Palynology as a tool for the knowledge on the millennial human impact and land management in the central Mediterranean

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✓ Palynology and Cultural Landscape
✓ Long-Term Environmental Change (LoTEC)
✓ The LoTEC becomes Cultural Landscape
✓ Influence or Impact?
  ✓ 1. Multifunctional land-use in Mediterranean prehistory
  ✓ 2. Landscape and human activity at Stromboli, Sicily
  ✓ 3. Pastures and crops of Greek colonies in southern Italy
  ✓ 4. Agriculture and local economies of Roman central Italy
✓ Conclusions
Human impact and land management can be studied by palynology.
The millennial scale of these phenomena as Long-Term Environmental Change (LoTEC)

The LoTEC studies successions from undisturbed to anthropogenically influenced environment (Faegri et al. 1989)

Interdisciplinary *a-b-g* applications

- Palaeoecology / Ecology
- Conservation biology
- Landscape reconstructions
- Land-use management

The understanding of LoTEC implies knowledge and description of environments at subsequent steps of human impact and knowledge on the scale and duration of human presence in a territory.
The LoTEC becomes Cultural Landscape

The 3-concept definition of Cultural Landscape

by Mulk and Bayliss-Smith (1998)

- **Ecological**
  - marine / continental cores
  - dynamic ecosystems

- **Formal**
  - archaeological sites
  - biostratigraphic deposits

- **Cognitive**
  - symbols and traditions
  - intangible links between humans and their territories

**Concepts**

**The 3-concept definition of Cultural Landscape**

- landscape produced by cumulative effects of human activities: **dynamic ecosystems**
- landscape produced by a particular culture: **biostratigraphic deposits**
- intangible links between humans and their territories: **symbols and traditions**
✓ Human ecosystems **replace** natural ecosystems
✓ Cultural landscapes are the lands **transformed** by human impact

Mercuri 2014 - Landscape Ecol 29: 1799-1810
On-site palynology to recognise the first influence of humans

Near/Off-site sequences to recognise the area of site influence
1. From influence to impact (8.0-2.8 ka BP)

Palynology of prehistoric Mediterranean archaeological sites shows a multifunctional land use (Mercuri et al 2019)

Neolithic/Bronze: an increasing importance to wood exploitation seems to have occurred over time, that was probably the main cultural change at the passage from the Neolithic land-use (influence) to the Bronze age land exploitation (impact).
Similar general patterns:
(1) declines of trees at the onset of settlement (especially oaks)
(2) alternative cycles of retreat and recovery of woodland
(3) trends of decrease of woodland cover just before the abandonment

All the sites were settled near wet environments, surrounded by grasslands and mixed oakwoods, with many synanthropic taxa.

Neolithic

Bronze Age
- Sylvopastoral and crop farming mixed systems
- Neolithic and Bronze different focuses on land uses and cultural skills
- increasing importance given to wood exploitation over time

**Principal Component Analysis of selected pollen taxa and sums from the 6 archaeological sites**

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**Neolithic**

**Bronze**

**Biplot (axes F1 and F2: 36.71 %)**

- Axis 1: from forested towards more open environments, and from tree crops to herb crops and grassland
- Axis 2: from more forested to tree crops against open and wetland environments
Early evidence of agrarian practices, including cereal cultivation, dates back to the Bronze Age while the current vegetation seems to have originated during the Medieval period.

San Vincenzo-Stromboli  Mediterranean plants  anthropic  wetlands

Bronze age site of San Vincenzo. 60 pollen samples, and 1/3 had enough pollen to calculate pollen spectra (pollen is the only botanical remain preserved)
3. Pastures and crops of Greek colonies in southern Italy (Chora of Metaponto, 6th-1st BC)

Reconstruction of the agrarian landscape on which was based the economy of the Greek colonial system at Metaponto (Florenzano & Mercuri 2012, 2018)

Economy was prevalently based on crop (cereals) and tree (olives) cultivation and pastoralism or animal breeding; agriculture was performed just close to the settlements.

4 rural sites in the countryside of Metaponto. 90 pollen samples

Florenzano A & Mercuri AM 2012 - Rendiconti Online SGI 21: 750-752
4. Agriculture and local economies of Roman central Italy (1st BC-5th AD)

Information on the land-use, agrarian landscape and site function to illuminate the complexity of Roman peasant life-ways (Bowes et al 2020)

Case Nuove processing site

Roman sites were built in patches of fields and pastures simultaneously present in the territory intensively exploited and managed by farmers and peasant people.

7 archaeological sites (rural settlements and temporary use structures) in the Ombrone river valley. 87 pollen samples and 84 macroremain samples taken from different contexts.
Conclusions

Human impact and land management are studied by palynology as LoTEC and researches on the transition from influence to impact.

- **Central Mediterranean**: Multiple land use activities (multifunctional landscapes) since the Neolithic

- **Stromboli island**: Environmental reconstruction pointing to the availability of resources in a limited space; current Mediterranean landscape since the Middle Ages

- **Greek colonies in S Italy**: Complex agro-pastoral system instead of monoculture cropping in the chora-countryside

- **Roman central Italy**: Signals of great human control over productive landscapes; seasonality of agrarian activities and dynamic production system
Quoted references


Mercuri AM, Florenzano A (2019) The Long-Term Perspective of Human Impact on Landscape for Environmental Change (LoTEC) and Sustainability. Sustainability 11(2) [https://www.mdpi.com/journal/sustainability/special_issues/Human_Impact_on_Landscape]

