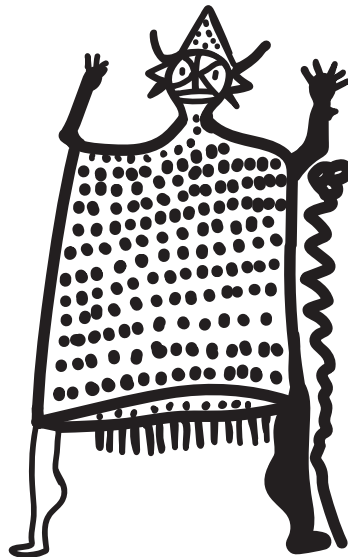


STUDIES IN MEDITERRANEAN ARCHAEOLOGY
VOL. CLIV

THE DECLINE OF BRONZE AGE CIVILISATIONS IN THE MEDITERRANEAN: CYPRUS AND BEYOND

edited by

Teresa Bürge and Peter M. Fischer



ASTROM EDITIONS
NICOSIA 2023

Extract from T. Bürge and P.M. Fischer (eds) 2023: *The Decline of Bronze Age Civilisations in the Mediterranean: Cyprus and Beyond* (SIMA 154), Nicosia
ISBN 978-9925-7935-3-2 © Astrom Editions and the authors 2023

STUDIES IN MEDITERRANEAN ARCHAEOLOGY

Volume CLIV

Founded by Paul Åström

Editors-in-Chief

Jennifer M. Webb

David Frankel

La Trobe University, Melbourne
sima@astromeditations.com

Editorial Board

Teresa Bürge

Giorgos Papantoniou

Peter Fischer

Despo Pilides

Maria Iacovou

Jacopo Tabolli

Robert Merrillees

Athanasios Vionis

Demetrios Michaelides

Cover image: 'Horned God' on krater N121 from Hala Sultan Tekke, CQ2, Stratum 2
(LC IIIA early; ca 1200 BC) (drawing by T. Bürge)

Published by Astrom Editions Ltd
Apt 401, 7 Andrea Michalakopoulou Street, Ayioi Omologites
1075 Nicosia, Cyprus
www.astromeditations.com

© Astrom Editions and the authors 2023

ISSN: 0081-8232

ISBN: 978-9925-7935-3-2

Printed by Ch. Nicolaou & Sons Ltd., Nicosia

Contents

Table of contents	iii
Preface and acknowledgements	v
List of contributors	vii

Introduction

1. Peter M. Fischer and Teresa Bürge
The end of the Bronze Age in the Eastern Mediterranean: collapse and transformation, continuity and resistance 3

The 'Sea Peoples' and the Late Bronze Age crisis in written sources

2. Annik Wüthrich and Uroš Matic
Sea Peoples in Egyptian sources during the reign of Ramesses III: context, composition and perception 21
3. Carole Roche-Hawley
A synthetic view of the House of Urtēnu at Ugarit and its contribution to our understanding of the end of the Late Bronze Age in the Eastern Mediterranean 39
4. Natalia Lodeiro Pichel
Cypro-Anatolian connections in the Late Bronze Age according to textual sources 51

Destruction, abandonment and transformation in the archaeological record

5. Maria Iacovou
The first urban landscape of southwest Cyprus: Paphos in the 'Age of Transformations' 63
6. Jan Driessen, Joachim Bretschneider and Athanasia Kanta
Prelude to crisis? A closer look at Pyla *Kokkinokremos* 81
7. Igor Kreimerman
Destruction by fire and its effect on settlement patterns on Cyprus during the 'crisis years': a view from the Levant 97
8. Jan Driessen and Florence Gaignerot-Driessen
Toppling the domino: the destruction of the palace at Knossos and the Aegean Bronze Age collapse 117

Regional and interregional connections, and economic resources

9. Reinhard Jung, Hans Mommsen and Tatiana Pedrazzi
The external contacts of Cyprus in the Late Bronze Age on the basis of the ceramic evidence 137
10. Ekin Kozal
Cypro-Anatolian connections en route to the downfall of the Late Bronze Age: an archaeological perspective 201
11. Teresa Bürge
The LC IIC to IIIA transition at Hala Sultan Tekke: a pottery perspective 229
12. Johannes H. Sterba
Neutron activation analysis of the pottery corpus of Hala Sultan Tekke and comparison to literature data 261
13. Paula Waiman-Barak, Teresa Bürge and Peter M. Fischer
Petrographic studies of ceramics from Hala Sultan Tekke: evidence for intra-island and interregional connections 269
14. Vasiliki Kassianidou
Cypriot copper production, consumption and trade: before and during the 12th century BC 319
15. Mathias Mehofer
Bronze Age copper production at Hala Sultan Tekke, Cyprus: preliminary results 347
16. Laerke Recht
Equids at the end of the Bronze Age on Cyprus 357

Radiocarbon and climate, sciences and technologies

17. Eva Maria Wild, Peter Steier, Teresa Bürge and Peter M. Fischer 379
¹⁴C-dating of the Late Bronze Age city of Hala Sultan Tekke: status report 2020
18. David Kaniewski, Nick Marriner, Rachid Cheddadi, Peter M. Fischer, Teresa Bürge, Thierry Otto, Frédéric Luce and Elise Van Campo 387
A 6000-year record of climate change from Hala Sultan Tekke, Cyprus
19. Sorin Hermon, Marina Faka, Svetlana Gasanova, Martina Polig, Valentina Vassallo, Jan Driessen, Athanasia Kanta and Joachim Bretschneider 393
Work in progress: the contribution of science and technology in the investigations at Pyla Kokkinokremos

Preface and acknowledgements

The papers presented in this volume are the results of the conference *The Decline of Bronze Age Civilisations in the Mediterranean: Cyprus and Beyond* organised by the editors of the volume and held on January 17 and 18, 2020 at the Department of Historical Studies, University of Gothenburg. It was supported by much appreciated funds from the Swedish Research Council (Vetenskapsrådet, registration number 2019-00327) and the Riksbank's Anniverary Fund (Riksbankens Jubileumsfond, registration number F19-1036:1). In addition, it was the final conference of the project *The Collapse of Bronze Age Societies in the Eastern Mediterranean* (Vetenskapsrådet, registration number 2015-01192; project director Peter M. Fischer) that investigated the causes of disruption in international trade and the 'collapse' of Bronze Age civilisations in the Eastern Mediterranean in the second half of the 13th and the 12th centuries BC, focusing on the island of Cyprus which was the centre of interregional trade in this region. The project was closely connected with our ongoing excavations at the Late Bronze Age harbour city of Hala Sultan Tekke on the island's southern coast.

The newly restored and enlarged building of the Faculty of Humanities, where the conference was hosted, thanks to the support of Henrik Jansson, the Head of the Department, provided an excellent environment for the conference. The conference dinner in the refined Jugendstil milieu of 'Ågrenska Villan', built in 1916 in the centre of Gothenburg as a private residence and since 1981 owned by the University of Gothenburg, was much appreciated by the participants. To the best of our knowledge, this conference was the last at the university of

Gothenburg before the serious outbreak of COVID-19 ended physical meetings for almost two years. In retrospect, we are even more grateful that we could enjoy these very intense and stimulating two days to the full, untroubled by thoughts about physical distancing, the potential spread of infection and other issues that would start to affect our everyday life only a few weeks later.

For some of us the pandemic was a very quiet and perhaps more productive period than usual, while others had to deal with parental challenges while schools and preschools were closed. In spite of these and the many other difficulties, issues and changes that we all had to face during the last more than two and a half years, we are particularly glad that all participants were able to submit a contribution to the present volume. In addition, we have included three more chapters to round off the topic.

Besides the funding bodies mentioned above, we would like to thank Jennifer Webb and David Frankel and Lennart Åström, the editors-in-chief and manager of SIMA, for including the volume in this series. Each single contribution was carefully peer-reviewed and we are grateful to all reviewers for accepting this task. Jennifer Webb has given us incredible support by finalising the layout and correcting and improving the language. We are very much obliged for all her accurate work! We also want to thank Elena Peri, who has assisted with copy editing, and Jennie Fälth of the administration of our department for practical help.

Gothenburg and Bern, June 2023
Teresa Bürge and Peter M. Fischer

List of contributors

Joachim Bretschneider
Department of Archaeology, Ghent University,
Belgium
Joachim.Bretschneider@UGent.be

Teresa Bürge
Institute for Archaeological Sciences (IAW), University
of Bern, Switzerland
Department of Historical Studies, University of
Gothenburg, Sweden
Austrian Archaeological Institute (ÖAI), Austrian
Academy of Sciences (ÖAW)
teresa.buerge@oeaw.ac.at

Rachid Cheddadi
CNRS-UM2-IRD, ISEM, Université Montpellier II,
France
cheddadi.rc@gmail.com

Jan Driessen
AEGIS, CEMA-INCAL-UCLouvain, Belgium
jan.driessen@uclouvain.be

Marina Faka
Science and Technology in Archaeology and Culture
Research Center, The Cyprus Institute
faka@cyi.ac.cy

Peter M. Fischer
Department of Historical Studies, University of
Gothenburg, Sweden
peter@fischerarchaeology.se

Svetlana Gasanova
Science and Technology in Archaeology and Culture
Research Center, The Cyprus Institute
s.gasanova@cyi.ac.cy

Florence Gaignerot-Driessen
Department of Classics, University of Cincinnati, USA
gaignefm@ucmail.uc.edu

Sorin Hermon
Science and Technology in Archaeology and Culture
Research Center, The Cyprus Institute
s.hermon@cyi.ac.cy

Maria Iakovou
Archaeological Research Unit, Department of History
and Archaeology, University of Cyprus
iakovou.maria.1@ucy.ac.cy

Reinhard Jung
Austrian Archaeological Institute (ÖAI), Austrian
Academy of Sciences (ÖAW)
Reinhard.Jung@oeaw.ac.at

David Kaniewski
Département Biologie et Géosciences, Université
Toulouse Jean Jaurès & Université Paul Sabatier-
Toulouse 3, France
david.kaniewski@univ-tlse3.fr

Athanasia Kanta
Mediterranean Archaeological Society, Centre for
the Study of Cretan and Mediterranean Civilization,
Greece
athanasiaka@gmail.com

Vasiliki Kassianidou
Archaeological Research Unit, Department of History
and Archaeology, University of Cyprus
kassianidou.vasiliki@ucy.ac.cy

Ekin Kozal
Department of Archaeology, Faculty of Humanities
and Social Sciences, Çanakkale Onsekiz Mart
University, Turkey
ekoza08@gmail.com

Igor Kreimerman
Institut für Ur- und Frühgeschichte und
Vorderasiatische Archäologie, Heidelberg University,
Germany
Igor.kreimerman@gmail.com

Natalia Lodeiro Pichel
Department of Ancient History, Medieval History,
Paleography and Diplomacy, Faculty of Philosophy
and Letters, Universidad Autónoma de Madrid, Spain
natalia.lodeiro@estudiante.uam.es

Frédéric Luce
EcoLab, Université de Toulouse, CNRS, INP, France
frederic.luce@univ-tlse3.fr

Nick Marriner
CNRS, Théma, Université de Franche-Comté, UMR
6049, MSHE Ledoux, France
nick.marriner@gmail.com

Uroš Matić
Austrian Archaeological Institute (ÖAI), Austrian
Academy of Sciences (ÖAW)
Uros.Matic@oeaw.ac.at

Mathias Mehofer
Vienna Institute for Archaeological Science (VIAS),
Human Evolution and Archaeological Sciences
(HEAS), University of Vienna, Austria
mathias.mehofer@univie.ac.at

Hans Mommsen
Helmholtz-Institut für Strahlen- und Kernphysik,
Universität Bonn, Germany
mommsen@hiskp.uni-bonn.de

Thierry Otto
EcoLab, Université de Toulouse, CNRS, INP, France
thierry.otto@univ-tlse3.fr

Tatiana Pedrazzi
Institute of Heritage Sciences, National Research
Council of Italy
tatiana.pedrazzi@cnr.it

Martina Polig
Science and Technology in Archaeology and Culture
Research Center, The Cyprus Institute
m.polig@cyi.ac.cy

