

### Large-scale Open Data integration in Archaeology: Challenges and Prospects

### Julian Richards Director ADS; ARIADNE Deputy Coordinator



### The Challenges we face

🕅 Language 🔁 >>

FASTIONLINE

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EOLOGICAL

ERVATION

of the Internation

Ancient Italy of the Universit

(2)奈良文化财研究所

English | 日本語 + go to top

- Multiple datasets
- Multiple repositories
- Multiple languages
- Multiple vocabularies and time periods

ads

EXPLORE

NOVATE

DISCOVER

resources

Welcome to the new ADS website. There are a number of new features of the website that will make it easier and more enjoyable to use. Please read the 'About' this site section for

more details. This site works best with the Firefox,Chrome and Safari browsers. Why not register as a myADS user to take full

advantage of the additional features. On registration these

sing the tools at the bottom of each page save your favour

personal myADS features become available

Supporting research, learning and teaching

with free, high quality and dependable digital

DEPOSIT

December 2016: Th

Cross border searching

#### History Your recent e protion of the site and the archives is auto-December 2016: A saved in your myADS Histor Keywords Search on the map of Japa Translate Free Word legistered ADS users can take advantage of a number of addition charred rice grains Sueki pottery haniwa broi myADS services, such as tailored email alerts and download of configurable results sets oted for entirely Ream ze coins Jomon period backed blade Pale 13 Advanced Sea ithic period polished stone axe microlith clay sla 13 Site Search sarcophagus radiocarbon date tu DANS LOG IN OR SIGN U RAINING AND CONSULTANCY ABOUT DANS NEWS AND EVENT ABOUT SEARCH USING TOAR UPLOAD NEW! MY ACCOUNT E-depot Dutch archaeology (EDNA) Archiving and reusing data The e-depot for Dutch Archaeology (EDNA) was established by DANS and the Cultural Heritage Agency (RCE What can you dig up? archive digital research data of Dutch archaeologists in a sustainable manner and make them available. The data EASY then remain accessible and usable in the long-term. Since 2007, archaeologists in the Netherlands are formally NARCIS obligated to deposit their data via DANS, according to the Quality Standard for Dutch Archaeology (KNA). The data The Digital Archaeological Record (tDAR) is your online archive are stored in EASY, the online archiving system of DANS, and are used mainly by archaeologists, policy makers, for archaeological information fraining and consultance ompanies and people interested in culture. Organisation and policy Find archaeological data Q ad Archaeological collection Research and Innovatio EDNA contains data of archaeological research (GIS data, field drawings, data tables, photographs) and the final eports on this research. This concerns research in the broadest sense: from field survey to excavation, from specialist research to dissertation. The archived reports and datasets can be found in EASY per archaeological organization or per specific project (for example the Betuweroute and Maaswerken), and are accessible for other scientists. More than 80% of the archaeological data in EASY is publicly accessible By participating in European portals such as Europeana and ARIADNE. DANS provides better visibility for the archaeological data in EASY. Contact: Hella Hollander (project leader Archaeology) and Valentiin Gilissen (data manager Read more about depositing data or go to EASY directly Access & Use Upload Preservatio Who Uses tDA Resources nowledge of the past, an

KNAW

ehensive Datebase of Archaeological Site Reports in Japan

You can read Japanese excavation reports on the Web

Comprehensive Database of

Archaeological Site Reports in Japan

Full-text search is available!

全国遺跡報告総算



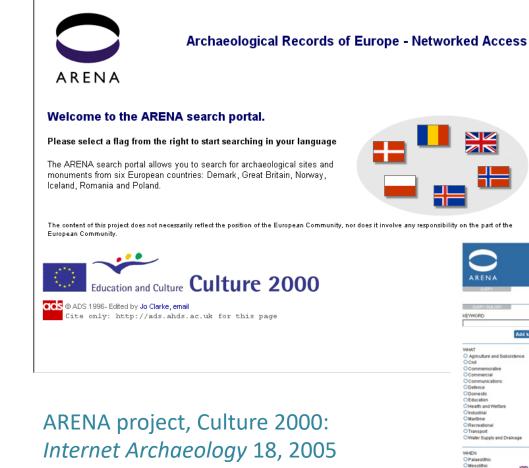


### Some prehistory....



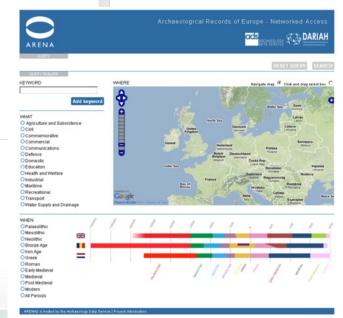
CAA 92, Aarhus: Henrik Jarl Hansen "European archaeological databases: problems and prospects".





Based on Z39.50 protocol and qualified Dublin Core

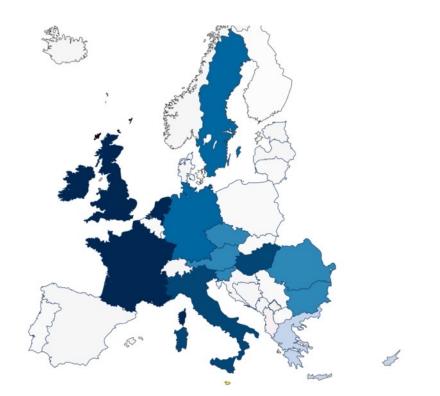
ARENA2 (DARIAH) 2009 Migrated to RESTful technologies



