The skeleton as map: using GIS technology to facilitate the display and dissemination of anatomical data

The Problem

Zoarchaeologists often want to display data on an idealised animal skeleton, with individual elements or portions coloured or shaded. Whether data relate to skeletal part frequency, location of butchery marks, or taphonomic variables, presentation in anatomical form is both easier to interpret and visually more attractive than simple charts or tables of results. Producing anatomical diagrams can be very time consuming, however, limiting the practicality of their use beyond the most obvious and important data categories. If the process of displaying anatomical data could be made faster and simpler this would not only save a considerable amount of time for analysts, but would also encourage them to explore possible patterns in data categories that might not otherwise be considered in detail.

A Solution

GIS software allows tabular data to be linked to spatial features and displayed graphically at the touch of a button. If we treat the skeleton as analogous to a map or site plan, the same technology can be used to explore and present zoarchaeological data.

I have created shapefile sets for six common mammalian species, using original templates by Michel Coutureau (available on Archéozoos: Yilmaz et al. 2007). Combined with a GIS software package (such as ArcGIS) these allow users to:

- Link external data tables to a template using standard element codes
- View frequencies or taphonomic variables graphically, using the software's symbology options to colour/shade elements automatically
- Display data by element, portion, or a customisable combination
- Normalize counts using the built-in element frequency ('Q') fields
- Present multiple variables side-by-side to compare sites, phases, etc.
- Use SQL queries to exclude elements meeting selected criteria
- Create legends automatically

Beyond learning the basics of the chosen software’s interface, no specialist GIS knowledge is required.

Links and references

The six shapefile sets have just been published in Internet Archaeology, along with a tutorial, sample data, and instructions for converting additional Illustrator format templates to shapefiles:

Orton, D.C. 2010. ‘A new tool for zoarchaeological analysis: ArcGIS skeletal templates for some common mammalian species’, Internet Archaeology, 28

The files themselves are also available at http://zoarchaeology.ning.com/profile/DavidCOrton. The original digitalised templates are part of a much larger corpus available on the Archéozoos website:


Other analyses are encouraged to convert and distribute shapefiles for additional species as needed.

David Orton, McDonald Institute for Archaeological Research, University of Cambridge - dco21@cam.ac.uk

More than a labour-saving tool?

GIS skeletal templates can save faunal analyst huge amounts of time when studying datasets or producing multiple illustrations for publication. Their potential contribution to zoarchaeology goes beyond this, however. If use of the shapefile format presented here became routine, it could have a considerable impact on data dissemination. Electronic appendices to faunal reports are already common; if they were to include summary tables formatted by element/portion with a standardised ID field to allow linking, this would allow unprecedented cross-examination and re-analysis of published data. This would be particularly useful for large and complex datasets and for situations where publication resources are limited.