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Oxygen and strontium isotope tracing of human migration at the Bell Beaker site Le Tumulus des Sables, France.

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Oxygen (δ^{18}O) and strontium (^{87}Sr/^{86}Sr) isotopes were used as tools to investigate human migration at the early Bell Beaker site (2500-2000 BC) Le Tumulus des Sables, Saint-Laurent-Médoc, south-west France. The O and Sr isotope ratios measured in tooth enamel record the average dietary isotope signature ingested by that individual during their childhood. When this data is compared to the isotope signature of the burial site it can be used to indicate if the individual migrated into this area during their lifetime. The O isotopic composition of meteoric water changes depending on climate, temperature and quantity of precipitation. O isotope ratios in skeletal and dental remains are related to body water, which in turn is influenced by diet, physiology and climate. Most of the water consumed by large mammals comes from drinking water, typically sourced locally. Sr isotope ratios on the other hand vary between different geologic regions, depending on their age and composition. Sr is released through weathering and transported into the soil, ground and surface water, where it becomes available for uptake by plants, enters the food cycle and eventually ends up in skeletal and dental tissue where it substitutes for calcium.

We analysed the teeth of 18 adult and 8 juvenile disarticulated skeletons from Le Tumulus des Sables. O isotopes were analysed in-situ by Sensitive High Resolution Ion Micro Probe (SHRIMP).The Sr isotope analysis involved drilling a 0.2-0.5 mg sample of enamel from the tooth. The Sr was then chemically separated and analysed by Thermal Ionization Mass Spectrometry (TIMS). These results were then compared to the O isoscape of Europe and bioavailable Sr isotope data (fauna, plants, soils) from the IRHUM database. We found that most of the individuals at Le Tumulus des Sables show O and Sr isotope ratios corresponding to the local environmental signal and we interpret these as part of the local population. 3 adults however show slightly higher ^{87}Sr/^{86}Sr ratios, which correspond to a clay and limestone unit in close proximity ($<$25 km) to the burial site, suggesting some limited mobility. In conclusion the application of O and Sr isotopes has allowed us to investigate mobility at this site and offers an additional string of evidence to interpret the mobility or lack of it of Bell Beaker populations in prehistoric Europe.