Poster 304

GIS Applications for Environmental Archaeology and Historical Ecology: Problems and Potentialities. The Case Study of Punta Mesco (Cinque Terre National Park Italy)

University of Genoa

Nicola Gabellieri, Alessandro Panetta, Valentina Pescini

Department of Antiquity, Philosophy and History (DAFIST); Laboratory of Environmental Archaeology and History (LASA)

Abstract: Research in Environmental Archaeology and Historical Ecology provides valuable information about past landscape. Our poster outlines a methodology to integrate field and textual data in a GIS-based database to collect and analyse heterogeneous spatial data.

CASE STUDY

The study area is part of the Cinque Terre National Park in Ligury. Since 2009, a **project** has been pursued by the FAI with the aim of **studying and restoring a peculiar site of terraced farming, now completely abandoned. As a reference for these activities,** (e.g. restoration of buildings and recovery of historical crops) the **study of historical and environmental features of the site** has been planned by University of Genoa and LASA since 2014.

Fig. 1: Location map of Punta Mesco (SP)

METHODS

For a deep understanding of the past landscape of Punta Mesco **we adopt a multi-proxy approach** involving every available sources and every temporal and spatial scale.

Historical ecology and environmental archaeology are a cluster of approaches and methods that extract information through the study of **field** and **documentary sources** and offer a holistic perspective to the study of historical environmental changes.

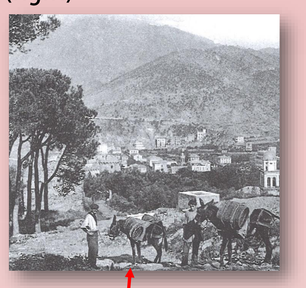
Punta Mesco project; list of different sources collected		
	Type	**Information**
Documentary sources	Textual sources (historical notary deeds, descriptions, historical cadastres, etc.)	Property system, agricultural system, land use
	Historical cartography and aerial photos	Vegetation, roads network, cultivations, landscape
	Iconographic sources (paintings and photos)	Agricultural practices, vegetation, landscape
Field sources	Archaeological evidences	Rural buildings, terraces, pottery
	Pollen analysis	Vegetation
	Charcoal identifications	Charcoal production, vegetation
	Dendrochronological analysis	Vegetation, dating
	Vegetation survey	Vegetation, grazing, livestock
	Radiocarbon analysis	Dating
Oral sources	Interviews, biographies	Agricultural practices, livestock, cultivations, property system

Tab.1: Range of different collected sources

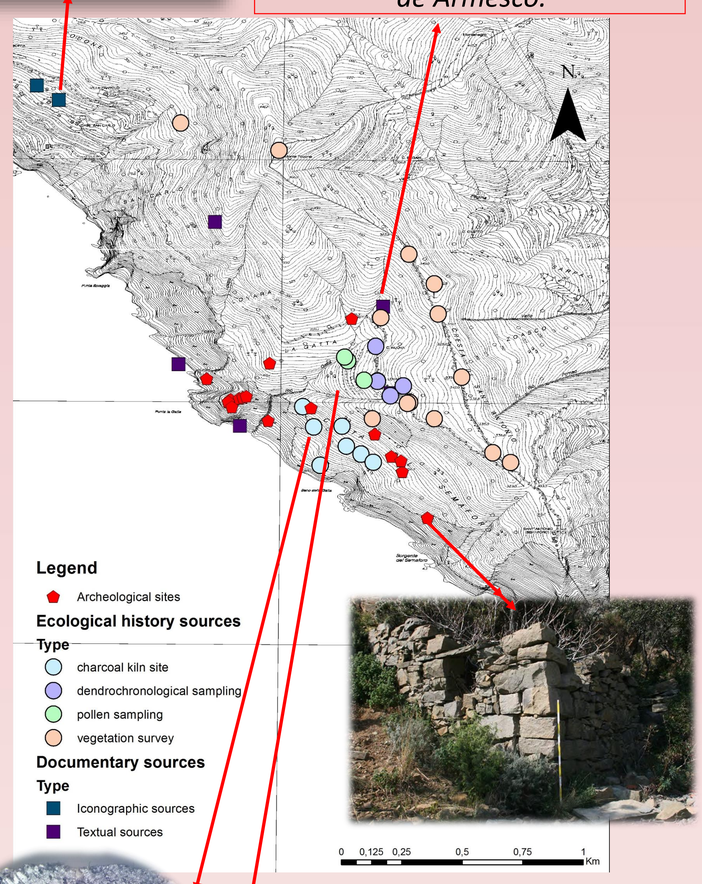
LINKING DIFFERENT SOURCES

The problem of integration of so many different data has been resolved through the creation of a geo–referenced database. Although the use of **Geographic Information Systems** (GIS) tools in modern archaeology is common practice, its **application in our field presents some challenges** that need to be faced, involving the management and standardization of heterogeneous data and graphic representation of final results. In the sourrounding a location map of different sources positions integrated with a Geo – refereced database.

