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

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

Laurent Lespere, Maria-Angela Bassetti, Jean-François Berger, Jean-Michel Carozza, Laurent Carozza, Nathalie Combournieu-Nebout, Laurent Dezileau, Arthur Glais, Matthieu Ghihirda, Catherine Kuzucuoglu, Didie Peyron, Pierre Sabatier, Mehdi Saqqal, Boris Vanniere, Marie-Alexandrine Sirco, Bassem Islabi and Paléomex team

Objectives and challenges

- Climatic trends in Mediterranean areas during the Holocene (from 12 ka BP)
- Definition of the spatial and temporal variability of the Rapid Climate Changes (RCCs)
- Climate change and impact on cultural and political dynamics?
- Neolithic (9.2, 8.2 and 6-5 ka BP)
- Bronze Age (4.2 ka cal BP)
- Final Bronze Age and Historical periods (3.2-2.8 and 1.3 et 0.7 ka cal BP)

Methods: 4 transects – multiproxies analyses

- Long marine sequences....
- Analyses of high resolution pollen and fire signature series for high resolution climate changes analyses (e.g., modern analogues)
- Analyses of high resolution lake and fluvial sequences (e.g., 8.2 implosion in Berger et al. -2010)
- Socio-political changes: cultural areas, settlement, political changes (e.g., Carozza et al., 2015; Lespere 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/Societies 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 ka BC recorded in the lake, fluvial and soil systems
- A temporal imparite structure with 2 wet periods in Southern France
- Change in the human settlement system around 2.2-2.1 ka BC
- In lowland areas, the number of settlements decreased significantly along the river systems during a period of very high hydrosedimentary discharges, dryness, and fire activity.
- Environmental changes (agricultural retreat) permitted the exploitation of copper and marble, which offers a high altitude of about 2,000 m above for an exploitation of alpine copper, as in Saint-Vaën (Alt France) and archiological finds suggest human pressure in human pressure in mountain areas, specifically in the Pyrenees (Alt France)
- Change of settlement from lowland area to mountains area may have resulted in a societal neopetalism at a regional level, but not in a global societal collapse.

Modelling Climate/Environment/Societies interactions

Dynamic and spatially-explicit modelling is the only way for combining various scales of interactions, such as climate, lake and soil systems, with archeologically and socio-ecology based modelling from historical hypotheses in the functioning of the Neolithic societies.

Assumptions
- Paleo-environmentalists provide climate and landscape reconstructions with a century-scale temporal perspective to understand the consequences on local populations, one should translate these data into models for better nowcasting purposes.
- Archaeologists provide site-specific habitat and activity descriptions for specific time periods which, to extend such reconstructions to a regional scale, the site occupied by the ancient culture, a generic and adaptable behaviour realistically should be hypothesized, assigning social or economic rules and production practices.

Reference: