I. The Çukuriçi Höyük Research Project

Barbara Horejs

The following overview will provide the backbone information of our long-term investigations at Çukuriçi Höyük. Each project has its own biography by means of research questions and related team establishment, research history and publication program. The first volume of the Çukuriçi Höyük publication series starts with this background information inclusive of our main methodologies and approaches, which are important for the detailed studies in this book based on the excavated data.

I.1. The Site and its Investigation

The site of Çukuriçi Höyük has always been visible in the eastern plain of Bülbül Dağı as a small, elevated feature in the landscape and had already been mapped by A. Schindler in 1897 as a natural mound (Fig. 1.1).¹ The first archaeological investigations took place in 1995 as a salvage operation,

Fig. 1.1 Çukuriçi Höyük in the plain of the Derbent valley with a view from the Bülbül Dağı in the west
(photograph: N. Gail/ÖAI)

¹ Benndorf 1906, attached map.
due to intensified farming activities in the plain. The rescue activities of the local archaeological museum (Selçuk Müzesi) were published 1998 in a report by Ç. İcten and A. Evren. They presented some Early Bronze Age and potential Chalcolithic finds related to some structures excavated within small trenches located on the top of the tell.\(^2\) Despite the hereby first detected contextualised prehistoric evidence in the vicinity of antique Ephesos, the site was continuously disturbed in the following years. The main destruction took place presumably between 1995 and 2005, when the surrounding fields were enlarged by cutting the tells’ edges in the north and levelling its cultural layers in the southern part. Parts of the tell erased by modern disturbances were farmed, accompanied by the installation of a massive water pipe in an east-west direction for irrigation. In addition, the tell itself has been irrigated and farmed (not very successfully) until the first systematic excavations were initiated in 2006. Thanks to the 2005 initiative of the director of the Ephesos excavations, F. Krinzinger, the prehistory of the region came into focus for the first time since 1893 in the Austrian engagement in Ephesos. By integrating the prehistory into the archaeological site concept of the Austrian excavations, he offered the author the opportunity to excavate a Late Bronze Age burial in Halkapınar\(^3\) and to conduct the first test soundings at Çukuriçi Höyük in 2006. A year later, the first project funded by the Austrian Research Fund (FWF) and managed by the author began and constitutes the first systematic investigations of Çukuriçi and its surroundings between 2007 and 2010.\(^4\) The scientific potential of the site in providing groundbreaking new results became obvious during the first three years and, consequently, led to broader follow-up projects funded by FWF as well as by the European Research Council (ERC) since 2010 and 2011, respectively.\(^5\) Additional support came from the collaboration with the Marie Curie ITN network “BEAN” between 2013 and 2016; the project was managed by J. Burger (Mainz). Several additional grants have been awarded to members of the Çukuriçi team since 2014.\(^6\) The lack of experienced and specialised researchers in the Austrian prehistoric scientific community in Aegean-Anatolian prehistory made it necessary to integrate and train students and young scholars from the beginning of our investigations until today. So far, 23 academic theses dealing with Çukuriçi materials and topics have been initiated and supervised, of which 11 are successfully finished to date. Some of these supervised thesis topics are partially integrated in this volume and represent the outcome of an intensive collaboration and supervision of students. The Çukuriçi excavations therefore developed into a platform for training Austrian and international young academics over the years; which led to the establishment of the new research group Anatolian Aegean Prehistoric Phenomena at the OREA Institute of the Austrian Academy of Sciences.\(^7\)

### Excavation and Documentation Methodologies

Systematic excavations took place between 2007 and 2009 (20 weeks) as well as from 2011 to 2014 (31 weeks) in seven seasons of altogether 51 weeks (Fig. 1.2). The excavations were conducted with experts, students and experienced local workers. All removed sediments were dry-sieved and additional wet-sieving (flotation) took place on-site as well. The general methodological system of the excavation is based on stratigraphical units as continuous unique numbers (‘stratigraphische Einheit: SE’), which are each documented in detail; they are described, measured and defined in their stratigraphical positions. This information was collected in standardised

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\(^3\) Horejs 2008.

\(^4\) FWF project P 19859-G02.

\(^5\) FWF START project Y 528-G02; ERC Prehistoric Anatolia 26339; FWF project P 25825 ‘Interaction of Prehistoric Pyrotechnological Crafts and Industries. Natural Resources, Technological Choices and Transfers at Çukuriçi Höyük (Western Anatolia)’.

\(^6\) PhD grants awarded to Ch. Britsch (DOC grant by AAS), M. Röcklinger and St. Emre (DOC Team grants by AAS); Postdoc grant awarded to M. Brami (Fonds National de la Recherche Luxembourg, AFR-Postdoc Grant).

\(^7\) For further information regarding the AAPP group see OREA annual reports since 2014, available online.
formulas on-site and was integrated into the database afterwards. Photogrammetric documentation forms the basis of additional detailed information added on-site by the excavators and the excavation engineers. Mario Börner, as the responsible excavation engineer of all seasons, coordinated the entire documentation procedure. He also generated the detailed single layer plans in AutoCAD in strong cooperation with the trench managers Ch. Schwall and F. Ostmann during and after the excavations. All small finds, in-situ ceramic jars, accumulation of sherds, etc. have been measured separately on-site to provide detailed distribution maps related to single layers. Aside from the stratigraphical unit sheds, the digital database, photogrammetric documentation and single layer plans, there is also a general excavation diary as well as hand-drawn sketches. All these separate data form the Çukuriçi documentation archive. All removed finds have been sorted and categorised on-site immediately after their recovery. Within this first stage of sorting, the principal information was collected and documented in standardised find formulas for each stratigraphical unit. After cleaning and restoration procedures, detailed documentation was conducted in tandem with the excavations in the depot. All information regarding the excavations and finds are stored as analogue and preliminary digital archives; the latter are scheduled to be transferred to a permanent digital Çukuriçi repository in the near future. Detailed publication of the excavation data of each settlement phase or chronological period, respectively, is currently in preparation and is planned as volumes in this series.

Interdisciplinary Approach

Due to the research concept of studying the site and its wider vicinity in relation to environmental conditions and raw material procurement strategies, an interdisciplinary approach has been in progress since 2007. Several experts of different scientific fields provide the analytical
data of various raw materials excavated on site. The parallel environmental surveys focused on metal sources (G. Borg, D. Wolf, M. Mehofer), clay sources (L. Peloschek, D. Wolf) and stone sources (D. Wolf) now offer a detailed picture of their availability and procurement in prehistory. Additional studies of the knapped stone materials and their identification have been conducted by M. Brandl, M. Martinez and B. Milić. Further information of already analysed marble quarries in Ephesos has been provided by W. Prochaska to identify their potential use at prehistoric Çukuriçi as well. Various analyses were carried out in European labs to identify and define the differently used metals (E. Pernicka, M. Mehofer), pigments and lime (J. Weber), minerals (D. Wolf), cherts and flints (M. Brandl, Ch. Hauzenberger), jadeits (D. Wolf, L. Sörensen, P. Petrequin) and obsidians (E. Pernicka). Besides the essential identification of used sources, a research collection of all raw materials observable at Çukuriçi has been built up, and is permanently available in the Ephesos excavation house depot. Ceramics have been studied petrographically by L. Peloschek, she has also developed a systematic framework of all pottery fabrics that can partially be related to their clay sources.
An important impact to the environmental framework has been provided by the paleogeographical team (H. Brückner, F. Stock) through their study of the landscape’s development and the shifting of the coastline (Fig. 1.3). These results regarding the prehistoric environment through time are complemented by the crucial faunal studies of A. Galik and U. Thanheisers and B. Eichhorn; they provided results of the excavated botanical remains and charcoals. Palynological studies of drillings in the Belevi region are expected to produce essential new data of the environmental development and changing human impact, thanks to the Ephesos excavations pollen project. The few anthropological remains stemming from the 4th and 3rd millennia BC have been studied by F. Kanz, while the study of potential aDNA remains of Neolithic animal bone fragments are being undertaken by D. Bradley. More than 100 radiocarbon dates of the whole Çukuriçi sequence have been modelled by B. Weninger.

Research Questions

The main aims of the Çukuriçi excavations are related to the definition and understanding of various prehistoric periods detected for the first time in the micro-region. The tell provided an excellent archaeological archive for various periods, which first of all required an archaeological-cultural definition by means of materials and chronologies. A complete vertical sequence from the ground soil to the latest usage of the tell was intended to offer a solid chronological framework. The tells’ embedment in the landscape was the second main question – the focus was on understanding the site in its ecological and environmental context across time. Within these environmental studies, the change of the landscape through time, including potential abrupt climatic events and human impact, was in focus as well. Due to the lack of essential geological data, an additional approach was to focus on natural sources in the micro-region and their potential procurements. The third general aim concerns the different settlements and their large-scale context as well as detailed spatial analyses of these settlements. Each settlement phase is therefore studied in detail to provide solid data for the sites’ definition. Detailed spatial analyses combined with reconstructed deposition processes provide the background of potential activity zones and an interpretation of each zone’s function. These data are used for the modelling of a site’s specific history and its environment.

The integration of this micro-scale approach into a broader socio-cultural context forms another general aim of our investigations. The particular site’s characteristics in each phase and archaeological period are analysed and discussed in regional and supra-regional comparisons and perspectives, and are related to each period’s specific research questions. These are in chronological order: the beginnings of sedentism and early farming societies (including their potential origins) in the early 7th millennium, the development of housing societies and the establishment of village life, the definition of potential regional Neolithic groups and their connectivity and networks, development and changes in Neolithic subsistence, raw material procurement and economies. Detailed analyses of the Late Chalcolithic remains are focused upon for contextualisation of the Çukuriçi remains into the wider picture of 5th and 4th millennia settlement structures, subsistence strategies, materiality, regionalism and inter-regionalism as well as far-reaching networks. In addition, the 4th millennium data offers the opportunity to discuss the archaeological periodisation, potential concepts of the Chalcolithic as a period and the transformation into the Early Bronze Age in relation to socio-cultural developments (e.g. ‘proto-urbanisation’). Our approach aimed to integrate questions of socio-economical organisation and specialisation (metallurgy, textile and pottery production, etc.) into the detailed Late Chalcolithic studies to provide new input to these debates. The Early Bronze Age settlements are analysed from aspects of metal production, consumption and technologies, general economical strategies and exchange systems and networks. Details of architecture and settlement organisation are in focus as additional information to social organisation concepts. Based on bottom-up analytical methodology, households as potential social entities for the Early Bronze Age settlements form one of the detailed research questions. The site’s relationship to well-
known EBA centres in the wider region is another topic for detailed studies of the Çukuriçi EBA remains. Not least are the reasons for the abandonment of the site, which are strongly related to the Early Bronze Age cultural background and therefore require further study. Finally, some additional studies are to use the long chronological sequence for a diachronic approach. Topics in diachronic focus are: pottery technology, raw material procurement and exchange, textile production techniques, subsistence and economic strategies. Some of the research questions have already been discussed and published, others are currently in preparation for publication, and some results are presented in this volume.

I.2. Çukuriçi Höyük Stratigraphy and Settlements

The site has been excavated in three main areas: the northern edge and the attached fields (trenches N 1–6), the middle area (Trench M1) and the southern current edge (trenches S1–4) – which turned out to be the original centre of the tell (Fig. 1.4). The complete tell stratigraphy is based on the concept of single stratigraphical units (‘Stratigraphische Einheit: SE’) that are defined based on their respective relationships and position. They can be bundled into an archaeological context (‘Befund’): for example, several SEs within a pit filling form together with the pit installation itself (‘interface’) the context

Fig. 1.4 Plan of the excavated areas between 2006–2014 at Çukuriçi Höyük
(plan: M. Börner; DEM: Th. Urban)
of the whole pit (installation, filling in several deposition events, closing procedure/sealing). Sediment depositions in horizontal layering are named as layers and, if possible, are defined by their function as filling, floor, levelling layer, plaster, etc. This single unit system with bundled contexts is organised into a detailed stratigraphical sequence matrix, where particular archaeological contexts are documented as well. This documentation system requires an excavation in reversed order of original deposition, with on-site definition of each unit. An additional analytical tool is the combination of several contemporaneous contexts (walls, hearth, pit etc.) within a combined complex (e.g. building, several pits). These so-called complexes could, for example, include a built structure and associated floors, pits, or depositions, all which are marked in the

<table>
<thead>
<tr>
<th>Settlement Phase</th>
<th>Archaeological Period</th>
<th>Preliminary Dating</th>
</tr>
</thead>
<tbody>
<tr>
<td>ÇuHö I</td>
<td>Present times</td>
<td>20th century AD</td>
</tr>
<tr>
<td>ÇuHö II</td>
<td>Early Bronze Age 1 with mixed deposits</td>
<td>2900–2750 BC/20th century AD</td>
</tr>
<tr>
<td>ÇuHö III</td>
<td>Early Bronze Age 1</td>
<td>2850–2800/2750 calBC</td>
</tr>
<tr>
<td>ÇuHö IV</td>
<td>Early Bronze Age 1</td>
<td>2950/2900–2850 calBC</td>
</tr>
<tr>
<td>ÇuHö Va</td>
<td>Early Bronze Age 1</td>
<td>3050–2950 calBC</td>
</tr>
<tr>
<td>ÇuHö Vb</td>
<td>Late Chalcolithic</td>
<td>3110–3050 calBC</td>
</tr>
<tr>
<td>ÇuHö VI</td>
<td>Late Chalcolithic</td>
<td>3270–3110 calBC</td>
</tr>
<tr>
<td>ÇuHö VII</td>
<td>Late Chalcolithic</td>
<td>3350–3270 calBC</td>
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| Hiatus           |                                             |                     |
| ÇuHö VIII        | Late Neolithic                              | c. 6200–5970 calBC  |
| ÇuHö IX          | Late Neolithic                              | c. 6300–6200        |
| ÇuHö X           | Late Neolithic                              | c. 6400–6300        |
| ÇuHö XI          | Late Neolithic                              | c. 6500–6400        |
| ÇuHö XII         | Early Neolithic                             | c. 6600–6500 calBC  |
| ÇuHö XIII        | Early Neolithic                             | c. 6680–6600 calBC  |

Fig. 1.5 Çukuriçi settlement phases with periodisation and absolute dating based on radiocarbon data (calBC dates are finally modelled; the other radiocarbon data are preliminary assumptions)
matrix as well as in the detailed documentation of stratigraphical level plans of the site. The predominant category of classification is defined as a settlement phase and includes all archaeological features from its founding phase to its abandonment. Altogether, 13 settlement phases could have been defined at Çukuriçi Höyük by means of stratigraphy, and are abbreviated as ÇuHö I–XIII. Each settlement phase is dated in relative terms based on material studies (mainly pottery studies), as well as in absolute terms based on a sequence of more than 100 radiocarbon dates. Although a modelling of radiocarbon dates will be presented and discussed separately in the future, the benchmarking data are summarised above (Fig. 1.5). The absolute time range defined as ‘calibrated BC’ are already modelled and/or published, the others are as of now only approximated values. The schematic cross-section of the tell illustrates the main development of the tells’ composition (Fig. 1.6) based on excavations and studies of the deposition process as well as on drillings conducted by F. Stock and H. Brückner.

**I.3. Results**

The collected studies in this volume contain various aspects of Çukuriçi research and present supervised academic ongoing or accomplished theses. The detailed study of lithic pressure technology in the early Neolithic period\(^8\) is based on the lithic assemblages found in Çukuriçi’s founding phase XIII dating to 6680–6600 cal BC. The evidence of pressure technology in combination with specific tool types unknown in the region (neither in the former Mesolithic Aegean nor at the contemporaneous Anatolian Aegean coast) indicates that there was a new input from outside the region. As we have argued elsewhere,\(^9\) there are several other strong indicators in the founding horizon of the first settlers related to the PPN B northern Levant (Fig. 1.7). Our concept of pioneers seeking for new land on the Aegean coast is moreover related with maritime networks; which may have formed the fundament for the newcomers through their nautical package of knowledge – including maritime routes, fishing and specific sources (e.g. Melian obsidian). The attested maritime networks in the PPN B eastern Mediterranean between Cyprus, the northern Levant and Anatolia are somehow spatially overlapping with the contemporaneous Mesolithic maritime networks in the Aegean.\(^10\) These maritime communication and exchange systems forms the basis for the pioneers in the early 7th millennium BC, probably starting somewhere at the northern Levantine coastal region. Assumable links on this route might come to light at the southern Anatolian coast in the future – probably even earlier than 7000 BC. The broad study on pressure blade making in this volume revealed the evidence of certain levels of specialisation of the Çukuriçi pioneers. The definition of particular modes of pressure technique for blade production can also be related with technologies further east. Anyhow, the unique role of the site in the Neolithisation process of the Aegean is supported by the outcome of the pressure technology study in this volume.

The Chalcolithic period in western Anatolia has not been a focus for prehistoric researchers for a long time, unfortunately resulting in a lack of knowledge in terms of cultural characteristics and pathways as well as basic archaeological data in general. The excavations at Çukuriçi provide new data for the Late Chalcolithic period, which are partially presented and discussed already.\(^11\) The study by Ch. Schwall and B. Horejs in this volume highlights the impact of Chalcolithic figurines and their indications for shifting networks between inner Anatolia, the Aegean coast and the Cyclades. For the first time, recently excavated marble figurines of different types

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\(^8\) Milić – Horejs, this volume, chapter II.
\(^9\) Horejs et al. 2015.
\(^10\) For detail information regarding the networks s. Horejs et al. 2015.
from Çukuriçi are presented and their potential origins, as well as broader contextualisation, are critically discussed. The outcome of this study indicates a tradition of schematic marble figurines already in the early Chalcolithic period (6th millennium BC), probably showing a western Anatolian tradition. Within a regional concept and development of schematic figurines during the Chalcolithic millennia, the so-called Beycesultan types in Early Bronze Age are somehow illustrating the continuous development of a traditional western Anatolian concept of figurines. The contemporaneous schematic marble figurines known at the Cycladic islands let us assume a strong connectivity between the Büyük Menderes river valley in western Anatolia and the Cyclades, probably not only in Early Bronze Age times but even earlier. Anyhow, a regional production, distribution and concept of marble figurines in western Anatolia is evident already in the Middle and Late Chalcolithic periods. The discussion of the so-called Kiliya types in this study is integrating recent finds and their chronological contextualisation as well. The broader embedding of the Çukuriçi figurines demonstrates a regional tradition of marble figurines on the one hand and a Cycladic-Aegean coast-Büyük Menderes valley relation on the other hand.

Textile production at Çukuriçi and its embedding in the Aegean-Anatolian world reveals partially comparable results of connectivities regarding the late 4th and early 3rd millennia BC. The
already discussed specialisation in EBA textile production at Çukuriçi is indicated by various technological aspects and spatial distribution in the settlement. The study about metrical systems of spindle whorls of the Çukuriçi sets and 17 other sites in east Aegean and west Anatolia with different statistical methods offers a new insight into textile technologies. The results of the 4th millennium analyses let us assume a tendency of different metrical systems in use, detectable in spatially related sites. Although the regional relations in particular weights of spindle whorls are recognisable, we are still facing a lack of good archaeological data. The outcome of the 3rd millennium analyses leads to the definition of regional groups that share specific metrical relations. The connectivity of the Aegean coast with the Büyük Menderes valley and the Lake District becomes obvious in the statistical analyses. These shared commonalities do not only support the strong relations within this particular region as discussed also in the figurine study. The outcome is additionally indicating an earlier evidence of exchange routes, so far known only for the second half of the 3rd millennium BC. The metrically related groups indicate exchange of ideas and technologies and bonds of contact already around 3000 BC and even earlier. The figurine study and the textile technological analyses support our former assumption of Late Chalcolithic regional and intra-regional networks in western Anatolia. Their impact on social, economic and cultural developments probably leads to a new dynamic in the 4th millennium BC in the region. This process of proto-urbanisation has been discussed recently and shed some new light to an almost neglected period.

The importance of specialised crafts in early 3rd millennium BC (EBA I period) has been discussed for Çukuriçi especially in metallurgical aspects. The definition of the settlements in phases ÇuHö IV and III as metallurgical centre is based on the intensive metal production on-site. M. Mehofer was able to reconstruct the complete chaîne opératoire in altogether 49 oven installations of metal workshops. His analytical studies of the metals, slags, half-products, finished products and related equipment provided a highly specialised metal production community at Çukuriçi Höyük between 2950/2900–2750 calBC. Their focus on arsenic-copper production was supplemented by a few precious metals (gold, silver), silver-copper alloys and rarely also tin-bronze production. This volume contains a new study of one workshop mainly related to metallurgy at first sight.

The spatial analyses of this EBA I workshop at Çukuriçi offer a deep insight into a rooms’ life circle. The detail study of the architecture and deposition process, stratigraphically defined four using horizons and related installations let us assume specific activities of each archaeological generation. The outcome shows that room 18 of the phase Çukuriçi Höyük IV (2950/2900–2850 calBC) was always used as a workshop. The two older generations focused mainly on metal production, whereas the latest using points to textile production within the building. The analyses of the ceramic assemblages and their specific contexts allow a differentiation between in situ and secondary or later depositions. The functional interpretation of the primary pottery sets belonging to defined using horizons demonstrates a change of food production and consumption. Whereas in the metal workshops of the older horizons food was only sometimes prepared or reheated; food preparation and cooking is increasing during the latest use of room 18 as a textile workshop. Another detail aspect has been discussed elsewhere; the metal producers of the two oldest horizons in room 18 preferred also hunting of large deer. The deposition of a huge antler within this building (together with remains of deer antlers in other contemporaneous houses on-site) probably indicates a particular social ritual as argued already.

14 Schwall – Horejs, this volume, chapter III.
15 Horejs 2014.
16 Horejs 2014.
18 Horejs – Grasböck – Röcklinger, this volume, chapter V.
Finally, the archaeometric approach on Çukuriçi ceramics in the study of Lisa Peloschek illustrates the high potential of systematic pottery analyses in a diachronic view. She provides not only a deep insight into the shifting of pottery production concepts; L. Peloschek is also able to relate potential clay sources in the surroundings of the site with clay receipts of the potters. Due to a geological survey she conducted with the geologist D. Wolf, the essential data of available rocks and clay sources in the direct vicinity are known. Her petrographical analyses are additionally demonstrating that the clays probably origin from a very restricted geographical area. Anyhow, her contribution reveals a high variety of clay pastes during the millennia on the one hand, only at first sight appearing heterogeneous. On the other hand she shows chronological patterns of pottery production with characteristic pottery concepts for each period (Early to Late Neolithic and Late Chalcolithic to Early Bronze Age). Advanced pottery techniques for specific use start around 3000 BC with new receipts evident in marble/calcite and sand tempering. Finally, the dominance of local production in all prehistoric periods illustrates a self-sufficient ceramic production with only few imports.

I.4. List of Publications on Çukuriçi Höyük and Related Topics
(in chronological order)

2008


2009


2010


2011


20 Peloschek 2016a; Peloschek 2016b.


2012


2013


2014


2015


2016


in press


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References

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Evren – İçten 1998

Horejs 2008

Horejs 2009

Horejs 2014

Horejs – Britsch in press

Horejs – Galik 2016

Horejs – Mehofer 2014

Horejs – Mehofer 2015

Horejs – Schwall 2015

Horejs et al. 2010

Horejs et al. 2015
Mehofer 2014
M. Mehofer, Metallurgy during the Chalcolithic and the beginning of the Early Bronze Age in Western Anatolia, in: Horejs – Mehofer 2014, 463–489.

Mehofer 2016

Peloschek 2016a

Peloschek 2016b