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

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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.

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Objectives and challenges

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

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

שמחה, então, que para a modelagem de tal escala, vamos precisar de dados bastante maiores, mas a questão é que estamos trabalhando com um modelo quase "realista" que considera aspectos como climatologia, geologia e evolução humana.

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

Reconstitute the 1-ha territory during the Neolithic era

- present-time Elevation at the 1-ha scale
- present-time Hydrogeology at the 1-ha scale
- present-time Predation at the 1-ha scale

A cellular automata

Each cell is characterized by its reactivity and sensitivity regarding the climate but also the local uses (agriculture, livestock)

Reconstitute the season-level climate

- 1-mm Neolithic Europe Temperature map
- 1-mm Neolithic Europe Precipitation map

Simulate the biophysical environment

Simulate the farming system

A farming system based on a crop-livestock association

Formalize the Neolithic livestock-keeping system

Cattle, sheep, goats, pigs

Livestock-keeping practices

Collective management of herds, family use of by-products, ruminants pastures: meadows, forest foddering by pruning, fields refuse, pigs feeding house wastes & refuses, oak acorns

Hunting & Gathering

Seasonally-defined activities:
Declining over time with human long-term presence

Hunting

A focus on large game: Boars & wild ruminants/deers, aurochs
Gathering

Local mushrooms & fruits, dry (hazelnuts) or not (apple, wood fruits etc)

Simulating the social systems and dynamics

Pushing factors

Attracting factors

Colonization & segmentation rules

Local dissemination according to amenities (soil, water, resources)

Presence of a long distance colonization?

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

Among all datasets 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 15) are the data or metadata available in the PALEOMEX team or that can be constructed by one PALEOMEX member;

The black numbers (from 16 to 19) are the ones not available for now. Their construction needing a consensus of several working hypotheses on their values and organizations