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Special feature

Unravelling the Kura-Araxes cultural tradition across space and time

Stephen BATIUK, Mitchell ROTHMAN,
Siavash SAMEI and Roman HOVSEPYAN

Dedicated to our friend and colleague, Tony Sagona,
whose untimely passing was a great personal and professional loss
to us and to everyone interested in the Kura-Araxes.

Unraveling the Kura-Araxes cultural tradition across space and time

Stephen BATIUK, Mitchell ROTHMAN,
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Abstract

The Kura-Araxes is one of the cultural traditions that, along with those of its neighbors in Mesopotamia, Iran, Eurasia, Anatolia, and the Levant, tells the story of the Middle Eastern region in late prehistory. All cultural traditions of the Middle East and the societies they spawned have distinctive cultural packages and economic, political, and social organization and practices. At the same time, each region was in some ways interrelated with the others. In this regard, the Kura-Araxes represents a particular pattern. The Kura-Araxes first appeared in the mid-fourth millennium BC in the South Caucasus (modern Armenia, Georgia and Azerbaijan). By 2850 BC its core package of cultural traits had spread across the Zagros Mountains to its south, north across the Caucasus Mountains, and west along the Taurus Mountains down into the Levant. Evidence indicates that the tradition spread through population migration and cross-cultural interactions. It created a different yet interrelated narrative in each area of the so-called homeland zone and in its diaspora. Batiuk and Rothman organized a six-day workshop in Toronto in 2017 to bring together eleven scholars from different parts of the world and from different intellectual traditions to discuss issues related to solving the complex puzzle that is the Kura-Araxes. This paper is a summary of that workshop's discussion and where possible, conclusions relating to why the Kura-Araxes cultural tradition originated, what its essential nature was, why it expanded, and what the interaction of bearers of this cultural tradition with other traditions says about processes of cross-cultural contact and change in the past.

I. Introduction

The Kura-Araxes presents an important case study for understanding cultural and societal structures, interactions, and long-term change in the ancient world. This cultural tradition began in the South Caucasus (in modern Armenia, Azerbaijan, Georgia, and a small corner of Turkey and Iran) and then extended primarily by means of migration and cross-cultural interaction across the mountainous highlands of the Zagros, Taurus, and Caucasus Mountains and into the lowlands of the Levant (**Fig. 1**).

The most obvious marker archaeologists identified for this tradition was its very distinctive pottery styles and technology. Clearly, it was different in form, finish, and technology from many of

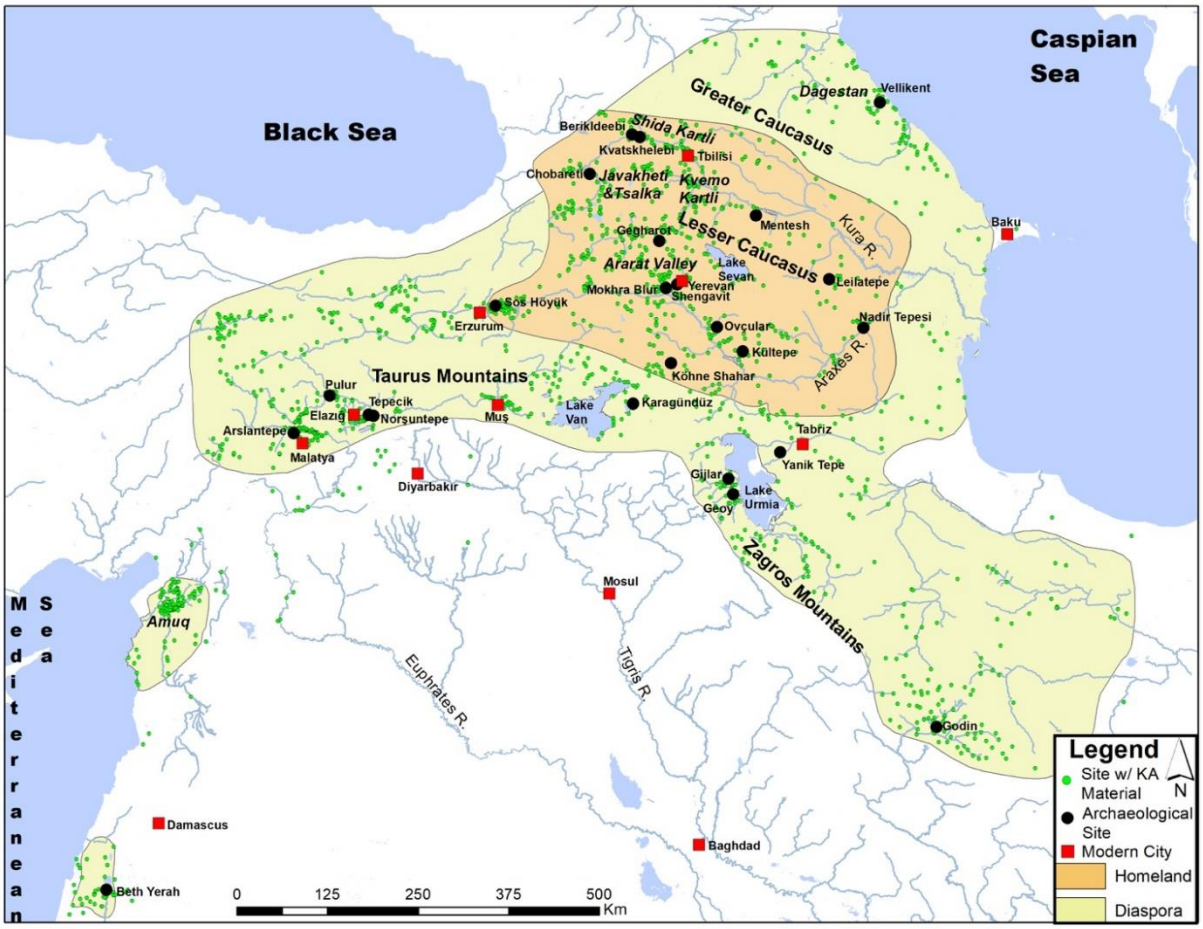


Fig.1. The distribution of the Kura-Araxes cultural tradition.

the other local assemblages of the regions into which Kura-Araxes populations migrated. It often stood in opposition to other ceramic industries with its hand-made techniques and a significant amount of energy spent on surface finish and decoration. In most of the new 'homelands' of the diaspora, mass-produced, wheel-made and more simply ornamented ceramics were becoming the norm. Taken together with its ritual and other cultural and economic practices, the Kura-Araxes defined a unique tradition or cultural package of pottery style, technology, building, and ritual that was followed by populations in its homeland as well as in its migrant diaspora. At the same time, even within the original homeland, the nature of the many different landscapes fostered variations in the expression of this tradition and alternative modes of economic, social, and political organisation. The Kura-Araxes is often depicted and discussed as monolithic in nature, but the reality is significantly more nuanced; a fact which we aim to highlight in this work.

Chronologically, the Kura-Araxes was contemporaneous with the evolution of the state organised societies in neighbouring Mesopotamia during the Uruk (LC3–5) and Early Dynastic I.[1] Culturally and organizationally, Mesopotamia and the Kura-Araxes homeland were very different,

[1] Reade 1991; Rothman 2001.

and they had little demonstrated direct interaction during the time of the Kura-Araxes. Some scholars among them Algaze[2] and Frangipane[3] as well as others, claim that Kura-Araxes migrants interrupted the Uruk expansion trading network that lasted from 3600 to 3100 BC, particularly in the Euphrates River basin, where contact between Mesopotamia and the highlands at that time was most intense[4]. However, most of the migration happened during the Uruk expansion or after disruptions had already ended or transformed it. Little evidence exists of raw materials or products from the South Caucasus homeland ever coming into the Mesopotamian heartland at this time. Kura-Araxes migrants never established themselves south of the Taurus or in the hills of the Mahi Dast in the western Zagros front in Greater Mesopotamia. In the Southern Levant clearly Kura-Araxes (Khirbet Kerak Ware) settlements occurred only parallel and north of the central Jordan Valley.

The existence of the Kura-Araxes cultural tradition has been known for over a century, but because its homeland was for the most part located behind the Iron Curtain, intensive international investigations were not possible.[5] Most initial research on it was published in Russian, Armenia, and Georgian, languages not typically read by Western scholars. They first discovered it independently in the diaspora regions. A Soviet culture historical approach limited the data that more anthropologically-oriented scholars sought. Therefore, understanding the "big picture" of the Kura-Araxes was difficult. With the collapse of the Soviet Union, interest from outside the region catalyzed the interaction of local and international scholars, as represented in our workshop; a gathering which brought together scholars from Armenia, Britain, Canada, France, Iran, Israel, Italy, and the United States. They represented European and Russian culture historians, anthropologists, and practice theorists. Our workshop joins an increasing number of new approaches and data that have begun to appear in the published literature and at academic meetings.[6] A number of key issues remain unresolved. Stephen Batiuk and Mitchell Rothman decided that the best way to share information and promote discussion was by bringing together face-to-face a set of scholars covering the homeland and the different regions of the diaspora, many from different scholarly traditions. This article in that sense represents the work of eleven scholars (aside from the current authors: Karim Alizadeh, Grand Valley State University; Ruben Badalyan, Institute of Archaeology and Ethnography of Armenia; Rafael Greenberg, Tel Aviv University; Bertille Lyonnet, Centre National de la Recherche Scientifique, France; Giulio Palumbi, Université Nice Sophia Antipolis; Sarit Paz, Tel Aviv University; and Graham Philip, Durham University). Funded predominantly by the Social Sciences and Humanities Research Council of Canada (SSHRC), and with the help of the University of Toronto, especially Michael Chazan at the Institute of Archaeology and Tim Harrison of the Department of Near & Middle Eastern Studies, and the American Research Center in the South Caucasus (ARISC) we met in Toronto in February 2017. Our initial goal was a first report on the proceedings co-authored by all the participants, followed by a book with individual chapters, each followed by a section with discussion. Getting agreement among scholars with such a wide range of scholarly traditions proved difficult. The

[2] Algaze 1993.
[3] Frangipane 2014.
[4] Algaze 1993; Frangipane 2014.
[5] Sagona 2014b; Smith 2005.
[6] Greenberg *et al.* 2012; Kohl 2007; Palumbi and Chataigner (Ed). 2014; Smith *et al.* 2009.

current authors chose to write this first report on our own, emphasizing what was new, but also providing a systematic summary of what has been discussed in the published literature in one place for the first time. The participants all agreed to this, but they wanted it to be clear that this presentation represents the current authors' understanding of what was discussed. While presenting ideas from other participants, the resulting conclusions do not all reflect a consensus among all who attended the workshop. Responsibility for it is that of the current authors.

The following article is organized as our workshop was. First, we address the chronology of the Kura-Araxes. Considering we approach the Kura-Araxes through the lens of an actual migration of people out of the South Caucasus into different regions of the Near East (admittedly not a model wholly accepted by all), knowing what happened in each place and over time is key to understanding the origins of societal structures and cultural practices, as well as patterns in population movement and their cross-cultural interactions. Many scholars have suggested chronological schemes to set the beginning and ending dates of the Kura-Araxes and the sub-phases within it (see Section II). The workshop spent a full day on this issue, and everyone agreed on a new overarching chronological scheme. That scheme changes the narrative of the immigrant spread, as well as that of the cultural and organizational changes in the homeland zone. We next focused on the cultural and economic elements that defined the Kura-Araxes across its extent. Thus, we address the elements of what scholars of the Kura-Araxes have called its "package" of cultural practices that are distinct to the Kura-Araxes populations. This package includes pottery style, production techniques, and function (representing among other things diet and food preparation); as well as housing, ritual and symbolism, and subsistence adaptations (see Section III). These elements speak not only to the nature of the Kura-Araxes identity, but how it was organized, and why it changed over time and space (see Section III). The landscapes of the Kura-Araxes were heterogeneous topographically, environmentally, and socially; although key patterns of similarity can still be observed throughout. Each subregion within the homeland zone, and, even more so, each subregion into which migrants moved, presented different challenges for the populations, and different trajectories of change. To clarify how the tradition was expressed within different societal orders in different settings, our Section IV summarizes what we know about each geographical subregion (and provides ample references for further investigation). The final Section V discusses some of the issues raised in the first five sections.

