



**HAL**  
open science

## Land, rain and sweat: Building a database of what we need for building a temporally dynamic and a spatially-explicit agent-based model of Neolithic occupation in Languedoc-Roussillon, France

Mehdi Saqalli, Marie-Alexandrine Sicre, Odile Peyron, Pierre Sabatier, Nathalie Combourieu-Nebout, Laurent Dezileau, Matthieu Ghilardi, Catherine Kuzucuoglu, Maria-Angela Bassetti, Boris Vannière, et al.

### ► To cite this version:

Mehdi Saqalli, Marie-Alexandrine Sicre, Odile Peyron, Pierre Sabatier, Nathalie Combourieu-Nebout, et al.. Land, rain and sweat: Building a database of what we need for building a temporally dynamic and a spatially-explicit agent-based model of Neolithic occupation in Languedoc-Roussillon, France. Atelier MISTRALS "Impacts des changements climatiques en Méditerranée", Oct 2017, Montpellier, France. , 2017. hal-01688180

**HAL Id: hal-01688180**

**<https://univ-tlse2.hal.science/hal-01688180v1>**

Submitted on 19 Jan 2018

**HAL** is a multi-disciplinary open access archive for the deposit and dissemination of scientific research documents, whether they are published or not. The documents may come from teaching and research institutions in France or abroad, or from public or private research centers.

L'archive ouverte pluridisciplinaire **HAL**, est destinée au dépôt et à la diffusion de documents scientifiques de niveau recherche, publiés ou non, émanant des établissements d'enseignement et de recherche français ou étrangers, des laboratoires publics ou privés.

# Land, rain and sweat: Building a database of what we need for building a temporally dynamic and a spatially-explicit agent-based model of Neolithic occupation in Languedoc-Roussillon, France.

Mehdi Saqalli<sup>1</sup>, Marie-Alexandrine Sicre<sup>2</sup>, Odile Peyron<sup>3</sup>, Pierre Sabatier<sup>4</sup>, Nathalie Combourieu-Nebout, Laurent Dezileau<sup>5</sup>, Matthieu Ghilardi<sup>6</sup>, Catherine Kuzucuoğlu<sup>7</sup>, Maria-Angela Bassetti<sup>8</sup>, Boris Vannières<sup>9</sup>, Laurent Carozza<sup>1</sup>, Jean-Michel Carozza<sup>10</sup>, Laurent Lespez<sup>11</sup> and Paleomex team

1. GEODE-UMR 5602 CNRS Université Toulouse 2 Jean Jaurès ; 2. LOCEAN, Sorbonne universités ; 3. ISEM Montpellier ; 4. Laboratoire EDYTEM - UMR CNRS 5204, Université Savoie Mont Blanc ; 5. Géosciences Montpellier UMR CNRS 5243 ; 6. CEREGE-UMR CNRS 7330 - Université d'Aix-Marseille ; 7. LGP-UMR CNRS 8591 - Université de Paris Est, Créteil et Université de Paris 1 ; 8. CEFREM-UMR CNRS 5110 ; 9. Chrono-Environnement-UMR CNRS 6249, Université de Franche-Comté, Besançon ; 10. LIENS3, UMR 7266, CNRS - Université de La Rochelle ; 11. LETG-Caen-UMR CNRS 6554-Université de Caen-Normandie.

