Encounter postdoc cover letter

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The University of Cambridge offers a fixed-term postdoctoral position, in the frame of the ERC-funded research project ENOUNTER (PI: Enrico Crema), for the data integration, geostastical and temporal analysis, data management and publishing of J={o}mon-Yaoi transition.

Research context

J={o}mon period (16,000–2,800 cal BP)(Habu and Junko (2004)) is the most famous counter-example of farming economy adoption by a a society having hunter-gather economy. Indeed, while the surroundings of the island have all adopted farming economy, the J={o}mons maintained a subsistence based on sailing, gathering and hunting. J={o}mons used a part of the Western Eurasia so-called Neolithic *package*: sedentary settlements (pit-dwellings), storage structures, and pottery. The agriculture was introduced during the Yaoi (ca. 950 - period parallely to demic and a cultural diffusion process. Including rice and millet agriculture. Question Jomon-Yayoi transition. The duration of J={o}mon period at least three cycles of population (Kobayashi 2008). To assess the dynamic, time and space must be cover-up with heteroclite data (eg,) with quantitative analysis.

work.package	thm.package
WP1	population dynamics
WP2	analyse organic residues
WP3	spatial extent of different cultural traditions
WP4	modelling landcover changes
WP5	spatial diffusion of rice, broomcorn millet and foxtail millet
WP6	data integration

These archaeological information could come from a large rank of proxies adressed by the members of the ERC and key collaborators: radiocarbon chronicles and typo-chronology of pottery (Crema and Kobayashi (2020)), juvenility index from skeletal data (WP1), analyse organic residues MANON BONDETTI OLIVER CRAIG (WP2), modelling landcover changes LEAH BRAINERD (WP4)

Postdoctoral perfil

Assess the patterns of cultural connectivity during the Final Jomon period and the extent by which this can predict the tempo and the mode of the spread of Yayoi cultural elements

Cultural change, classic complementarity between adoption demic diffusion (DD) and cultural diffusion (CD)

I have already worked with such models

Mapping cultures extents

Pottery is often used to trace cultural patterns ethnographical insights Dietler and Herbich (1998)

Environment

Landcover and climate The Kopper-Geigen climates. Map algebra crossing edaphic condition, solar radiation, rain falls, etc.

determine patterns of cultural trait co-occurrence during the Yayoi period in relation to the dynamics of crop dispersal

IT management

The candidate will have to manage R programming, GitHub repository

R programming

R programming offer an open source and multi-paradigm programm. The numerous package of R permit, among other things to deal with radiocarbon datings, spatial data, temporal logic

Temporal settings

Granularity of temporal dynamics is a clue element of archaeological reasonment. J={o}mon period offer a robust ceramic-based chrono-typological sequence that have been correlate to absolute datins (Crema and Kobayashi (2020)).

radiocarbon datings

summed probability distribution of radiocarbon dates (SPDR) R packages rcarbon, Bchron, etc. allow to calibrate radiocarbon dates. For example, the c14dates.csv file of the GitHub ***jomonPhasesAndPopulation*** repo host near 2,000 radiocarbon dates (Crema and Kobayashi (2020)). R can connect the repo and calibrate the dates

```
library(curl) # to connect url
```

