JOB DESCRIPTION – Post-doc

GENERAL INFORMATION

Contract duration: 18 months

Location: Paris

The post-doctoral candidate will be hosted in METIS and in AASPE. The candidate will also work in collaboration with MONARIS and LEMTA (Nancy) research units.

Worktime percentage: Full time

Qualification required: PhD (postdoc experience < 2 years)

Starting date : November 2021

Deadline for application (CV (including the list of publications) + application letter + thesis reports)**: August 25th, 2021**

Interviews: Early september

SCIENTIFIC CONTEXT

This post-doc project aims to investigate how post-depositional processes modify the geochemical signatures of ancient charcoals and consequently, $\delta^{13}C$-based climate reconstruction. The work is part of a larger project focused on Medieval Climatic Optimum, socio-economic development and its forestry consequences. This project relies on an interdisciplinary collaboration between dendro-anthracologists, palynologists, biogeochemists, soil scientists, and historians. This project is funded by the Domaine d'intérêt majeur Matériaux anciens et patrimoniaux in the framework of the DIM-MAP call for post-doctoral funding.

PROJECT AIMS AND JOB PROFILE

Produced by the use of wood as fuel or during forest fires, charcoals are ubiquitous in soils and sediments. Persisting in soil and sediments over millennia, ancient charcoals offer then a unique window to reconstruct palaeoclimate changes provided carbonisation and post-depositional processes do not bias the use of their stable carbon isotope composition ($\delta^{13}C$) as a climate proxy. **The objectives of this project are (i) to assess the effects of fire and of post-depositional processes on the geochemistry of woods and (ii) to apply these insights to reconstruct past climate modifications determining the $\delta^{13}C$ isotopic composition in archaeological charred woods.** To this end, the project is composed of three parts. The first part will aim to understand how the heterogeneity of carbonization impacts the initial chemical properties of wood, in particular its $\delta^{13}C$ isotopic composition. Different taxa often found in archaeological contexts will then be charred experimentally at different temperatures. Combination of Rock-Eval thermal analysis, Raman spectroscopy, infrared spectroscopy and gas chromatography coupled with an isotope ratio mass spectrometer (GC-irMS) will be used to determine the geochemical and $\delta^{13}C$ isotopic compositions of studied woods. The second part of the project will aim to investigate how post-depositional processes modifies our perception of (i) the carbonization undergone by charred wood and of (ii) climate proxies. This will be achieved through the incubation of charcoals into soil. The geochemical properties of charcoals will be investigated following the procedure defined in the first part of the project. Finally, the third part of this project will consist in reconsidering $\delta^{13}C$-based climate reconstruction according to the application of previous key insights on archaeological charred woods.

The candidate should be trained in Earth Sciences, with a strong taste for biogeochemistry and lab work. Knowledge and/or interest for archaeology, dendrology, geology or soil science would be highly appreciated.

Job requirements and characteristics:

Interdisciplinarity: work between different laboratories.

Work in clean labs with strong acids.

Contact:

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