Fostering the publication of spatial archaeological data: A decentralized approach

The archeoViz web application and its portal

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Fostering the publication of spatial archaeological data

1. The most jealously kept archaeological secret

2. The archeoViz app

3. The archeoViz portal

4. Using archeoViz

5. A federative and decentralized approach

6. Perspectives
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The most jealously kept archaeological secret

What secret? Spatial data in archaeology

A change with the so-called “Digital Revolution”?

Related work and existing solutions

The archeoViz answer

The archeoViz app

The archeoViz portal

Using archeoViz

A federative and decentralized approach

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The most jealously kept archaeological secret

What secret? Spatial data in archaeology

An intense and long-standing recording effort

But a contrasting neglect
Fostering the publication of spatial archaeological data

The most jealously kept archaeological secret

What secret? Spatial data in archaeology

An intense and long-standing recording effort

Flinders Petrie, Tell Hesy, 1891.


But a contrasting neglect
Fostering the publication of spatial archaeological data

The most jealously kept archaeological secret

What secret? Spatial data in archaeology

An intense and long-standing recording effort

A long technological history:

- 1858-1880: William Pengelly excavation at Kents Cavern.
- 1890: Flinders Petrie excavating Tell el-Hesy.
  Petrie 1891. *Tell El Hesy (Lachish)*.
- From 1947: Georges Laplace and Louis Méric recorded spatial coordinates at Montmaurin.
  Laplace and Méric 1954. “Application des coordonnées cartésiennes à la fouille d’un gisement”.
- Late 1980’s: Harold Dibble *et al.* started to use theodolites
- 2000’s: GIS, remote sensing, drones, etc.

But a contrasting neglect
Fostering the publication of spatial archaeological data

The most jealously kept archaeological secret

What secret? Spatial data in archaeology

An intense and long-standing recording effort

But a contrasting neglect

Spatial data are:
- underused: (possibly some statistics and) some figures;
- kept in notebooks and, more recently, hard-drives, or lost:
- very little shared: data sharing in archaeology is an old problem

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The most jealously kept archaeological secret

A change with the so-called “Digital Revolution”?

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A changing situation? Yes, but slowly...

- Few spatial data sets in the main disciplinary and generic repositories of archaeological data.
  - disciplinary: tDAR, ADS, OpenContext, OpenArkeo;
  - generic: Zenodo, Figshare, Github, OSF, Nakala, etc.

- However, very few dataset are at site’s scale and/or include the “z” third spatial dimension.

- Even papers specialized in spatial data analysis rarely publish... spatial data.
  (Supporting material is limited to the programming code.)

- Better situation in the major generic scientific journals, which require authors to publish supporting data e.g.: Nature, Science, PlosONE.
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The most jealously kept archaeological secret

Related work and existing solutions

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The most jealously kept archaeological secret

Related work and existing solutions

Existing archaeological visualization software

Existing Geographic Information Systems

Existing online repositories for archeological spatial data
Fostering the publication of spatial archaeological data

The most jealously kept archaeological secret

Related work and existing solutions

**Existing archaeological visualization software**

Lightweight software for archaeological spatial data visualization:

- Dataset-specific scripts or web applications:
- R Shiny application implementing specific statistical methods:
- R packages:

**Existing Geographic Information Systems**

**Existing online repositories for archeological spatial data**
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The most jealously kept archaeological secret

Related work and existing solutions

Existing archaeological visualization software

Lightweight software for archaeological spatial data visualization:

- Dataset-specific scripts or web applications:
  - S. McPherron’s R Shiny *Plot it* application (unpublished),
  - A. Sécher’s *PyCoCu* python script.
- R Shiny application implementing specific statistical methods:
- R packages:

Existing Geographic Information Systems

Existing online repositories for archeological spatial data
Existing archaeological visualization software

Lightweight software for archaeological spatial data visualization:
- Dataset-specific scripts or web applications:
- R Shiny application implementing specific statistical methods:
  - Couillet et al. 2022. “New Visual Analytics Tool and Spatial Statistics to Explore Archeological Data: The Case of the Paleolithic Sequence of La Roche-à-Pierrot, Saint-Césaire, France”.
- R packages:

Existing Geographic Information Systems

Existing online repositories for archeological spatial data
Existing archaeological visualization software

Lightweight software for archaeological spatial data visualization:

- Dataset-specific scripts or web applications:
- R Shiny application implementing specific statistical methods:
- R packages:
  - recexcavAAR (no longer maintained)
  - SEAHORS
    (only does visualization but offers more advanced features than archeoViz)

Existing Geographic Information Systems

Existing online repositories for archeological spatial data
Fostering the publication of spatial archaeological data

The most jealously kept archaeological secret

Related work and existing solutions

Existing archaeological visualization software

Existing Geographic Information Systems

archeoViz is a lightweight, complementary alternative to more complex archaeological software, and the more demanding association of GIS software and export libraries:

- **ArchField**

- **Aspectus**

- **4D system**

- **QGIS and the Qgis2threejs plugin**.
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The most jealously kept archaeological secret

Related work and existing solutions

Existing archaeological visualization software

Existing Geographic Information Systems

Existing online repositories for archeological spatial data

- **arkeoGIS**, [https://arkeogis.org](https://arkeogis.org)
  No dataset with 3D data so far.

- **Field**, [https://field.dainst.org](https://field.dainst.org)
  No third dimension. Only 2 datasets so far.

- **PaleoCore**, [https://paleocore.org](https://paleocore.org)
  Datasets are currently private.
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The most jealously kept archaeological secret

The archeoViz answer

Barriers to data availability

The archeoViz answer

archeoViz principles
Fostering the publication of spatial archaeological data

The most jealously kept archaeological secret

The archeoViz answer

**Barriers to data availability**

Lack of:

1. accessible and handy tools,
2. training in data management,
3. time to prepare data for publication,
4. recognition related to data publishing


The archeoViz answer

*archeoviz principles*
Fostering the publication of spatial archaeological data

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The archeoViz answer

Barriers to data availability

Lack of:

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The archeoViz answer

- minimal and multilingual interface (viz. issue 1)
- simple data structure (viz. issues 2, 3)

make archeoViz handy to use and fast to deploy on the web,

- contributing to promote datasets as citable scientific outputs and, consequently, to promote data creators as well (viz. issue 4).

archeoViz principles
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The most jealously kept archaeological secret

The archeoViz answer

Barriers to data availability

The archeoViz answer

ArcheoViz principles

- An incentive to publish: a workaround to archaeologists’ reluctance to publish data: archeoViz as a tool to promote data sets, emphasizing data reuse as an incentive to publish data.

- A decentralized approach: archeoViz as the building block of a decentralized web edition network for archaeological data, made of as many archeoViz instances as there are datasets (instead of using a central repository).

- A federative perspective: using the archeoViz portal to gather the multiple archeoViz static instances and describes them with metadata aligned on standards and authorities.
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The archeoViz app

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   - General features
   - The app interface
   - Highlights on notable features and use

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The archeoViz app

General features

archeoViz, in a nutshell

Targeted uses
Fostering the publication of spatial archaeological data

**The archeoViz app**

**General features**

**archeoViz, in a nutshell**

A web R Shiny application embedded in an R package “a decentralized mean for the editorialization of spatial data in archaeology”.

- **“spatial archaeological data”**: mainly individual objects located with set of coordinates (x, y, z) and represented as points;
- **“decentralized”**: based on multiple autonomous instances of the application and a portal to link them (vs a centralized platform);
- **“editorialization”**: offering views on a dataset (vs publishing the dataset)

**Targeted uses**
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The *archeoViz* app

General features

**archeoViz, in a nutshell**

**Targeted uses**

- For everyone:
  - make visible and communicate on the web archaeological datasets; e.g.:
    a tool to present an ongoing excavation to the public;
    a way to generate a feedback to citizens and taxpayers.

