

TerraLID metadata profile for Lead Isotope Data in Archaeology

Recommended citation

TerraLID Team (2025). TerraLID Metadata Profile (0.3). Zenodo. <https://doi.org/10.5281/zenodo.18069847>

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The TerraLID Team gratefully acknowledges the valuable contributions of many other colleagues to the TerraLID metadata profile in discussions and various other formats.

Introduction

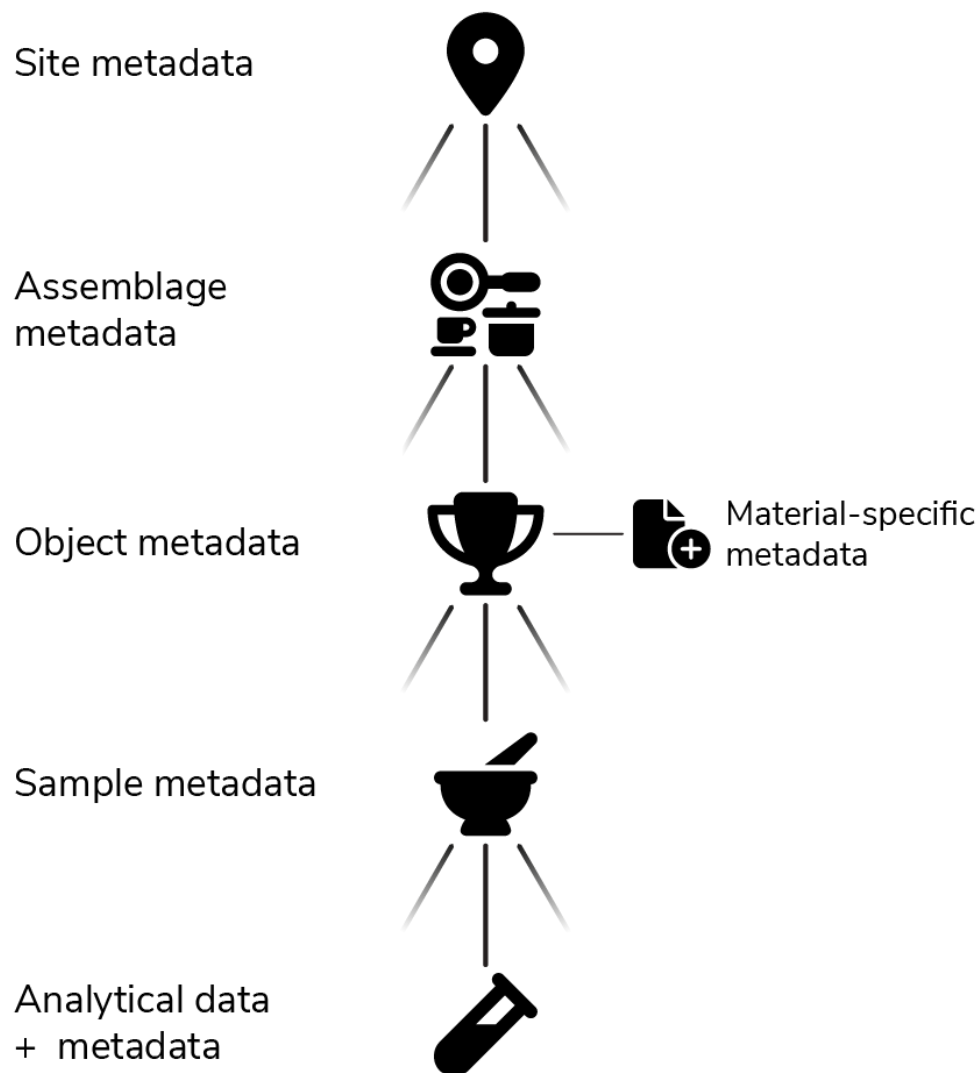
The TerraLID metadata profile comprehensively describes lead isotope data, their analytical background, and their geological and/or archaeological context. It aims to optimise lead isotope data for future reuse regardless of the original motivation for their measurement and the collection of the objects 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 significant challenge encountered by the [TerraLID Team](#) during the development of the metadata profile was balancing contemporary day-data standards with legacy data standards. To meet this objective, mandatory metadata was intentionally limited, even though additional elements are considered pivotal.

1. Structure

The TerraLID metadata profile is designed with a strong focus on organising information clearly and allowing for continued expansion. To achieve this, the metadata are structured in modules which are connected through one-to-many relationships. A geological or archaeological site can yield several and complex assemblages. During analytical investigation, a sampling may include multiple samples from the same object and/or each sample analysed more than once. ([see figure](#)).