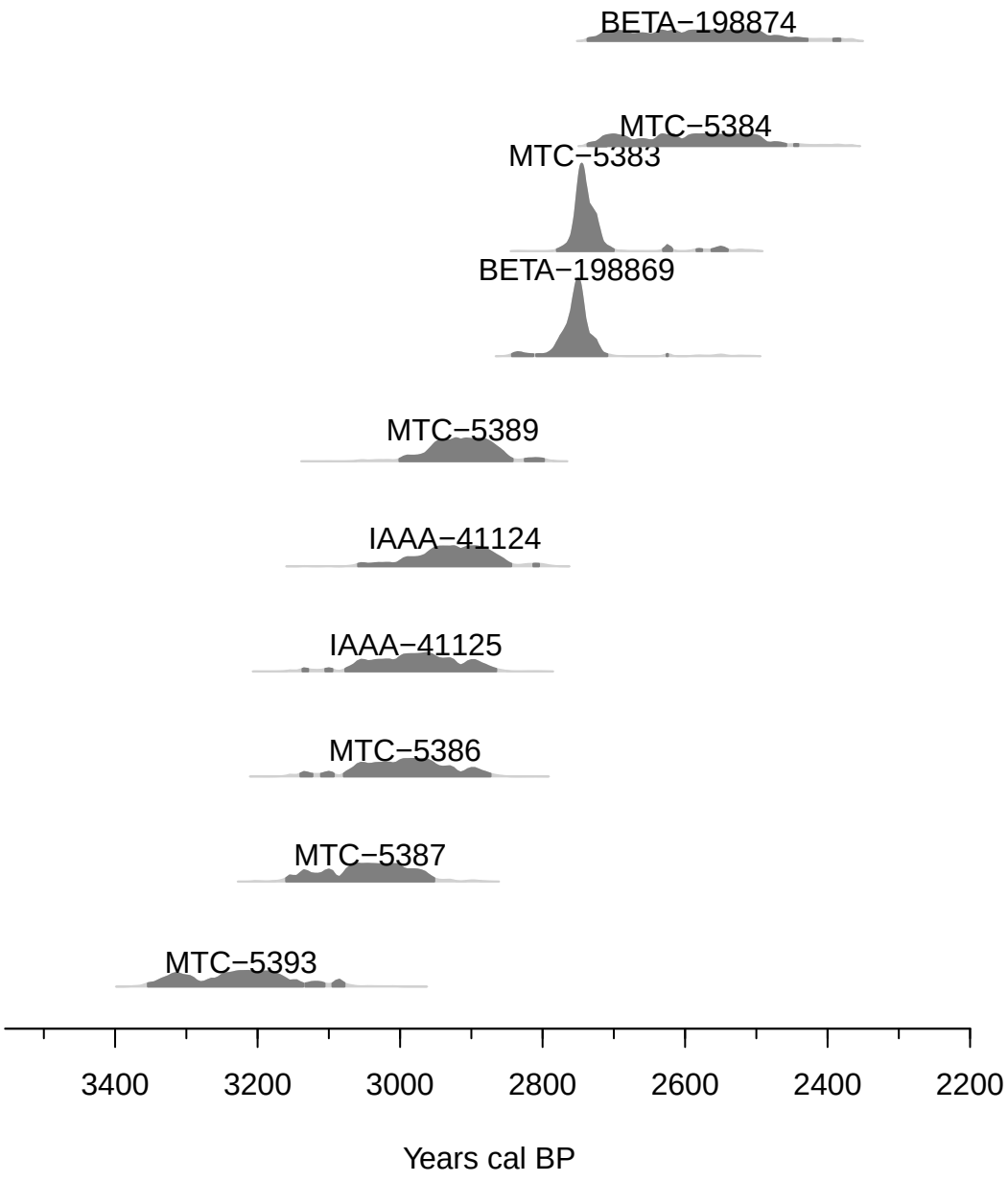
```
## Warning: package 'curl' was built under R version 3.6.3
```

```
library(rcarbon) # for C14 calibrations
```

```
## Warning: package 'rcarbon' was built under R version 3.6.3
```

```
# get C14 data
gh.c14.repo <- "https://raw.github.com/ercrema/jomonPhasesAndPopulation/"
gh.c14 <- "master/data/c14dates.csv"
gh.data.c14 <- read.csv(curl(paste0(gh.c14.repo, gh.c14)))
# 10 first dates
gh.data.c14.sample <- head(gh.data.c14, 10)
gh.data.c14.sample$ids <- 1:nrow(gh.data.c14.sample)
ages <- calibrate(x = gh.data.c14.sample$CRA,
                  errors = gh.data.c14.sample$Error,
                  calCurves = 'intcal13',
```

```
                    ids = gh.data.c14.sample$LabCode,
                    verbose = F)
multiplot(ages, decreasing=TRUE, HPD=TRUE)
```



I have already used

Bayesian modeling

A priori assertion on the relative chronology can be done to accurate the SPD and manage the uncertainity of chronological events

Aoristic analysis

R packages aoristic permit to deal with time series in a

In the frame of the OH-FET project, I have manage temporal conceptual Allen to quantify the urban dynamics of medieval times (Saligny et al. (2015)). In such a modeling, *events* are considered as POINTS when *duration* as considered as LINES with a starting *event* (x-) and an ending *event* (x+). Durations and events can be manage with binary topological relationships (*birel*) and operators like touches/meets, overlaps/intersects, etc.

Spatial data

R packages st, sp, rgdal, etc. and Leaflet. Leaflet permits the use of basemaps,

see the Leaflet app

Scientific publications

Open science

Reference

For example, the Web Ontology Language-Time (OWL-Time) Reprend le formalisme de Allen Binding (2010)

Binding, Ceri. 2010. "Implementing Archaeological Time Periods Using Cidoc Crm and Skos." In *Extended Semantic Web Conference*, 273–87. Springer.

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Dietler, Michael, and Ingrid Herbich. 1998. "Habitus, Techniques, Style: An Integrated Approach to the Social Understanding of Material Culture and Boundaries." *The Archaeology of Social Boundaries*, 232–63.

Habu, Junko, and Habu Junko. 2004. *Ancient Jomon of Japan*. Vol. 4. Cambridge University Press.

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Saligny, Laure, Ludovic Granjon, Thomas Huet, Gaël Simon, Xavier Rodier, and Bastien Lefebvre. 2015. "OH_FET: A Computer Application for Analysing Urban Dynamics over Long Time Spans." In *CAA2014. 21st Century Archaeology. Concepts, Methods and Tools. Proceedings of the 42nd Annual Conference on Computer Applications and Quantitative Methods in Archaeology*, 381–92. Archaeopress.