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Understanding diet through combined stable and radiogenic Sr isotope systematics in archaeological skeletal remains

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The analysis of mass-dependent Sr isotope variability in diet is an exciting, novel tool for the archeological sciences. Yet our understanding of this tool is still in its infancy. Strontium transfer is massively impacted by environmental factors such as the age and type of bedrock and soil, as well as the proximity to water sources. Untangling the regional factors influencing Sr isotope fractionation is the aim of this research. In this study, tree, shrub, and grass samples collected from 101 locations covering most of Slovenia were analyzed for δ^{88}Sr and ^{87}Sr/^{86}Sr. Limited variations in ^{87}Sr/^{86}Sr between different plant types in the same location were found. In contrast, the δ^{88}Sr of distinct plant types display large variations (up to 0.35 ‰) between grass and tree samples. While mass-dependent Sr isotope variations between different types of plants in the same location are to be expected, the observed variations may be traced to factors such as root depth and therefore fractionation between soil layers. Alternatively, variable uptake rates of strontium between plant species, and different parts of the plants, may need to be invoked. Additionally, animal teeth from the Late Bronze Age settlement at Brinjeva gora and cremated human remains from the adjacent cemetery were measured. The site was selected due to its unique representation of the complex landscape Slovenia has to offer. Our preliminary results show significant differences in δ^{88}Sr (up to 0.3 ‰) between different species (cow, sheep/goat, pig, horse, and human) which cannot be explained by a simple trophic level fractionation. We suggest a possible relation to either the digestive systems (monogastric vs. ruminant), or food source variations (e.g. different grazing areas). In this presentation, the potential and limitations of δ^{88}Sr as a diet proxy are discussed.