How can we determine the diet of past populations?

Reconstructing the diet of past populations can be complex. Traditional methods include analysing animal, or plant remains found at a site. However, skeletal remains, or rather, the analysis of stable carbon (C) and nitrogen (N) isotopes in collagen, which is the most abundant protein in bone tissue, are an extremely useful source of information in this regard. In nature, C and N exist in two stable isotopic forms: ^{12}C, ^{13}C and ^{14}N, ^{15}N, respectively. The relative abundance of each of these isotopes in bone collagen depends on the foods consumed in the last 10-15 years of life, as different food sources have different isotopic values.

The two elements provide different information: the ratio between carbon isotopes allows us to distinguish between a diet based on resources from the terrestrial and marine ecosystems, as well as to assess the consumption of different types of plants (C_3 plants, such as wheat and legumes, and C_4 plants, such as millet and sorghum).

Nitrogen isotopes provide information on the trophic level, i.e. the position occupied in the food chain (herbivores, omnivores and carnivores).

The joint analysis of the two isotopic ratios makes it possible to reconstruct the type of food consumed by the individual under examination.

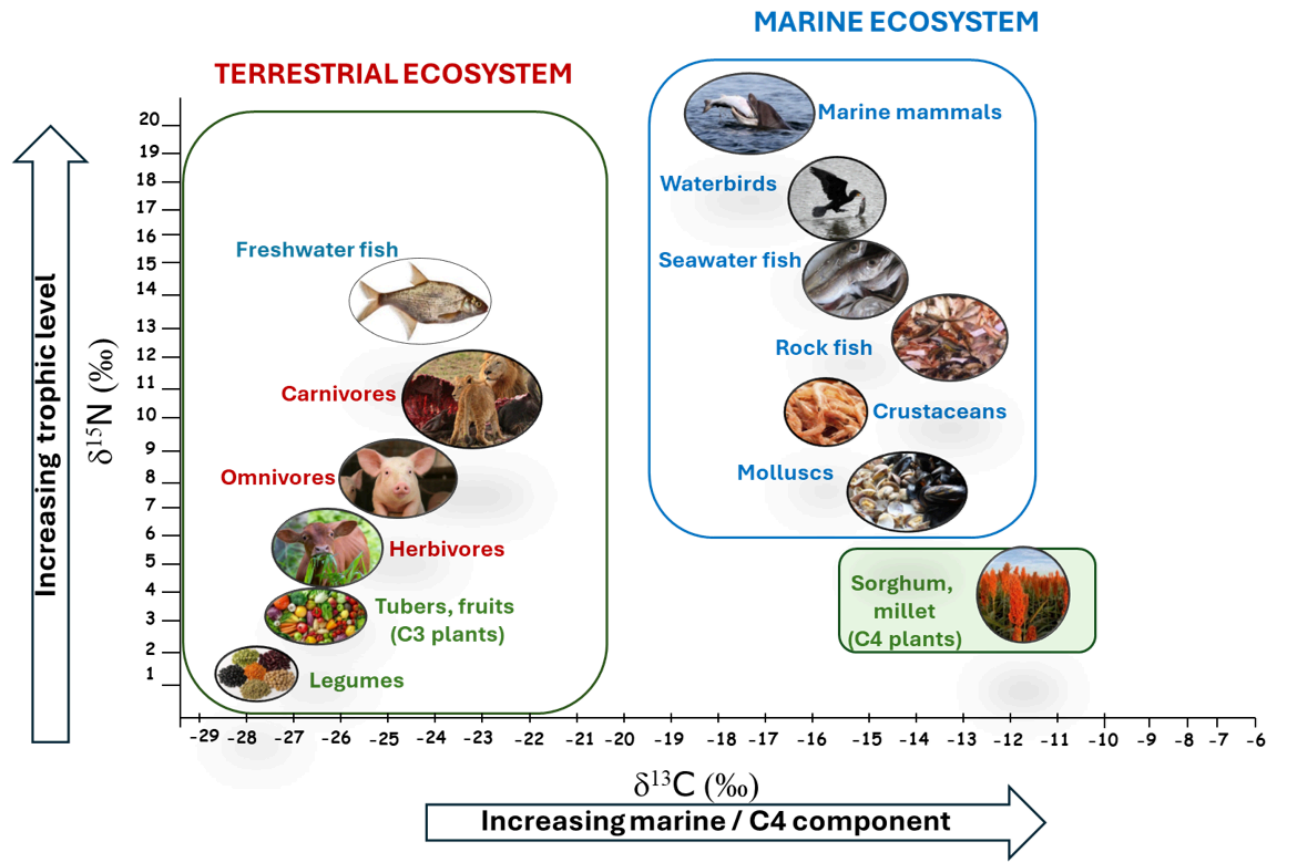

Figure 1. Schematic representation of the carbon and nitrogen isotope values of various organisms belonging to the terrestrial and marine ecosystem