and name: OG3 material_glass_chemistry
Provided by: data provider
Obligation: mandatory
Occurrences: 1-n
Definition: The chemical composition of the glass.

with the eight subproperties:

3.1 Analytical method

ID and name: B4.1 chemistry_method
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The method used to determine the chemical composition.
Allowed values and other constraints: controlled vocabulary

3.2 Analysed compound

ID and name: B4.2 chemistry_compound
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: The analysed chemical compound (chemical element or oxide).
Allowed values and other constraints: controlled vocabulary, not available if a mass spectrometric-method is recorded in `B4.1 Analytical method`.

3.3 Analysed isotope

ID and name: B4.3 chemistry_icp_isotope
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: The isotope used for quantification of a chemical element.
Allowed values and other constraints: controlled vocabulary, only available if a mass spectrometric-method is recorded in `B4.1 Analytical method`.

3.4 Value

ID and name: B4.4 chemistry_value
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: The concentration of the analysed chemical compound.
Allowed values and other constraints: decimal number
Example: 15.3

3.5 Unit

ID and name: B4.5 chemistry_unit
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: The unit in which the concentration of the analysed chemical compound is given.
Allowed values and other constraints: controlled vocabulary

3.6 Uncertainty type

ID and name: B4.6 chemistry_uncertainty_type
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: The type of analytical uncertainty.
Allowed values and other constraints: controlled vocabulary

3.7 Confidence level

ID and name: B4.7 chemistry_uncertainty_sigma
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: Sigma value of the reported absolute analytical uncertainty.
Allowed values and other constraints: 1, 2, 3
Example: 2

3.8 Uncertainty value

ID and name: B4.8 chemistry_uncertainty_value
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: Value of the absolute analytical uncertainty.
Allowed values and other constraints: decimal number
Example: 0.3

4. Glass group

ID and name: OG4 material_glass_group
Provided by: TerraLID system
Obligation: recommended
Occurrences: 0–1
Definition: The glass material group of the sample, inferred from the chemical composition.
Allowed values and other constraints: controlled vocabulary

5. Glass colour

ID and name: OG5 material_glass_colour
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: The colour of the glass.
Allowed values and other constraints: controlled vocabulary

6. Colourant

ID and name: OG6 material_glass_colourant
Provided by: TerraLID system
Obligation: recommended
Occurrences: 0–1
Definition: The compound giving the glass its colour, inferred from the chemical composition.
Allowed values and other constraints: controlled vocabulary
Example: Cu

7. Decolourant

ID and name: OG7 material_glass_decolourant
Provided by: TerraLID system
Obligation: recommended
Occurrences: 0–1
Definition: The compound responsible for decolouring the glass, inferred from the chemical composition.
Allowed values and other constraints: controlled vocabulary

8. Lead source

ID and name: OG8 material_glass_lead_source
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: The constituent that is the source of lead in the glass.
Allowed values and other constraints: controlled vocabulary

9. Sr isotopes

ID and name: OG9 material_glass_isotopes_Sr
Provided by: data provider
Obligation: optional
Occurrences: 0–n
Definition: The $^{87}Sr/^{86}Sr$ ratio of the glass.

with the two subproperties:

9.1 Value

ID and name: OG9.1 material_glass_isotopes_Sr_value
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: Value of the $^{87}Sr/^{86}Sr$ ratio.
Allowed values and other constraints: decimal number
Example: 0.7856

9.2 Analytical precision

ID and name: OG9.2 material_glass_isotopes_Sr_2SD
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: Absolute analytical uncertainty of the $^{87}Sr/^{86}Sr$ ratio in double standard deviation (2SD).
Allowed values and other constraints: decimal number
Example: 0.0002

10. Nd isotopes

ID and name: OG10 material_glass_isotopes_Nd
Provided by: data provider
Obligation: optional
Occurrences: 0–n
Definition: The εNd value of the glass.

with the two subproperties:

10.1 Value

ID and name: OG10.1 material_glass_isotopes_Nd_value
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: Value of εNd.
Allowed values and other constraints: decimal number
Example: t.b.d.

10.2 Analytical precision

ID and name: OG10.2 material_glass_isotopes_Nd_2SD
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: Absolute analytical uncertainty of the εNd value in double standard deviation (2SD).
Allowed values and other constraints: decimal number
Example: t.b.d.

11. Hf isotopes

ID and name: OG11 material_glass_isotopes_Hf
Provided by: data provider
Obligation: optional
Occurrences: 0–n
Definition: The εHf value of the glass.

with the two subproperties:

11.1 Value

ID and name: OG11.1 material_glass_isotopes_Hf_value
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: Value of εHf.
Allowed values and other constraints: decimal number
Example: t.b.d.

11.2 Analytical precision

ID and name: OG11.2 material_glass_isotopes_Hf_2SD
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: Absolute analytical uncertainty of the εHf value in double standard deviation (2SD).
Allowed values and other constraints: decimal number
Example: t.b.d.

12. O isotopes

ID and name: OG12 material_glass_isotopes_O
Provided by: data provider
Obligation: optional

Occurrences: 0–n
Definition: The $\delta^{18}O$ value of the glass.

with the two subproperties:

12.1 Value

ID and name: OG12.1 material_glass_isotopes_O_value
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: Value of $\delta^{18}O$.
Allowed values and other constraints: decimal number
Example: t.b.d.

12.2 Analytical precision

ID and name: OG12.2 material_glass_isotopes_O_SD
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: Absolute analytical uncertainty of the $\delta^{18}O$ value given in single SD.
Allowed values and other constraints: decimal number
Example: t.b.d.

13. Glass corrosion

ID and name: OG13 material_glass_corrosion
Provided by: data provider
Obligation: optional
Occurrences: 0–n
Definition: Information about the corrosion of the glass and its extent.

with the two subproperties:

13.1 Extent

ID and name: OG13.1 material_glass_corrosion_extent
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The extent of corrosion affecting the glass.
Allowed values and other constraints: controlled vocabulary

13.2 Details

ID and name: OG13.2 material_glass_corrosion_reason
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: If `OO13.1 Recycling indicator` is provided, short description of features.
Allowed values and other constraints: free text
Example: iridescent corrosion crust

Metals

1. Metal chemistry

ID and name: OM1 material_metal_chemistry
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: Chemical composition of the metal.

with the two subproperties:

1.1 Chemical composition

ID and name: OM1.1 material_metal_chemistry
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: The chemical composition of the metal with additional information.

with the eight subproperties:

1.1.1 Analytical method

ID and name: B4.1 chemistry_method
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The method used to determine the chemical composition.
Allowed values and other constraints: controlled vocabulary

1.1.2 Analysed compound

ID and name: B4.2 chemistry_compound
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: The analysed chemical compound (chemical element or oxide).
Allowed values and other constraints: controlled vocabulary, not available if a mass spectrometric-method is recorded in `B4.1 Analytical method`.

1.1.3 Analysed isotope

ID and name: B4.3 chemistry_icp_isotope
Provided by: data provider

Obligation: recommended
Occurrences: 0–n
Definition: The isotope used for quantification of a chemical element.
Allowed values and other constraints: controlled vocabulary, only available if a mass spectrometric-method is recorded in `B4.1 Analytical method`.

1.1.4 Value

ID and name: B4.4 chemistry_value
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: The concentration of the analysed chemical compound.
Allowed values and other constraints: decimal number
Example: 15.3

1.1.5 Unit

ID and name: B4.5 chemistry_unit
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: The unit in which the concentration of the analysed chemical compound is given.
Allowed values and other constraints: controlled vocabulary

1.1.6 Uncertainty type

ID and name: B4.6 chemistry_uncertainty_type
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: The type of analytical uncertainty.
Allowed values and other constraints: controlled vocabulary

1.1.7 Confidence level

ID and name: B4.7 chemistry_uncertainty_sigma
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: Sigma value of the reported absolute analytical uncertainty.
Allowed values and other constraints: 1, 2, 3
Example: 2

1.1.8 Uncertainty value

ID and name: B4.8 chemistry_uncertainty_value
Provided by: data provider
Obligation: recommended

Occurrences: 0–n
Definition: Value of the absolute analytical uncertainty.
Allowed values and other constraints: decimal number
Example: 0.3

1.2 Major elements

ID and name: OM1.2 material_metal_chemistry_major
Provided by: TerraLID system
Obligation: mandatory
Occurrences: 1–n
Definition: Major chemical elements (>1 wt%) in the metal, inferred from the chemical composition.
Allowed values and other constraints: controlled vocabulary

2. Metal corrosion

ID and name: OM2 material_metal_corrosion
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: Information about the corrosion of the metal.

with the two subproperties:

2.1 Extent

ID and name: OM2.1 material_metal_corrosion_extent
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The extent of corrosion affecting the metal.
Allowed values and other constraints: controlled vocabulary

2.2 Details

ID and name: OM2.2 material_metal_corrosion_reason
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: Indicators and observations for corrosion.
Allowed values and other constraints: free text
Example: thick green crust with sediment

