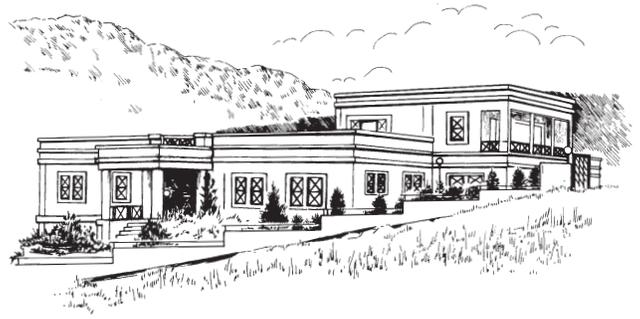


# KENTRO

The Newsletter of the INSTAP Study Center for East Crete

Volume 24 (Fall 2021)



## IN MEMORIAM COSTIS DAVARAS

*Thomas Brogan, Jeffrey Soles, and Philip Betancourt*

All of us were deeply saddened by the loss of Prof. Costis Davaras on the 5th of August. Three of his friends and colleagues kindly share their thoughts on the passing of a pioneering and influential Minoan archaeologist.

### Costis's Support for the Study Center

*Thomas M. Brogan*

Costis wore a range of hats during his long and distinguished career in the Greek Archaeological Service and at the University of Athens (Fig. 1), but perhaps his most important role was protecting and preserving the Greek past. The term “Mother Tree” was introduced in a recent pioneering study of Canadian forests to describe the dominant role played by the oldest and tallest trees in nurturing and sheltering the surrounding plant life, above and below ground, through the transfer of nutrients and information back and forth among the wider community of trees and plants (Simard 2021). As the first and last Ephor of East Crete (director of the local governmental district of the Ministry of Culture), Costis brought similar attention and stimulus to the archaeological community and its unique resources, and he wrote more than once about the role of sacred trees in Minoan religion (Davaras 2004). Dozens of archaeological projects have drawn benefit

directly or indirectly from his decisions and support. He will be sorely missed.

Highlights from his career and many contributions to Cretan archaeology are recounted in detail by Prof. Eleni Mantzourani in the introduction to his Festschrift (Fig. 2), *PHILISTOR. Studies in Honor of Costis Davaras* (2012, pp. xxi–xxiv). Here I would like to draw attention to his support for the establishment of the INSTAP Study Center for East Crete (SCEC; Fig. 3) and his direction of several of its major projects.

After more than a decade working in the Greek Ministry of Culture

as a curator in the Ephorates of Crete, Attica and Boeotia, Lakonia, and Patras and as the ephor of the newly established Ephorate of West Crete (1965–1968), Costis was appointed as the first ephor of the new Lassithi Ephorate of Antiquities in 1970 where he collaborated with many friends and colleagues (Fig. 4). He quickly grasped the danger posed by Crete’s burgeoning tourist industry to the island’s unique cultural heritage and instituted a program of legal protections for archaeological sites like those he had earlier developed as Ephor of West Crete. Such actions were often extremely unpopular; they saved countless sites from the bulldozer, however, and thus marked

Costis as a pioneer in the now widely recognized field of Cultural Heritage Management. For proof, one need look no further than



*Figure 1. Costis Davaras (left) with Markus Engel (center) and Christos Doumas (right) visiting the Vatopedi Monastery on Mount Athos during a break from their second year of undergraduate studies at the University of Athens, ca. 1953. Both Costis and Christos joined the faculty of the department later in their distinguished careers. Photo C. Doumas.*



Figure 2. Dione and Costis Davaras during the celebration at the INSTAP SCEC in 2012 where Costis received his Festschrift. Photo S. Ferrence.



Figure 3. Costis Davaras and Phil Betancourt signing the documents on July 27, 1994 to purchase the land and immediately turn it over to Greece for the purpose of building the INSTAP SCEC. Photo courtesy P. Betancourt.

the capital of Minoan Crete, Knossos, where ongoing efforts to win the monument World Heritage status have been stymied by the presence of so many modern constructions near the palace.

Another important step in preserving the cultural heritage of Crete was conducting rescue excavations at sites under more immediate threat, including the burial cave of Hagios Charalambos, the important Early Minoan cemetery of Hagia Photia, several Minoan peak sanctuaries (e.g., Traostalos and Prinias), and what he called the cult villa at Makrygialos. Along the way, Costis recovered a rich assemblage of finds that he displayed in the new museum of Hagios Nikolaos and generously offered to scholars to study and publish. With similar energy, Costis encouraged efforts by the foreign schools of archaeology to resume work at sites where they had long associations. This group included members of the American School of Classical Studies (ASCSA; e.g., J.S. Soles' restudy of Mochlos tombs, G. Gesell, L.P. Day, and W. Coulson's restudy of finds from Kavousi, B. Hayden's work at Vrokastro), Costis's later *synergasies* at Pseira and Hagios Charalambos with P. Betancourt, and sites like Mochlos with Jeff Soles and Gournia with Vance Watrous.

To describe Costis narrowly as an archaeologist would, I believe, completely miss the mark. He was a humanist with a deep interest in large-scale efforts to save sites and their surrounding landscapes and a preference for individual objects and iconographic motifs that he believed held the answers to fundamental questions about the past. During the first campaigns at Mochlos, it took me a while

to grasp how this approach applied to excavation. My first trenches uncovered a street that had been resurfaced several times during the Neopalatial period. Because the individual finds so rarely stimulated discussion, Costis inevitably turned to discourses on philology, the correct usage of words, or the meanings of Minoan symbols. This outlook can be seen most clearly in his valuable *Guide to Cretan Antiquities*, which uses an encyclopedic approach to sites, objects, and terms rather than the more common frameworks arranged by time, place, or social structure (Davaras 1976).

Early in 1993 Costis asked the directors of several affiliated projects of the ASCSA to make plans for the long-term storage of their finds. When Phil Betancourt asked if it would be possible to build a storage and research facility with funding from INSTAP, Costis threw his full support behind the project. I wrote to Costis for his thoughts about the institution when we celebrated the 20th anniversary of opening the Study Center in 2017. His response reveals both his sense of humor and his satisfaction in what had been accomplished:

“For many years, as Ephor of Antiquities, I signed thousands of documents, and I always wondered which would be the last when I retired. I assumed it would be something common like payroll, but quite surprisingly, it was this letter from the Greek side approving the application to build the INSTAP Study Center. And for that very reason there has always been this special connection between me and the Study Center. Health and best wishes to all. Costis Davaras”



Figure 4. Costis Davaras (second from right) and his wife, Dione (third from left), as koumbare (primary attendants) at the wedding of Costis and Eusebia Nikakis (left and center) on May 8, 1977. Nikakis worked as a conservator for the Lasithi Ephorate and other projects based in Crete. Photo courtesy C. and E. Nikakis.



Figure 5. Members of the Mochlos Excavation Project in 1992 with Jeff Soles and Costis Davaras at lower right. Photo courtesy J. Soles.

## A 50-Year Partnership at Mochlos

Jeffrey S. Soles

I had the privilege of working with Costis Davaras for 50 years, first as a young graduate student in 1971 when I came to Crete in search of a dissertation topic, and eventually as his partner in 1989 when we began the Greek-American Excavations at Mochlos (Fig. 5). I remember our first meeting as if it were yesterday: when I knocked on the door of his residence in the Hagios Nikolaos Museum a beautiful woman—who turned out to be his wife, Dione—opened it and led me to his office. I had no appointment, but he welcomed me graciously, and Dione brought me a cup of coffee. I told him my dilemma: I had received a Fulbright grant to study tholos tombs, but I had been scooped by Olivier Pelon who had just completed his monumental study on the subject. I wondered if I could instead clean and study the house tombs explored by Harriet Boyd Hawes at Gournia in 1904 and Richard Seager at Mochlos in 1908, which were never published fully. His exact response was, “Not only may you do so, you have a duty to do so since these were American projects that their excavators left unfinished.” Always impatient with bureaucracy, which would have delayed the work a year or two, he arranged for me to work “υπό την επίβλεψή του” (under his supervision), much to the distress of the director of the ASCSA who told me that I would just be “his workman.” Little did he realize that Costis and I would become close friends and true collaborators who would produce nearly 50 publications together in the years to come.

We carried out excavations together at Mochlos in five field campaigns (1989–1993, 2004–2005, 2009–2010, 2012, 2021–2022), separated by 30 study seasons, and made numerous sensational discoveries. Among them, to Costis’s delight, were a number

of sacred trees: a temenos full of olive trees, an ivory pyxis lid with the apotheosis of the Minoan goddess under an olive tree, and the remains of another tree that grew alongside a window in the house of the Lady with the Ivory Pyxis. In the belief that Minoan culture was rooted in eastern traditions, Costis explored the similarities between Minoan Crete and the ancient Harappan culture of India (Davaras 2005) and took a personal interest in Hinduism and Buddhism. When we received our fifth and final permit to excavate, he celebrated by sending me an image of the Hindu god Hanuman carrying his mountain of medicinal herbs across the sky, suggesting that we would need them, but also that like Hanuman we would be able to overcome difficult obstacles to fulfill our mission. He added that he was not at all “hail and hearty,” but he would be present “in spirit, or else as a spirit.” So he made it through the 2021 season, bringing us a great discovery as in the past, and we expect he will do so again in 2022.

Costis had a wry and ironic sense of humor. He was also a confirmed Stoic, fond of repeating in times of adversity, “Life makes us all Stoic philosophers whether we like it or not.” But he was also interested in Buddhism and passed many hours during our excavations in meditation in the small church of Hagios Nikolaos on the island of Mochlos. Life is full of suffering, but he believed the purpose of life is to become a better person by following the teachings of the Buddha, and that in doing so it is possible to put an end to suffering.

## Minoan Collaborations

Philip P. Betancourt

With the passing of my good friend and colleague Costis Davaras, the field of Aegean Prehistory has lost one of its great men. Costis was a fine scholar, but he was also a warm friend, a witty conversationalist, and a strong believer in saving the ancient heritage of Crete for the next generations.



Figure 6. Undated photo of Costis Davaras during excavations on the island of Pseira. Photo P. Betancourt.

We worked closely together on four large archaeological projects, each one lasting several years: the excavations at Pseira (Fig. 6) and Hagios Charalambos, the publication project for Hagia Photia—which he had excavated when he was a young man—and our current project, the publication of the Shrine of Eileithyia at Inatos, a collaboration that is about to result in its first of several volumes. Costis had a special interest in this shrine because as a young staff member at the Herakleion Archaeological Museum in 1962, he had volunteered for a dangerous undercover assignment to discover its whereabouts. For two years, looted objects of fine quality had been appearing on the secret Cretan market of illegal antiquities. Costis pretended to be a German tourist who spoke no Greek at all, and he and his interpreter (who was actually an undercover policeman) approached the thieves to buy antiquities. Slowly, Costis gained their confidence (including one time when he heard them discussing in Greek about killing him). Finally, they revealed where the site was, and a police raid arrested the thieves and confiscated hundreds of ancient objects that had already been looted.

The excavation of the Shrine of Eileithyia took place in two episodes, the first by Museum Director Nikolaos Platon assisted by Davaras (Fig. 7), and the second by Costis himself. Just a few days before his untimely passing, Costis was very happy to hear



Figure 7. Members of the team excavating ancient Inatos in 1962. Nikolaos Platon at center top and Costis Davaras at right end of the back row. Photo L. Platon.

that the English language book he helped to edit illustrating the highlights of the shrine was almost finished (Kanta, Davaras, and Betancourt, eds., forthcoming).

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## Congratulations

Congratulations to Dr. Thomas Strasser, Professor of Art and Art History at Providence College and recipient of their 2021 Outstanding Faculty Scholar Award. A member of the INSTAP SCEC Managing Committee, Tom was recognized for the high

caliber of his research, scholarship, and contributions to the field of Aegean prehistoric archaeology—in particular the Cretan Stone Ages, island archaeology, and ancient seafaring. Congratulations, Tom! Photo courtesy Providence College.



# HUNTING CLAYEY MATERIALS IN WEST CRETE

*Eleni Nodarou*

“... and the earth when compressed by the air into an indissoluble union with water becomes rock. The fairer sort is that which is made up of equal and similar parts and is transparent; that which has the opposite qualities is inferior. But when all the watery part is suddenly drawn out by fire, a more brittle substance is formed, to which we give the name of pottery.”

Plato, *Timaeus*, 60

## Introduction: The “Cultural Landscape” Approach in West Crete

Studies of ancient pottery often stress the potential for clayey materials and material properties to reflect patterns of both production and consumption in addition to the technological choices of the producers. Attention to geological variation provides, therefore, significant information about the availability of raw materials suitable for pottery manufacture and their exploitation and use in the past. Especially in Crete, geological prospection is of paramount importance, considering that the geology is both varied and repetitive, and the same formations may occur in different places across the island due to the complex fault system. When evidence from pottery analysis is combined with survey of the raw materials and study of their natural properties and mineralogical characteristics, the results allow us to take a closer look at human agency—that is, the ancient potters and their ways of making pottery.

In the 1980s, Jennifer Moody developed a pioneering approach to the study of coarse wares and applied it to the pottery from the Chania survey. She focused on the macroscopic study, identification, detailed description, and classification of the coarse ceramic fabrics, and she showed that rugged coarse pottery can be a useful chronological marker that in turn can contribute to the dating and interpretation of sites (Moody 1987; Moody et al. 2003). The macroscopic study and classification of pottery fabrics also has been applied elsewhere (e.g., Haggis and Mook 1993), and it has become a standard component of pottery studies. The Chania survey was important also for another reason: it was not limited to the identification of sites and the study of pottery but offered a more holistic approach to the paleoenvironment and modern environment of the area, including topography, geology, tectonics, water systems, sedimentation processes, climate, vegetation, and fauna. In this way, the ancient sites were presented in their palaeoenvironments, providing a diachronic perspective of environmental change and its repercussions on habitation patterns and human activities.

This approach further was pursued for the entire island of Crete. In their seminal book *The Making of the Cretan Landscape*, Oliver Rackham and Moody considered Crete as a miniature continent in order to assess the diversity of the Cretan landscape in its diachrony (Rackham and Moody 1996, xi). Parameters that remain unchanged in the passing of time, such as the geological background, are inextricably linked with the cultural landscape and the way(s) all living creatures (plants, animals, and people) interact with the ever-changing environment and each other.

As part of the “cultural landscape” approach, pottery is seen in close relation to environmental factors that remain unchanged through time such as bedrock. Pottery is also closely related to other environmental factors that do change through time such as sedimentation, geomorphology, proximity to water sources, and, most importantly, available materials that are suitable for pottery manufacture. Our clay sampling expedition in West Crete forms part of this long-lasting exploration initiated by Moody and colleagues in attempting to unveil the links between landscape, natural resources, and human agents through the lens of ancient pottery.

## The West Cretan Clay Project

Our project targeting clay sources in the province of Chania was largely inspired by previous work carried out in the area with a variety of scales and approaches. The first clay sampling project at Chania was carried out in the 1980s by Moody and Graham Chandler. They collected clays, and a set of thin sections was manufactured to be used in the future because comparative pottery analysis was not available at the time. To assess the workability of the clays, Moody, Harriet Lewis Robinson, and Jerolyn Morrison began experimenting with the replication of ancient cooking fabrics in the 1990s and 2000s (Moody, Morrison, and Lewis Robinson 2012). In the early 2000s, the present author initiated a second clay sampling project as part of her archaeometric study of Early Minoan pottery from western Crete (Nodarou 2011). All clay samples were taken from the vicinities of specific Prepalatial sites, and experimental briquettes were manufactured, thin sectioned, and ultimately compared to the ancient pottery in order to discuss questions of provenance and technology of manufacture.

For the current project J. Moody and E. Nodarou teamed up with Associate Prof. Ioannis Iliopoulos, post-doctoral researcher Dr. Vaia Xanthopoulou, and graduate student Marilia



Figure 1. The Lissos Gorge, looking south toward the South Cretan Sea. Photo West Cretan Clay Project.



Figure 2. Modern quarry near Chania. Photo West Cretan Clay Project.

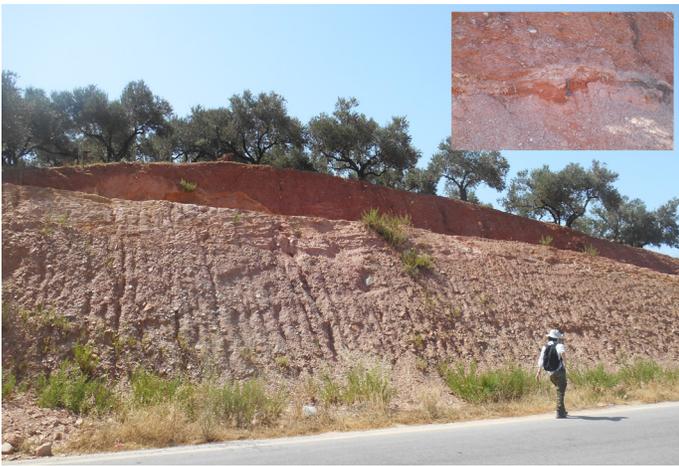


Figure 3. Alluvial deposit near Platanias, with inset showing details. Photo West Cretan Clay Project.



Figure 4. Gray marl deposit near Kandanos. Photo West Cretan Clay Project.

