

Contributions from stable light isotopes to understanding the dietary ecology of early hominins in southern Africa

Julia Lee-Thorp

Department of Archaeology, Private Bag, Rondebosch 7701,
University of Cape Town, South Africa
e-mail: jlt@science.uct.ac.za

Determination of carbon and oxygen isotope values from tooth enamel to obtain information about the dietary ecology and environments of Pleistocene, Pliocene and even Miocene fauna has by now become widely applied. As one example, a significant body of isotopic data now exists for South African hominins and associated fauna during the Plio-Pleistocene allowing us to make robust deductions about their dietary ecology. The data show that, almost without exception, hominins interacted with grassy environments independently of environmental shifts, which were significant over this time. Their diets were weighted towards carbon from C₃ (woody plants, shrubs and herbs) sources but show significant C₄ (tropical grass) contributions which demonstrate either direct consumption of grasses or C₄ sedges, or indirect consumption of grass-eating animals (both vertebrates and invertebrates), or both. Termite 'hunting' has been independently suggested from examination of bone tool wear at Swartkrans but carbon isotopes alone do not permit trophic distinctions. Relatively low oxygen isotope values for all hominins in comparison to associated fauna show similarities with suids, certain monkeys, and faunivores. These patterns are as yet poorly understood but some promising subtle distinctions are emerging from studies of modern assemblages, such as between insectivores and carnivores. On present evidence consistent hominid interaction with grassland foods, at whatever trophic level, seems deeply rooted even before significant brain expansion with emergence of early Homo, setting both Australopithecines and the genus Homo firmly apart from chimpanzees in their dietary ecology.

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Digitale Literatur/Digital Literature

Zeitschrift/Journal: [Berichte des Institutes für Geologie und Paläontologie der Karl-Franzens-Universität Graz](#)

Jahr/Year: 2004

Band/Volume: [8](#)

Autor(en)/Author(s): Lee-Thorp Julia

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