3. Provenance indicators

ID and name: OM3 material_metal_provenance
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: Information about provenance if known from other sources (e.g. stamps).
Allowed values and other constraints: free text
Example: Moulded inscription: Imp(eratoris) Caes(aris) Hadriani Aug(usti) met(alli) Lut(udarensis)

Coins

Coin-specific metadata extent the metal-specific metadata and are a subset of the Nomisma ontology and intended to be filled in the records of the coin in a numismatic data infrastructure using this ontology based on the type series and the coin's type series ID. The equivalent in the Nomisma ontology is given by the prefix `nmo`. Descriptions are taken from the Nomisma ontology and the controlled vocabulary of Nomisma will be used for the respective properties.

1. Type series

ID and name: OM.C1 material_coin_type_series (`nmo:TypeSeries`)
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: A published or recognized reference list of numismatic object types, such as a catalogue or corpus.
Allowed values and other constraints: controlled vocabulary

2. Type series ID

ID and name: OM.C2 material_coin_type_series_id (`nmo:hasTypeSeriesItem`)
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: Identifies the position of a numismatic object within a published or recognized reference list of types, such as a catalogue or corpus.
Allowed values and other constraints: valid identifier according to reference work listed in `OM.C1 Type Series`.
Example: ric.1(2).aug.2A

3. Deposition type

ID and name: OM.C3 material_coin_deposition_type (`nmo:DepositionType`)
Provided by: Nomisma API, data provider
Obligation: recommended
Occurrences: 0–1
Definition: The circumstances under which an object or group of objects came to be deposited and part of the archaeological record, for example as a hoard, votive deposit or chance loss.
Allowed values and other constraints: controlled vocabulary

4. Authority

ID and name: OM.C4 material_coin_authority (`nmo:hasAuthority`)
Provided by: Nomisma API, data provider
Obligation: recommended
Occurrences: 0–1
Definition: Identifies the authority in whose name (explicitly or implicitly) a numismatic object was issued.
Allowed values and other constraints: controlled vocabulary (Organisation), controlled vocabulary (Person)

5. Mint

ID and name: OM.C5 material_coin_mint (`nmo:hasMint`)
Provided by: Nomisma API, data provider
Obligation: recommended
Occurrences: 0–1
Definition: Identifies the place of manufacture or issue of a numismatic object.
Allowed values and other constraints: controlled vocabulary

6. Denomination

ID and name: OM.C6 material_coin_denomination (`nmo:hasDenomination`)
Provided by: Nomisma API, data provider
Obligation: recommended
Occurrences: 0–1
Definition: Describes the monetary value assigned to an object within a denominational system.
Allowed values and other constraints: controlled vocabulary

7. Date

ID and name: OM.C7 material_coin_date (`nmo:hasDate`)
Provided by: Nomisma API, data provider
Obligation: recommended
Occurrences: 0–1
Definition: Describes date (range) assigned in a numismatic context.

with the two subproperties:

7.1 Opening date

ID and name: OM.C7.1 material_coin_date_from (`nmo:hasNumismaticOpeningDate`)
Provided by: Nomisma API, data provider
Obligation: recommended
Occurrences: 0–1
Definition: The date of the earliest numismatic object of a given context, e.g. a hoard or layer.
Allowed values and other constraints: integer
Example: -25

7.2 Closing date

ID and name: OM.C7.2 material_coin_date_to (`nmo:hasNumismaticClosingDate`)
Provided by: Nomisma API, data provider
Obligation: recommended
Occurrences: 0–1
Definition: The date of the latest numismatic object of a given context, e.g. a hoard or layer.
Allowed values and other constraints: integer
Example: -23

8. Manufacture

ID and name: OM.C8 material_coin_manufacture (`nmo:hasManufacture`)
Provided by: Nomisma API, data provider
Obligation: recommended
Occurrences: 0–1
Definition: Describes the method of manufacture of a numismatic object.
Allowed values and other constraints: controlled vocabulary

9. Peculiarity of Production

ID and name: OM.C9 material_coin_peculiarity_production (`nmo:PecularityOfProduction`)
Provided by: Nomisma API, data provider
Obligation: recommended
Occurrences: 0–1
Definition: Describes a notable, characteristic or unusual physical feature of an individual numismatic object which distinguishes it from other examples of the same group, or of a group of numismatic objects that marks it out from other groups, and which is related to the process of production of a numismatic object.
Allowed values and other constraints: controlled vocabulary
Example: double-struck

