Abstract

There are currently 100,000 open missing persons cases and 40,000 sets of unidentified human remains in medical examiners' offices across the nation. Stable isotope analyses can serve as a first line of inquiry to narrow down the possible region of origin for skeletal remains. The analysis of the variation between the isotope ratios of oxygen ($^{18}O/^{16}O$) is of particular value for this purpose. Local water resources determine body $\delta^{18}O$ and these values should remain predictable for local fauna and humans. This study fills a void in the isotopic record of interior Alaska. It provides an updated predictive $\delta^{18}O$ model for Alaskan drinking water ($\delta^{18}O_{water}$) and a predictive $\delta^{18}O$ model for Alaskan moose ($\delta^{18}O_{moose}$). A statewide $\delta^{18}O_{water}$ predictive surface was created from collaborative data and this surface was then used in conjunction with sampled $\delta^{18}O_{moose}$ values to create a statewide $\delta^{18}O_{moose}$ predictive surface. These predictive models can in turn be useful for identifying geographic origin of human remains in forensic cases because both $\delta^{18}O_{moose}$ and $\delta^{18}O_{human}$ values should approximate the local $\delta^{18}O_{water}$ values with similar fractionation effects.