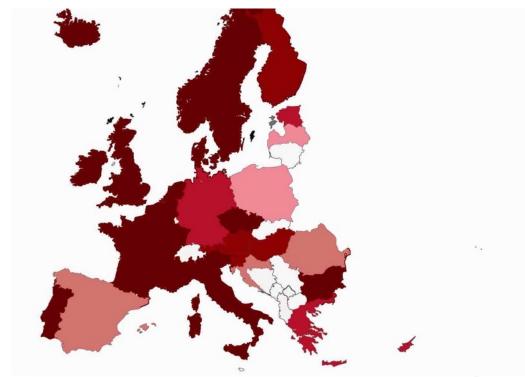


### Extending geographically









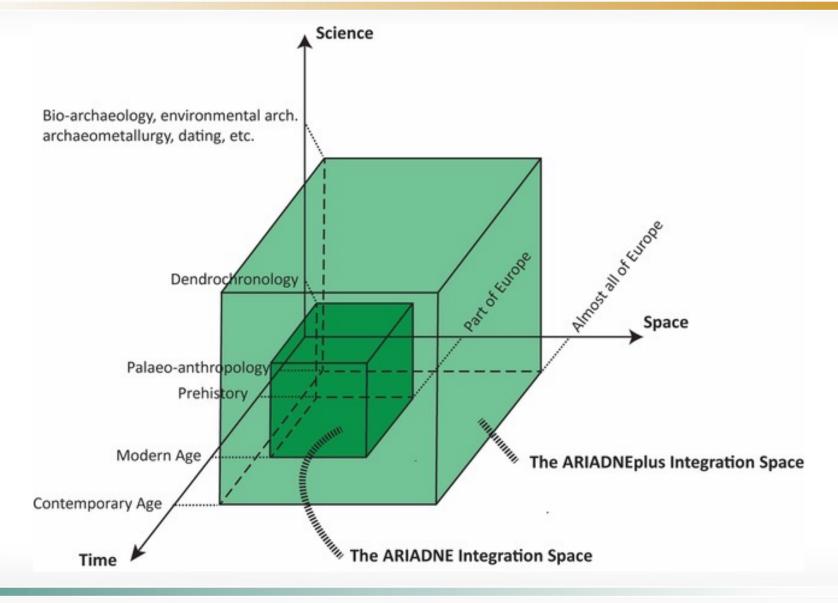
#### 2018-2022

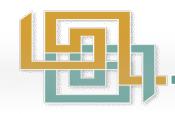
• 41 partners; 27 countries. Including Argentina, Japan, USA



24 partners; 18 countries

### **Extending thematically**



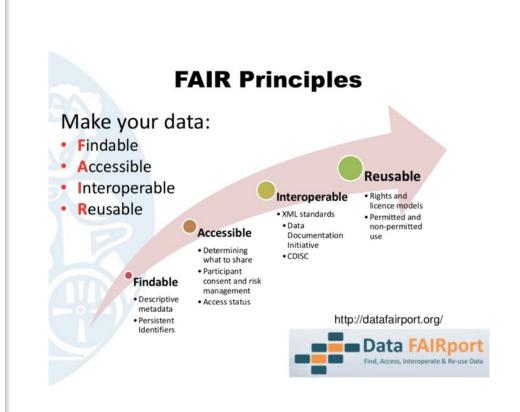


### Our aims

 Enabling cross-border / crossinstitution resource discovery i.e. finding data

RIADNE

- Enabling interoperability across partners, countries, data types, data schemas i.e. enabling research
- Capacity and community building in the sector – working with SEADDA COST action





### How do we measure success?

### 1. Quantity

- i. Number of records in the ARIADNE Catalogue / triplestore
- ii. Number of countries represented

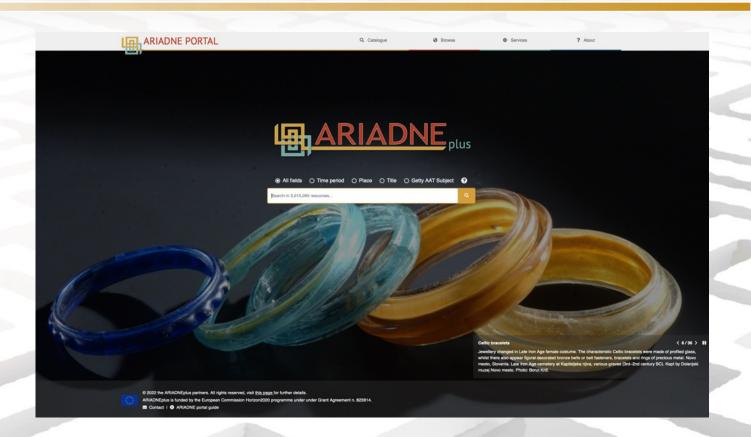
### 2. Quality

- i. Good *meaningful* search results
- Level of *granularity* item level interoperability e.g. individual artefacts, not just sites; individual dates; individual graves, not just cemeteries
- iii. Integration of new data types
- 3. Quantity and quality of re-use i.e. new users; new research