Pigments

1. Pigment name

ID and name: OP1 material_pigment_name
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: Name(s) of the pigment.
Allowed values and other constraints: controlled vocabulary

2. Pigment form

ID and name: OP2 material_pigment_archaeological_context
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: In which shape/form was the pigment found in the archaeological context?
Allowed values and other constraints: free text
Example: pellets; as part of a fresco

3. Pigment type

ID and name: OP3 material_pigment_type
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: Information about the pigment type.

with the two subproperties:

3.1 Type

ID and name: OP3.1 material_pigment_type_chemistry
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: Is it an organic or inorganic pigment?
Allowed values and other constraints: controlled vocabulary

3.2 Occurrence

ID and name: OP3.2 material_pigment_type_production
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: Is it a natural or synthetic pigment?
Allowed values and other constraints: controlled vocabulary

4. Pigment composition

ID and name: OP4 material_pigment_composition
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The chemical and/or mineralogical composition of the pigment. At least one of its subproperties must be provided.

with the three subproperties:

4.1 Chemical composition

ID and name: OP4.1 material_pigment_composition_chemistry
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: If it is an inorganic pigment, the chemical composition of the pigment.

with the eight subproperties:

4.1.1 Analytical method

ID and name: B4.1 chemistry_method
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The method used to determine the chemical composition.
Allowed values and other constraints: controlled vocabulary

4.1.2 Analysed compound

ID and name: B4.2 chemistry_compound
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: The analysed chemical compound (chemical element or oxide).
Allowed values and other constraints: controlled vocabulary, not available if a mass spectrometric-method is recorded in `B4.1 Analytical method`.

4.1.3 Analysed isotope

ID and name: B4.3 chemistry_icp_isotope
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: The isotope used for quantification of a chemical element.
Allowed values and other constraints: controlled vocabulary, only available if a mass spectrometric-method is recorded in `B4.1 Analytical method`.

4.1.4 Value

ID and name: B4.4 chemistry_value
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: The concentration of the analysed chemical compound.
Allowed values and other constraints: decimal number
Example: 15.3

4.1.5 Unit

ID and name: B4.5 chemistry_unit
Provided by: data provider
Obligation: mandatory
Occurrences: 1–n
Definition: The unit in which the concentration of the analysed chemical compound is given.
Allowed values and other constraints: controlled vocabulary

4.1.6 Uncertainty type

ID and name: B4.6 chemistry_uncertainty_type
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: The type of analytical uncertainty.
Allowed values and other constraints: controlled vocabulary

4.1.7 Confidence level

ID and name: B4.7 chemistry_uncertainty_sigma
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: Sigma value of the reported absolute analytical uncertainty.
Allowed values and other constraints: 1, 2, 3
Example: 2

4.1.8 Uncertainty value

ID and name: B4.8 chemistry_uncertainty_value
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: Value of the absolute analytical uncertainty.
Allowed values and other constraints: decimal number
Example: 0.3

4.2 Organic compounds

ID and name: OP4.2 material_pigment_composition_compound
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: The (main) organic compounds in the pigment.
Allowed values and other constraints: controlled vocabulary

4.3 Mineralogical composition

ID and name: OP4.3 material_pigment_composition_mineral
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: If it is mineral pigment, which minerals are present?

with the two subproperties:

4.3.1 Mineral name

ID and name: OP4.3.1 material_pigment_composition_mineral_name
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: Name of the mineral approved by the International Mineralogical Association (IMA).
Allowed values and other constraints: controlled vocabulary (IMA list of minerals), retrieved from the Mindat API

4.3.2 Mineral ID

ID and name: OP4.3.2 material_pigment_composition_mineral_id
Provided by: Mindat API
Obligation: mandatory
Occurrences: 1
Definition: The Mindat ID of the mineral.
Allowed values and other constraints: Value in the `id` field of a Mindat mineral record.