- For archaeologists:
  - visual and statistical exploration of datasets;
  - a companion tool to a publication (as an interactive supplemental);
  - an educational resource;
  - an incentive to publish data (on third-party services: *OSF*, *Zenodo*, *Nakala*, etc.).
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- **The archeoViz app**
  - The app interface

1. **The most jealously kept archaeological secret**

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   - The app interface
   - Highlights on notable features and use

3. **The archeoViz portal**

4. **Using archeoViz**

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- **The archeoViz app**

- **The app interface**

![Image of the archeoViz app interface with data selection, interactive legend, and visualisation settings]
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The archeoViz app

The app interface

Demonstration: Combe Capelle A2

https://analytics.huma-num.fr/archeoviz/combe-capelle-a2
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The archeoViz app

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The *archeoViz* app

Highlights on notable features and use

- *archeoViz* functionalities are simple.
- They are also flexible and can be adapted and used for many purposes.

- Representing spatial uncertainty
- Representing fabrics
- Representing shapes
- Linking *archeoViz* to data repositories and standard ontologies
- *archeoViz* use and reproducibility
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The archeoViz app

Highlights on notable features and use

Display spatial uncertainty
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The archeoViz app

Highlights on notable features and use

Display fabrics (using the “show refits” feature)
Display shapes: e.g., elephant bones at Marathousa 1A
## Reproducibility

*archeoViz* is, by definition, an interactive tool. Consequently, ensuring the reproducibility of users’ interactions with the app is challenging. Nevertheless, the app includes features satisfying this requirement:

1. Dynamic generation of R code to launch the app with the parameters sets by the user when interacting with the app.
2. Export of the plots in self-contained HTML files. *E.g.,*
   - 3D plot of Le Flageolet
   - Map plot of Barger Gulch
3. If relevant, publication of the code to recode and reshape the published dataset into the *archeoViz* format:
   - publication of the code;
   - “Data editor” and “Data reprocessing code” metadata.
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The *archeoViz* app

Highlights on notable features and use

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**Reproducibility**

To reproduce your current settings, run `archeoViz` with the following R command (adjust the "objects.df" and "refits.df" parameters to your needs):

```r
archeoViz(objects.df=data,
reverse.axis.values="xy", title="Těšetice X09",
lang="en", set.theme="sandstone", home.text="",
squ.x.square.labels=0.4,
class.variable="object_type",
class.values=c("burin", "denticulated",
"double/multiple", "fragment", "lighter", "notch",
"percussive tool", "retouched"), square.size=100,
default.group="by.variable", location.mode="fuzzy",
map.x.val=c(20, 80), map.density="overall",
plot3d.ratio=1, plot3d.hulls=FALSE,
section.x.val=c(2500, 1419),
section.y.val=c(2700, 4500),
section.x.y.val=c(2600, 5000),
sectionY.x.val=c(251, 378))
```
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Linking points in *archeoViz* to records in repositories and to concepts in standard ontologies: e.g., to the *tDAR* Barger Gulch dataset
Linking points in *archeoViz* to records in repositories and to concepts in standard ontologies: e.g., to the *tDAR* Barger Gulch dataset.
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The *archeoViz portal*

A portal to bind them all

1. The most jealously kept archaeological secret

2. The *archeoViz app*

3. The *archeoViz portal*
   - A portal to bind them all
   - A focus on refitting data

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The archeoViz portal

A portal to bind them all

Homepage of an archeoViz specific instance on the portal. E.g., the Cassenade Paleolithic site

Homepage structure:
- Figure and short presentation
- Metadata
- Reference for citing this instance
- References of related publications and dataset
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The archeoViz portal

A portal to bind them all

Welcome to the archeoViz portal

Presentation
This portal gives access to 40 datasets visualised with the archeoViz application (also referenced in the HAL repository). They include 351,690 objects, and 10,908 refitting relationships.

archeoViz is an application designed for archaeology. It allows you to visualise, interactively explore, and quickly deploy and communicate on the web data about archaeological remains found during excavations and surveys.

It offers interactive visualisations, can generate and export 3D views, cross sections, and maps of the remains, can run basic spatial statistics methods (convex hull, regression surfaces, 2D kernel density estimation), and can display an excavation interactive timeline.