Laerke Recht
Ancient Eastern Mediterranean Studies, Institute of
Classics, University of Graz, Austria
rechtl@tcd.ie

Carole Roche-Hawley
Département d'Archéologie et d'histoire de
l'Antiquité, Institut français du Proche-Orient (Ifpo)
c.roche-hawley@ifpoorient.org

Peter Steier
Faculty of Physics, Isotope Physics, Vienna
Environmental Research Accelerator, University of
Vienna, Austria
peter.steier@univie.ac.at

Johannes H. Sterba
Center for Labelling and Isotope Production, TRIGA
Center Atominstitut, TU Wien, Austria
johannes.sterba@tuwien.ac.at

Elise Van Campo
EcoLab, Université de Toulouse, CNRS, INP, France
evancampo@orange.fr

Valentina Vassallo
Science and Technology in Archaeology and Culture
Research Center, The Cyprus Institute
v.vassallo@cyi.ac.cy

Paula Waiman-Barak
Sonia & Marco Nadler Institute of Archaeology, Tel
Aviv University, Israel
pwaimanbarak@tauex.tau.ac.il

Eva Maria Wild
Faculty of Physics, Isotope Physics, Vienna
Environmental Research Accelerator, University of
Vienna, Austria
eva.maria.wild@univie.ac.at

Annik Wüthrich
Austrian Archaeological Institute (ÖAI), Austrian
Academy of Sciences (ÖAW)
Annik.Wuethrich@oeaw.ac.at

The end of the Bronze Age in the Eastern Mediterranean: collapse and transformation, continuity and resistance

Peter M. Fischer and Teresa Bürge

Introduction

The present volume aims to combine diverse approaches towards a broader and contextualised understanding of the decline of Bronze Age societies in the Eastern Mediterranean. In the past decades of research, numerous conferences and workshops have taken place which have focused on the Late Bronze to early Iron Age transition in the Aegean and the Eastern Mediterranean and resulted in seminal conference proceedings. There have also been a large number of monographs and other academic publications (to mention only some: Ward & Joukowsky 1992; Gitin *et al.* 1998; Oren 2000; B. Fischer *et al.* 2003; Killebrew 2005; Harrison 2008; Bachhuber & Roberts 2009; Maran 2010; Yasur-Landau 2010; Killebrew & Lehmann 2013; Stampolidis *et al.* 2014; Emanuel 2016; Fischer & Bürge 2017; Driessen 2018; Middleton 2020; Mühlenbruch 2021; Jung & Kardamaki 2022), as well as—in one of the most intriguing and fascinating phenomena in Mediterranean prehistory—in literature intended for a wider public (Cline 2014).

While the discussion in the Southern Levant has to a large extent revolved around the origin of and evidence for the Sea Peoples and the Philistines, one of the key aspects concerning Cyprus has been the LC IIC to IIIA transition (in absolute terms the second half of the 13th and the first half of the 12th centuries BC; see **Table 1**). This transition is associated with the closure or destruction of numerous settlements on the island, the striking increase of Aegean-type pottery and pottery production methods—reflected in decorated tableware as well as in plain wares and cooking vessels—and, in general, with shifting patterns in the trade networks by which Cyprus, due to its location in the centre of the Eastern Mediterranean, was particularly affected (e.g. Voskos & Knapp 2008; Knapp 2010; Karageorghis 2013; Knapp & Manning 2016; Fischer 2017; Fischer & Bürge 2018a: 608–617; Bretschneider *et al.* 2021).

Hence, the project *The Collapse of Bronze Age Societies in the Eastern Mediterranean* (project director Peter M. Fischer) focused on the study of the economic, political and climatological situation on Cyprus from

the 13th to the 12th centuries BC. In the course of our research, it became clear that the complexity and variety of sources and the ways and methods used to approach them may represent pieces of an enormous jigsaw puzzle, many (or perhaps most?) of which are yet to be discovered, investigated, discussed and contextualised. Only a careful connection and interpretation of all those aspects can enable us to provide a picture of one of the most influential periods in the history of the Mediterranean, which shaped the societies of this area for centuries to come. Among the plethora of different approaches, we have focused on five main themes in the chapters of this volume:

1. Egyptian, Ugaritic and Hittite written sources: what information on the disruptions at the end of the Late Bronze Age do they present and how can these texts be contextualised?
2. The interpretation of the possible evidence for the destruction, abandonment and transformation of sites;
3. The study of regional and interregional connections;
4. The importance of economic resources;
5. The contribution of scientific approaches, viz. radiocarbon, climatological studies and material analyses.

The contribution of written sources

The possible impact of the ‘Sea Peoples’ (‘peuples de la mer’), a term coined by the French Egyptologist Emmanuel de Rougé (1855) in his studies of the Medinet Habu temple of Ramesses III and further developed by Gaston Maspero (1896), has played a central role in the discussion of the upheavals around 1200 BC. The interpretations of 19th-century scholars have since undergone varying phases of attention during which their analyses were (partly) accepted or (much) criticised, and diverging explanations have been put forward by later generations. Over time, this topic and related interpretations have come to resemble a sine curve, attracting either much or little interest and either overinterpretation or a minimalistic

Late Cypriot	Anatolia	Late Helladic	Late Minoan	Levant	Egypt	Approx. dates BC
IA1–2	Old Hittite	I	IA	MB III	Hyksos	1630–1560
IB	Old Hittite (Middle Hittite)	IIA	IB	LB IA	18th Dynasty, early	1560–1450
IIA(–B)	Middle Hittite	IIB	II	LB IB	18th Dynasty, middle	1450–1400
II(A–)B	Imperial Hittite	IIIA1–2	IIIA1–2	LB IIA	18th Dynasty, late	1400–1300
IIC1–2	Imperial Hittite	IIIB1–2	IIIB	LB IIB	19th Dynasty	1300–1200
IIIA1–2	Neo-Hittite I	IIIC	IIIC	Iron Age IA	20th Dynasty	1200–1100

Table 1. Comparative chronology of the Late Bronze Age Eastern Mediterranean and approximate absolute dates with the period 1300–1100 BC in bold. The division of the periods is floating and the absolute dates are rounded up or down to fit, approximately, the periodisation of various cultures in a single table

stance (see a recent summary in Jung 2017a). Studies range from literally talking about the various groups of ‘Sea Peoples’ (e.g. the Peleset, see already Chabas 1872: 250) to discussions of the movement of small well-organised groups (e.g. Sandars 1978: 94) or large-scale migration (e.g. Dothan 1998), and from a propaganda-oriented attitude over a multifaceted phenomenon in the later part of the 13th and the 12th centuries BC (contributions in Fischer & Bürge 2017) to a borderline minimalistic position (Knapp 2021).

In **Chapter 2** of this volume, Annik Wüthrich and Uroš Matic re-evaluate the appearance of Sea Peoples in Egyptian textual and visual sources during the reign of Ramesses III, focusing specifically on the inscriptions of the Medinet Habu temple. While underlining the risk of an interpretation of the references to the Sea Peoples being taken out of context and thereby gaining a life of their own, the authors consider other elements of the documents in which these peoples are mentioned. By studying the overall archaeological contexts and considering the intention of text and image and their target audience, they conclude that the story of the war on land and sea between Ramesses III and the Sea Peoples was aimed at reaching as large an audience as possible. While a propagandistic intention for this narrative cannot be denied, the question about a potential historically true ‘kernel’ remains open.

Much different in nature are the letters from the so-called House of Urtēnu in Ugarit, which inform us about the last decades of the kingdom of Ugarit and the situation in the neighbouring regions, in absolute terms at the end of the 13th and beginning of the 12th centuries BC. **Chapter 3** by Carole Roche-Hawley sheds new light on this rich textual corpus consisting of 545 texts (115 of these are unpublished as of 2022). These chronicles include correspondence dealing with frequent commerce with coastal Levantine cities, family-related scribal activities linked to the royal administration, aspects of local religious and cultic life, a flourishing and active commerce in equids, and the ritual context and rites surrounding the death of a Levantine king. Reported also are migrations of foreign people and invasion, famine, political problems with eastern kingdoms and various wars within the Hittite

empire, thus reflecting political complications not only involving Ugarit and its immediate neighbours but also other kingdoms in the vast region from Cyprus to Mesopotamia.

According to the chronology presented by Roche-Hawley, the texts include the period of the reign of Niqmaddu IV (ca 1225–1215 BC), the period of transition during his final illness and immediately following his death, the reign of his son and ‘young’ king of Ugarit, Ammurapi II (ca 1215–1210? BC), and the reign of Ammurapi II as a grown man (ca 1210?–1186 BC when Ugarit was destroyed). The date of the fall of the Ugaritian kingdom can be placed roughly between 1192 and 1177 BC (e.g. Singer 1999: 729–730; Dietrich & Loretz 2003; Bretschneider *et al.* 2021: 609; recently also Jung 2018: 293–296; 2022: 255–265). Although there are diverging absolute chronological schemes, for example, 1201–1200 BC for the destruction of Ugarit (and the attack of the ‘Sea Peoples’ at the Nile Delta in 1186 BC; both dates refer to Wiener 2017 with further references), the divergence of 15 years between the high and low chronological dates is here regarded as of minor importance concerning the nucleus of the discussion on the Sea Peoples phenomenon (Fischer & Bürge 2017).

The texts from the House of Urtēnu report large-scale interregional interactions including contacts with Assyria and Babylonia. It seems that Niqmaddu IV’s son and successor, Ammurapi II, the last king of Ugarit, maintained a certain distance with regard to Ḫatti but cordial relations with Egypt. The tablets of the House of Urtēnu are further distinguished from those of other complexes by a high number of texts which mention boats and other aspects of maritime commerce, not only with the southern ports of the Levant but also with Hittite Anatolia and Cyprus. At least 34 texts mention boats, including the remarkable references to the Šikilāyū people who were ‘living on boats’. These texts are of major importance for the study of events at the close of the Bronze Age.

‘Threats from the sea’ are reported in the correspondence with Alašiya (Cyprus), Ḫatti and Karkemiš from the reign of Ammurapi II. Roche-Hawley emphasises the central role of Cyprus as the last ally of the kingdom of Ugarit against its enemies.

It should be remembered that the hierarchical political position of Cyprus, as seen by the Ugaritians, was on the same level as that of Hatti and Egypt. Five letters from the House of Rap'ānu and the House of Urtēnu mention the arrival of seaborne enemies. In particular, in four of them the pleading tone points to the disastrous situation in the kingdom of Ugarit caused by 'enemies on boats'. The last(?) letter describes the establishment of the enemy at Ras Ibn Hani close to Ugarit, obviously just immediately prior to the final destruction of Ugarit.

A few reflections on the relationship between the Hittite king Tudḫaliya IV, Alašiya and Ugarit follow. The naval battle between Hatti and Alašiya, which was clearly won by Tudḫaliya IV, may have been supported by the ships of the Hittite vassals from Ugarit and Amurru, as suggested by Natalia Lodeiro Pichel in **Chapter 4** (*sic!* quoting Virolleaud 1965: 88–89; de Martino 2008: 249–250; the deployment of Ugaritian ships in southern Anatolia is known from RS 20.238, see below), resulting in the destruction of the Alašiyian ships. It is notable that Ugarit supported (or was forced to assist?) the Hittite king, when Ammurapi II, the last king of Ugarit, answered a letter sent by the king of Alašiya who pleaded for support and clearly anticipated receiving it. Ammurapi II's well-known response was:

My father, now the enemy ships are coming (and) they burn down my towns with fire. They have done unseemly things in the land. My father is not aware of the fact that all the troops of my father's overlord are stationed in Hatti and that all my ships are stationed in Lukka. They still have not arrived and the country is lying like that [...] Now, the seven enemy ships that are approaching have done evil things to us... (RS 20.238; Nougayrol 1968: 87–90, no. 24; English translation from Hoftijzer & van Soldt 1998: 344; see also Gilan 2013: 62).