The subregions we will discuss include the core of the homeland zone in a) the basins of the Araxes River from Erzurum in the west to Naxçivan, b) the basins and plateaus of the Kura River in the Republic of Georgia (Shida Kartli, Kvemo Kartli, Samtskhe-Javakheti including the Tsalka Plateau), and c) the area along the Araxes River north of Lake Urmia in the east. The diaspora subregions include d) the area along the Caspian littoral, e) the area from the western shore of Lake Urmia to Lake Van and Muş, f) the high Zagros Mountain areas east and south of Lake Urmia, g) the highland and lower elevation parts of the Turkish provinces of Elaziğ and Malatya between the massifs of the Taurus Mountains and along the Upper Euphrates, and h) lowlands of the Amuq, northern Orontes Valley and the southern Levant.

The theoretical underpinning of the analyses that follow are based on ideas of how societies in the past adapted to their natural and human landscapes in the past, how through cultural perceptions and practices the people associated with the Kura-Araxes created their unique identity,

and how their economic, political, and social organization reflects the intersection of those elements[7].

II. Chronology

Sagona[8] has argued that chronology is one of the biggest problems in making sense of the Kura-Araxes. Sagona, [9] along with Burney, [10] Munchaev, [11] Kushnareva and Chubinishvili,[12] Japaridze,[13] Kushnareva,[14]and others have proposed different beginning and ending dates for the Kura-Araxes and different phases within it. Part of the problem when dealing with the chronology of the Kura-Araxes is the very variability we mentioned above. Additionally, the process of adoption and alteration was not uniform within the homeland zone, let alone in the diaspora.

For archaeologists, two means of dating are available: absolute and relative. The former is based on radiocarbon primarily,[15] and the latter is based on changing styles and the introduction of new types in pottery and other artifact categories.[16] The early attempts at a chronology of the Kura-Araxes emphasized relative dating with three or four sub-phases. Kushnareva and Chubinishvili[17] developed a broad chronological scaffolding divided into three phases, KAI–III, based on typological changes in pottery. This original three-part system spanned the third millennium with KAI dating from 3000 to 2700 BC. It was represented by monochrome wares. KA II was dated from 2700 to 2400 BC. It saw the advent of the black and red color combination in the ceramics. KA III dated from 2400 to 2000 BC and was marked by the development of incised Black Burnished Wares.

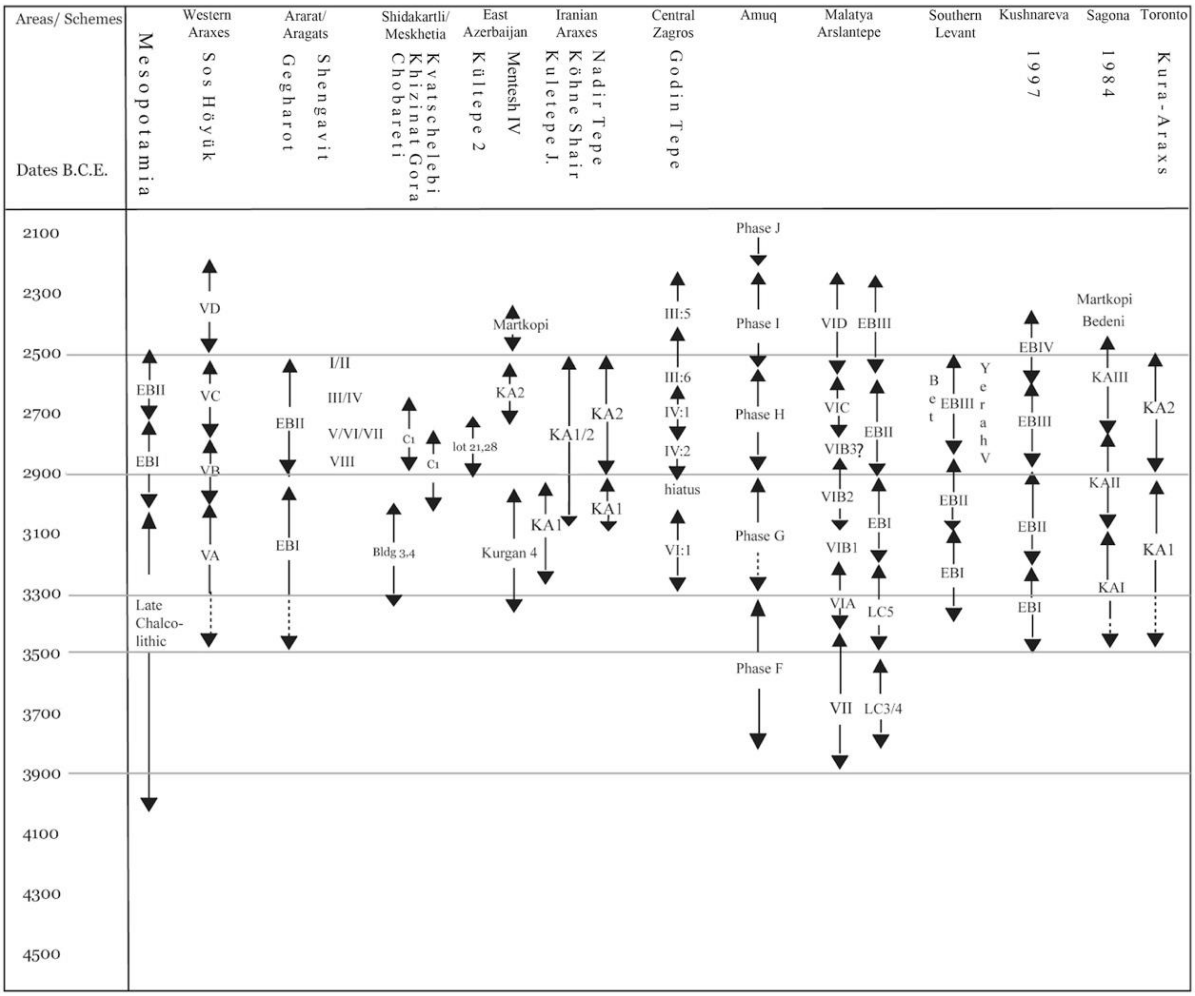
Kavtaradze later attempted to push the Kura-Araxes back entirely to the fourth millennium based on newly calibrated radiocarbon dates.[18] Kushnareva[19] identifying a middle ground, incorporated architecture and metallurgy into a revised four-fold Early Bronze Age (EBA) chronology: with EB I dated from approximately 3500 to 3200 BC, EB II dated from 3200 to 2900 BC, EB III from 2900 to 2600 BC, and EB IV from 2600 to 2300 BC. Sagona[20] continued with the Kura-Araks I–III schema, but he suggested that his schema should start and end earlier than the previous schemas. However, he thought that the continued use of black-burnished pottery after 2500 BC (Kushnareva's EB IV)—when the societies of the South Caucasus supposedly became

[7] Rothman 2014, 2017.
[8] Sagona 2014a.
[9] Sagona 1984, 2000.
[10] Burney 1958.
[11] Munchaev 1975.
[12] Kushnareva and Chubinishvili 1970.
[13] Japaridze 1992.
[14] Kushnareva 1997.
[15] American Chemical Society. National Historic Chemical Landmarks. Discovery of Radiocarbon Dating. http://www.acs.org/content/acs/en/education/
[16] Renfrew and Bahn 1999; Rice 2015.
[17] Kushnareva and Chubinishvili 1970.
[18] Kavtaradze 1983.
[19] Kushnareva 1997.
[20] Sagona 1984.

"mobile and militaristic"[21]—could still be called Kura-Araxes.[22] The various schemes with key sites appear below in Table 1.

Badalyan[23] avoided the more traditional approach of developments in ceramic decoration and utilized more concrete site stratigraphies and a view of the ceramic industries that took the geography of the homeland into account. He proposed a two-fold division, combining what was traditionally Kura-Araxes I and parts of Kura-Araxes II. More recently, Passerini et al.[24] undertook

Table 1. Comparative chronological table of schemes and sites.



a Bayesian approach to 212 radiocarbon dates from 42 different sites in Turkey, Georgia, Armenia and Azerbaijan dated from 4400 to 2000 BC. She followed the more traditional Kura-Araks I–III system. As important as the study is, it is not without its problems (see Supplementary Data, **Table 5**). We at the Toronto Workshop built on the same core data, but we added an additional 137 dates from new or overlooked samples for a total of 359 radiocarbon dates from 51 sites. We were less

[21] Smith 2005.

[22] Sagona 2000.

[23] Badalyan 2014

[24] Passerini *et al.* 2018

stringent in our exclusion of data, and we emphasized the strata and dates rather than the changes in artifact style of relative dating to create a single uniform scale.

Still, the dating for the Kura-Araxes is particularly difficult for five reasons: (1) the sheer volume of its settlements, over 1465 at present count, across an immense geographic area; (2) most settlements have been identified only in surveys; comparatively few having been excavated; therefore, the nature of the occupation, be it an actual Kura-Araxes settlement, a mixed occupation of indigenous and Kura-Araxes, or simply a chance find of Kura-Araxes material remains, is often difficult to determine; (3) a significant number of Kura-Araxes settlements were built on sterile soil or abandoned sites, especially in the diaspora regions, thereby lacking long sequences with which to compare each with other sites' sequences and correlate their strata; (4) few sites have radiocarbon dates with secure proveniences; (5) pottery style is extremely variable from place to place in the diaspora, and even in the homeland zone, 6) the adoption of Kura-Araxes lifestyle and culture happened over time, even in the homeland, and was not a single unitary event.

The Toronto Workshop Chronology

At the workshop, we as a group rejected the extension of the Kura-Araxes past 2500 BC and favored a narrower time frame for the Kura-Araxes that reflects larger patterns beyond pottery style. The Kura-Araxes is more than its pottery; it is a way of living and organizing that changed radically after 2500 BC, so this is reflected in the model. While elements of KA ceramics may have survived in places like northwest Iran, the Van Region, or the Amuq, the *complete* Kura-Araxes cultural package does not appear to continue. Given that, the approach of the workshop members was to start with a framework based on absolute dates – the complete set of dates appear in our online version – as our independent variable, and only then look at how the elements of relative dating refined and to some degree validated the structure built by those absolute date.

Given that, the approach of the workshop members was to start with a framework based on absolute dates (see **Table 5** in the Supplementary Data) as our independent variables, and only then looked at how the elements of relative dating refined and to some degree validated the structure built by those absolute dates (**Table 1**). The absolute dates essentially favored Badalyan's two-phase approach, which is what we now call KA1 and KA2 to distinguish it from Kura-Araxes I–III, and EB I–IV schemes. The workshop participants accepted this approach, as did Tony Sagona in his communications over e-mail with the participants.

Although created by independent variables based on radiocarbon dates from 265 dates (out of a collection of 359, see Supplementary Data) from 39 sites, especially in the homeland, the KA1/KA2 nomenclature does seem nonetheless to fit macro-changes, especially in pottery style. There was a general trend from homogeneity to heterogeneity in pottery style.

> "The outstanding characteristic of the East Anatolian E.B. I [KA1] period is the uniformity of its pottery both in shapes and in decoration [...] This remarkable homogeneity of culture eventually began to break down, and [...] as the time the horizon progressed from one that was largely homogenous [KA1] to an assemblage characterized by greater diversity and fragmentation" [KA2].[25]

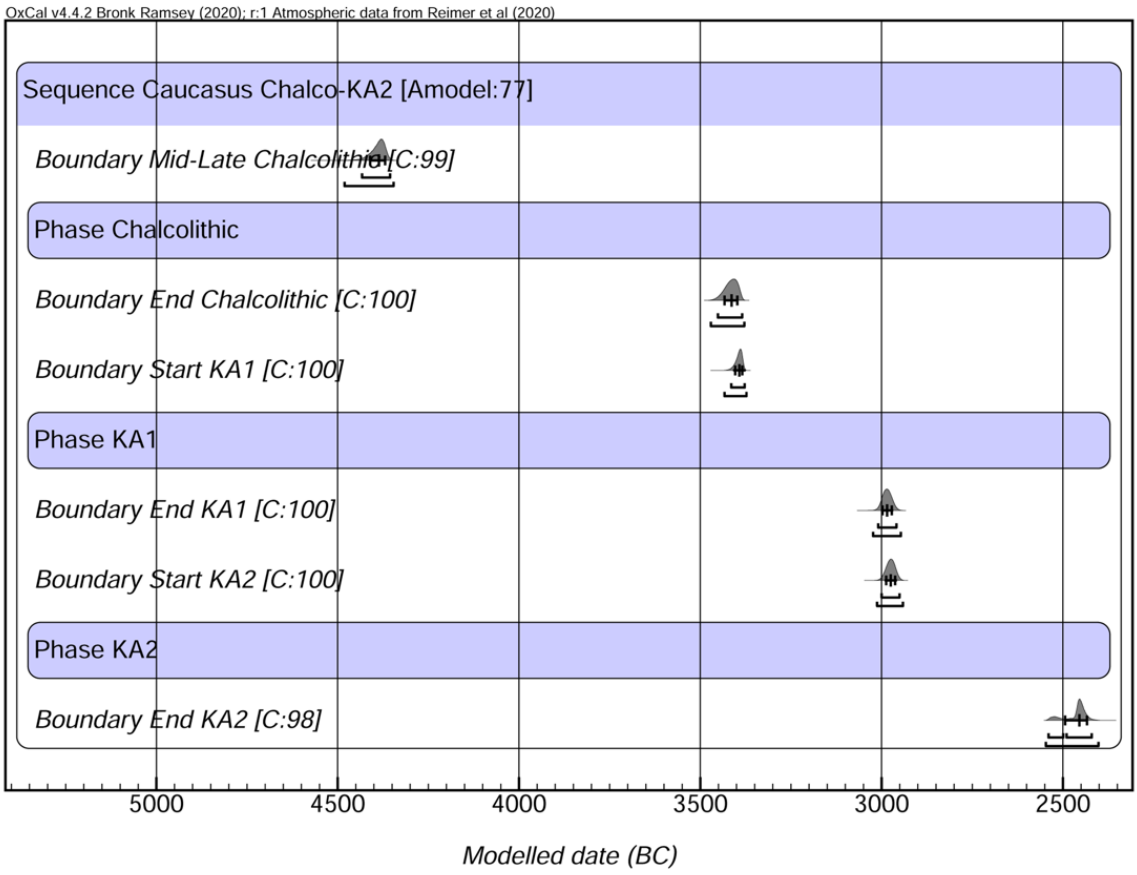
[25] Burney 1958; see also Sagona 2017.

