

# Tracking Pleistocene mega-faunal migration using dental enamel

---

**HA Martinez De La Torre<sup>a</sup>, AV Reyes<sup>a</sup>, RA Creaser<sup>a</sup>, GD Zazula<sup>b</sup>, and MJ Suitor<sup>c</sup>**

<sup>a</sup> *Earth and Atmospheric Sciences, University of Alberta, AB, Canada*

<sup>b</sup> *Yukon Palaeontologist, Cultural Services Branch, Department of Tourism & Culture, Whitehorse, YK, Canada*

<sup>c</sup> *Fish and Wildlife Branch, Yukon Environment, Box 600, Dawson City, Yukon, Canada*

Beringia was a refugium for mega-fauna during Pleistocene glaciations, including several taxa that are still present in the region. However, it is not known how ice-sheet proximity and deglaciation would have affected movement patterns of taxa that presently have well-defined migratory patterns, such as caribou (*Rangifer tarandus*). We are assessing a geochemical approach for determining the geographic mobility of Pleistocene caribou, which in turn may be applied to other taxa in the rich Pleistocene fossil collection of the Yukon.

We analyzed the Sr isotope composition of dental enamel from GPS-collared caribou of the Forty Mile and Porcupine herds to assess how enamel isotope composition tracks bedrock geology in the study region, with respect to contemporary migration patterns. We also analyzed fossil remains, with <sup>14</sup>C dates on ultrafiltered collagen of 1305±15 to 42000±1400BP, recovered from placer gold mines in the Klondike region (historically occupied by the Forty Mile and Porcupine herds). Molars were extracted from the modern and fossil caribou mandibles and sectioned longitudinally along the length of the dental enamel. Strontium isotope composition of the sectioned enamel fragments was determined by isotope-dilution TIMS. Preliminary results indicate relatively large shifts in <sup>87</sup>Sr/<sup>86</sup>Sr, from 0.71148 to 0.71220. In contrast, a modern bovine with no allochthonous dietary inputs yielded mean <sup>87</sup>Sr/<sup>86</sup>Sr of 0.70825 ± 0.00012 (n=11). The subtle variations in Sr isotope composition from the modern bovine, compared to fossil and modern caribou, reveal how Sr isotope composition of caribou tissue is affected by migration over bedrock with different Sr isotope composition. The fossil caribou enamel Sr isotope compositions will be compared to mapped and modeled bedrock Sr isoscapes to evaluate potential spatial patterns of paleo-migration.

Corresponding author: hamartin@ualberta.ca