



## LabEx BCDiv PhD studentship

**Title:** Herding practices and mobility in Mongolia in modern and ancient times: a high resolution GPS and isotopic approach.

**Application deadline: \*\*15th March\*\***

### Key-words

Movement ecology, geochemistry, archaeology, GPS, GIS, pastoralism, nomadism

### Funding body

Labex « Biological and cultural diversities: origin, evolution, interaction, future» (BCDiv ; MNHN-CNRS-UPMC-IRD-EPHE).

### Supervisory team:

The PhD student will be based in Paris (France), at the Museum national d'Histoire naturelle. He/she will work in tight collaboration with the team « Archaeozoology, archaeobotany: society, practices, environments (UMR 7209 AASPE, with Dr Antoine Zazzo and Sébastien Lepetz) and the Center of Ecology and Conservation Sciences (UMR 7204 CESCO, with Dr Aurélie Coulon)

### Project description

In modern Mongolia, nomad pastoralism is the main strategy to exploit available resources (water, herbage), deal with their spatial and temporal fluctuation and cope with climatic irregularities. Different strategies have been developed depending on the environment. In the steppe, camps are installed in the plain during summer, and near the hills during the cold season. This is the opposite in the mountain areas, where the flocks are usually moved between high altitude pastures during the summer and lowlands during the rest of the year. Besides resource availability, this general model of nomadisation takes several parameters into account (protection from the wind, against insects, etc.). Anthropologists have demonstrated that the pastoral system is continuously adapting to socio-economical, political and environmental constraints. Recently, archaeological excavation programs have also shown that the organisation of the societies varied through time between sedentary, semi-sedentary or nomad agropastoral systems. The understanding of the mechanisms implied in the evolution of the dynamics of pastoralism in Mongolia requires to study past human-animal relationships. This archaeology of mobility, so delicate to perceive, is at the heart of this PhD project which will rely on stable isotope geochemistry. The isotopic composition of vertebrate tissues reflects several aspects (including diet, climate, movement) of the life history of human and animal populations. This approach is widely used in ecology since the 1980's, and more recently in archaeozoology in order to reconstruct herding strategies elaborated by

human societies since the Neolithic. But the interpretation of the results often remains too empirical due to the insufficient knowledge of the spatial distribution of the isotopic signature of the sources of water and food available to the animals. An accurate interpretation of the isotopic profiles performed along continuously growing tissues (hair, horn, teeth) requires a local reference set made of animals whose movements are documented with precision.

This project aims at progressing in the understanding of modern and past herding practices in Mongolia. It will rely on an integrated approach of GPS monitoring and stable isotope analysis of modern flocks in Mongolian Altai, a field where our group is directing an archaeological excavation program. Sequential sampling and isotopic analysis will be performed in different tissues (hair, horn, teeth) of the four domesticates (goat, sheep, cattle, horse) in order to document aspects of the management of the modern flocks (season and seasonality of birth, age at weaning, foddering, etc.). The coupling of satellite and isotopic data has never been attempted on domestic animals and will allow to test whether short-term movements can be tracked in apatite or keratin stable isotope composition, using conventional (C, N, O) but also less conventional (Sr) markers. Once validated, this approach will be applied to archaeological material in order to study the diversity of animal provenances in funerary contexts, and the evolution of herding practices between the Bronze Age (beginning of 1<sup>st</sup> mill BC) and the end of the Turk period (end of 1<sup>st</sup> mill AD).

### **Beginning**

01/10/2016

### **Duration**

3 years

### **Requirements**

We are seeking a highly motivated, creative candidate, hard working and collaborative, both in the lab and in the field. Candidates must be among the highest achievers in their undergraduate cohort. A relevant master's qualification is an advantage. The successful candidate will need a strong background in geochemistry, ideally with an interest in GIS, archaeology, or both.

### **Applications and contacts**

Applications should contain a detailed CV and letter of motivation, and at least one letter of recommendation. They should be sent before **\*\*March 15<sup>th</sup> 2016\*\*** by email as a single pdf to Antoine Zazzo ([zazzo@mnhn.fr](mailto:zazzo@mnhn.fr)), Sébastien Lepetz ([lepetz@mnhn.fr](mailto:lepetz@mnhn.fr)) and Aurélie Coulon ([acoulon@mnhn.fr](mailto:acoulon@mnhn.fr)). An interview will be organised in the following month with the short-listed candidates.