



Linked Open Data Approaches within the ARIADNE project



@ARIADNE_Network

ariadne-infrastructure.eu

portal.ariadne-infrastructure.eu

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What is ARIADNE?

A proposal to integrate existing archaeological data infrastructures across Europe, so researchers can use the various distributed datasets and new technologies to explore new research methodologies.



What is ARIADNE?

Stimulate new research avenues in the field of archaeology, relying on the comparison, re-use and integration into current research, the outcomes of past and on-going field and laboratory activity.



- **Research Workpackages**
 - **Implementing Interoperability**
 - **Developing Integrated Services**
 - **Addressing Complexity**
 - **Linking Archaeological Data**
 - **Data Mining and Natural Language Processing**
 - **Innovation in Archaeological Research Methodology**



- How does working with Linked Data make the ARIADNE project more open?
- What Linked Data approaches are used by ARIADNE?
- Lessons learned: How can archaeological data be more open?



- How does working with Linked Data make the ARIADNE project more open?
 - Using Linked Data is a way to make data more easily processable by machines, more automated
 - A way to make heterogeneous data more interoperable and searchable (often) by linking with other data by mapping to an authoritative vocabulary or mapping between vocabularies
 - A way to infer new information from existing data



ARIADNE and Linked Data

- Just because your using Linked Data doesn't mean your data is open (LOD)
 - Linked Data is a technical solution for breaking down data silos and creating a Web of Data instead of a Web of Documents (pages)
 - The data still has to be open and accessible, through open licensing and open dissemination



ARIADNE

All fields ▾

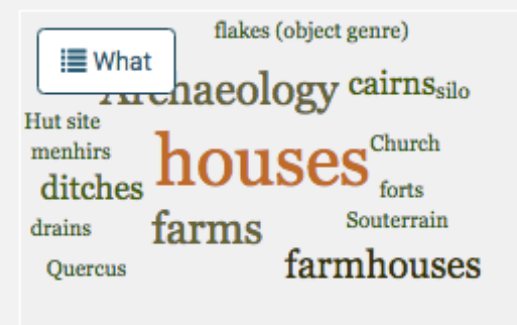
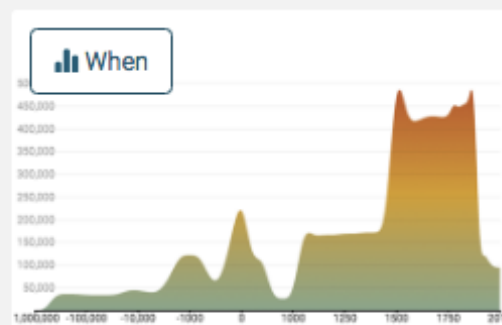
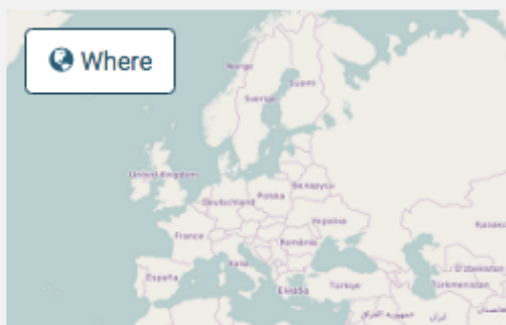
Search for resources in the Ariadne catalog ...



Welcome

ARIADNE brings together and integrates existing archaeological research data infrastructures so that researchers can use the various distributed datasets and new and powerful technologies as an integral component of the archaeological research methodology.

Browse the Catalog



- What Linked Data approaches are used by ARIADNE?
 - What: Mapping subjects to Getty Art & Architecture Thesaurus (controlled)
 - When: Contributing to/using PeriodO (assertions) for time periods



- Manually matched vocabulary concepts to Getty Art & Architecture Thesaurus (AAT) concepts; a popular LOD vocabulary
 - Used the AAT as a ‘mediating platform’ or neutral spine to map concepts in national languages
 - Partners at the University of South Wales created a bespoke thesaurus mapping tool for the task, but tool is openly available for use outside of ARIADNE



Vocabulary Matching Tool

Source Vocabulary

(FISH Archaeological Objects Thesaurus) 

Axe Axe AXE (TOOL) AXE (WEAPON) AXE HAMMER AXE MOULD AXE TRIMMING FLAKE AXEHEAD AXEHEAD ROUGHOUT BATTLEAXE Core Axe CUTTING EQUIPMENT → AXE (TOOL) *Axe Celt*
A tool with an edged head and a wooden shaft, used for a variety of purposes.
HATCHET

Target Vocabulary

(Getty Art & Architecture Thesaurus) 

ax chairs ax heads axe money axes (tools) axhammers barking axes battle-axes beginning axes ge (ceremonial knives) stone working axes throwing axes cutting tools → axes (tools) ax (tool) axe (tool)
Cutting tools that consist of a relatively heavy edged, squarish head fixed to a handle, the edge or edges being parallel to the handle so as to be suited for striking, hewing, cleaving, or chopping, trees, wood, ice, or another material. For axes used as weapons,

Concept Matching

Show entries Search:

Source Concept	Match	Target Concept	Created
<input type="text" value="AXE (TOOL)"/>	exact match	<input type="text" value="axes (tools)"/>	2015-06-17T09:13:23.444Z 

<http://www.heritagedata.org/vocabularyMatchingTool/>



Mapping to the AAT

- Manually matching vocabulary concepts to Getty Art & Architecture Thesaurus (AAT) concepts
- Uses linked data – Javascript components using external SPARQL endpoints (no back-end)
- Side by side comparison of concepts, with contextual details (labels, scope notes, linked concepts)
- Multilingual - French, German, Spanish, English, Dutch AAT concept details
- Export created mappings to JSON, CSV, RDF





All fields ▾

broo



penannular brooches / penannular brooches / brooches, penannular / penannular brooch ⓘ
ring brooches / ring brooches / brooches, annular / brooch, annular / ring brooch/ ... ⓘ
brooches / brooches / breastpins / broaches / brooch ⓘ

Welcome

ARIADNE brings together and integrates existing archaeological research data infrastructures so that researchers can use the various distributed datasets and new and powerful technologies as an integral component of the archaeological research methodology.



Mapping to the AAT



Start a new search...



Catalog

ring brooches

Getty AAT ID 300263352

Note Brooches in the shape of a ring, with a movable pin that may extend beyond the diameter of the ring; usually of metal and often ornamented. Used to fasten costume and worn especially during the Medieval period in Europe.

URI <http://vocab.getty.edu/aat/300263352>

Broader brooches

Terms

English	ring brooches	brooches, annular	brooch, annular	ring brooch	annular brooches	annular brooch	brooches, ring	ring-brooch
	brooch, ring	ring-brooches						
Spanish	broches	ring brooches	broche					
Dutch	ringbroches	ringbroche						

Provider mapping


ANNULAR BROOCH

Match URI <http://www.w3.org/2004/02/skos/core#exactMatch>

Source URI http://purl.org/heritagedata/schemes/mda_obj/concepts/97114



Mapping to the AAT



Start a new search...

[Catalog](#) [Services](#) [About](#)


Current search

ARIADNE subject: ring brooches

*

Filters





Where



Leaflet | © OpenStreetMap contributors


When


Total results: 5 **Order By** Title

-  **An Archaeological Evaluation at 98-100 Bull Close Road, Norwich, Norfolk**
Type: **Sites and monuments databases or inventories** Publisher: **Archaeology Data Service**
An Archaeological Evaluation at 98-100 Bull Close Road, Norwich, Norfolk
-  **Archaeological Excavation Report: Norwich Road and Exeter Crescent Road alignment, RAF Lakenheath ERL 161**
Type: **Sites and monuments databases or inventories** Publisher: **Archaeology Data Service**
Archaeological Excavation Report: Norwich Road and Exeter Crescent Road alignment, RAF Lakenheath ERL 161
-  **Report on a Second Phase of Archaeological Evaluation at Land adjoining Swanton Morley Airfield, Beetley, Norfolk**
Type: **Sites and monuments databases or inventories** Publisher: **Archaeology Data Service**
Report on a Second Phase of Archaeological Evaluation at Land adjoining Swanton Morley Airfield, Beetley, Norfolk
-  **The Mucking Anglo-Saxon cemeteries**
Type: **Fieldwork archives** Publisher: **Archaeology Data Service**
The Anglo-Saxon cemeteries at Mucking, Essex, represent the burials of over 800 individuals from the 5th to early 7th centuries AD. The mixed rite Cemetery II is one of the largest and most complete Anglo-Saxon cemeteries yet excavated (282 inhumations, 463 cremation burials), while the pa...



Mapping to the AAT

Start a new search...  [Catalog](#) [Services](#) [About](#)

 [Back to search results](#)

Report on a Second Phase of Archaeological Evaluation at Land adjoining Swanton Morley Airfield, Beetley, Norfolk






[Access resource on the web](#)

Report on a Second Phase of Archaeological Evaluation at Land adjoining Swanton Morley Airfield, Beetley, Norfolk

 ring brooches  necklaces  crematoria

 Swanton Morley Airfield, Beetley, Norfolk

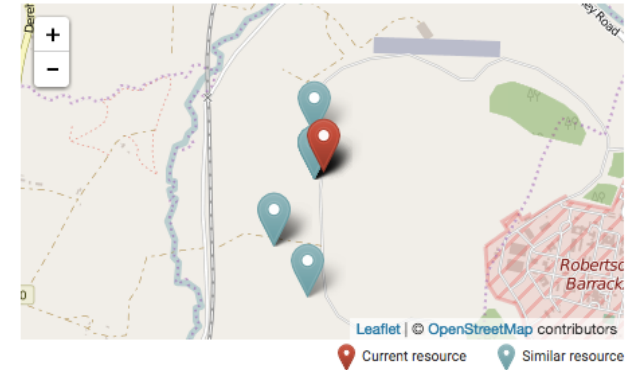
Metadata

ARIADNE ID 14672180
Original ID 1942829
Language English
Resource type Sites and monuments databases or inventories
Subject ring brooches 
necklaces 
crematoria 
Dating 410 – 1066
Place Swanton Morley Airfield, Beetley, Norfolk, ENGLAND [0.954953, 52.729908]
Type Dataset
Publisher Archaeology Data Service [Organization]
Issued 2011-10-11T00:00:00.0
Modified 2011-10-11T00:00:00.0

Resource is part of

ArchSearch: ADS catalogue

Geographically similar



Thematically similar

 Report on a Second Phase of Archaeological Evaluation at Land adjoining Swanton Morley Airfield, Beetley, Norfolk

Responsible persons and organisations



- PeriodO is a LOD gazetteer for linking and visualising data
 - It contains scholarly definitions of historical, art-historical and archaeological period
 - Allows easier linking of datasets that define periods differently (when is always linked with where in archaeology)
 - Allows users to see where period definitions overlap or diverge



- Issues with interoperability and time in archaeology
 - We often use conceptual, rather than quantitative language to refer to time (e.g. Bronze Age)
 - Different people can use the same period terms to refer to very different things (Bronze Age happens at different times and can have different meaning depending on place)



- The PeriodO approach
 - Documents definitions of periods by authoritative sources (assertion and attribution)
 - Corresponds with traditional scholarly practice, so users know what place is associated with the assertion, and who says so (what authoritative source has contributed the assertion)



- How ARIADNE is working with PeriodO
 - All ARIADNE content-providing partners were asked to submit the authoritative period terms in use in their country or region, in their national languages to PeriodO
 - The submitted terms were given PeriodO Linked Data URIs (Linked Data addresses) and incorporated into the gazetteer for use within ARIADNE, but allowing interoperability with any other project or researcher using PeriodO



Working with PeriodO

PeriodO

Current backend: Canonical [\[switch\]](#)

[Sign in](#)

[Menu](#) ▾

Browse by:

[Period](#)

[Collection](#)

Periods

Viewing 1 - 25 of 3745

Show periods at a time.