The term "break down" might not be the most accurate; what we see is rather a marked increase in population sizes represented by site numbers (from 115 KA1 sites in the "homeland" to 606 in KA2) and occupied hectares (see **Figs. 7** and **8**), changes in local systems of control, systematic integration within subregions, and increasing social complexity.[26]

Many elements of the chronological framework are still debated. The dates of the beginning of the Kura-Araxes were still a matter of considerable discussion among those attending the workshop and those outside it (Table 2).

The earliest proposed date for Kura-Araxes materials was from the Late Chalcolithic occupation of Ovçular Tepesi in Azerbaijan from 4300 to 4100 BC.[27] According to Marro, who participated in the workshop via Skype during these discussions, these early dates are based on only 18 sherds, which

Table 2. Results of OXcal modeling of transitions from Chalcolithic to KA1, KA1 to KA2, and the end of the Kura-Araxes.



appear to come from pits. Some potsherds were found "scattered on a surface," but the scatter is concentrated directly underneath "Dial 5167." The dials were circular platforms inside rectangular houses. The function of these dials is unclear. They are circular and pise faced with stone inclusions,

[26] Rothman 2015b.

[27] Marro *et al.* 2014.

and sometimes with evidence of burning. They are often superimposed upon each other (in one example eight dials were superimposed on each other).

Sometimes, they are positioned above pits, and their distribution appears random within rooms. It is tempting to see these more as indications of faced, bell-shaped pits with hardened lenses and occasional burning. Many of the admittedly few potsherds had the Red-Black color combination, which by all our understanding emerged after the earlier monochrome wares around 3200 BC.[28] One could propose that these pits were dug from higher and later strata with Kura-Araxes remains. Even Marro admits that all of the manufacturing, typological, and decorative features of Kura-Araxes wares found in their Late Chalcolithic levels compare better with those of the 3rd millennium than with the earliest (3500–3300 BC) Kura-Araxes pottery.[29]

More critically, we questioned why—if Ovçular's Kura-Araxes were that much earlier than the great majority of other Kura-Araxes sites—were there no other sites that would have the same material for hundreds of years. The two sites with which Marro compares Ovçular are Areni-1 Cave in Armenia[30] and Mentesh Tepe in Azerbaijan.[31] Both sites have significant problems with stratigraphy, as Samei and Lyonnet who studied the material of these sites personally attested, and as in the case of Areni-1 has been already published. They are not reliable sources for dating. Additionally, their pottery does not have the same "late" characteristics as seen at Ovçular. If the Ovçular dates were too early, then when did the Kura-Araxes as a recognizable cultural tradition originate? After our workshop Passerini, Rova and Boretto[32] published their study on the chronology of the Kura-Araxes. Unfortunately, dates belonging to the earliest part of the KA1 are limited compared to the preceding and following periods. However, Bayesian analysis allows one to model the approximate transitions between periods, and as a result more definitive boundaries for the KA1 were suggested. Passerini et al. grouped Ovçular, Areni-1, Mentesh, as well as six other Late Chalcolithic sites into a "Pre-Kura-Araxes" phase, which began sometime in the second half of the 5th millennium BC. However, the term "Pre-Kura-Araxes" is misleading. Setting aside the outlying Ovçular example, there is no Kura-Araxes cultural package present in this phase, only some ceramics that seem to be related in shape to some later, traditional Kura-Araxes vessels, but lacking the characteristic finish and formation techniques (see below), and only appearing at the very end of this phase. We prefer to use the term Chalcolithic as it is more in-line with existing chronological understandings.

The important discussion was when did the transition from the Chalcolithic (or Pre-Kura-Araxes) to the KA1 occur, and whether the often-cited date of 3500 BC was accurate or, as some workshop members claimed, 3300 BC was more appropriate? The Chalcolithic of the South Caucasus is only now becoming an intensively investigated period. Our understanding of its relation to the preceding Neolithic and following Early Bronze Age periods is presently poor. Additionally, the inter-regional interactions were apparently more complex than had originally been thought.[33] Close to a dozen Chalcolithic sites have produced a long series of radiocarbon dates,

[28] Marro *et al.* 2009, 2011.
[29] Marro *et al.* 2009.
[30] Areshian *et al.* 2012; Wilkinson *et al.* 2012.
[31] Lyonnet *et al.* 2015.
[32] Passerini *et al.* 2018.
[33] Akhundov 2007; Marro *et al.* 2010; Sagona 2014a, 2018.

chief among them are the aforementioned sites of Areni-1 and Ovçular, but also the important sites of Berikldeebi and Orchosani.

Berikldeebi in the Shida Kartli area of Georgia is presently the only site that appears to preserve the transition from the Chalcolithic to the Kura-Araxes. Level V, the lowest level of occupation, is assigned to the Late Chalcolithic, while the following Level IV is dated to KA1 based on the predominance of monochrome ceramics and diagnostic shapes. Concerns were raised in our discussions as to whether level IV directly followed Level V or if there was a hiatus. Unpublished field notes examined by Sagona confirm that although there are some squares at the site where the Chalcolithic deposits were distinct from KA1, in others there was no hiatus, but rather clear continuity. Only one radiocarbon date is available from Berikldeebi which consistently proved to be an outlier with poor agreement and most likely belonged to a mixed context.

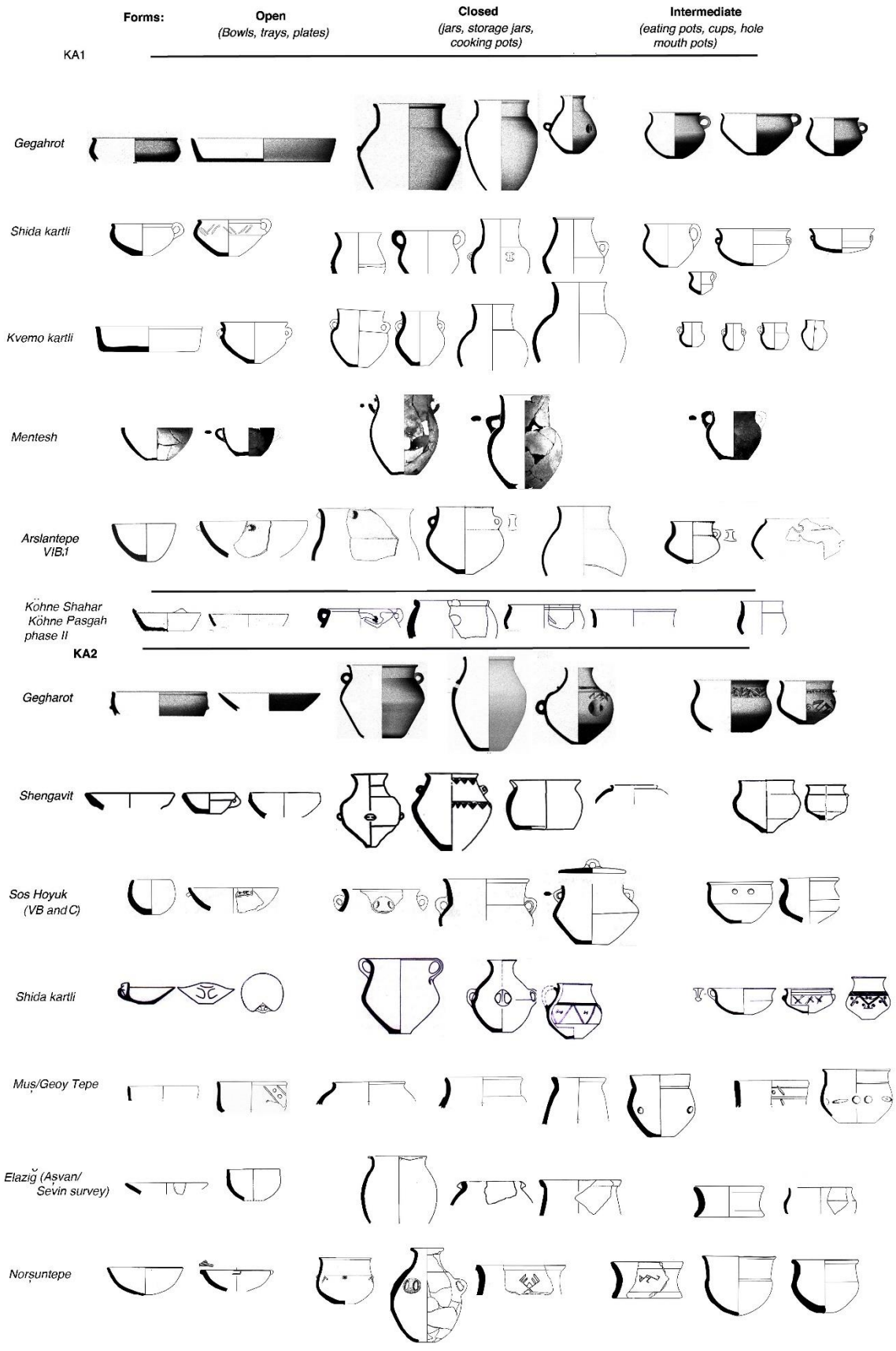
The site of Orchosani is in the Samtskhe region of Georgia (see Section VB) reveals a terminal Late Chalcolithic phase with some possible early Kura-Araxes material, but it does not provide a direct stratigraphic link between the end of the Late Chalcolithic and the beginnings of the Kura Araxes. A series of 14 radiocarbon dates cluster around 3650 to 3540 BC for this material, providing a mid-fourth millennium date for Late Chalcolithic to Early Bronze Age (Kura-Araxes) transitional material.[34]

Sos Höyük VA in Erzurum, the farthest western part of the Araxes River basin and at the outside edge of the homeland zone, has a very wide range of carbon dates from the Chalcolithic, ranging between 3900 and 3300 BC.[35] The pottery has some types that could fit the KA1. These came from levels VA, which dates to as early as 3500 BC. Passerini's new modeling of the Sos VA dates, however, seeing the earliest date as an outlier, suggests a start date of between 3400 and 3100 BC.[36] She argues that it was not until Level VC, a couple of hundred years later that clearly Kura-Araxes pottery dominated the assemblage (**Fig. 2**).

Chobareti in the Meskheti region of Georgia yielded Kura-Araxes monochrome wares with a preponderance of tall neck vessels, alongside Chaffed-Faced Wares, typical of pre-Kura-Araxes times.[37] The identification of bichrome, Kura-Araxes Red-Black Burnished Wares would suggest it is in the later part of KA1.[38] This is substantiated by the 11 radiocarbon dates within the date ranges of 3350 to 3000 BC which fit our understandings of the KA1. The 26 radiocarbon dates for the KA1 phase from six sites of the Elar-Aragats style area of pottery in Armenia start at about 3500 BC, but cluster between 3300 and 2900 BC.[39]

Taken together and factoring in the size of the confidence intervals that make radiocarbon dating more of a range than a point in time, and the difficulty of finding precise points on the radiocarbon calibration curve for this time period, these data suggest that the Kura-Araxes appears to have its roots in the Chalcolithic. 82 Chalcolithic dates with 76 KA1 and 107 KA2 dates were modelled with an agreement of 77 (with a value of 60 being the general threshold for positive agreement). There are almost no sites that preserve the transition, and few reliable very early KA1 dates. While the direct

[34] Gambashidze *et al.* 2018.
[35] Sagona 2000., fig. 6.
[36] Passerini *et al.* 2018, p. 111.
[37] Kakhiani et al. 2013.
[38] Badalyan 2014, p. 43.
[39] Badalyan 2014.


