From 3D GIS to ArcheoGIS: First Steps towards a Timeless Conceptual Model

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Concept

Current limitations of available software and tools in handling archaeological data hamper the extensive use of GIS in Archaeology. Data is more complex than regular geospatial data: 3D, various temporal values and fuzziness.

→ Need for a fully-fledged 3D archaeological GIS

Advantages:
- improved understanding of spatial and temporal relations
- enhanced analytical potential

First step: identify basic elements of 3D ArcheoGIS via case study
- examine relationships and characteristics
- test with commonly used and new analyses

Case study

Site located in Molesme (Bourgogne, France) in a meander of the Laigne. Excavations led by C. Petit (1996-2004).

Occupation: late Hallstatt – Gallo-Roman

Movable objects: amfora, animal bones, ceramic crockery

Immovable objects: ditches, pits of piles, built structures

Data model

Examining spatio-temporal relationships between structures and objects on site Molesme ‘Sur-les-Creux’. The main objects and common characteristics are incorporated in a UML-schema, organized around characteristic archaeological relationships object-space-time.

ArcGIS - Database

The existing excavation database is transformed in accordance with the UML-schemas. This allows for a better insight in the spatial and temporal relations in a complex excavation database.

Analysis – Future research

Currently, the performance of the new data model is being tested in a cluster analysis. Adding a 3rd and even 4th dimension to standard spatial analysis could reveal previously hidden patterns.

Next research steps should eventually result in a conceptual data model applicable in a wide variety of sites. This standardised model will facilitate data exchange and new analyses and will be an essential step towards a full 3D GIS with temporal functionalities for archaeological use.