This app is distributed as an open source R package, with its code available on GitHub. archeoViz can be used locally on a personal computer or deployed on a server. It can be run statically with a specific dataset or dynamically by loading data through the interface, which is available in German, English, French, Italian, and Portuguese.

Use cases

- Click on a row of the table below to zoom the map to the location of a site.
- Use the "Search" field to search sites by name, period, and country.

<table>
<thead>
<tr>
<th>Site name</th>
<th>Period coverage</th>
<th>Nr of objects</th>
<th>Nr of refitting relationships</th>
<th>Nr of refitting objects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Altenendig</td>
<td>Medieval, Merovingian</td>
<td>6889</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Arnalda 1. layer VII</td>
<td>Middle Paleolithic</td>
<td>1966</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Barging Gulch</td>
<td>Paleoindian, Folsom</td>
<td>17219</td>
<td>1082</td>
<td>1266</td>
</tr>
<tr>
<td>Barnhouse</td>
<td>Mesolithic</td>
<td>473</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
The *archeoViz portal* is intended to index *archeoViz* specific instance.

Currently, it indexes:

- 40 datasets, that include
- 351,690 objects (including 61,133 objects linked to their data repository),
- 10,908 refitting relationships.

The portal is currently hosted on the *huma-num* servers:

https://analytics.huma-num.fr/archeoviz/home
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The archeoViz portal

A portal to bind them all

The small team currently maintaining the archeoViz portal:

Anaïs Vignoles
PhD, Université Paris Nanterre

Sébastien Plutniak
PhD, CNRS

Maintenance workflow

- Synchronization and versioning using a private github repository;
- bash script for fast and automatic deployment on the server.
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The archeoViz portal

A focus on refitting data

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The archeoViz portal

A focus on refitting data
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The archeoViz portal

A focus on refitting data

Why refitting?

Same reasoning that about spatial data. Refitting relationships are:

- fundamental in archaeological study (the most certain archaeological knowledge that can be determined),
- time-consuming to determine,
- but rarely published and, consequently, reused.

Consequently, refitting data are highlighted in the archeoViz portal.
Datasets sorted by number of refitting relationships:

<table>
<thead>
<tr>
<th>Site name</th>
<th>Period coverage</th>
<th>Nr of objects</th>
<th>Nr of refitting relationships</th>
<th>Nr of refitting objets</th>
</tr>
</thead>
<tbody>
<tr>
<td>Le Bost des Vergnes</td>
<td>Middle Palaeolithic → Upper Palaeolithic, Châtelperronian, Aurignacian</td>
<td>17679</td>
<td>3740</td>
<td>4350</td>
</tr>
<tr>
<td>Champ-Parel 3</td>
<td>Upper Palaeolithic, Aurignacian</td>
<td>3746</td>
<td>2410</td>
<td>1770</td>
</tr>
<tr>
<td>Chez Thuliet</td>
<td>Upper Palaeolithic, Magdalenian</td>
<td>15462</td>
<td>1846</td>
<td>2140</td>
</tr>
<tr>
<td>Chez Thuliet</td>
<td>Upper Palaeolithic, Magdalenian</td>
<td>1523</td>
<td>454</td>
<td>480</td>
</tr>
<tr>
<td>Bilzingsleben</td>
<td>Lower Palaeolithic</td>
<td>2522</td>
<td>61</td>
<td>160</td>
</tr>
<tr>
<td>Grotte XVI</td>
<td>Middle Palaeolithic, Mousterian → Upper Palaeolithic, Châtelperronian</td>
<td>4545</td>
<td>60</td>
<td>196</td>
</tr>
<tr>
<td>Cassenweide</td>
<td>Upper Palaeolithic, Châtelperronian</td>
<td>2466</td>
<td>26</td>
<td>76</td>
</tr>
</tbody>
</table>

Showing 1 to 10 of 36 entries
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Using archeoViz

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Using archeoViz

Choose one of the 4 ways to use archeoViz

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3. The archeoViz portal

4. Using archeoViz
   - Choose one of the 4 ways to use archeoViz
   - Prepare your CSV file
   - Get the application
   - Learn more and contribute
   - Use archeoViz for education in archaeology

