

# ABSTRACT BOOKLET



HUMAN-ENVIRONMENT DYNAMICS IN THE  
**PELOPONNESE  
AND BEYOND**  
IDEAS – METHODS – RESULTS  

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ATHENS, 6–8 APRIL, 2017

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## Thursday, 6 April, 2017: Opening lecture

Michael GIVEN (University of Glasgow), *Conviviality of the land: towards a new academic ecology*

Doing research where human culture and the environment intersect is particularly vulnerable to the old academic ecologies of disciplinary silos and micro-specialisation. Behind them are the broader societal challenges that are being played out in the landscapes we study, from species loss and deforestation to social alienation and anthropogenic climate change. In spite of these challenges, landscape researchers tend to be both creative and persistent in building the new academic ecology needed to address these pressing issues. This work is transdisciplinary, in that it constantly crosses disciplinary boundaries into zones of discomfort that require hard listening. It is prepared to engage with all sorts of stakeholders, from farmers and schoolchildren to government departments and NGOs. And it is deeply committed to understanding the mutual dependencies of all players in our world, whether nonhuman or human.

Following the Austrian philosopher Ivan Illich, I term this commitment towards movement, engagement and understanding ‘conviviality’. I will demonstrate how it works by a series of vignettes from the landscape of central Cyprus. Conviviality appears in the astonishing abundance of life contained within soils. It lies in the interconnections across the landscape that are mediated by the sounds of birds, goat bells, the wind, and people working on the threshing floor. Ottoman flour mills and Medieval sugar refineries show how differently the tensions within conviviality can be played out, particularly when social and environmental limits are transgressed. Forests can express the interdependence of all their members, whether trees, wild animals, soils or goatherds, or they can project an artificial division of nature and culture articulated by colonial forest boundaries.

Conviviality is an ethical intention to value everyone and everything that participates in the landscape, in direct opposition to those who reduce the environment to ‘natural resources’ to be exploited by a particular group of humans, and recast interdependence as human mastery of nature and of other humans. As demonstrated by the aims and participants of this conference, conviviality is a way of working together, to create a new academic ecology.

**Friday, 7 April, 2017**

(I) Erika WEIBERG (Uppsala University), *Communication is key: interdisciplinarity in socio-natural studies*

This talk will introduce the aims of the conference as well as the interdisciplinary framework within which the initial idea and the final content of the meeting were shaped. Organized by the PELOPS (Past Environment and Landscapes of Peloponnesian Societies) group, the conference is both the result of interdisciplinary communication as well as a call for further advancement of scholarly exchange. To maintain successful interdisciplinary collaborations, new methodological and theoretical tools need to be developed, assessing the reliability and accuracy of each dataset and of the correlations between them. Fruitful communication between disciplines, or even between researchers within the same discipline, needs to be consciously articulated and continuously practiced. The main question today is not whether we should engage in interdisciplinary projects, but instead concerns the models and levels of generalizations to be employed, and how to integrate disparate records to produce mixed but coherent transdisciplinary datasets and integrated narratives on human-environment interaction.

(M) Dan LAWRENCE (University of Durham), *Challenges in integrating and interpreting survey and climate datasets: a view from Northern Mesopotamia*

Since the pioneering studies of Robert McCormick Adams, Robert Braidwood, Thorkild Jacobsen and others, archaeologists working across the Ancient Near East have developed a large corpus of settlement and landscape data. This is increasingly being supplemented by high resolution satellite imagery, especially declassified spy photography such as CORONA, and greater access to cartographic information. However, as in the Mediterranean, there have been few attempts to integrate these disparate datasets in ways which allow for regional level comparison and interpretation. A series of projects based at Durham University, including the Fragile Crescent Project, the Persia and its Neighbours Project and the EAMENA Project, have attempted to fill this gap by bringing together data from huge numbers of regional surveys supplemented by satellite imagery and cartographic analysis. More recently, we have begun to relate the settlement and landscape trajectories visible to broader human-environment trends. The interpretation of different sources of information, as well as differences between the methodologies by which the original data were obtained, resulted in a high degree of complexity. Rather than sweeping this complexity under the carpet, we seek to embrace these discrepancies through concepts of certainty and uncertainty. This paper will give an overview of the approaches used in constructing contiguous settlement datasets from disparate sources and discuss some of the results, relating trends visible in urbanism, irrigation and settlement to climate at a variety of temporal and spatial scales.