Antonopoulou (University of Patras, Department of Geology). We expanded the size of the sample area and previous methodology. We surveyed large areas with natural sedimentation with an emphasis in the wider regions of major archaeological sites from both the Minoan and post-Minoan periods. At the end of July 2021 and during the warmest days of the summer, our team travelled across the northern and northwestern parts of West Crete (from Stylos to Phalasarna) and to the region's southern limits (i.e., the outskirts of Lissos [Fig. 1] and the coast of Sphakia) in search of clayey deposits. We collected samples from modern quarries (Fig. 2), road cuts, and riverbeds, including red alluvial sediments (Fig. 3) and white marls (Fig. 4). All the samples will be split between the INSTAP SCEC and the Department of Geology of the University of Patras; the analytical methodology that will be applied involves not only thin-section petrography but also a series of geochemical and mineralogical techniques in order to: (a) investigate the nature and extent of raw materials (clays and tempering agents) available for pottery manufacture across the province of Chania; (b) assess potential regional geochemical and mineralogical variation within

materials of similar nature (e.g., red clays); and (c) create a “compositional map” for these materials that will be available for comparative purposes to researchers doing archaeometric analyses on ancient pottery.

We all enjoyed the work in the field, and the highlight of the expedition was an opportunity to save a small goat that was trapped in a fence (Fig. 5). On such trips one also can never



Figure 5. Rescue operation. Photo West Cretan Clay Project.

underestimate the benefits of good company and great food (Fig. 6). We are all looking forward to the results of our fieldwork, hopefully to be presented in a future issue of *KENTRO*.

### Acknowledgments

This project was made possible thanks to the vision and generosity of Dr. Jennifer Moody, who is also the principal investigator. The Ephoreia of Antiquities of Chania and the Institute of Geological and Mineral Explorations (EAGME) provided the necessary permits for the fieldwork.

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Figure 6. The West Cretan team at dinner (from left): Jennifer Moody, Eleni Nodarou, Vaia Xanthopoulou, Ioannis Iliopoulos, Marilia Antonopoulou (note empty plates). Photo W. Dossett.

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### Librarian Reunion

We recently had the pleasure of visits from several former library fellows of INSTAP SCEC. Pictured left to right are Gabriella Lazoura, Eleftheria Daleziou, Stavroula Flouri, Eleftheria Almasidou, and Melissa Eaby gathered on the patio outside the library. For more details about recent library fellows, see page 25. Visit our website for more information about our extensive library collection: <https://instapstudycenter.net/library-and-archives/>. Photo E. Huffman.

## FROM THE REGISTRAR'S DESK: A REPORT FROM THE MOCHLOS APOTHEKE AT INSTAP SCEC

*Angela M. Ratigan and Brianna Jenkins*

This summer, the Mochlos Archaeological Project, under the co-direction of Costis Davaras and Jeffrey Soles, excavated the island in three zones: (1) on the summit where Natalia Vogeikoff-Brogan explored a Hellenistic tower and circuit wall; (2) beyond the western limit of the Late Minoan settlement where Georgios Doudalis uncovered a Middle Minoan building; and (3) to the east where Mitch Cadden led the effort to unearth more of the Late Minoan settlement. In the field they were doing the hard and rewarding work of excavation, while at the INSTAP SCEC the *apotheke* team works with the staff of the Study Center to ensure that the finds are registered, conserved, and stored for analysis, study, and publication (Figs. 1, 2). In an archaeological context, the Greek word *apotheke* means the work space of an excavation project used to store, process, and study the finds.

Most work this year in the Mochlos *apotheke* involved intake, cataloging, liaising with specialists, and storing finds within the Study Center. This year a top priority was to ensure that front-end intake practices align with long-term publication goals. For the Mochlos *apotheke* team, that meant designing a system to record new excavation finds on a flexible, cloud-based Google Sheet that is lovingly called the Tracker and using formulas to aggregate finds information both for excavators and by category, the latter of which in future study seasons will ensure specialists have

an easier time organizing their work for study and publication (Fig. 3). COVID-19 restrictions related to movement and capacity, including in cars, emphasized the importance of restricted but remote access to registration information for trench supervisors. Thanks to the Tracker, excavators in the field had real-time remote access to registration and processing information, and they used that data—from catalog numbers to weights and numbers of sherds—to complete their notebooks and write trench reports. Communication between the *apotheke* and excavators and study specialists is critical on the path to publication, and the more flexible, streamlined, and automated the data is generated, the more efficient and error-free the process becomes. The *apotheke* team included three senior staff members—Angela Ratigan, Luke Kaiser, and Brianna Jenkins—and Lauren Tang, our rookie of the year. Each staff member had different work streams and responsibilities, but all collaborated on two Mochlos projects simultaneously: processing and publishing. This excavation season, Brianna handled the processing of new pottery from intake to analysis, and she collaborated with INSTAP SCEC conservator Matina Tzari to ensure pottery went through a brief acid bath to loosen any stubborn dirt before washing. As of August 13, 2021, Brianna had registered and handled 2,097 kilos of ceramic material in eight weeks.



Figure 1. Luke Kaiser and Brianna Jenkins making space for new finds by organizing previously published pottery in one of the Study Center's storage containers. Photo A. Ratigan.



Figure 2. The Mochlos crew receiving soil samples from the field. Photo A. Ratigan.

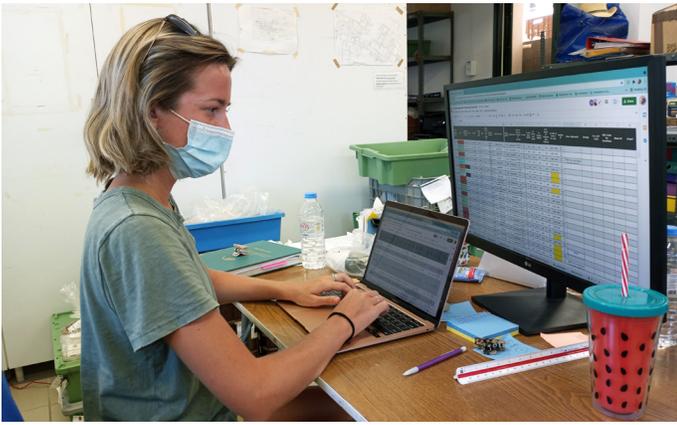


Figure 3. Registrar Angela Ratigan updating the excavation processing tracker in the Mochlos office at the INSTAP SCEC. Photo B. Jenkins.



Figure 4. Left to right: Luke Kaiser, Brianna Jenkins, and Lauren Tang sort and examine pottery in the Mochlos apotheke at the INSTAP SCEC. Photo A. Ratigan.

Once the pottery was washed carefully, it was sent back to the apotheke where Brianna again updated the Tracker and informed trench supervisors that ceramic deposits were available for analysis. She interacted directly with trench supervisors so that they could visit the apotheke on particular days to perform preliminary studies of their ceramics, get an idea about the dates of stratigraphic levels, and build a narrative concerning their trenches (Fig. 4). Once the pottery was cleaned and given that important first glance, it was inventoried by crate and stored in the basement of the Study Center until further evaluation.

In addition to processing excavation finds, staff finalized aspects of the manuscript for the fifth installment of the Mochlos publication series (Fig. 5). Luke checked the statistics for *Mochlos* volume VA, and he and Brianna checked locus numbers, deposit descriptions, weights, percentages, and characterizations of pottery from earlier excavation campaigns. They, along with Georgios Doudalis, have spent the last few years statistically analyzing the pottery from Blocks A and B, and this summer they double-checked their work.

Balancing these priorities and fulfilling our mission to publish the results of the excavation makes it very exciting to work in the Mochlos apotheke. We accomplished a great deal of work on both of the fronts of excavation and publication this summer, and we look forward to a second excavation season in this campaign next summer.

*Angela Ratigan is the registrar for the Mochlos Archaeological Project. She is a doctoral candidate at Ruprecht Karl University of Heidelberg writing a dissertation on the uses of three-dimensional digital reconstructions toward understanding design principles and*



Figure 5. Luke Kaiser (left) and Brianna Jenkins (right) hard at work in the Mochlos office at the INSTAP SCEC. Photo A. Ratigan.

*the built environment in LM IB Mochlos. Brianna Jenkins is a senior staff member on the Mochlos project. She received her master's degree from the University of Exeter where her thesis explored her experimental approach to Minoan kilns and scored basins. Luke Kaiser is a research associate and pottery specialist for the Mochlos project. He is a doctoral candidate at the University of Arizona writing a dissertation on Early Minoan ceramic deposits at Mochlos. Lauren Tang is a first-year volunteer for the project. She is pursuing an undergraduate degree in Exercise Science and Classics at California State University, Long Beach.*



## UPDATE ON STUDY CENTER OPERATIONS DURING THE COVID-19 PANDEMIC

*Eleanor Huffman*

I am pleased to report on our first full year of operations during the COVID-19 pandemic. As Fall 2020 began, we continued to wear masks, use antiseptic gel, physically distance, and avoid the use of air conditioners. In November, restrictions returned, and many businesses and organizations, including our operation, officially closed. Movement outside one's home was restricted to just a few necessary destinations. The effect was not the same as that of the first lockdown, however. There was quite a bit of traffic on the roads, and even though many stores were closed, people seemed to go about their usual business as much as possible. We operated with a few people in the building; others worked from home. Several employees were again on a federal program to preserve jobs. As COVID-19 tests became more widely available, we instituted a twice weekly self-testing regime while waiting patiently to be vaccinated. Tavernas reopened in early May 2021 in preparation for the country to welcome tourists, but there was little information about a possible reopening date for the Study Center. Nevertheless, in May and June we began bringing a few employees back, always operating under strict safety measures and testing regularly. Some members of INSTAP SCEC, vaccinated and with negative tests in hand, were able to travel to Greece in May. By June, operations were as normal as could be under the circumstances. In July, fully vaccinated staff members were exempt from the self-testing rule, though we still required a test of anyone arriving at the Study Center or returning from a trip. This is still our policy as I write this article. Belatedly, we received word in mid-July that we had officially been reopened on July 1st.

Over 60 members were able to successfully use the Study Center from May through September 2021 (Figs. 1, 2). We were happy to host the Mochlos project, which successfully conducted their first excavation season in nine years. Their season is being followed by site conservation on Mochlos island. Natalia Poulou returned with a small team working at the site of Mochlos-Loutres.



Figure 1. Leslie and Joe Day use the library, Sept. 2021. Photo E. Huffman.



Figure 2. Yiannis Papadatos (right) and students Artemis Chalastara (left) and Spyros Stylios (center) study material outside in the stoa, September 2021. Photo E. Huffman.

Many Gournia project members studied artifacts in the building and stoa. Members of the Azoria project carried out a short study season and continued their site conservation project. We hope to welcome even more members in 2022!



Congratulations to Dr. Jerolyn Morrison on her new position at Baylor University as Lecturer of Art History with a focus on Minoan Art and Archaeology. Jerolyn is a senior member of the Mochlos project as well as

### Congratulations

the founder and creative force behind her company Minoan Tastes, which holds events in the United States and Europe. We wish you all the best, Jerolyn! Photo J. Morrison.

# ANIMALS AND PEOPLE ON THE ISLAND OF GAVDOS IN THE EARLY PART OF THE LATE BRONZE AGE

Dimitra Mylona and Katerina Kopaka

Gavdos, the largest, most distant, and only inhabited satellite island of Crete, is situated off the Sfakiote shores in the Libyan Sea (Fig. 1). Despite its small size (30 km<sup>2</sup>), this remarkable insular place has a maximum altitude of 362 meters above sea level and hosts a variety of natural and human-made landscapes: protected coves, extensive cedar (*Juniperus phoenicia* and *Juniperus oxycedrus* ssp. *macrocarpa*) and pine habitats, dense gorges and their streambeds, and fertile slopes; but also very limited contemporary water supplies, arid zones, and many sand dunes.

Ancient rock-cut wine and oil presses, abundant cultivated terraces, threshing floors, and numerous grinding tools are some of the material remains of long-lasting mixed agropastoral exploitation on Gavdos (Kopaka 2002). In the last centuries, this exploitation was undertaken by islanders living in family farmsteads, or *metochia*, which dot the landscape and still can be spotted, abandoned and ruined, all over the island. With only 50–60 permanent inhabitants, Gavdos today forms, together with its satellite islet Gavdopoula, one of the smallest municipalities in Greece—but many and often very loyal seasonal visitors choose to live there for shorter or longer periods of time.

## Multi- and Interdisciplinary Archaeological Work

Participants of the Gavdos Project, organized and coordinated since the early 1990s by the University of Crete, aim to approach

archaeological, environmental, social, and overall cultural aspects of life on the island in a comprehensive way, and, eventually, to focus on some of the ways in which these aspects were and are interacting with each other (Kopaka 2015a, 2015b; University of Crete 2019). In line with the project's academic spirit, students of all levels are trained in interdisciplinarity and a number of related analytical and theoretical methods and techniques, starting in the field. Combined knowledge comes from different specialists, mainly anthropologists, biologists, geologists, and other environmental scientists, who initiate students in the challenges of uncovering and interpreting aspects of the relevant archaeological record in a holistic way (Figs. 2, 3).

Research on Gavdos during the last ca. 30 years has revealed a particularly interesting microcosm, a sea-bound “living museum of nature and culture” (Kopaka 2015b, 38), with its own identity yet also well embedded in its Cretan, Aegean, and wider Mediterranean contexts. The systematic survey conducted by the University of Crete and the Ephorate of Antiquities of Chania (1992–2000; see Kopaka 2001) has shown the persistent historical trajectory of the island, which begins with abundant early Palaeolithic chipped stone tools (Kopaka and Matzanas 2009, 2011). Intensive habitation is attested by pottery and other finds from the Middle Neolithic period to the Late Bronze Age (LBA) and, later, in Greek, Roman, and Early Byzantine times.

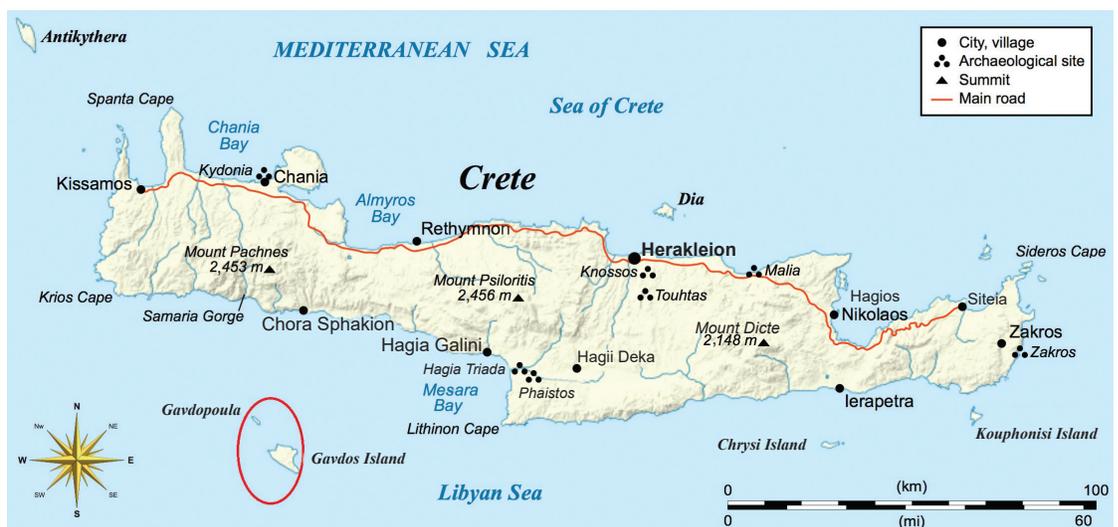


Figure 1. Map of Crete with the islands of Gavdos and Gavdopoula in the red circle. Image Eric Gaba (CC BY-SA 4.0; [https://commons.wikimedia.org/wiki/File:Crete\\_integrated\\_map-en.svg#file](https://commons.wikimedia.org/wiki/File:Crete_integrated_map-en.svg#file)).



Figure 2. Lecture on traditional pottery making and local sources of clay by the potter Gelly Kallinikou (left) at Ampelos on August 27, 2021. Photo D. Mylona.



Figure 3. The 2021 excavation team makes the most of the shade of a lone pine at lunch break. Photo K. Kopaka.

The ongoing excavation since 2003 focuses on the island's Prehistoric past, and especially on a rather large Bronze Age architectural complex at the site of Katalymata on the Tsirmiris hill (Fig. 4; Kopaka 2015a, 2015b). This building was constructed in the Middle Bronze Age on an inland location that was occupied already in the Neolithic period and the Early Bronze Age. Most of the uncovered remains belong to LBA I, at the end of which (i.e., the end of LM IB in Crete) the building was destroyed, apparently by an earthquake, and was partly burned and abandoned. Its many rooms and other spaces had been housing ample storage and industrial activities, including grinding and pounding, cooking, and most probably pottery production and metalworking.

Late Bronze Age ceramics from Katalymata are, as a rule, locally made in a variety of shapes and have idiosyncratic construction and decorative modes (Fig. 5; see Kopaka and Theou 2020), which share features with Crete but also with the Cyclades and, perhaps, more distant places. Among other finds are stone vases of various types, plenty of beads, a few seals, and bronze items, including a hoard of five tools and two pieces of copper (K. Kopaka, pers obv.; Kopaka 2015a, 2015b). Organic remains such as carbonized grape seeds, wood charcoal, mammal and fish bones, and marine shells left from culinary and other uses further suggest that a lively community stayed and worked here, enjoying, rather unexpectedly for this small and remote island, high standards of living.



Figure 4. The Bronze Age building at Katalymata in August 2015. Photogrammetry P. Charamis.

