

Supplementary Material

Carbon, nitrogen and oxygen stable isotopes in modern tooth enamel: a case study from Gorongosa National Park, central Mozambique

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1 Supplementary Text

1.1 Tooth formation

In this study, we targeted the latest-forming permanent tooth for each taxon, which was usually the third molar (M3). In most mammals this tooth mineralizes after weaning, when animals begin to consume their adult diet. Teeth that form earlier, while an individual is still nursing, were avoided because of the isotopic effect of breast milk consumption (Fuller et al., 2006; Tsutaya and Yoneda, 2015; Dailey-Chwalibóg et al., 2020; Chinique de Armas et al., 2022).

Of the taxa included in this study, felids, elephants, and crocodiles differ in their tooth formation. Felids do not have M3s, instead, the first molar (M1) is latest forming tooth. Lions are usually weaned at ca. 7 months, and first enamel mineralization does not initiate until 9–11 months, which is concluded by 28–36 months (Smuts et al., 1978; White et al., 2016). Little information is available regarding the rate of tooth enamel mineralization in modern leopards, but canines, molars, and premolars do not erupt until 8–12 months, hence when the leopard is twice as old as when it was weaned (on average at 4.6 months; Stander, 1997). The here reported stable isotope data for bulk M1 samples of felids should therefore reflect adult diet. Elephants have a total of six successively developing molars (M1 – M6) in each dental quadrant which are shed throughout their lifetime as wear. For this study we sampled the M4 or M5 which develop between seven and 28 years of age (Stansfield, 2015) and therefore should have formed after the individual was fully weaned (Lee and Cynthia, 1986).

Although the physiology of reptiles differs from mammals, their dental tissues are similar. While teeth of mammals are morphologically complex and usually only replaced once, those of reptiles are all similar in shape, have vertical thin walls with irregular crystallites, and are replaced many times within the same socket (Dauphin and Williams, 2008). This makes the teeth of reptiles robust, but should not affect their carbon, nitrogen or oxygen isotope composition.

2 Supplementary References

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