Fig. 2: Historical photo of Punta Mesco road of 1924 (left). Notary deed describing a Mesco property of 14th century (right)



16 agosto 1379, Levanto.
In nomine Domini amen. Iohannes quondam Andree Stegueti de Levanto dedit, vendidit, traddidit et remissit Bartholomeo quondam Andrioli Amadei de Levanto, presenti et recipienti, peciam ***unam terre vineate*** *posite in territorio Levanti, in Capite de Armesco,* ***loco dicto in Lovaria****, cui coheret superius via, inferius et ab una parte <terra> dicti Bartholomei et ab allia terra ecclesie Sancti Anthonii de Capite de Armesco.*



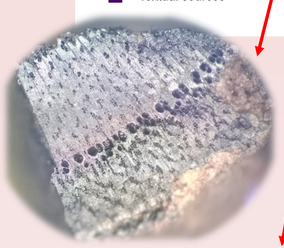
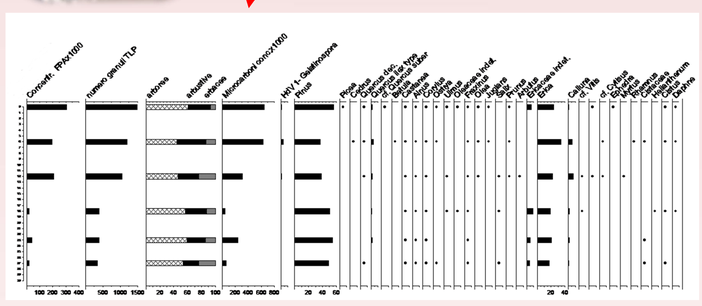


Fig.3: Rural builing found during archaeological survey (on top); Charcoal evidence (on left); Pollen diagram showing past vegetation (on bottom)



RESULTS

Our approach relied on the use of **ArcGIS 10.2** to collect, catalogue, digitize, display and analyse the spatial sources. Digitizing and vectorizing historical maps and aerial photos allowed us to overlay and compare historical layers, underlining changes in **vegetation coverage** and **settlement**. The data spatially specific enough that could be located were **included** in our GIS as a **point layer**. Each point has been linked with a **set of attributes** including descriptions, dates and sources.

As a final result, we created one **comprehensive georeferenced landscape model** with spatial quotes. Synthesis and interpretation is based on the **cross-checking of all the sources**, involving GIS spatial analysis tools such as "transect" and "kernel".

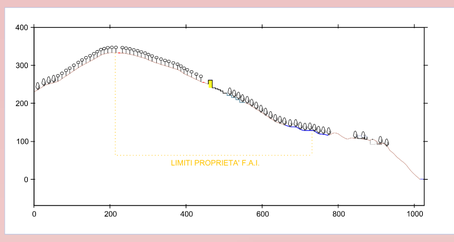


Fig. 4: Transect of study area showing morphology and vegetation coverage and buildings. Produced with Qgis plug-in

Fig. 5: Map of 19th Century vegetation coverage and settlements of Punta Mesco. Result of vectorization of historical cartography of 1827 and 1854 with ArcGis.

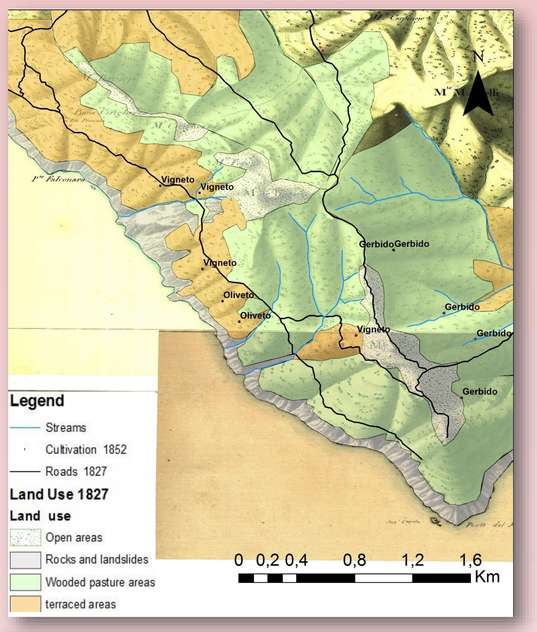


Fig. 6: Digital Terrain Model, texture map and vector features of XIX Century vegetation coverage and settlements of Punta Mesco. This provisional edition should be improve through the use of higher resolution digitised maps.

The next steps in this ongoing work are:

- To develop additional studies for a better understanding of the past landscape transformations.
- To find experimental and intriguing digital tools for a large public dissemination.