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Freeing information to the people: Using the past to aid the future

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Dr Philip Buckland discusses his recent project SEAD: the web-accessible scientific database that crosses archaeological and environmental disciplines.

What is the driving force behind this project?

The project’s driving force is open access, analytical empowerment, scientific transparency and making data freely available to the research and professional community by providing an integrated system for the storage, dissemination and analysis of data relating to past human activities, and environmental and climatic change. Large scale palaeoenvironmental datasets cannot be efficiently analysed without the help of databases and are often lost in archives or left unpublished. We aim to make them available through a system which smoothly facilitates complex queries and renders it unsustainable.

What can be learned from studying the past environments, climates and human impacts the project aims to help reconstruct?

These studies can yield a better understanding of past relationships between people and their surroundings; how the environment and climate influenced their possibilities and choices; and how their actions influenced both society and the environments themselves. For example, in any particular culture, in a particular landscape, climate can either enable farming, or, perhaps due to a series of bad summers, render it unsustainable.

What are some of the main challenges in creating a large-scale, web-accessible, GIS-ready database?

Initially, designing a powerful, flexible database which satisfies the data, access and analysis needs of a broad spectrum of power users. Secondly, developing intuitive interfaces tailored to the needs of these and other potential users. We have settled on a concept of multiple front ends to a single database, combining online and downloadable software. Thirdly, funding data entry and, finally, convincing people to share their data and take part in the project to create something greater than the sum of its parts.

The project is being undertaken as a collaboration between the Environmental Archaeology Lab and HUMlab. Could you give us a brief insight into these partners and what they will contribute to the project?

The Environmental Archaeology Lab is a Swedish National Resource Laboratory and has over 30 years experience in driving education, consultancy, and R&D in scientific methods in archaeology. We are directing the project and represent the domain science group, managing the initial datasets and forming the initial research and development strategies. HUMlab, the Humanities Computing Lab, is a creative meeting place and development environment for the digital humanities. They are running the development of innovative web-based interfaces for querying and visualisation, as well as networking across the humanities. Together we form a partnership with considerable experience and expertise in the science and business of both environmental archaeology and ICT.

How will the system be integrated into teaching and online learning interfaces in the future?

Initially, the system will be incorporated into Umeå University’s campus and online archaeology courses. Material will then be made available to help others incorporate SEAD into their teaching. Online learning interfaces and supporting material will subsequently be developed in which students will be able to simulate the research process using real data and interfaces as used by the researchers themselves. This will better prepare future generations for answering complex questions on past, present and future environments through digital means. We will also be working with international partners, especially the Neotoma Consortium, based in the U.S., towards producing school level educational and museum orientated systems.

Is the database intended just for researchers and professionals or will amateurs have access to it as well?

Everyone will have access to the system, but it will, at least initially, be orientated towards researchers and professionals. Our funding is clearly research infrastructure-orientated and there are fundamental differences between designing interfaces for the latter and for the public. We are currently investigating funding and partnership opportunities for creating more publicly orientated interfaces.
Using the past to aid the future

Disciplines as diverse as anthropology and palaeoecology take an interest in our environment and how we have treated it. The Strategic Environmental Archaeology Database aims to create a multi-proxy, GIS-ready database for environmental and archaeological data to aid multidisciplinary research.

LEARNING ABOUT THE PAST has a great impact on our ability to predict the future. The past relationships between people and their surroundings, such as how the climate, landscape or human decisions influenced their opportunities, can tell us a lot about our societies of today.

Direct measurement of the evidence for past environments is not always possible, but changes often leave records in the remains of plants, animals and sediments. Proxy analyses allow researchers to use the relationships between these organisms or materials, their environments and the specific conditions needed for survival or formation, to study past changes. Many scientists use Geographical Information Systems (GIS) to analyse, store, edit and integrate these geographical and temporal data and assist in decision making. Human activity often produces anomalies in the data, and their identification allows us to study the environmental impacts of past societies.

As is true in most scientific research, no single method of analysis can provide a full story of the past. With this in mind, the Environmental Archaeology Lab at Umeå University in Sweden set up the Strategic Environmental Archaeology Database (SEAD). The SEAD project aims to create a multi-proxy, GIS-ready database for environmental and archaeological data, which will allow researchers to study the interactions of past environments, climates and human impact. The system will also enable researchers to study the implications of these interactions for present or future research agendas such as cultural heritage, habitat or species conservation.

REACHING A LARGER DEMOGRAPHIC

The SEAD infrastructure is being created through a web-based database for environmental archaeology and palaeoecology. Data will be taken from a large number of archaeological and Quaternary geological sources and then made available online to provide the basis for many interdisciplinary research projects.

There has been a number of palaeoenvironmental and archaeological database projects in the past that have tried to make this sort of information available to a larger demographic of researchers. However, the majority of databases suffered from poor organisation, lack of funding or because the project worked on too small a scale.

Most existing projects have only concentrated on individual sites or a limited group of proxies and...
INTELLIGENCE

SEAD

OBJECTIVES

To provide the scientific community with open facilities for the storage of and access to raw data on prehistoric changes in environment, climate and human activities, along with advanced tools for their interrogation and analysis, and furthermore, to make data currently of limited availability accessible online.

PARTNERS

Project management and development:
The Environmental Archaeology Lab, Sweden
HUMlab – The Humanities Computing Lab, Umeå, Sweden

Data partners:
The National Laboratory for Ceramic Research, Sweden
The National Laboratory for Wood Anatomy and Dendrochronology, Sweden

Development and database partners:
The Bugs Coleopteran Ecology Package
Neotoma Paleoecology Database

FUNDING

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DR PHILIP BUCKLAND obtained his PhD in Environmental Archaeology in 2007 and is now senior lecturer in the same at Umeå University, Sweden. He has been the director of the SEAD project since it began in 2008, and conducts research, development and teaching in archaeology and palaeoenvironmental science.