

**Todd Whitelaw, Maria Bredaki, Andonis Vasilakis**

## Long-term urban dynamics at Knossos: the Knossos Urban Landscape project, 2005-16

### ABSTRACT

The Knossos Urban Landscape Project is an intensive surface survey, organised as a collaboration between the British School at Athens and the Herakleion Ephoreia. It is documenting the archaeology of the site of Knossos and its environs, including the ancient city and all of its surrounding mortuary landscape accessible for investigation. It was initiated in recognition of a century of intensive investigation of the Knossos valley by both institutions. Its specific objectives are to record the archaeological resources of the valley to aid their protection and manage future development in the valley; to document systematically the archaeological record to contextualise a century of research and rescue investigations; to integrate new systematically collected surface data with existing excavation data to reconstruct long-term urban dynamics at Knossos; and to establish a comprehensive base-line for future research in the valley.

This paper serves as an introduction to the six papers which follow, together presented as a session at the 12th Cretological Congress. This introduction briefly presents the background to the project, its aims and methodology, and summarises its progress to date, in the field and in follow-up studies of the collected material. Interim results are presented in the following five papers, authored by the period specialists studying the ceramics for major cultural periods. These summarise the work to date on the project collections, within the context of previous investigations in the valley, to provide an overview of the long-term development of Knossos, from the establishment of the initial Neolithic community c. 7000 BCE, until the final decline of the site as a major centre in the early 8th century CE.

A final concluding paper highlights the insights, but also the challenges presented by the project to date, which will continue to be addressed as the project moves toward publication.

ΛΕΞΕΙΣ ΚΛΕΙΔΙΑ: Knossos, Crete, Aegean, Greece, urbanism, surface survey, urban survey

Knossos, situated 6km inland from the central north coast of Crete, just inland of modern Herakleion, was founded as one of the earliest sedentary farming villages in Europe, ca. 7000 BCE. Around 2000 BCE, it became the centre of the first state-level society in Europe, and again, early in the first millennium BCE, it was one of the most precocious of the newly emerging centres which became city states in the Classical world. It remained occupied as an urban centre until the early 8th century CE, so was a major regional centre for nearly eight millennia. In this respect, it serves as an excellent index for long-term cultural developments in the Aegean, and through its widespread connections in many periods, well beyond.

The site has been investigated intensively for over a century. The principal focus of attention has been on its later Bronze Age, Minoan phases, when it was the largest community on the island, and politically dominated, minimally, a polity in north central Crete, or in some reconstructions, the entire island. It is best known, both academically and to the wider public, for its Bronze Age palace, excavated by Arthur Evans in the early decades of the 20th century. Surrounding that palace, and largely unrecognised, is one and a half square km of urban site, almost entirely invisible beneath olive groves. That in turn sits centrally within a further 10 square km of cemeteries, mostly cut into the hillslopes surrounding the city, now largely lost at the north under the suburbs of modern Herakleion.

While long visited by antiquarians and explored in more detail by the local antiquarian Minos Kalokairinos in the late 19th century (Kotsonas 2016), a clearer idea of the overall site was gained in the first year of systematic investigations, when David Hogarth, then Director of the British School at Athens (BSA), dug some 300 test pits around the valley, attempting to locate the prehistoric cemeteries, while Evans started excavating the palace (Hogarth 1899-1900).

Over the next three decades, Evans focused his investigations firmly on the prehistoric remains, of the Bronze Age palace and the surrounding contemporary grand houses, and several cemeteries further afield

(Fig. 1). Evans was well aware of the wider city, though his reconstruction (Evans 1928, 545-564) is over-ambitious.

In the mid-1920s, Evans donated the palace and his estate to the BSA, which took the opportunity to broaden out the investigation of the site to include systematic post-Bronze Age excavations. The BSA has conducted major research excavations, on and off, to the present, and inherited Evans' interest in the wider valley, undertaking many rescue excavations in the valley, until 1981, when both

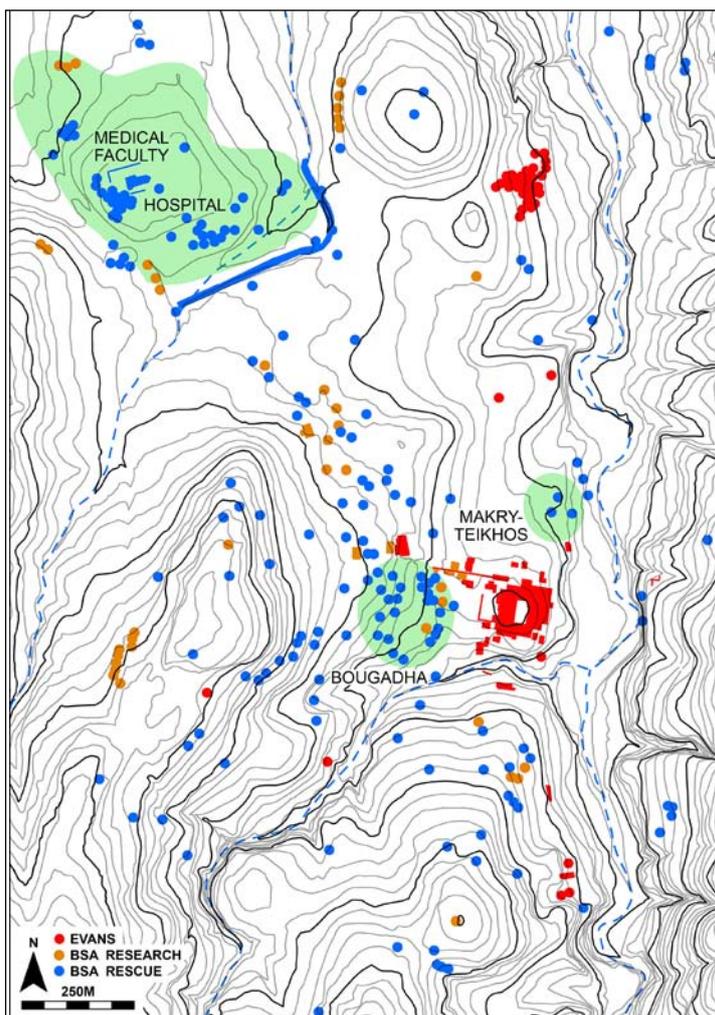


Fig. 1. Excavations by Evans and the BSA at Knossos.

Greek law and UK funding limited the role of the BSA in rescue excavations in Greece. From the mid-30s, the Greek Archaeological Service also conducted rescue excavations in the valley, and exclusively since the early 80s.

This continuous history of exploration makes Knossos one of the most intensively investigated sites in the Mediterranean. Typically for major Mediterranean sites, publication has not always kept up with excavation; in particular, as elsewhere, most of the small rescue excavations have not been felt to warrant publication, individually making little clear contribution to understanding the site, though individual discoveries considered exceptional tend to be published.

In 1997, in response to a consideration by the BSA of how to commemorate a century of research at the site since Evans' and Hogarth's original campaign, Whitelaw proposed an intensive survey of the site, and was encouraged to develop a proposal. It was considered appropriate that this be undertaken as a *synergasia*, since the BSA and the Archaeological Service had shared responsibility for and collaborated in the investigation of the archaeology of the valley through the previous century.

In reviewing the published and the BSA's archival information on the site, it became readily apparent how dependent our present understanding of the site was on investigations concentrated in the south, near to the prehistoric palace. This is clearly demonstrated by the then current reconstructions of the overall extent of the site in different periods (e.g. Hood and Smyth 1981; Evely *et al.* 1994; Whitelaw 2000), which indicate how few, usually limited rescue, investigations defined the inferred extent of occupation in all periods. This made clear the academic need for the proposed project.

A second long-standing concern of both institutions, in addition to the documentation of the archaeology of the valley, has been its preservation. The site is under threat, with a major axis of expansion of modern Herakleion heading up the valley toward Knossos. Since the mid-1970s the site has been legally protected by the Alpha Zone defined around the site, but this is under pressure for development, particularly with only limited visible archaeological remains. So it was both important and timely to document the site more comprehensively, to effectively manage its archaeological heritage. With these concerns in mind, the survey was designed from the start as both an academic and a management tool.

Pursued as a collaboration between the BSA and the Herakleion Ephoreia, we defined four principal objectives:

1. to record the archaeological resources of the valley to aid their protection and manage future development in the valley;
2. to document systematically the archaeological record, to contextualise a century of research and rescue investigations;
3. to integrate new systematically collected surface data with existing excavation data to reconstruct long-term urban dynamics at Knossos; and
4. to establish a comprehensive base-line for future research in the valley.

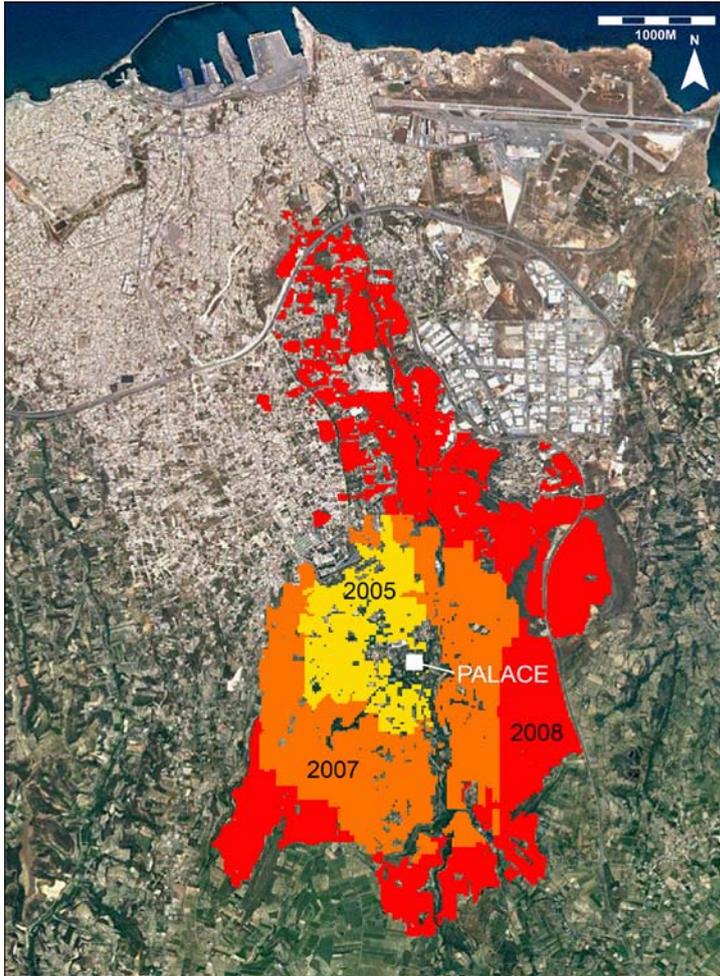


Fig. 2. KULP: survey location and fieldwalking progress by year.

We field-walked in 2005, 2007 and 2008, taking a break in 2006 to start to process the nearly 300.000 sherds we recovered from the city in 2005 (Fig. 2). Three teams were fielded daily, consisting of a team leader and usually four walkers.

We surveyed all fields we could access where vegetation allowed any visibility. While our archaeological permit allowed us to survey all land within the defined boundaries, if we could not

convince a land-owner to allow us access, we did not survey their property. Only a very limited number of individuals did not allow us on their land; we are extremely grateful to the vast majority of residents of the valley for facilitating the project.

Whitelaw's previous experience collecting and analysing data from rural and large-site surveys made it clear that we needed large and systematic pottery samples. For a project on this scale, there would be no value in having to do it again in the future. The rescue context for areas outside the protected Alpha Zone also meant there was unlikely to be another opportunity to do so.

In addition, a site occupied for such a long period and investigated so intensively, presented an exceptional opportunity to undertake a very detailed study. Both the very detailed documentation of the Knossian pottery sequence (*e.g.* Momigliano 2007; Coldstream *et al.* 2001) and preparatory work by Whitelaw on the collections of pottery retained from BSA excavations in the Stratigraphic Museum at Knossos, made it clear that ceramic fabrics changed on a fairly regular basis, and would allow pottery to be at least broadly dated by fabric alone, to 200-500-year intervals. This degree of chronological resolution, rarely possible for the bulk of sherds encountered in archaeological surveys, held out the prospect for more convincing inferences

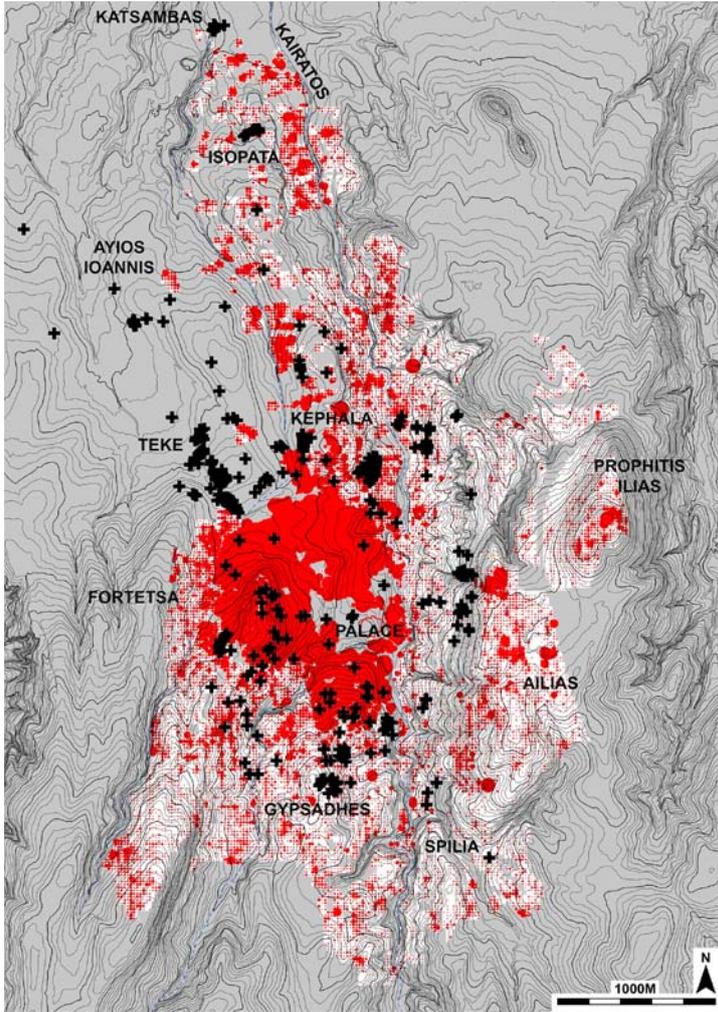


Fig. 3. Survey area, all collected sherds and excavated tombs.

based on substantial samples, and justified collecting all sherds within defined sample units.

Preliminary scouting by Whitelaw of sherd densities across the site defined the focal area for the survey, and also allowed estimates of the quantities of sherds that could be recovered through different strategies, and thus could be considered in terms of the practicalities of collecting, processing, storing and analysing the material. Discussions with the BSA

indicated that we could expect large-scale access to the School's research facilities at Knossos for about six years, before the next planned major field project, so this also needed to be factored into the collection strategy in terms of the scope for initial large-scale processing of the recovered material.

Over the entire city and well beyond, we collected a standard sample of all material (sherds greater than 1cm; all other finds) from 10m<sup>2</sup>, within each 20m grid square (400m<sup>2</sup>, a 2.5% sample). The 10m<sup>2</sup> collection area was located for the best surface visibility within each grid. In all, we recovered some 355,000 sherds and 49,000 fragments of tile ranging from Neolithic to modern, from some 17,000 20m grid squares within the 21,000 grids searched, covering 11 sq km (Fig. 3). We recovered over 10,000 other finds in a wide range of materials, but to date have concentrated on analysing the pottery, because it provides the framework for understanding the rest.

At the core of the site, it was not possible to survey within the fence defining the palace area, nor would it have been effective to do so, most of the area being contaminated by back-dirt from the excavation of the palace and the surrounding houses. It was also neither feasible nor productive

to survey within the built-up areas of the upper (Bougadha) and lower (Makryteikhos) villages. Thankfully, all three areas have been quite extensively investigated, the villages through rescue excavations particularly since the 1970s. The different investigation strategies therefore provide complementary information, covering all of the archaeological site and surrounding landscape.

For the Alpha Zone, we used a 1:1.000 map surveyed for the Ephoreia by the Athens Polytechnic in the mid-1980s; beyond that core area, we relied on the Hellenic Army Mapping Service's 1:5.000 maps surveyed c. 1978. Grids were located on the ground using aerial photos provided by the Ephoreia, measured on the ground by tapes, pacing, and alignment; in 2007 and 2008, hand-held GPS were also used. Because of the amount of construction outside the Alpha Zone since the available maps were drawn, a Quickbird satellite image was commissioned in 2007. This was digitised for the base-map in 2007-08, and supplemented and up-dated the aerial photo coverage.

The 20m grid size was larger than has become standard for Aegean transect-based landscape surveys, where 15m spacing was designed to ensure small farmstead-sized sites would not be missed between walker lines. But on an urban site, one is usually dealing with higher densities of material (at Knossos 30-70 sherds/m<sup>2</sup> over much of the city), deposited and subject to different discard and mixing processes. Pragmatically, if large individual samples were maintained, a 10m grid would have produced some 1.5 million sherds to process.

After collecting the standard systematic sample, walkers searched the rest of each 20m square for archaeological features and exceptional artefacts, producing both a systematic sample which could be analysed statistically, and a supplementary grab sample.

During 2007, after we had surveyed well beyond the concentrations representing the city, we changed this collection strategy in response to two pragmatic factors. First, outside the city, surface densities were so low that many 10m<sup>2</sup> collection areas produced few or no sherds. But by then, it was also clear that the intensive collection strategy would not enable us to complete coverage of the full study area. So we were faced with two seemingly contradictory problems – we needed to collect intensively from a larger area to increase the likelihood of recovering any material, but also had to move faster. After maintaining our original collection strategy well beyond the limits of the dense urban distribution, and so ensuring comparability of recovery across the city (the primary focus of the project), we changed to walking two transects across each 20m grid, searching a 1m-wide transect. This increased the intensively searched area to 40m<sup>2</sup> (a 10% sample), but also increased the coverage rate, enabling us to complete the originally proposed study area. This latter was particularly important from the perspective of documentation and management of the entire Alpha Zone.

At the time, the new strategy seemed effective, but of course we were searching four times the area in each grid, considerably more rapidly. Analyses indicate that the cost was in the size of material recognised and recovered, with a systematic bias toward larger sherds (Whitelaw 2013).

Of the sherds recovered, about 20% retain some trace of form or decoration. Where this can be estimated from published surveys (comparing their field counts to studied material), Aegean

surveys usually have a diagnostic sherd rate of c. 8-12%. Our higher rate might reflect lesser battering of surface material in the Knossos valley, but is far more likely simply to reflect the higher recognition of diagnostic features when this is assessed with washed material, not relying on a snap decision made in the field with unwashed material, usually assessed while still on the ground. On the one hand, one can argue that the major costs of a survey are getting teams into the field (transport, accommodation, subsistence), so doubling the information return is obviously attractive. On the other hand, we transported, washed and processed ten times as many sherds, for twice the diagnostic returns, with all the concomitant labour and storage costs. In this case, because of our intensive understanding of the Knossian ceramics and our ability to date nearly all sherds at least broadly on the basis of fabric alone, this was very justifiable, but the pros and cons might be and usually are assessed differently in other surveys.

Were such large samples necessary? Though dealing with 300-500 sherds per collection over much of the city, these quantities rapidly decrease when one recognises that most samples divide roughly into one-third each prehistoric, Hellenic (Protogeometric to Hellenistic) and Roman (including Early Byzantine), each phase roughly representing material from 800-900 years of intensive deposition. If less than 20% of these are the most highly diagnostic – sherds potentially ascribable to individual ceramic periods, each still usually representing a century or two – the need for large samples to address any questions other than simple chronological presence/absence, is obvious.

Of course all this effort presupposes that the surface archaeological record tells us something about the sub-surface record and the material originally deposited near that location. At Knossos, this can be demonstrated both by the sheer amount of material from earlier periods represented on the surface, even at the core of the Roman city, but is also explained by the extreme amount of pit-digging and stone-robbing to Minoan levels, documented for example in the Unexplored Mansion excavation (Sackett 1992). This is bad news for much of the post-Bronze Age stratigraphy and accounts for the only scrappy survival of pre-Roman architecture and stratified levels within the city. But this is an obvious boon for surface survey, bringing quantities of earlier sherds to the surface, such that our abundant surface material should provide a fairly reliable record of the subsurface remains.

The distribution of all surface sherds for all periods (Fig. 3) indicates the highly nucleated occupation for all periods at the site, which will be explored in greater detail for each of the major phases in the other papers from this conference session (see Legarra Herrero (2018), Shapland (2018), Cutler and Whitelaw (2018), Kotsonas (2018) and Trainor (2018), which follow in this volume). Before the survey, we thought that our documentation of the cemeteries beyond the city would take us far enough out into areas not previously investigated in detail, such that we might pick up small hamlets which might periodically form away from the city and subsequently be brought in, in different periods, giving us an assessment of the local impact of the changing nature of the city during the cycles of urbanisation and collapse. In fact, there are few such indications, with local occupation highly nucleated at the city through the nearly eight millennia of its existence. There was a large but low density suburb overlooking the city on the summit

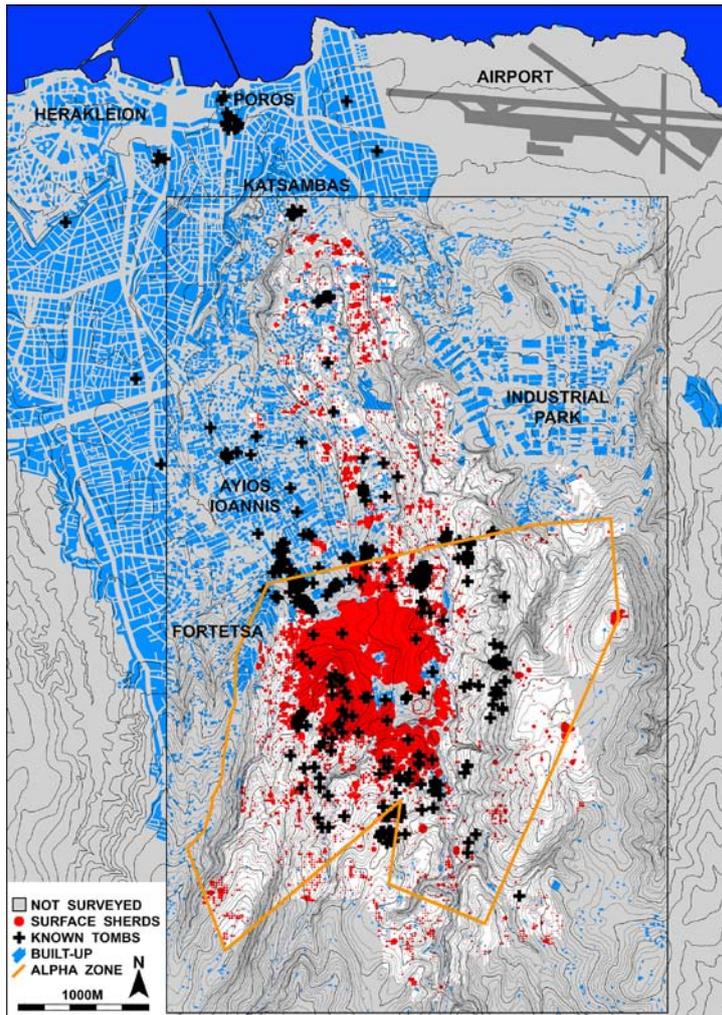


Fig. 4. The survey area in relation to modern Herakleion, collected sherds, excavated tombs and the protected Alpha Zone.

of Ailias, east of the Kairatos, in the MM and LM I periods, and repeated but scattered or low density activity on the tall conical hill of Prophitis Ilias, to the northeast. There was also a relatively extensive but low density scatter, probably representing occupation, at the

southwest corner of the study area, with material from the prehistoric through Roman periods. It may be that a natural feature, such as a spring, served as a magnet to repeatedly attract settlement there.

The other limited concentrations, particularly flanking the Kairatos valley north of the city, appear to be large but very low density scatters. They correspond to areas known to be used for cemeteries from prehistory through at least the Early Iron Age (EIA), but it is possible that some of this material may indicate dispersed farmsteads or hamlets, about as far from the city as the hamlet in the southwest, and intermediate between the city and its port at Poros-Herakleion.

In terms of site management, we investigated all of the Alpha Zone and as much of the Beta Zone north of the city as was available for surface exploration (Fig. 4). We did not survey a strip along the west boundary of the Alpha Zone, including the east side of the village of Fortetsa and the slope below it, as this rising slope was beyond the landscape directly relevant to Knossos. The present Alpha Zone has effectively protected the archaeology of the city, and the principal cemeteries of the city on the west, south and east. On the north, much of the mortuary landscape has been lost beneath the expansion of Herakleion's suburbs into Ayios Ioannis and

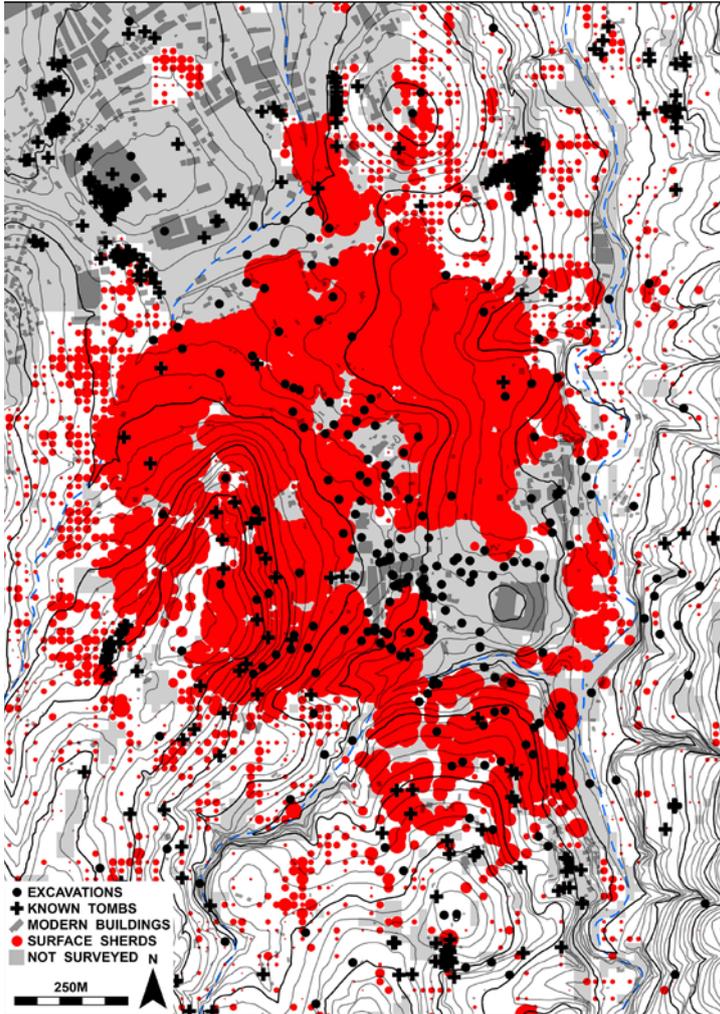


Fig. 5. City area, collected sherds, excavations, visible ancient remains, and modern structures.

Ambelokipi/Teke, a regular focus of rescue excavations. Our investigations, and earlier excavations, indicate that the urban occupation extended as far as the gully of the seasonal stream which originally ran under the car park of the Venizeleion hospital; Roman

house walls can be seen cut by the drainage ditch, dug to divert the stream when the hospital was constructed in the early 1950s, and tombs of Minoan to Early Byzantine date have been recovered under and around the hospital and the Medical Faculty buildings immediately to the north.

Members of the project will review our present understanding of the city, and the contributions made by the project, by period, in the papers which follow. Here it is simply worth making two general observations of ways in which the systematic and continuous coverage of the surface survey complements and extends the understanding of the site built up over the preceding century of intensive investigations.

A comparison of the aggregate surface pottery distribution with the locations previously known, either through excavations, or because of visible archaeological features (Fig. 5), makes clear that large areas of the ancient city have simply never been investigated intensively or at all. When we qualify this by observing that most of the dots representing known features in the southwest are visible Roman rock-cut tombs, and that many of the excavations away from the southern core of the site were very limited rescue excavations often stopping at the uppermost Roman levels

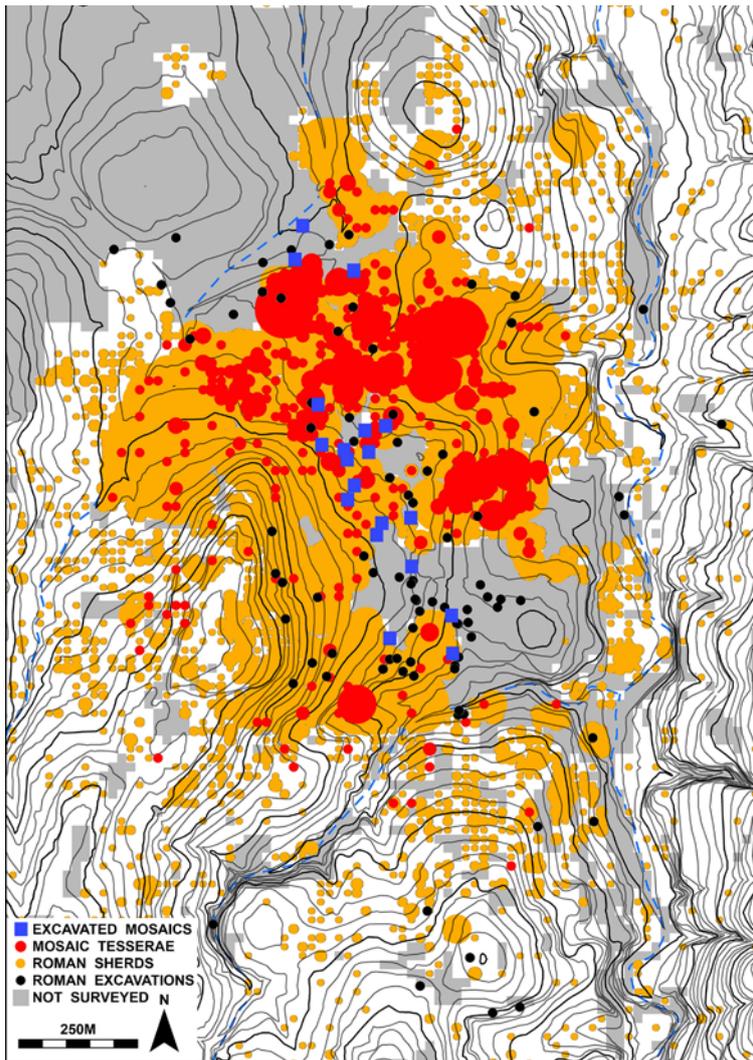


Fig. 6. City area, all Roman sherds, excavations with Roman material, excavated mosaics and surface mosaic tesserae.

(documenting that archaeology was present), the actual knowledge of the site represented by the mapped dots is reduced considerably.

As well as providing nearly comprehensive coverage, spatial and temporal, of the occupation of the site, the continuous picture provided by the survey serves to contextualise existing knowledge in three ways. First, the areas investigated through excavations provide very structured information; for major research excavations, principally focused on the prehistoric periods, these are clustered at the south centre of the site, surrounding the palace. In contrast, the smaller rescue excavations, often limited to the latest levels, are principally under the two villages, the hospital and Medical Faculty, and along the main road. As an example of the effect of these biases, recent studies of the mosaics of Roman Knossos have identified an area of elite housing probably flanking the major northwest to south-central street through the city (Sweetman 2003; 2007). In Figure 6, these can be seen to correspond to a fair degree with excavations which have revealed Roman deposits. But the distribution of stone tesserae from mosaics recovered by the survey indicates a far more extensive distribution of mosaics across most of the northern core

of the city, with those documented through excavation forming a ribbon along the west side of this distribution, essentially corresponding to the distribution of rescue excavations under the upper village and along the modern road. So the continuous coverage of the survey allows us to re-assess, contextualise and better understand earlier excavations.

Second, it has been noted that most rescue excavations have not been published, being judged not to document, on their own, interesting information. This is largely a corollary of their limited extent, limited material, and the difficulty of relating them to often distant neighbouring tests. The continuous coverage provided by the surface assemblages can now provide a local context for interpreting such deposits. Indeed, the abundance of such small subsoil tests was a significant attraction for undertaking the survey, allowing us to 'anchor' our surface distributions to subsoil investigations, to aid the interpretation of each.

Finally, the surface collections, recovered through rigorously comparable collection methods, allow existing excavation information to be contextualised in terms of standardised, quantifiable assemblages. Excavations, unsurprisingly given the sheer quantities of material recovered, have invariably been very selective about what is collected, retained and published (published accounts and the retained collections in the Stratigraphic Museum suggest the standard rate of sherd retention for excavations during the later 20th century has been c. 5% – the most highly diagnostic material). Given that our questions change as archaeology develops, this can lead to very biased collections. For example, studying later Hellenistic and Roman amphorae as indices of imports into the city, one cannot do quantified studies on any published collections (e.g. Hayes 1993; Sackett 1992), since what was originally recovered is not presented, and the decisions about what was retained and of that, what published, are rarely stated explicitly. Based on a review of the collections and publications, one can anticipate that better preserved examples were retained, and examples of (then) recognisable imports, but no quantification to assess the patterns of trade and how these changed through time can be meaningfully pursued. At present, all ceramics recovered from our systematic collections have been retained and can be used in quantitative analyses, all across the city, to help us better understand the retained and previously published evidence, and ultimately the past behaviour of the occupants of the city.

So the potential for changing our understanding of the site is significant, both in terms of new information, but also in terms of how this allows us to expand and develop our understanding of previously collected evidence. It is the purpose of the following papers to present our current and developing understanding of the site during different phases, integrating the existing evidence with our interim interpretations of our survey data.

A few final comments on the current stage of the project, and how the evidence drawn upon in the following papers has been compiled, will help readers to assess what weight to give to specific observations and interpretations, and to what degree these are likely to change as further documentation, analysis and interpretation progress.

In terms of our survey data, the papers which follow will almost exclusively consider ceramics, for several reasons. These represent the vast bulk of the material recovered by the survey, reflecting the ubiquity of their consumption in all periods, their near indestructibility, and

their diagnosticity, with so much attention in Mediterranean archaeology focused on ceramics as chronological indicators. They have been the near exclusive focus in the project's study seasons to date, because they provide the chronological and spatial framework for interpreting everything else. The flip side is that all other archaeological materials are extremely limited for all periods preceding the Roman. This is due to the quantity and diversity of material culture consumed in the Roman and Early Byzantine periods, its mass-produced character, and hence its diagnosticity.

Processing the ceramics has been undertaken in several stages, under Whitelaw's supervision. First, following washing, all collections were rapidly processed, extracting all non-pottery finds, and separating pottery into tile, body and diagnostic (feature or decorated) sherds. The tile, by its spatial distribution, is apparently nearly all Roman in date. The c. 90,000 diagnostic sherds were subsequently sorted by date and into readily recognisable and replicable categories, by student volunteers, checked by Whitelaw, processing several thousand sherds a day. All diagnostic sherds were subsequently reassessed individually by Whitelaw, drawing on the experience of having seen the broader patterns represented across the entire collection, supplementing his previous experience based on reviewing retained excavated material. This documented several hundred sherds a day. The chronological distribution patterns identified at this stage did not differ significantly from the first stage of sorting, and have been corroborated by the subsequent specialist analyses.

The largely undiagnostic body sherds were sorted by fabric comparably to the first stage of diagnostic sorting, at a rate of several thousand a day. This is satisfactory for the fairly distinctive coarse and cooking fabrics in all major periods, but less reliable for the fine wares, since the same local clays were generally used in all periods, so distinctions rely more on firing, hardness, and surface finishing.

Since 2010, the members of the project who report on their work in the other KULP project papers in this volume have been studying material from specific phases in detail. Borja Legarra Herrero, Andrew Shapland and Joanne Cutler participated in the project from the start of fieldwork, and trained themselves on their period specialisations through several seasons studying the excavated collections from Knossos. Antonis Kotsonas joined the project in 2010 and spent time familiarising himself with the Knossian collections, drawing on much broader familiarity with Cretan EIA ceramics. Conor Trainor joined the project in 2014, having developed an interest in Knossian ceramics through teaching the Archaic to Late Roman component of the BSA's Knossos pottery course. We started the focus on the earlier phases because of the far more variable and localised character of the ceramics in the prehistoric periods.

For the specialist studies, attention first focused on alternating 100m-wide transects (five 20m collection units wide) running south to north across the city. This is the longest axis of the sherd distribution, and as known from the preliminary analyses, the major direction of expansion and shift of the city through time. It was anticipated that this would provide the broad history of the most significant changes in the long-term occupation of the site. Given the time this detailed study would take, and the decline in information returns that studying the remaining transects

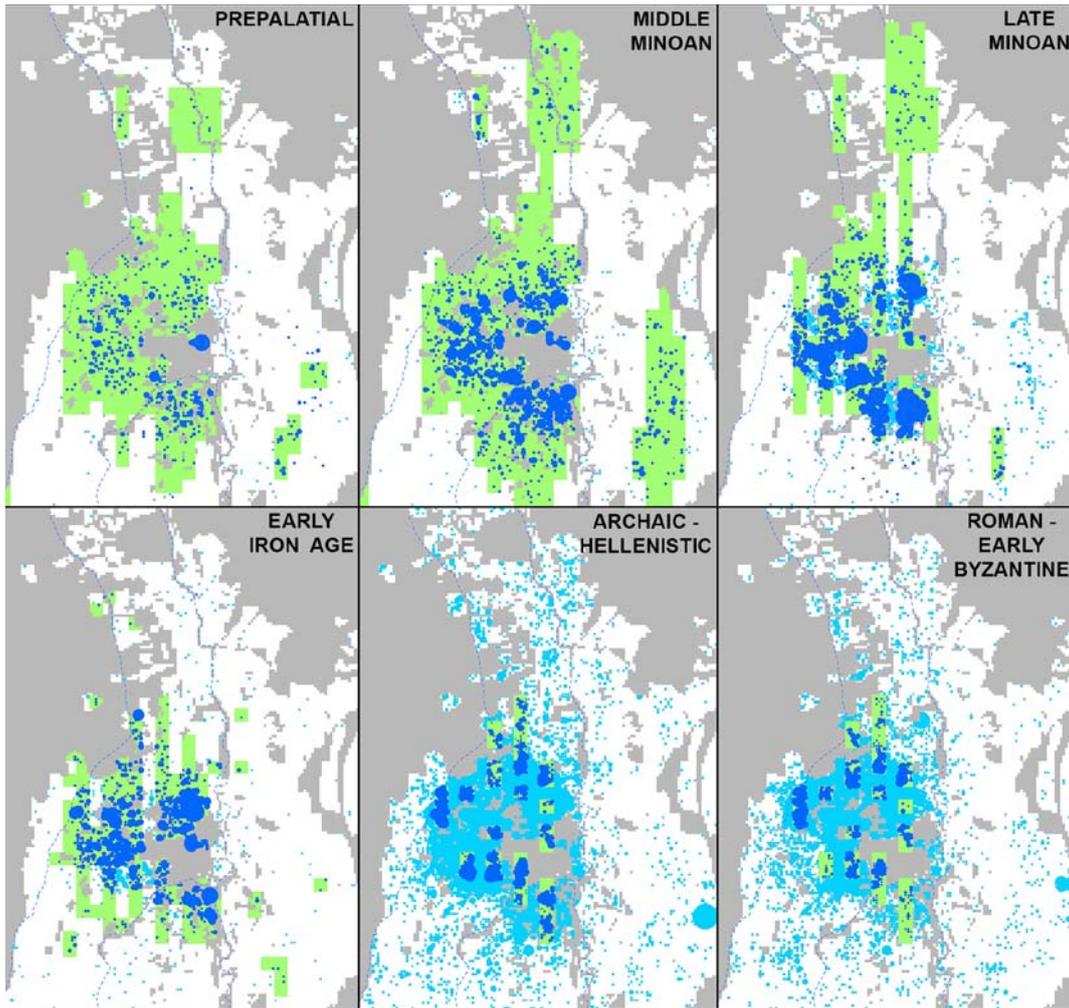


Fig. 7. Survey units studied for each major phase: A. Prepalatial; B. Middle Minoan; C. Late Minoan; D. Early Iron Age; E. Archaic to Hellenistic; F. Roman to Early Byzantine.

in the same degree of detail would produce, it was anticipated that with this common comparable framework across all periods, the intervening 100m transects could be studied more strategically by each specialist. This would mean that different squares might be studied by individual analysts to address their period-specific questions. This was a pragmatic compromise between the time required for such detailed documentation and the new information obtained. Given the history of slow publication at most major sites in Crete, a pragmatic compromise seemed justified. It was also becoming increasingly clear that while the detailed studies provided a wealth of information not documented in the preliminary study, the broad overall picture was not changing dramatically, though it now could be nuanced considerably.

The result is that a common set of transects across the city has been studied in detail by all analysts, but other components of the coverage differentially (Fig. 7). In addition, analysts have sampled some of the outlying low density distributions, mostly thought to represent cemeteries. This has been less successful, because with only limited sub-surface reservoirs of material,

either from shallow episodic occupations or from disturbed tombs, most of the material on the surface is quite battered, and has only limited diagnosticity. Fabric alone allows most sherds to be assigned to a broad phase and category (fine, coarse, cooking), but relatively few sherds can be given more detailed identifications.

Because of the spatial gaps in the specialist studies, in the following papers, the preliminarily dated material is also plotted. While the detailed dating should supersede the preliminary documentation, it is not possible to match up the two assessments of each unit, because the preliminary dating by Whitelaw is not by individual sherd, but by unit (x sherds of a date / type within the collection). Individual sherd documentation was not possible given the sheer quantity of material to be assessed, and because it was anticipated that more detailed and informative study would follow. These distributions remain relevant because subsequent study has indicated the preliminary identifications are basically reliable, if usually not as detailed as the follow-up studies.

The papers which follow use a common set of conventions to display information on maps, on a standard base map with 4m and 20m contours. The outline of the Bronze Age palace will often be included simply for orientation. The 20m squares in grey were not surveyed, the remaining white squares were. Dots of varying size indicate the relative counts of sherds per collection unit. Usually in light blue, are counts from Whitelaw's preliminary dating, with detailed dating indicated in dark blue. For reference, in green are the squares re-studied in detail by each analyst. Finally, excavation data has been indicated in black, with dots for sherds and deposits, and crosses for tombs.

In Figure 7, the areas studied in detail for each major phase are indicated. Study is now complete for the Prepalatial, Middle Minoan, and Early Iron Age, and detailed publications are in preparation. The analyst who prepared to study the LM II-III period left archaeology, and a new analyst is expected to start work soon. But for this overview, we can bridge this gap to some degree by drawing on preliminary identifications and the evidence from excavations.

Overall, the Knossos Urban Landscape Project allows us to trace in detail the development of the major centre at Knossos from the 4th millennium BCE through most of the 1st millennium CE, as will be outlined in the papers by Borja Legarra Herrero (2018), Andrew Shapland (2018), Joanne Cutler and Todd Whitelaw (2018), Antonis Kotsonas (2018), and Conor Trainor (2018), which follow in this volume. A final paper provides a general overview of the results to date (Whitelaw, Bredaki and Vasilakis 2018).

#### ACKNOWLEDGMENTS

The Knossos Urban Landscape Project is a collaboration between the British School at Athens and the Herakleion Ephoreia of the Hellenic Archaeological Service. It is directed by Todd Whitelaw, Maria Bredaki and Andonis Vasilakis. We are grateful to the Ministry of Culture and Sport for granting, and the BSA for administering the permit to undertake fieldwork.

Study has been based at the research facilities of the British School, at Knossos, and facilitated by the BSA Curators and their staff to whom we are also very grateful.

The project would not be possible without the financial and practical support of the Institute for Aegean Prehistory, the British Academy, the Herakleion Ephoreia, the British School at Athens and the Institute of Archaeology, University College London.

The fieldwork would have been impossible without the co-operation of the residents of the Knossos valley, who allowed us to explore their properties.

We would particularly like to thank our ceramic specialists, Borja Legarra Herrero, Andrew Shapland and Joanne Cutler, who have been with the project since the start of fieldwork, Antonis Kotsonas and Conor Trainor who joined us later, and over 130 other participants in the project who have collected, sorted and helped document our material over the years.

Participation at the Cretological Congress by members of the project was funded by the Department of Classics, the University of Cincinnati; the British Museum; the Institute of Archaeology, University College London; from KULP project funds and the individual contributors.

All figures for this paper were produced by Todd Whitelaw.

## BIBLIOGRAPHY

- Nicolas Coldstream, Jonas Eiring and Gary Forster (2001), *Knossos Pottery Handbook: Greek and Roman*, British School at Athens Studies 7, London, The British School at Athens.
- Joanne Cutler and Todd Whitelaw (2018), "Neopalatial and Mycenaean Knossos: Urban Expansion and Collapse", *12th International Congress of Cretan Studies* (this volume), Heraklion, SCHS.
- Arthur Evans (1928), *The Palace of Minos at Knossos*, London, Macmillan.
- Doniert Evelyn, Helen Hughes-Brock and Nicoletta Momiogliano (eds.) (1994), *Knossos: a Labyrinth of History: Papers Presented in Honour of Sinclair Hood*, London, The British School at Athens.
- John Hayes (1983), "The Villa Dionysus Excavations, Knossos: the Pottery", *Annual of the British School at Athens* 78, 97-169.
- David Hogarth (1899-1900), "Knossos. Summary Report of the Excavations in 1900: II. Early Town and Cemeteries", *Annual of the British School at Athens* 6, 70-85.
- Sinclair Hood and David Smyth (1981), *Archaeological Survey of the Knossos Area*, BSA Supplementary Volume 14, Oxford, The British School at Athens.
- Antonis Kotsonas (2016), "Greek and Roman Knossos: the Pioneering Investigations of Minos Kalokairinos", *Annual of the British School at Athens* 111, 299-324.
- Antonis Kotsonas (2018a), "Early Iron Age Knossos and the Development of the City of the Historical Period", *12th International Congress of Cretan Studies* (this volume), Heraklion, SCHS.
- Legarra Herrero Borja (2018) "Knossos: From the Neolithic to the End of the Prepalatial period", *12th International Congress of Cretan Studies* (this volume), Heraklion, SCHS.
- Nicoletta Momiogliano (2007), *Knossos Pottery Handbook: Neolithic and Bronze Age (Minoan)*, British School at Athens Studies 14, London, The British School at Athens.
- Hugh Sackett (1992), *Knossos from Greek City to Roman Colony: Excavations at the Unexplored Mansion*, British School at Athens Supplementary volume 21, London, The British School at Athens.

Andrew Shapland (2018) "Protopalatial Knossos: the Development of a Major Urban Community", *12th International Congress of Cretan Studies* (this volume), Heraklion, SCHS.

Rebecca Sweetman (2003), "The Roman Mosaics of the Knossos Valley", *Annual of the British School at Athens* 98, 517-547.

Rebecca Sweetman (2007), "Identification of Space Through a Study of Mosaics: a Case Study, Knossos, Crete", Ruth Westgate, Nick Fisher and James Whitley (eds.), *Building Communities: House, Settlement and Society in the Aegean and Beyond*, The British School at Athens, Studies 15, London, The British School at Athens, 363-371.

Conor Trainor (2018), "Polis, colony and beyond: urban Knossos from Archaic to Late Roman times", *12th International Congress of Cretan Studies* (this volume), Heraklion, SCHS.

Todd Whitelaw (2000) "Beyond the Palace: a Century of Investigation in Europe's Oldest City", *Bulletin of the Institute of Classical Studies* 44, 223-226.

Todd Whitelaw (2013), "Collecting Cities: Prospects and problems", Paul Johnson and Martin Millett (eds.), *Archaeological Survey and the City*, University of Cambridge Museum of Classical Archaeology Monograph 2, Oxford, Oxbow Books, 70-106.

Todd Whitelaw, Maria Bredaki and Andonis Vasilakis (2018), "The long-term dynamics of Knossos in context", *12th International Congress of Cretan Studies* (this volume), Heraklion, SCHS.