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# Can Stable carbon isotope ratios ( $\delta^{13}\text{C}$ ) from archaeological charcoal be used as regional palaeoenvironmental indicators? : Potential of the method for "les gorges de l'Ardèche" archaeological complex during Upper Paleolithic.

Benjamin Audiard<sup>\*1</sup>, Julien Monney<sup>2</sup>, Nicolas Teyssandier<sup>3</sup>, Jean-Michel Geneste<sup>4,2</sup>,  
Giovanna Battipaglia<sup>5</sup>, and Isabelle Théry-Parisot<sup>1</sup>

<sup>1</sup>CEPAM – CNRS : UMR7264, Université Côte d'Azur (UCA) – France

<sup>2</sup>EDYTEM – Université Savoie Mont Blanc, Centre National de la Recherche Scientifique : UMR5204 –  
73376 Le Bourget du Lac cedex, France

<sup>3</sup>Travaux et recherches archéologiques sur les cultures, les espaces et les sociétés (TRACES) –  
Université Toulouse 2, Centre National de la Recherche Scientifique : UMR5608 – Maison de la  
Recherche, 5 allée Antonio Machado 31058 TOULOUSE Cedex 9, France

<sup>4</sup>PACEA – Université de Bordeaux, Centre National de la Recherche Scientifique : UMR5199 – 33615  
PESSAC CEDEX, France

<sup>5</sup>Department of Environmental, Biological and Pharmaceutical Sciences and Technologies University of  
Campania "L. Vanvitelli", Via Vivaldi 43 Caserta – Italie

## Résumé

Since Prehistory, the evolution of societies is embedded in a context of deep environmental and climatic changes modifying human/environment interactions, resources and territories accessibilities. Understanding the way ancient societies faced environmental conditions and their changes are critical issues for prehistorians. However, establishing correlations between cultural and environmental changes is fraught with complexity as long as the latter are documented mainly by extra-regional data (e.g. far ice cores). Most of the models are supported by proxies that show no direct connection with archaeological records (e.g. pollen, 18O), providing information on the prevailing environmental conditions at wider (e.g. extra-regional) levels. Conversely, charcoal which is usually well preserved in prehistoric occupations and provides records covering long term spans is a witness of local environment. Studies focusing on plants  $\delta^{13}\text{C}$  isotopic signal have become a reliable method to reconstruct past climatic and environmental conditions. Wood remains are notably absent from the very ancient archaeological record, due to degradability of plant tissue. For archaeological studies, the analysis of isotopic signals from charcoal of *Pinus* species, which is more reliably preserved over time, and continuously represented among archaeological remains yielded more robust findings. Methodological assessment of this approach has been developed in a previous study, confirming the possibility to use it for archaeological implementation. Indeed, a primary reference set was established in the context of climatic and environmental parameters for archaeological analyses of charcoal remains. We present here the first study of the

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\*Intervenant

stable carbon isotope ratios ( $\delta^{13}\text{C}$ ) applied to charcoal from the *Pinus* genus of a complex of Paleolithic sites from the same region: "Les gorges de l'Ardèche": "la Grotte aux Points", "Les Deux Ouvertures", La Baume d'Oulen" et "La Grotte de Chauvet Pont d'Arc". We then discuss the potential and the limit of the method as a regional climatic proxy at a scale which **really documents the climatic conditions experienced by the human groups.**

**Mots-Clés:** Stable isotopes, Charcoal, Paleolithic, Paleoclimatology, Palaeoenvironment, Pleistocene