(M) Jed KAPLAN, Philipp SOMMER, Ryan HUGHES (University of Lausanne), *Quantitative modeling of land use in the prehistoric and classical Peloponnese, to characterize influence on land cover, sustainability, and vulnerability of society to environmental change*

Direct observations of land use and societal responses to environmental change are sparse in space and time, particularly in prehistory. Numerical models are therefore valuable tools for providing a spatially and temporally continuous picture of human-environment interac-

tions in the past. Here we apply a new type of quantitative model of human-environment interactions in preindustrial time that is adapted to regional- to global-scale studies. The model is informed by a suite of variables describing the characteristics of societies that cannot be predicted on the basis of environment, e.g., diet, presence of agriculture, or range of animals exploited. These data are combined with the properties of the physical environment in a coupled human-environment model. The model is a dynamic vegetation simulator at its core, with a module for simulating crop growth adapted for pre-industrial agriculture. This allows us to simulate yield and calories for feeding both humans and their domesticated animals. We couple this basic caloric availability with a simple demographic model to calculate potential population, and, constrained by labor requirements and land limitations, we create scenarios of land use and land cover for the Peloponnese on a kilometer-scale. We further implement a feedback loop where anthropogenic activities lead to changes in the properties of the physical environment, e.g., through soil erosion. Our preliminary results allow us to identify demographic scenarios in the prehistoric and classical Peloponnese that may have led to populations having been highly vulnerable to climate variability given the technological, social, and environmental constraints simulated by the model.

(M) Amy BOGAARD, Valasia ISAAKIDOU, Erika NITSCH, Amy STYRING, Petra VAIGLOVA (University of Oxford), *Characterising land-use in prehistoric Greece and beyond: interdisciplinary approaches to on-site bioarchaeological evidence*

In this talk we present approaches refined in recent ERC-funded research ('The agricultural origins of urban civilization', AGRICURB) for characterising past land use from bioarchaeological remains in western Eurasia, including a series of case studies in Greece. We use integrated stable carbon and nitrogen isotope analysis of plant, faunal and human remains, combined with ecological analysis of crop weed floras, to identify land management practices and to reconstruct food webs. We present key case studies from Neolithic and Bronze Age Greece to illustrate these methods, and outline an emerging model of agricultural development under early urbanization. Our results suggest that strategies of agricultural intensification or extensification were contingent on urban scale and form.

(R/C) Benjamin GRAHAM (University of Memphis), *Ecological mentality: Rome, dendrophori, and wood fuel in Late Antiquity*

Rome's exploitation of Italian woodlands for its imperial agenda has typically been understood in destructive terms. Either overly motivated by short-term profit or ignorant of the deleterious impact of deforestation, scholars agree that the ancient empire committed ecological suicide by consuming too many trees. This paper confronts some new evidence for surprising equilibrium in the woodlands just north of the city of Rome during late Antiquity. These findings suggest that we rethink how imperial agents experienced those trees. This paper will analyze the evidence for one possible stabilizing force in late ancient woodlands, the *dendrophori*—an urban guild in charge of managing and harvesting trees.

(R/C) Mieke PRENT, Sjoerd KLUIVING (Free University Amsterdam), *The Geraki Archaeological Project: 6000 years of human-environment interactions in southeastern Laconia*

The Geraki Archaeological Project was initiated in 1995 with the aim to reconstruct in detail the history of human settlement at the ancient fortified acropolis in Geraki, Laconia. The project uses an integrated approach, including archaeological survey and excavation,



architectural study, geomorphological and ecological analysis. The site has yielded evidence for human activities in the Final Neolithic period, Early and Middle Bronze Ages, and again from Protogeometric to Hellenistic and late Roman/early Byzantine times. This enables us to trace changes and transitions in human-environment interaction over the past 6000 years in changing social and political circumstances.

Results of ongoing archaeobotanical, -zoological and charcoal analyses indicate significant shifts in agricultural regimes through time. Recently, an archaeometrical [pottery study was begun, as well as a project focusing on the complex geology and colluvial fan stratigraphy in the environs of the acropolis. The latter project, to be continued in 2017 with the collection of new data on outcrops, colluviation (coring), and absolute ages (C14, OSL), promises further insights into a) the evolution of the landscape and ecology around Geraki during the last 6000 years, including multiple periods of soil formation and colluviation and b) the natural resources (wood, water, clays, rocks, arable soils) available during the various periods of human occupation.