[Previous](#)

[1](#)

[2](#)

[3](#)

[...](#)

[149](#)

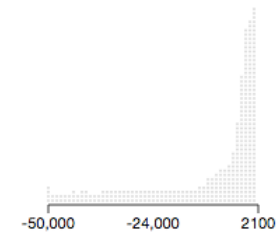
[150](#)

[Next](#)

▲ Label	Earliest start	Latest stop
2nd Millenium BCE	-2000	-1000
2nd Millennium BC Egypt (2000-1000 BC)	-2000	-1000
2nd Millennium BC Levant (2000-1000 BC)	-2000	-1000
3rd millennium BC	-3000	-2000
4th millenium BCE	-4000	-3000
13th Century AD Eastern Mediterranean (AD 1200-1300)	1200	1300
16th Century	1500	1600
17th Century	1600	1700
17th Century (1600 - 1699)	1600	1699

Filters

Time range



Hide outliers?

Hiding range from -2600000 to -49942

Text

Match string

Source

[Reset](#)

944 [British Museum.](#)

659 [ARIADNE Consortium. ARIADNE Data Collection. 2015.](#)

522 [David G. Anderson. Digital Index of North American Archaeology \(DINAA\). 2012.](#)

212 [AIAC and L - P : Archaeology. FASTI - Home. 2004.](#)

116 [Roger Bagnall. Pleiades: A community-built gazetteer and](#)

Working with PeriodO

PeriodO Current backend: Canonical [switch] Sign in Menu ▾

Browse by: Period Collection

Periods

Viewing 1 - 8 of 8

Show periods at a time.

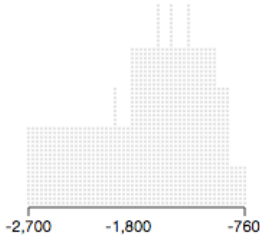
Previous 1 Next

▲ Label	Earliest start	Latest stop
bronasta doba	-1750	-751
bronzkor	-2700	-901
kora bronzkor	-2700	-1901
késő bronzkor	-1400	-901
középső bronzkor	-1900	-1401
mlajša bronasta doba	-1250	-1001
srednja bronasta doba	-1500	-1251
starejša bronasta doba	-1750	-1501

Previous 1 Next

Filters

Time range



Hide outliers?

Text

Match string

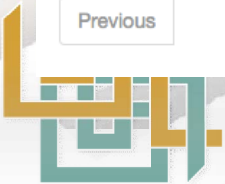
Source

[Reset](#)

Selected

8 [ARIADNE Consortium. ARIADNE Data Collection. 2015.](#)

1 [AIAC and L - P : Archaeology. FASTI - Home. 2004.](#)



- How ARIADNE is working with PeriodO
 - PeriodO search is currently being implemented in the ARIADNE portal, and should be available within the next couple of months
 - As new associated partners are added to ARIADNE (e.g. Lithuania!) they will also be invited to submit their period terms to PeriodO, further broadening coverage across Europe



- Lessons learned: How can archaeological data be more open?
 - Linked Data provides important tools for making archaeological data more open, but working together to support open practices is the real key
 - Most researchers have bigger concerns than making their data open as Linked Data, there is a significant learning and technology curve
 - Getting to this point has taken years of cooperative work by archaeologists and developers



- Lessons learned: How can archaeological data be more open?
 - Archaeologists across Europe are coming under increasing pressure to deposit their data in an open repository and make it available for re-use
 - Pressure from funders
 - Pressure from institutions
 - Funding available but no guidance
 - No appropriate options for archaeological data



- Lessons learned: How can archaeological data be more open?
 - This initial deposit is where support is really needed; making data available with an open license is the hardest work
 - Once data is online under an open license, opportunities to make it even more open and accessible using Linked Data become possible!



Thank You!

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