



JOB DESCRIPTION – Post-doc

GENERAL INFORMATION

Contract duration: 12 months

Location: Paris

The post-doctoral candidate will be hosted in METIS and will work with AASPE and MONARIS Research Units. Several missions in Nancy (LEMTA) are scheduled.

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 initiate a high temporal reconstruction of climate changes during the Medieval Warm Period (MWP) by determining the $\delta^{13}\text{C}$ isotopic composition determined within tree rings from charred wood of Notre-Dame de Paris. The work is part of a larger project focused on the carbonized wood frame of the Notre-Dame de Paris cathedral, and relies on an interdisciplinary collaboration between dendro-archaeologists, dendro-anthracologists, biogeochemists, soil scientists, and historians. This project is funded by Sorbonne Université in the framework of the "Emergence call for proposals".

PROJECT AIMS AND JOB PROFILE

The destruction of the framework of "Notre-Dame de Paris" cathedral in the fire of April 15th 2019 is a unique and exceptional opportunity to investigate the woods that composed it. Indeed, the timber constituting part of the framework grew during the 12th-13th centuries, a period marked by a global warming, the MWP (~900 - 1350 AD). **The objective of this project is to initiate a climate reconstruction of MWP with a high temporal resolution by studying the $\delta^{13}\text{C}$ isotopic composition at the scale of individual charred oak ring from Notre-Dame de Paris.** To this end, the project is composed of two parts. The first part will aim to understand how the heterogeneity of carbonization impacts the initial chemical properties of wood, in particular its $\delta^{13}\text{C}$ isotopic composition. Oak wood will then be charred experimentally at different temperatures. Combination of Raman spectroscopy, infrared spectroscopy and gas chromatography coupled with an isotope ratio mass spectrometer (GC-irMS) will be used to determine the effect of temperature on the chemical and $\delta^{13}\text{C}$ isotopic compositions of wood. Finally, in the second part, the aim will be to apply previous key insights on charred woods from Notre-Dame (following the availability of samples, the candidates would be able to work on archaeological samples from the same temporal window) to provide an annual-scale resolution climate reconstruction detailing in particular the frequency of extreme events during the MWP.

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.

Project in relation with the progress of the restoration work of the cathedral.

Work in clean labs with strong acids.

Contact:

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