Forms:
Open
(Bowls, trays, plates)
Closed
(jars, storage jars, cooking pots)
Intermediate
(eating pots, cups, hole mouth pots)
KA1
Gegahrot
Shida kartli
Kvemo kartli
Mentesh
Arslantepe VIB.1
Köhne Shahar
Köhne Pasgah phase II
KA2
Gegharot
Shengavit
Sos Hoyuk (VB and C)
Shida kartli
Muș/Geoy Tepe
Elaziğ (Aşvan/ Sevin survey)
Norșuntepe

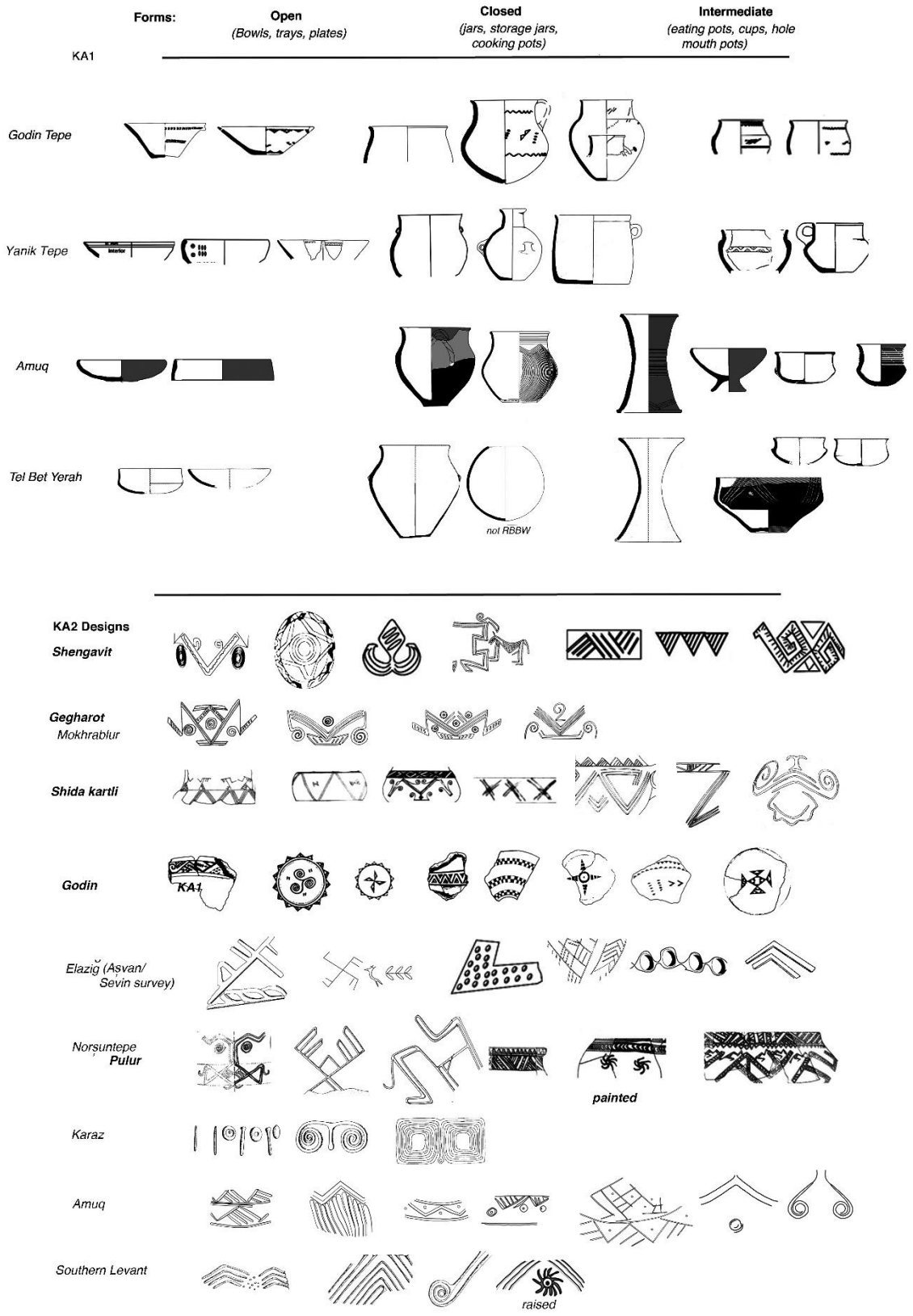


Fig. 2. Pottery Style Variation in the Kura-Araxes Cultural Tradition.

dating of the transition between the Caucasian Late Chalcolithic and the KA1 is presently not possible, by modeling the Chalcolithic and KA1 phases, a best estimate of the start of the KA1 can be assigned to between 3500 and 3373 BC (**Table 2** and **Supporting Data**). This must be taken with some caution as a) we presently do not have a good picture of the nature of the Chalcolithic in the South Caucasus, nor its relation vis-à-vis the Kura-Araxes, b) no site at present preserve a well-dated transition between the two periods, and therefore there could be a gap between them. c) few dates are available for the earliest phases of the KA1, and d) there is significant overlap among many of the dates. More secure dates from any site that has the transition will undoubtedly shift the transition further back. Conversely, it could be evidence of a chronological and geographical overlap of groups bearing the Late Chalcolithic and groups bearing the Kura-Araxes cultural traditions. Given the later patterns of cohabitation of cultural groups within the same geographical area attested to in the Caucasus, this reconstruction may also be viable for this important transitional between these, periods.

Most scholars agree that a major development happened late in the KA1 when the "homeland" expanded, and many more settlements were founded, particularly in Eastern Anatolia (the Taurus Mountains), but also in Dagestan and Iran (the Zagros). This is evidenced by the increase in the number of KA1 dates and should also be tied to the development of the red-black colour pattern in the ceramics in most of the homeland zone. This appears to have occurred around 33/200 BC, and it is represented by a significant clustering of sites with these dates. The new chronology, therefore, predicts that the first movements into the diaspora regions such as in the area west of Lake Urmia, northeast into Dagestan, or west into highland Taurus happened in the later part of KA1 (see below). There is no Red-Black Ware at Yanik or Haftavan Tepe (either side of Lake Urmia), and little to none around Lake Van. This area was part of the dimple or dimple and line Gray Ware tradition. That zone is typical of the KA1/KA2 transition, so we are seeing a kind of localised cross-current of style sharing in this western Urmia-Van-Lower Province area. This set a pathway that was followed in the KA2 south and east of Lake Urmia, later than the westward Taurus. That movement is represented by a cluster of Kura-Araxes sites around Godin Tepe. People used very typical KA2 Lower Province traditions like the double carination shapes there.

If the first signs of the Kura-Araxes were at 3500 BC, when was the transition to KA2? The general consensus of the workshop was that KA2 represents the time of the establishment of the diaspora in Central and Western Iran, Levantine Syria, and the Southern Levant. This is best approached by charting the chronological history of a variety of well-dated sites in the homeland zone and in the diaspora (**Tables** 1 and **2**). The increase in the number of settlements begs the question of what it represents. Is it the result of population growth? The adoption of the Kura-Araxes cultural package by other (perhaps Chalcolithic) groups? Given the levels of abandonment between the periods observed at many sites in the homeland that are occupied in KA1 and 2, do some of the new KA2 settlements simply represent a shift in settlement, because agricultural practices did not sustain the fertility of the soil? Presently, it is impossible to say, but in all likelihood, the reason for the increase in settlement in the KA2 is multi-variant, and new settlements were established inside and outside of the homeland over a lengthy period of time. Again, the new chronology suggests that the migration, and certainly inter-cultural contacts, began before the KA2. The dating of the Kura-Araxes in Iran remains unclear, because there are few radiocarbon dates, and settlements found within the modern political borders of the state of Iran encompass three

distinct subregions within the Kura-Araxes: one west of Lake Urmia into the area of Lake Van, the other along the Araxes River north of Lake Urmia in the Caspian Sea littoral, and the third east and south of Lake Urmia. Köhne Shahar, although in modern Iran, was clearly within the Lower Province of the Kura-Araxes homeland. Some KA1 ceramics are found in small numbers in the preceding Chalcolithic settlements at Kültepe (in the Jolfa Plain), and at Köhné Pasgah Tepesi as early as 3400 BC. These sites along the Araxes River north of Lake Urmia are really part of the Kura-Araxes homeland zone, or at least represent part of the earliest 'expansion' of the homeland. New data from Nadir Tepesi dates its beginning to approximately 3100 BC,[40] toward the end of KA1 and into KA2, which fits the relative chronology of Yanik and Haftavan Tepe, Geoy, and Gijlar.

The KA1/KA2 chronology is fairly broad, in part because the radiocarbon confidence intervals are so long and the calibration curve so wavy. For those wanting more specificity, one can still use the Toronto KA1/KA2 scheme to define sub-phases; for example, KA1a, b, c representing its beginning at 3500 BCE, b at 33/200 BC with the first appearance of red-black surfaces, and c the final phase, and the like. Deciding on sub-phases will require more discussion and analysis.

Chronology: the regional picture

Through the lens of Badalyan's sequence, the Kura-Araxes had a discrete character, reflected by the predominance of both early (KA1) and late (KA2) strata and often the presence of a sterile layer on a number of multilayered (KA1/2) sites. It seems to us that the hiatus expressed by this sterile layer[41] and the later resettling reflects not only the particular situation and the history of specific sites, but also captures much deeper and larger historical and cultural processes: the replacement of a relatively homogeneous KA1 complex with a mosaic of local versions of the KA2 mentioned above, through multiple, small-scale migrations, even within the homeland. As a result, the later part of the KA1 is underrepresented in the radiocarbon model, and the transition from the end of it may still change with further excavations and more radiocarbon data. We also note that not all the hiatuses were contemporaneous. There appears to be some variation in when they occurred and how long they lasted.

This represents two different sets of changes. One is focused on some degree of increase of population in the homeland zone and the development of more localized interaction networks (see Section IV). Certainly, those interaction networks involved economic trade and production (see Section IIIF). Whether they involved the formation of broad areas of multi-site polities is not yet clear. The second set of changes was focused on the migrants, who left the homeland provinces in the KA1 and began to develop new, partially hybridized repertoires of culture, most clearly marked

[40] Alizadeh et al. 2018.

[41] By their very nature, dating these sterile levels is difficult, understanding them even more so. KA 1 sites are being abandoned, and some of the new KA2 settlements may represent a partial shift in settlement, with the occupants of the former sites settling the latter. At a later point, the older settlements are resettled, as populations increase. The reasons for this settlement shift in the homeland region will need to be investigated, however, the gross patterns in the settlement data sees a dispersal of settlement in the KA2 into lower elevations and may represent a shift in focus of subsistence to greater reliance on agriculture or different plants.

Table 3. Chronology of the Upper Euphrates.