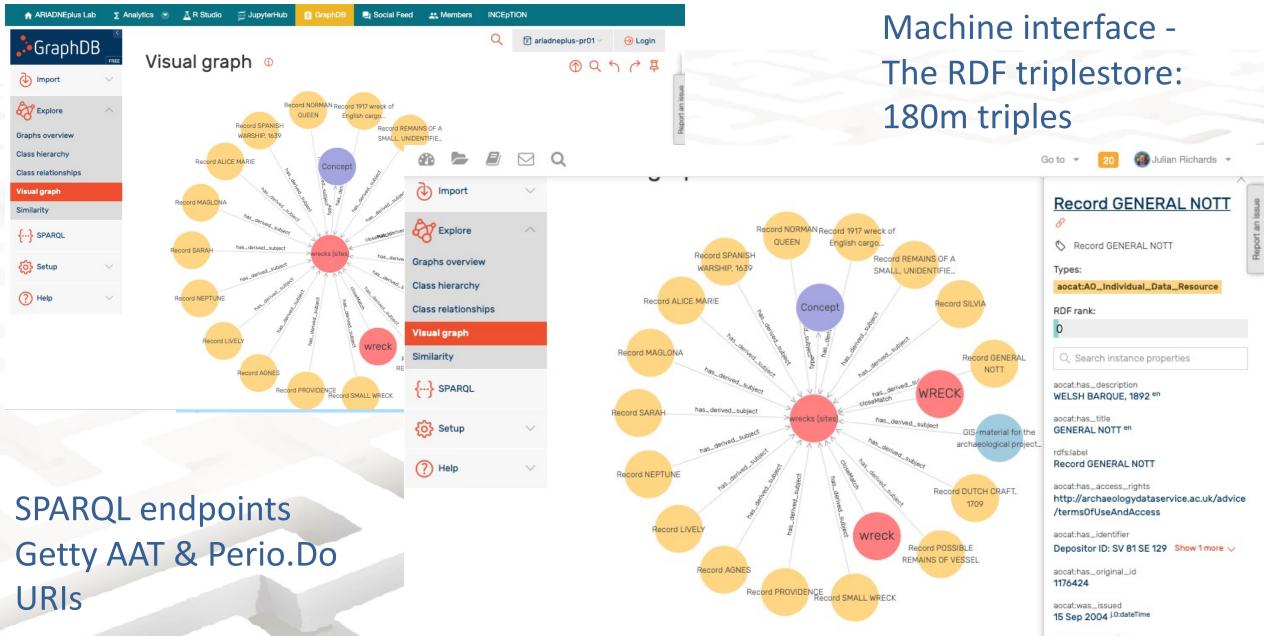
### **Quantity of resources**

### 1. Quantity

i. Number of records in the ARIADNE Catalogue
3.5m resources; aiming for 4m



• The largest research infrastructure for Archaeology & heritage - anywhere in the world



aocat:was\_modified 15 Sep 2004 j.0:dateTime

### Number of countries represented

# Quantity Number of countries represented: 50+

Getty AAT Subjects		S	National Zoo
✓ Publisher			As part of His Reference Re zooarchaeolo
Enter text to filter on Publishers. Name	Hits 🗸		Resource typ
Archaeology Data Service	1098725		Place: World, Publisher: Ar
British Museum	945228		Original subj
Historic Environment Scotland	334636	5	Wearmouth a
Archaeological Information System of the Czech Republic (AIS CR)	229999		In 2009 Newc Wearmouth a a large team o
Nara National Research Institute for Cultural Properties	139368		Resource typ
Data Archiving and Networked Services (DANS)	99291		Place: World, sunderland, m Publisher: Ar
• HNM	59684		Original subj
CEIPAC - Universitat de Barcelona	57054		Northamptor
Institut national de recherches archéologiques préventives (Inrap)	37616	- ()))	The Northam Northamptons
Swedish Rock Art Research Archives	25223	and	of broadly sim
National Heritage Institute - Romania	18279		Resource typ Place: World,
International Association for Classical Archaeology	14279		Publisher: Ar Original subj
C ZRC SAZU	8775		Land adjacer
Aarhus University	8687		An archaeolog
CENIEH	8405	and	identified agrie drainage ditch
Heidelberg Academy of Sciences and Humanities	7517		Resource typ Place: World,
IDACOR (CONICET/UNC)	2502		Publisher: Ar Original subj
National Institute of Archaeology with Museum, Bulgarian Academy of Sciences	1952		Land adjacer

Get 20 more resu

		Q Catalogue	Browse	Services	? About
	Š	National Zooarchaeological Reference R	esource (NZRR)		
		As part of Historic England (HE)'s Improving Reference Resource (NZRR) project (projec zooarchaeological research across all secto	ct 7444) is to improve accessibility to a	zooarchaeological reference colle	ctions and facilitate
s ~		Resource type: Scientific analysis Place: World, europe, united kingdom, scotl	land, World, europe, united kingdom,	wales, World, europe, united king	dom, england
15228		Publisher: Archaeology Data Service Original subject: Antler, Bone, Tooth, Anim	al bone, Ecofacts		
4636	5	Wearmouth and Jarrow: Northumbrian M			
29999		In 2009 Newcastle and Durham Universities Wearmouth and Jarrow, from their foundation a large team of professionals with funding fr	on some seven centuries after the birth	h of Christ, to their place in conter	
39368		Resource type: Fieldwork archive Place: World, europe, united kingdom, engl.	and, tyne and wear, south tyneside, ja	arrow, World, europe, united kingd	lom, england, tyne and wear,
99291		sunderland, monkwearmouth Publisher: Archaeology Data Service Original subject: Optically stimulated lumin	nescence Building elevation survey (	are campling Geophysical survey	v. Geophysical magnetometer
59684		Northamptonshire Historic Landscape C		ore sampling, deophysical surve	y, deophysical magnetometer
37616	No.	The Northamptonshire Historic Landscape ( Northamptonshire Landscape, The Northam	Character Assessment provides a deta		
25223	and	of broadly similar character into Character T		0 0	, , ,
18279		Resource type: Fieldwork archive Place: World, europe, united kingdom, engl. Publisher: Archaeology Data Service	and, northamptonshire		
14279		Original subject: Historic landscape charac	sterisation		
8775	5	Land adjacent to A5, Lutterworth, Leices An archaeological evaluation was undertake			
8687		identified agricultural use of the land in the f drainage ditches and a former hedge-line fie	form of extensive post-medieval ridge	and furrow field system remains,	
7517		Resource type: Fieldwork archive Place: World, europe, united kingdom, engl.	and, leicestershire, lutterworth		
2502		Publisher: Archaeology Data Service Original subject: Evaluation, Sample trenct	hes, Ridge and furrow, Rural commer	cial	
1952	5	Land adjacent to Glebe Farm, Coventry F	Road, Lutterworth: Archaeological r	monitoring of boreholes (OASIS	D: headland3-369514)
484		Archaeological borehole monitoring was une Evidence suggesting an earlier route for the			

along with the suggestion that intermittent and conjoining water sources contributed to deposit a sequence of allu