The general structure of the TerraLID metadata profile, highlighting the different modules and their relation to each other.

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While the metadata profile 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. In such a case, 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

The use of modularity is advantageous to the flexibility of the TerraLID metadata profile. 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: example, coins are described using same basic information as other metallic objects, but additional fields are foreseen for coin-specific information 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: recommended

Occurrences: 0–1

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? This field controls the behavior of some dating-related metadata fields such as the unit of the absolute age (archaeological dates in calendar years, with BCE dates as negative values; geological dates 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 range. A negative value indicates a BCE date.

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 range. A negative value indicates a BCE date.

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: "Ma" if B3.2 Date type = "geological"; "a" (calendar years) if B3.2 Date type = "archaeological".

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_orogenesis

Provided by: data provider

Obligation: recommended

Occurrences: 0–1

Definition: The relative date expressed as an orogenic 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: free text

Example: Trench

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 [05.1.2 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 [05.2 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 [08.2 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 [08.1 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, oxide, isotope).

Allowed values and other constraints: controlled vocabulary, the actual measured compound must be reported if available (e.g., the isotope for mass spectrometric values rather than the element).

13.3 Value

ID and name: B4.3 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

13.4 Unit

ID and name: B4.4 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

13.5 Uncertainty type

ID and name: B4.5 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

13.6 Confidence level

ID and name: B4.6 chemistry_uncertainty_sigma

Provided by: data provider

Obligation: recommended

Occurrences: 0–n

Definition: Multiple of standard deviation (sigma) of the reported absolute analytical uncertainty.

Allowed values and other constraints: 1, 2, 3

Example: 2

13.7 Uncertainty value

ID and name: B4.7 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

13.8 Qualitative value

ID and name: B4.8 chemistry_relative_value

Provided by: data provider

Obligation: recommended

Occurrences: 0–n

Definition: Value of qualitative results and other non-numeric values such as the reporting of detection or quantification limits rather than values.

Allowed values and other constraints: free text

Example: +++, tr, <0.4, bdl = 0.5 wt%

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? This field controls the behavior of some dating-related metadata fields such as the unit of the absolute age (archaeological dates in calendar years, with BCE dates as negative values; geological dates 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 range. A negative value indicates a BCE date.

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 range. A negative value indicates a BCE date.

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: "Ma" if B3.2 Date type = "geological"; "a" (calendar years) if B3.2 Date type = "archaeological".

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_orogenesis

Provided by: data provider

Obligation: recommended

Occurrences: 0–1

Definition: The relative date expressed as an orogenic 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 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 two 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 [012 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, oxide, isotope).

Allowed values and other constraints: controlled vocabulary, the actual measured compound must be reported if available (e.g., the isotope for mass spectrometric values rather than the element).

12.3 Value

ID and name: B4.3 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

12.4 Unit

ID and name: B4.4 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

12.5 Uncertainty type

ID and name: B4.5 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

12.6 Confidence level

ID and name: B4.6 chemistry_uncertainty_sigma

Provided by: data provider

Obligation: recommended

Occurrences: 0–n

Definition: Multiple of standard deviation (sigma) of the reported absolute analytical uncertainty.

Allowed values and other constraints: 1, 2, 3

Example: 2

12.7 Uncertainty value

ID and name: B4.7 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

12.8 Qualitative value

ID and name: B4.8 chemistry_relative_value

Provided by: data provider

Obligation: recommended

Occurrences: 0–n

Definition: Value of qualitative results and other non-numeric values such as the reporting of detection or quantification limits rather than values.

Allowed values and other constraints: free text

Example: ++, tr, <0.4, bdl = 0.5 wt%

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% HNO₃.

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, oxide, isotope).

Allowed values and other constraints: controlled vocabulary, the actual measured compound must be reported if available (e.g., the isotope for mass spectrometric values rather than the element).

7.3 Value

ID and name: B4.3 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

7.4 Unit

ID and name: B4.4 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

7.5 Uncertainty type

ID and name: B4.5 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

7.6 Confidence level

ID and name: B4.6 chemistry_uncertainty_sigma

Provided by: data provider

Obligation: recommended

Occurrences: 0–n

Definition: Multiple of standard deviation (sigma) of the reported absolute analytical uncertainty.