5. Pigment production

ID and name: OP5 material_pigment_processing
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: Information about the production context and processing steps of the pigment.

with the two subproperties:

5.1 Production context

ID and name: OP5.1 material_pigment_production_context
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The production context the object is related to.
Allowed values and other constraints: controlled vocabulary

5.2 Treatment

ID and name: OP5.2 material_pigment_production_treatment
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: Which treatments were done to the raw material(s) to produce the pigment?
Allowed values and other constraints: controlled vocabulary

6. Colour

ID and name: OP6 material_pigment_colour
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: The colour of the pigment.

with the two subproperties:

6.1 Name

ID and name: OP6.1 material_pigment_colour_name
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: General colour of the pigment.
Allowed values and other constraints: free text
Example: blue; 5P 5/10; L*56 a*26 b*3

6.2 Colour system

ID and name: OP6.2 material_pigment_colour_system
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: The colour system used to determine the colour.
Allowed values and other constraints: controlled vocabulary

7. Pigment alteration

ID and name: OP7 material_pigment_alteration
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: Information about the alteration of the pigment.

with the two subproperties:

7.1 Alteration type

ID and name: OP7.1 material_pigment_alteration_type
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: The type of the observed alteration process.
Allowed values and other constraints: controlled vocabulary

7.2 Details

ID and name: OP7.2 material_pigment_alteration_description
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: Additional information about the observed alteration or its productions.
Allowed values and other constraints: free text
Example: t.b.d.

8. Pigment recycling

ID and name: OP8 material_pigment_recycling
Provided by: data provider
Obligation: mandatory

Occurrences: 1
Definition: Information about whether the pigment was recycled or reused.

with the two subproperties:

8.1 Indicators

ID and name: OP8.1 material_pigment_recycling_indicator
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: Does the pigment show indicators for recycling or reuse?
Allowed values and other constraints: controlled vocabulary

8.2 Reasoning

ID and name: OP8.2 material_pigment_recycling_reason
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: Observed indicators for recycling or reuse.
Allowed values and other constraints: free text
Example: presence of Sn in trace element analysis

9. Lead source

ID and name: OP9 material_pigment_lead_source
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: The source of lead in the pigment.
Allowed values and other constraints: controlled vocabulary

10. Provenance indicators

ID and name: OP10 material_pigment_raw_material_provenance
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: Information about provenance, if known from other sources.
Allowed values and other constraints: free text
Example: t.b.d.

11. Sr isotopes

ID and name: OP11 material_pigment_isotopes_Sr
Provided by: data provider
Obligation: optional
Occurrences: 0–n
Definition: The $^{87}Sr/^{86}Sr$ ratio of the pigment.

with the two subproperties:

11.1 Value

ID and name: OP11.1 material_pigment_isotopes_Sr_value
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: Value of the $^{87}Sr/^{86}Sr$ ratio.
Allowed values and other constraints: decimal number
Example: 0.7856

11.2 Analytical precision

ID and name: OP11.2 material_pigment_isotopes_Sr_2SD
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: Absolute analytical uncertainty of the $^{87}Sr/^{86}Sr$ ratio in double standard deviation (2SD).
Allowed values and other constraints: decimal number
Example: 0.0002

12. Nd isotopes

ID and name: OP12 material_pigment_isotopes_Nd
Provided by: data provider
Obligation: optional
Occurrences: 0–n
Definition: The εNd value of the pigment.

with the two subproperties:

12.1 Value

ID and name: OP12.1 material_pigment_isotopes_Nd_value
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: Value of εNd.

Allowed values and other constraints: decimal number
Example: t.b.d.

12.2 Analytical precision

ID and name: OP12.2 material_pigment_isotopes_Nd_2SD
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: Absolute analytical uncertainty of the εNd value in double standard deviation (2SD).
Allowed values and other constraints: decimal number
Example: t.b.d.

13. Hf isotopes

ID and name: OP13 material_pigment_isotopes_Hf
Provided by: data provider
Obligation: optional
Occurrences: 0–n
Definition: The εHf value of the pigment.

with the two subproperties:

13.1 Value

ID and name: OP13.1 material_pigment_isotopes_Hf_value
Provided by: data provider
Obligation: mandatory
Occurrences: 1
Definition: Value of εHf.
Allowed values and other constraints: decimal number
Example: t.b.d.

13.2 Analytical precision

ID and name: OP13.2 material_pigment_isotopes_Hf_2SD
Provided by: data provider
Obligation: recommended
Occurrences: 0–1
Definition: Absolute analytical uncertainty of the εHf value in double standard deviation (2SD).
Allowed values and other constraints: decimal number
Example: t.b.d.

By-products

Coming soon...

Metadata for archaeometallurgical by-products are coming soon...

Mappings

Coming soon...

Mappings to other metadata profiles and research data infrastructures will be provided after the first version of the metadata profile is published.

Version 0.3

- Export of the Metadata profile to pdf added
- Inclusion of citation information
- Publication on Zenodo (https://doi.org/10.5281/zenodo.18069848)
- Correct formatting and broken links

1. Version 0.2

- Integration of Community feedback

2. Version 0.1

- Initial version of metadata profile for community feedback