2000		
2250	VI D	Early Bronze III (2500-2000 BC)
2500		
2750	VI C	Early Bronze II (2750-2500 BC)
	VI B2 Late	Early Bronze Ib2 (3000-2800 BC)
3000	VI B2 Early	Early Bronze Ib1 (3100-3000 BC)
	VI B1	Early Bronze Ia (3200-3100 BC)
3250	VI A	Late Chalcolithic 5 (3400-3200 BC)
3500		
3750	VII	Late Chalcolithic 3/4 (3900-3400 BC)
4000		
4250	VIII	Late Chalcolithic 1/2 (4700-3900 BC)
4500		
4750		

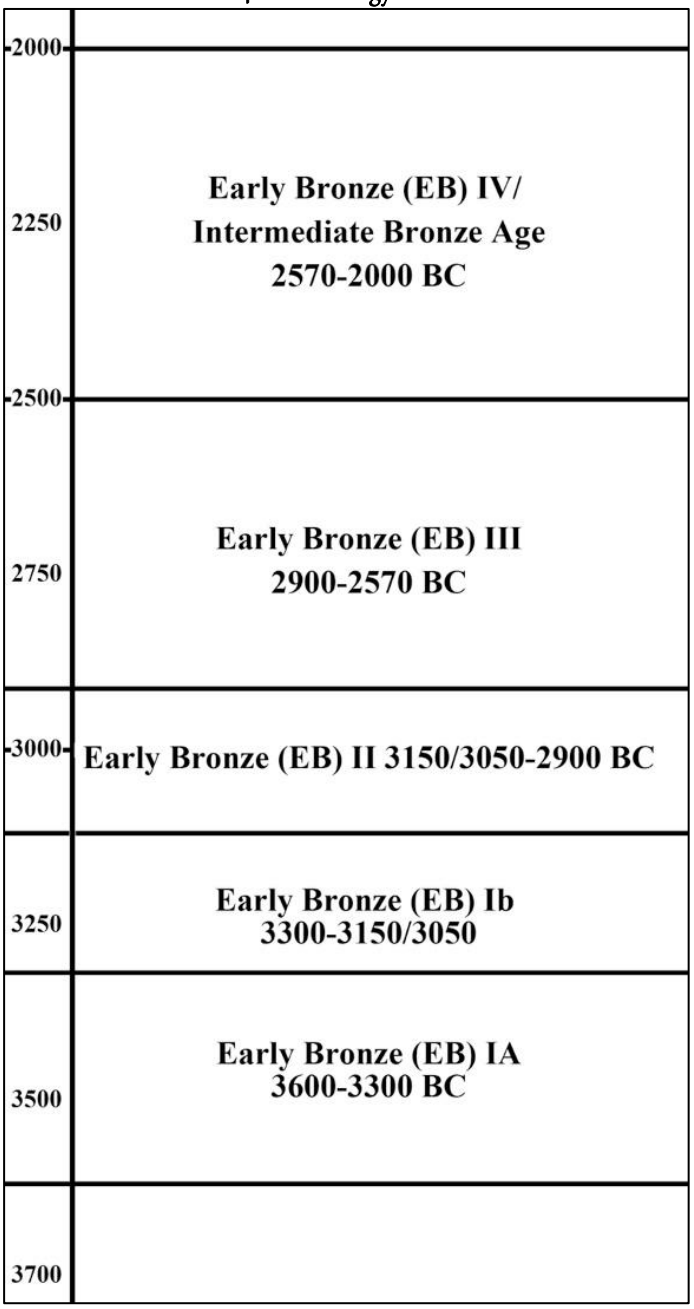
by pottery styles. The great variation was explained by Rothman[42] as ripples in the stream. That is, the migration was not a single broad outpouring of population, but a sequence of smaller vectors of movement, from each of the different provinces, in varied directions, over a fairly long period of time.

Styles in the homeland during the KA2 varied markedly even though the underlying technical practices of pottery makers remained amazingly consistent (see Section IIIF). For example, in Armenia at least three synchronous KA2 complexes can be distinguished: "Shresh-Mokhrablur" in the central part of the Ararat plain, "Karnut-Shengavit" to the north and east, and "Ayrum-Tekhut" in the Aghstev and Debed River basins north of Lake Sevan.[43] This latter group connected with the Upper Province. At the same time, the formation of local synchronous versions takes place

[42] Rothman 2003a.
[43] Badalyan 2014.

in the original territory of Kura-Araxes: Shida-Kartli on the Kura River near modern Tbilisi, Kvemo Kartli on the Kura River south of Tbilisi, and Tsalka on the plateau south of the Kura River. In the KA2 a number of other ware traditions developed in the diaspora: Yanik Wares to the east and south of Lake Urmia,

Table 4 . Chronology of the Levant.



Gray Wares with dimple and line impressed designs in the valley bottom of Muş and the western bank of Lake Urmia (Geoy Tepe)[44], and Red-Black Burnished Wares in the northern Levant and

[44] Rothman 2003b; Rothman and Kozbe 1997.

its derivative, Khirbet Kerak Wares, in the southern Levant (**Fig. 2**).[45] This Red-Black Burnished Ware tradition, it should be emphasized, is not the Central Anatolian Red-Black Burnished wares known from Malatya (see below).[46]

Among all the sites with Kura-Araxes wares, Arslantepe is the most distinct and as the authors now understand it, has the least to do with the general patterns of Kura-Araxes settlement (see Section IVF, **Table 3**). It has the greatest connections both the Mesopotamian and the Central Anatolian worlds. In the latter archaeologists recovered burnished ceramics with an all black, all red or red-black finish by the first half of the fourth millennium.[47] The excavators identify Central Anatolian "Red and Black Burnished Wares" as early as Phase VII.[48] However, this material is mostly monochrome, and the bichrome version is not that common. Red-Black Burnished Ware was a term developed by Robert Braidwood during his seminal work in the Amuq plain in the 1930s to describe the local variant of Kura-Araxes Wares.[49] He notes that an "aspect of red-black pottery" occurs at Arslantepe, but he does not equate the two.[50] The use of the term Red-Black Burnished Ware for both Central Anatolian and Kura-Araxes wares makes the story of the Upper Euphrates significantly more complicated (see below).

The temple/palace complex at Arslantepe ended at 3200 BC (period VIA). The following period was VIB1, the only phase with some links to the Kura-Araxes cultural traditions.[51] VIB1 ended by 3100 BC. VIB2 is no longer directly linked stylistically, culturally, or organisationally to the Kura-Araxes. Throughout level VIB1 the hybrid forms of burnished wares existed side by side with local Plain Simple Wares, including Late Reserved Slip Wares, associated with sites in northern Mesopotamia along the Euphrates River.

The appearance of the Kura-Araxes Red-Black Burnished Ware in the Amuq regions of southeastern Anatolia/ northwestern Syria has not been directly dated (**Table 4**). A few radiocarbon dates are available that date the phases preceding and following the floruit of Kura-Araxes Red-Black Burnished Ware in Phase H (c. 2900 to 2600 BC) and Phase I (c. 2600 to 2350 BC) (see Table 1). A few bichrome examples, alongside some traditional bovine figurines, make their appearance in the terminal sub-phases of the Late Chalcolithic/ EB I or Phase G, which has been dated through some salvage work undertaken at Tell Judeideh and nearby sites in the valley to no later than 3100–2900 BC.[52] Given the unstratified nature of these samples, they should be treated with caution, but the early date parallels the appearance of monochrome "Red Black Burnished Wares" at Tell Afis, where it is found in the Mesopotamian Early Bronze Age I (Anatolian EBII, KA2) levels.[53] This suggests that its appearance in the Amuq follows its appearance in the Malatya-Elazığ region in relatively quick succession.

A similar pattern can be observed in the southern Levant. The appearance of Kura-Araxes, or Khirbet Kerak Wares, as it is locally known, has long been identified as a chronological marker for

[45] Batiuk 2005; Greenberg *et al.* 2014; Iserlis *et al.* 2010.
[46] Çaliskan 2012; Frangipane and Palumbi 2007.
[47] Gorny *et al.* 1999, p. 156; Gorny *et al.* 2002, p. 117.
[48] Frangipane and Palumbi 2007.
[49] Braidwood and Braidwood 1960.
[50] Braidwood and Braidwood 1960, p. 519.
[51] Frangipane and Palumbi 2007; Palumbi 2012.
[52] Yener *et al.* 1996.
[53] Mazzoni 2000, pp. 102–3.

the Levantine Early Bronze Age III (**Table 4**). The dating of the beginnings of the EB III based on radiocarbon dating now appears to be 2900–2850 BC, based on the renewed and intensive excavations at Tel Bet Yerah[54]. The Khirbet Kerak Ware is probably contemporary with or immediately post-dates the beginning of its floruit in the northern Levant (Amuq Phase H) or immediately post-dates it.

The dating of the Kura-Araxes in Iran remains unclear, because there are few radiocarbon dates and what is in the modern political borders of the state of Iran encompasses three distinct subregions within the Kura-Araxes: one west of Lake Urmia into the area of Lake Van, the other along the Araxes River north of Lake Urmia, and the third east and south of Lake Urmia. Köhne Shahar, although in modern Iran, was clearly within the Lower Province of the Kura-Araxes homeland.

Some KA1 ceramics are found in small numbers in the preceding Chalcolithic settlements at Kültepe (in the Jolfa Plain), and at Köhné Pasgah Tepesi[55] as early as 3400 BC. These sites along the Araxes River north of Lake Urmia are really part of the homeland zone, or at least represent an 'expansion' of the homeland. New data from Nadir Tepesi[56] dates its beginning to approximately 3100 BC, toward the end of KA1 and into KA2. In the Velikent area of Dagestan, a Kura-Araaxes-related zone (see Section IVD), the earliest dates follow 3300 BC.[57]

The KA2 phase saw a dramatic increase of settlements around Lake Urmia, many of which were on sterile soil, making linkages to the Chalcolithic difficult. Sites such as Yanik and Haftavan[58] Tepe east of Lake Urmia are dated at the earliest 3100 BC but mostly to the KA2 based on relative dating, but their absolute dates are unknown. Radiocarbon data from excavations undertaken by a new generation of Iranian scholars, however, has finally begun to clarify this picture. Their absolute dates fit with much of the relative dating of the two sites.[59] The recalibrated data from a third site in the central Western Zagros to the south, Godin Tepe IV, would suggest that the Kura-Araxes package arrived in the Hamadan area after 2900 BC. Many of the Godin IV shapes are similar to those of the Lower Province of the homeland, especially double carinated, small s-shaped pots (**Fig. 2**)[60]. Dyson found Kura-Araxes wares at Hasanlu in the Solduz valley south of Lake Urmia[61], but a recent survey in this area produced almost no other sites with Kura-Araxes wares.[62]

The chronology of the 'end' of the Kura-Araxes

The end of the KA2 was another important matter of discussion at the workshop. In the South Caucasus Kura-Araxes communities underwent a crisis and many of the settlements were subsumed

[54] Regev *et al.* 2012.
[55] Maziar 2015.
[56] Alizadeh *et al.* 2018b.
[57] Kohl and Magomedov 2014.
[58] Edwards 1983.
[59] Summers 2014.
[60] Rothman 2011a.
[61] Danti *et al.* 2004.
[62] Abedi *et al* 2019.

into a mobile Early Kurgan Culture beginning about 2600 BC[63]. A black burnished pottery similar to the Kura-Araxes continued for several centuries, characterized by more diminutive forms. Some centers such as Shengavit, which was itself founded in the KA2 after a number of sites in the Ararat Valley were abandoned, lasted until about 2450 BC. This dating for the end of the Kura-Araxes in the South Caucasus is supported by the new radiocarbon model, which estimates an end for the KA 2 between 2553 and 2425 BC, although these dates should again be treated with caution due to the few radiocarbon samples from the end if this period. The nature of the abandonment of KA2 sites is most frequently peaceful. Some tombs had a few Early Kurgan Period shapes alongside classical Kura-Araxes ones. One of few settlements where the end of the Kura-Araxes may have been a violent one was Nadir Tepesi, where, following the destruction at the site, its potting traditions were quickly replaced by a new one.[64] Given the small area excavated at Nadir Tepe and frequency of fires in these settlements, this fire may not necessarily be a sign of widespread destruction during an attack.

A similar pattern emerged in the diaspora. A large majority of new settlements in the diaspora regions were built on sterile soil or uninhabited tells. Some are abandoned for a few hundred years, others are not reoccupied until the Iron Age some 1500 years later. At some sites, the Kura-Araxes tradition was replaced by a new cultural tradition. In yet others, like Godin Tepe, the black burnished techniques continued as 10% of the pottery in the post-Kura-Araxes level III:6,[65] although the designs and most of the shapes of the Yanik Ware variant style were no longer in use. They were replaced by a local highland tradition associated with the Awan confederacy.[66] As at Yanik, architecture at Godin III changed to agglomerated square rooms connected to form buildings and neighbourhoods. The post-Kura-Araxes occupations of the Amuq of EB IV B follow a similar pattern.[67]

When it comes to the rarer, multi-period sites that reveal the Kura-Araxes culture living alongside indigenous inhabitants, the story may be more complex. In some cases, the discrete 'neighborhoods' are peacefully abandoned, while life in rest of the settlements continues. This is best exemplified in the southern Levant observed at Tel Bet Yerah, where the Khirbet Kerak Ware neighborhoods were abandoned approximately at the same time as the smaller Khirbet Kerak Ware settlements in the rest of region.[68] New data suggests that this event occurred about 2600 BC.[69]

These dates represent a "macro-view" and "current condition" of our knowledge of the chronology of the Kura-Araxes but they fit well with the patterns in the archaeological record. As more dates become available, greater accuracy will be achievable, especially at regional scales. Having established, we felt, a clear periodization of KA1 and KA2, the next steps were to look at the cultural, economic, and organizational elements of the Kura Araxes, and its various subregion variations. These are factors that we needed to account for as they manifested themselves in a number of places within the homeland zone and the diaspora.