Resource type: Fieldwork archive

### Just a few examples.....

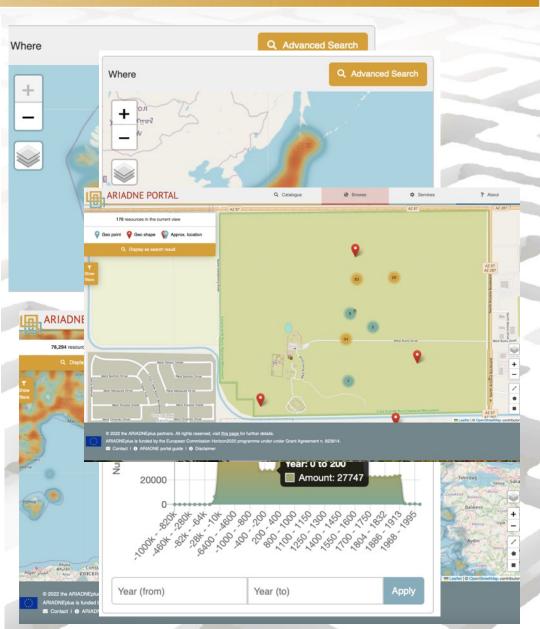
- France: 37616 fieldwork reports from Inrap
- Netherlands: 99291 records from DANS
- Iceland: 10344 sites and monuments from FSI
- FASTI: 14279 fieldwork records

### Extending into southern and eastern Europe:

- Hungary: 62401 fieldwork records from HNM
- Romania: 18279 sites & monuments from INP
- Bulgaria: 1952 sites & monuments from NIM-BAS
- Czech Republic: 229999 records from AIS CR
- Slovenia: 8775 records from ZRC-SAZU

### Extending beyond Europe:

- Japan: 139368 fieldwork reports from Nara
- United States: Casa Grande fieldwork archive from Digital Antiquity, ASU
- Argentina: 2502 records from CONICET



### Extending in time....

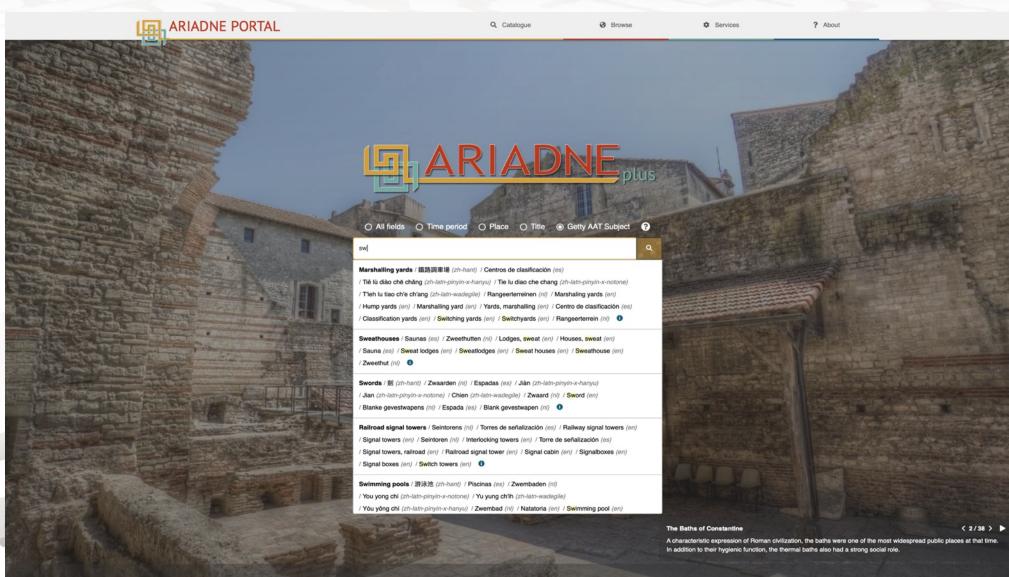


8405 records from CENIEH and 7417 from ROCEEH for early prehistory and hominid origins