## Objectives and challenges

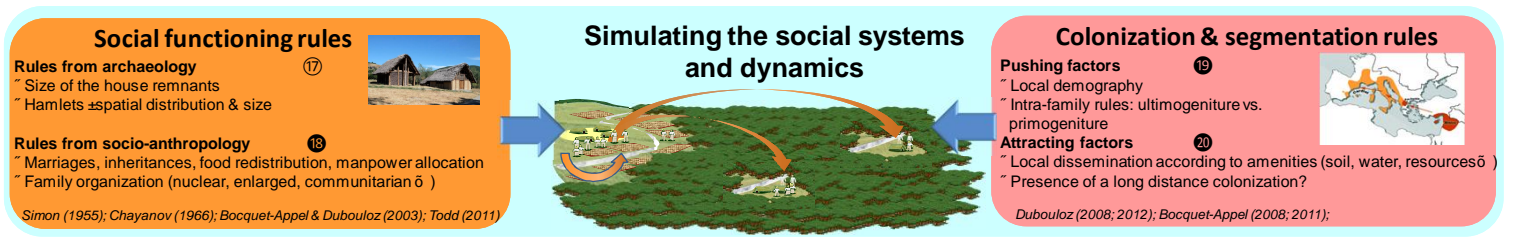
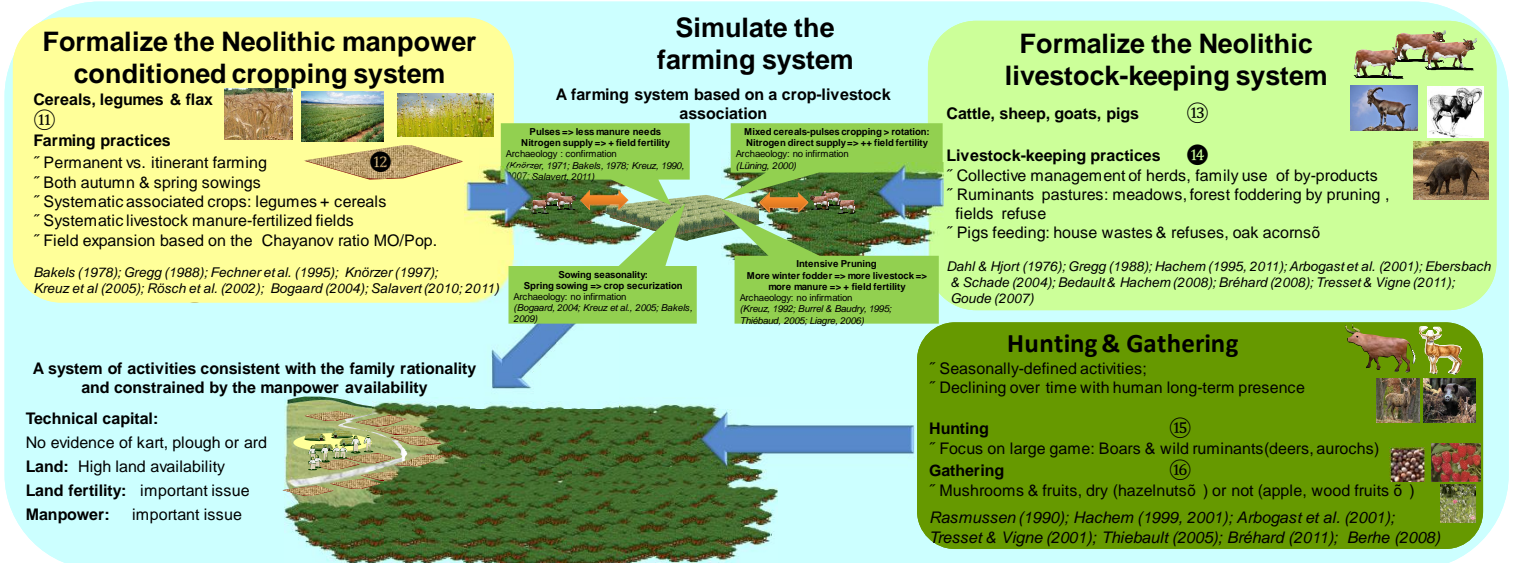
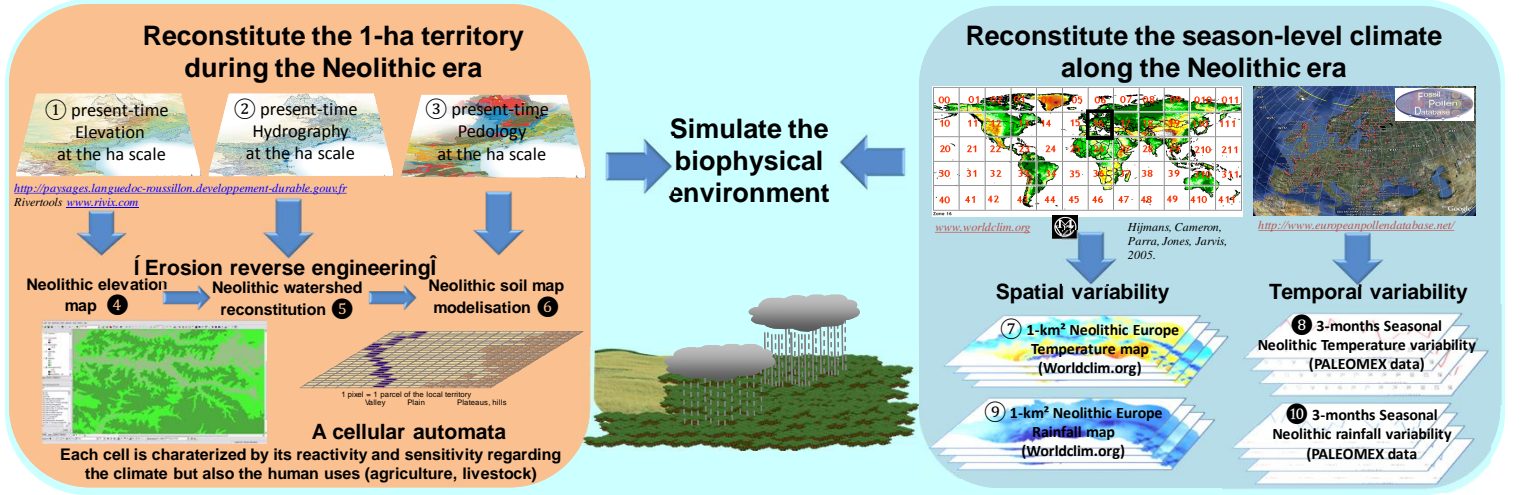
Building a dynamic and spatially-explicit model is an interesting way for combining altogether:

- “ At the operational scale, meaning the Neolithic family level, i.e. one hectare and one season
- “ All the biophysical and socio-economical constraints and assets this family face
- “ Along the period and the site we considered, meaning the Languedoc Roussillon during the Neolithic era



⇒ for such a model, we need to collect accurate data, meaning:

- ⇒ Precise enough, exhaustive both temporally and spatially
- ⇒ relevant, meaning having a defined impact on simulated dynamics



## A long-term project to build within the PALEOMEX research group

Among all data and groups of data needed for building a socially-defined multi-agent model, few are available or not-so-hard to prepare :

- “ The white numbers (from ① to ⑰) are the data or metadata available in the PALEOMEX team or that can be constructed by one PALEOMEX member;
- “ The black numbers (from ④ to ⑳) are the ones not available for now. Their constructions need the building of a consensual agreement of several working hypotheses on their values and organizations

References:  
Carozza, Berger, Burens-Carozza, Marcigny, 2015. Society & environment in Southern France from the 3<sup>rd</sup> millennium BC to the beginning of the 2<sup>nd</sup> millennium BC: 2200 BC a tipping point? 2200BC: A climatic breakdown as a cause for the collapse of the old world? In Tagungen des Landesmuseum für vorgeschichte, Halle, Band 12, 333-362.  
Saqalli, Baum, 2015. Pathways for scale reconciliation: Building ecological sociomodeling methodologies for a reconstitution of human past dynamics over a landscape. In: Chap. 9. Barceló J. A., Del Castillo F. (eds.) *Simulating prehistoric and ancient worlds. Springer Computational Social Sciences*. 233-255.  
Saqalli, 2014. Simple is beautiful? Building a simple climate model for modelling archaeological issues. Ateliers de Modélisation de l'Atmosphère CNRM, Toulouse, France  
Saqalli, Salavert, Bréhard, Bandyre, Vigne, Tresset, 2014. Revisiting & modelling the woodland farming system of the early Neolithic Linear Pottery Culture (LBK), 5600-4900 B.C. *Vegetation History and Archaeobotany* 23, 1: 37-50.  
Lespez, Carozza, Berger, Kuzucuoğlu, Ghilardi, Carozza, Vannières & the ArcheoMed team, 2016. Rapid climatic change and social transformations: Uncertainties, Adaptability and Resilience. In Alleno (ed.) *The Mediterranean region under climate change - A scientific Update*, 10 p.  
Peyron, Combourieu-Nebout, Brayshaw, Goring, Andrieu-Ponel, Desprat, ... & Kotthoff, 2017. Precipitation changes in the Mediterranean basin during the Holocene from terrestrial and marine pollen records: a model-data comparison. *Climate of the Past*, 13, 3, 249.  
Vannières, Blarquez, Rius, Doyen, Brucher, Colombaroli, Connor, Feurdean, Hickler, Lemmen, Leys, Massa, Olofsson, 2016. 7000-year human legacy of elevation-dependent European fire regimes. *Quaternary Science Reviews* 132, 206-212.  
Hijmans, Cameron, Parra, Jones, Jarvis, 2005. Very high resolution interpolated climate surfaces for global land areas. *International Journal of Climatology* 25: 1965-1978