

You are what you eat: Using isotopes to work out the diet of extinct animals

C₃ and C₄ plants fractionate carbon isotopes in distinctly different ways and it is this feature which makes them suitable for palaeoenvironmental analysis. By studying the carbon isotopes in animal/human bones or teeth the diet of the living animal can be extrapolated from the carbon 13 to carbon 12 ratio. The scientific way of writing this is $^{13}\text{C}/^{12}\text{C}$. The $^{13}\text{C}/^{12}\text{C}$ ratio of fossil bones or teeth thus reflect the diet of an animal or human. If a sample has a relatively high ratio of $^{13}\text{C}/^{12}\text{C}$, it means the animal ate a diet rich in C₄ plants. If the animal is a carnivore it would indicate that they ate animals which were in turn eating the C₄ plants.

African savannas have both C₃ (trees and herbs) and C₄ plants (tropical grasses), while forests have only C₃ plants. Fynbos plants are generally C₃. (See 'Plant photosynthesis and the palaeoenvironment').