Ottoman mosques and Communist farms in Dobruja, Romania, from IAVP

### Meaningful search results

2. Quality i. Good *meaningful* search results





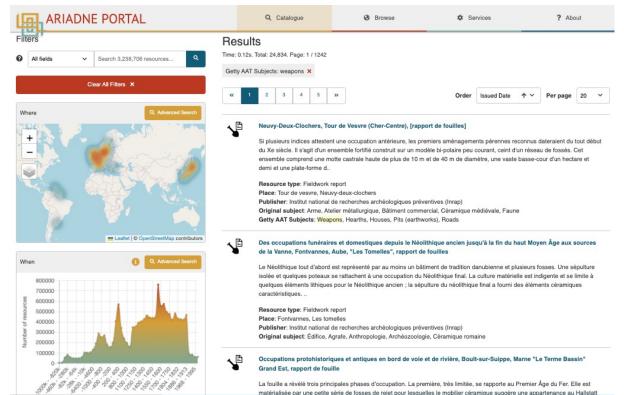
### The power of the AAT hierarchy

#### Searching on "weapons" only: 753 resources

Filters

#### ARIADNE PORTAL Q Catalogue Browse Services ? About Results Time: 0.14s. Total: 753. Page: 1 / 38 Search 3,238,706 resources. All fields Getty AAT Subjects: weapons × Clear All Filters × 2 3 4 5 » Issued Date 1 v Per page 20 v Neuvy-Deux-Clochers, Tour de Vesvre (Cher-Centre), [rapport de fouilles] Si plusieurs indices attestent une occupation antérieure, les premiers aménagements pérennes reconnus dateraient du tout début du Xe siècle. Il s'agit d'un ensemble fortifié construit sur un modèle bi-polaire peu courant, ceint d'un réseau de fossés. Cet ensemble comprend une motte castrale haute de plus de 10 m et de 40 m de diamètre, une vaste basse-cour d'un hectare et demi et une plate-forme d.. Resource type: Fieldwork report Place: Tour de vesvre, Neuvy-deux-clochers Publisher: Institut national de recherches archéologiques préventives (Inrap) Original subject: Arme, Atelier métallurgique, Bâtiment commercial, Céramique médiévale, Faune Getty AAT Subjects: Weapons, Hearths, Houses, Pits (earthworks), Roads Aspeberget Tanum - Bild 16 - Tanum 12:1 Thu fält/seminarium When G Q Advanced Resource type: Rock art 700 Place: Bohuslän, Sweden, Tanum, Västra götaland, Aspeberget tanum 600 Publisher: Swedish Bock Art Research Archives Original subject: Cirkelfigur, Djurfigur, Djurfigur fågel, Djurfigur hjort, Djurfigur hund 500 Getty AAT Subjects: Weapons, Anthropomorphic, Women (female humans), Boats, Cattle 400 300 Aspeberget Tanum - Bild 17 - Tanum 12:1 200 Thu fält/seminarium. Resource type: Rock art Place: Bohuslän, Sweden, Tanum, Västra götaland, Aspeberget tanum Publisher: Swedish Rock Art Research Archives Original subject: Cirkelfigur, Cirkelfigur hjulkors, Detalj, Människofigur, Människofigur bågskytt former Formert Arrent

#### Searching on "weapons" and narrower terms: 24,834 resources





Services

? About

#### Filters

G	All fields	<ul> <li>✓ Search 3,238,706 resources</li> </ul>	<u>م</u>
	曲 Filter By Year	う Filter By Time	Periods
	Year (from)	Year (to)	Apply
	> Resource type		
	> Getty AAT Subjects		
	> Publisher		
	> Contributor	Publications Contact 😏 😡	
	ons for linking and visua	lizing data.	
e period definition	ns as JSON. Use the Pe	riodO period browser.	

#### What is this?

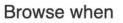
PeriodO is a gazetteer of scholarly definitions of historical, art-historical, and archaeological periods. It eases the task of linking among datasets that define periods differently. It also helps scholars and students see where period definitions overlap or diverge.

#### Who are you?

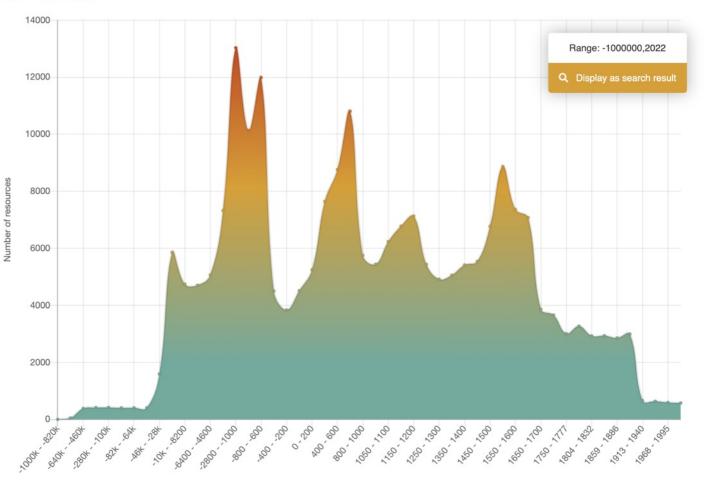
The PeriodO project is led by Adam Rabinowitz (University of Texas at Austin), Ryan Shaw (University of North Carolina at Chapel Hill), and Eric Kansa (OpenContext). Patrick Golden developed the PeriodO software and Sarah Buchanan helped curate the initial dataset. Our work is funded by a Digital Humanities Start-Up Grant from the Office of Digital Humanities at the National Endowment for the Humanities.

#### Tell me more. Start by looking at the guide to using PeriodO.

You may also be interested in reading about the motivation for the project or getting a technical overview. Further information can be found in our publications. To keep up with PeriodO developments, follow us on Twitter: @perio\_do. Or contact us and ask whatever you want!



Scroll on the timeline to zoom. Drag to pan. Hold shift and drag a selection to apply a time range. Click "Display as search result" to search the time range in the catalogue.





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ARIADNEplus is funded by the European Commission Horizon2020 programme under under Grant Agreement n. 823914

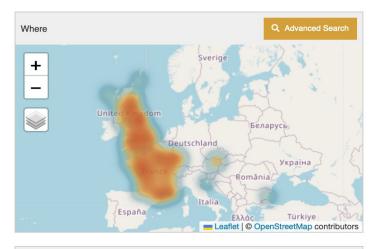
i Contact I 🕕 ARIADNE portal guide I 🕕 Disclaimer



#### Filters



Clear All Filters ×



#### **Results**

S

Time: 0.23s. Total: 180,204. Page: 1 / 9011

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Cultural periods: Medieval (gbr) ×	Cultural periods: Medieval (scotland)	Cultural periods: Medieval christian	period (prt) ×
<b>«</b> 1 2 3 4 5	»	Order Rele	evance $\checkmark$ $\checkmark$ Per page 20 $\checkmark$

#### Valence (Drôme), Plateau de Lautagne, Réservoir ville de Valence, rapport de fouilles

Le projet de construction par la ville de Valence d'un réservoir d'eau sur le plateau de Lautagne, dont le riche passé antique et médiéval n'est plus à démontrer, induit la réalisation d'une opération de diagnostic en février 2017 (Ronco, 2017), laquelle s'est avérée positive avec la découverte de fosses et de fours médiévaux. Une opération de fouille d'une durée de six semaines a donc été menée e..

Resource type: Fieldwork report Place: Plateau de lautagne, Valence

nace. Plateau de lautagne, valence

Publisher: Institut national de recherches archéologiques préventives (Inrap)

Original subject: Acquisition de ressource naturelle, Artisanat, Céramique médiévale, Exploitation, Faune domestiquée

#### Le Hameau de Haut, Digosville, (Manche), rapport de diagnostic

Le diagnostic archéologique réalisé à Digosville sur 4790 m<sup>2</sup> voués à laréalisation d'un lotissement a uniquement révélé la présence de fosséscorrespondant à différents états du parcellaire. Trois d'entre eux sesuccèdent, adoptant les mêmes orientations, depuis la fi n du Moyen âgejusqu'à nos jours en passant par la période moderne. Trois segments fossés, semblent indiquer la présence d'une trame..