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Using archeoViz

Choose one of the 4 ways to use archeoViz

4 use modes for archeoViz:

- local (green solid line),
- remote and dynamic (dashed line),
- remote, static, with data publication (black solid line),
- remote, static, without data publication (blue solid line).
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Using archeoViz

Prepare your CSV file

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- Using archeoViz
- Prepare your CSV file

**Required fields**

**Optional fields**
Required fields

- **id**: unique identifier of the object;
- **xmin**: coordinate of the object on the X axis (in cm);
- **ymin**: coordinate of the object on the Y axis (in cm);
- **zmin**: coordinate of the object on the Z axis (depth value in cm);
- **layer**: identifier of the object’s layer;
- **object_type**: category of the object.

Optional fields
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Using archeoViz

Prepare your CSV file

**Required fields**

**Optional fields**

- *square_x*: identifier of the square on the X axis;
- *square_y*: identifier of the square on the Y axis;
- *year*: year when the object was excavated;
- *xmax*: when the X location of the object is included in a range of X coordinates;
- *ymax*: when the Y location of the object is included in a range of Y coordinates;
- *zmax*: when the Z location of the object is included in a range of Z coordinates;
- *object_<edit>*: unlimited number of additional variables describing the object.
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Using archeoViz

Prepare your CSV file

File example

<table>
<thead>
<tr>
<th>id</th>
<th>square_x</th>
<th>square_y</th>
<th>xmin</th>
<th>xmax</th>
<th>ymin</th>
<th>ymax</th>
<th>zmin</th>
<th>layer</th>
<th>object_type</th>
<th>object_subtype</th>
</tr>
</thead>
<tbody>
<tr>
<td>1</td>
<td>A</td>
<td>1</td>
<td>51</td>
<td>55</td>
<td>61</td>
<td>65</td>
<td>10</td>
<td>1a</td>
<td>fauna</td>
<td>bos</td>
</tr>
<tr>
<td>2</td>
<td>B</td>
<td>2</td>
<td>152</td>
<td>140</td>
<td>30</td>
<td>2</td>
<td>1a</td>
<td>lithic</td>
<td>blade</td>
<td></td>
</tr>
</tbody>
</table>

Mandatory fields are in bold.
Alternative option: use the SEAHORS application to generate an archeoViz-compatible file.

https://aurelienroyer.shinyapps.io/Seahors
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Using archeoViz

Get the application

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6. Perspectives
Fostering the publication of spatial archaeological data using archeoViz. Get the application for remote or local use.
Fostering the publication of spatial archaeological data

Using archeoViz

Get the application

For remote use

- Generic demonstration instances (in multiple languages: en, de, fr, it, pt) are deployed on the huma-num servers:
  - https://analytics.huma-num.fr/archeoviz/fr
  - https://analytics.huma-num.fr/archeoviz/en
  - https://analytics.huma-num.fr/archeoviz/pt (Renata Araujo)
  - https://analytics.huma-num.fr/archeoviz/it (Sara Giardino)
  - https://analytics.huma-num.fr/archeoviz/de (Julian Laabs)

For local use
Fostering the publication of spatial archaeological data

Using archeoViz

Get the application

For remote use

For local use

- The R package in the CRAN repository:
  https://cran.r-project.org/package=archeoViz

- The code on github:
  https://github.com/sebastien-plutniak/archeoviz
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**Using archeoViz**

**Learn more and contribute**

1. The most jealously kept archaeological secret
2. The archeoViz app
3. The archeoViz portal

4. Using archeoViz
   - Choose one of the 4 ways to use archeoViz
   - Prepare your CSV file
   - Get the application
   - Learn more and contribute
   - Use archeoViz for education in archaeology

5. A federative and decentralized approach
6. Perspectives
Fostering the publication of spatial archaeological data

Using ArcheoViz

Learn more and contribute

Documentation

Publications

Stay up-to-date and access support
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**Using archeoViz**

**Learn more and contribute**

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**Documentation**

- Online documentation (README file on the github repository):
  [https://github.com/sebastien-plutniak/archeoviz](https://github.com/sebastien-plutniak/archeoviz)

- This documentation is also embedded in the app interface, in English and in French (tab “Guidelines” and “Aide”, respectively).