[63] Smith 2005.
[64] Alizadeh *et al.* 2018a.
[65] Rothman 2011a.
[66] Potts 1999.
[67] Akar and Kara 2018; Braidwood and Braidwood 1960; Welton 2014.
[68] Greeneberg *et al.* 2016.
[69] Regev *et al.* 2012.

III. Elements of the cultural core

As mentioned above, common to the Kura-Araxes cultural package common throughout its entire geographical range are architecture, pottery style, ritual/ symbolism, subsistence practices, and manufacturing. These are critical as they were used to define the identity of Kura-Araxes populations and their ontologies. I what follows, we separate the style component from the manufacturing, although the manufacturing techniques represent not only economic and technological elements, but also the common traditions (*habitus*) that unite various Kura-Araxes populations as communities of practice.

Pottery style

When researchers refer to the Kura-Araxes, one of the first attributes they cite is its hand-made black-burnished pottery. Ceramics are the bread and butter of the archaeologist, serving as the foundations of chronological schemes, defining characteristics of culture groups, and modes of production to name a few. Sagona[70] asserts that pottery is the most critical diagnostic of the Kura-Araxes cultural tradition. Style, to him, was so important that he proposed that the use of handmade, black-burnished pottery in the homeland after 2500 BC would mean the continuation of Kura-Araxes tradition for several hundred years after many of the other archaeological signatures disappear.[71] We would argue that the Kura-Araxes is more than a simple pottery tradition; it is a tradition representing the organizations and adaptations of societies to basic economic processes.[72] The populations who had originally shared the Kura-Araxes cultural tradition may have remained, but in the Middle Bronze Age, their entire way of life had changed. They broadly abandoned the patterns of a more sedentary life that were at the heart of the Kura-Araxes for a mobile and militaristic life[73] with leaders akin to chieftains, warlords, or something similar. Theirs were the spectacular kurgans, atypical of most Kura-Araxes mortuary customs.

What therefore is so critical about pottery? What does Sagona mean about pottery defining the Kura-Araxes cultural tradition? He means specifically pottery style. Style here means those characteristics beyond function and beyond the technical details that potters add to reflect the traditions they have learned or new "words" they have created that became popular with their consumers. The tradition is also represented by the means of production, but that has been so conservative in the homeland and the entirety of the diaspora that we cannot measure important variations within it (see Section IIIF).

Why is style so critical? In the era of culture history that defined archaeology before the rise of the New Archaeology of the 1970s, pottery style was a complete overlap to culture. If pottery, deemed particular to one culture at one time, appeared somewhere else, it had to be that groups from the original source of that pottery style conquered, migrated to, or diffused their culture as a

[70] Sagona 2014a.
[71] Sagona 2000.
[72] Steward 1955.
[73] Smith 2005.

whole to another place. Kramer[74] in reaction to this theory wrote the now famous phrase, "pots are not people." While almost everyone would second that opinion, the meaning of pottery style is not completely unrelated to culture. For example, during the so-called Uruk expansion, very typical Uruk pottery types appeared in many places that were not part of the Uruk homeland. Often, chemical characterization or petrography of these "Uruk" pots proved that they were locally made,[75] and the local tradition continued as the dominant style in those places. One can theorize that this borrowing represented intentional copying because of the meaning of those exotic styles in local cultural contexts. Winter demonstrated how the Iron Age people at Hasanlu in Iran copied or were receptive to the style of Neo-Assyrian war horse breastplates, because of the well-known fierceness of Neo-Assyrian cavalry in battle.[76]

Similarly, seeming homogeneity can hide differences. Despite the distance traversed by Kura-Araxes communities, archaeologists have documented the sharing of potting traditions and emerging innovations and hybridizations between the subregions of the diaspora and the homeland. For example, the innovations of biconical pot stands and conical lids in the Amuq are transmitted to the southern Levant. This could be a direct result of mobility among different groups at the time.

However, there is a lack of transmissions of these same innovations north to the Middle Euphrates or back to the South Caucasus homeland. Nor are the innovations and/ or hybridizations of the southern Levant transmitted back to the Amuq, such as their large plates. The chronological data clearly reveals an incremental, but unidirectional movement from north to south of the Kura-Araxes cultural traditions, which is also reflected in the patterns of innovation in the ceramic repertoire. The unidirectional nature of innovations would suggest that when the new community was established, its ties to the previous ones were weak, as the local innovations are not communicated backwards. The variations that emerge from the chance development of certain ceramic forms (or even elements of forms), and the resultant hybridization may have been foundations for the new diaspora community (for example, Karaz, Kura-Araxes Red Black Burnished Ware and Khirbet Kerak Ware). These differences may have represented the ethnic boundary between Kura-Araxes and local populations and other Kura-Araxes communities. Their habitus in pottery-making defined for them symbols of ethnicity, much as ethnographically attested cultures do today.[77] This technical differentiation is reflected in a wide variety of subsistence activities (see below).

Styles do change, often in a non-random way. Certainly, this is the case with the Kura-Araxes cultural tradition. One way of looking at this change is to see style as analogous to the dialect of a spoken language.[78] Language as powerfully as any cultural element defines identity. It also defines the way people of a particular place and time interpret the world around them. Linguists usually trace the dialectical differences to the interaction spheres people engage in. The more they interact, the more likely that they share a common dialect, at least at home; in public realms, people may switch to a regional or national dialect. One can see this dialect shift when one compares the

[74] Kramer 1977, 1997.
[75] Blackman 2011; Helwing 1999.
[76] Winter 1980.
[77] Rothman 2017, 2015.
[78] Rothman 2014.

homeland pottery styles of the Kura-Araxes and the Khirbet Kerak Wares (KKW) of the diaspora (**Fig. 2**). One can see the common linguistic threads that link the two pottery style traditions together, yet the Khirbet Kerak Wares represent a quite different dialect than the homeland styles. The ware follows much of the KA1 style book, but it adds the burnishing and in some cases the alternative outside/inside color contrast. This at times has led to much confusion, since the Red Black Burnished Ware tradition of the northern Levant is conflated with the Red Black Burnished Ware (RBBW) tradition of Arslantepe VIA. Frangipane and Palumbi[79] see the Arslantepe ware as part of the language of the Central Anatolian plateau, whereas the Levantine RBBW is a dialect of the Kura-Araxes language (see above).

The style corpus can have other meanings. We would argue that moving from a very homogeneous, small corpus of styles across the whole area in the KA1 to much more heterogeneous "dialects" within the South Caucasus and across the diaspora, speaks to different organizational spheres in different localities. These localities tend to map onto the various subregions discussed below in Section IV. Also, the decoration inscribed or built onto the pottery of the KA2 is rich in meanings. These meanings may be ideological. A design of intersecting angled lines (**Fig. 4c**) looks like it is merely abstract. However, it was painted on the wall of the feasting center at Godin Tepe,[80] appears on plaques at Yanik Tepe, and is associated with ritual emplacements at Shengavit.[81] Other designs may indicate group membership. For example, when Rothman mapped the designs onto buildings in Godin Tepe stratum IV:2, they were not shared among all buildings.[82] In IV:1b the pattern changed from different patterns in various buildings to a more homogenized distribution. This Rothman interprets as a tendency toward centralization of leadership also represented in the feasting center, Building 3. Similar mapping needs to be done at other sites.

This overall pattern of pottery style represents potentially rich sources of information on Kura-Araxes societies and its cultural tradition. There is much written about this issue.[83] **Figure 2** gives an overall impression of some local and regional variants in the stylistic forms organized by functional type.

Architecture

The architectural forms of Kura-Araxes buildings, along with settlement layouts, are a second part of its cultural package. While some key characteristics of Kura-Araxes architectural traditions were identified decades ago, primarily in the South Caucasus, recent excavations and more detail-oriented comparative studies of architecture and households in the South Caucasus and the diaspora shed new light on the matter.[84] These studies have highlighted the diversity of house plans and construction techniques. They enable us to identify some trends and recurring patterns in the homeland, some of which extend to the Kura-Araxes diaspora, but others contrast with diaspora practices. These buildings help define the cultural distinctiveness of Kura-Araxes sites in the homeland, and to lesser extent in the diaspora. In addition (see below), they enable us to discuss

[79] Frangipane and Palumbi 2007.
[80] Rothman 2011a.
[81] Simonyan and Rothman 2015.
[82] Rothman 2011a.
[83] Kushnareva 1997; Palumbi 2008; Sagona 1984.
[84] Palumbi 2008; Palumbi 2016; Palumbi *et al.* 2017; Sagona 1984.

social and cultural implications of the built environment and use of space in Kura-Araxes settlements (**Fig. 3**).

Kura-Araxes houses vary widely in a number of elements. One of those elements is the material used for construction. In sites at higher elevations like Gegharot (**Fig. 3B**),[85] Sos Höyük,[86] and

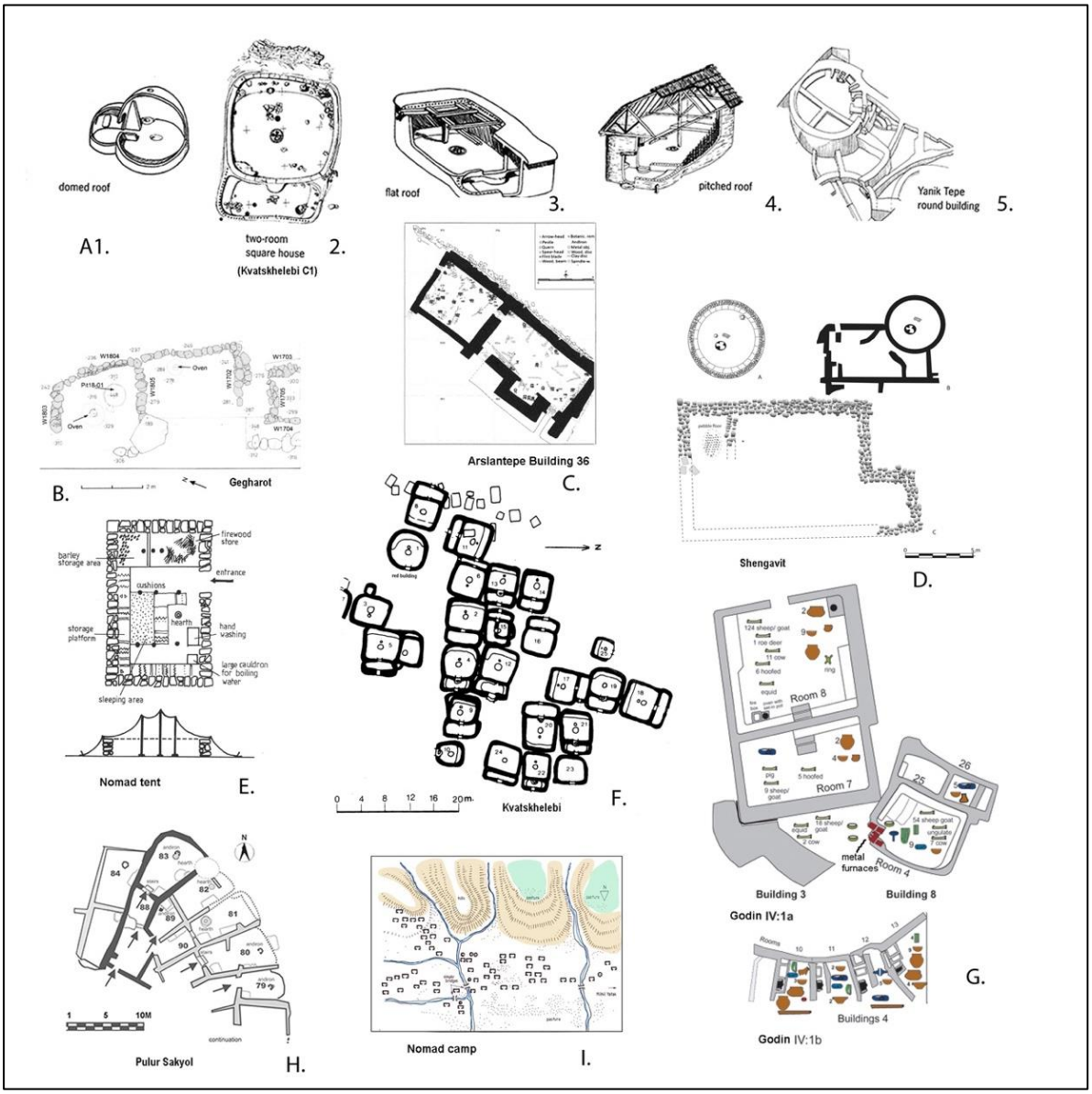


Fig. 3. Kura-Araxes Architecture, A1) Kvatskhelebi house, dome roof, A2-3) Kvatskhelebi house, flat roof, A4). Kvatskhelebi house, pitched roof, A5). Yanik Tepe round house;[1] B) Gegharot;[1] C) Arslantepe Building 36;[1] D) Shengavit;[1] E) nomad tent;[1] F) Kavtskhelebi village layout after;[1] G) Godin;[1] H) Pulur Sakyol;[1] I) nomad camp.[1]

