Data Analysis in Palaeoecology and Environmental Archaeology

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Environmental change and human activity leave (proxy) evidence
Evidence preserved & sampled in many different ways
Environmental Archaeology
Analyses create lots of data and metadata...
Research Data Infrastructure:
The Strategic Environmental Archaeology Database (SEAD)

Sites, survey

Subsample archive

Reference collections

Specimen archive

Samples

Raw data

Features

Analyses

More science & publications

Reports Publications

Data reuse
Analyses Syntheses

Reports Publications
Open access database network
Environmental/climate reference/calibration data
Species traits, habitats, thermal tolerance, associations…
Site based spatio-temporal, multivariate data, phases

Dead flies, Viking Age farm, Greenland

Occupied - warm in some rooms, carrion outside

Abandoned - cold in all rooms, carrion indoors
From many individual finds to global patterns

Prototype: supersead.humlab.umu.se (Old version: qsead.sead.se)
Dating the spread of agriculture and grain storage from fossil beetles

“Roman sites with *Sitophilus granarius* L. [and other pests] in Britain indicating the spread of the species with the movement of the Roman army”
QSR 156
Reversing the questions – look for environments, not species

Prototype: supersead.humlab.umu.se

Grain weevil & friends
Simple questions with BIG implications – climate change
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Environments derived from beetle UK *regional extinctions*

Lateglacial = wet (cold)

Holocene = woody
Interpretation & Visualization

Systematically to enable comparisons over multiple sites and time periods
Complex research – integrating evidence

Narrative

Quantitative

Visual

Comparisons, correlations & exploratory analysis
Interpretation & Visualization
Systematically to enable comparisons over multiple sites
Taking it further

Systematically to enable comparisons over all sites and time periods

add key labels
Taking it further
Systematically to enable comparisons over all sites and time periods
Modern records, future predictions based on knowledge of past

The Analysis portal for biodiversity data

Data › Species observations (databases)

Data provider | Number of observations | Number of public observations
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Species Observations System (Artportalen) (Swedish Species Information Centre (ArtDatabanken)) | 65,909,426 | 65,503,396
Observation database of Redlisted species (Swedish Species Information Centre (ArtDatabanken)) | 725,929 | 0
MVM (Environmental data MVM, SLU) | 1,194,484 | 1,194,484
The National Register of Survey test-fishing (NORS) (Department of Aquatic Resources, SLU) | 2,693,173 | 2,693,173
The Database for electrofishing in streams (SERS) (Department of Aquatic Resources, SLU) | 407,425 | 407,425
Wireless Remote Animal Monitoring (WRAM) (Umeå Center for Wireless Remote Animal Monitoring (UC-WRAM), SLU) | 7,906 | 7,906
Shark SMHI (SMHI) | 620,834 | 620,834

SBDI – Swedish Biodiversity Data Infrastructure
Insect biodiversity – fossil and (reference) data coverage
INSECTS ARE ALMOST EVERYWHERE

Ecological traits

= Habitat categories

= Concepts

= Ontology

= Linkable

...SO ARE HUMANS
Multi-site, multiproxy comparisons

Palaeolithic sites in SE UK (0.9-0.5 million years ago)

Potentially similar samples, Cluster analysis, habitat proportions, Bray-Curtis
THANK YOU!

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& many others

sead.se
visead.se
data-arc.org

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