- **Plutniak, S. & A. Vignoles, “L’application web / package archeoViz et son portail web. Une solution décentralisée d’editorialisation de données archéologiques spatialisées”, presentation at the SITraDA – Systèmes d’information et traitements de données archéologiques workshop.**

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**Publications**

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Fostering the publication of spatial archaeological data

- Using archeoViz
- Learn more and contribute

**Documentation**

**Publications**


**Stay up-to-date and access support**
Fostering the publication of spatial archaeological data

Using archeoViz

Learn more and contribute

Documentation

Publications

Stay up-to-date and access support

- Subscribe to the archeoViz mailing list:
  - https://listes.services.cnrs.fr/wws/info/archeoviz-users.
  - Monthly newsletter.
  - A space for mutual support.
Fostering the publication of spatial archaeological data

- Using archeoViz
- Learn more and contribute

Contribute to the app development

Contribute to the archeoViz portal
Fostering the publication of spatial archaeological data

Using archeoViz

Learn more and contribute

Contribute to the app development

- Contribute to the code: clone the github repository, write your code, and create pull requests.

Contribute to the archeoViz portal
Fostering the publication of spatial archaeological data

Using archeoViz

Learn more and contribute

Contribute to the app development

Contribute to the archeoViz portal

- Prepare your dataset,
- test it online on a generic archeoViz instance
- deploy your archeoViz instance,
  - on the Shiny server of your choice: shinyapps.io, Posit Connect, huma-num, your institution’s Shiny server, your own Shiny server (on AWS, etc.),
  - or write to archeoviz-maintainers@services.cnrs.fr to deploy it on the huma-num server,
- write to archeoviz-maintainers@services.cnrs.fr to index your instance on the portal.
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Using archeoViz

Use archeoViz for education in archaeology

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Using archeoViz

Use archeoViz for education in archaeology

Concepts

Exercises
Concepts

archeoViz can be used to introduce students to multiple concepts:

- Archaeological field data recording
- Spatial analysis and statistics, post-excavation stratigraphic analysis
- Data description, data curation, data publication
- Metadata, data alignment, semantic web
- File formats (CSV, HTML, SVG)
- Open and reproducible science
- Scientific programming, computational archaeology
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**Using archeoViz**

**Use archeoViz for education in archaeology**

## Concepts

## Exercises

Teaching materials for classes in computational archaeology are available on the [https://archeoviz.hypotheses.org](https://archeoviz.hypotheses.org) webpage about:

- “Data preparation and tabular file formats”
- “Spatial data visualization and graphic outputs”
- “Data curation, description, and edition”
- “An introduction to the R language and reproducible science”
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A federative and decentralized approach

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4. Using archeoViz

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A federative and decentralized approach

A network of archeoViz static instances

1. The most jealously kept archaeological secret

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3. The archeoViz portal

4. Using archeoViz

5. A federative and decentralized approach
   - A network of archeoViz static instances
   - Metadata and data alignment
   - Referencing archeoViz instances

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FOSTERING THE PUBLICATION OF SPATIAL ARCHAEOLOGICAL DATA

A FEDERATIVE AND DECENTRALIZED APPROACH

A NETWORK OF archeoViz STATIC INSTANCES

Welcome to the archeoViz portal

Presentation

This portal gives access to 40 datasets visualised with the archeoViz application (also referenced in the HAL repository). They include 351,690 objects, and 10908 refitting relationships.

archeoViz is an application designed for archaeology, it allows to visualise, interactively explore, and quickly deploy and communicate on the web data about archaeological remains found during excavations and surveys.

It offers interactive visualisations, can generate and export 3D view, cross sections and maps of the remains, can run basic spatial statistics methods (convex hull, regression surfaces, 2D kernel density estimation), and can display an excavation interactive timeline.