Chobareti,[87] stone is the most common material. It is readily available and provides potential

[85] Badalyan *et al.* 2008.
[86] Sagona and Sagona 2000.
[87] Sagona 2018.

warmth and protection from strong, highland winds. The stone walls were plastered. The most common construction materials in the homeland were mud bricks on a stone foundation.[88] There are cases where mud bricks alone are the construction material.[89] The bricks varied in dimension from site to site and even for re-buildings on the same wall over time.[90] Another common construction material was wattle and daub. In this construction upright posts are connected by a thatch of smaller twigs, all covered by clay (daub). At Kvatschelebi (**Fig. 3A**), the front entryway room was constructed with wattle and daub, while mud bricks were used for the main room. Builders used timber mostly for poles to hold up the roof. In modern nomadic tents, a system of a rectangular or circular stone base with timber uprights over which the cloth of the tent is slung are common (**Fig. 3E**). Cribb[91] saw this as the sign that the Kura-Araxes populations were pastoral nomads (see below). We see instead commonalities in the degree and kind of organisation rather than necessarily a nomadic one. At Norşuntepe near the beginning of the Kura-Araxes migration, square mud foundations served as the basis for wattle and daub houses.[92] Similar construction archaeologists recovered at Arslantepe VIB1.

Roof construction was also quite variable. In circular buildings, such as those at Yanik Tepe (**Fig. 3A5**), there is evidence of a domed roof made in part with a material that looks similar to wattle and daub.[93] That same material was used in different combinations for other roofs from a flat to arched ones (**Fig. 3**). Common throughout the Kura-Araxes range were plastered floors. These floors tended to be redone periodically. Sometimes, the old floor was burned to harden it, and then to form a base for a new floor.[94] At Shengavit, a large working floor (at least 10x10 meters) with pits had a mat of plant material between each resurfacing. The excavators believe it was an outside surface on which the final building at the site was laid out.

The shapes of the buildings also varied widely (**Fig. 3**). Houses were rectilinear, circular, or square with at least one convex wall. The variations reflect different environmental factors, regional traditions, and to some degree also chronological trends.[95] In general, smaller circular buildings were found earlier, many in the KA1 phase, at sites like Norabats and Mokhrablur in the Ararat Valley,[96] Khizanaat Gora level C2 and D in Shida Kartli,[97] and Maxta[98] and Kültepe II in Naxçivan.[99] The development of more substantial round buildings with square anterooms followed these smaller circular buildings.[100] Functionally, the anterooms may be the equivalent to the anterooms of the Shida Kartli houses like Kvatschelebi, although at Shengavit, at least one had a ceramic hearth that was covered with thick, white plaster, as if it were desacralized after the adjoining building went out

[88] Palumbi 2016.
[89] Simonyan and Rothman *forthcoming*.
[90] Palumbi 2008.
[91] Simonyan and Rothman 2015.
[92] Hauptmann 1979.
[93] Summers 2013.
[94] Dzhavakhishvili 1973; Kikvidze1972.
[95] Sagona 2018, p..230.
[96] Areshian 2005.
[97] Kikvidze 1972.
[98] Kikvidze *et al.* 2015.
[99] Bakhşaliyev 1997; Bakhşaliyev *et al.* 2009; Ristvet *et al.* 2011; Sagona 2018.
[100] Palumbi 2016; Simonyan and Rothman 2015.

of use.[101] Square buildings were at times contemporaneous with these circular forms, but they seem more common as the KA1 transitioned into the KA2. At the very end of the Kura-Araxes KA2 phase, at least at Shengavit, a larger rectangular building (7x14 m) with a pebbled floor, a small anteroom, and interior dividers replaced the earlier shapes (**Fig. 3D**).

Most Kura-Araxes houses were freestanding. This was not universally true, however, either in the homeland or in the diaspora. As the Kura-Araxes people made more use of the uplands than Late Chalcolithic societies did,[102] terraced houses were necessary, like the ones at Chobareti.[103] In the diaspora, residents constructed more buildings with shared walls (agglomerated) were constructed at sites such as at Karagündüz,[104] Pulur Sakyol (**Fig. 3H**),[105] Norşuntepe,[106] and Yanik Tepe.[107] Parenthetically, Rothman[108] proposes that the square buildings at Yanik Tepe, and the "palace" at Norşuntepe postdate the Kura-Araxes, being equal in time to Godin III:6 at about 2600 BC. Then a typical mountain architectural style, different from the Mesopotamian one, took hold in these highland zones. Aside from the change to a mountain architectural style, some hybrid forms also existed. Godin IV:1b had a series of—perhaps most aptly called—apartments with shared common walls in a semi-circular design.[109] More reminiscent of Arslantepe,[110] each apartment had a griddle for cooking than the hearths of the Kura-Araxes homeland. They all had storage bins on the same wall as the hearths. The two room buildings of Kura-Araxes Pulur Sakyol with shared walls were also constructed in a circular design.[111]

On the other hand, non-domestic buildings with a communal function, either civic or ritual, are notably few in Kura-Araxes sites. Some structures, such as the circular House 1 of phase C1 at Kvatskhelebi, the oval room at Gudaberka,[112] and some units at Pulur Sakyol and Shengavit have been interpreted as being for ritual.[113] At Pulur Sakyol and, as Rothman would argue, at Shengavit[114] they were household shrines.[115]. Simonyan[116] sees them as fire temples. Perhaps better identified with special function are Building 3 in Godin IV:1a and b (**Fig. 3G**),[117] and the tower area of Mokhrablur.[118] All indicate public feasting as one of their likely functions. The primary evidence of this is the very high number of animal bones and the paucity of normal household goods other than those for cooking and serving. At Godin Tepe, there was a front room with a raised platform in the

[101] Simonyan and Rothman 2015.
[102] Kushnareva 1997.
[103] Sagona 2014a.
[104] Kozbe 2004.
[105] Koşay 1976.
[106] Hauptmann 1982.
[107] Summers 2013.
[108] Rothman 2011a.
[109] Rothman 2011a.
[110] Palumbi *et al.* 2017.
[111] Koşay 1976.
[112] Sagona 2018.
[113] Sagona 2018; Simonyan and Rothman 2015.
[114] Simonyan and Rothman 2015.
[115]Palumbi 2016; Smith 2015.
[116] Simonyan 2015.
[117] Rothman 2011a.
[118] Areshian 2007.

center (a hearth?), benches around three sides, and bins with evidence of burned material. The secondary room's contents suggest that it may have been a kitchen for the feasting or ritual room. The semi-subterranean "ritual" room was entered by walking down three steps, as were the family shrines at Pulur Sakyol and Shengavit. At Mokhrablur the tower was topped by a solid rock stela. This would have been visible in the countryside around it. The wall of what could be a ritual room adjoined the tower. Building 36 of Arslantepe VIB1[119] may be another of the special function buildings, although it contains many household items like spindle whorls and lithic materials. Overall, these public buildings served as a focus of communal interaction, perhaps extending into satellite sites. They suggest, though hardly prove, that there was some coordination through shared public activity.[120]

Generally, most Kura Araxes households were small, autonomous productive units sustaining a subsistence-oriented, domestic economy.[121] Consistently, the contents of the houses reflected a series of domestic tools and activities, including food processing, cooking, serving, agricultural tools, cloth, pottery, and leather or other craft-making tools.[122]

> Still, as Sagona[123] argues, at the heart of the Kura-Araxes cultural tradition
>
> "is the notion of house and compound. Given the geographical extent of the developed Kura-Araxes complex, it is not surprising that houses reflect regionalism in terms of basic plan [...]. This diversity, already apparent in the formative stages, surely reflects different groupings and traditions, and the specific ways of life appropriate to environmental settings. Villages of free-standing houses are more common than the complex mud brick agglomerations typical of the Near East. [...] Whereas houses would have looked different on the outside, their internal arrangement of features conveyed a clear code of practice, perhaps reflecting a shared ideology. Uniformity prevailed for the most part, with fixed points of human existence clearly delineated. The layout of the house with a circular hearth and a bench along the back wall was fundamental to the psyche of Kura-Araxes communities [...] Thus, the 'blueprint' of a Kura Araxes house is a clear expression both of social unity and a conservative building code."[124]

Sagona here is reflecting the idea that "whether a culture is settled or nomadic, the form of its family and the presence or absence of status distinctions are related to its house type, and that house type can in turn be inferred from the floor plan."[125] Studies of modern house layout in this region affirms this relationship.[126]

The question of what buildings tell us about the societal organization of the Kura-Araxes communities is a critical one that is not often discussed. Contemporary differences in household size and fittings theoretically reflect differences in access to goods and raw materials and thereby

[119] Palumbi *et al.* 2017.
[120] Rothman 2015b.
[121] Smith 2015.
[122] Kozbe 2004; Palumbi 2016; Sagona 2018; Simonyan and Rothman *forthcoming*.
[123] Sagona 2014a, p. 43.
[124] Sagona 2014a, p. 43.
[125] Whiting and Ayres 1968, p. 117.
[126] Abdel-Aziz and Osman 2017.

differential social status in a settlement.[127] From what we know—one has to remember how few broad horizontal excavations have been published— there is little evidence of such differences. Even at Shengavit, where architecture changes from small round buildings to round or square buildings with ante-rooms, to large rectangle buildings, there is no indication of contemporaneous differences in size or structure.[128] The parallel evidence of graves also suggests that status differences were few (see Section IIIC).

Neither the materials used, nor the labour required in constructing these buildings suggest the ability to compel work or obtain exotic goods as markers of status differences. At the higher elevations where stone was used for whole walls, that stone was readily available. At the lower elevations like the Ararat area, increasing use of mudbrick suggests that builders there, too, were using materials that were readily and locally available. From paleoclimate studies we know that forests were expanding during the KA1 into the KA2.[129] Logs were not hard to find near sites. Stone foundations for mudbrick walls were made of unshaped field stones with larger ones placed at the outside of the foundation and filled in with small stones. Mud bricks were laid directly on the stones or they used a mat over the stones to level the wall. Overall, the labour needed to build and maintain these houses was not more than a small family with help from a few kinsmen or neighbors could provide. The building of houses adds to a picture of small, not specialized work units and simple technical knowledge.

The traffic pattern of the houses is generally one where the door is opposite the bench on the back wall. The hearth would be in the middle of the room near the roof support (**Fig. 3A2**). We do not have enough detailed examples of the distribution of artifacts within buildings to say, but from what little we do have, we can suggest that domestic activities such as cooking and food preparation, some domestic crafts like weaving, wood and bone working, and possibly other tasks requiring hammering were in one quadrant; and sleeping was in another. Other productive activities such as metal working, flint knapping, and leather making would be conducted outside the house.[130] One might assume that the benches were for sitting, but if the similarity of houses to modern nomad tents suggests that the benches might have been for storage. Pictures from Kvatskhelebi show a variety of pots with grain and other substances were kept on such platforms (**Fig. 3A2**).[131] The clean plastered floor, however, could also provide clean space for storage and other activities.

We have very few Kura-Araxes sites with broad, horizontal exposures. Kvatskhelebi is one. Its settlement plan looks like a series of small, separate houses, most facing the same way and tightly packed (**Fig. 3F**). Shengavit maps show broad architectural plans, but unfortunately Sardarian was very careless in recording elevations, so it is hard to trust whether the houses in his plans were really contemporaneous.[132] Again, save for the Round House 1 of Kvatskhelebi, there is no indication of status or functional differences among the houses, as it looks like the nomad camp drawn by Cribb (**Fig. 3E**). There is an inherent contradiction in the use of wattle and daub for structures with the

[127] Rothman 2004.
[128] Simonyan and Rothman 2015, *forthcoming.*
[129] Connor and Kvavadze 2014.
[130] Palumbi 2016.
[131] Djavakhishvili and Glonti 1962.
[132] Sardarian 1967.