(R/C) Ingmar UNKEL, Torben KESSLER (Kiel University), *Transformations in early Greek societies and landscapes around the Gulf of Corinth*

The new started project aims to reconstruct environmental changes and their influence on the cultural development in the region around the Gulf of Corinth during the Bronze Age/Iron Age transition (12th to 8th century BC) based on a complementary study of sedimentary and archaeological archives. The former will be investigated by applying geochemical, sedimentological and pedological proxies to sequences from selected valleys on the northern Peloponnese, Aetolia, and Boetia. The latter will compile and utilize a survey of archaeological data from relevant regions around the Gulf of Corinth. The aims of our project are (a) to reconstruct the changes in air temperature and hydrological dynamics; (b) to describe reactions of regional climate to short-term climate variations reported for the higher latitudes and potentially find coupling mechanisms; (c) to differentiate natural environmental conditions in the region from effects of human influence on the local climate, vegetation, erosion, and sedimentation; (d) to reconstruct social development from the archaeological record. The individual aims cumulate into a better understanding of socio-environmental interactions and possible scenarios of transformation, crisis, and collapse on local and regional scales. Combining organic and inorganic geochemical analyses with sedimentological and pedological analyses from the same archives, promises detailed palaeo-environmental information at a resolution that goes beyond the capabilities of each individual method.

The connection with knowledge of social developments derived from archaeological data and the reconstruction of scenarios of transformation and crisis will enable us to disentangle and evaluate the role of natural and human-induced environmental changes within societies of changing complexity.

(R/C) Andreas VÖTT (Johannes Gutenberg University Mainz), Franziska LANG (Technische Universität Darmstadt), Hans-Joachim GEHRKE (University of Freiburg), Birgitta EDER (Austrian Academy of Science), Lea OBROCKI (Johannes Gutenberg University Mainz), Björn RÖBKE (Deltares), Timo WILLERSHÄUSER, Peter FISCHER, Kurt EMDE, Hanna HADLER (Johannes Gutenberg University Mainz), *Major flood events recorded in Holocene sedimentary sequences in and around ancient Olympia (Western Peloponnese, Greece)*

The cult site of Olympia is situated some 21 km inland from the Gulf of Kyparissia (wes-

tern Peloponnese). Since the end of the 19th century AD, Olympia has been excavated under the auspices of the German Archaeological Institute (Deutsches Archäologisches Institut, DAI).

For decades, the Olympia or Kladeos valley infill and erosion history has been one of the most intriguing geoarchaeological questions in the Mediterranean. The main objective of our studies was to find out the reasons for the rapid burial of the cult site by several meters of sandy and silty sediments and the subsequent incision of the local Kladeos and Alpheios Rivers by 8-10 m. We have carried out an extended geophysical survey and drilled more than sixty vibracores both in the lower and middle Kladeos and Alpheios River valleys. Based on geomorphological, sedimentological, geochemical, geochronological and micropalaeontological methods we detected strong consistencies of the stratigraphical record between Olympia and the nearby coast of the Gulf of Kyparissia.

Our data helped to detect several phases of major flooding events that occurred since the mid-Holocene. Potential climatic, tectonic and seismological triggers for these catastrophic floods are discussed based on a case study from the immediate environs of ancient Olympia.

## Saturday, 8 April, 2017

(R/C) Anton BONNIER, Martin FINNÉ (Uppsala University), *East-west divides? Landscape narratives of the ancient Peloponnese and local effects of climate change in the late first millennium BC*

The current paper will focus on regional and microregional changes in terms of both settlement systems and climate during the second half of the final millennium BC. Following a much generalised historical and archaeological narrative, the 5th and 4th centuries BC saw rapid urbanisation and settlement expansion across the Peloponnesian peninsula, followed by contraction of rural settlement as well as the abandonment of some urban sites from the later 3rd century BC until the 1st century AD. However, there are clear exceptions to these broad trends. Microregional settlement trajectories, as provided by survey archaeology, highlight local variability in terms of the chronology of expansion and contraction.

Within previous research, emphasis has been placed on the significance of political agency as the driving force behind local settlement dynamics both locally and regionally. Stable isotope data from speleothems from the Peloponnese provides us with novel perspectives on the potential impact of climate variability on local settlement structures. By combining the results from archaeological survey projects with paleoclimate records we can start to construct more complex landscape narratives of the ancient Peloponnese, involving political agency, climate change, land-use and environmental dynamics.

(R/C) Gert Jan van WIJNGAARDEN, Nienke PIETERS (University of Amsterdam), Pavlos AVRAMIDIS (University of Patras), *Human agency and landscape dynamics: an archaeological landscape biography at Zakynthos Island*

Since 2005, detailed geo-archaeological research has been conducted on the island of Zakynthos. The project constitutes a cooperation between Patras University and the University of Amsterdam under the aegis of the regional archaeological service on the island and the Netherlands Institute at Athens. The research has focused on three different parts of the island: an inland hilly area, a peninsula and a coastal valley. The research aims to compare these three regions with regards to the presence and distribution of archaeological sites

and materials and relate these to the geography of the island.