This app is distributed as an open source R package, with its code available on github.

archeoViz can be used locally on a personal computer or deployed on a server. It can be run statically with a specific dataset or dynamically by loading data through an interface, which is available in German, English, French, Italian, and Portuguese.

Use cases

• Click on a row of the table below to zoom the map to the location of a site.
• Use the "Search" field to search sites by name, period, and country.

<table>
<thead>
<tr>
<th>Site name</th>
<th>Period coverage</th>
<th>Nr of objects</th>
<th>Nr of refitting relationships</th>
<th>Nr of refitting objects</th>
</tr>
</thead>
<tbody>
<tr>
<td>Allending</td>
<td>Medieval, Merovingian</td>
<td>6889</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Aremida 1. layer VII</td>
<td>Middle Paleolithic</td>
<td>1966</td>
<td>0</td>
<td>0</td>
</tr>
<tr>
<td>Barter Gulch</td>
<td>Paleoindian, Folsom</td>
<td>17219</td>
<td>1082</td>
<td>1206</td>
</tr>
<tr>
<td>Barnhouse</td>
<td>Mesolithic</td>
<td>473</td>
<td>0</td>
<td>0</td>
</tr>
</tbody>
</table>
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A federative and decentralized approach

A network of *archeoViz* static instances

Notable examples

**Bilzingsleben**

**Le Flageolet**

**Le Poeymaü**

**Altenerding**
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Bilzingsleben

Bilzingsleben is an open air site located in Bilzingsleben, Germany. The site was known since at least the 18th century, but was reexcavated by Dietrich Maria from 1969 to 1993. Lower Palaeolithic artifacts have been found together with hominid skeletal remains, enclosed in a travertine layer. Artifacts made of stone, bone, antlers, ivory, and calcified wood were found, and also bones from hunted animals, structures of dwelling, and hearths.

Several areas were distinguished:

- The "diluvial fan", a flood plain or made of travertine sands.
- The "shore facies", a terrace of loess-like deposit with clay on the top.
- A shore line separates the diluvial fan and the terrace (in green in the map above).
- The "pavement" is a part of the terrace paved with close small objects (<10cm), mostly stones and bones, and interpreted by Maria as a human-made feature (in purple in the map above).

Le Flageolet

Le Poeymaü

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Bilzingsleben

**Bilzingsleben**, lower Paleolithic site, Germany.

- Data 1st publication: 2000;
- Data raw format: digital;
- Highlights:
  - Linking between the archeoViz instance and the database published in 2000 in *Internet Archaeology*;

Le Flageolet

Le Poeymaü

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Bilzingssleben

June 4, 2023

Reprocessing script and data for the Bilzingssleben antlers dataset to visualise it with the archeoViz web application

Plutniak, Sebastian

Data collector(s)

Vollbrecht, Jürgen

This files were created to be used for visualisation with the archeoViz application.

This record includes:

- and an R script with the code used to reprocess this dataset.

In the resulting files,

- bilzingssleben-data.csv: partially reprocessed Vollbrecht's data.
- bilzingssleben.csv: output file of the reprocessing: the objects (antlers) are associated with the ranges of coordinates of the square they were found, links to their record in Vollbrecht's database are included.
- bilzingssleben-refits.csv: refitting data are reformatted in a convenient format.
- bilzingssleben-timeline.csv: the year the squares were excavated were deduced using Vollbrecht 2000 and recoded. This made it possible to generate:
- bilzingssleben-timeline-map.jpg: a map of the site giving the year the squares were excavated and the labels arbitrary attributed for the archeoViz visualisation.