Another letter (RS 20.18) written by Ešuwara, the ^{LU}*pidduri*, i.e. 'senior governor' of Alašiya (Singer 1999: 721), found in the house of Rap'ānu at Ugarit, contains advice that the city of Ugarit has to protect itself against internal 'enemies' and that he is not responsible for any harm done to Ugarit:

As for the matter concerning those enemies: (it was) the people from your country (and) your own ships (who) did this! And (it was) the people from your country (who) committed these transgression(s) [...] I am writing to inform you and protect you. Be aware! (Hoftijzer & van Soldt 1998: 343).

This was followed by the mention of 20 ships which have departed from Cyprus in an unknown direction (RS 20.18; Nougayrol 1968: 83–85, no. 22). One wonders how Ešuwara could have known about Ugarit's internal problems, but we are not in the possession of the entire correspondence or the correct chronological sequence of these messages.

Several letters prove—in addition to military activities in Cyprus—the arrival of seaborne people along with internal problems causing the destruction of the city of Ugarit (Singer 1999: 719–728 with further references). It is most likely that the marauders on their way to Ugarit—from wherever they originated—came into conflict with neighbouring cultures including Cyprus, coastal Anatolia and the Northern Levantine littoral. These seaborne people, together with attacks by the Hittites (see, however, some reservations below) could plausibly explain a number of destructions on Cyprus around 1200 BC and in the first half of the 12th century BC (Fischer 2017: 198–199; Fischer & Bürge 2018a: 605–613).

Despite the prominent political role of the king of Cyprus, coequal with the Egyptian and Hittite rulers—at least from the mid- to second half of the 14th century BC, which is documented in the so-called Amarna correspondence (EA 33–40; Moran 1992; Cochavi-Rainey 2003), to the period just prior to the fall of Ugarit (see above)—some Hittite texts seem to treat the Alašiyian king as a vassal (de Martino 2008). However, Lodeiro Pichel argues in her summary of the textual sources on the Cypro-Anatolian connections in the Late Bronze Age (**Chapter 4**) that the Hittite sovereignty over Alašiya was (during most of the time) probably more symbolic than real (see also de Martino 2008). This statement finds support in the archaeological evidence from major Cypriot cities including Hala Sultan Tekke: during most of the city's existence (ca 1630–1150 BC) it demonstrates a plethora of intercultural connections comprising Sardinia, Mycenae, Crete, the Levant, Egypt, Mesopotamia and beyond, while Anatolia is less frequently reflected in the material culture than the written evidence may suggest (see overview in Fischer 2022).

The literary sources suggest that Cyprus was an independent kingdom in the 14th and during most of the 13th centuries BC (see also Knapp 2013: 432–447), since a king of Alašiya is not only mentioned in the Amarna letters but also in documents from Hattuša (KBo XII 38 and KBo XII 39; see Otten 1963; Güterbock 1967), in some instances together with ^{LU}*pidduri* or ^{LU}MASKIM (GAL), obviously one (or more?) high ranking dignitaries in close interaction with the king (de Martino 2008: 255–256) or even sharing the political and military power on the island. In contrast, some archaeologists have argued for a fragmentation into several polities, including, for instance, Enkomi, Hala Sultan Tekke, Kalavassos *Ayios Dhimitrios*, Maroni *Vournes*, Alassa *Paliotaverna*, the Paphos area (e.g. Keswani 1993, 1997: 238–239; South 2002; see also Iacovou's **Chapter 5** in this volume) and, in the later part of this period, also Kition. While this question goes beyond the scope of the present volume, Hittite documents suggest that Cyprus was under Hittite domination from the late 13th century BC on, during the reign of Tudḫaliya IV (1237/27–1209 BC according to Bryce 2005 or 1240–1215 BC according to Starke

2002) and his son Šuppiluliuma II, the last Hittite king (de Martino 2008). In any case, the collapse of the Hittite empire certainly had a serious impact on the island's political and economic situation.

Destruction, abandonment and transformation in the archaeological record

Maria Iacovou discusses the response of Paphos and other Cypriot regions and sites to the 1200 BC transformations in **Chapter 5**. Contexts from mainly coastal but also inland sites which flourished at the end of the 13th and in the first half of the 12th centuries BC (end of LC IIC and LC IIIA) show dissimilar pictures. In this period, several sites survive the crisis, others were destroyed and abandoned or just abandoned (Fischer 2017; Fischer & Bürge 2018a: 606–607). Surviving sites, for instance Kition and Paphos, continued to flourish after the crisis years. These two sites witness, for example, the enhancement of their sanctuaries and *temene*, viz. Temple 1 at Kition and Sanctuary I at Paphos, maybe as the result of an influx of people from adjacent sites which were abandoned.

In the Late Bronze Age, Paphos developed into a central place controlling the southwest of Cyprus according to Iacovou, growing around the harbour and not around the sanctuary. The evidence from Paphos does not provide proof of violent destructions (and it is unclear on what basis Knapp and Manning 2016: 132 included it in their list of sites destroyed around 1200 or in the 12th century BC, along with Kition and Maroni *Vournes* which have no recorded evidence for the destruction of monumental structures; Kreimerman in **Chapter 7**, this volume). However, it should be highlighted that today the only visible monument of Late Cypriot Paphos is the *temenos*.

In contrast to many other sites in the period of the crisis years, the evidence from tombs at Paphos demonstrates a marked increase of wealth peaking in the 12th century BC. This is underlined by the products of specialised craftsmen not only in LC IIC but also in LC IIIA who supplied the local elite with status objects. Examples include the carved objects of ivory from the wells at Evreti (von Rüden *et al.* 2016).

The evidence from Pyla *Kokkinokremos* differs from that of Paphos in many aspects: Jan Driessen, Joachim Bretschneider and Athanasia Kanta focus on the interpretation of the half dozen hidden hoards of valuable objects from this short-lived settlement in **Chapter 6**. These objects were concealed just prior to the abandonment of the site, possibly following a destructive event at the end of LC IIC, i.e. roughly around 1200 BC. Pyla *Kokkinokremos* is characterised by a casemate system and finds from a multitude of geographic regions, spanning from Sardinia to Mycenaean Greece, Crete, Anatolia, the Levant and Egypt. As regards the hidden hoards of recyclable scrap metal as well as excellently preserved complete objects, the authors of this chapter interpret these as

emergency hoards deposited in a 'single' event (cf. also Karageorghis & Demas 1984: 62, 74). Obviously, they were concealed at a time of danger when hostile activities at Pyla *Kokkinokremos* were impending. Hence, the authors argue that deliberate deposition for religious reasons should be excluded. The entire situation gives the impression that the site was left suddenly and in haste. The fact that the inhabitants of Pyla *Kokkinokremos* had time to conceal their valuables may point to the receipt of reports of an imminent threat, most likely epitomised by invaders, or even the first visible contact with approaching ships or land-based hordes of invaders. The latter cannot be excluded because these invaders, if they approached from the west, must have passed the territory of Kition which shows possible evidence of a limited destruction in the most recent contexts of the Floor IV level (transitional LC IIC/IIIA) but not a general destruction (cf. Fischer & Bürge 2018a: 606 with further references). Hypothetically, this situation can be explained by restricted military activities and the successful defence of the city of Kition followed by the advance of hostile forces towards the east and Pyla *Kokkinokremos* where the defence system was weaker than that of Kition. Driessen *et al.* also suggest that the concentration of hoards along the east side of the settlement plateau could imply that the inhabitants of this area of the settlement had more time than those on the west side to hide valuables. This could also point to an enemy approaching from the west. Military interference as a consequence of rivalry with the inhabitants of Kition, who may have objected to these newcomers settling close to their own city, can also not be excluded. Looting, but not systematically (see the hoards), seems to have taken place at Pyla *Kokkinokremos* but the entire settlement did not suffer a general conflagration. The site was abandoned by its residents and taphonomic processes led to the burial of the remains of the settlement.

The case of Pyla *Kokkinokremos* is particularly interesting, as the recent excavation results greatly contribute to our understanding of the political and economic situation in the Larnaca Bay area in this period. As mentioned above, Kition, just to the southwest of Pyla, has a continuous occupational history from LC IIC to the Hellenistic period. Hala Sultan Tekke, 15km southwest of Pyla, flourished in LC IIC and LC IIIA. As the last decades of the city have been discussed in previous publications (e.g. Fischer 2017, 2019, 2022; Fischer & Bürge 2018a: 603–617), only a summary and some additional thoughts are presented here. The city was destroyed (Stratum 1) and abandoned in approximately the mid-12th century BC following a previous destruction around 1200 BC (Stratum 2). There is no occupational gap between the destruction of Stratum 2 and the rebuilding and reoccupation in Stratum 1, and the pottery evidence suggests a closeness in time of these two strata (Bürge & Fischer 2018: 255–256). The

question of whether groups of people who dwelled in the city of Stratum 2 left after the destruction—and moved elsewhere, for instance, to Kition and/or the Levant and further south—cannot be answered since we do not know the total extent of the occupation of Stratum 1 compared to that of the older Stratum 2 (there is roughly an equal area exposed of both strata). In any case, the ‘survivors’ of Stratum 2 rebuilt their city and dwelled there for quite a short period, maybe a few decades at most, until the abandonment after another destruction affecting Stratum 1 around the mid-12th century BC. After that, the area was never reoccupied by permanent settlers and ca 500 years of occupation came to an end.

In addition to destructions caused by hostile activities there are other possible causes to consider which might have been (co-)responsible for the abandonment of the city. The silting-up of the harbour has been discussed by some scholars as the main reason for the abandonment of the city (e.g. Iacovou 2013: 597–599). This phenomenon may have contributed to the abandonment but we cannot disregard the destructive event from which the last settlement of Hala Sultan Tekke suffered. It might have been the case that Hala Sultan Tekke was abandoned after the destruction of Stratum 1 because the efforts to build up the city again in combination with the need to maintain the harbour, which was essential for the economy, were too demanding. A scenario could be that major elements of the population voluntarily left or were forced by invaders to leave the city directly after the last destruction. This may have resulted in insufficient manpower for necessary repair and maintenance tasks. Consequently, due to neglect in the maintenance of the harbour and the tectonic uplift which did not stabilise before ca 3000 cal. BP (Dalongeville *et al.* 2000: 16–19), the harbour became a shrinking lagoon ending up as the Larnaca Salt Lake cut off from the open sea and useless for direct anchorage with serious trade-related consequences. Thus, there was little motivation to re-build the city after the last destruction, and later re-occupation was not encouraged because of the efforts and costs arising from the loss of direct access to the sea. Climatological changes have been discussed (e.g. Kaniewski *et al.* 2010; Kaniewski & Van Campo 2017; Kaniewski *et al.* 2019; see also below and Kaniewski *et al.* **Chapter 18** in this volume) but they are of limited relevance to the discussion of why Hala Sultan Tekke was abandoned when, at the same time and under the same climatological conditions, nearby Kition survived these years of crisis. However, several observations, although chronologically inadequately defined, may support the theory of a worsening climate in this period.

Another question concerns the political relations between Hala Sultan Tekke and Kition, which are only 5km distant from each other. A friendly relationship in the period covering the end of LC IIC and LC IIIA

early cannot be excluded but it is of course possible that trade-related competition led to violent actions eventually resulting in the destruction of Hala Sultan Tekke roughly in the mid-12th century BC. Whatever the reasons behind the abandonment of Hala Sultan Tekke, one cannot exclude the possibility that groups of people moved from Hala Sultan Tekke to Kition and contributed to the increased power and wealth of the latter. Since major parts of Kition are buried under modern structures and, consequently, the size of the city is not known, we cannot decide if Kition expanded in LC IIIA to provide dwellings for immigrants from Hala Sultan Tekke.

A re-assessment of destruction layers based on excavation reports of various sites on Cyprus and the Levant is provided by Igor Kreimerman in **Chapter 7**. Such layers are often represented by collapsed structures covered with burned debris such as mudbricks, ash and charcoal, and broken (and intact) objects. One of Kreimerman’s main arguments is that the thorough burning of an entire settlement was most likely human induced. This is certainly correct in most cases but it represents a problem *per se* because there are not many, if any, cases from the period around 1200 BC where entire settlements have been exposed and—equally importantly—sufficiently well published to report on extensive destruction layers and/or confirm their total destruction by fire. This leaves us with partly exposed settlements and, consequently, restricted information depending on the quality of the excavation reports and subjective interpretations offered by the excavators, all of which have a serious influence on our conclusions.