Resource type: Fieldwork report Place: Digosville, Le hameau de haut Publisher: Institut national de recherches archéologiques préventives (Inrap) Original subject: Structure agraire

#### Poitiers (86), Rue de l'Université, rue des Vieilles-Boucheries, entre la rue de l'Université et la rue Savatier - Suivi de travaux en contexte urbain 2015-2016, rapport de diagnostic

Une série de surveillances de travaux, prescrites sous la forme de diagnostic archéologique, a débuté en 2015, dans le secteur de la rue de l'Université à Poitiers. Ces travaux de réfection, déviation et enfouissement profond des réseaux (eau, gaz, électricité, téléphone) sont réalisés en prévision du projet de Modernisation du réseau de transport public, lancé par la communauté d'agglomération Gr.

#### Resource type: Fieldwork report

Place: Poitiers, Rue de l'université, rue des vieilles-boucheries, entre la rue de l'université et la rue savatier

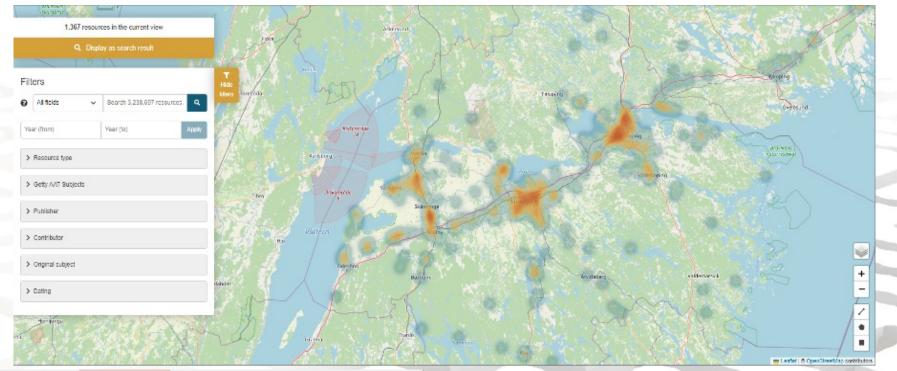
Publisher: Institut national de recherches archéologiques préventives (Inrap)

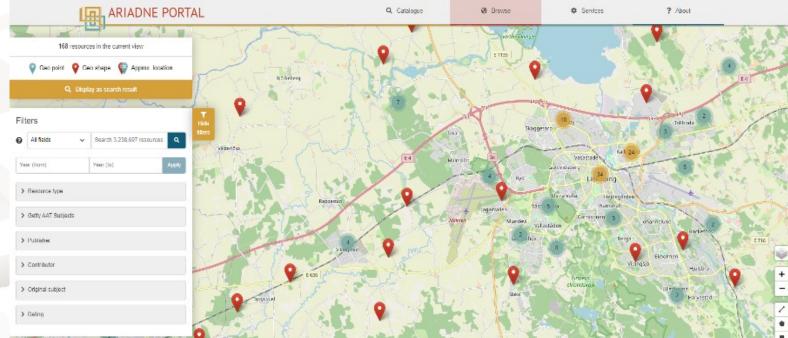
Original subject: Céramique gallo-romaine, Céramique médiévale, Céramique moderne, Céramique protohistorique, Céramologie



### WGS84

- Latitude
- Longitude





### Heat maps Cluster points

Q. Catalogue

- Back to search results

#### **ARIADNE PORTAL** Services Q Catalogue Browse ? About ← Back to search results + C Services contributors 53 Current resource ( Resource location is approximate ) 🛛 💿 Nearby resource (hide)

#### Gold INGOT

#### Description

A small and complete gold ingot of 1.17g (17.9gn). The ingot is sub triangular, 8.9mm in length, 5.7mm wide and 1.9mm thick. The surfaces show signs of hammering and hand working. There are no stamps or markings. Both ends are rounded without evidence of cutting.

← Back to: Previous Archaeological Excavations along the 'Ost

Current resource 💡 Nearby resource (ahow)

Polygon support

ARIADNE PORTAL

GIS-material for the archaeological project: Land use planning area Herstadberg

#### O Description

The information in the abstract is translated from the archaeological report. In connection with local planning concerning an extension of the golf course in Herstadberg and Loddby, Nonkoping municipality wished to elucidate the enchaeological conditions in the area. A archaeological assessment (phase 1) has been performed by the Swedish National Heritage Board's Centract Archaeology Service, UV Öst. The assessment has shown that the development will affect an area of regional, cultural interest, as well as the oldest locations of the manor i lenstadberg and the village Lodoby, a brickworks remnant, three building remnants, a historically interesting building, five prehistoric graves and six topographically delimited areas which are likely to contain unmarked archaeological remains. A expansion of the gelf course would affect Loddby to a higher degree than Herstadberg, since the latter is already much affected by the residential area, the railway and the motorway.