Publication date:
June 4, 2023

Le Flageolet

Le Poeymaü

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Bilzingsleben

Le Flageolet

Le Poeymaü

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<table>
<thead>
<tr>
<th>Bilzingsleben</th>
</tr>
</thead>
</table>

<table>
<thead>
<tr>
<th>Le Flageolet</th>
</tr>
</thead>
<tbody>
<tr>
<td><strong>Le Flageolet</strong>, Paleolithic site, France</td>
</tr>
<tr>
<td>- Data 1\textsuperscript{st} publication: unpublished;</td>
</tr>
<tr>
<td>- Data raw format: archived notebooks;</td>
</tr>
<tr>
<td>- Highlight: 65,000 objects (larger dataset in the portal so far).</td>
</tr>
</tbody>
</table>

<table>
<thead>
<tr>
<th>Le Poeymaü</th>
</tr>
</thead>
</table>

<table>
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<tr>
<th>Altenerding</th>
</tr>
</thead>
</table>
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Bilzingsleben

Le Flageolet

Le Poeymäü


Altenerding
### Bilzingsleben

### Le Flageolet

### Le Poeymaü

**Le Poeymaü**, Mesolithic site, France

- **Data 1\textsuperscript{st} publication**: unpublished;
- **Data raw format**: archived notebooks;
- Manually digitalized: 15,000 objects, data enrichment, semantic alignment (work in progress).
- **Data publication**: forthcoming.

### Altenerding
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Bilzingsleben

Le Flageolet

Le Poeymäü

Altenerding

The Altenerding Merovingian necropolis is an open air site located in Altenerding, Germany. It was discovered by accident in 1965, during the construction of a new housing area, and excavated during four campaigns between 1965 and 1973. This necropolis was used from the second half of the 5th to the last third of the 7th century. With 1521 of originally 2200 to 2300 documented burials, it is the largest Merovingian cemetery in southern Germany.


The data set presented here includes 1348 burials and 2629 objects (weapons, pearls, and other types of objects) represented by points. In addition, burial goods are documented as a variable of the burials (object_burial goods), as well as the presence of terra sigillata (for these variables the points representing objects – and not burials – have 'NA' values). Information about the skeletal remains are also given (gender, age of the deceased, etc.).
**Bilzingsleben**

**Le Flageolet**

**Le Poeymaü**

**Altenerding**

*Altenerding*, medieval cemetery, Germany

- **Data 1st publication**: 1998;
- **Data raw format**: digital;
- **Highlight**: translated from Slovenian into English.
- **Data republication**: forthcoming.
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Metadata and data alignment

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Metadata and data alignment

Metadata

Metadata Alignment
## Metadata

- Site name
- Number of objects, refitting relationships, objects included in refitting sets
- Location: latitude & longitude, country, municipality
- Chronology covered by the dataset
- Excavation dates
- Excavators names
- Data creators names
- Data editor names
- Data reprocessing workflow reference
- Data publication year
- Data reference
- Data license
- Publication date of the archeoViz instance
- HAL identifier of the archeoViz instance
## Metadata

### Geographic data:
- *Geonames*
- (and *OpenStreet map*)

### Chronological periods: *PACTOLS*

### Personal names (for excavation leaders, data creators, data editors):
- *ORCID*
- *VIAF*
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Metadata and data alignment
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Referencing "archeoViz" instances

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Referencing workflow

For each archeoViz static instance, a record is created in the HAL.science repository, making it possible

- to cite this static instance:
  - archeoViz platform maintainers, Anaïs Vignoles. 2023. Online data visualisation of: Le Flageolet (Upper Palaeolithic, Gravettian), using the archeoViz web application, hal-04049675.

- the percolation of the reference in other scientific documentation systems:
  - Google Scholar,
  - Base (Bielefeld Academic Search Engine),
  - Isidore (generates a “handle” unique identifier) – work in progress.
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Perspectives

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Continue the development of the application with new features:
- A formatting tool to create CSV files at the archeoViz format.
- Further develop the interoperability of archeoViz with documentation systems (tDAR, OpenContext, etc.) and software: archeo10, SPARTAAS, archeofrag, etc.

Increase the number of use-cases and index them in the portal:
- through publications
- using archives material
- by promoting the archeoViz approach to archeological institutions.

Animate the users community through the mailing-list and the https://archeoviz.hypotheses.org website.
Thank you for your attention, and get in touch if you have data sets!

archeoviz-maintainers@services.cnrs.fr

https://analytics.huma-num.fr/archeoviz/home