Climate Change and social transformations in the past (12ka BP): from field data acquisition towards socio-ecological modeling
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**Objectives and challenges**

Ā Climatic trends in Mediterranean areas during the Holocene (from 12 ka BP)

Ā Definition of the spatial and temporal variability of the Rapid Climate Changes (RCCs)

⇒ Climate change and impact on cultural and political dynamic?

- Neolithic (9.2, 8.2 and 6-5.5 ka BP)
- Bronze Age (4.2 ka cal BP)
- Final Bronze Age and Historical periods (3.2-2.8 and 1.3-0.7 ka cal BP)

**Methods : 4 transects – multiproxy analyses**

- Long marine sequences....
- Analyses of long pollen and fire signature series for high resolution climate changes analyses (e.g. modern analogs – Peyron et al., 2010; Vannière et al., 2014)
- High resolution analyses of lake and fluvial sequences (e.g. 8.2 temperature in Berger et al. – IF 2015)
- Socio-political changes : cultural areas, settlement, political changes (e.g. Carozza et al., 2015; Lequer et al., 2016a, b)

**Paleoxem in the Lion’s Gulf**

Improve climate and environmental change: seesaw across the Mediterranean basin

![Conceptual model of Climate/Environment/Society interactions](image)

**Conceptual model of Climate/Environment/Society interactions**

4.2 ka BP climatic event and settlement pattern changes from the Late Neolithic to the Early Bronze Age in western Mediterranean

- Effects of RCC lasting 3-4 centuries around the 4.2 ka BP event, c. 2.2-2 ka BC occurred in the lake, fluvial and soil systems
- A temporal hierarchic structure with 2 wet periods in Southern France
- Changes in the human settlement system around 2.2-2 ka BC
- In lowland areas, the number of settlements decreased significantly along the river system during a period of very high hydrosedimentary discharges, dryness, and fire activity
- Environmental changes (glacial retreat) permitted the exploitation of coppice and meadows (high altitudes or above 2,450 m) allowed for an exploitation of alpine copper as in Saint-Vaast (OR Franche) and archaeological findings. New revealed a growth in human pressure in mountain areas, specifically in the Pyrenees (3400 BP France)
- Change of settlement from lowland to mountainous areas may have resulted in a societal reorganization at a regional level, but not in a global societal collapse

**Modelling Climate/Environment/Society interactions**

Dynamic and spatially-explicit modelling is the only way for combining biophysical and sociopolitical elements such as climate, socio-economic change, with archaeologically and socio-anthropological data and proxy based hypotheses in the functioning of the Neolithic societies.

**Assumptions**

A Paleo-environmentalists provide climate and landscape reconstructions with a century-scale temporal resolution whereas, to understand the consequences on rural populations, one should translate these data within a sociopolitical and human living system.

A Archaeologists provide site-specific habitat and activity descriptions for specific time periods whereas, to extend such reconstructions by exploiting a regional level, the site occupied by the same culture, a generic and adaptable behavior rationality should be hypothesized, allowing to overcome cultural rules and production practices.

Reference: