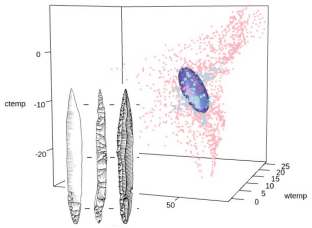

What is an eco-cultural niche?

Rethinking the shape of eco-cultural niches

An inter-disciplinary workshop organized by Anaïs Vignoles and Pierre Noiret

The application of ecological niche modeling to archaeological data was first done in the 2000s by W.E. Banks *et al.*, and termed eco-cultural niche modeling by these authors (Banks *et al.*, 2006). Since, a growing number of discussions on the appropriateness of methods and algorithms to model ecological niches in the field of Ecology have flourished in the literature (*e.g.*, Elith *et al.*, 2006; Merow *et al.*, 2014; Peterson *et al.*, 2015; Qiao *et al.*, 2015, 2017), emphasizing on the necessity to contextualize this choice in a clear theoretical framework. In this aspect, theorizing the shape of ecological niches has been discussed lately by *e.g.*, A.T. Peterson and J. Soberón (2020). However, this concern has not really percolated into ECNM (but see for instance Banks, 2017) while it seems pertinent to question the theoretical shape of eco-cultural niches to be able to model them adequately.

An eco-cultural niche can be defined as the ecological space occupied by a culture (Banks *et al.*, 2006). In archaeological applications, cultures are defined on the basis of the material culture of past populations at different scales (*i.e.*, an archaeological culture; *cf. e.g.*, Clarke, 1968 for different definitions of archaeological cultures). Eco-cultural niches are thus the environmental conditions with which the populations using a (or a group of) cultural traits interacted (Vignoles, 2021).

This workshop aims at discussing **the theoretical grounds of eco-cultural niche modeling**, through the angle of **niche geometry** in environmental space. This apparently trivial problem in fact raises fundamental questions one must ask when embracing the approach of eco-cultural niche modeling: is the shape of an eco-cultural niche comparable to that of a ecological niche? How can we model the relationship (*i.e.*, response) between cultural data and environmental variables? Is it also unimodal as is postulated for fundamental ecological niches? Is the distinction between the different types of niches operated by Hutchinson in his theoretical framework (Hutchinson, 1957) pertinent when applied to cultural data? How do the inclusion of cultural factors influence the framework of ecological niches in relation with distributional areas (*e.g.*, BAM diagram ; Soberón & Peterson, 2005)? The workshop aims to foster interdisciplinary interactions around these questions, bringing together ecologists, anthropologists and archaeologists. We hope this will give birth to a renewed framework for defining eco-cultural niches and explore large scale human-environment relationships in the past.

This scientific event will take place at the **Université de Liège** on the **9th and 10th of January 2025**.

Selected bibliography:

Banks, William E. 2017. « Improving eco-cultural niche estimations: the potential of archaeological faunal remains for taking biotic interactions into consideration ». In *TaphonomieS*, J.-Ph. Brugal (dir.), 1-10 (encart 10). Paris: Archives Contemporaines.

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Peterson, A. Townsend, Monica Papeş, Jorge Soberón. 2015. « Mechanistic and Correlative Models of Ecological Niches ». *European Journal of Ecology* 1 (2): 28-38. https://doi.org/10.1515/eje-2015-0014.

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Soberón, Jorge, A. Townsend Peterson. 2005. « Interpretation of Models of Fundamental Ecological Niches and Species' Distributional Areas ». *Biodiversity Informatics* 2: 1-10. https://doi.org/10.17161/bi.v2i0.4.

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Vignoles, Anaïs. 2021. « Trajectoires technologiques et dynamiques de niches éco-culturelles du Gravettien moyen au Gravettien récent en France ». Thèse de doctorat, Pessac: Université de Bordeaux.

Preliminary program

9th of January ; salle Wittert (University of Liège, place du XX août)

9h-9h30 *Welcoming of participants*

9h30-9h45 **Introduction** (Anaïs Vignoles)

9h45-11h15 **Session 1: Insights from macro-ecology and biogeography** (convener: A. Vignoles)

-A. Townsend Peterson: What is an eco-cultural niche and what should it look like? Conceptual and practical lessons from Ecology and Biogeography

-Jorge Soberón: Fundamental niches and behavior

-Monica Papeş: *title to be defined*

11h15-11h30 *Coffee break*

11h30-13h **Session 2: Eco-cultural niche modeling methodology revisited** (convener: A.T. Peterson)

-Jesper B. Pedersen, Felix Riede, Peter M. Yaworsky: Addressing the impacts of collinearity on interpretations of variable importance

-Erwan Vaissié: For those about to rock: could raw material circulation help discussing eco-cultural niche modeling?

-William Banks (coll. Marta Benito, Marlon E. Cobos, A. Townsend Peterson) : Do we need to be including biotic interactions when estimating the ecological niches of past hunter-gatherer cultures?

13h-14h *Lunch*

14h-15h30 **Session 3: Finding the middle-ground: a matter of scale** (convener: D. Roche)

-Peter M. Yaworsky, Jesper B. Pedersen, Felix Riede: Adapting ecological niche models to diachronic data and archaeological questions

-Felix Riede, Peter M. Yaworsky, Jesper B. Pedersen: Meaningful units of analysis for archaeological niche models

-Kim Génuite: Landscape evolution of the valleys of Prehistory: a new scale to consider for modeling past processes and socio-ecosystems

15h30-15h45 *Coffee break*

15h45-17h45 **Session 4: Feedbacks from the field** (convener: P. Noiret)

-Nejma Goutas, Bibiana Hromadová: How can data about hard animal materials industry be useful for modeling eco-cultural niches in the Upper Paleolithic?

-Nicolas Bureau: When pastoralism creates grazing land: ecological dynamics of reindeer herding populations

-Tiffanie Fourcade: Human-Environment relationship in France during the Middle-to-Upper Palaeolithic transition: What do the data tell us?

-Sonja Tomasso, Dries Cnuts, Veerle Rots: Ecological influences on technological systems: The scarcity of raw materials and their impact on tool morphologies at Ifri n'Ammar

17h45-18h **Conclusion of the day**

19h30 *Social dinner*

10th of January ; salle Wittert (University of Liège, place du XX août)

9h-9h30 *Welcoming of participants*

9h30-11h15 **Round table and discussions**

11h15-11h30 *Coffee break*

11h30-12h30 **Round table and discussions**

12h30-13h **Conclusive remarks** (Pierre Noiret)

13h-14h *Lunch*

List of participants and affiliations

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