#### Metadata

Original ID: https://doi.org/10.5878/000639	
Landing page: https://doi.org/10.5878/000539	
Language: Swedish	
Resource type: Fieldwork archive	
Subject AAT: 😧	Subject Original:
O graves (en)	Grave, unknown type
modern (style or period) (en)	Modern age
	Modern age
	Elistorical period
	Prehistoric time

#### Metadata

Original ID: HAMP-5015EC

Swedish National Data Service Online Catalogue

Thematically similar Thematically similar resources based on terms in common of

Corridor 1965 2012: Land use planning area Herstadberg

Y CIS-material for the archeeological project: Deserted fields and remains of cooll

Y Previous Archaeological Excavations along the 'Ostlänken' Railway Corridor 1965 2012: The "Krogen" city block

Y GIS material for the archaeological project: A part of Skäggetorp from old times

SIS-material for the archaeological project: Drottningmarken

Y Previous Archaeological Excavations along the 'Ostlänken' Rallway Corridor 1965 2012: House foundation and clearance calm

Y CIS-material for the archaeological project: Prehistoric trench and shandoned field on the medieval village site of Sund

Bounding boxes to mask precise location

#### View resource at provider

Json

Report an issue

Resource is part of

Portable Antiquities Scheme Database

O Thematically similar

12 View resource at provider

@ Browse

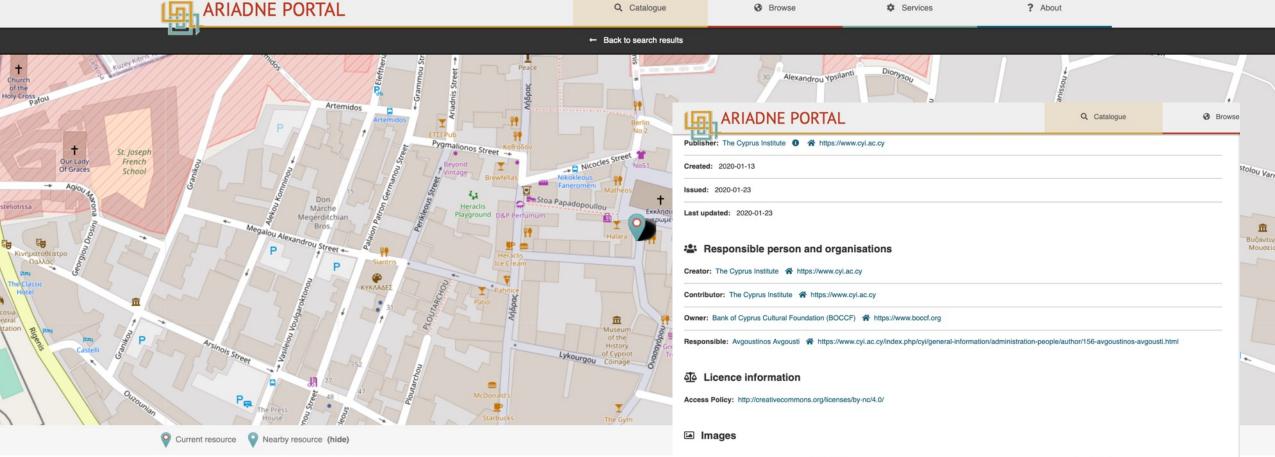
#### Resource links

🔕 Json 🥠 Xml < Rdf 🔗 Cite 🖂 Report an issue

#### Resource is part of

Subject & Time period 🐱

Y Previous Archaeological Excavations along the 'Ostlänken' Railway



#### AR Gros. Peter I, 1359-1369

#### Description

Coin Gros, Frankish Period, issued by Peter I. Weight: 4.41 gm, diameter: 25 mm, axis: 11:00. From Nicosia. Inscription: obverse 'PIERE PAR L reverse 'DE IERVSALEM E DE ChIPRE

#### S Metadata

Original ID: 1998-04-08

Landing page: https://numismatics-medieval.dioptra.cyi.ac.cy/?q=node/132

Language: English

Resource type: Coin





Thematically similar resources based on terms in common of:

Subject & Time period

AR Gros. Hugh IV, 1324-1359



### Quality of data

### 2. Quality

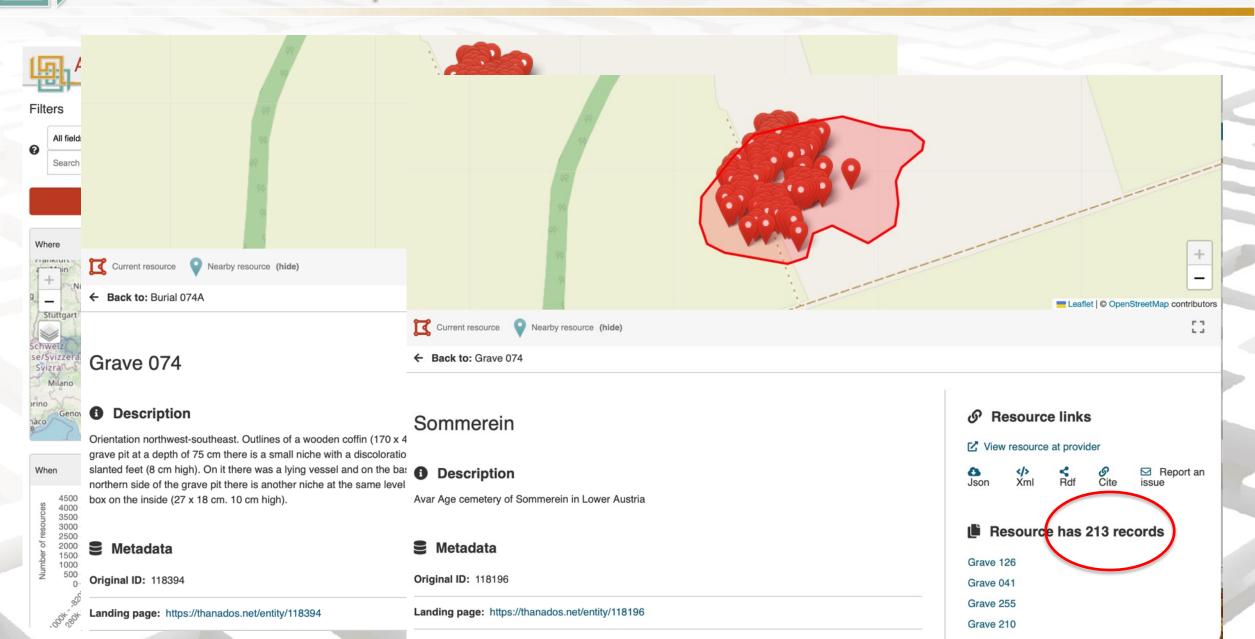
 ii. Level of *granularity* – item level interoperability e.g. individual artefacts, not just sites; individual dates; individual graves, not just cemeteries:

>550,000 artefacts – from PAS, FindSampo, DIME, PAN >500,000 coins – from RGK, BM, CY, AU >20,000 dates – from ADS, INFN, DANS DCCD >11,000 burials – from THANADOS



## ARIADNE

### Granularity: THANADOS example



### Granularity: Artefacts research

Public finds databases:

ARIADNE

- 474,552 artefacts from the PAS, British Museum
- 48,884 artefacts from PAN, the Netherlands
- 13,641 artefacts from DIME, Aarhus University
- 2410 artefacts from FindSampo, Finnish Heritage agency





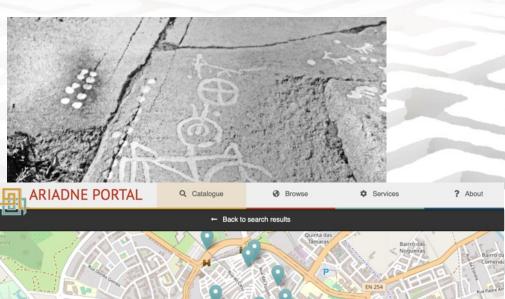
### Range of data types

2. Qualityiii. Integrationof new datatypes

Resource type	
inter text to filter on Reso	urce types.
Name	Hits 🗸
e/monument	1218756
efact	539594
n	471403
ldwork	395124
ldwork report	276850
ldwork archive	113360
cription	83357
ritime	33666
ck art	26805
te	9015
entific analysis	7785
lding survey	1274
ial	42

# Fourteen ARIADNE resource types:

- 25523 Rock Art records from Sweden
- 57054 Inscriptions from CEIPAC
- 1061 Buildings surveys from LNEC
- Scientific analyses SEAD, INFN
- 60,000+ Maritime records from ADS





#### Portas de Moura Fountain

#### Description

This collection comprises description and history of interventions of Portas de Moura Fountain, including documents, images, and scientific and technical related records on materials characteristics and performance.

#### Resource links

View resource at provide

🔕 Json 🌾 Xml < Rdf 🔗 Cite 🖂 Report an issue

### **Re-Use: Portal usage statistics**

#### Jan 22- Dec 22: 32,000 new users

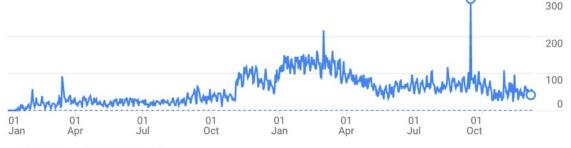
Users 🔻 by Country



	COUNTRY		USERS
	United Kingdom	16K	<b>†</b> 177.9%
	United States	1.3K	<b>1</b> 160.0%
•	France	772	<b>1</b> 16.1%
	Bulgaria	406	<b>1</b> 8.7%
	Italy	330	<b>1</b> 18.7%
	Germany	369	<b>†</b> 64.0%
	Netherlands	352	<b>†</b> 50.4%
			0

LICEDO

COUNTRY



— Custom = = Preceding period

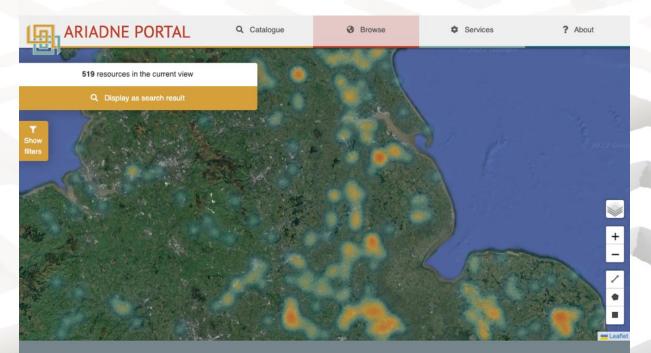
3. Quantity and quality of re-usei.e. new users; new research– the elusive R of FAIR!

Views by Page title and screen class				
PAGE TITLE AND SCREEN		VIEWS		
Browse / WhereAriadne portal	111K	-		
Ariadne portal	60K	-		
Search - Ariadne portal	28K	-		
Welcome - Ariadne portal	12K	-		
404 - Ariadne portal	4.5K	-		
Browse / When - Ariadne portal	2.5K	-		
Services - Ariadne portal	1.7K	-		

### Enabling new forms of research

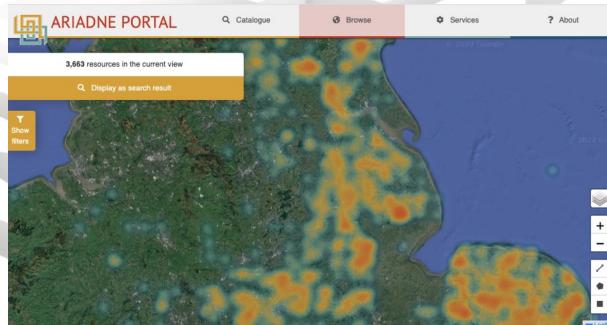
Public and professional finds together in one web search for the first time

#### Known early medieval brooches (from PAS) : 519



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### Known early medieval cemeteries (from SMRs): 3663



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### Lessons learned

- Consistent use of an ontology is essential
  - CIDOC-CRM was broad enough to cover all domains involved but it is important to map to it consistently
- Vocabulary control is also essential
  - Getty AAT very powerful but needs oversight to ensure consistency in partner mappings
- Can't make everything interoperable
  - Focus on key themes
  - What, When, Where; maybe Who?
- Requirement for archaeologists to work closely with IT specialists
  - Always think about how the data will be used
- Granularity and scale are important
  - Collection level vs item level
  - Be driven by research questions



### **THANK YOU!**

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