Interestingly, most known occupational strata designated as destruction layers from this period did not produce skeletal remains. This is, for instance, true as regards the authors’ site, Hala Sultan Tekke. With the exception of a few isolated human bones, human skeletons are missing in the destruction layers of Strata 2 and 1. We agree with Kreimerman that the absence of entombed victims in the debris implies that the inhabitants had time to leave the settlements prior to the destruction.

As Kreimerman demonstrates in his chapter, the emerging picture is complex and differs between Cyprus and the Levant: whereas in the Levant the burning down of an entire settlement (see, however, the reservations expressed above) commonly led to the site’s abandonment and was a prime catalyst of changes in settlement patterns, in Cyprus cities were frequently reconstructed after suffering similar destruction. The abandonment of settlements in Cyprus was usually a gradual process rather than the result of an abrupt event. However, there are some exceptions, such as Hala Sultan Tekke.

In certain cases, Kreimerman observed a possible interval between the city’s fall due to warfare and its destruction by fire, from which he concludes that a decision to destroy the city was taken after the city

was conquered. In his chapter he presents hypotheses regarding why such decisions to burn down cities on Cyprus in LC IIC–IIIA were taken and the role these destruction events played in the collapse of the political system at the end of the Late Bronze Age in Cyprus and the Levant. The distinction between potential indicators of premeditated, human-induced destruction and accidental destruction or destruction associated with natural disasters is a complex task. Often there is no direct correlation between the extent or intensity of a fire in a building and the cause of the fire—accidental or intentional—because the result would be the same.

Weathering can significantly transform and erode the remains, particularly those close to the surface. This is particularly relevant where Stratum 1 at Hala Sultan Tekke is concerned. Some 1350m² of both settlement Strata 1 and 2 have been exposed in the course of the renewed excavations (together with the old excavations ca 6000m²; see the approximately similar area exposed at Kition in Fischer & Bürge 2018a: 611 with further references). Stratum 1, today just below colluvial soil, is the last layer of occupation. In many places where the burnt remains of Stratum 1 were once on the surface—because the city was abandoned after the destruction of the occupational layer of Stratum 1—they were exposed to erosion, but deposits survived in better protected places across the excavated area, suggesting a general conflagration. This situation is repeated in Stratum 2 (both from the period around 1200 BC to roughly the mid-12th century BC). Consequently, the most valuable indication of a general conflagration is the coverage of the burnt debris of a settlement (including those areas where destruction debris is eroded away).

Leaving the island of Cyprus, further evidence is provided by Jan Driessen and Florence Gaignerot-Driessen's contribution on the destruction of the palace at Knossos and the Aegean Bronze Age collapse in **Chapter 8**. The palace of Knossos and the major satellite towns at Chania, Amnisos, *Setoija* and Phaistos exercised considerable power before its destruction in LM IIIA2. Without going into a detailed discussion on absolute chronology, some dates for the destruction should be referred to: Driessen and Gaignerot-Driessen date the destruction level at Knossos partly on the ceramic evidence at Malia and Sissi between 1350 and 1325/20 BC (Driessen 2021; see also Macdonald 2010), and Malcolm H. Wiener within the same time span, viz. 1350/40 BC (*pers. comm.* February 14, 2022). However, in earlier literature there are advocates of a very low chronology, viz. 1250–1200 BC (Hallager 1977; Niemeier 1982) which, due to various weighty arguments, is dismissed by the authors of the chapter. Driessen and Gaignerot-Driessen discuss the multitude of hypotheses dealing with the causes for the destruction of the palace of Knossos, which include a local uprising to gain more independence, punitive trade-related expeditions

from one or more mainland palace centres and external raiders—harbingers of the 'Sea Peoples phenomenon' from the second part of the 13th and the first half of the 12th centuries BC.

Prior to the destruction of Knossos, much Mycenaean pottery on Crete comes from Knossos itself but it was also exported. An example is an excellently manufactured and decorated piriform jar from Hala Sultan Tekke which can be dated to Late Minoan II/IIIA, viz. around 1400 BC (Fischer & Bürge 2018b: 54, fig. 20). After the catastrophe, the Kydonia workshop at Chania took over the former role of Knossos (Hallager & Hallager 2011: 431; see also Bernhardt 2021). In this post-destruction period, there is a serious drop in interregional trade (e.g. Cline 2007: 192). After the LM IIIA2 destruction, the palace of Knossos was partly restored, but, while there does not seem to be anything to suggest that the building could still compete with the Mycenaean palaces in quality or attraction, its use as a squatter occupation is perhaps far-fetched. Driessen and Gaignerot-Driessen suggest that the downfall of the palace of Knossos was much more serious than previously regarded. It can be considered to have had a serious impact on the entire palatial system in the Aegean. Thus the authors pose the question: 'Can we even argue that the massive military investment in fortification systems on the Mycenaean Mainland, which is basically a 13th century BC phenomenon, was first of all a reaction to the destruction of Knossos and a preparation for even more troubled times to come? ... It is remarkable that, with Knossos toppled and reduced to a minor player, a domino effect was set off, with a progressive and incremental collapse of the Bronze Age system as a consequence.' Their hypothesis suggests a period which lasted approximately one century before the generally accepted (partial) collapse of the Bronze Age political systems known as the Sea Peoples phenomenon.

Regional and interregional connections

The geographical position of Cyprus was a prerequisite for intense economic and political interactions with the surrounding regions. Besides the written sources mentioned above, it is the material culture, and most prominently the pottery, that may provide information on the island's external relationships and possible changes in these relationships towards the end of the Late Bronze Age. In **Chapter 9**, Reinhard Jung, Hans Mommsen and Tatiana Pedrazzi provide a detailed discussion on typology in connection with NAA results on pottery of local and non-Cypriot manufacture from 13th to mid-11th century BC contexts at Enkomi (LC IIC–IIIB), Pyla Kokkinokremos (LC IIC) and Maa *Palaeokastro* (mainly LC IIIA, possibly late LC IIC). The fact that all analysed vessels come from stratified and well-documented contexts enables a precise chronological reconstruction of

Cypriot exchange networks from LC IIC to LC IIIB. The selected material comprises mostly Aegean-type and Aegeanising pottery as well as Levantine (and Egyptian) storage and transport amphorae, the so-called Canaanite jars. In addition, a wide range of other pottery classes, such as cooking vessels, plain wares and Base Ring, were included.

Their results on Mycenaean finewares are in line with previous and most recent analyses, according to which workshops most likely located in the northern Argolid (of the so-called Mycenae/Berbat group; see Zuckerman *et al.* 2010; also Sterba, **Chapter 12** in this volume) specialised in the large-scale production of decorated tableware for export to Cyprus and the Eastern Mediterranean (Jung 2015; Mountjoy 2015; Mountjoy & Mommsen 2015; Zuckerman *et al.* 2020; Jung & Mommsen 2022). Imports from Crete reached the island in much lower numbers, while products from other regions, such as western Anatolia, are relatively rare. Furthermore, painted finewares of Aegean type, either closely resembling Mycenaean prototypes or amalgamating Aegean features with local traditions (see the comprehensive study of this group by Mountjoy 2018), were produced in the area of Enkomi throughout the entire period covered in the chapter, as well as in various other regions (see also Mountjoy & Mommsen 2015, 2019; Sterba **Chapter 12** in this volume; Waiman-Barak *et al.* **Chapter 13** in this volume). The radical change in the pottery repertoire from Level IIB (LC IIC) to Level IIIA (LC IIIA) at Enkomi has been discussed in detail in earlier publications by Jung (e.g. 2011a, 2011b, 2017b) and includes not only decorated tableware but also plain wares and cooking pots. In the case of tableware, the abandonment of a large part of the traditional Cypriot repertoire, most prominently White Slip and Base Ring, is characteristic of the LC IIC to IIIA transition throughout the island (see, e.g. the summary in Georgiou 2018), while Aegean shapes—comparable to those from contemporaneous contexts in various Aegean regions—were locally produced and now dominated the LC IIIA repertoire. As regards cooking pots, the replacement of handmade round-bottomed vessels of LC II type by wheelmade flat-bottomed pots of Aegean type at the beginning of LC IIIA is striking and also attested at other sites, such as Hala Sultan Tekke (Bürge & Fischer 2018: 226–229; Bürge **Chapter 11** in this volume).

In contrast to these morphological and technological changes, the NAA results obtained from the unpainted and painted finewares at Enkomi point to a continuity in the use of clay pastes from LC IIC to IIIA, whereas the analysed finewares from Maa *Palaeokastro* indicate different clay recipes for Aegean-type vessels and traditional Cypriot pottery classes. The cooking vessels, again, show a different pattern: while those from LC IIC layers at Enkomi and Pyla *Kokkinokremos* could be traced to clays from the southern foothills of the Troodos mountains (for

previous petrographic studies on the Pyla cooking pots see Dikomitou-Eliadou *et al.* 2014), the LC IIIA types from Enkomi and Maa *Palaeokastro* are of different provenance, most probably local to the respective site.

The NAA results suggest that Canaanite jars from the entire Levantine coastal region reached the three sites, without any noticeable difference from the 13th to the 11th centuries BC. The typology of Canaanite jars may, however, hint at close relations between Maa and the Northern Levantine, and between Enkomi and the Central and Southern Levantine coastal regions (see also Pedrazzi 2007: 348–349 and *passim*).

Despite the short distance between Cyprus and the southern and southeastern Anatolian coast, Cypro-Anatolian relations have been largely neglected in the discussion of Late Bronze Age Eastern Mediterranean exchange (see, however, e.g., Kozal 2017). Ekin Kozal's **Chapter 10** outlines the relations between Cyprus and Anatolia from an archaeological perspective, tracing continuities and changes visible in the material culture from the 14th to the 12th centuries BC. She discusses the evidence from sites in the regions of Rough Cilicia, Plain Cilicia, Central Anatolia and West Anatolia. Objects of Cypriot provenance identified in these areas include pottery—mainly White Slip, Monochrome and Base Ring—copper ingot fragments and possibly some other metal artefacts. Cypriot imports are not extremely frequent in any region of Anatolia and very scarce in Central Anatolia. Vice versa, Anatolian imports are mainly substantiated in pottery of Red Lustrous Wheelmade ware, the provenance of which can be localised in Rough Cilicia (see also Kozal 2015; Kozal & Kibaroglu 2017). Apart from these, West Anatolian Grey Ware has been found in smaller numbers mainly in southeastern Cyprus (Allen 1991; Mommsen & Pavúk 2007), as well as various Hittite objects including seals and figurines of silver, bronze and terracotta. The picture that emerges is that of constant contacts between Cyprus and Anatolia during the 14th and 13th centuries BC, but their intensity is hard to determine if we only consider the material preserved (see above on the disputed extent of Hittite control over Cyprus). Even more difficult to assess is the nature of the contacts in the 12th century as far as pottery of LH IIIC type is concerned—a ware that is only attested in limited quantities at some sites (see bibliography in Lehmann 2017: 247–248), the most important of which are Kilise Tepe (French 2007), Soli Höyük (Yağcı in Novák *et al.* 2017: 155 with further references), Kazanlı (Sherratt & Crouwel 1987), Tarsus Gözlükule (French 1975) and Kinet Höyük (Lehmann 2017: 234–238), as well as Troy (Mountjoy 2017). Analyses of LH IIIC type pottery found at Tarsus revealed that some was produced on Cyprus, other vessels were locally made and yet others were imported from the Aegean (Mommsen *et al.* 2011; Mountjoy *et al.* 2018).

Without the written evidence, we would therefore hardly expect intense relations between these two

regions. This case demonstrates how distorted our notion of political, economic and cultural relations may be, if crucial evidence is missing or not preserved in the archaeological record.