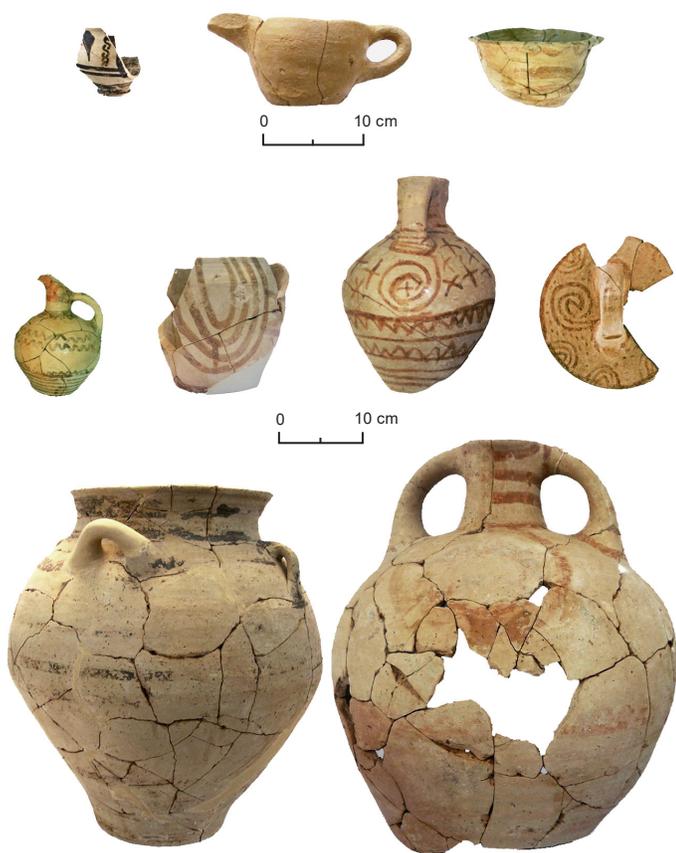


Figure 5. Pottery of the last phase of the building. After Kopaka and Theou 2020, fig. 1.

The study of the terrestrial and marine animal remains from Katalymata is in progress. The discussion here is based on the analysis of a large fraction of data considered to be representative.

### Animals of the Land

At present, mammal bones are not abundant at Katalymata, and the majority are quite eroded. Proportions in the studied assemblage suggest that animal husbandry agrees with the Cretan norm of the time in its basic features (Table 1; Fig. 6): sheep and goats were at the core of the economy, pigs were bred and eaten regularly, and wild resources were tapped, but cattle do not seem to have been raised or eaten to any significant degree.

Sheep were more common than goats at Katalymata where some ovicaprids were of quite small stature, an issue that will be explored further in the future. Their bones suggest the presence of gracile animals, quite unlike the dominant types both on Gavdos and in Crete. These bones probably indicate the existence of a different breed that is also detected elsewhere, if in small numbers, including on another small island of Crete, Chryssi (D. Mylona, pers. obv.).

Today, considerable numbers of goats and fewer sheep are integral elements of the local landscape (Fig. 7). The current emphasis on the breeding of goats could be explained by the

Taxon	Number of Remains
Pig	56
Ovicaprid	162
Sheep	27
Goat	20
Dog	1
Medium-sized mammals	13
Mammal non-identifiable	422
Birds	2
Fish	18
Fossil fish	8
Crabs	8
Seashells	936
Fossil shells	44
Land snails	Hundreds

Table 1. Taxonomic representation of animals, 2005–2018 seasons at Gavdos Katalymata. The figures for seashells represent the minimum number of individuals (MNI). The rest are numbers of specimens. The bones of smaller taxa and fossil shells reported in this table represent only a sample of the existing remains.

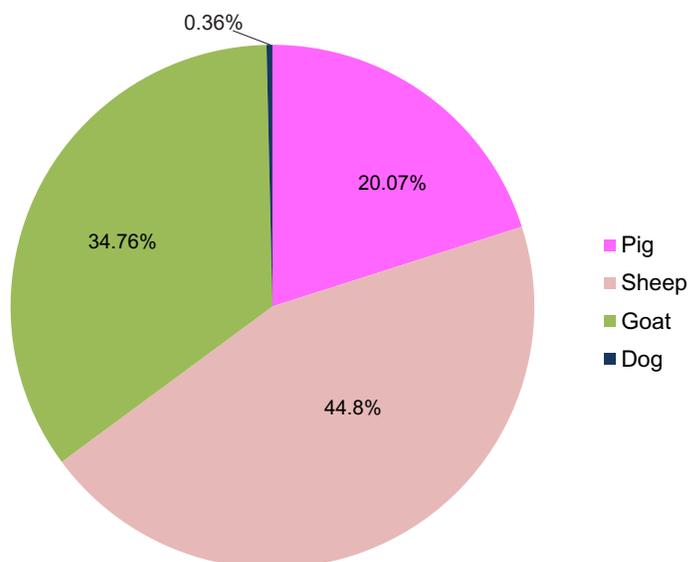


Figure 6. Representation of mammalian taxa based on number of identifiable specimens.

steady reputation, and higher price of their meat in Cretan markets, as they are considered especially tasty (Kopaka 2005, 94 n. 20). The Gavdiots' economic priorities regarding the breeding of ovicaprids in the LBA remain, at the moment, uncertain; an investment in wool production and weaving, as was the case in contemporary Crete (see, e.g., Godart 1980; Schoep 2002; Karnava 2017), seems probable—and the numerous loomweights and spindle whorls collected during the survey definitely support this hypothesis (Lazar and Kopaka 2020).



Figure 7. Small herd of goats at Ambelos on August 27, 2021. Photo D. Mylona.

The absence of cattle bones is intriguing, but a similar lack is observed at the contemporary sites of Chryssi (D. Mylona, pers. obs.) and Mochlos (Mylona, forthcoming) in East Crete. Breeding of cows and oxen is demanding on resources and, consequently, it is difficult to do in confined territories like Gavdos. In recent times, nevertheless, some pairs of cattle were kept and used as work animals on the island (Nikolakakis 1993–2021). A similar arrangement could have been true in the 2nd millennium B.C., although related evidence is lacking so far (for the use of cattle as work animals on Bronze Age Crete, see Isaakidou 2006).

The single dog bone found so far in the material shows that this animal was also present. Remains of birds suggest that hunting was part of a diversified food procurement strategy. Abundant land snail shells belong to small inedible varieties and are apparently intrusive, having found refuge in the ruined building at any point during the process of its decay. Prehistoric snail gathering, however, is tentatively implied by a burned *Helix* shell found in the building.

Animal remains at Katalymata are mostly food waste in primary or secondary deposition contexts. They represent edible species and often bear the marks of processing before consumption (e.g., cut marks on bones, certain types of crushing of shells). In certain cases, other processes are also represented. For example, the complete skeletons of two young sheep, only a few months old, were found close to each other, both in a fetal position, along the western wall of Room 7 (Fig. 8). Had these animals met an accidental death, or were they deliberately deposited there? The results of the micro-excavation of the articulated skeletons, which are still packaged in plaster for protection, in addition to the study of the room's stratigraphy and contexts will shed light on this issue.

### Animals of the Sea

Despite the distance of the site from the coast, marine mollusks are abundant and fish bones are common. The sea provided food in the form of inshore fish and mollusks, such as picarel, small



Figure 8. One of the two immature sheep skeletons from Room 7. Photo D. Mylona.

sea breams, larger groupers, moray/conger eels, and also limpets and top shells along with a few crabs. These animals comprise the typical Cretan Bronze Age combination of species fished in the shallows gathered from the rocks on the wave line, and they also make up the core of the Gavdiot marine meals (Table 2). Individuals of other edible species that have been found in very small numbers at Katalymata were caught or gathered from the same habitat. Shells of the two dominant kinds, limpets and top shells, vary considerably in size from very small, immature examples to large, fully developed specimens, a fact that suggests an opportunistic collection with no planned selectivity. Bivalve shells that live in sandy or muddy substrates (*Cerastoderma* sp. and *Mactra* sp.) show that such coastal environments were also exploited, if not systematically.

Not all mollusks from Katalymata were consumed as food. Smaller inedible varieties, such as *Columbella rustica*, *Hinia* sp., and *Pisania* sp., could have been brought accidentally to the site, for example, together with beach sand and/or seaweed to be used in architectural or other applications (for such examples from Malia, see Devolder and Lorenzon 2019, esp. 95 n. 50, table 2). Some others, like the glossy *Luria lurida* and the *Cymatium gibbosum* with a remarkable shell, could have been collected for their aesthetic value. A triton shell (*Charonia* sp.) and a tun shell (*Tonna galea*; Fig. 9), both being among the largest Mediterranean gastropods, were probably part of the locals' everyday and/or ritual equipment (for various uses of triton shells in the Aegean Bronze age and related bibliography, see Mylona 2020).

Purple shells (*Hexaplex trunculus*), both whole and fragmented, are apparently food remains. They have been found scattered throughout the building along with other marine shells and animal bones. Non-culinary uses of this mollusk on LBA Gavdos, however, are well represented by a considerable quantity of some

Taxon	MNI	Edibility
<b>Bivalves</b>		
<i>Barbatia barbata</i>	1	Edible
<i>Cerastoderma edule</i>	3	Edible
<i>Mactra</i> sp.	5	Edible
<b>Gastropods</b>		
<i>Bittium</i> sp.	1	Nonedible
<i>Bolinus brandaris</i>	5	Edible
<i>Cerithium vulgatum</i>	1	Edible
<i>Charonia</i> sp.	1 whole, 10 fragments	Edible
<i>Columbella rustica</i>	3	Nonedible
<i>Conus mediterraneus</i>	1	Nonedible
<i>Cymatium gibbosum</i>	2 whole	Nonedible
<i>Euthria cornea</i>	6	Edible
<i>Gibbula</i> sp.	12	Edible
<i>Hexaplex trunculus</i> whole	54	Edible
<i>Hexaplex trunculus</i> fragmented	181	Edible
<i>Hinia incrassata</i>	2	Nonedible
<i>Luria lurida</i>	5	Edible
<i>Patella</i> sp.	417	Edible
<i>Pisania</i> sp.	10	Nonedible
<i>Phorcus</i> sp.	212	Edible
<i>Tarantinea lignaria</i>	1	Edible
<i>Tonna galea</i>	2	Edible
<b>Other</b>		
Crabs	8	Edible
Fossil Coral	1	—
Fossil shells	44	—
<b>Total</b>	<b>988</b>	

Table 2. Marine invertebrates, 2005–2018 seasons, Gavdos Katalymata. All figures represent minimum numbers of individuals (MNI), except for *Charonia* sp. and *Tonna galea*, for which numbers refer both to whole specimens and fragments.



Figure 9. A large *Tonna galea* shell from Room 1. Photo D. Mylona.



Figure 10. A portion of the purple shells found packed in Room 1 (set on a quern stone in Room 7). Photo D. Mylona.

hundreds of purple shells tightly packed along the eastern wall of Room 1. This group was partly excavated in 2009, and the rest was recently uncovered (Kyriaki 2009; Mylona 2021a)—here only the former are taken into account.

The concentration of purple shells is made of whole, small, and even tiny shells intermixed with some crushed ones that seem to be larger in size (Fig. 10). It is homogenous, with only the addition of a few inedible *Euthria cornea* shells. Given the taxonomic profile of this group, the compactness of the deposition, the size range, and the type of observed fragmentation of the individual shells, it is assumed that they constitute a cache of raw materials brought on site from a purple dye workshop elsewhere on the island, for some as yet unknown application. Empty and often crushed purple shells—leftovers of the process of dye

production—were themselves a valuable resource in the LBA, and they were used often as temper in clay floors and walls or as raw material for the production of lime all over the eastern Mediterranean (for criteria for the identification of shells as waste of purple production and their various uses in architecture, see Alberti 2008; see also Mylona 2021b with references). This find places Gavdos among the known purple dye production locations of the time (for such places in Neopalatial Crete, see Mylona 2020).

A peculiar group of fossilized fish remains should be mentioned here: notably, six shark teeth of the Neogene species *Cosmopolitodus* cf. *hastalis* and two molariform teeth of some contemporary Sparidae, which have been identified by the paleontologist Thodoris Argyriou (pers. comm.). They must have been collected by the Katalymata inhabitants from local Upper Miocene–Pliocene

deposits and then kept in a perishable container, and thus found together on a LBA I floor in Room 9. Interestingly, modern Gavdiots also ardently seek such fossils, which are called *liokourna* (*liokourna*: sun or snake horns!) and traditionally are empowered with important healing properties. This archaeological discovery and its probable ethnographic analogy have started a novel and fascinating discussion on long-lasting comparable folk medical practices and related curative fossils or heirlooms in Cretan, wider Greek, and other Mediterranean cultures (Kopaka 2021).

## Epilogue

In this short report, an outline of the ongoing zooarchaeological study of the finds at Katalymata is presented. Several lines of enquiry need to be pursued further. Issues of taphonomy, herd management, and the organization of fishing, as well as the processing of animals and their by-products, the attitudes toward them, and the specifics of eating practices represent parts of the dense web of relations between humans and the animal world on Gavdos in the early LBA. Such associations can be understood better within the context of the insular identity of the place, and more so in its particular condition of being an island's isle (Kopaka and Kosyva 1999).

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## WOODY RESOURCES, FUEL, AND WOOD USE IN THE LATE MINOAN I SETTLEMENTS AT MOCHLOS, PAPADIOKAMBOS, AND CHRYSSE

*Maria Ntinou*

Over the course of the last 18 years, the INSTAP Study Center for East Crete (SCEC) has supported and hosted my research on prehistoric vegetation and the management of woodland resources of Crete through the study of carbonized wood macro-remains recovered from archaeological deposits. My research is not an isolated case; it is the outcome of the focus of archaeological projects collaborating with the INSTAP SCEC on the study of bioarchaeological remains and ecofacts and on the important information that their analyses can provide on economic and social aspects of past societies. The Study Center is a hub that facilitates research at all stages. In my field, it is the place where vast amounts of sediment samples from different excavations are effectively processed, ensuring the recovery and study of all categories of bioarchaeological remains. Researchers find a well-organized, well-equipped, and hospitable place to carry out their work where ideas are exchanged and people interact. It is a place located in a unique setting that, at least for me, literally has opened a gate to the variable environmental settings of past and present East Crete by means of visits to different places and the study of different archaeological sites.

In the following notes I will concentrate on some preliminary reflections from the study of carbonized wood macro-remains

from Late Minoan (LM) I deposits at Mochlos, Papadiokambos, and Chryssi. The results from the Neopalatial settlement at Mochlos will be presented in detail in the forthcoming *Mochlos IVA* volume, while the studies of Papadiokambos and Chryssi are in progress. At all three sites, in addition to systematic hand collection of ecofacts, there was a systematic program of flotation of sediment samples, thus providing abundant and comparable wood charcoal assemblages for study (Brogan et al. 2013; Mylona 2016). The remains were recovered from floors and fills in buildings at all three sites and also from open spaces of the LM I settlement at Mochlos. According to the archaeological information, although the three settlements were destroyed during the LM IB period, there is little evidence for destruction by fire inside the buildings. In the majority of cases, ash deposits and wood charcoal remains appear to be related to fire installations for food processing, cooking, and/or crafts (Apostolakou et al. 2016; Brogan, Sofianou, and Morrison 2011; Brogan et al. 2013).

What, then, do charred wood remains represent? Wood use in the studied LM I settlements would be associated primarily with the procurement of fuel to feed domestic and craft thermal structures operating on a regular basis in more than one room of the studied buildings. Nevertheless, the use of timber also would have

been an important feature in domestic Minoan architecture, as evidenced by the existence of upper stories, columns, and staircases in the LM I settlements. As already mentioned, no extended destruction layers by fire have been recognized in any of the studied settlements. Sporadic finds such as burned mudbrick, wood charcoal concentrations close to column bases, and mentions of carbonized beams, however, might point to small-scale destruction by fire not necessarily associated with the time of the primary disaster.

The Neopalatial settlement at Mochlos produced a large number of wood charcoal remains from different houses and from some open areas (Table 1; Fig. 1). The results are presented for each of the buildings: those in the southern and southwestern part of Block C are listed first followed by those located in the northern part of the area. Carbonized wood remains of olive, almond, kermes/holm oak, deciduous oak, and pine have been identified in all houses alongside smaller woody plants such as heath, Labiatae, Fabaceae, lentisk, and so forth. Olive and almond carbonized wood remains outnumber all other taxa, and it seems that these trees were a basic firewood source in every household. Other woody plants are rarer, such as strawberry tree, maple, wild pear, cypress, tamarisk, poplar, and plane tree, but their presence adds to the diversity of the environments providing wood to the LM I settlement.

The carbonized wood assemblages from Houses A and B at the Late Minoan I settlement at Papadiokambos (Table 1; Fig. 1) are characterized by the predominance of olive remains. Burned remains of other woody plants deposited in the sediments are few and include almond, kermes/holm oak, lentisk, and pine. Isolated finds of strawberry tree, heath, and grape vine have also been identified, and there is a single deciduous oak find in House A. In both houses, there is plenty of evidence in different rooms for food processing, cooking, and food consumption in the form of animal and plant food remains, hearths and ovens, and variable types of cooking and serving pottery (Brogan et al. 2013). Moreover, in House B there is evidence for other activities requiring the use of fire such as metalworking (Sofianou and Brogan 2016). In such a context, the charred wood remains represent the residue of the firewood used in fire installations. No evidence for large-scale destruction by fire has been identified in these houses, and therefore no straightforward information about the use of wood in construction can be discussed. The presence of burned, concentrated remains of deciduous oak wood in one of the larger rooms of House A potentially could be associated with the burning (during destruction?) of the wooden frame of a second story or of a wooden column of which only the stone base is preserved.

