S09 Archaeological Information Languages and Notations

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Most of the efforts that are made in the realm of information technologies and archaeology are directly related to data or information. The way in which we represent archaeological information, the particular languages that we use, the formalisms that we employ to describe the archaeological record or to convey archaeological meaning, and the visual representations that we choose or construct, have a great impact on how knowledge is constructed at the other end of the communication process. This session aims to address this by, precisely, analyzing the languages and notations that we use in archaeology, i.e. by studying the vocabularies, conceptualizations, ontologies and graphical or textual representations that are involved in discussing the archaeological record and its interpretations from an abstract viewpoint and beyond anecdotal evidence. Major research areas that are welcome in the session include (but are not limited to) the following:

- What kind of natural language is being used to describe archaeological information? Is this language any different to regular language?

What specific conceptualisations are we using to represent archaeological information? How are they developed? What are the key concepts on which the archaeological discourse relies?

What formal systems, such as models or ontologies, are being used in archaeology? How are they useful? In what scenarios? Who develops and uses them?

How is archaeological information conveyed between specialists in the field or the lab, while exploring hypotheses or developing arguments? What note taking, sketching, diagramming or other techniques are used?

How is archaeological information presented in final form through publications or similar artefacts? What visual or textual notations are employed? What criteria are used to select the right presentation format?

What kinds of actors are involved in the use of different languages and notations? Do specialists, amateurs and the general public, for example, use the same or different ones? What languages and notations mediate the communication between actor kinds?

What software tools exist that facilitate the use of the above mentioned languages and notations? Who uses them and in which situations? How useful are them?

How are these languages and notations useful for the development of computer systems such as databases or repositories?

What reasoning and knowledge construction processes take place in relation to the languages and notations mentioned above? Please bear in mind that the session is intended to focus on the theoretical and analytical study of archaeological languages and notations, rather than on the detailed account of specific case studies. The session will be of interest to people who:

Participate in the development of models, ontologies, thesauri or other formal conceptualizations for archaeology.

Have adopted, or are considering adoption of, a particular model or ontology for archaeological information.

Believe that no particular conceptualization of archaeological information is especially better than others, or that no formal conceptualization can or should be used.

Are interested in how archaeological knowledge is created, refined, visualized and shared.

Are interested in the ways in which we interact among ourselves and with computer systems in relation to archaeological information.

Need to assess the impact of the adoption of a tool or technique on the overall results of their work.

Make decisions about standards adoption or methodological choices, either small- or large-scale.

Are interested in the mechanisms by which meaning is constructed in archaeology, either individually or collectively.

S09-01 Is that a good concept?

Stephen Stead, Martin Doerr, George Bruseker, Maria Daskalaki

This paper draws on the experience of the 20 years of development of the CIDOC Conceptual Reference Model (now an ISO standard) to look at what constitutes a good concept. That is what are the characteristics of a concept that will form a robust part of a useful ontology. It first discusses the characteristics of Knowledge, Information and Data. From these characteristics it draws the conclusion that shared Interpretation Functions are required to induce Knowledge in an audience. Concepts act as such shared functions and so must have a solid definition. The paper continues by identifying and characterising the four foundational elements of such a definition: Arena, Purpose, Intension (spelt with an s!) and Potential. We then go on to describe the four components of the concepts Intension, namely Identity, Substance, Unity and Existence.

S09-02 Towards a formalisation of spatio─temporal relationships in chronometric databases

Igor Bogdanović, Capuzzo Giacomo, Berta Morell, Juan Antonio Barceló Àlvarez

In this paper we address the possible ways to manage and explain spatio-temporal information to reconstruct the duration of historical events. The way in which we represent absolute dating and the formalisms that describe the stratigraphic relationships and spatial coordinates, have a great impact on how historical knowledge is constructed. In this paper we found a database model for radiocarbon dated and georeferenced archaeological contexts and findings, and we analyse the languages and notations, i.e. studying vocabularies, conceptualizations, ontologies and relationships. The paper is based on previous team-work on databases of radiocarbon dated archaeological contexts: Prehistory of Northeastern Iberian Peninsula (http://www.mac.cat/eng/ Research/Catalunya-C14), Bronze Age of Southwestern Europe (the EUBAR - Capuzzo 2014) and other relevant case studies (Bogdanovic et al. 2013, Morell et al., in press.). To create an integrated data base in which chronometric dating of isotopic events are related with the archaeological contexts, we propose data model based on the inference chain: Isotopic event - Depositional event - Archaeological event - Historical event. In this way, each isotope event is related with its corresponding depositional events taking into account stratigraphic and taphonomic information of each dated sample. Defining context reliability is a fundamental step for obtaining a true relation between the radiocarbon probability intervals and the depositional event we are referring to. A particular logical connection should be found within the isotopically determined calendar dates of all determinable death events within the same depositional event. The estimated calendar date and duration of all depositional events within the same archaeological event will be used to measure the date and duration of events higher in the hierarchy. The calculated calendar date and duration of all archaeological events within a single historical event should be used to compute an estimation of the initial and final position of events within the historical period.