An important result of the geological research is the detailed knowledge on the development of the geomorphology of the central plain of Zakynthos. This central plain separates the three archaeological research areas. In this contribution, we will look at the differences in the characteristics and distribution of prehistoric pottery among the three research areas. Next, we will try to relate these to the diachronic development of the island's landscape. This will constitute a basis for a discussion on the interaction between human agency and geology in the landscape biography of Zakynthos.

(R/C) Andrew BEVAN (University College London), Ralph FYFE (Plymouth University), Markos KATSIANIS (Aristotle University of Thessaloniki), Alessio PALMISANO (University College London), Neil ROBERTS (Plymouth University), Stephen SHENNAN (University College London), Jessie WOODBRIDGE (Plymouth University), *Case studies in human demography, climate and land use in the later Holocene Mediterranean*

The Mediterranean provides a globally-famous, data-rich theatre in which to explore the long-term relationship between prehistoric demography, subsistence and climate. However, beyond a centuries-old but largely misleading claim that human action brought ruin to a Mediterranean Eden, what has the role of human population rise-and-fall been in the creation of the distinctive Mediterranean landscapes we see today? How regionally varied is the story of the making and unmaking of Mediterranean vegetation communities over the Holocene? To what extent has the spatial structure of human settlement -- whether dispersed across many small habitations or nucleated into major towns and cities, whether focused on coastal areas or predominantly inland -- moved in step with such changes? This paper begins with some small-scale behavioral insights from intensive landscape survey, and then introduces an ongoing collaborative project between geographers at Plymouth University (PI, Roberts) and archaeologists at UCL, bringing together radiocarbon-led population proxies, settlement surveys and vegetation models from pollen cores to investigate these dynamics in an explicitly comparative way. I will briefly discuss two case studies from Italy and southern France where our work is at a more advanced stage, and then focus on recent promising results from Greece.

(R/C) Meighan BOYD (Royal Holloway University of London), Karin HOLMGREN (Swedish University of Agricultural Sciences), Panagiotis KARKANAS (Malcolm H. Wiener Laboratory for Archaeological Science), Dirk HOFFMAN (Max Planck Institute for Evolutionary Anthropology), Klaus Peter JOCHUM (Max Planck Institute for Chemistry), Christoph SPÖTL (University of Innsbruck), *Alepotrypa Cave: insights into climate and human activity captured in speleothems*

Speleothems from the archeologically well-studied Neolithic site Alepotrypa Cave, Greece have been used to investigate human impact on the cave and provide a record of past climate. The cave was inhabited between 8.0-5.2 ka and was closed by a tectonic event, preserving the settlement until the rediscovery of the cave in the 1950's. Since 1970 Alepotrypa Cave has been the site of extensive excavations which have revealed aspects of past life, economic activities, social organization, ritual expression, as well as regional trade practices. Despite decades of work at the site, studies of speleothems from the cave began only recently.

Multiple speleothems with overlapping growth periods have been analyzed to provide records of climate, vegetation, and human induced changes in the cave environment



during parts of the Holocene. The results provide new insights into changes in rainfall and vegetation productivity for the period of 6.3-1.0 ka. The stable oxygen record, interpreted as a precipitation amount proxy, is one of the most precisely dated of its type from Peloponnese, and exhibits several rapid onset dry periods.

For the period of habitation which is preserved in the speleothem record, circa 6.3-5.2 ka, U-Th dating, laser ablation, and microscopy have provided a new background for interpreting some aspects of human influence at the site. We present a record which details the climate throughout the mid to late Holocene at the site, and also show how speleothems can be valuable tools for reconstructing the behavior of cave inhabitants.

(R/C) Martina HÄTTESTRAND, Elin NORSTRÖM, Christos KATRANTSIOTIS, Erika MODIG, Taariq SHEIK (Stockholm University), Shari STOCKER (University of Cincinnati), Calla McNAMEE (The American School of Classical Studies at Athens), Pavlos AVRAMIDIS (University of Patras), *Environmental change and human activity since the Late Bronze Age in SW Peloponnese: interpretations of new multiproxy data from Gialova lagoon in relation to archaeological findings*

