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Stable Carbon and Nitrogen Isotope Values in Bone Collagen from Europe, 0-40 ka: Implications for Climatic and Palaeodietary Research

Michael Richards

Research Laboratory for Archaeology, University of Oxford, 6 Keble Road, Oxford, OX1 3QJ, UK

Faunal bone collagen can be well preserved in palaeontological and archaeological contexts for tens of thousands of years. In appropriate circumstances bone collagen will also retain carbon and nitrogen stable isotope values. Here, I report the $\delta^{13}C$ and $\delta^{15}N$ values of directly radiocarbon dated herbivore bone collagen from archaeological sites in Northwest Europe. There are intriguing patterns in the data over time. The $\delta^{13}C$ values are likely to reflect atmospheric changes in CO_2 $\delta^{13}C$ due to climate changes, and there is a good correlation with contemporary ice core $\delta^{18}O$ values. The $\delta^{15}N$ values, which are likely to be reflecting soil nitrogen values, show much greater variation in magnitude than the $\delta^{13}C$ values, and I will discuss possible explanations for this latter effect.

Apart from bone collagen carbon and nitrogen isotopes possibly providing climatic information, they are often used in archaeology to explore ancient human diets. The large observed variations seen in this dataset emphasise the need for researchers to measure the isotope values of fauna spatially and temporally associated with the humans of interest. To illustrate this point I will provide examples of applications of isotope analyses to pre-Holocene European Neanderthals and anatomically modern humans.