Stable isotope and radiocarbon investigations of archaeofaunal and human remains in the North Atlantic Islands

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During the Viking Age, Norse peoples established settlements across the North Atlantic, colonizing the Faroe Islands, Iceland and Greenland. Current North Atlantic archaeological research foci include understanding human adaptation and impact in these environments. The Norse settlers exploited both imported domestic livestock and natural resources, including freshwater and marine material. Stable isotope ratios in bone collagen enable us to reconstruct the diet of faunal or human remains and are extensively used to answer archaeological research questions. Carbon isotope ratios (expressed as δ13C) from different environments (e.g. marine versus terrestrial) are significantly different, while nitrogen isotope ratios (expressed as δ15N) increase with each step along a food web. Coupled δ13C and δ15N measurements have been used to reconstruct the proportion of marine versus terrestrial material in Norse diets; such understanding is not only invaluable for investigating economic and subsistence strategies, but for correcting radiocarbon (14C) age measurements for the marine 14C reservoir effect. In northern Iceland however, the picture has been significantly complicated by the use of freshwater resources by Norse settlers, particularly due to the presence of a large Freshwater 14C Reservoir Effect. This is because of overlap in the δ13C and δ15N of marine, terrestrial and freshwater resources, making it difficult to reliably reconstruct the proportion of these resources in Norse diets. This limits our ability to obtain reliable 14C ages for affected samples, and to reconstruct economic strategies for Viking period archaeological sites in the region. The use of sulphur isotope ratios (expressed as δ34S) has recently provided the means to resolve this problem, as using δ34S can discriminate between marine and freshwater dietary components. Here we assess research findings from several interlinked projects using one or several of 14C, δ13C, δ15N and δ34S values in archaeofaunal and human samples from archaeological sites across the North Atlantic to reconstruct Norse economy and human-environment interactions. This work fits within ongoing archaeological and palaeoenvironmental studies to understand the Norse economic strategies that had a dramatic effect upon the ecology and geomorphology of the North Atlantic islands which remains visible today.