The next three contributions, **Chapters 11–13**, are closely related to each other, as they discuss and present results of pottery provenance analyses. As stated above, one of the core aims of the project *The Collapse of Bronze Age Societies in the Eastern Mediterranean* was to characterise the LC IIC to IIIA transition at the coastal site of Hala Sultan Tekke in terms of continuity versus change, and the possible impact of people from other regions in the material culture. In **Chapter 11**, Teresa Bürge examines typological, technological and stylistic developments over this period reflected in various pottery classes from well-stratified contexts at the site. These trends correspond to the LC IIC–IIIA changes discussed at other sites (e.g. Enkomi, for which see Jung 2011a: 58–64; 2011b). In addition to the changes in cooking pot shapes and production technologies and the well-known transformations of the fineware repertoire, other innovations characteristic of the end of LC IIC and the beginning of LC IIIA at Hala Sultan Tekke comprise the appearance of Levantine-type biconical cooking pots and torches of Aegean type. Hence, there seem to be close cultural ties to both regions, the Aegean and the Levant, that cannot be (solely) explained by economic phenomena (*contra* Sherratt 2003) but rather by the mobility of people. In any case, the pottery evidence confirms earlier studies (Fischer 2017; Fischer & Bürge 2018a: 611–613), according to which Hala Sultan Tekke was a flourishing settlement until its destruction during or at the end of LC IIIA, and there are no visible signs of decline before this.

First results on NAA studies of more than 300 samples representing the entire range of pottery wares from Hala Sultan Tekke are presented by Johannes Sterba in **Chapter 12**. They have been compared to already established Cypriot chemical groups (Mountjoy & Mommsen 2015; see also Jung *et al.* **Chapter 9**, this volume), the production of which can be placed in the area of Larnaca Bay, Sinda and Kouklia. The absence of products from Enkomi, which have been detected in previous analyses (Mountjoy & Mommsen 2015), is surprising and certainly needs further discussion. As regards foreign imports, vessels with the well-known Mycenae/Berbati and Tiryns/Asine chemical fingerprints, as well as from Troy, could be identified. The typological and macroscopic identification of Egyptian imported amphorae could also be verified by NAA.

The same samples from Hala Sultan Tekke were also analysed by petrography. Paula Waiman-Barak, together with the current authors, discusses preliminary results in **Chapter 13**. In correspondence with NAA, various local petrographic groups as well as imports from other regions of the island were identified. The latter comprise Famagusta Bay, the

southern coast around Kalavassos and the southwestern coast, i.e. the region near Paphos. Imports include vessels from Anatolia, the Levant, Egypt, the Aegean and Sardinia. While the petrographic studies on the Sardinian vessels have been published (Gradoli *et al.* 2020), Aegean, Levantine and Egyptian imports will be presented in a forthcoming study.

Despite the marked changes in morphology and production techniques, it becomes clear from both NAA and petrography that the potters of Hala Sultan Tekke largely used the same clay sources and recipes throughout the LC IIC and LC IIIA periods—in contrast to what the results from Enkomi have shown (see above and **Chapter 9**). It seems that each community had a different strategy of incorporating changes and innovations in the ceramic industry.

Economic resources: copper and livestock

The following three chapters are dedicated to further aspects of the economy. As far as copper production during the crisis years is concerned, two studies authored by Vasiliki Kassianidou (**Chapter 14**) and Mathias Mehofer (**Chapter 15**) contribute towards a clarification of basic, diachronic and site-specific issues. In Kassianidou's overview of the production and export of Cypriot copper, it is highlighted that the 15th century BC (at the latest) represents the establishment of a large-scale copper industry on Cyprus. This industry was of tremendous economic and political importance for Cyprus and the entire Mediterranean area and beyond. In the 13th century BC, the most talented metalworkers manufactured advanced products such as the gods found at Enkomi and the four-sided stands. Copper production culminated in the 13th and the first half of the 12th centuries BC, as exemplified by the copper workshops at the sites of Enkomi, Kition and Hala Sultan Tekke, the latter of which is treated by Mehofer.

Kassianidou argues for a differentiation of the *chaîne opératoire* into two main actions, i.e. metallurgical activities, including mining and smelting, and metalworking, including refining and the production of ingots and artefacts (cf. the much discussed three stages proposed by Hauptmann 2014: 92, fig. 5.1, viz. mining/roasting and smelting/refining-alloying-casting). Can, however, the plethora of workshops provide an answer to the question of the political situation in Cyprus in this period? Sydney Pickles and Edgar Peltenburg (1998: 88–89), referred to by Kassianidou, have proposed that the vast distribution of Cypriot workshops in this period is indicative of the culmination of a long-term trend towards the dissolution of central control of metals, whereas Kassianidou argues that this picture does not necessarily reflect a dissolution of central control. This raises the following questions: was there a central control of metal production and trade prior to (or

during) the crisis years and, if there was, how was this control administered?

Kassianidou, furthermore, argues that additional investigation of the recorded slags is necessary to decide from which part of the *chaîne opératoire* they derive. This is to some extent resolved by Mehofer as regards the evidence from Hala Sultan Tekke from the period around 1200 BC and the first half of the 12th century BC. Based on the present state of research, which shows that ingots and much of the slag from the urban centres can be traced to a single or a few sources—Apliki or one of the other ore deposits in the Solea mining district—Kassianidou defends the theory of central control, perhaps by a '*primus inter pares*', at least as far as the management of the export of copper from the island is concerned.

At Hala Sultan Tekke, Mehofer investigated the evidence associated with intraurban metallurgy. During the new excavations (2010–2019), a quite restricted area (City Quarters 1 and 2) produced more than one ton of slag, together with tuyères, pieces of raw copper, part of an ingot and the remains of furnaces dating from the 14th to the first half of the 12th centuries BC. Mehofer concludes, based on the (so far) missing evidence of roasting beds and ore processing tools such as hammer stones, that not copper ore but an intermediate product from a first smelt was processed. This evidence is open to various interpretations—for instance, that smelting was carried out in another part of the city or that the intermediate product of a first smelt was brought from the ore deposit(s) to Hala Sultan Tekke. Lead isotope analyses suggest that the raw material came from the Troodos mountain range (Lantaria, Mavri Sykia, Platies and the mines of the Solea axis).

Previous publications (Fischer & Bürge 2018a, 2020) have highlighted the fact that smelting operations at Hala Sultan Tekke were carried out in intraurban industrial areas. Mehofer distinguishes between tapped slag (TS) and furnace slag (FS). There is a third type of slag which could not be assigned to either because of its high fragmentation. The principal difference between the two main groups is that TS was tapped into a small pit in front of the furnace and FS formed inside the furnace. Both were found in the same contexts, pointing to smelting activities which were conducted simultaneously. The TS had large and more matte inclusions containing iron and sulphur as well as iron sulphides. According to Mehofer, such components are typically found in smelting products from an early stage of the smelting process. Ideally, the iron (and the sulphur) is removed during (repetitive) roasting and smelting as its presence reduces the quality of the copper. Because Fe-sulphides were not detected in any significant quantities in the FS and the matte contained low levels of iron, Mehofer concludes that the FS originated from a later stage of the smelting process, during which metallic copper of high quality was produced. According to Mehofer the

same or similar processes can be seen, for instance, at Enkomi, at Kition and at Kalavassos *Ayios Dhimitrios* which suggests that the technological know-how was common knowledge on Cyprus. This points to some sort of cooperative enterprise.

Other aspects of economy and society can be deduced from the study of human-animal relations. The role of equids in Late Bronze Age Cyprus is discussed by Laerke Recht in **Chapter 16** on the basis of faunal and iconographic evidence. The types of equids identified on the island are limited to donkeys (*E. asinus*) and horses (*E. caballus*), neither indigenous to the island: donkeys were introduced as early as the Philia phase (both Chalcolithic and Early Bronze Age; Webb & Frankel 1999: esp. 40, n. 269), and the horse probably not before the Middle Cypriot or the early Late Cypriot period according to Recht. In her chapter, the different roles of donkeys and horses are described: donkeys were associated with trade and transport and horses with the light, two-wheeled chariot as part of an expression of elite status and ideology, by analogy with the entire Late Bronze Age Eastern Mediterranean.

There seems to be a good correlation between the evidence based on horses and donkeys and the events at the end of the Late Bronze Age both in Cyprus and the Eastern Mediterranean: a culmination from the 15th to the 13th centuries BC, i.e. LC II, when interregional contacts were established and advanced. The role of horses and chariots in the representation of elites continued to some extent into the 12th century BC, i.e. LC IIIA, but without the same evidence for interregional contacts. In her chapter, Recht highlights that equids can serve as an illustration of how human and animal lives were closely entangled. In addition to equids, much information on the species and frequency of various species, including marine animals, at Hala Sultan Tekke during the crisis years has been published by David Reese (2018) and Omri Lerna (2018).

The contribution of scientific approaches

The validity of the paradigm 'chronology is the backbone of archaeology' certainly cannot be questioned. Undeniably of the highest importance to archaeology in general, the study of ancient societies' diachronic developments depends on reliable stratigraphic excavation records to establish relative chronological schemes which then can be anchored in an absolute chronological frame as the basis for comparative studies between different sites.

In **Chapter 17**, Eva Maria Wild, Peter Steier and the current authors present a status report on the radiocarbon dates from Hala Sultan Tekke (state 2020). Fifty AMS radiocarbon dates were obtained from meticulously excavated and recorded contexts. Forty-three were analysed at the Vienna Environmental Research Accelerator Laboratory of the University

of Vienna (VERA dates) and seven at the W.M. Keck Carbon Cycle Accelerator Mass Spectrometry Laboratory of the University of California, Irvine (UCIAMS dates; as regards the latter, see Höflmayer *et al.* 2018). The dated samples came from contexts of Strata 3–1 of City Quarters (CQ) 1–4 (40 dates) and Area A, the cemetery of the city (ten dates). Whenever possible, short-lived terrestrial plant remains were analysed to avoid any material-inherent age offsets. If only pieces of charcoal were available, the samples were inspected by a dendrochronologist and only samples where a negligible ‘old wood’ effect could be expected were selected for ^{14}C determinations.

The 34 samples from CQ1, where the most complete sequence of occupation had been exposed (state 2019), came from three main strata, viz. clearly distinguishable phases of occupation. These samples enabled us to create a Bayesian model to determine the most probable time intervals when the transition between Strata 3 and 2, and Strata 2 and 1 took place.

Some problems when comparing the Bayesian model with conventional relative dates based on stratigraphy and pottery should be highlighted. The first is the restricted number of samples (five) from Stratum 3 which was not reached before 2019, the latest season of excavations in the settlement. According to our preliminary results, Stratum 3 should be divided into three sub-phases (3A–C, Stratum 3C being the oldest). There are three dates from Stratum 3C but only one date each from Strata 3B and 3A, and so far no sample from Stratum 4 of which only a few structures were exposed in 2019. Consequently, we do not know when the transition from Stratum 4 to 3 took place. The oldest radiocarbon dates of Stratum 3 are from around 1500 BC. The suggested transition period between Strata 3 and 2, here sometime between 1406 BC and 1316 BC (95.4% probability), is quite problematic because it implies a fairly long period for Stratum 2 which seems not to be in accord with the archaeological dating based on pottery (see Bürge **Chapter 11** in this volume).

As regards the transition from Stratum 2 to Stratum 1 (boundary of ~50-years), we are confident that it took place between 1178 and 1129 BC which is in line with the archaeological evidence. Bayesian statistics are of no help when defining the beginning of Stratum 1, since the site was abandoned after the destruction of this occupational phase and we do not have any dated samples of the sporadic squatter occupation(s) after the city was abandoned; and, if we did, we do not know the time span between the abandonment and the squatter occupation. Thus, the boundary value of 1170 to 1104 BC (95.4% probability) for the end of Stratum 1 should be considered with caution. Consequently, in the last decade’s publications dealing with the new excavations ~1150 BC has been suggested as a working theory for the destruction and abandonment of the city. Therefore, desiderata for radiocarbon dating of settlement layers include

additional samples from Stratum 4 (and earlier) and Stratum 3 contexts and their subphases as well as samples from corresponding contexts in other city quarters.