Allowed values and other constraints: 1, 2, 3

Example: 2

7.7 Uncertainty value

ID and name: B4.7 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

7.8 Qualitative value

ID and name: B4.8 chemistry_relative_value

Provided by: data provider

Obligation: recommended

Occurrences: 0–n

Definition: Value of qualitative results and other non-numeric values such as the reporting of detection or quantification limits rather than values.

Allowed values and other constraints: free text

Example: +++, tr, <0.4, bdl = 0.5 wt%

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: Multiple of analytical uncertainty (sigma) 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 $^{205}\text{Tl}/^{203}\text{Tl}$ 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 $^{205}\text{Tl}/^{203}\text{Tl}$ 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](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: Multiple of analytical uncertainty (sigma) 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 [002.1 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? This field controls the behavior of some dating-related metadata fields such as the unit of the absolute age (archaeological dates in calendar years, with BCE dates as negative values; geological dates 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 range. A negative value indicates a BCE date.

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 range. A negative value indicates a BCE date.

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: "Ma" if B3.2 Date type = "geological"; "a" (calendar years) if B3.2 Date type = "archaeological".

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_orogenesis

Provided by: data provider

Obligation: recommended

Occurrences: 0–1

Definition: The relative date expressed as an orogenic 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 texture of the ore mineral.

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, oxide, isotope).

Allowed values and other constraints: controlled vocabulary, the actual measured compound must be reported if available (e.g., the isotope for mass spectrometric values rather than the element).

4.1.3 Value

ID and name: B4.3 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

4.1.4 Unit

ID and name: B4.4 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

4.1.5 Uncertainty type

ID and name: B4.5 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

4.1.6 Confidence level

ID and name: B4.6 chemistry_uncertainty_sigma

Provided by: data provider

Obligation: recommended

Occurrences: 0–n

Definition: Multiple of standard deviation (sigma) of the reported absolute analytical uncertainty.

Allowed values and other constraints: 1, 2, 3

Example: 2

4.1.7 Uncertainty value

ID and name: B4.7 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

4.1.8 Qualitative value

ID and name: B4.8 chemistry_relative_value

Provided by: data provider

Obligation: recommended

Occurrences: 0–n

Definition: Value of qualitative results and other non-numeric values such as the reporting of detection or quantification limits rather than values.

Allowed values and other constraints: free text

Example: +++, tr, <0.4, bdl = 0.5 wt%

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 [008.1 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 [002.1 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, oxide, isotope).

Allowed values and other constraints: controlled vocabulary, the actual measured compound must be reported if available (e.g., the isotope for mass spectrometric values rather than the element).

3.3 Value

ID and name: B4.3 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

3.4 Unit

ID and name: B4.4 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

3.5 Uncertainty type

ID and name: B4.5 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

3.6 Confidence level

ID and name: B4.6 chemistry_uncertainty_sigma
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: Multiple of standard deviation (sigma) of the reported absolute analytical uncertainty.
Allowed values and other constraints: 1, 2, 3
Example: 2

3.7 Uncertainty value

ID and name: B4.7 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

3.8 Qualitative value

ID and name: B4.8 chemistry_relative_value
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: Value of qualitative results and other non-numeric values such as the reporting of detection or quantification limits rather than values.
Allowed values and other constraints: free text
Example: +++, tr, <0.4, bdl = 0.5 wt%

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 $^{87}\text{Sr}/^{86}\text{Sr}$ 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 $^{87}\text{Sr}/^{86}\text{Sr}$ 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 $^{87}\text{Sr}/^{86}\text{Sr}$ 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 ϵ Nd 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 ϵ Hf 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 ϵ Hf.

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 ϵ Hf 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 $\delta^{18}\text{O}$ 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 $\delta^{18}\text{O}$.

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 $\delta^{18}\text{O}$ 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 [0013.1 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, oxide, isotope).

Allowed values and other constraints: controlled vocabulary, the actual measured compound must be reported if available (e.g., the isotope for mass spectrometric values rather than the element).

1.1.3 Value

ID and name: B4.3 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

1.1.4 Unit

ID and name: B4.4 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

1.1.5 Uncertainty type

ID and name: B4.5 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

1.1.6 Confidence level

ID and name: B4.6 chemistry_uncertainty_sigma

Provided by: data provider

Obligation: recommended

Occurrences: 0–n

Definition: Multiple of standard deviation (sigma) of the reported absolute analytical uncertainty.