At Chryssi, carbonized wood remains from Houses A1, A2, and B1 have been studied. The assemblages are characterized by an abundance of Cretan pine remains (Table 1; Fig. 1). Olive is quite frequent, but all other finds are rare, namely almond, lentisk, heath, and kermes/holm oak. Some of the pine wood remains are quite sizeable and preserve smoothed or worked surfaces at right

angles. Given that no fire layer has been identified in any of the houses, however, it is difficult to associate the carbonized wood remains to fire destruction of the structural woods, roof timbers, or other wooden elements. On the contrary, evidence for hearths and fuel discard in relation to workshops is abundant. Apart from pine and olive wood, another fuel source at Chryssi was the remains of olive and almond processing, found in the form of fragmented endocarps and nutshells (Apostolakou et al. 2016).

The results of the study of wood charcoal remains from LM I Mochlos and Papadiokambos indicate that olive wood was the main fuel source, supplemented by almond in the case of the former (Fig. 1). These findings are in agreement with the importance of tree crops, especially olive, in the economy of Neopalatial Crete. Trees would have been cultivated in orchards and groves, and pruning probably was part of agricultural labor, at the same time producing firewood for domestic and other purposes. The predominance of burned olive wood remains at LM I Papadiokambos compared to Mochlos, where more diverse firewood resources are exhibited, is worth discussing. One possible reason that accounts for the difference might be the character of the two settlements. At Papadiokambos, the widely spaced buildings were surrounded by orchards, gardens, and fields (Sofianou and Brogan 2016). Such an unusual settlement plan, very different from the densely built LM I Mochlos, might be related to a focus on agricultural production, especially olive cultivation, and distribution. Household firewood provisions would have come directly from the management of the cultivated trees and only occasionally would have been supplemented by other sources. Densely built LM I Mochlos, on the other hand, was a port and a center for crafts, trade, and exchange (Soles 2005), and it might have depended on its broader coastal and hinterland network for the supply of fuel among other goods. In this sense, it is interesting that the woody plants identified at LM I Mochlos are much more diverse compared to those at Papadiokambos. Present in the assemblages are oak, pine, cypress, and plane tree, all of which would not have originated strictly from the cultivated fields and coastal areas. Moreover, the identification of black pine testifies to the rare presence of wood brought from afar.

In order to evaluate the differences seen in the assemblages of the two sites, another factor worth considering is taphonomy. Late Minoan I Mochlos was a densely built settlement, witnessing rebuilding, expansion, and restructuring of built and open spaces. These recurrent activities would have created fills that incorporated the materials and ecofacts of many and varied uses over the long term. At LM I Papadiokambos, on the contrary, there are many indications that activities were interrupted at the moment of disaster, causing the assemblages to be preserved as a snapshot in time and revealing the types of fuels burned in the hearths and ovens (Brogan et al. 2013).

The abundance of pine in the houses at Chryssi distinguishes the LM I use of woody resources on the island from the two other

Taxa	Mochlos												Papadiokambos		Chryssi		
	C.1	C.2	C.3	C.4	C.5	C.6	C.8	B.4	C.10	C.12	D.7	Open Spaces	House A	House B	House A1	House A2	House B1
<i>Olea europaea</i>	***	****	***	**	***	***	***	***	***	**	***	****	****	****	***	**	**
<i>Prunus amygdalus</i>	**	**	**	*	*	**	**	**	**	**	**	**	*				*
<i>Quercus</i> sp. evergreen	**	**	**	***	**	*	**	**	**	**	**	**	*	*	*	*	*
<i>Pistacia</i> sp.	*	*	*		*	*		*	*		*	*	*	**			*
<i>Quercus</i> sp. deciduous	*	*	**	*	**	**	*	**	*	*	*	*	**				
<i>Pinus brutia/P. halepensis</i>	**	*	*	*	**	*		*	*	*	*	*	*		****	****	****
<i>Arbutus</i> sp.					*								*				
<i>Acer</i> sp.			*														
<i>Phillyrea/Rhamnus alaternus</i>	*	*	*				*	*	*	*	*						
Maloideae	*	*	*		*		*	*				*				*	
<i>Prunus spinosa</i>	*	*															
<i>Prunus</i> sp.	**	**	**	*	**	**	**	**	**	***	**	*					
<i>Erica</i> sp.		*	*			*						*	*	*			*
Fabaceae	*	*	*			*	*			*	**	*	*				
Labiatae		*	*						*								
Cistaceae												*					
Monocot (Palmaceae?)		*															
Chenopodiaceae		*										*					
<i>Tamarix</i> sp.			*														
<i>Platanus orientalis</i>	*											*					
<i>Populus</i> sp.								**									
<i>Cupressus sempervirens</i>	*		*					*				*					
<i>Juniperus</i> sp.	*		*										*				
<i>Pinus nigra</i>			*									*					
<i>Vitis vinifera</i>												*		*			
<b>Total fragments studied</b>	<b>373</b>	<b>884</b>	<b>1520</b>	<b>73</b>	<b>89</b>	<b>92</b>	<b>65</b>	<b>103</b>	<b>157</b>	<b>141</b>	<b>69</b>	<b>610</b>	<b>712</b>	<b>101</b>	<b>35</b>	<b>161</b>	<b>319</b>
<b>Total number of taxa</b>	<b>14</b>	<b>15</b>	<b>17</b>	<b>6</b>	<b>9</b>	<b>10</b>	<b>8</b>	<b>11</b>	<b>9</b>	<b>7</b>	<b>9</b>	<b>16</b>	<b>10</b>	<b>5</b>	<b>3</b>	<b>4</b>	<b>6</b>

Table 1. Qualitative and quantitative results of the analysis of carbonized wood assemblages from different houses at LM I Mochlos, Papadiokambos, and Chryssi. The data of relative frequencies of the taxa in each assemblage are based on percentage of fragment counts: \* >0% up to 5%, \*\* >5% up to 25%, \*\*\* >25% up to 50%, \*\*\*\* >50%.

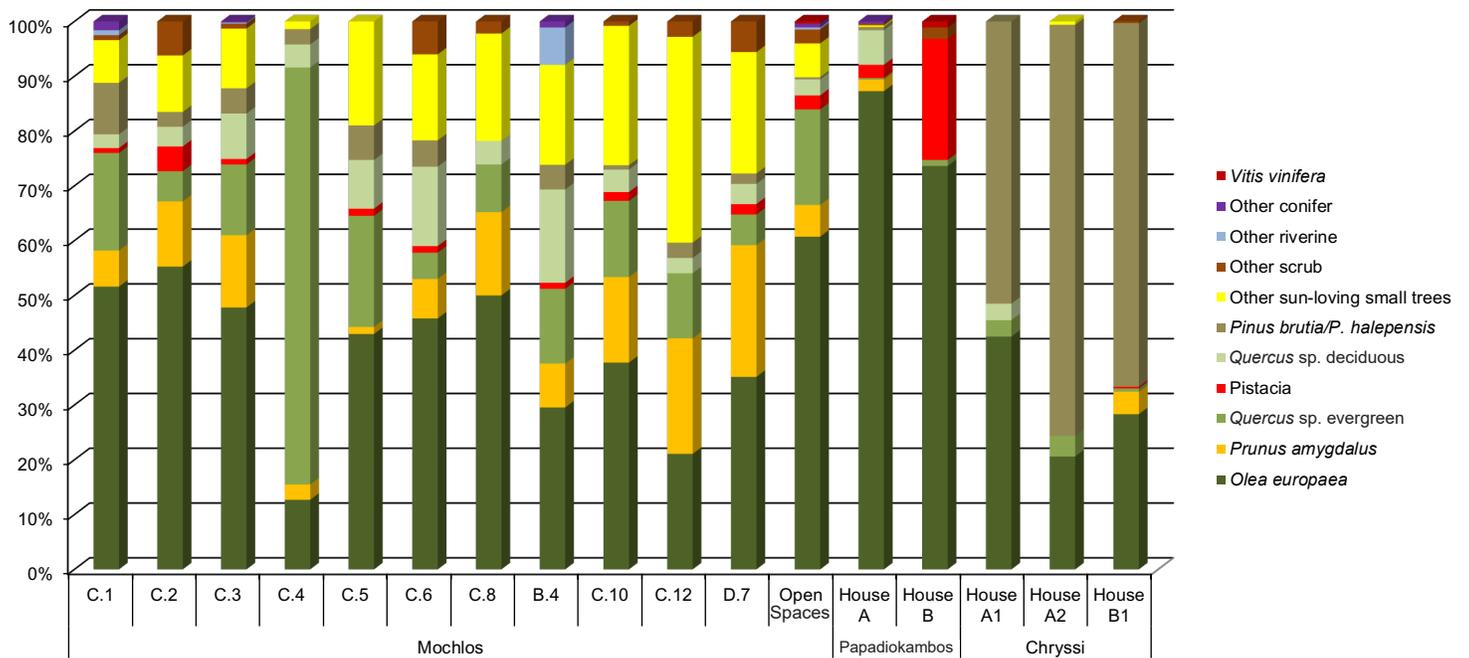


Figure 1. Comparison of relative frequency of taxa in each carbonized wood assemblage and across different houses at LM I Mochlos, Papadiokambos, and Chryssi. Note the diversity of taxa at Mochlos, the high percentage of olive (*Olea europaea*) at Mochlos and in particular at Papadiokambos, and the high percentage of pine (*Pinus brutia*/*P. halepensis*) at Chryssi.

LM I settlements located on the northern coast of Crete (Fig. 1). Similarly, the presence of pine contrasts with the present-day vegetation of the island, which is dominated by junipers. Of course, charred wood remains might not reflect directly the vegetation on the island, but they may reveal the provisioning from the opposite coast of Crete of timbers and/or different types of fuel destined to the specialized workshops on the island. The abundance of pine in the buildings at Chryssi could be an example of the exploitation of the woodland resources of the mountains around Ierapetra that still today support Cretan pine (*Pinus brutia*) woodland (Rackham and Moody 1996, 62–63).

But for what were these resources managed, and how did pine wood reach Chryssi? The easy explanation would be to attribute the presence of pine to timbers used for roofing. It is still uncertain, however, if fire destroyed the buildings. Could the pine remains, especially the worked pieces, represent carpentry waste? What woodworking tasks could be involved? Would it be reasonable to consider the management of the pine woodlands for timber use and exchange? Could shipbuilding and/or repair be the activity related to the abundant presence of pine wood at Chryssi? Or perhaps all such activities were taking place in the north, and pine carpentry waste, alongside tree crop processing waste, was brought to Chryssi for fuel? No definite answers can be given at the moment, but fortunately integrated studies of architecture, material cultural, and bioarchaeological materials are part of the research projects based at the INSTAP SCEC, and many possible interpretations can be discussed in the light of different disciplines.

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## SEEDS OF RITUAL: AN ARCHAEOBOTANICAL APPROACH TO INVESTIGATING RITUAL ACTIVITY IN BRONZE AGE CRETE

*Carly Henkel*

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The past decade has witnessed an ever-increasing emphasis on the role of archaeological sciences within the discipline of archaeology (e.g., Voutsaki and Valamoti, eds., 2013). Various subfields such as osteology, petrography, archaeometry, and archaeobotany have made significant contributions to archaeological investigations. Their application and integration within archaeological research not only have provided new lines of inquiry but also have produced new evidence critical to a more comprehensive understanding of key topics. The doctoral research briefly presented here fits within this current model of archaeological investigation: it employs archaeobotany as an alternative approach to the study of Minoan ritual activity—a topic that has received a substantial amount of scholarly attention (Renfrew 1981; Warren 1981; Gesell 1985; Marinatos 1993; Adams 2004; D’Agata and Hermary 2012), but very little scientific consideration to date.

The archaeobotany of ritual contexts in Crete, in general, has been neglected until recently (Livarda and Kotzamani 2013, 22). This neglect did not stem from a disinterest to study such contexts by archaeobotanists, but rather it resulted from a lack of sampling and a prior focus on questions concerning diet, subsistence, environment, and economy (Margaritis 2017, 226). As the subfield has adopted new analytical methods and theoretical frameworks, however, archaeobotanical investigations have

expanded beyond traditional lines of inquiry to include topics such as ritual and religion (Livarda and Madgwick 2018, 2).

The first systematic archaeobotanical work on ritual contexts in Crete was conducted by Evi Margaritis (2014) in a study that examined plant remains recovered from prehistoric mortuary sites on the island as well as in mainland Greece. Subsequent archaeobotanical analysis of the Prepalatial house tombs at Petras (Margaritis 2017) and the Late Geometric graves at Kavousi Vronda (Flint-Hamilton 2016) have since provided additional information about ritual plant remains from funerary contexts. Collectively, these publications have demonstrated the deliberate use of plants in mortuary practices in Crete from the 3rd to 1st millennia B.C.

The dissertation research presented here complements the aforementioned work by investigating the role of plants within the broader ritual landscape of Bronze Age Crete. To this end, samples from several different types of ritual sites across East and Central Crete have been selected for analysis (Fig. 1): an urban shrine at Knossos (Anetaki), a ritual building complex on Mt. Juktas (Alonaki), a peak sanctuary (Mt. Juktas), an open-air sanctuary (Kophinas), and a hilltop cemetery (Petras). These sites span the height of Minoan ritual activity during the Protopalatial to Final Palatial periods. Their functional diversity allows for a two-fold investigation of ritual activity during the Bronze Age. First, they provide a baseline from which to establish the general role—active

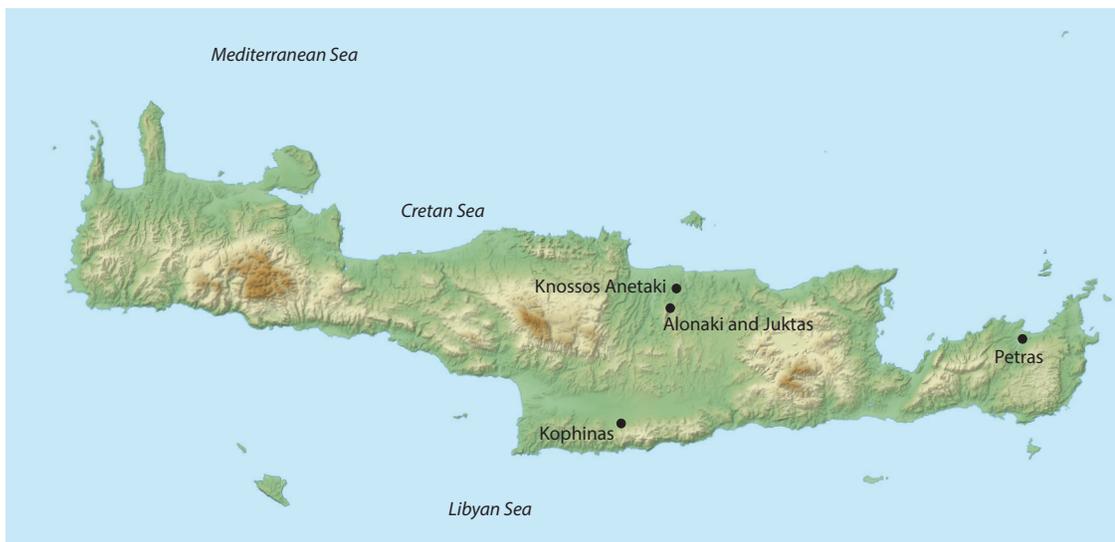


Figure 1. Map of Crete showing ritual sites involved in the doctoral research. Original map by Bibi Saint-Pol (CC BY-SA 3.0; [https://commons.wikimedia.org/wiki/File:Map\\_Minoan\\_Crete-es\(1\).svg](https://commons.wikimedia.org/wiki/File:Map_Minoan_Crete-es(1).svg)) enhanced by author.

or passive—which plants played within the ritual arena as a whole. For example, plants simply may have accompanied ritual events in the form of funerary, votive, or sacrificial offerings (passive), or they actually may have helped shape and define the events by acting as sensory agents, such as aromatics or hallucinogens, which would have enhanced the religious experience (active). Second, studying the individual practices that took place at each site enables the comparison of different types of ritual settings. Similarities and/or differences observed in the repertoire of seeds recovered from these contexts can help determine whether or not different kinds of ritual activities occurred at different types of ritual sites. The results of this research will not only provide a more nuanced understanding of Minoan rituals, but they also will demonstrate how this activity functioned within their culture, as well as the wider social dynamics of Bronze Age Crete.

## Materials and Methods

The research methodology involves an examination of macrobotanical remains from sediment samples collected at all of the above-mentioned sites, as well as microbotanical remains from subsamples of the sediment taken from two of the sites (Alonaki and Mt. Juktas). Macrobotanical remains refer to charred plant material, while microbotanical remains pertain to phytoliths, which are inorganic silica bodies that develop in the cellular and intercellular spaces of plants. Because the preservation of phytoliths does not rely on exposure to fire (unlike the macrobotanical remains), this analysis will expand the range of plant taxa that can be recovered from the different ritual settings. It also will facilitate a detailed examination of the taphonomic formation processes responsible for creating the plant assemblages at these sites—a factor that already has been recognized as crucial to developing meaningful interpretations about archaeobotanical evidence of ritual activity (Livarda and Madgwick 2018, 3). Along the same

line of inquiry, the research also will include analysis of samples from an experimental archaeology project undertaken in May 2014 under the direction of Gunnel Ekroth at the University of Uppsala. This experiment involved the burning of a reconstructed ritual pyre that contained various plant and animal food offerings and the subsequent collection of its charred remains. The analytical results of these samples will provide a better understanding of preservation nuances associated with carbonized macrobotanical material from ritual contexts.

