INTERNATIONAL SEMINAR

"ROMAN AGRARIAN & VITICULTURAL LANDSCAPES-GEOSPATIAL ANALYSIS, STATISTICS & PREDICTIVE MODELLING: CASE STUDIES RESEARCH"

Session 1

14th October 2019

9:00 h – 15:30 h

University of Barcelona

Faculty of Geography and History

Philosophy Seminar 4thfloor

Carrer Montalegre, 6-9

08001 Barcelona.

Session 2

15th October 2019

9:00 h - 15:30 h

***Cella Vinaria* Archaeological Park**

Centre Enoturístic i Arqueològic de Vallmora

Carrer Ernest Lluch, 41

08329 Teià, (Maresme, Barcelona)

CellaVinaria Research & Heritage Project

UB

Universitat de Barcelona

Ajuntament de Teià

toolbox

"ROMAN AGRARIAN & VITICULTURAL LANDSCAPES-GEOSPATIAL ANALYSIS, STATISTICS & PREDICTIVE MODELING: CASE STUDIES RESEARCH"

INTERNATIONAL SEMINAR

PROGRAMME

Session 1: Monday, 14th October 2019, 9:00 h – 15:30 h at University of Barcelona-Faculty of Geography and History-Philosophy Seminar 4thfloor- carrer Montalegre, 6-9 08001 Barcelona.

9:00 -10:00 ***"The SALVE Research Project: Sarno River plain – Ancient Life in the Vesuvian Environment-Hinterland of Pompei (Campania, Italy)"*** by Sebastian Vogel (Leibniz Institute for Agricultural Engineering and Bioeconomy -ATB- Potsdam-Germany)

10:00-10:30 Discussion

10:30-11:00 Coffee break

11:00-12:00 ***"Modelling Roman Settlement, Population & Agriculture in the Middle Tiber Valley-Hinterland of Rome (Italy)"*** by Helen Goodchild (University of York) & Robert E. Witcher (Durham University).

12:00-12:30 Discussion

13:00-14:00 Lunch

14:00-15:00 ***"GIS Analysis of Villae, Figlinae and Roman Viticulture in the Guadalquivir-Guadalete Interfluve (Hasta Regia and Gades Territoria)"*** by Pedro Trapero Fernández (UCA-University of Cádiz, Unit of Geodetection, Analysis and Georeferencing of Historical Heritage).

15:00-15:30 Discussion

Session 2: Tuesday, 15th October 2019, 9:00 h - 15:30 h at *Cella Vinaria* Archaeological Park-Centre Enoturístic i Arqueològic de Vallmora, carrer Ernest Lluch, 41, 08329 Teià, (Maresme, Barcelona)

9:00 -10:00 ***"Quantifying Laetanian Roman wine production function (1st century BC-3rd century AD). A microeconomic approach to vineyard's yields and winemaking processing facilities"*** by Antoni Martín i Oliveras (University of Barcelona-CEIPAC-UB).

10:00-10:30 Discussion

10:30-11:00 Coffee break

11:00-12:00 ***"Viticulture in the Laetanian Region during the Roman Empire: Semi-automated Predictive Modelling and Spatial Analysis"*** by Lisa Stubert (University of Potsdam, Institute of Environmental Sciences and Geography)

12:00-12:30 Discussion

12:30-13:30 Visit Vallmora's Roman Cellar

13:30-14:00 O.D Alella wine taste

14:00-15:30 Official Lunch

ABSTRACTS

THE *SALVE* RESEARCH PROJECT: SARNO RIVER PLAIN – ANCIENT LIFE IN THE VESUVIAN ENVIRONMENT (CAMPANIA, ITALIA)

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The ancient city of Pompeii, buried by the explosive AD 79 eruption of Mount Vesuvius, is excavated and intensively studied for more than 265 years. However, in an archaeological prospective, its hinterland, in which the urban centre was politically and culturally embedded and from which it was economically dependent, is still relatively unknown. As yet no comprehensive and integrated study exist that focus on both the socio-economic as well as paleoenvironmental conditions of the Sarno River plain in Roman and pre-Roman times.

To close this gap of knowledge, in 2006, the German Archaeological Institute initiated a research project bringing together scholars from the archaeologies and geosciences from Italy and Germany to reconstruct the pre-AD 79 cultural landscape of the Sarno River plain. As this paleolandscape and almost all ancient sites lie buried underneath 1 to 15 m of volcanic deposits conventional archaeological methodologies had to be combined with interdisciplinary and up-to-date techniques such as stratigraphic investigations, GIS-based spatial analysis, geostatistics and predictive modelling.

At first, a comprehensive GIS database of archaeological evidence of the pre-Roman and Roman period was build up, which yielded a dataset of more than 600 entities. Furthermore, about 1,900 drilling stratigraphies were collected to generate a high resolution landscape model of the Sarno River plain using a machine learning modelling approach. In a following integrative project phase, the geodata were combined with the archaeological data to reconstruct the ancient rural settlement structure.

Finally this wide-range cross-section approach provided insights into the development and dynamics of the hinterland of Pompeii and its complex interdependencies between the physiographic conditions and the anthropogenic influence on the paleo-landscape before AD 79. Furthermore, the Sarno River plain was characterized by a highly specialized and export-oriented rural economy that focussed on wine production and thus was of great economic importance for the Italian peninsula as well as for the entire circum-Mediterranean region.

MODELLING ROMAN SETTLEMENT, POPULATION & AGRICULTURE IN THE MIDDLE TIBER VALLEY-HINTERLAND OF ROME (ITALY)

Helen Goodchild (University of York) & Robert E. Witcher (Durham University)

Thanks to the pioneering South Etruria Survey of the 1950s-1970s, the middle Tiber valley is one of the best-studied archaeological landscapes of the Roman world, and has been the focus of several attempts to model the scale of settlement, population and agricultural production. Prior to the South Etruria survey, historians widely believed the area to have been largely unproductive during the Roman period; Rome was supplied by provincial imports, leaving its hinterland thinly populated and uncultivated.

