Assessing δ^{26}Mg in bioapatite as proxy for faunivory

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Knowledge about feeding behavior is essential to determine trophic interactions and reconstruct predator-prey relationships in modern and past foodwebs. Traditionally, nitrogen isotopes (δ^{15}N) of collagen are used to quantify the ingestion of animal protein, however collagen usually does not preserve over geological time scales. To infer the diet of extinct vertebrates from fossil material more resistant dietary proxies such as Ca and Mg isotopes are needed, which are major elements in the bioapatite of bones and teeth. Magnesium is a bio-essential element that replaces calcium in the bioapatite lattice and bone and enamel δ^{26}Mg values of extant mammals increase systematically along the foodchain [1, 2].

The existing δ^{26}Mg data, however, is scarce, in particular with respect to carnivores, thus still limiting the capability of this dietary proxy to reliably determine trophic differences between plant- and animal-feeders. To better constrain trophic-level effects recorded in Mg isotopes, we analyzed δ^{26}Mg of bioapatite from modern mammals with a focus on faunivores, both carnivores and as yet unexplored insectivores.

The trophic level effect of δ^{26}Mg is influenced by the geological substrate which causes isotope variability in δ^{26}Mg of faunal remains between different ecosystems [1, 2]. Therefore, as first-order proxy for sample provenance and to assess potential influences of the bedrock substrate of the animals´ habitats on δ^{26}Mg of bones and teeth, we measured the ^{87}Sr/^{86}Sr on the same specimens. This information will enable us to refine trophic level effects and determine whether δ^{26}Mg can be used to distinguish different faunivores isotopically. This will be of paramount importance for dietary reconstructions of trophic niches in fossil foodwebs.

[1] Martin *et al.* (2014) *Geochmica Cosmochimica Acta* **130**, 12-20. [2] Martin *et al*. (2015) *Proceedings of the National Academy of Sciences* **112**, 430-435.