All sediment samples, apart from the experimental ones, were processed by Matina Papadaki using mechanized water flotation machines at the INSTAP Study Center for East Crete (INSTAP SCEC). Analysis of macrobotanical remains, which is taking place both at INSTAP SCEC and the Science and Technology in Archaeology and Culture Research Center (STARC) at the Cyprus Institute, entails an examination of archaeobotanical samples under the microscope in order to extract, identify, and quantify the archaeobotanical material. Plant taxa identifications are made according to relevant seed atlases, floras, and identification keys (e.g. Martin and Barkley 1961; Tutin et al. 1993; Cappers, Neef and Bekker 2009; Neef, Cappers, and Bekker 2012; Sabato and Peña-Chocarro 2021), as well as by comparison with modern reference collections and, where needed, the application of more specialized identification approaches such as scanning electron microscopy (SEM). The initial analysis of microbotanical remains will take place as part of an Erasmus Student Mobility (traineeship) at the Milá y Fontanals Institution for Research in Humanities in Barcelona, Spain, where the author will receive formal training in phytolith analysis. Thereafter, any remaining analytical work on the phytolith samples will continue at STARC. The research also will include the use of appropriate statistical methods to facilitate inter-site comparisons and the integration of other archaeological evidence from the sites in order to synthesize and contextualize the archaeobotanical data.

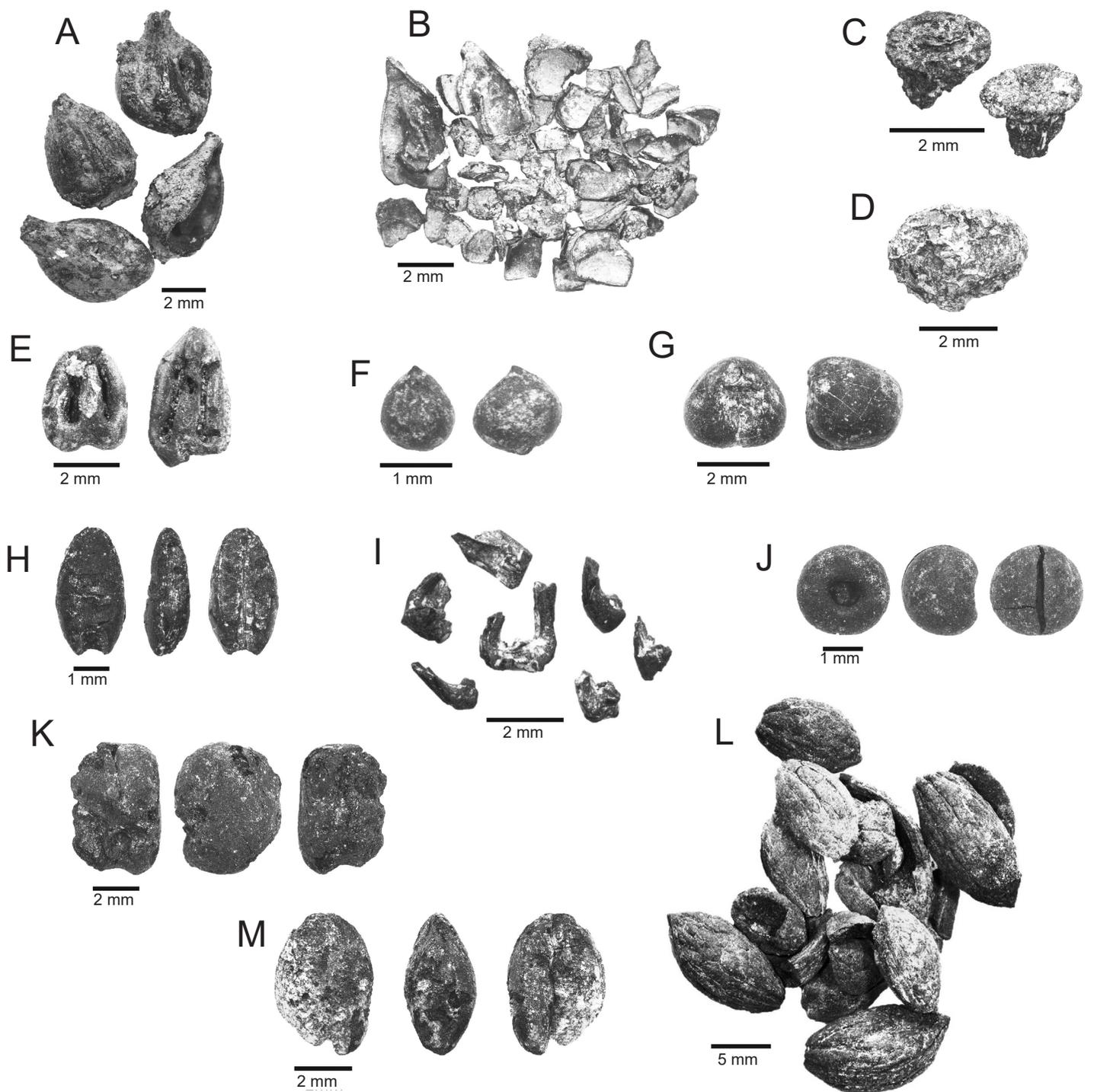


Figure 2. Some of the plant remains recovered from Kophinas (A–B), Alonaki (C–E), and Knossos Anetaki (F–M): (A) whole grape pips (*Vitis vinifera*); (B) fragments of grape pips; (C) grape stems; (D) lentisk drupe (*Pistacia lentiscus*); (E) grape endosperms; (F) fig seeds (*Ficus cf. carica*); (G) bitter vetch (*Vicia ervila*); (H) rye-grass (*Lolium sp.*); (I) glume wheat spikelet and glume bases; (J) bedstraw (*Galium sp.*); (K) broad bean (*Vicia faba var. minuta*); (L) whole and fragmented olive stones (*Olea europaea*); (M) hulled barley (*Hordeum vulgare*). Photos C. Henkel.

### Preliminary Results and Concluding Remarks

Research for the dissertation has reached the beginning of its second year. So far, work has focused primarily on the initial collection of macrobotanical data, and, to date, three of the six sites have

been completed in this respect (Alonaki, Anetaki, Kophinas). Archaeobotanical remains were recovered from all three sites (Fig. 2), and they suggest the ritual consumption of food at one (Alonaki), and the intentional burning of food offerings as part of ritual acts

at the other two (Anetaki and Kophinas). This data demonstrates that plants definitely played a role in the Bronze Age ritual activities of Crete. A more complete account of the results will appear in the near future as chapters in excavation volumes on Anetaki and Alonaki and as a journal article that has been submitted to *Religions* (Henkel and Margaritis, forthcoming).

On a final note, the author would like to stress that this research constitutes a fully funded dissertation project conducted as part of the Science and Technology in Archaeology and Cultural Heritage doctoral program at the Cyprus Institute, under the supervision of Evi Margaritis. It is the first doctoral thesis to be dedicated entirely to the analysis of archaeobotanical material from Crete. Furthermore, it moves beyond conventional studies that conceptualize plants as mere calorific necessities by recognizing their more dynamic nature and importance as social tools, such as mnemonic devices and sensory stimuli—a role that plants not only played in the past but continue to play today. As such, the results will reinforce the value of integrating archaeological sciences with traditional archaeological research methods by shedding new light on an old topic, and it also indirectly will link the past to the present.

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First and foremost, I would like to express my deep gratitude to my doctoral supervisor, Dr. Evi Margaritis, for the support, encouragement, and guidance she always so readily supplies. I also would like to thank Dr. Alexandra Karetso (director of the Juktas, Alonaki, and Kophinas excavations), Dr. Athanasia Kanta (director of the Knossos Anetaki excavations), and Dr. Metaxia Tsiopoulou (director of the Petras excavations) for allowing me to study the archaeobotanical remains from their projects and for supplying the relevant contextual information. I am also grateful to Dr. Tom Brogan, director of the INSTAP SCEC, for providing support and lab space to study the material. Thanks also are extended to Matina Papadaki for her tireless efforts at floating all of the sediment samples involved in this research, and to Dr. Melissa Eaby for her time and help editing various drafts of different written works connected to my dissertation.

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## MESSAGES FROM THE LIBRARIAN FELLOWS

During the pandemic, two fellows have worked in the INSTAP SCEC library (Fig. 1). From June 15 to September 18, 2020, Eleftheria Almasidou served as the interim librarian. From October 5, 2020 to May 28, 2021, Niki Saridaki served the same position, which again was filled by Almasidou from May 31, 2021.

### Pandemic Summers in the Library

#### *Eleftheria Almasidou*

During my fellowship, several new publications were acquired through purchases, donations, exchange programs, and digital downloads. They include 62 printed books and journals, one offprint, and 155 digital documents. I also added several papers and books on the Greek Neolithic period to our digital collection. My daily duties in the library involved ordering new books, renewing subscriptions of periodicals and journals, checking the inventory, helping readers find papers or books, checking and correcting the library catalog, and maintaining the library printers. I also was responsible for answering email and scanning local newspapers (*Anatoli* and *Ierapetra 21st Century*) and the internet for articles on archaeological subjects. I occasionally undertook digital shopping duties (especially equipment for COVID-19 precautions such as masks, gloves, and antiseptic gel) and interacted with courier companies (mailing and receiving letters/packages).

In addition to my work in the library, I also assisted other Study Center projects. I helped with photographing and relabeling photographs for various archaeological projects including Azoria, Chrissy, Mochlos, Petras, and Papadiokambos. I re-bagged the pottery from the 1989 Pseira excavations and provided help to Natalia Poulou with Byzantine pottery from the same site. I also helped with the transfer of flots into bags for storage and collected soil sub-samples from the excavations at Chrissy.



Figure 1. Eleftheria Almasidou (left) in the basement storage area and Niki Saridaki (right) in the library. Photos J. Vanderpool (left) and M. Tzari (right).

After a winter and spring hiatus, in June 2021 I continued to reorganize the shelves of the library to gain new space for books. During this process, I cleaned the shelves, repaired the tape on the books, and checked that the books are in their correct location. Also, INSTAP Academic Press printed three new publications, which I mailed to contributors and exchange partners in Europe and beyond.

Working in the library was a thrilling experience, and I am grateful for the chance to meet interesting people and cooperate with the friendly and kind staff of the INSTAP SCEC.

### Lockdown Librarian

#### *Niki Saridaki*

Unfortunately, during my term as the librarian, due to the COVID-19 pandemic, the library closed on November 6, 2020. I was able to return to the Study Center on April 20, 2021, and I worked there

until May 28, 2021. During the lockdown, I worked from home on the digital documents in the Study Center's collection. As a result, I enriched the library with more than 900 digital files including books, papers, and periodicals. In March 2021, we ordered a large number of new publications, including much-needed books. The library was ready to reopen for researchers.

The years 2020 and 2021 have been difficult but fruitful, and they brought new experiences to all of us. It was a time for me to examine and pursue new opportunities, and in August 2021 I was hired by the Hellenic Ministry of Education and Religious Affairs to teach ninth grade at the First Middle School in

Ierapetra. I would like to thank all my INSTAP SCEC friends and colleagues for the amazing years that I have spent at the Study Center since 2016. The working environment is excellent, and all the staff members are very supportive, and they have helped me find solutions to any problem. I had the opportunity to work with amazing colleagues, meet new people (who are now friends), and participate in new activities. The two Librarian Fellowships that I held at the INSTAP SCEC improved my communication skills and were of benefit to my personal and professional development. I look forward to returning!

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## PETROGRAPHIC ANALYSIS OF LATE BRONZE AGE CERAMICS FROM CHANIA: A PRELIMINARY REPORT ON IMPORTED POTTERY

*Stavroula Fouriki*

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### Introduction

This study covers the chronological horizon from the Neopalatial period to the Postpalatial period (LM IB–IIIB:2; ca. 1525–1200 B.C.E.). The Late Bronze Age (LBA) in Crete is a period of sociopolitical upheaval characterized by large-scale destructions and changes in the material culture of the island at the end of the Neopalatial period (Late Minoan [LM] IB), and ultimately by the demise of the palatial system at the end of LM IIIB:1. As the archaeological finds reveal, Chania in West Crete was an important LBA palatial center, which had a central role in the long-distance maritime trade of the eastern Mediterranean. In this context, this article presents the preliminary results of thin-section petrography of the imported pottery from the Greek-Swedish excavation at Hagia Aikaterini Square in the Old Town of Chania. It is part of my doctoral research at the University of Sheffield in which I use petrography and elemental analysis to investigate issues of provenance and technology for ceramics of the LM IB and LM III phases from Chania. Before the presentation of the analytical results and their discussion, a brief introduction to the site and information on the material and methodology also are included.

### The Site

Chania, or *ku-do-ni-ja* according to the Linear B tablets, was an important settlement on the north coast of West Crete. Situated on the low hill of Kastelli at the Venetian harbor, the area has been inhabited since the Final Neolithic period (Andreadaki-Vlazaki, ed., 2009, 15–16; Andreadaki-Vlazaki 2010, 518). During the

Neopalatial period, ca. 1700–1450 B.C.E., the existence of a Minoan palatial center is indicated by important archaeological finds including a rich Linear A archive (Andreadaki-Vlazaki 2010, 519). In the later phase of the LBA, ca. 1450–1200 B.C.E., the settlement flourished. The wide distribution of the products of its local ceramic workshop, known as the “Kydonian workshop” (Tzedakis 1969), suggests that due to its strategic location Chania had a central role in the long-distance maritime trade of the eastern Mediterranean. The Kydonian ceramic workshop became dominant on Crete, and its products are also found in the Cyclades, the Greek mainland, Sardinia, Cyprus, Canaan, Syria, and Egypt (Hallager 2010, 156). Moreover, the existence of Linear B administration (Hallager, Vlasakis, and Hallager 1990; 1992; Andreadaki-Vlazaki 2009, 42) further supports the important status of the settlement during this phase. Around 1150 B.C.E., the settlement seems to have been abandoned after a period of destructions that led to the end of the Minoan and Mycenaean civilization, and it flourished once again in the 8th century B.C.E. (Andreadaki-Vlazaki, ed., 2009, 22).

### Materials and Methodology

The pottery presented in this study derives from sealed and undisturbed LM IB, IIIA:1, IIIA:2, IIIB:1, and IIIB:2 pits. The large ceramic assemblages were studied in order to establish macroscopic fabric groups (MFGs) according to their characteristics—that is, color, texture, and types of inclusions. Based on the MFGs, a number of samples were selected for further study involving refiring tests, petrographic analysis, and elemental analysis. In

total, 233 samples were analyzed petrographically, of which 21 have been identified as imports. The identification of imported pottery was based on a mineralogical composition that indicated a geological provenance other than Chania. The geology of Chania mainly consists of outcrops of the Phyllite-Quartzite Series and hard limestones of the Plattenkalk Unit (Kilias, Fassoulas, and Mountrakis 1994). This unique geologic profile is very characteristic of Chania, and imported pottery is easily recognizable compared to the local pottery.

## Results of Petrographic Analysis

In total, nine imported fabrics have been identified: three are imports from elsewhere in Crete, four are off-island imports, and, lastly, two are of unidentified origins.

### ON-ISLAND IMPORTS

#### *Fabric Group 1. Coarse Ophiolitic*

This coarse fabric (Figs. 1, 2) is related to the Ophiolite Series and the Asterousia nappe of South-Central Crete (i.e., the Mesara). It is characterized by a fine calcareous matrix and a high firing temperature that is reflected in the optically inactive groundmass. The ophiolitic fabric includes four samples that are further subdivided based on their mineralogical composition, which indicates different origins within the wider area of the Mesara Plain. In particular, three samples consist of metamorphic rock fragments (i.e., quartzite and phyllite), a few quartz fragments, very few sedimentary fragments (i.e., siltstone), rare fragments of basalts, and very rare metamorphic rocks composed of minerals of the epidote group and quartz (Fig. 1). This fabric is typical of the western Mesara and has parallels in the material from Kalochorafitis cemetery (Nodarou 2015, 347, 356, fabric group 1, subgroup A) and from the harbor-town of Kommos (Day et al. 2011, 528, fabric F).

On the other hand, one sample (Fig. 2) comprises mainly biotite gneiss and few low-grade metamorphic rock fragments (i.e. phyllite and quartzite). Even though biotite gneiss is present in other fabrics from the wider area of the western Mesara, it is referred to as a secondary component (Nodarou 2015, 349). This sample, however, contains this high-grade metamorphic rock as its primary component. Biotite gneiss suggests an origin in the Asterousia nappe that outcrops the area of Hagia Triada (Nodarou 2015, 349, 354). An exact parallel to this composition comes from two cemeteries, Kalochorafitis and Klima, situated in the wider area of Hagia Triada and Phaistos (Nodarou 2015, 349, fabric group 1, subgroup C).

The shape repertoire of this fabric at Chania includes closed vessels such as stirrup jars, amphorae, and a small pithos, and they all date from LM IIIA:1 to IIIB:1. This chronology is in accordance with the shapes from the Kalochorafitis cemetery where most of the pots made in this fabric belong to closed vessels, mainly stirrup jars (Nodarou 2015).

#### *Fabric Group 2. Semi-Coarse Granitic Dioritic*

This fabric only comprises one sample (Fig. 3). It is semi-coarse and characterized by the presence of acid igneous rock fragments (i.e., granite and diorite). The mineralogical composition of the sample is compatible with what has been described as the “Mirabello Fabric” (e.g., Nodarou 2007, 2010; Nodarou and Moody 2014), with an origin in the central and western parts of the Mirabello Bay in East Crete (Nodarou and Moody 2014, 92). The only example of this group from Chania is a stirrup jar of the LM IIIA:2 period.

#### *Fabric Group 3. Fine Calcareous with Clay Pellets*

This fine calcareous fabric includes one sample, a LM IIIA:1 goblet (Fig. 4). It is composed of fine monocrystalline quartz and clay pellets that are partially vitrified due to the high temperature of firing. This fabric is generally considered East Cretan, but an origin in Central Crete cannot be excluded.