One of the major issues in the discussion of the end of the Late Bronze Age and other periods of ‘crisis’ and ‘collapse’ has been the impact of potential climate changes (e.g. Weiss *et al.* 1993; Kaniewski *et al.* 2010; Kaniewski *et al.* 2013; Meller *et al.* 2015; Finné *et al.* 2017; Kaniewski & Van Campo 2017; Kaniewski *et al.* 2019). In **Chapter 18** David Kaniewski *et al.* present a pollen-based reconstruction of temperature and precipitation from Hala Sultan Tekke, Cyprus. Two cores were drilled in the Larnaca Salt Lake, the ancient harbour of Hala Sultan Tekke, one 8.3m and the other 5.75m deep. Of these two cores, a composite core was subsequently constructed based on radiocarbon, sedimentological and palaeoecological (pollen based) correlations to create a sequence which covers the period from $\sim 6000 \pm 20$ to 500 ± 50 cal yr BP. According to Kaniewski *et al.*, the end of the Bronze Age was characterised by aridity and cooling in the range of $-2.6 \pm 0.5^\circ\text{C}$. Furthermore, the authors of the study suggest that major social changes often occur in tandem with changing precipitation patterns and cooler climate conditions, with anomalies ranging from $-3 \pm 0.4^\circ\text{C}$ to $-1 \pm 0.5^\circ\text{C}$. They propose five major cold periods at Hala Sultan Tekke: 5250 ± 20 , 4215 ± 40 , 3200 ± 90 , 1400 ± 70 and 620 ± 20 years BP. Each cold period is consistent with a significant instability in precipitation, mainly for the winter and spring seasons. The 3.2ka BP event seems not to be an isolated occurrence but an element of the 1000-year cycles between the main cold and dry episodes at 5200, 4200 and 3200 BP.

Although radiocarbon dating of the climatological ‘3.2ka BP event’ is problematic in the extreme because of an unfavourable calibration plateau in this period which would allow a date from the 14th/13th to the 11th centuries BC (see above the radiocarbon dates e.g. of LC IIIA contexts from Hala Sultan Tekke, viz. 1370–1055 BC (2σ) and 1392–1122 BC (2σ); cf. also Manning 2007; Manning *et al.* 2017), a rather consistent picture emerges. Both written sources mentioning grain shipping, possible food shortages and famines (see Roche-Hawley **Chapter 3**, this volume; also Singer 1999: 715–719) as well as climatological studies indicate changes in climate that affected the population. On the other hand, the Mediterranean is not one single climate system and the same alterations may have different effects depending on the region. In addition, various regions and societies certainly differed as regards their resilience and adaptation to climatic variations, a decisive factor which is sometimes neglected (see, however, e.g. various contributions in Meller *et al.* 2015; Dibble & Finné 2021; Molloy 2022).

The volume concludes with **Chapter 19** by Sorin Hermon *et al.*, who present several analytical and computational methods that contribute towards an understanding of the material culture and socio-

economic crisis with Pyla Kokkinokremos as a case study. In their research, geodesic data together with remote sensing by georadar, aerial surveys and satellite images, as well as 3D documentation by photogrammetry and laser scanning, were combined. As far as the analysis of artefacts is concerned, spectroscopical methods (XRF and FTIR), different imaging and 3D modelling methods were used to interpret productional, functional and societal aspects. Their chapter demonstrates the extent to which specific methods may efficiently support our work in the field and in the laboratory.

Summary and prospects

The wide array of material categories, methods and approaches dealt with in the present volume opens up new directions in the study of the collapse of pre- and protohistoric societies. The chapters demonstrate how these may lead to different interpretations and assessments of the same phenomenon. Due to the complexity of the Late Bronze Age collapse it is impossible and—in our opinion—not helpful to summarise these into one coherent narrative.

However, despite divergences in various aspects, it becomes clear in this volume that the socio-political and economic perturbances at the end of the Bronze Age were expressed in discontinuities in settlement patterns and site histories and, as regards Cyprus, in most cases in the destruction and abandonment of sites. Changes in the material culture are visible in various pottery classes and other objects, in shifting patterns of imported goods and export-related industries and also in the integration of foreign trends and innovations in the local culture, both from the Aegean as well as from the Levant. Furthermore, we see altered ways of behaviour that may be crisis-related, e.g. the hoarding of metal objects and other precious items.

It is important to stress that some changes may have occurred over an extended period of time, while others may have happened quite suddenly. In addition, not all regions and sites were affected the same way: Palaepaphos and Kition, for instance, prospered in this period and may even have benefited from the decline of other urban centres and, in the case of the latter, from the abandonment of the much older neighbouring city of Hala Sultan Tekke.

Finally, we would like to stress the necessity of bottom-up approaches, in connection with ongoing excavations, textual and material studies and the use of innovative methodologies. Only by meticulously combining new evidence with re-evaluations of available sources and materials and by taking into account overarching perspectives will we gain further insights into this troubled period.

Bibliography

- Allen, S.H. 1991: Late Bronze Age Grey Wares in Cyprus, in J.A. Barlow, D.L. Bolger & B. Kling (eds), *Cypriot Ceramics. Reading the Prehistoric Record* (University Museum Monograph 74), 151–167, Philadelphia
- Bachhuber, C.S. & R.G. Roberts (eds) 2009: *Forces of Transformation. The End of the Bronze Age in the Mediterranean. Proceedings of an International Symposium held at St. John's College, University of Oxford, 25–26th March 2006* (Themes from the Ancient Near East BANEA Publication Series 1), Oxford
- Bernhardt, K. 2021: *Importieren – Imitieren – Inkorporieren. Der mykenische Einfluss auf Kreta während der mykenischen Palastzeit* (Phoibos Humanities Series 8), Vienna
- Bretschneider, J., J. Driessen & A. Kanta 2021: Cyprus and Ugarit at the end of the Late Bronze Age: insights from Pyla-Kokkinokremos, in V. Matoian (ed), *Ougarit, un anniversaire: bilans et recherches en cours* (Ras Shamra-Ougarit 28), 607–638, Leuven
- Bryce, T. 2005: *The Kingdom of the Hittites*, Oxford
- Bürge, T. & P.M. Fischer 2018: The pottery, in P.M. Fischer & T. Bürge, *Two Late Cypriot City Quarters at Hala Sultan Tekke. The Söderberg Expedition 2010–2017* (SIMA 147), 187–416, Uppsala
- Chabas, F. 1872: *Études sur l'antiquité historique d'après les sources égyptiennes et les monuments réputés préhistoriques*, Paris
- Cline, E.H. 2007: Rethinking Mycenaean international trade with Egypt and the Near East, in M.L. Galaty & W.A. Parkinson (eds), *Rethinking Mycenaean Palaces II* (Cotsen Monograph 60), 190–200, Los Angeles
- Cline, E.H. 2014: *1177 B.C. The Year Civilization Collapsed*, Princeton
- Cochavi-Rainey, Z. 2003: *The Alashia Texts from the 14th and 13th Centuries BCE. A Textual and Linguistic Study* (Alter Orient und Altes Testament 289), Münster
- Dalongeville, R., P. Bernier, A. Prieur & T. Le Campion 2000: Les variations récentes de la ligne de rivage du sud-est de Chypre, *Géomorphologie: relief, processus, environnement* 6.1, 13–19
- de Martino, S. 2008: Relations between Hatti and Alašiya according to textual and archaeological evidence, in G. Wilhelm (ed), *Hattuša – Boğazköy: Das Hethiterreich im Spannungsfeld des Alten Orients. 6. Internationales Colloquium der Deutschen Orient-Gesellschaft, 22.–24. März 2006, Würzburg* (Colloquien der Deutschen Orient-Gesellschaft 6), 247–263, Wiesbaden

- de Rougé, E. 1855: *Notice de quelques textes hiéroglyphiques récemment publiés par M. Greene*, Paris
- Dibble, F. & M. Finné 2021: Socioenvironmental change as a process: changing foodways as adaptation to climate change in south Greece from the Late Bronze Age to the Early Iron Age, *Quaternary International* 597, 50–62, <https://doi.org/10.1016/j.quaint.2021.04.024>
- Dietrich, M. & O. Loretz 2003: Der Untergang von Ugarit am 21. Januar 1192 v. Chr.? Der astronomisch-hepatoskopische Bericht KTU 1.78 (= RS 12.061), *Ugarit-Forschungen* 34 (2002), 53–74
- Dikomitou-Eliadou, M., E. Kiriati & A.K. Vionis 2014: Petrographic analysis of Late Cypriot cooking pots and Late Minoan pottery from Pyla-Kokkinokremos, in V. Karageorghis & A. Kanta, *Pyla-Kokkinokremos. A Late 13th Century BC Fortified Settlement in Cyprus. Excavations 2010–2011 (SIMA 141)*, 189–196, Uppsala
- Dothan, T. 1998: Initial Philistine settlement: from migration to coexistence, in S. Gitin, A. Mazar & E. Stern (eds), *Mediterranean Peoples in Transition: Thirteenth to Early Tenth Centuries BCE*, 148–161, Jerusalem
- Driessen, J. (ed) 2018: *An Archaeology of Forced Migration. Crisis-induced Mobility and the Collapse of the 13th c. BCE Eastern Mediterranean (AEGIS 15)*, Louvain-la-Neuve
- Driessen, J. 2021: Coping with a changed Mediterranean in the 13th century BCE Cretan countryside: evidence from Sissi, in E. Karantzali (ed), *Proceedings of the 3rd International Interdisciplinary Colloquium: The Periphery of the Mycenaean World. Recent Discoveries and Research Results, 18–21 May, Lamia 2018*, 711–722, Athens
- Emanuel, J.P. 2016: Maritime worlds collide. Agents of transference and the metastasis of seaborne threats at the end of the Bronze Age, *Palestine Exploration Quarterly* 148.4, 265–280
- Finné, M., K. Holmgren, C.-C. Shen, H.-M. Hu, M. Boyd & S. Stocker 2017: Late Bronze Age climate change and the destruction of the Mycenaean Palace of Nestor at Pylos, *PloS one* 12.12, e0189447, <https://doi.org/10.1371/journal.pone.0189447>
- Fischer, B., H. Genz, É. Jean & K. Köroğlu (eds) 2003: *Identifying Changes: The Transition from Bronze to Iron Age in Anatolia and its Neighbouring Regions. Proceedings of the International Workshop, Istanbul, November 8–9, 2002*, Istanbul
- Fischer, P.M. 2017: The 12th century BCE destructions and the abandonment of Hala Sultan Tekke, Cyprus, in P.M. Fischer & T. Bürge (eds), *“Sea Peoples” Up-to-Date. New Research on Transformations in the Eastern Mediterranean in the 13th–11th Centuries BCE. Proceedings of the ESF-Workshop held at the Austrian Academy of Sciences, Vienna, 3–4 November 2014 (Contributions to the Chronology of the Eastern Mediterranean 35)*, 177–206, Vienna
- Fischer, P.M. 2019: The occupational history of the Bronze Age harbour city of Hala Sultan Tekke, Cyprus, *Egypt and the Levant* 29, 189–230, <https://doi.org/10.1553/AEundL29s188>
- Fischer, P.M. 2022: Interregional trade at Hala Sultan Tekke, Cyprus: analysis and chronology of imports, *Journal of Archaeological Science: Reports* 47, 103722, <https://doi.org/10.1016/j.jasrep.2022.103722>
- Fischer, P.M. & T. Bürge (eds) 2017: *“Sea Peoples” Up-to-Date. New Research on Transformations in the Eastern Mediterranean in the 13th–11th Centuries BCE. Proceedings of the ESF-Workshop held at the Austrian Academy of Sciences, Vienna, 3–4 November 2014 (Contributions to the Chronology of the Eastern Mediterranean 35)*, Vienna
- Fischer, P.M. & T. Bürge 2018a: *Two Late Cypriot City Quarters at Hala Sultan Tekke. The Söderberg Expedition 2010–2017 (SIMA 147)*, Uppsala
- Fischer, P.M. & T. Bürge 2018b: The New Swedish Cyprus Expedition 2017. Excavations at Hala Sultan Tekke (The Söderberg Expedition). Preliminary results, *Opuscula. Annual of the Swedish Institutes at Athens and Rome* 11, 29–79, <https://doi.org/10.30549/opathrom-11-03>
- Fischer, P.M. & T. Bürge 2020: The New Swedish Cyprus Expedition 2019. Excavations at Hala Sultan Tekke (The Söderberg Expedition). Preliminary results, *Opuscula. Annual of the Swedish Institutes at Athens and Rome* 13, 73–111, <https://doi.org/10.30549/opathrom-13-03>
- French, E.B. 1975: A reassessment of the Mycenaean pottery at Tarsus, *Anatolian Studies* 25, 53–75
- French, E.B. 2007: The Mycenaean pottery, in J.N. Postgate & D. Thomas (eds), *Excavations at Kilise Tepe 1994–98. From Bronze Age to Byzantine in Western Cilicia (British Institute at Ankara Monograph 30)*, 373–376, Cambridge
- Georgiou, A. 2018: From the hand to the wheel: revisiting the transformations of the Late Cypriot ceramic industry of finewares during the 13th-to-12th c. BC transition, in I. Caloi & C. Langohr (eds), *Technology in Crisis. Technological Changes in Ceramic Production During Periods of Trouble (AEGIS 16)*, 177–200, Louvain-La-Neuve
- Gilan, A. 2013: Pirates in the Mediterranean—a view from the Bronze Age, in N. Jaspert & S. Kolditz (eds), *Seeraub im Mittelmeerraum. Piraterie, Korsarentum und maritime Gewalt von der Antike bis zur Neuzeit (Mittelmeerstudien 3)*, 49–66, Paderborn