Two new sediment cores from the Gialova lagoon, covering the last 6500 and 3650 years BP respectively, have been investigated with multi-proxy methods including: pollen, XRF, C/N ration, TOC, biomarker isotopes, and foraminifera. The sediment covering the Neolithic to the Middle Bronze age is coarse and less suitable for pollen analysis, which limits interpretation of vegetation changes during this period. From the Late Bronze age (3650-3025 BP/1700-1075 BC) onwards, the pollen record includes pollen from cultivated grass, vine, and the grazing indicator species *Plantago lanceolata*. In the Early Iron age (3025-2650 BP/1075-700 BC) olive pollen displays a marked peak at the same time as accumulation rates and influx from terrestrial sources increase. Thereafter the olive pollen percentages decrease and remain relatively low until the end of the Frankish period (c. 500 years ago) when both accumulation rates and olive pollen percentages increase again. We examine this data with a view toward understanding the relationship between our proxy record and changing land use practices through time and across local environmental zones.

(M) Anton BONNIER (Uppsala University), Adam IZDEBSKI (Jagiellonian University in Krakow), Grzegorz KOŁOCH (Warsaw School of Economics), Katerina KOULI (National and Kapodistrian University of Athens), Tymon SŁOCZYNSKI (Brandeis University), *Settlement dynamics and agricultural economies in Mainland Greece and Western Anatolia, 1000 BC–600 AD: correlating the evidence from palynological and archaeological data*

In this paper, we use unique palynological data and new methods of pollen analysis recently presented in Izdebski et al. (EEH 2016) to recover diachronic trends in vegetation change and agricultural land-use patterns in two areas of the Aegean world, incorporating the southern and central Greek mainland and SW Anatolia, between 1000 BC and AD 600. The result of the pollen analysis forms a basis for a broader comparative approach involving data derived from archaeological survey projects previously carried out in the two regions. Through such an integrated approach we will discuss changes in agricultural land-use patterns and the associated pattern of settlement dynamics and associated regional trends in agricultural production. In this way, we can validate our approach of using palaeoecological data as a source of information in economic history and achieve a deeper understanding of human-environment interactions as part of Classical, Hellenistic and Imperial Roman provincial economies.

(M) Ryan HUGHES (University of Lausanne), *Circle diagrams and (Peloponnesian) archaeology: methods, data, limitations and possibilities*

Circle diagrams are an innovative land use modelling technique that allows for the archaeological and historical record to be explored in a way designed to stimulate discussion, present where our gaps in knowledge are and, ultimately, encourage archaeologists and historians to view the ancient world from a different perspective. Employing a diverse array of techniques, including archaeological research, particularly botanical and zoological evidence and survey results, historical evidence, ethnographic studies and modern scientific approaches, ancient diet and land use requirements are estimated and visualised to determine *per capita* and overall land use in antiquity. To comprehensively visualise these elements, circle diagrams are divided into three interlinked productivity systems, field crop cultivation, arboriculture and woodlot, and livestock pasturage, each of which had a different intensity and impact on the local landscape. The interplay within and between these systems results in estimates of the environmental foot-print of the ancient population and the intensity of human impact on the landscape. This paper seeks to present the basic methodology behind the construction of circle diagrams and the types of data on which they are based, primarily gathered for the ancient Peloponnese by the *DoLP Project* (6500 B.C.E. – 300 C.E.), as well as the diverse results obtained by this method.

(I) Flint DIBBLE (University of Cincinnati), Martin FINNÉ (Uppsala University), *Changing foodways as adaptation to ancient climate change*

Recent interest in modern climate change has stimulated extensive scientific study into ancient climate and past societal response to climate variability. While it might be the end goal, examining climate change and society at the high social level of politics, economics, and settlement patterns does not provide a direct link between climate and society. Given that most inhabitants of the ancient world engaged in agriculture and/or pastoralism, examining changes in foodways is a proxy for examining past effects of and responses to climate change. Therefore, this paper examines the resolution of available datasets in demonstrating a causal link between climate and foodways using ancient Greece as an example.

From Greece, there is evidence for increasing aridity at the end of the Late Bronze Age (after 1200 B.C.). Is the disappearance of writing, art, and many known settlements at the end of the Bronze Age an example of collapse in the face of inability to adapt to climate change? These are difficult questions to answer given the coarse resolution of many of our archaeological and climatic datasets. Food production systems in different settlements become increasingly homogenous in Late Bronze Age Greece, potentially due to an increasing elite control over production systems. However, in the first half of the first millennium B.C., food production becomes more heterogenous when comparing different settlements or regions, potentially as an adaptive response to contemporary climatic changes. This paper examines how these trends in foodways might relate to changes in political economy and climate in ancient Greece, and outlines future testable approaches to research that might develop a stronger causal link between changing climate, foodways, and society.