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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

- 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 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 et 0.7 ka cal BP)

Methods : 4 transects – multiproxy analyses

- Analyses of high pollen and fire signature series for high resolution climate changes analyses (e.g. modern analogs) – Peyron et al., 2016 / Vannière et al., 2016
- High resolution analyses of lake and fluvial sequences (e.g. 8.2 implosion in Berger et al., 2016)
- Socio-political changes : cultural areas, settlement, political changes (e.g. Carozza et al., 2015, Lespès et al., 2016a, b)

Paleomex in the Lion’s Gulf

Improve climate and environmental change: seasaw across the Mediterranean basin

Conceptual model of Climate/Environment/Society interactions

⇒ Climate modellisation
⇒ Climate-Environment-Societies interactions [1]

4.2 ka BP climatic event and settlement pattern changes from the Late Neolithic to the Early Bronze Age in the eastern Mediterranean:
- Effects of RCC lasting 3-4 centuries around the 6.2 ka BP event, c. 2.2-2.0 ka BC registered in the lake, fluvial and soil sequences.
- A temporal Impatience structure with 2 wet periods in Southern France.
- Change in the human settlement system around 2.0-2.2 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 restraints) permitted the exploitation of copper resources and high altitudes (of about 2,400 m) allowed for an exploitation of alpine copper as in Saites/SAO France.
- Sociological changes: a New movement in human pressure on mountain areas, particularly in the Pyrénées (SAO France).
- Change of settlement from lowland area to mountainous areas may have resulted in a societal reorganisation 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 to combine field data acquisition (at the local scale) with socio-economic reconstructions, with archaeological data and climate reconstructions to test hypotheses in the functioning of the Neolithic societies.

Assumptions:
- Palaeoenvironmentalists provide climate and landscape reconstructions with a century-scale temporal projection whereas, to understand the consequences on rural populations, one should translate these data into human activities through farming systems. Archaeologists provide site-specific habitats and activity descriptions for specific time periods while, to extend such reconstructions to another scale level, the site occupied by the same culture, a generic and adaptable behaviour rationality should be hypothesised, examining social communicating rules and production practices.

References: