

I. The Çukuriçi Höyük Research Project

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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 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 Bülbüldağ 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
(photo: 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. İçten 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. Krinzing, 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 Halkapınar³ 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

² Evren – İçten 1998.

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.



Fig. 1.2 Overview of the excavations in the northern und middle trenches at Çukuriçi Höyük (photo: N. Gail/ÖAI)

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

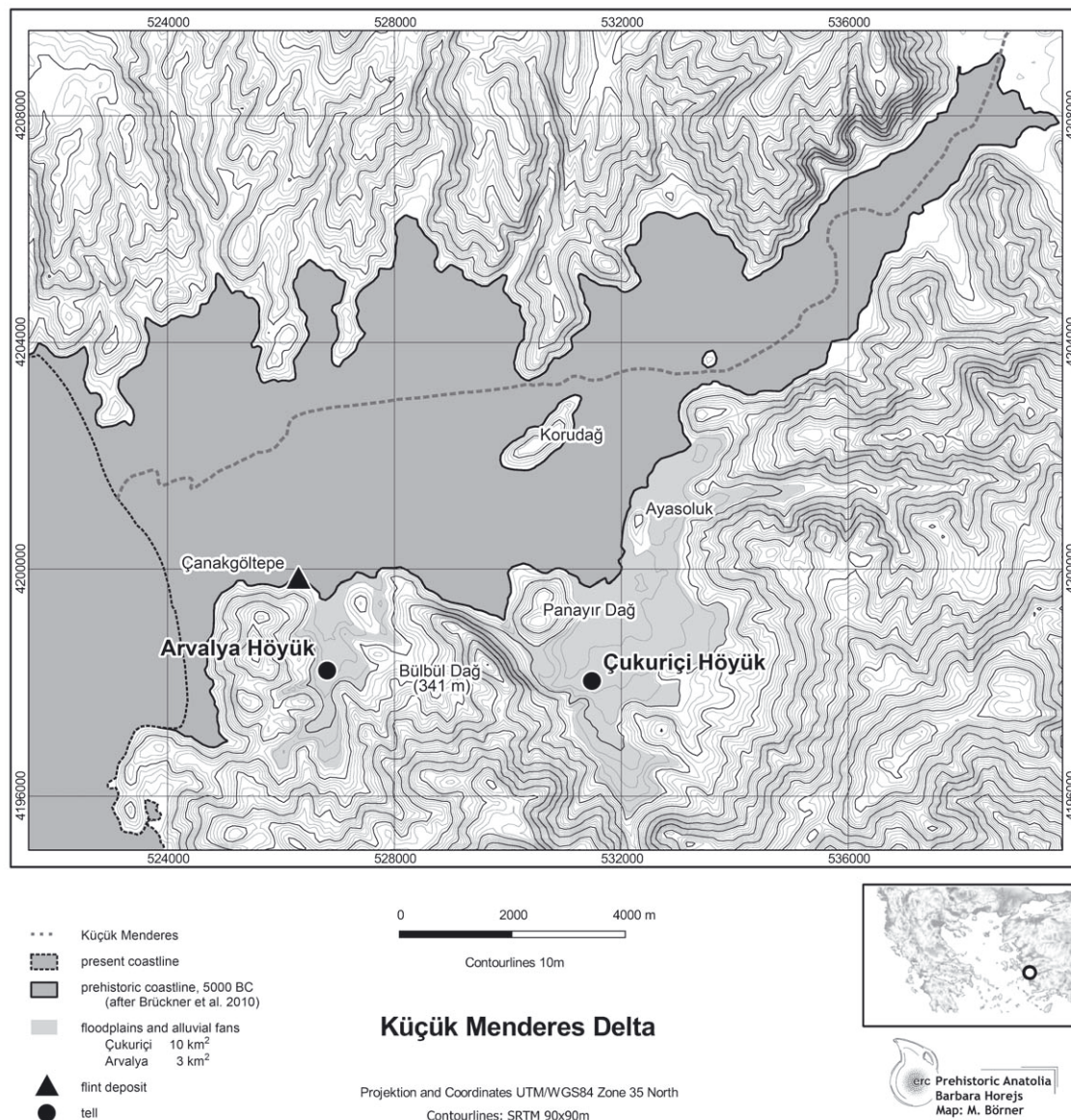


Fig. 1.3 Development and shifting of the coastline in the Küçük Menderes Delta (plan: M. Börner)

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-

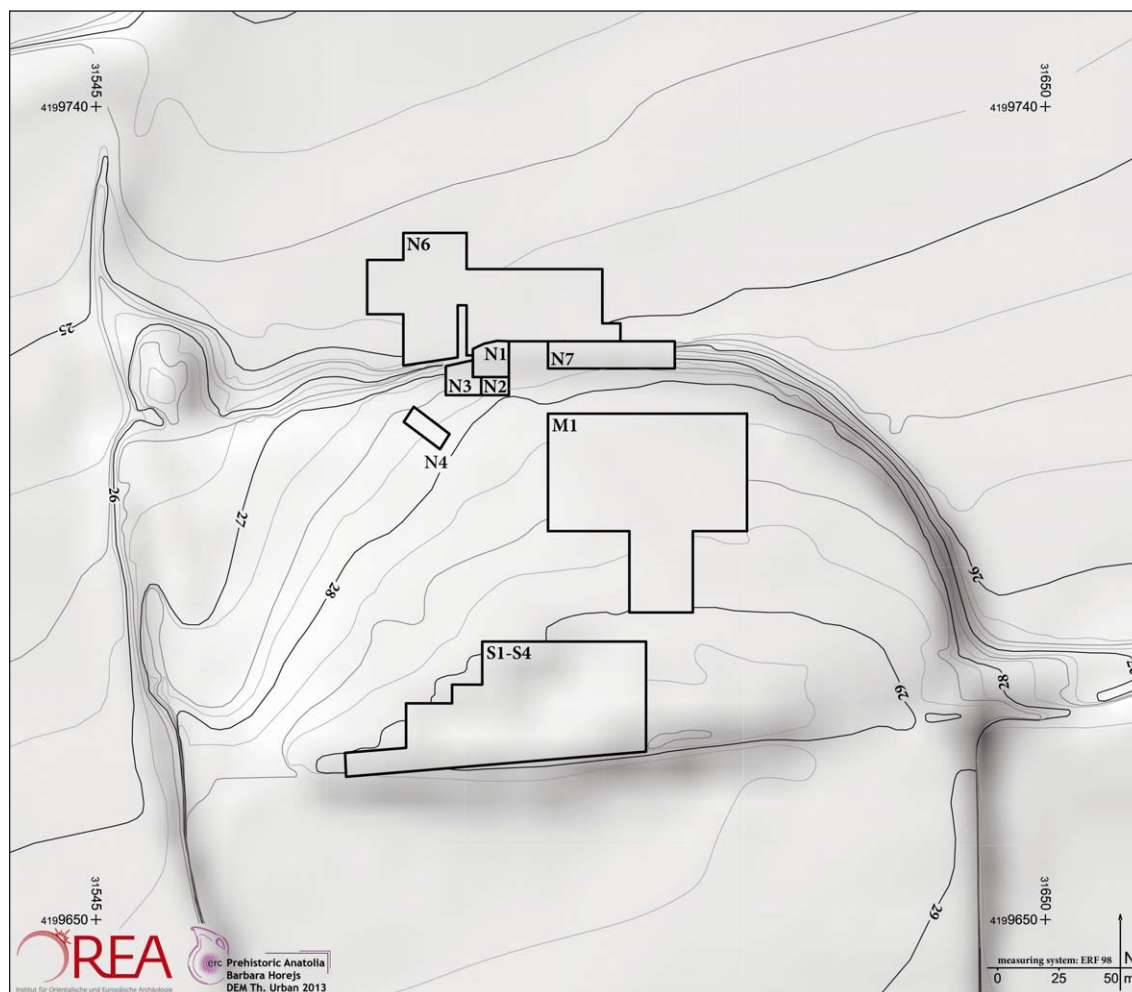


Fig. 1.4 Plan of the excavated areas between 2006–2014 at Çukuriçi Höyük
(plan: M. Börner; DEM: Th. Urban)

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.

1.2. 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

Settlement Phase	Archaeological Period	Preliminary Dating
ÇuHö I	Present times	20 th century AD
ÇuHö II	Early Bronze Age 1 with mixed deposits	2900–2750 BC/20 th century AD
ÇuHö III	Early Bronze Age 1	2850–2800/2750 calBC
ÇuHö IV	Early Bronze Age 1	2950/2900–2850 calBC
ÇuHö Va	Early Bronze Age 1	3050–2950 calBC
ÇuHö Vb	Late Chalcolithic	3110–3050 calBC
ÇuHö VI	Late Chalcolithic	3270–3110 calBC
ÇuHö VII	Late Chalcolithic	3350–3270 calBC
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)

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

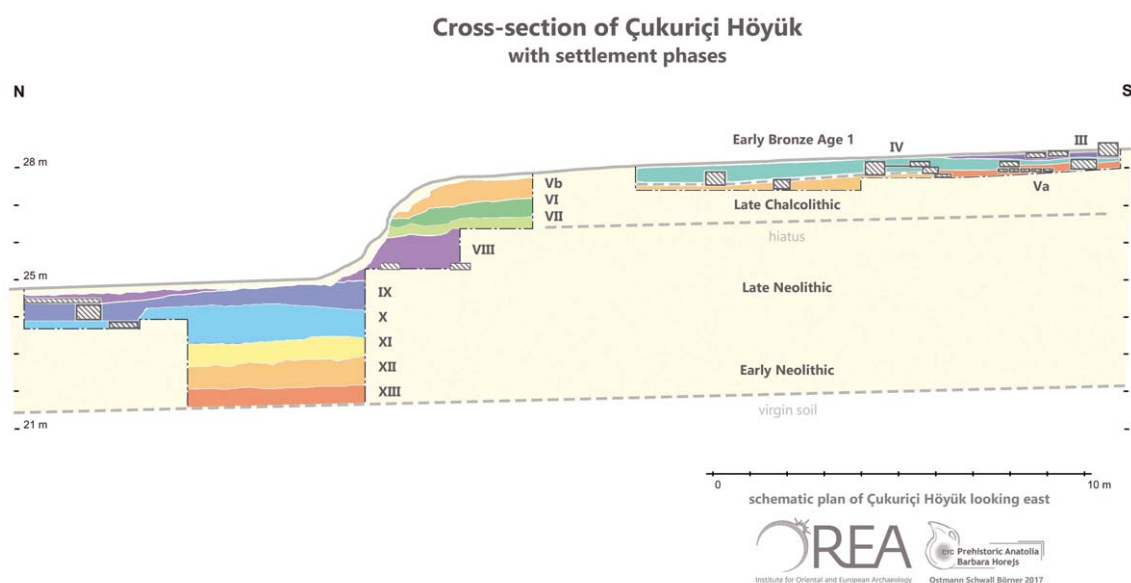


Fig. 1.6 Schematic cross-section of Çukuriçi Höyük with settlement phases, periodisation and dating (graphics: F. Ostmann, Ch. Schwall, M. Börner)

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.

1.3. 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 period⁸ 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

⁸ Milić – Horejs, this volume, chapter II.

⁹ Horejs et al. 2015.

¹⁰ For detail information regarding the networks s. Horejs et al. 2015.

¹¹ Horejs 2014; Horejs – Schwall 2015.

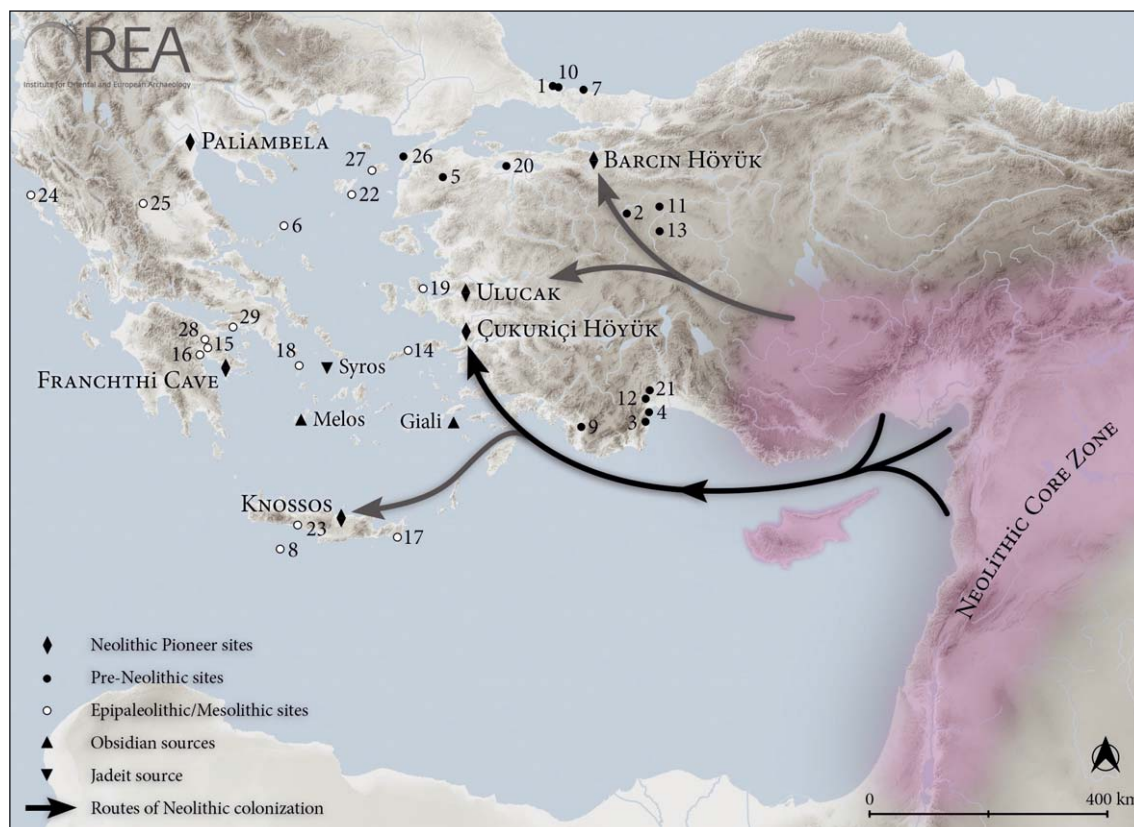


Fig. 1.7 Model of the maritime colonisation with the Neolithic pioneer sites starting around 6700 BC. The additionally mapped Aegean Mesolithic and Western Anatolian Pre-Neolithic sites are dating between c. 10.000 and 7000 BC (after Horejs et al. 2015 with modifications); 1. Ağaçlı; 2. Asarkaya; 3. Belbaşı; 4. Beldibi; 5. Çalca; 6. Cyclops Cave (Youra); 7. Domalı; 8. Gavdos; 9. Girmeler; 10. Gümüşdere; 11. Kalkanlı; 12. Karain; 13. Keçiçayırı; 14. Kerame; 15. Klissou-ra; 16. Koukou; 17. Livari; 18. Maroulas; 19. Mordoğan; 20. Musluçesme; 21. Öküzini; 22. Ouriakos; 23. Plakias; 24. Sidari; 25. Theopetra; 26. Üçdutlar; 27. Uğurlu; 28. Ulbrich; 29. Zaimis (map: M. Börner)

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.¹² The

¹² Britsch – Horejs, this volume, chapter IV.

already discussed specialisation in EBA textile production at Çukuriçi is indicated by various technological aspects and spatial distribution in the settlement.¹³ 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.¹⁴ 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.¹⁵ 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.¹⁶

The importance of specialised crafts in early 3rd millennium BC (EBA 1 period) has been discussed for Çukuriçi especially in metallurgical aspects.¹⁷ 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 1 workshop at Çukuriçi offer a deep insight into a rooms' life circle.¹⁸ 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.¹⁹ 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.

¹³ Britsch – Horejs 2014; Horejs – Britsch in print.

¹⁴ Schwall – Horejs, this volume, chapter III.

¹⁵ Horejs 2014.

¹⁶ Horejs 2014.

¹⁷ Horejs 2009; Horejs et al. 2010; Mehofer 2014; Horejs – Mehofer 2015; Mehofer 2016.

¹⁸ Horejs – Grasböck – Röcklinger, this volume, chapter V.

¹⁹ Horejs – Galik 2016.

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.²⁰ 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

B. Horejs, Çukuriçi Höyük. A New Excavation Project in the Eastern Aegean, *Aegeo-Balkan Prehistory*, 4 February 2008. Online <www.aegeobalkanprehistory.net> (last access 12.12.2016).

B. Horejs mit Beiträgen von F. Galik und U. Thanheiser, Erster Grabungsbericht zu den Kampagnen 2006 und 2007 am Cukurici Höyük bei Ephesos, *Jahreshefte des Österreichischen Archäologischen Instituts* 77, 2010, 91–106.

2009

M. Bergner – B. Horejs – E. Pernicka, Zur Herkunft der Obsidianartefakte vom Çukuriçi Höyük, *Studia Troica* 18, 2009, 251–273.

B. Horejs, Metalworkers at the Çukuriçi Höyük? An Early Bronze Age mould and a “Near Eastern weight” from Western Anatolia, in: T. L. Kienlin – B. Roberts (eds.), *Metals and Societies. Studies in Honour of Barbara S. Ottaway*, *Universitätsforschungen zur prähistorischen Archäologie* 169 (Bonn 2009) 358–368.

2010

B. Horejs, Çukuriçi Höyük. Neue Ausgrabungen auf einem Tell bei Ephesos, in: S. Aybek – A. K. Öz (eds.), *Metropolis Ionia II. Yolların Kesiştiği Yer. Recep Meriç İçin Yazılar / The Land of the Crossroads. Essays in Honour of Recep Meriç* (Istanbul 2010) 167–175.

B. Horejs, Çukuriçi Höyük, contribution in: J. Koder – S. Ladstätter, *Ephesos 2008, Kazı Sonuçları Toplantısı* 31, 3/2009, 2010, 321–322, 330–331.

B. Horejs – M. Mehofer – E. Pernicka, Metallhandwerker im frühen 3. Jt. v. Chr. Neue Ergebnisse vom Çukuriçi Höyük, *Istanbul Mitteilungen* 60, 2010, 7–37.

2011

A. Galik – B. Horejs, Çukuriçi Höyük. Various aspects of its earliest settlement, in: R. Krauß (ed.), *Beginnings. New Research in the Appearance of the Neolithic between Northwest Anatolia and the Carpathian Basin. Workshop held at Istanbul Department of the German Archaeological Institute, April 8th–9th 2009, Istanbul, Menschen – Kulturen – Traditionen. Studien aus den Forschungscustern des Deutschen Archäologischen Instituts* 1 (Rahden/Westf. 2011) 83–94.

²⁰ Peloschek 2016a; Peloschek 2016b.

B. Horejs, Neues zur Frühbronzezeit in Westanatolien, in: F. Blakolmer – C. Reinholdt – J. Weilharter – G. Nightingale (eds.), Österreichische Forschungen zur Ägäischen Bronzezeit 2009. Akten der Tagung vom 6. bis 7. März 2009 am Fachbereich Altertumswissenschaften der Universität Salzburg (Vienna 2011) 157–172.

B. Horejs – A. Galik – U. Thanheiser – S. Wiesinger, Aktivitäten und Subsistenz in den Siedlungen des Çukuriçi Höyük. Der Forschungsstand nach den Ausgrabungen 2006–2009, *Prähistorische Zeitschrift* 86, 2011, 31–66.

2012

G. Borg – D. Wolf, Systematic differences between prehistoric and modern metal provinces in Western Turkey as a result of supergene modification. Implications for archaeological provenance studies, in: *International Earth Science Colloquium on the Aegean Region, IESCA-2012. Abstracts Book* (Izmir 2012) 167.

A. Galik – B. Horejs – B. Nessel, Der nächtliche Jäger als Beute. Zur prähistorischen Leopardenjagd, *Prähistorische Zeitschrift* 87, 2, 2012, 261–307.

B. Horejs, Çukuriçi Höyük. A Neolithic and Bronze Age settlement in the region of Ephesos, in: M. Özdoğan – N. Başgelen – P. Kuniholm (eds.), *The Neolithic in Turkey. New Excavations and New Research. Western Turkey* (Istanbul 2012) 117–131.

B. Horejs, Çukuriçi Höyük. A Prehistoric Site in Ephesos, in: C. Helvacı – Y. Yılmaz – Y. Ersoy – H. Brückner – Ş. Tül – Ö. Sümer (eds.), *IESCA 2012. Mid-colloquium Social Trip Guide. Ephesus*, 3 October 2012 (Izmir 2012) 70–72.

D. Knitter – M. Bergner – B. Horejs – B. Schütt – M. Meyer, Concepts of centrality and models of exchange in prehistoric Western Anatolia, in: W. Bebermeier – R. Hebenstreit – E. Kaiser – J. Krause (eds.), *Landscape Archaeology. Proceedings of the International Conference held in Berlin, 6th–8th June 2012, eTopoi. Journal for Ancient Studies, Special Volume 3* (Berlin 2012) 361–368. Online <<http://journal.topoi.org/index.php/etopoi/article/view/135/160>> (last access 20.12.2016).

D. Wolf – G. Borg – B. Horejs, Geoarchäologische Untersuchungen zu den Erzvorkommen in Westanatolien, in: F. Schlütter – S. Greiff – M. Prange (eds.), *Archäometrie und Denkmalpflege 2012, Metalla Sonderheft 5* (Bochum 2012) 143–144.

D. Wolf – G. Borg – B. Horejs, Settlement walls of Çukuriçi Höyük. What stones could tell about prehistoric craftsman, in: *International Earth Science Colloquium on the Aegean Region, IESCA-2012. Abstracts Book* (Izmir 2012) 308.

2013

B. Horejs, Çukuriçi Höyük. Die älteste Siedlung im Raum von Ephesos, *Newsletter der Gesellschaft der Freunde von Ephesos* 2/2013, 2–4.

B. Horejs, I.1.1.1.1 Çukuriçi Höyük, in: Österreichisches Archäologisches Institut (ed.), *Wissenschaftlicher Jahresbericht des Österreichischen Archäologischen Instituts 2012* (Vienna 2013) 5–9.

D. Knitter – H. Blum – B. Horejs – O. Nakoinz – B. Schütt – M. Meyer, Integrated centrality analysis. A diachronic comparison of selected Western Anatolian locations, *Quaternary International* 312, 2013, 45–56.

F. Stock – A. Pint – B. Horejs – S. Ladstätter – H. Brückner, In search for the harbours. New evidence of Late Roman and Byzantine harbours of Ephesus, *Quaternary International* 312, 2013, 57–69.

2014

B. A. Arbuckle – S. Whitcher Kansa – E. Kansa – D. Orton – C. Çakırlar – L. Gourichon – L. Atici – A. Galik – A. Marciniak – J. Mulville – H. Buitenhuis – D. Carruthers – B. de Cupere – A. Demirergi – S. Frame – D. Helmer – L. Martin – J. Peters – N. Pöllath – K. Pawłowska – N. Russell – K. Twiss – D. Wörtenberger, Data sharing reveals complexity in the westward spread of domestic animals across Neolithic Turkey, *PLoS ONE* 9, 6, 2014, 1–11. doi: 10.1371/journal.pone.0099845.

Ch. Britsch – B. Horejs, The role of textile production and fishing in the EBA metallurgical centre of Çukuriçi Höyük, *Egypt and the Levant* 24, 2014, 229–242.

L. Ehlers – F. Stock – B. Horejs – H. Brückner, Reconstructing the Palaeogeographies of a Neolithic-Bronze Age Settlement Mound at Ephesos, Turkey, in: *European Geosciences Union General Assembly 2014, Geophysical Research Abstract 16* (Vienna 2014) EGU2014-692-1. Online <<http://meetingorganizer.copernicus.org/EGU2014/EGU2014-692-1.pdf>> (last access 20.12.2016).

A. Galik, Late Chalcolithic subsistence strategies on the basis of two examples. The Çukuriçi Höyük in Western Anatolia and the Barcın Höyük in Northwestern Anatolia, in: B. Horejs – M. Mehofer (eds.), *Western Anatolia Before Troy. Proto-Urbanisation in 4th Millennium BC. Proceedings of the International Symposium held at the Kunsthistorisches Museum Wien, Vienna, Austria, 21–24 November, 2012, Oriental and European Archaeology 1 (Vienna 2014) 385–393.*

B. Horejs, Proto-Urbanisation without urban centres? A model of transformation for the Izmir region in the 4th millennium BC, in: B. Horejs – M. Mehofer (eds.), *Western Anatolia Before Troy. Proto-Urbanisation in 4th Millennium BC. Proceedings of the International Symposium held at the Kunsthistorisches Museum Wien, Vienna, Austria, 21–24 November, 2012, Oriental and European Archaeology 1 (Vienna 2014) 15–41.*

M. Mehofer, Metallurgy during the Chalcolithic and the beginning of the Early Bronze Age in Western Anatolia, in: B. Horejs – M. Mehofer (eds.), *Western Anatolia Before Troy. Proto-Urbanisation in 4th Millennium BC. Proceedings of the International Symposium held at the Kunsthistorisches Museum Wien, Vienna, Austria, 21–24 November, 2012, Oriental and European Archaeology 1 (Vienna 2014) 463–489.*

B. Weninger – L. Clare – F. Gerritsen – B. Horejs – R. Krauß – J. Linstädter – R. Özbal – E. J. Rohling, Neolithisation of the Aegean and Southeast Europe during the 6600–6000 calBC period of rapid climate change, *Documenta Praehistorica XLI*, 2014, 1–31.

2015

K. Christanis – G. Siavalas – R. G. Oskay – D. Wolf – B. Horejs, Organic petrology in service of archaeology. A study on chars from Çukuriçi Höyük, western Turkey, in: J. Kus – P. David – S. Kalaitzidis – H.-M. Schulz – R. F. Sachsenhofer (eds.), *ICCP Program & Abstract Book. 67th Annual Meeting of the International Committee for Coal and Organic Petrology, September 5–11, 2015, Potsdam, Schriftenreihe der Deutschen Gesellschaft für Geowissenschaften 87 (Stuttgart 2015) 29.*

B. Horejs, Frühe Schleudern als Waffe, in: H. Meller – M. Schefzik (eds.), *Krieg. Eine archäologische Spurensuche. Begleitband zur Sonderausstellung vom 06.11.2015–22.05.2016 im Landesmuseum Sachsen-Anhalt (Halle 2015) 153–154.*

B. Horejs – M. Mehofer, Early Bronze Age metal workshops at Çukuriçi Höyük. Production of arsenical copper at the beginning of the 3rd mill. BC., in: A. Hauptmann – D. Modarressi-Tehrani (eds.), *Archaeometallurgy in Europe III. Proceedings of the 3rd International Conference, Deutsches Bergbau-Museum Bochum, 29th of June – 1st of July 2011, Der Anschnitt Beiheft 26 (Bochum 2015) 165–176.*

B. Horejs – Ch. Schwall, New light on a nebulous period – Western Anatolia in the 4th millennium BC. Architecture and settlement structures as cultural patterns? in: S. Hansen – P. Raczky – A. Anders – A. Reingruber (Hrsg.), *Neolithic and Copper Age Between the Carpathians and the Aegean Sea. Chronologies and Technologies from the 6th to the 4th Millennium BCE, Archäologie in Eurasien 31 (Bonn 2015) 457–474.*

B. Horejs – B. Milić – F. Ostmann – U. Thanheiser – B. Weninger – A. Galik, The Aegean in the Early 7th millennium BC. Maritime networks and colonisation, *Journal of World Prehistory* 28, 4, 2015, 289–330.

F. Stock – L. Ehlers – B. Horejs – M. Knipping – S. Ladstätter – S. Seren – H. Brückner, Neolithic settlement sites in Western Turkey. Palaeogeographic studies at Çukuriçi Höyük and Arvalya Höyük, *Journal of Archaeological Science Reports* 4, 2015, 565–577.

2016

M. Bami – B. Horejs – F. Ostmann, The ground beneath their feet. Building continuity at Neolithic Çukuriçi Höyük, *Anatolian Studies* 66, 2016, 1–16.

Z. Hofmanová – S. Kreutzer – G. Hellenthal – Ch. Sell – Y. Diekmann – D. Díez-del-Molino – L. van Dorp – S. López – A. Kousathanas – V. Link – K. Kirsanow – L. M. Cassidy – R. Martiniano – M. Strobel – A. Scheu – K. Kotsakis – P. Halstead – S. Triantaphyllou – N. Kyparissi-Apostolika – D. Urem-Kotsou – Ch. Ziota – F. Adaktylou – S. Gopalan – D. M. Bobo – L. Winkelbach – J. Blöcher – M. Unterländer – Ch. Leuenberger – Ç. Çilingiroğlu – B. Horejs – F. Gerritsen – St. J. Shennan – D. G. Bradley – M. Currat – K. R. Veeramah – D. Wegmann – M. G. Thomas – Ch. Papageorgopoulou – J. Burger, Early farmers from across Europe directly descended from Neolithic Aegeans, *Proceedings of the National Academy of Sciences of the United States of America* 113, 25, 2016, 6886–6891. doi: 10.1073/pnas.1523951113.

B. Horejs, Aspects of connectivity on the centre of the Anatolian Aegean coast in the 7th millennium BC, in: B. Molloy (ed.), *Of Odysseys and Oddities. Scales and Models of Interaction Between Prehistoric Aegean Societies and their Neighbours, Sheffield Studies in Aegean Archaeology 10 (Oxford) 143–167.*

B. Horejs, Neue Gewichtssysteme und metallurgischer Aufschwung im frühen 3. Jahrtausend – ein Zufall?, in: M. Bartelheim – B. Horejs – R. Krauß (eds.), *Von Baden bis Troia. Ressourcennutzung, Metallurgie und Wissenstransfer. Eine Jubiläumsschrift für Ernst Pernicka*, *Oriental and European Archaeology* 3 (Rahden/Westf. 2016) 251–272.