- Gitin, S., A. Mazar & E. Stern (eds) 1998: *Mediterranean Peoples in Transition: Thirteenth to Early Tenth Centuries BCE*, Jerusalem
- Gradoli, M.G., P. Waiman-Barak, T. Bürge, Z.C. Dunseth, J.H. Sterba, F. Lo Schiavo, M. Perra, S. Sabatini & P.M. Fischer 2020: Cyprus and Sardinia in the Late Bronze Age: Nuragic table ware at Hala Sultan Tekke, *Journal of Archaeological Science: Reports* 33, 102479, <https://doi.org/10.1016/j.jasrep.2020.102479>
- Güterbock, H.G. 1967: The Hittite conquest of Cyprus reconsidered, *Journal of Near Eastern Studies* 26.2, 73–81
- Hallager, E. 1977: *The Mycenaean Palace at Knossos. Evidence for Final Destruction in the LM IIIB Period (Medelhavsmuseet Memoir 1)*, Stockholm
- Hallager, E. & B.P. Hallager 2011: *The Greek-Swedish Excavations at the Agia Aikaterini Square Kastelli, Khania 1970–1987 and 2001 Volume IV, 1. The Late Minoan IIIB:1 and IIIA:2 Settlements (Skrifter utgivna av Svenska Institutet i Athen, 4° 4)*, Stockholm
- Harrison, T.P. (ed) 2008: *Cyprus, the Sea Peoples and the Eastern Mediterranean. Regional Perspectives on Continuity and Change (Scripta Mediterranea 27–28)*, Toronto
- Hauptmann, A. 2014: The investigation of archaeometallurgical slag, in B.W. Roberts & C.P. Thornton (eds), *Archaeometallurgy in Global Perspective. Methods and Syntheses*, 91–105, New York
- Höflmayer, F., A.A. Burke, B.N. Damiata, J. Southon, E.M. Wild, P. Steier & P.M. Fischer 2018: Radiocarbon, in P.M. Fischer & T. Bürge, *Two Late Cypriot City Quarters at Hala Sultan Tekke. The Söderberg Expedition 2010–2017 (SIMA 147)*, 595–602, Uppsala
- Hoftijzer, J. & W.H. van Soldt 1998: Appendix: texts from Ugarit pertaining to seafaring, in S. Wachsmann, *Seagoing Ships & Seamanship in the Bronze Age Levant (Ed Rachal Foundation Nautical Archaeology Series)*, 333–344, London
- Iacovou, M. 2013: Aegean-style material culture in Late Cypriot III. Minimal evidence, maximal interpretation, in A.E. Killebrew & G. Lehmann (eds), *The Philistines and Other “Sea Peoples” in Text and Archaeology (Archaeology and Biblical Studies 15)*, 585–618, Atlanta
- Jung, R. 2011a: Innovative cooks and new dishes. Cypriote pottery in the 13th and 12th centuries BC and its historical interpretation, in V. Karageorghis & O. Kouka (eds), *On Cooking Pots, Drinking Cups, Loomweights and Ethnicity in Bronze Age Cyprus and Neighbouring Regions. An International Archaeological Symposium held in Nicosia, November 6th–7th, 2010*, 57–85, Nicosia
- Jung, R. 2011b: Tafeln in Enkomi vom 13. bis zum 12. Jh. v. u. Z.: Neue Töpfe auf dem Tisch oder neue Gäste am Tisch?, 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*, 173–195, Wien
- Jung, R. 2015: Imported Mycenaean pottery in the east. Distribution, context and interpretation, in B. Eder & R. Pruzsinszky (eds), *Policies of Exchange. Political Systems and Modes of Interaction in the Aegean and the Near East in the 2nd Millennium B.C.E. Proceedings of the International Symposium at the University of Freiburg, Institute for Archaeological Studies, 30th May–2nd June 2012 (Oriental and European Archaeology 2)*, 243–275, Vienna
- Jung, R. 2017a: The Sea Peoples after three millennia. Possibilities and limitations of historical reconstruction, in P.M. Fischer & T. Bürge (eds), *“Sea Peoples” Up-to-Date. New Research on Transformations in the Eastern Mediterranean in the 13th–11th Centuries BCE. Proceedings of the ESF-Workshop held at the Austrian Academy of Sciences, Vienna, 3–4 November 2014 (Contributions to the Chronology of the Eastern Mediterranean 35)*, 23–42, Vienna
- Jung, R. 2017b: Cooking vessels from Late Bronze Age Cyprus. Local traditions, western and eastern innovations, in J. Hruby & D. Trusty (eds), *From Cooking Vessels to Cultural Practices in the Late Bronze Age Aegean*, 127–145, Oxford and Philadelphia
- Jung, R. 2018: Push and pull factors of the Sea Peoples between Italy and the Levant, in J. Driessen (ed), *An Archaeology of Forced Migration. Crisis-induced Mobility and the Collapse of the 13th c. BCE Eastern Mediterranean (AEGIS 15)*, 273–306, Louvain-la-Neuve
- Jung, R. 2022: Synchronizing palace destructions in the Eastern Mediterranean, in R. Jung & E. Kardamaki (eds), *Synchronizing the Destructions of the Mycenaean Palaces (Mykenische Studien 36)*, 255–322, Vienna
- Jung, R. & E. Kardamaki (eds) 2022: *Synchronizing the Destructions of the Mycenaean Palaces (Mykenische Studien 36)*, Vienna
- Jung, R. & H. Mommsen 2022: Mycenaean-type pottery from Tall Zirā’a, in K. Soenneken, *Tall Zirā’a Volume 3. Late Bronze Age (Strata 16–14)*, 516–547, Gütersloh
- Kaniewski, D. & E. Van Campo 2017: The climatic context of the 3.2 kyr cal BP event, in P.M. Fischer & T. Bürge (eds), *“Sea Peoples” Up-to-Date. New Research on Transformations in the Eastern Mediterranean in the 13th–11th Centuries BCE. Proceedings of the ESF-Workshop held at the*

- Austrian Academy of Sciences, Vienna, 3–4 November 2014 (Contributions to the Chronology of the Eastern Mediterranean 35), 85–93, Vienna
- Kaniewski, D., E. Paulissen, E. Van Campo, H. Weiss, T. Otto, J. Bretschneider & K. van Lerberghe 2010: Late second–early first millennium BC abrupt climate changes in coastal Syria and their possible significance for the history of the Eastern Mediterranean, *Quaternary Research* 74.2, 207–215, <https://doi.org/10.1016/j.yqres.2010.07.010>
- Kaniewski, D., E. Van Campo, J. Guiot, S. Le Burel & T. Otto 2013: Environmental roots of the Late Bronze Age crisis, *PloS one* 8.8, e71004, <https://doi.org/10.1371/journal.pone.0071004>
- Kaniewski, D., N. Marriner, J. Bretschneider, G. Jans, C. Morhange, R. Cheddadi, T. Otto, F. Luce & E. Van Campo 2019: 300-year drought frames Late Bronze Age to early Iron Age transition in the Near East. New palaeoecological data from Cyprus and Syria, *Regional Environmental Change* 19, 2287–2297, <https://doi.org/10.1007/s10113-018-01460-w>
- Karageorghis, V. 2013: Cyprus at the end of the Bronze age, *Pasiphae. Rivista di filologia e antichità egee* 7, 125–132
- Karageorghis, V. & M. Demas 1984: *Pyla-Kokkinokremos. A Late 13th-Century B.C. Fortified Settlement in Cyprus*, Nicosia
- Keswani, P.S. 1993: Models of local exchange in Late Bronze Age Cyprus, *Bulletin of the American Schools of Oriental Research* 292, 73–83
- Keswani, P.S. 1997: Hierarchies, heterarchies, and urbanization processes: the view from Bronze Age Cyprus, *Journal of Mediterranean Archaeology* 9.2 (1996), 211–250, <https://doi.org/10.1558/jmea.v9i2.211>
- Killebrew, A.E. 2005: *Biblical Peoples and Ethnicity. An Archaeological Study of Egyptians, Canaanites, Philistines, and Early Israel (ca. 1300–1100 B.C.E.)* (Archaeology and Biblical Studies 9), Atlanta
- Killebrew, A.E. & G. Lehmann (eds) 2013: *The Philistines and Other “Sea Peoples” in Text and Archaeology* (Archaeology and Biblical Studies 15), Atlanta
- Knapp, A.B. 2010: Migration, hybridisation and collapse: Bronze Age Cyprus and the Eastern Mediterranean, in A. Cardarelli, A. Cazzella, M. Frangipane & R. Peroni (eds), *Le ragioni del cambiamento: “Nascita”, “declino” e “crollo” delle società tra fine del IV e inizio del I millennio a.C. Atti del convegno internazionale. Roma, 15–17 giugno 2006* (Scienze dell’Antichità. Storia, Archeologia, Antropologia 15), 219–239, Rome
- Knapp, A.B. 2013: *The Archaeology of Cyprus. From Earliest Prehistory through the Bronze Age*, Cambridge and New York
- Knapp, A.B. 2021: *Migration Myths and the End of the Bronze Age in the Eastern Mediterranean*, Cambridge
- Knapp, A.B. & S.W. Manning 2016: Crisis in context. The end of the Late Bronze Age in the Eastern Mediterranean, *American Journal of Archaeology* 120.1, 99–149
- Kozal, E. 2015: A discussion of the origin and the distribution patterns of Red Lustrous Wheel-made ware in Anatolia. Cultural connections across the Taurus and Amanus Mountains, in D. Beyer, O. Henry & A. Tibet (eds), *La Cappadoce méridionale de la préhistoire à la période byzantine: 3èmes Rencontres d’Archéologie de l’IFÉA—Institut Français d’Études Anatoliennes Georges Dumézil*, Istanbul 8–9 Novembre, 2012, 53–64, Istanbul
- Kozal, E. 2017: *Fremdes in Anatolien. Importgüter aus dem Ostmittelmeerraum und Mesopotamien als Indikator für spätbronzezeitliche Handels- und Kulturkontakte* (Schriften zur vorderasiatischen Archäologie 11), Wiesbaden
- Kozal, E. & M. Kibaroglu 2017: Red Lustrous Wheel-made Ware Archaeometry Project, 2014–16 studies, *News Bulletin on Archaeology from Mediterranean Anatolia* 15, 312–319
- Lehmann, G. 2017: The Late Bronze–Iron Age transition and the problem of the Sea Peoples phenomenon in Cilicia, in P.M. Fischer & T. Bürge (eds), *“Sea Peoples” Up-to-Date. New Research on Transformations in the Eastern Mediterranean in the 13th–11th Centuries BCE. Proceedings of the ESF-Workshop held at the Austrian Academy of Sciences, Vienna, 3–4 November 2014* (Contributions to the Chronology of the Eastern Mediterranean 35), 229–255, Vienna
- Lernau, O. 2018: Fish remains, in P.M. Fischer & T. Bürge, *Two Late Cypriot City Quarters at Hala Sultan Tekke. The Söderberg Expedition 2010–2017* (SIMA 147), 563–566, Uppsala
- Macdonald, C.F. 2010: Knossos, in E.H. Cline (ed), *The Oxford Handbook of the Bronze Age Aegean (ca. 3000–1000 BC)*, 529–542, Oxford and New York
- Manning, S.W. 2007: Why radiocarbon dating 1200 BCE is difficult. A sidelight on dating the end of the Late Bronze Age and the contrarian contribution, in T.P. Harrison (ed), *Cyprus, the Sea Peoples and the Eastern Mediterranean. Regional Perspectives on Continuity and Change* (Scripta Mediterranea 27–28), 53–80, Toronto
- Manning, S.W., C. Kearns & B. Lorentzen 2017: Dating the end of the Late Bronze Age with radiocarbon. Some observations, concerns, and revisiting the dating of Late Cypriot IIC to IIIA, in P.M. Fischer & T. Bürge (eds), *“Sea Peoples” Up-to-Date. New Research on Transformations in the Eastern Mediterranean in the 13th–11th Centuries*