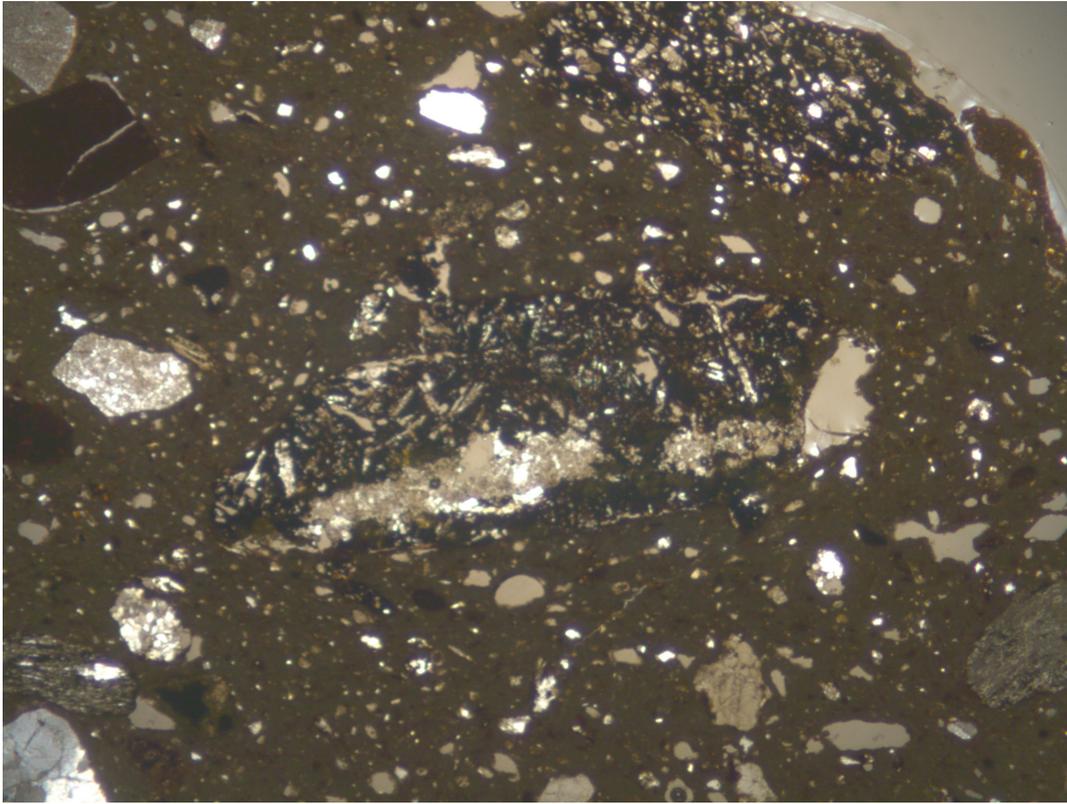
### OFF-ISLAND IMPORTS

#### *Fabric Group 4. Coarse to Semi-Coarse Micaceous*

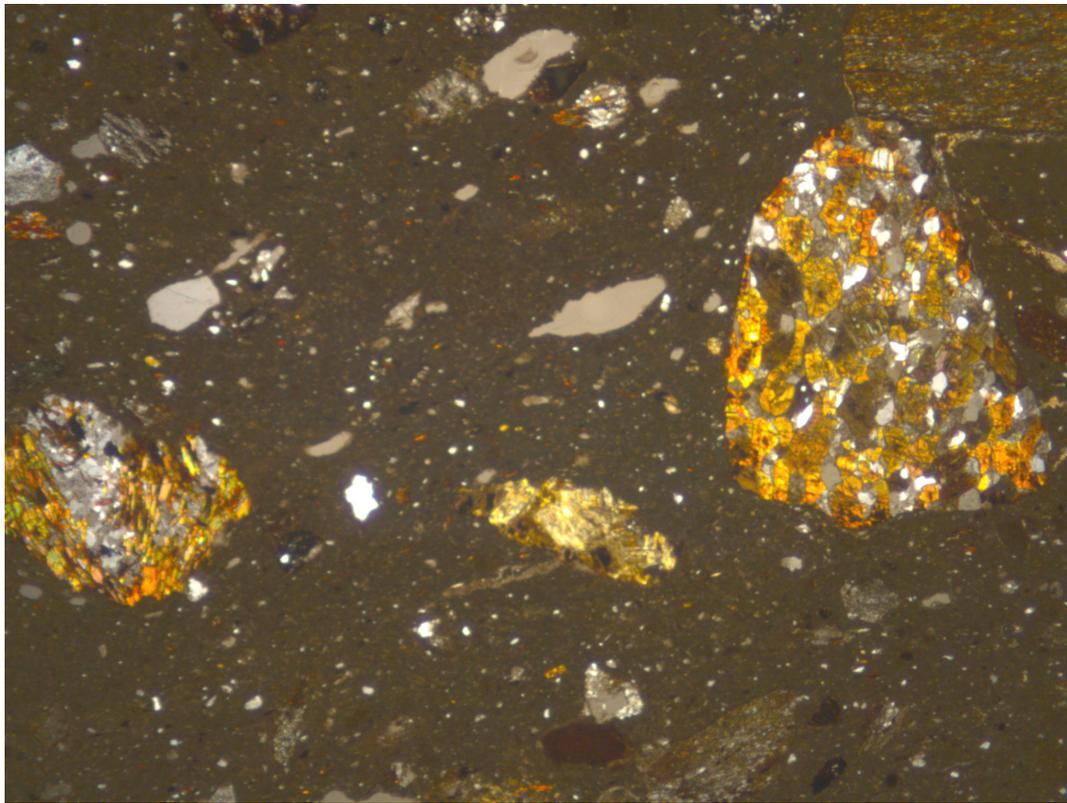
This group includes three samples (Fig. 5). It is a coarse to semi-coarse red-firing fabric mainly characterized by the presence of white mica, mica-rich rock fragments (i.e., white mica schists), and fragments of quartzite. The mineralogical composition of this fabric reflects the geological background of Kythera and, in particular, the metamorphic rocks compatible with the granitic orthogneisses that outcrop the northern part of the island (Kiriati 2003, 126–127; Broodbank and Kiriati 2007, 250). The exact parallels to this fabric group are the Orange Micaceous Fabric and the Red Micaceous Fabric (Kiriati 2003, 125; Broodbank and Kiriati 2007, 249). The samples from Chania belonging to this group date from LM IIIA:1 to LM IIIA:2. In terms of typology, the shapes represented are a jug, a basin, and a cooking pot (for the cooking pot, see Fouriki 2020).

#### *Fabric Group 5. Coarse to Semi-Coarse Micaceous with Chert, Mudstone, and Metamorphic Rocks*

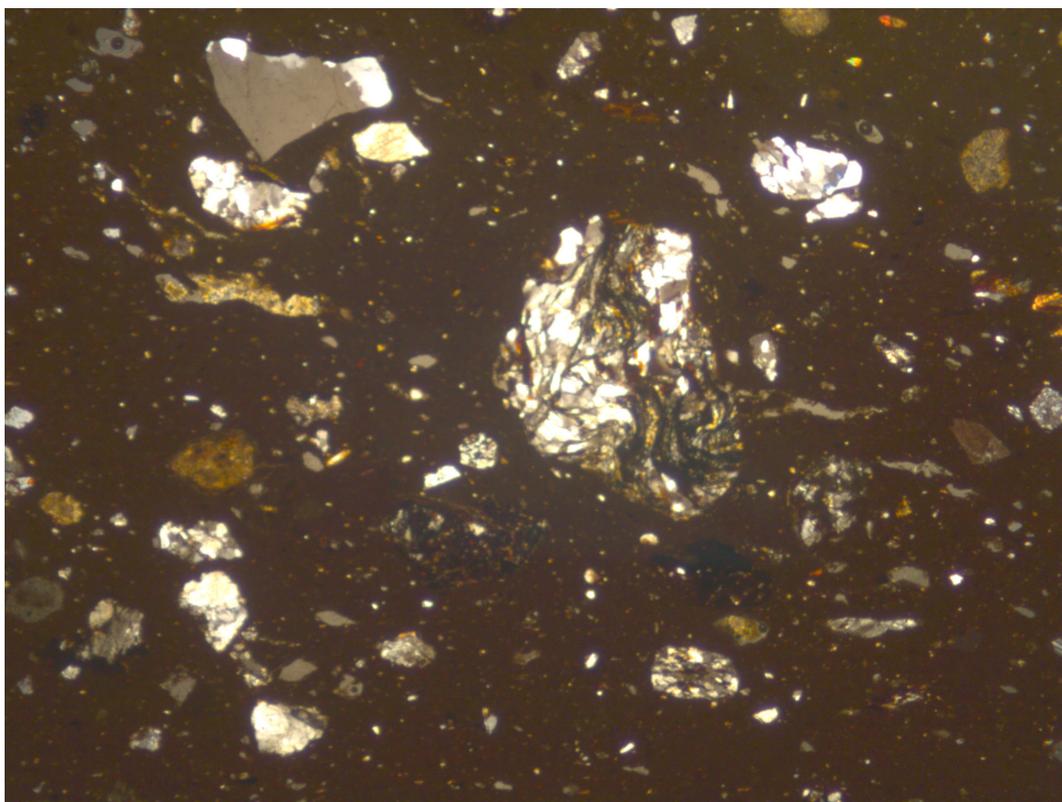
This red-firing fabric group includes five samples (Fig. 6), and it is characterized by the occurrence of white mica laths, sedimentary rocks (i.e. chert, mudstone, and shale), and metamorphic rock fragments (mainly quartzite and some quartz-white mica schist). Even though this fabric is similar to Fabric Group 4 and its provenance is from the same island, there are several important differences indicating a different production center on Kythera and the employment of raw materials different than the ones used in the manufacture of Fabric Group 4. The presence of mica is more prominent in Fabric Group 5, and it also contains more quartzite fragments than mica schists. Finally, it includes sedimentary rocks that are very rare or absent in Fabric Group 4. The shapes that occur in this fabric at Chania are jugs and



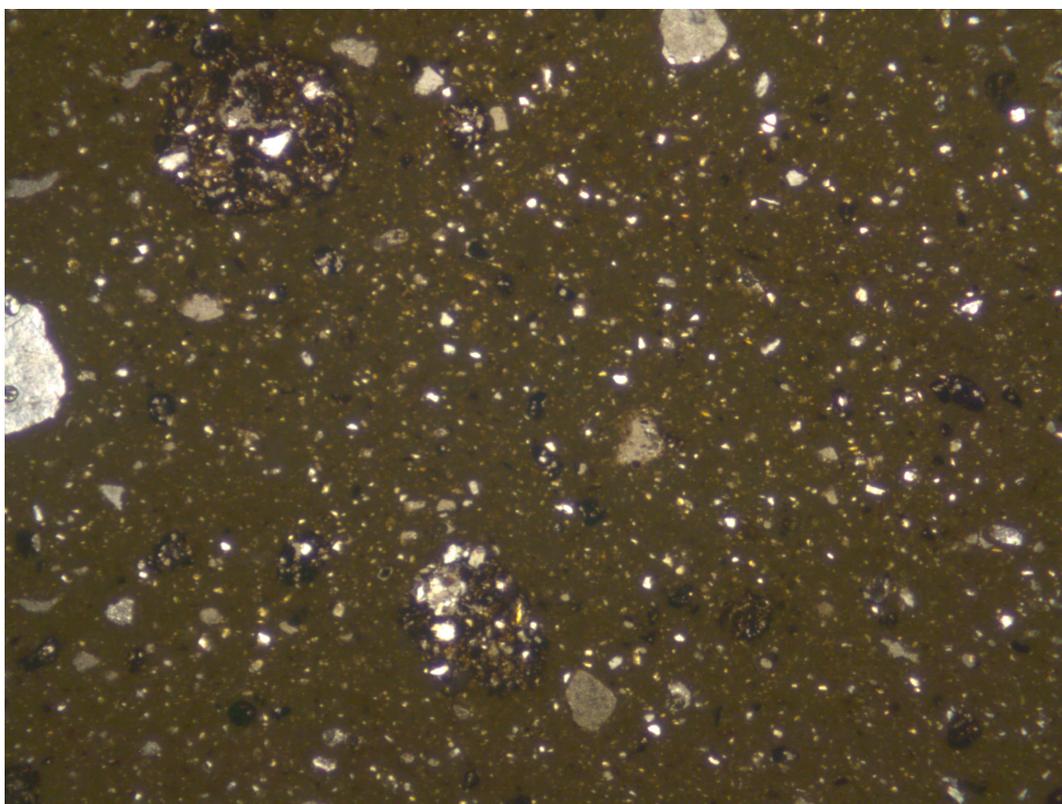
*Figure 1. Fabric Group 1, LM III B:1 stirrup jar (field of view 6 mm). Photo S. Fouriki.*



*Figure 2. Fabric Group 1, LM III A:2 stirrup jar (field of view 6 mm). Photo S. Fouriki.*



*Figure 3. Fabric Group 2, LM IIIA:2 stirrup jar (field of view 6 mm). Photo S. Fouriki.*



*Figure 4. Fabric Group 3, LM IIIA:1 goblet (field of view 6 mm). Photo S. Fouriki.*

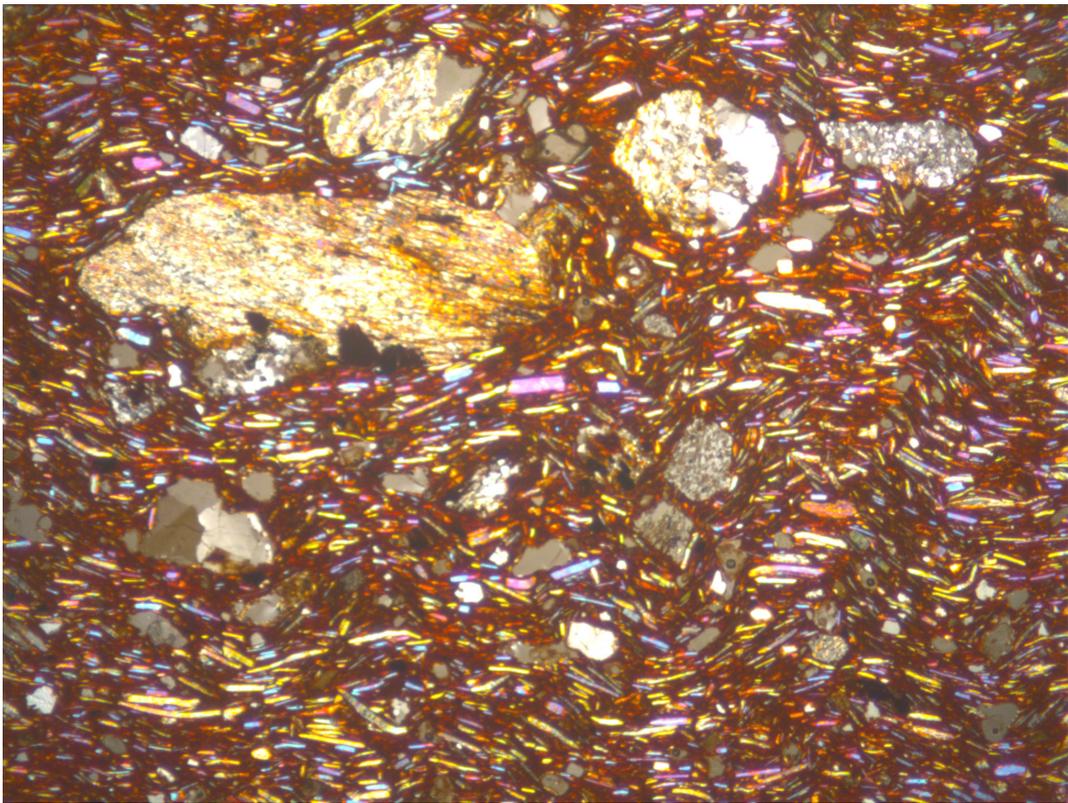


Figure 5. Fabric Group 4, LM IIIA:2 jug (field of view 6 mm). Photo S. Fouriki.

