ESR-U-series dating of Caune de l'Arago: discussion between sediment characteristics and dose rate calculation in a dense and diversely weathered Middle Pleistocene archaeological layer

Christophe Falguères*†[1], Christian Perrenoud*[2], Fei Han , Jean-Jacques Bahain[1], and Qingfeng Shao

[1]Muséum national d'Histoire naturelle (MNHN) – CNRS : UMR7194 – France
[2]MNHN-CERP (Muséum national d'Histoire naturelle - Centre Européen de Recherches Préhistoriques) – CNRS : UMR7194 – Avenue Léon-Jean Grégory - 66720 Tautavel, France

Résumé

Caune de l'Arago is a karstic cave located between the Mediterranean Sea and the Pyrenees. Excavations have revealed thirteen meters of its infilling, in which 55 Middle Pleistocene occupation layers have been individualized through the study and distribution of hundreds of thousands of faunal and lithic remains. The correlation to the LR05 Marine Isotopic Stage (MIS) curve, based on palaeoenvironmental, radiometric and biochronological data, attributes the excavated layers to MIS 15 to 5 and thus place them among the oldest Acheulean layers in Europe and among the rare sites with human remains of this age.
However, the richness and density of these anthropogenic occupation layers, their inhomogeneous degree of weathering, make the radiometric age, and more specifically the annual dose, difficult to calculate.

The ESR-U-series dating of the G archaeological layers have led to diverse ages. Three groups can be individualized, according to the nature of the embedding sediment, and we propose here to evaluate how the different textural, mineralogical and micromorphological data may interfere with the age calculation.

One scenario for the diagenesis of the sediment is that the sampled teeth were deposited in a probably open rubble, more or less filled in during MIS 12 and locally or totally cemented by secondary calcium carbonates from MIS 11 on, or transformed from calcium carbonates to calcium phosphates from MIS 5 on.
Whatever the option we prioritize for interpreting the datings, this site offers the opportunity to quantify the amplitude of changes affecting the age calculation for a single archaeological unit and may be remembered as a good reference for Middle Pleistocene karstic contexts.

Mots-Clés: ESR, U, series dating, Middle Pleistocene, Diagenesis, Dose rate, Caune de l'Arago

*Intervenant
†Auteur correspondant: christophe.falgueres@mnhn.fr