B. Horejs – A. Galik, Hunting the beast. A reconstructed ritual in the EBA metal production centre in Western Anatolia, in: E. Alram-Stern – F. Blakolmer – S. Deger-Jalkotzy – R. Laffineur – J. Weilharnter (eds.), *Metaphysis. Ritual, Myth and Symbolism in the Aegean Bronze Age. Proceedings of the 15th International Aegean Conference*, Vienna, Institute for Oriental and European Archaeology, Aegean and Anatolia Department, Austrian Academy of Sciences and Institute of Classical Archaeology, University of Vienna, 22–25 April 2014, *Aegaeum* 39 (Leuven, Liège 2016) 323–331.

B. Horejs – B. Weninger, Early Troy and its significance for the Early Bronze Age in Western Anatolia, in: E. Pernicka – S. Ünlüsoy – St. W. E. Blum (eds.), *Early Bronze Age Troy. Chronology, Cultural Development, and Interregional Contacts. Proceedings of the Conference at the University of Tübingen*, 8th–10th May 2009, *Studia Troica Monographien* 8 (Bonn 2016) 123–145.

M. Mehofer, Çukuriçi Höyük. Ein Metallurgiezentrum des frühen 3. Jts. v. Chr. in der Westtürkei, in: M. Bartelheim – B. Horejs – R. Krauß (eds.), *Von Baden bis Troia. Ressourcennutzung, Metallurgie und Wissenstransfer. Eine Jubiläumsschrift für Ernst Pernicka*, *Oriental and European Archaeology* 3 (Rahden/Westf. 2016) 359–373.

L. Peloschek, Verarbeitungsprozesse von Tonrohstoffen im prähistorischen und frühkaiserzeitlichen Ephesos, in: K. Piesker (ed.), *Wirtschaft als Machtbasis. Beiträge zur Rekonstruktion vormoderner Wirtschaftssysteme in Anatolien, Byzas* 22 (Istanbul 2016) 187–205.

L. Peloschek, Archaeometric analyses of ceramic household inventories. Current research in Ephesos and at Çukuriçi Höyük, *Arkeometri Sonuçları Toplantısı* 31/2015, 2016, 253–260.

in press

M. Bami – B. Horejs, Upscaling the Neolithic houses. Trends in house size and function in Anatolia and the Balkans, *Studia Praehistorica* (in press).

Ch. Britsch – B. Horejs, Agencies of textile production in western Anatolian and Aegean prehistory, in: L. Quillien – K. Sarri (eds.), *Textile Workers. Skills, Labour and Status of Textile Craftspeople Between the Prehistoric Aegean and the Ancient Near East* (in press).

B. Horejs – Ch. Britsch, Textile production and fishing technologies at EBA 1 Çukuriçi Höyük, in: IV. International Archaeology Symposium “Early Bronze Age in Western Anatolia”, 19th–21th March 2014, Kütahya (in press).

B. Horejs – Ch. Schwall, Interaction as a stimulus? Çukuriçi Höyük and the transition from the Late Chalcolithic period to the Early Bronze Age in Western Anatolia, in: S. Dietz – F. Mavridis – Ž. Tankosić – T. Takaoğlu (eds.), *Communities in Transition. The Circum-Aegean Area in the 5th and 4th Millennia BC* (in press).

L. Peloschek, Marble-tempered ware in 3rd millennium BC Anatolia, in: E. Alram-Stern – B. Horejs (eds.), *Pottery Technologies and Sociocultural Connections Between the Aegean and Anatolia During the 3rd Millennium BC* (in press).

M. Röcklinger – B. Horejs, Function and technology. A pottery assemblage from an EBA House at Çukuriçi Höyük, in: E. Alram-Stern – B. Horejs (eds.), *Pottery Technologies and Sociocultural Connections Between the Aegean and Anatolia During the 3rd Millennium BC* (in press).

Ch. Schwall, Çukuriçi Höyük 2. Das 5. und 4. Jahrtausend v. Chr. in Westanatolien und der Ostägäis (in press).

Ch. Schwall – B. Horejs, Permanent or seasonal? Evidence of settlements in late Chalcolithic western Anatolia, in: *Proceedings of the 10th International Congress on the Archaeology of the Ancient Near East*. 25–29 April 2016, Vienna (in press).

Acknowledgments: Excavations at Çukuriçi Höyük and related research are financed by the European Research Council (ERC grant no. 263339), the Austrian Science Fund (FWF P-19856; P-25199; Y-528) and Marie Curie ITN BEAN project (project no. 289966). Special thanks go to the Ephesos excavations and the Turkish authorities for the permissions and support of our research. I warmly thank all collaboration partners for their great scientific input as well as the Ephesos conservators and the photographer N. Gail. Finally, I am grateful to work with all those highly talented students during the years and I am glad to accompany their academic careers for a while.

References

Benndorf 1906

O. Benndorf, Zur Ortskunde und Stadtgeschichte, in: O. Benndorf (ed.), *Forschungen in Ephesos I* (Wien 1906) 9–110.

Britsch – Horejs 2014

Ch. Britsch – B. Horejs, The role of textile production and fishing in the EBA metallurgical centre of Çukuriçi Höyük, Egypt and the Levant 24, 2014, 229–242.

Evren – İçten 1998

A. Evren – C. İçten, Efes Çukuriçi ve Arvalya (Gül Hanım) Höyükleri, Müze Kurtarma Kazıları Semineri 8/1997, 1998, 111–133.

Horejs 2008

B. Horejs, Çukuriçi Höyük. A New Excavation Project in the Eastern Aegean, Aegeo-Balkan Prehistory, 4 February 2008. Online <www.aegeobalkanprehistory.net> (last access 12.12.2016).

Horejs 2009

B. Horejs, Metalworkers at the Çukuriçi Höyük? An Early Bronze Age mould and a “Near Eastern weight” from Western Anatolia, in: T. L. Kienlin – B. Roberts (eds.), *Metals and Societies. Studies in Honour of Barbara S. Ottaway*, Universitätsforschungen zur prähistorischen Archäologie 169 (Bonn 2009) 358–368.

Horejs 2014

B. Horejs, Proto-Urbanisation without urban centres? A model of transformation for the Izmir region in the 4th millennium BC, in: Horejs – Mehofer 2014, 15–41.

Horejs – Britsch in press

B. Horejs – Ch. Britsch, Textile production and fishing technologies at EBA I Çukuriçi Höyük, in: IV. International Archaeology Symposium “Early Bronze Age in Western Anatolia”, 19th–21th March 2014, Kütahya (in press).

Horejs – Galik 2016

B. Horejs – A. Galik, Hunting the beast. A reconstructed ritual in the EBA metal production centre in Western Anatolia, in: E. Alram-Stern – F. Blakolmer – S. Deger-Jalkotzy – R. Laffineur – J. Weilharnter (eds.), *Metaphysis. Ritual, Myth and Symbolism in the Aegean Bronze Age. Proceedings of the 15th International Aegean Conference*, Vienna, Institute for Oriental and European Archaeology, Aegean and Anatolia Department, Austrian Academy of Sciences and Institute of Classical Archaeology, University of Vienna, 22–25 April 2014, *Aegaeum* 39 (Leuven, Liège 2016) 323–331.

Horejs – Mehofer 2014

B. Horejs – M. Mehofer (eds.), *Western Anatolia Before Troy. Proto-Urbanisation in 4th Millennium BC. Proceedings of the International Symposium held at the Kunsthistorisches Museum Wien*, Vienna, Austria, 21–24 November, 2012, *Oriental and European Archaeology* 1 (Vienna 2014)

Horejs – Mehofer 2015

B. Horejs – M. Mehofer, Early Bronze Age metal workshops at Çukuriçi Höyük. Production of arsenical copper at the beginning of the 3rd mill. BC., in: A. Hauptmann – D. Modarressi-Tehrani (eds.), *Archaeometallurgy in Europe III. Proceedings of the 3rd International Conference*, Deutsches Bergbau-Museum Bochum, 29th of June – 1st of July 2011, *Der Anschnitt Beiheft* 26 (Bochum 2015) 165–176.

Horejs – Schwall 2015

B. Horejs – Ch. Schwall, New light on a nebulous period – Western Anatolia in the 4th millennium BC. Architecture and settlement structures as cultural patterns? in: S. Hansen – P. Raczky – A. Anders – A. Reingruber (Hrsg.), *Neolithic and Copper Age Between the Carpathians and the Aegean Sea. Chronologies and Technologies from the 6th to the 4th Millennium BCE*, *Archäologie in Eurasien* 31 (Bonn 2015) 457–474.

Horejs et al. 2010

B. Horejs – M. Mehofer – E. Pernicka, Metallhandwerker im frühen 3. Jt. v. Chr. Neue Ergebnisse vom Çukuriçi Höyük, *Istanbuler Mitteilungen* 60, 2010, 7–37.

Horejs et al. 2015

B. Horejs – B. Milić – F. Ostmann – U. Thanheiser – B. Weninger – A. Galik, The Aegean in the early 7th millennium BC. Maritime networks and colonization, *Journal of World Prehistory* 28, 4, 2015, 289–330.

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

M. Mehofer, Çukuriçi Höyük. Ein Metallurgiezentrum des frühen 3. Jts. v. Chr. in der Westtürkei, in: M. Bartelheim – B. Horejs – R. Krauß (eds.), Von Baden bis Troia. Ressourcennutzung, Metallurgie und Wissenstransfer. Eine Jubiläumsschrift für Ernst Pernicka, *Oriental and European Archaeology* 3 (Rahden/Westf. 2016) 359–373.

Peloschek 2016a

L. Peloschek, Verarbeitungsprozesse von Tonrohstoffen im prähistorischen und frühkaiserzeitlichen Ephesos, in: K. Piesker (ed.), *Wirtschaft als Machtbasis. Beiträge zur Rekonstruktion vormoderner Wirtschaftssysteme in Anatolien, Byzas 22* (Istanbul 2016) 187–205.

Peloschek 2016b

L. Peloschek, Archaeometric analyses of ceramic household inventories. Current research in Ephesos and at Çukuriçi Höyük, *Arkeometri Sonuçları Toplantısı* 31/2015, 2016, 253–260.