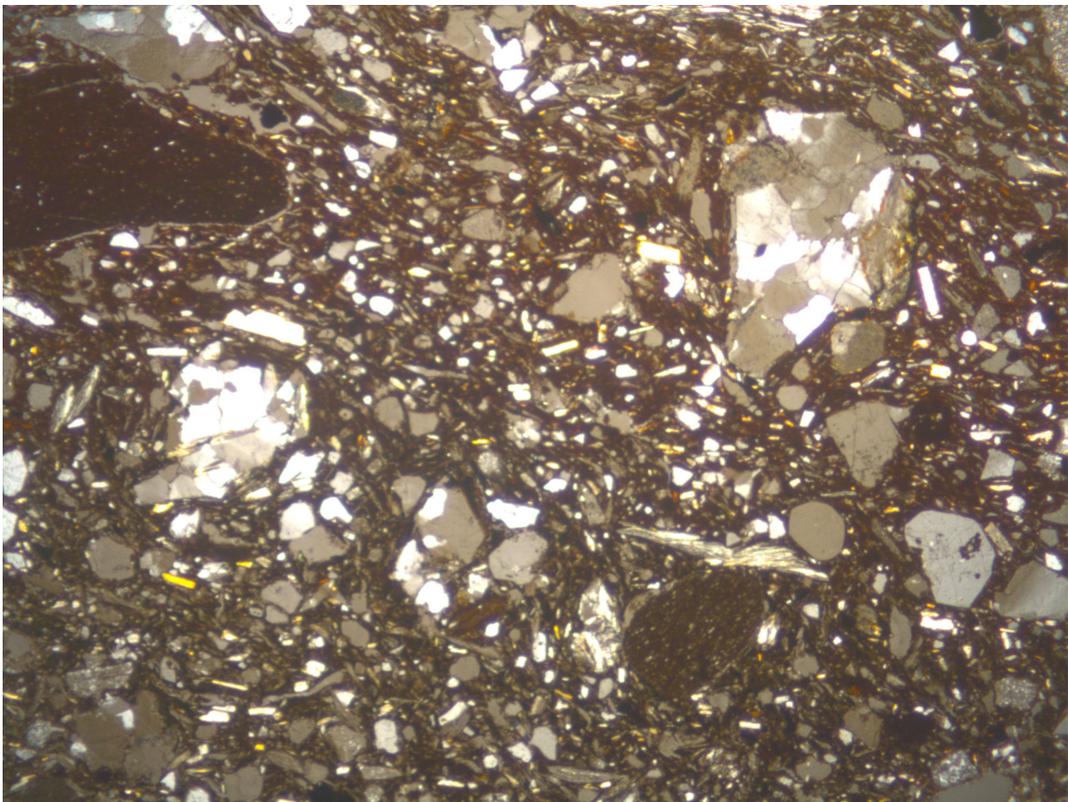


Figure 6. Fabric Group 5, LM IIIA:2 jug (field of view 6 mm). Photo S. Fouriki.

open and closed vessels of the LM IIIA:1–IIIA:2 and LM IIIB:1–IIIB:2 periods. The sedimentary inclusions in this fabric are related to the flysch and chert/shale deposits of the Tripolis and Olonos-Pindos zones (Kiriati 2003, 127; Marsellos 2006, pl. A), and the metamorphic rock fragments reflect the Phyllite-Quartzite outcrops of the Arna Unit, which covers most of the northern part of Kythera (Marsellos 2006, pl. A). A similar fabric seems to have been identified at Bronze Age Kastri (Broodbank and Kiriati 2007, 248, "Chert Fabric"). This material, which is much earlier than the pottery examined for the present research, displays a variation in its mineralogy. This variation has been interpreted as the outcome of the exploitation of different clay sources related to metamorphic and sedimentary geological formations, and it has been considered local—without excluding the possibility, however, that some of the samples could have been off-island imports (Broodbank and Kiriati 2007, 248).

#### *Fabric Group 6. Coarse to Semi-Coarse Mudstone Tempered*

This calcareous fabric (Fig. 7) includes two samples, an amphora of the LM IIIB:1 period and a closed vessel of LM IIIB:2. It is coarse to semi-coarse and characterized by the frequent occurrence of mudstone fragments, some of which are radiolarian. It also contains a few monocrystalline quartz inclusions, a few pieces of chert, some of which are radiolarian, and very rare microfossils and metamorphic rock fragments (i.e., quartzite and schist).

Similar pottery has been identified only macroscopically in West Crete by Jennifer Moody, specifically in the area from Gramvousa to Chrysoskalitissa in Kissamos (far west of Chania; Moody 2015, 614, inclusions described as "hard angular red grits"). The pottery appears in the area during the Neopalatial period (MM III–LM I), but it becomes more common during LM III. In Chania itself, however, it is "at no time abundant" (Moody 2015, 614). Petrographically, a similar fabric has been identified in the Early Minoan assemblages of Nopigeia (Nodarou 2011, 40, fabric group B6), a settlement west of Chania, and also in Chania itself (Nodarou 2011, 44–45, fabric groups D6, D7). An identical fabric also is found on Kythera (Kiriati 2003, 125, "Mudstone-tempered") and Antikythera (Pentedeika et al. 2010, 34–39, fabric groups MUTa, MUTb, and MUTc, with the latter identified as a Kytheran import).

Even though pottery containing mudstones occur in West Crete during the LBA, it seems more likely that the two examples from Chania are imports from Kythera. In particular, the Kytheran examples have a calcareous clay base and contain mudstone and chert fragments that are occasionally radiolarian, just like the samples from Chania. Moreover, since the pottery identified by Moody in Kissamos has not been analyzed petrographically, a local origin cannot be confirmed. In the same way, the scenario that it was imported from Kythera cannot be excluded—especially when considering the geographical position of Kissamos, situated

just south of Kythera, which would have been a natural gateway for ships and goods arriving from Kythera and the Greek mainland to West Crete.

#### *Fabric Group 7. Coarse Volcanic*

This is a coarse fabric (Fig. 8) that includes two samples, both tripod cooking pots of the LM IIIB:1 period. It is characterized by the presence of intermediate volcanic rock fragments and their constituent minerals. In particular, the non-plastic inclusions mainly comprise andesite, plagioclase feldspar, clinopyroxene, amphibole, and biotite. The mineralogical composition is compatible with the geology of the island of Aegina (Fouriki 2020) and, specifically, it reflects the second phase of volcanism that took place during the Pleistocene and produced mainly andesitic flows—that is, the Oros- and Lazarides-type andesites in the center of Aegina (Gauss and Kiriati 2011, 74). An exact parallel to this fabric from Kythera is the Noncalcareous Volcanic Fabric (Fabric Group 1; Gauss and Kiriati 2011, 9, 94–95).

#### UNIDENTIFIED IMPORTS

#### *Fabric Group 8. Fine Buff Micaceous*

Fabric Group 8 only includes a LM IIIB:2 amphoroid krater with a double rolled handle (Fig. 9). It is a very fine, buff fabric that is characterized by the presence of fine mica laths (i.e., muscovite and biotite). Apart from the mica laths, fine monocrystalline and rare polycrystalline quartz/quartzite as well as rare epidote crystals also occur. An origin in the Cyclades, such as Ios, cannot be excluded. With no access to a wide range of comparative material from the Cyclades and the islands of the eastern Aegean, however, it is not possible to determine the provenance of this vessel.

#### *Fabric Group 9. Semi-Fine Micaceous*

This group includes two LM IB cups. It is a semi-fine, red-firing micaceous fabric characterized by the occurrence of white mica laths, monocrystalline quartz, and small fragments of metamorphic rocks (i.e., schist and quartzite; Fig. 10). The presence of white mica laths, quartz-mica schist, and quartzite probably indicates Kythera as the place of origin. It is much finer, however, than the coarse micaceous Fabric Group 4 above, and dates to LM IB.

### Discussion and Summary

Petrographic analysis identified a number of imports from different sites in Crete and the southern Aegean. South-Central Crete, in the Mesara Plain, seems to be the area from which most of the Cretan imports came to Chania. Two more imports seem to be East Cretan, one from the Gulf of Mirabello and another, although considered to come from East Crete, possibly of Central Cretan origin.

Apart from the Cretan imported pottery, a significant number of off-island imports are also present in the assemblage. The

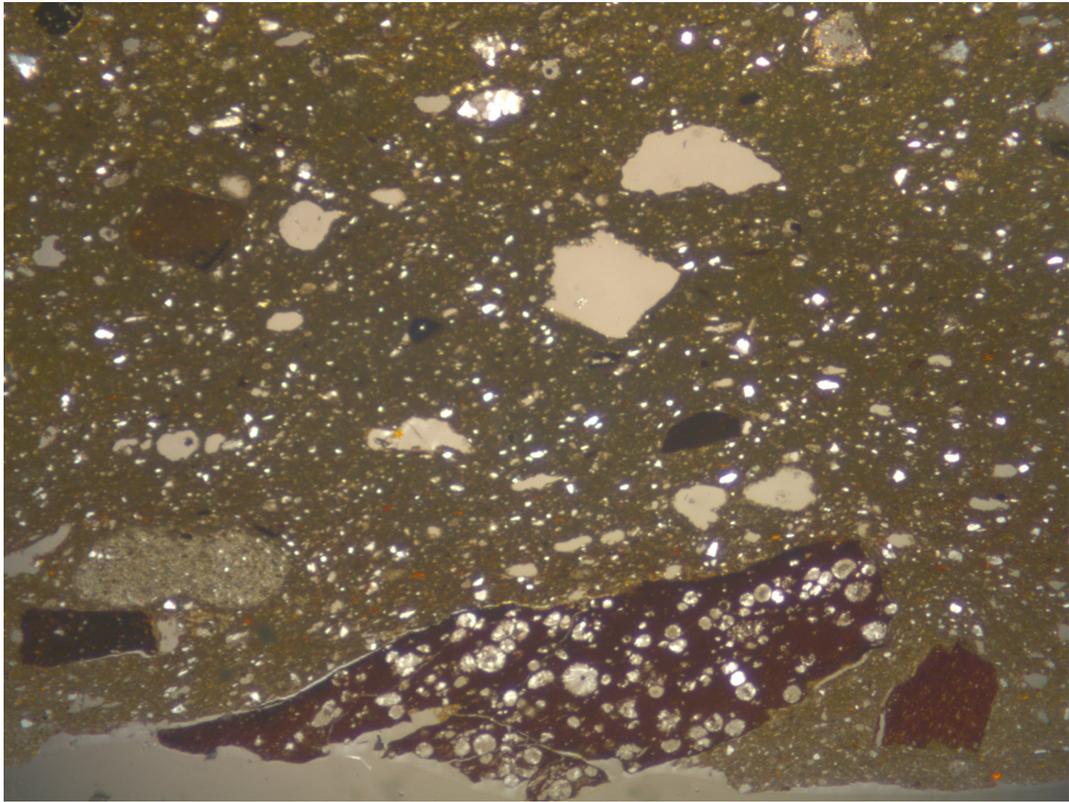


Figure 7. Fabric Group 6, LM IIIB:1 amphora (field of view 6 mm). Photo S. Fouriki.

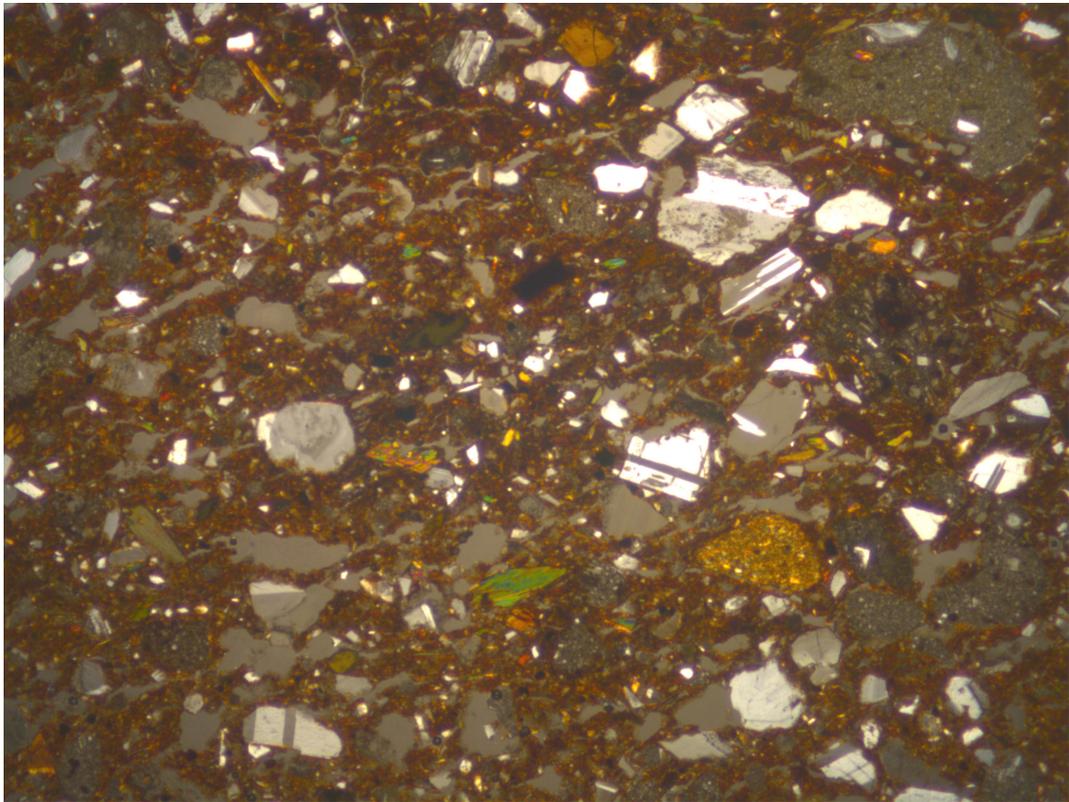
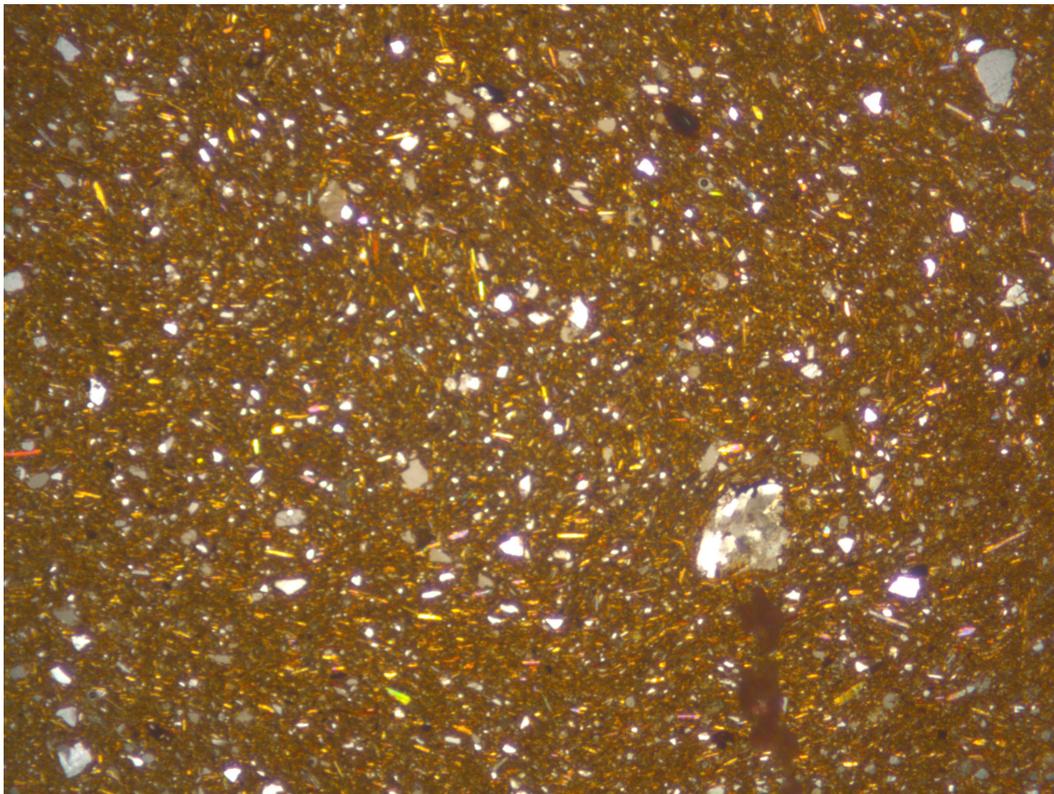
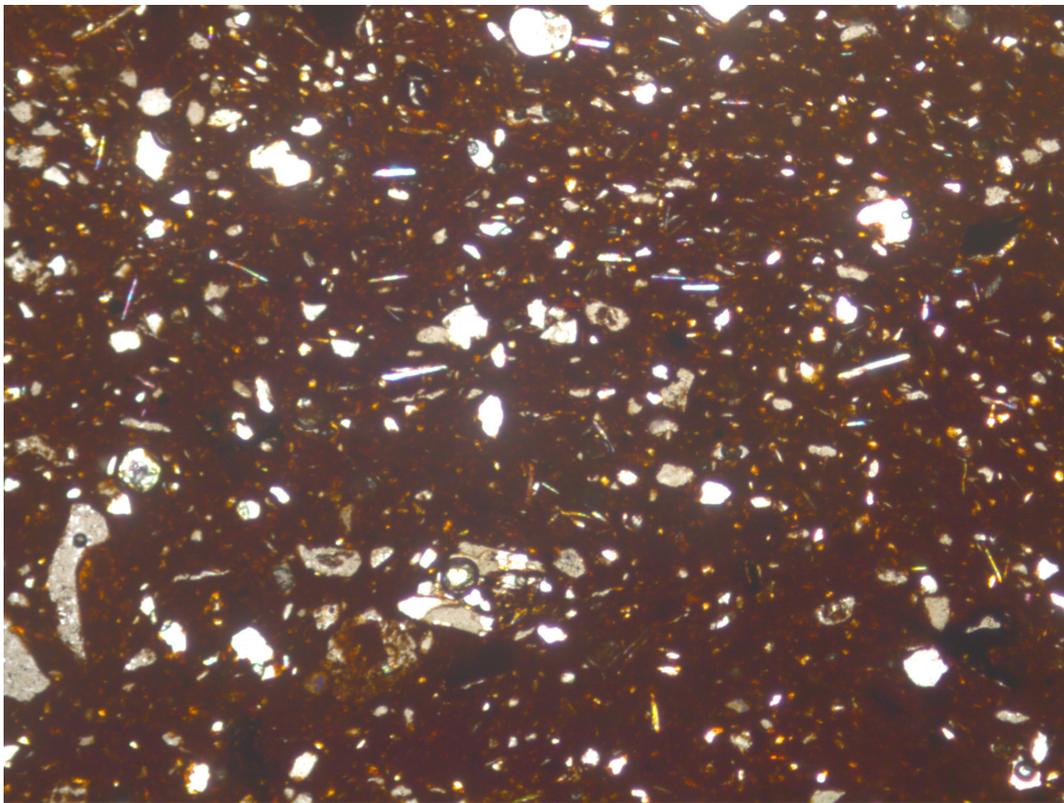


Figure 8. Fabric Group 7, LM IIIB:1 tripod cooking pot (field of view 6 mm). Photo S. Fouriki.



*Figure 9. Fabric Group 8, LM III B:2 amphoroid krater (field of view 3 mm). Photo S. Fouriki.*



*Figure 10. Fabric Group 9, LM IB cup (field of view 6 mm). Photo S. Fouriki.*

island of Kythera appears to be well represented in the LBA ceramic material of Chania, with 10 recorded imports. The Kytheran pottery found in Chania was made using three different clay recipes, with the great majority belonging to micaceous fabrics. This multitude of clay recipes probably indicates that the pottery imported to Chania from Kythera was produced by a number of different ceramic workshops. The large number of imports from this island is not surprising. West Crete and Kythera have been connected very well since the Early Bronze Age (Broodbank and Kiriati 2007), and Kytheran imports (with silver mica) identified macroscopically from the LM III period are very common (Hallager 2003, 248; 2011, 364–365; 2016, 280). Finally, two LM IIIB:1 tripod cooking pots from Aegina that have been identified petrographically (Fouriki 2020) shed new light on the interconnections between this island and Chania. Aegina, an important pottery production center in the Bronze Age, was renowned for its cooking pot production in the later phases of the LBA. Even though Aeginetan cooking pots witnessed wide distribution in Thessaly, the northeast Peloponnese, and the north Cyclades (Gauss et al. 2015, 67–68), imports from this island until now had not been identified petrographically in Crete. The present study, therefore, confirms that cooking ware from Aegina reached Crete, and particularly the settlement of Chania. It is worth mentioning that another Aeginetan cooking pot of LM IIIB:1 with “golden mica” was identified macroscopically by Birgitta Hallager in the ceramic assemblage of the Greek-Swedish excavations, but it was ascribed a Cycladic origin (Hallager 2003, 249; 2011, 365).

In summary, this preliminary study illuminates some aspects of trade and interconnection between West Crete and the southern Aegean. It paves the way for a more systematic approach involving the macroscopic study and sampling of imported ceramics from a number of excavations in the Old Town of Chania.

## Acknowledgments

I would like to express my gratitude to Dr. Maria Andreadaki-Vlazaki for kindly allowing me to study this material. I would also like to thank Dr. Eleni Nodarou of the INSTAP SCEC for kindly allowing me to examine comparative material from Central and East Crete and for providing useful information for this study. Lastly, I am grateful for the information kindly provided by Dr. Sergios Menelaou of the Cyprus Institute-STARC on Fabric Group 8 and its possible place of origin.

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## Congratulations

### Ayia Sotira

A Mycenaean Chamber Tomb Cemetery  
in the Nemea Valley, Greece



The Study Center would like to recognize the authors, contributors, and publisher of the prize-winning volume, *Ayia Sotira: A Mycenaean Chamber Tomb Cemetery in the Nemea Valley, Greece (Prehistory Monographs 56)*, by R. Angus K. Smith, Mary K. Dabney, Evangelia Pappi, Sevasti Triantaphyllou, and James C. Wright (2017, INSTAP Academic Press). The Archaeological Institute of America bestowed its inaugural Anna Marguerite McCann Award for

Fieldwork Reports on this richly illustrated book at the 2021 annual meeting of the institute. It presents the results of the excavation of six chamber tombs in the Late Bronze Age cemetery, employing an interdisciplinary approach that includes a wide range of types of archaeological remains and many specialized studies. For more details: <https://www.archaeological.org/grant/mccann-field-report-award/>.

# RENOVATIONS TO THE ANTIQUITIES COLLECTION IN IERAPETRA

Chrysa Sofianou

During the COVID-19 pandemic, it was decided to close the Archaeological Collection of Ierapetra (located in the center of town near city hall) in order to make improvements to the physical plant and the displays. Work on the building included the additions of a new restroom and new lights and changes to the floors and windows to reduce humidity levels. All the museum cases were cleaned and repainted, and several new displays were added with finds from Myrtos Pyrgos, Chryssi, Azoria, Gaidourophas (Fig. 1), and Stavromenos. A series

of new information labels and maps will also accompany the objects, all of which have been re-cleaned and conserved.

I would like to thank the staff of the INSTAP Study Center and in particular Kathy Hall and Matina Tzari from the Coulson Conservation Laboratory for their help preparing material for the displays (Fig. 2), and also Jeff Vanderpool (Fig. 3) for his help photographing the sculptures for publication. The collection will be reinstalled this winter, and I hope that all of you will take the opportunity to visit next summer.



Figure 1. Pithos from the LM IB destruction of the large building at Gaidourophas after conservation. Photo T. Brogan.



Figure 2. Three images showing before, during, and after conservation of a Late Hellenistic drinking vessel from the Ierapetra collection. The central image shows paper pulp used to clean the surface. Photo K. Hall.



Figure 3. Jeff Vanderpool photographing sculpture in the Ierapetra collection. Photo T. Brogan.

## Congratulations

We want to congratulate Dr. Niki Saridaki, who was hired to teach ninth graders at the First Middle School in Ierapetra. She took her acceptance oath on August 20 in Hagios

Nikolaos. Rumor has it she has promised to offer her students opportunities for extra credit should they show any special interest in the Greek Neolithic. Photo V. Netis.



## SUPPORT INSTAP SCEC FELLOWSHIPS

Each year, the INSTAP Study Center for East Crete offers the Richard Seager and Harriet Boyd Hawes fellowships to qualified candidates. These fellowships provide funds for scholars to work at the Study Center and take advantage of our unique facility in East Crete.

### Richard Seager Fellowship

Named for the American archaeologist Richard Seager, generous donations have enabled us to offer a yearly fellowship in the amount of \$4,000 since 2009. The fellowship is intended for scholars in the field of the Aegean Bronze Age or Early Iron Age who are working to complete their doctoral dissertations. Since its founding, seven of the 11 recipients have completed their dissertations, and we expect the remaining four to finish in the next few years.

#### FELLOWSHIP RECIPIENTS, STARTING FROM THE MOST RECENT

Charles Sturge, University of Cincinnati: “From Pots to People: Commensal Behaviors of the Early LBA in Comparative Perspective”

Christine Spencer, University College London: “Picking up the Pieces: Assessing the Role of Legacy Survey Data in the Interpretation of Social Change in Bronze Age Crete”

Luke Kaiser, University of Arizona: “Prepalatial Ceramic Analysis within the Mirabello Region, East Crete, and the Socio-economic Implications of Materiality”

Aikaterina Boukala-Karkagiani, National and Kapodistrian University of Athens: “The Prepalatial Period at Petras, Siteia, through the Study of Undisturbed Ceramic Contexts”

Paraskevi Stamatakis, National and Kapodistrian University of Athens: “The Study of Ceramic Technological Traditions at the LM I Building Complex at Vathypetro (Archanes Area) as a Means of Investigating the Society and Economy of Neopalatial North-Central Crete”

Georgios Doudalis, Ruprecht Karl University of Heidelberg: “Mochlos in the Middle Bronze Age: A Socio-Cultural Approach to the Settlement during the Middle Minoan Period”

Emilia Oddo, University of Cincinnati: “From Pots to Politics? Analysis of the Neopalatial Ceramic Assemblage from Cistern 2 at Myrtos-Pyrgos, Crete”

Florence Liard, Université Catholique de Louvain: “Pottery Production and Consumption Practices in the Plain of Malia during the Final Palatial and Postpalatial Periods of the Late Bronze Age (1450–1200 B.C.)”

Mihalis Zoitopoulos, National and Kapodistrian University of Athens: “The ‘Postpalatial’ Period in Far Eastern Crete: The Case of Zakros”

Konstantinos Chalikias, Ruprecht Karl University of Heidelberg: “Settlement Patterns and Socio-Economic Change in the Ierapetra Region from the Bronze Age to the Roman Period: Chryssi Island. A Case Study”

Jerolyn Morrison, University of Leicester: “The Art and Archaeology of Cooking: The Case of Mochlos”

### Harriet Boyd Hawes Fellowship

The Hawes Fellowship for Gender Studies was introduced in 2015 with the goal of incorporating gender studies in Aegean Bronze Age archaeology to highlight aspects of ancient life that have not yet received sufficient attention. This \$3,000 fellowship was established with the generous support of the Ms. Foundation for Women, and it is open to both doctoral and post-doctoral candidates in the fields of Anthropology, Art History, Ancient History, or Classics, and the recipients will use the Study Center’s resources in their research.

#### FELLOWSHIP RECIPIENTS, STARTING FROM THE MOST RECENT

Dr. Maria Anastasiadou, “Intergenderism in Minoan Seal Imagery”

Dr. Florence Gaignerot-Driessen, “Ladies of Anavlochos: Six Centuries of Female Devotion on a Cretan Mountain”

Prof. Julie Hruby, “Associating Fingerprint Patterns with Age and Sex: A Quantifiable Approach”

Dr. Caroline Tremaud, “Ten Centuries of Women in History: Archaeological and Iconographical Approaches of Minoan Civilization”

### Please Help Support the Next Generation of Aegean Bronze Age Scholars

We hope that you will help us continue to offer the Richard Seager and Harriet Boyd Hawes fellowships to qualified applicants. The COVID-19 pandemic prohibited the offering of these fellowships last year, but they are crucial to support scholars who work to expand our knowledge of the Aegean Bronze Age.

If you would like to fund these fellowships, please either donate online through PayPal at <https://instapstudycenter.net/friends-of-the-instap-study-center/donations/> or send a check made out to the INSTAP Study Center for East Crete with the name of the fellowship in the memo portion of your check. Checks should be sent to the attention of Elizabeth Shank at the INSTAP Study Center for East Crete, U.S. Office, P.O. Box 162, Rouzerville, PA 17250. The INSTAP Study Center is a non-profit 501(c)3 organization; all donations are tax deductible to the fullest extent of the law.

## Online Lecture Series

The INSTAP SCEC is hosting online lectures on topics about the Aegean Bronze Age. Announcements and invitations are sent via email and posted on the Facebook page of the [Friends of the INSTAP Study Center](#). The lectures are recorded and available on our website, <https://instapstudycenter.net/>

[news-and-announcements](#). If you would like to virtually attend these events, please contact Elizabeth Shank at [elizabethshank@hotmail.com](mailto:elizabethshank@hotmail.com) to be added to our email list. Please check our website for more information about lectures and events.



### PLEASE JOIN US ON FACEBOOK!

The newly created group Friends of the INSTAP Study Center is a great way to keep up with the latest developments at the INSTAP SCEC. The goal of this group is to share news, items of interest related to the INSTAP Study Center for East Crete and its members and projects, and publications that stem from work at the Center. Visit <https://www.facebook.com/groups/4353522511378183>.

## Recent Ph.D. Graduates

Congratulations from all of us at the INSTAP Study Center!

Dr. Müge Bulu Akar (Fig. 1) wrote her dissertation on “Production and Consumption of Syro-Cilician Ware at Tell Atchana, Alalakh: A Technological and Functional Analysis” at Koç University. Müge was our 2016 petrography intern, and she carried out part of her research at the Study Center and part at the Wiener Laboratory of the ASCSA.

Dr. Samantha Ximeri (Fig. 2) studied “Cultural Biographies of Cretan Storage Jars (Pithoi): From Antiquity to Postmodernity” at the University of Amsterdam. She was our 2012 petrography intern

and carried out much of her research at the Study Center. This winter Samantha will present aspects of her work during a lecture in the Study Center's online series.

Dr. Laura Ursprung Nerling (Fig. 3) researched “The Pre- and Protopalatial Minoan Larnax: Individual vs. Collective Identity in Pre- and Protopalatial Crete” at the University of Missouri, Columbia. Laura spent the beginning of her summer in 2021 working at the Study Center for the Gournia Project. In March, she presented a short version of her dissertation work in an online lecture for the Friends of the INSTAP Study Center.

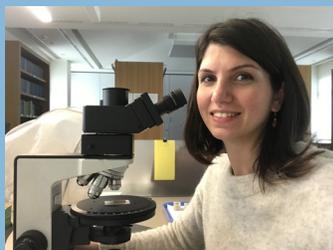


Figure 1. Müge at work. Photo M. Bulu.

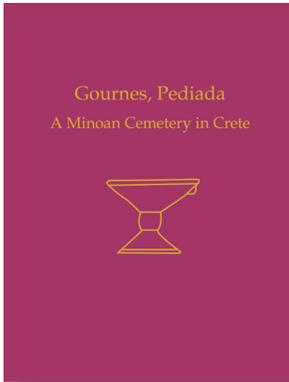


Figure 2. Samantha after graduation. Photo V. Gerritsen.



Figure 3. Laura at graduation. Photo T. Nerling.

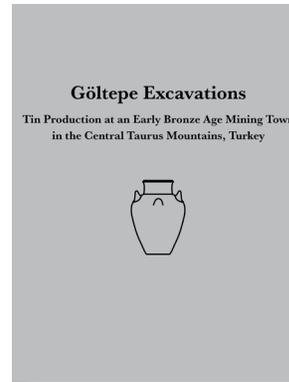
## New and Forthcoming Titles



### Gournes, Pediada: A Minoan Cemetery in Crete (Prehistory Monographs 63, 2021)

By Calliope E. Galanaki

466 pp, 119 illustrations, 17 tables, 90 figures, 132 plates, ISBN 9781931534260. Hardback. ~~US\$80.00~~ **US\$64.00**, ~~GB£55.00~~ **GB£44.00**.



### Göltepe Excavations

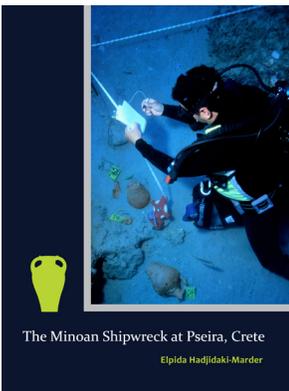
Tin Production at an Early Bronze Age Mining Town in the Central Taurus Mountains, Turkey

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(Prehistory Monographs 64, 2021)

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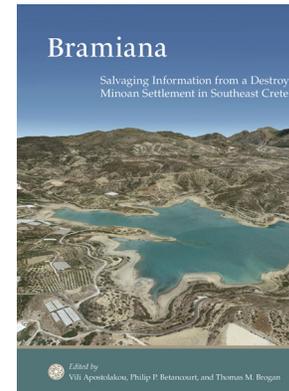
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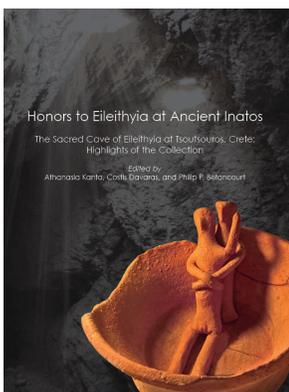
### Bramiana

Salvaging Information from a Destroyed Minoan Settlement in Southeast Crete

### Bramiana: Salvaging Information from a Destroyed Minoan Settlement in Southeast Crete (Prehistory Monographs 66, 2021)

Edited by Vili Apostolou, Philip Betancourt, and Thomas Brogan

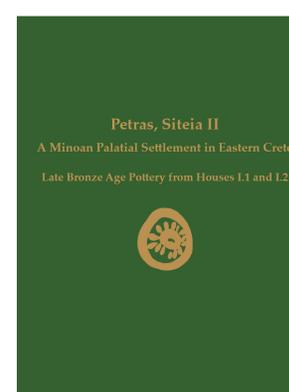
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### Honors to Eileithya at Ancient Inatos: The Sacred Cave of Eileithya at Tsoutsouros, Crete. Highlights of the Collection (Forthcoming)

Edited by Athanasia Kanta, Costis Davaras, and Philip Betancourt

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### Petras, Siteia II

A Minoan Palatial Settlement in Eastern Crete

Late Bronze Age Pottery from Houses I.1 and I.2

### Petras, Siteia II: A Minoan Palatial Settlement in Eastern Crete. Late Bronze Age Pottery from Houses I.1 and I.2 (Prehistory Monographs 67, forthcoming)

By Metaxia Tsiopopoulou

526 pp, 68 tables, 98 figures, 42 plates, ISBN 9781931534321. Hardback. ~~US\$80.00~~ **US\$64.00**, ~~GB£55.00~~ **GB£44.00**.

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The Study Center is affiliated with the Mediterranean Section of the University of Pennsylvania Museum of Archaeology and Anthropology and the History of Art Department at the University of Pennsylvania.

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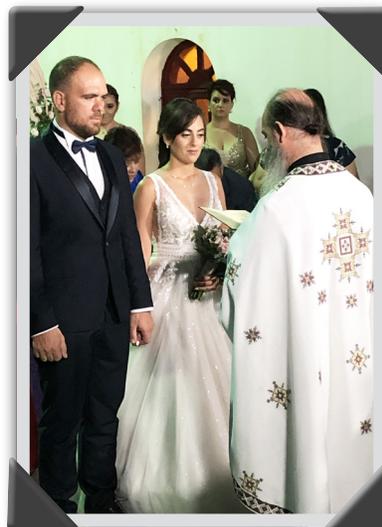
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## Friends of the INSTAP Study Center for East Crete

Please join us for the annual meeting of the Friends of the INSTAP Study Center on January 7, 2022, during the Annual Meeting of the Archaeological Institute of America in San Francisco. Speakers will include Thomas M. Brogan and Kim Shelton. Please check the AIA schedule for the date and time of this event. We hope to see you there!



## BEST WISHES

We extend our best wishes to Vaso Papadopoulou and Michalis Delimpaltadakis who were married at Hagios Andreas in Ierapetra on August 28, 2021. Vaso is a former librarian fellow. *Photo T. Brogan.*