Allowed values and other constraints: 1, 2, 3

Example: 2

1.1.7 Uncertainty value

ID and name: B4.7 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

1.1.8 Qualitative value

ID and name: B4.8 chemistry_relative_value

Provided by: data provider

Obligation: recommended

Occurrences: 0–n

Definition: Value of qualitative results and other non-numeric values such as the reporting of detection or quantification limits rather than values.

Allowed values and other constraints: free text

Example: +++, tr, <0.4, bdl = 0.5 wt%

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 extend 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:PeculiarityOfProduction)

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 three 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

3.3 Chromophore

ID and name: OP3.3 material_pigment_composition_chromophore
Provided by: data provider
Obligation: recommended
Occurrences: 0–n
Definition: The part of the pigment's compound creating its colour.
Allowed values and other constraints: free text
Example: Organic-based, Co-based

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, oxide, isotope).

Allowed values and other constraints: controlled vocabulary, the actual measured compound must be reported if available (e.g., the isotope for mass spectrometric values rather than the element).

4.1.3 Value

ID and name: B4.3 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

4.1.4 Unit

ID and name: B4.4 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

4.1.5 Uncertainty type

ID and name: B4.5 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

4.1.6 Confidence level

ID and name: B4.6 chemistry_uncertainty_sigma

Provided by: data provider

Obligation: recommended

Occurrences: 0–n

Definition: Multiple of standard deviation (sigma) of the reported absolute analytical uncertainty.

Allowed values and other constraints: 1, 2, 3

Example: 2

4.1.7 Uncertainty value

ID and name: B4.7 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

4.1.8 Qualitative value

ID and name: B4.8 chemistry_relative_value

Provided by: data provider

Obligation: recommended

Occurrences: 0–n

Definition: Value of qualitative results and other non-numeric values such as the reporting of detection or quantification limits rather than values.

Allowed values and other constraints: free text

Example: +++, tr, <0.4, bdl = 0.5 wt%

4.2 Chemical compound

ID and name: OP4.2 material_pigment_composition_compound

Provided by: data provider

Obligation: recommended

Occurrences: 0–n

Definition: The (chemical) formula or name of the main compounds in the pigment. If it is a mineral pigment, record the name in [OP4.4.1 Mineral name](#).

Allowed values and other constraints: free text

Example: Dracorubin, $\text{Mg}_2\text{Co}(\text{AsO}_4)_2$

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 a 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 three 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

5.3 Details

ID and name: OP5.3 material_pigment_production_details

Provided by: data provider

Obligation: optional

Occurrences: 0–1

Definition: Additional information about the production context.

Allowed values and other constraints: free text

Example: t.b.d.

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; L56 a26 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 $^{87}\text{Sr}/^{86}\text{Sr}$ 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 $^{87}\text{Sr}/^{86}\text{Sr}$ 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 $^{87}\text{Sr}/^{86}\text{Sr}$ 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 ϵ_{Hf} .

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 ϵ_{Hf} 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.

History

Version 0.3.3

- Change Obligation of `SI6 site_registry` to *recommended*.
- Refined definitions of `B3.2 date_type`, `B3.3.1 date_absolute_start`, `B3.3.2 date_absolute_end`, `B3.3.4 date_absolute_unit`

Version 0.3.2

- Merging of `B4.3 chemistry_icp_isotope` into `B4.2 chemistry_compound` to record values measured e.g. by mass spectrometry but reported as elements rather than isotope together with values reported by isotope
- Renumbering of metadata fields `B4.4` to `B4.8` to `B4.3` to `B4.7` as consequence of the above change
- Addition of new `B4.8. chemistry_relative_value` to record relative compositional values (e.g. +++, tr, <0.4, bdl = 0.5 wt%)
- Improved definition of `B4.6 chemistry_uncertainty_sigma`
- Improved definition of `B6.4 lia_ratio_uncertainty_sigma`

Version 0.3.1

- Addition of new `OP3.3 material_pigment_composition_chromophore`
- Change field type of `AS 3.1 assemblage_investigation_unit_type` to free text
- Change scope of `OP4.2 material_pigment_composition_compound` to all chemical formulas (or names) and its field type to free text

Version 0.3

- Addition of `OP5.3 material_pigment_production_details`
- Refined definition of some metadata
- Addition of automatic pdf export of the metadata profile and download button on start page
- Addition of citation information
- Correct formatting and broken links
- Publication on Zenodo (<https://doi.org/10.5281/zenodo.18069848>)

Version 0.2

- Integration of Community feedback

Version 0.1

- Initial version of metadata profile for community feedback