The discovery by the survey of thousands of settlements sites, from large villas through to modest farms and outbuildings, led to greater recognition of the agricultural exploitation of this landscape, but (perhaps under the influence of Moses Finley) this was considered largely of local significance, with limited integration with the market at Rome.

It was only in mid 1990s, with Neville Morley's *Metropolis and hinterland* and the initiation of the British School at Rome's 'Tiber Valley Project', that there was a marked a shift in theoretical framework and the availability of the underlying data and a move towards the formal modelling of agriculture in the middle Tiber valley. Importantly, these developments coincided with the development of archaeological GIS.

One result was Helen Goodchild's thesis which used the results of the restudy of the South Etruria Survey to populate models based on a range of variables derived from the ancient agricultural writers in order to evaluate the scale of production in the middle Tiber valley and to estimate the sizes of population that could be supported. Further work by Helen, developed with Robert Witcher, highlighted the potential of these models for exploring agrarian social relations such as tenancy. Such studies, reflecting a wider interest in modelling and quantification of agriculture across the Roman world, show how the South Etruria Survey data can be used emphasise the integration of local, regional and inter-regional markets, the scale and structure of population and the variability of farming practices.

In our paper, we present a brief history of the landscape archaeology of the middle Tiber valley and an introduction to the Tiber Valley Project database, emphasising its particular strengths and weaknesses in comparison with other key regional datasets. We then outline some of the analysis undertaken to date and consider the potential next steps, both for modelling the Tiber valley in the Roman period and, crucially, for comparing and integrating these results with those from other regions, in order to better understand the scale and organisation of the Roman economy.

GIS ANALYSIS OF *VILLAE, FIGLINAE* AND ROMAN VITICULTURE IN THE GUADALQUIVIR-GUADALETE INTERFLUVE (*HASTA REGIA* AND *GADES TERRITORIA*).

Pedro Trapero Fernández
(Unit of Geodetection, Analysis and Georeferencing of Historical Heritage
UCA-Universidad de Cádiz)

The use of spatial analysis through Geographic Information Systems (GIS), allow us to understand issues related to the distribution and production of the territory. In our study case, we analyse the Guadalquivir and Guadalete interfluve, the *territoria* of *Hasta Regia* and *Gades*, based on agronomic sources and the study of the landscape, collecting all archaeological information about the location and distribution of *villae* and *figlinae,* as well as a detailed analysis of Roman viticulture, thanks to the references that Columela refers of his uncle, a Baetican farmer.

QUANTIFYING LAETANIAN ROMAN WINE PRODUCTION FUNCTION (1ST CENTURY BC-3RD CENTURY AD). A MICROECONOMIC APPROACH TO VINEYARD'S YIELDS AND WINEMAKING PROCESSING FACILITIES.

Antoni Martín i Oliveras (University of Barcelona-CEIPAC-UB)

Viticulture has played an important role in the economy of the Mediterranean coast of *Hispania Citerior Tarraconensis* between the 1st century BC and the 3rd century AD. The vineyards, wineries and pottery workshops are usually found clustering in specific areas, such as the Laetanian region located in the northeast coast of the Iberian Peninsula.
Their spatial and temporal distribution has been previously interpreted as a proof of the existence of intensive and specialized winemaking economy, associated with large-scale production & trading of wine in bulk quantities targeting predominantly to overseas markets.
Despite the significance of wine-growing activity in the territory and its more or less important role in the empire-wide economy, the processes involved in production, trade and consumption of Laetanian wine and its evolution over time, have not been quantifying using formal empirical economic models and further econometrical methods.
Here we present a first approach to a microeconomic explanatory data analysis of this ancient wine production function, paying particular attention in vineyard's and winemaking processing facilities yields, taking the values from Roman writing sources, archaeological record, experimentation and ethnographic or current viticulture data.
The main goal of this paper is to explain the different processes and agents involved in this supply chain and evaluate "*ab origine*" the changing dynamics of Laetanian wine production system.

VITICULTURE IN THE LAETANIAN REGION DURING THE ROMAN EMPIRE: SEMI-AUTOMATED PREDICTIVE MODELLING AND SPATIAL ANALYSIS

Lisa Stubert
(University of Potsdam, Institute of Environmental Sciences and Geography)

The use of predictive modelling and GIS-based analyses evolved to a widely used approach in archeology in the last decades. It can be used to calculate suitabilities of archaeological site locations and determine the underlying factors of their distribution. To get proper results, a certain amount of prior knowledge is required for such studies.
This involves information about the ancient socio-economic and the topographical conditions and their expected impact on the subject of interest and on the other hand the actual execution of the modelling. In this thesis a semi-automatic approach with the programming language Python was created to accelerate and simplify the process of predictive modelling, but at the same time consider a wide range of potential predictor variables.
This was carried out on the case study of viticulture in the Laetanian region in times of the Roman Empire. 16 topographical and 6 socio-economic cost distance data sets were prepared as variables and different models were calculated. The variable subsets for each model were selected either with expert knowledge or semi-automated by the algorithm on the basis of statistical distribution metrics of the data. With both methods, a model was found, that described the distribution of the known archeological sites in the region sufficiently well.
The results indicate that the accessibility of a location and its connectivity to the distribution and trade routes, determined by terrain steepness, was decisive for the settlement of wine pressing facilities. With the knowledge gained the ancient cultivated area and number of wine presses were extrapolated. The developed algorithm has been designed in a way it can easily be used with other data sets for future studies.