- BCE. *Proceedings of the ESF-Workshop held at the Austrian Academy of Sciences, Vienna, 3–4 November 2014 (Contributions to the Chronology of the Eastern Mediterranean 35)*, 95–110, Vienna
- Maran, J. 2010: The crisis years? Reflections on signs of instability in the last decades of the Mycenaean palaces, in A. Cardarelli, A. Cazzella, M. Frangipane & R. Peroni (eds), *Le ragioni del cambiamento: “Nascita”, “declino” e “crollo” delle società tra fine del IV e inizio del I millennio a.C. Atti del convegno internazionale. Roma, 15–17 giugno 2006 (Scienze dell’Antichità. Storia, Archeologia, Antropologia 15)*, 241–262, Rome
- Maspero, G. 1896: *The Struggle of the Nations. Egypt, Syria, and Assyria*, London
- Meller, H., H.W. Arz, R. Jung & R. Risch (eds) 2015: 2200 BC – Ein Klimasturz als Ursache für den Zerfall der Alten Welt? 7. Mitteldeutscher Archäologentag vom 23. bis 26. Oktober 2014 in Halle (Saale) (Tagungen des Landesmuseums für Vorgeschichte Halle 12), Halle (Saale)
- Middleton, G.D. (ed) 2020: *Collapse and Transformation. The Late Bronze Age to Early Iron Age in the Aegean*, Oxford and Philadelphia
- Molloy, B. 2022: Was there a 3.2 ka crisis in Europe? A critical comparison of climatic, environmental, and archaeological evidence for radical change during the Bronze Age–Iron Age transition, *Journal of Archaeological Research* 35.3, 87, <https://doi.org/10.1007/s10814-022-09176-6>
- Mommsen, H., P.A. Mountjoy & A. Özyar 2011: Provenance determination of Mycenaean IIIC vessels from the 1934–1939 excavations at Tarsus-Gözlükule by neutron activation analysis, *Archaeometry* 53.5, 900–915
- Mommsen, H. & P. Pavúk 2007: Provenance of the Grey and Tan wares from Troia, Cyprus and the Levant, *Studia Troica* 17, 25–41
- Moran, W.L. 1992: *The Amarna Letters*, Baltimore
- Mountjoy, P.A. 2015: The north-east Peloponnese and the Near East. Ceramic evidence for contacts in LH III, in A.-L. Schallin & I. Tournavitou (eds), *Mycenaeans Up to Date. The Archaeology of the North-Eastern Peloponnese—Current Concepts and New Directions (Skrifter utgivna av Svenska Institutet i Athen, 4° 56)*, 533–554, Stockholm
- Mountjoy, P.A. 2017: *Troy VI Middle, VI Late and VII. The Mycenaean Pottery (Studia Troica Monographien 9)*, Bonn
- Mountjoy, P.A. 2018: *Decorated Pottery in Cyprus and Philistia in the 12th Century BC. Cypriot IIIC and Philistine IIIC (Contributions to the Chronology of the Eastern Mediterranean 36)*, Vienna
- Mountjoy, P.A. & H. Mommsen 2015: Neutron activation analysis of Aegean-style IIIC pottery from 11 Cypriot and various Near Eastern sites, *Egypt and the Levant* 25, 421–508
- Mountjoy, P.A. & H. Mommsen 2019: Neutron activation analysis of Aegean-style IIIC pottery from Maa Palaeokastro, Cyprus, and a discussion on the foundation of the site, *Egypt and the Levant* 29, 272–301, <https://doi.org/10.1553/AEundL29s272>
- Mountjoy, P.A., H. Mommsen & A. Özyar 2018: Neutron activation analysis of Aegean-style IIIC pottery from the Goldman excavations at Tarsus-Gözlükule, *Anatolian Studies* 68, 75–98, <https://doi.org/10.1017/S0066154618000030>
- Mühlenbruch, T. 2021: «1200 v. Chr.» – Zeit eines kulturellen Umbruchs in der Alten Welt? (Würzburger Studien zur Vor- und Frühgeschichtlichen Archäologie 7), Würzburg
- Niemeier, W.-D. 1982: Mycenaean Knossos at the age of Linear B, *Studi Micenei ed Egeo-Anatolici* 23, 219–287
- Nougayrol, J. 1968: Textes suméro-accadiens des archives et bibliothèques privées d’Ugarit, in C.F.-A. Schaeffer (ed), *Ugaritica 5. Nouveaux textes accadiens, hourrites et ugaritiques des archives et bibliothèques privées d’Ugarit (Mission de Ras Shamra 16)*, 1–446, Paris
- Novák, M., A.L. D’Agata, I. Caneva, C. Eslick, C. Gates, M.-H. Gates, K.S. Girginer, Ö. Oyman-Girginer, É. Jean, G. Köroğlu, E. Kozal, S. Kulemann-Ossen, G. Lehmann, A. Özyar, T. Ozaydin, J.N. Postgate, F. Şahin, E. Ünlü, R. Yağcı & D.Y. Meier 2017: A comparative stratigraphy of Cilicia, *Altorientalische Forschungen* 44.2, 150–186, <https://doi.org/10.1515/afo-2017-0013>
- Oren, E.D. (ed) 2000: *The Sea Peoples and Their World. A Reassessment (University Museum Monograph 108)*, Philadelphia
- Otten, H. 1963: Neue Quellen zum Ausklang des hethitischen Reiches, *Mitteilungen der Deutschen Orient-Gesellschaft* 94, 1–23
- Pedrazzi, T. 2007: *Le giare da conservazione e trasporto del Levante. Uno studio archeologico dell’economia fra Bronzo Tardo II e Ferro I (ca. 1400–900 a.C.)*, Pisa
- Pickles, S. & E.J. Peltenburg 1998: Metallurgy, society and the Bronze/Iron transition in the East Mediterranean and the Near East, *Report of the Department of Antiquities, Cyprus*, 67–100
- Reese, D.S. 2018: Faunal evidence: catalogues, worked bones, ivory, horn, shells, in P.M. Fischer & T. Bürge, *Two Late Cypriot City Quarters at Hala Sultan Tekke. The Söderberg Expedition 2010–2017 (SIMA 147)*, 493–563, Uppsala

- Sandars, N.K. 1978: *The Sea Peoples. Warriors of the Ancient Mediterranean, 1250–1150 B.C.* (*Ancient Peoples and Places* 89), London
- Sherratt, E.S. 2003: The Mediterranean economy. “Globalization” at the end of the second millennium B.C.E., in W.G. Dever & S. Gitin (eds), *Symbiosis, Symbolism, and the Power of the Past. Canaan, Ancient Israel, and Their Neighbors, from the Late Bronze Age through Roman Palaestina. Proceedings of the Centennial Symposium W.F. Albright Institute of Archaeological Research and American Schools of Oriental Research, Jerusalem, May 29–31, 2000*, 37–62, Winona Lake
- Sherratt, E.S. & J.H. Crouwel 1987: Mycenaean pottery from Cilicia in Oxford, *Oxford Journal of Archaeology* 6.3, 325–352, <https://doi.org/10.1111/j.1468-0092.1987.tb00160.x>
- Singer, I. 1999: A political history of Ugarit, in W.G.E. Watson & N. Wyatt (eds), *Handbook of Ugaritic Studies (Handbuch der Orientalistik Abteilung 1, Der Nahe und Mittlere Osten 39)*, 603–733, Leiden
- South, A.K. 2002: Late Bronze Age settlement patterns in southern Cyprus. The first kingdoms?, *Cahiers du Centre d’Études Chypriotes* 32, 59–72
- Stampolidis, N.C., Ç. Maner & K. Kopanias (eds) 2014: *Nostoi. Indigenous Culture, Migration + Integration in the Aegean Islands + Western Anatolia During the Late Bronze + Early Iron Ages*, Istanbul
- Starke, F. 2002: Chronologische Übersicht zur Geschichte des hethitischen Reiches, in H. Willinghöfer (ed), *Die Hethiter und ihr Reich. Das Volk der 1000 Götter. Begleitbuch zur Ausstellung vom 18. Januar bis 28. April 2002 in der Kunst- und Ausstellungshalle der Bundesrepublik Deutschland in Bonn*, 310–315, Stuttgart
- Virolleaud, C. 1965: *Le Palais Royal d’Ugarit V. Textes en cuneiformes alphabetiques des Archives Sud, Sud-ouest et du Petit Palais (Mission de Ras Shamra 11)*, Paris
- von Rüden, C., A. Georgiou, A. Jacobs & P. Halstead 2016: *Feasting, Craft and Depositional Practice in Late Bronze Age Palaepaphos. The Well Fillings of Evreti (Bochumer Forschungen Zur Ur- und Frühgeschichtlichen Archäologie 8)*, Rahden/Westf.
- Voskos, I. & A.B. Knapp 2008: Cyprus at the end of the Late Bronze Age: crisis and colonization or continuity and hybridization?, *American Journal of Archaeology* 112, 659–684
- Ward, W.A. & M.S. Joukowsky (eds) 1992: *The Crisis Years. The 12th Century B.C. from beyond the Danube to the Tigris*, Dubuque, IA
- Webb, J.M. & D. Frankel 1999: Characterizing the Philia facies. Material culture, chronology, and the origin of the Bronze Age in Cyprus, *American Journal of Archaeology* 103.1, 3–43
- Weiss, H., M.A. Courty, W. Wetterstrom, F. Guichard, L. Senior, R. Meadow & A. Curnow 1993: The genesis and collapse of third millennium north Mesopotamian civilization, *Science* 261.5124, 995–1004, <https://doi.org/10.1126/science.261.5124.995>
- Wiener, M.H. 2017: Causes of complex systems collapse at the end of the Bronze Age, in P.M. Fischer & T. Bürge (eds), *“Sea Peoples” Up-to-Date. New Research on Transformations in the Eastern Mediterranean in the 13th–11th Centuries BCE. Proceedings of the ESF-Workshop held at the Austrian Academy of Sciences, Vienna, 3–4 November 2014 (Contributions to the Chronology of the Eastern Mediterranean 35)*, 43–74, Vienna
- Yasur-Landau, A. 2010: *The Philistines and Aegean Migration at the End of the Late Bronze Age*, New York
- Zuckerman, S., S. Bechar, D. Ben-Shlomo, H. Mommsen & P.A. Mountjoy 2020: Neutron activation analysis of Mycenaean pottery from north Israel. Reconstruction of Aegean-Levantine trade patterns, *Ägypten und Levante* 30, 569–633, <https://doi.org/10.1553/AEundL30s569>
- Zuckerman, S., D. Ben-Shlomo, P.A. Mountjoy & H. Mommsen 2010: A provenance study of Mycenaean pottery from northern Israel, *Journal of Archaeological Science* 37, 409–416, <https://doi.org/10.1016/j.jas.2009.10.005>