Kura-Araxes. Cribb[133] proposes that the wattle and daub house is a sign of pastoral nomads because of its easy construction and supposedly movable objects like andirons. Palumbi[134] takes the same approach, and along with the increasing percentage of sheep/goat in Arslantepe VIB1 sees this as proof of a dominant pastoral production system (although see Section IIID). We find this to be too broad an assumption. While the walls may seem temporary in nature, the consistently repeated internal features, plastered floors, built-in mudbrick benches, and bins, suggest permanence. Additionally, these features usually do not show evidence of exposures to the elements, suggesting that the proposed semi-permanent walls were in fact permanent. Clearly, there is a symbolic element to the use of wattle and daub. In the southern Levant in EB III when Kura-Araxes immigrants arrived, they moved into the center of Tel Bet Yerah. The excavators found remains of wattle and daub in areas where their immigrant Khirbet Kerak Ware pottery was concentrated, but many Kura-Araxes migrants seem to have occupied abandoned houses.[135] In sum, the architectural shapes, sizes, and layouts suggest a very typical and conservative building tradition. They further suggest a small-scale and self-sufficient social unit as the basis of Kura-Araxes society.

Still, the rise of some differentiation in influence or ability to recruit and coordinate workers toward the end of the KA2 is possible to hypothesize.[136] That could happen without symbols of rank, or simply be a consensual system of elders or other kinsfolk with influence.[137]

Ritual and symbolism

The Kura-Araxes traditions defined their view of the world and a sense of belonging to a common identity and ideal. In this section we explore how its symbolism and the ritual performance reflected the population's ideological view of the secular and sacred realms. Ritual is making beliefs and values concrete through their performance of ideologically based ideas in a public sphere using a consistent show of symbols, words, and gestures. It is a re-enactment of myths that involves the use and display of symbols in a holy place. Eliade[138] called that holy place an "irruption" of the sacred into the secular world. The nature of that holy place reflects the nature of relationships and statuses within a given society. For example, in modern states with Great Tradition religions, the authority of the leader (priest, minister, rabbi, mullah, monk) is illustrated by the way the congregation all face the front to where the liturgical leader sits or stands, and the sacred symbols are most prominently displayed. In more egalitarian or kinship-based societies the holy place is usually oriented toward the center of the sacred space, and presumably everyone is in an equal position. That is the case, for example, with the kiva of Pueblo societies in the United States Southwest,[139] a possible analogy for the Kura-Araxes. Similarly, the sacred spaces of the Kura-Araxes have the same orientation toward the center from benches that rest along the outside walls of the room with sacred symbols. This is the case at the public feasting center at Kura-Araxes Godin IV:1,

[133] Cribb 1991.
[134] Palumbi 2017.
[135] Paz 2009.
[136]Rothman 2015b; Samei and Alizadeh 2020.
[137] Rothman 2021.
[138] Eliade 1987.
[139] Mills 2000.

Fig. 4. Ritual elements of the Kura-Araxes. A) ceramic hearth at Norşuntepe;[1] B) Shengavit hearths;[1] C) bowl from Shengavit;[1] d) Shengavit andiron;[1] E) andirons and serving vessels in Shrine at Pulur Sakyol;[1] G) obsidian blades, bull and sheep figurines, phallus, and red deer horn from Erzurum and Shengavit;[1] H) Kvatskhelebi round, red house;[1] I) M5 shrine at Shengavit;[1] J) feasting center at Godin IV:1;[1] K) ritual emplacement in houses at Pulur Sakyol.[1]

the red house of Kvatskhelebi C1, the Building 36 at Arslantepe, and possibly at Shengavit (**Fig. 3**), all from the KA2 phase.

The sacred places of the Kura-Araxes ritual were not focused on temples, defined as meeting places for a congregation. Rather, it was focused on the household, with a couple possible exceptions (see below).[140] Sagona and Sagona suggest that our division of the Kura-Araxes into secular and sacred spaces may not reflect their native point of view.[141] They emphasize rather the physical symbols of ritual. In particular, the hearth was the core sacred symbol (**Fig. 4**). In the KA2 phase Kura-Araxes tradition at Norşuntepe, at Kvatskhelebi C1, and in the early roundhouse phase at Shengavit the three-lobed hearth (*ojagh/ocak*) sat near the center. While the shape of the three-lobed hearth is not universal throughout the entire distribution of the Kura-Araxes, it was common in the homeland zone and into the Taurus diaspora. In the KA1 phase at sites like Sos Höyük the ceramic hearth had a small hole in an otherwise closed top. Like the three-lobed ones, the Sos example also had carved designs. In other parts of the diaspora, the ceramic hearth did not exist. The andiron, which existed alongside the hearth at homeland sites like Shengavit, replaced it in the far diaspora like the Southern Levant and the central Western Zagros. Andirons were made in the shape of animals, or had faces, or just bumps to suggest faces.[142]

The symbols associated with the hearth, andiron, and other objects in ritual contexts indicate possible elements of meaning. The shape is formulaic, where the top lobe is rounded, and the bottom two lobes heart-shaped with an additional indentation in the center of the lobes (**Figs. 4A** and **4B**). The shape of the three-lobed hearth bears a striking resemblance to the grape vine leaf. Given the long history of wine production in the Caucasus[143] and the emerging evidence of wine production during the Kura-Araxes,[144] in addition to the role intoxicants have traditionally played in ritual in many cultures, this possible interpretation adds further significance to the ritual nature of the hearth.

In the M5 shrine at Shengavit, a deep bowl with incised designs sat in one of the depressions of the lobes.[145] A unique bowl from Shengavit (**Fig. 4C**) has a painting of a three-lobed object with figures, perhaps wild birds, wheeling around it on the inside. On the outside is an abstract design, which appeared in ritual spaces at Godin on a wall of Building 3, on an andiron from Yanik Tepe and on pottery designs often found in association with ritual spaces.[146]

The faces carved into hearths and andiron may indicate a spiritual presence. This suggestion is somewhat supported by tufa statues that appear to be male and clay figurines of females associated with ritual. Excavators recovered them in ritual smplacements, ordinary houses, and graves. The shape of the hearth bears a striking resemblance to the grape vine leaf. Given the long history of wine production in the Caucasus[147] and the emerging evidence of wine production in the Kura-Araxes,[148] in addition to the role intoxicants have traditionally played in ritual in many cultures, this possible interpretation adds further significance to the ritual nature of the hearth. Also associated

[140] Sagona 1998; Simonyan and Rothman 2015.
[141] Sagona and Sagona 2009.
[142] Smogorzewska 2004; Takaoğlu 2000.
[143] McGovern et al. 2017.
[144] Batiuk 2013.
[145] Simonyan and Rothman 2015.
[146] Simonyan and Rothman 2015.
[147] McGovern *et al.* 2017.
[148] Batiuk 2013.

with the hearth were a series of additional symbols, often buried around the hearth, such as zoomorphic figurines, phallic symbols, arrowheads, bone tools, and animal bone (particularly red deer antlers).[149] We can speculate that all of these relate to food gathering activities and to fertility or masculinity. The repeated use of similar items suggests to us a concern with fertility and productivity, but we cannot be sure what it meant to them. The rooms we have with ritual emplacements all are somewhat subterranean with steps down into them. Sagona and Sagona[150] suggest that metallurgy with its association with fire was another part of the symbolic language of Kura-Araxes people, although metals do not seem to be buried near the hearths, but they are interred with bodies in burials.

So, within these spaces and with this variety of symbols, what were the steps of the ritual process? Certainly, creating fire and smoke was among the first activities. Food and drink played a part. At Pulur Sakyol the hearth and decorated andiron were surrounded by a large jar with an incised face (of a deity?) and many small cups.[151] M5 at Shengavit, the Godin IV feasting center, and Building 36 at Arslantepe had many bones of butchered (and cooked) animals, mostly sheep, goat, and cattle.

At Shengavit and Pulur Sakyol, a small, raised platform behind the fire appears to have been used to burn (sacrifice?) something which had liquid that ran down carved gullies in the platform. Excavators at Aradetis Gora uncovered two unique zoomorphic rhyta, presumably used for libations, in a small domestic structure behind a central hearth. Palynological evidence points towards wine, or more probably a 'grog; mixture being used in the ritual.[152] Interestingly, however, the identification of pure wine in use in funerary rituals at Doghlauri cemetery and Nachivchavebi suggest a possible difference in the choice of beverage based on the ritual.[153] The liquid could also contain a hallocenogen,[154] suggesting that like many shamanistic practices, visions brought on by hallogenogens and interpreted by spiritually in--tune practioners would have been an important part of ritual practice. The choice of which plant remains they used in ritual appears constant. According to the Shengavit ethnobotanist, Roman Hovsepyan, "there was a lot of wheat and barley in the bins of the M5 shrine (**Fig 4i**), which is amazingly similar to the Pulur Sakyol ritual emplacements. There were no other crop remains of any quantity."[155] Clearly, the worshippers were burning, not so much cooking, these plant remains. At Kvatskhelebi and nearby Tsikhiagora built up layers of clay, crushed lime, and ashes were attached to the bench. They were painted red and burnished like the bench. They, too, contained grains, and various artifacts were also placed on the bench between and around them. In ethnographically documented modern societies, the slaughter of animals and the creation of fire were thought of a way to send wishes of the supplicants into the sacred realm of the mystic spirits or gods.

As far as the hearths are concerned, the average size of the firing hole—usually with a diameter of no more than 30 cm—and a general lack of black carbon staining from smoke, would suggest the use of charcoal as opposed to wood or dung fuel. Given its red-black nature (black on the outside,

[149] Simonyan and Rothman 2015; Sagona 1998.
[150] Sagona and Sagona 2009.
[151] Koşay 1976.
[152] Batiuk 2022; Kvavadze *et al.* 2019.
[153] Batiuk *2022*.
[154] Sagona and Sagona 2009.
[155] Hovsepyan ND.

but turning red when heated), the use of charcoal in the hearths for a sacred flame may have had a symbolic nature as well.[156]

Andirons lack carbon staining as well, suggesting that they sat over a coal-fired heat source. Ishoev and Greenberg[157] propose that the andiron was where the cooking pot was placed from the hearth for serving. We know, in addition, that these cultural and mental elements reflect societal and organizational ones as well. Ritual "was the mechanism that integrated the individuals of the community across household and kin ties, and it provided long-term stability."[158] The apparent domestic focus of the ritual suggests societies that did not have centrally organized political leadership. On the other hand, even though congregational ritual was not practiced, there is the possibility that shrines were places where many small groups met. For example, very similar looking shrines at Late Bronze Gegharot[159] were possibly divination centers used by many members of the community.

In the KA2 there are indications, in addition, that public ritual was conducted. The stone tower with an upright stone stele on its top at Mokhra Blur,[160] the rectangular stone platforms at Talin,[161] the platform structures at Temel Kizilkaya[162] and Köhne Shahar,[163] the proposed feasting center at Godin Tepe with its raised central hearth in the meeting room,[164] and Arslantepe VIB1 all

suggest that in the later phase of the Kura-Araxes some change may have occurred.[165] While Sagona[166] suggests that the ritual symbolism is only of animals and plants (nature), the appearance

in ritual contexts of human statues and faces in the KA2 implies that some figures represented more divine presences or perhaps persons with increased influence, but not likely those with authority.[167]

A second class of Kura-Araxes ritual is its mortuary practices (**Fig. 5**). The funerary traditions of the Kura-Araxes vary in their design and ritual even more than Kura-Araxes architectural traditions. Archaeologists have identified more than 154 archaeological sites with Kura-Araxes graves; comparatively few of which have been identified outside of the homeland zone[168]. The earliest burials, both individual and multiple burials, are generally found isolated from the settlements proper as is exemplified at Talin, Jrvezh/Avan, and Maisyan in Armenia; Treli and Kiketi in Georgia; and Ozman Bozu and Uzun Rama in Azerbaijan. These isolated burials have often been seen as indicative of mobile groups, particularly those involved in a cattle-breeding economy.[169] However, these examples are more the exception than the rule. Most cemeteries with several dozens

[156] Greenberg 2007.
[157] Ishoev and Greenberg 2019.
[158] Simonyan and Rothman 2015, p. 5.
[159] Smith and Leon 2014.
[160] Areshian 2005.
[161] Sagona 2018.
[162] Batiuk 2005.
[163] Alizadeh 2015.
[164] Rothman 2011a.
[165] Rothman 2015a.
[166] Sagona 1998.
[167] Simonyan and Rothman 2015.
[168] Altunkaynak *et al.* 2018.
[169] Lyonnet 2014.

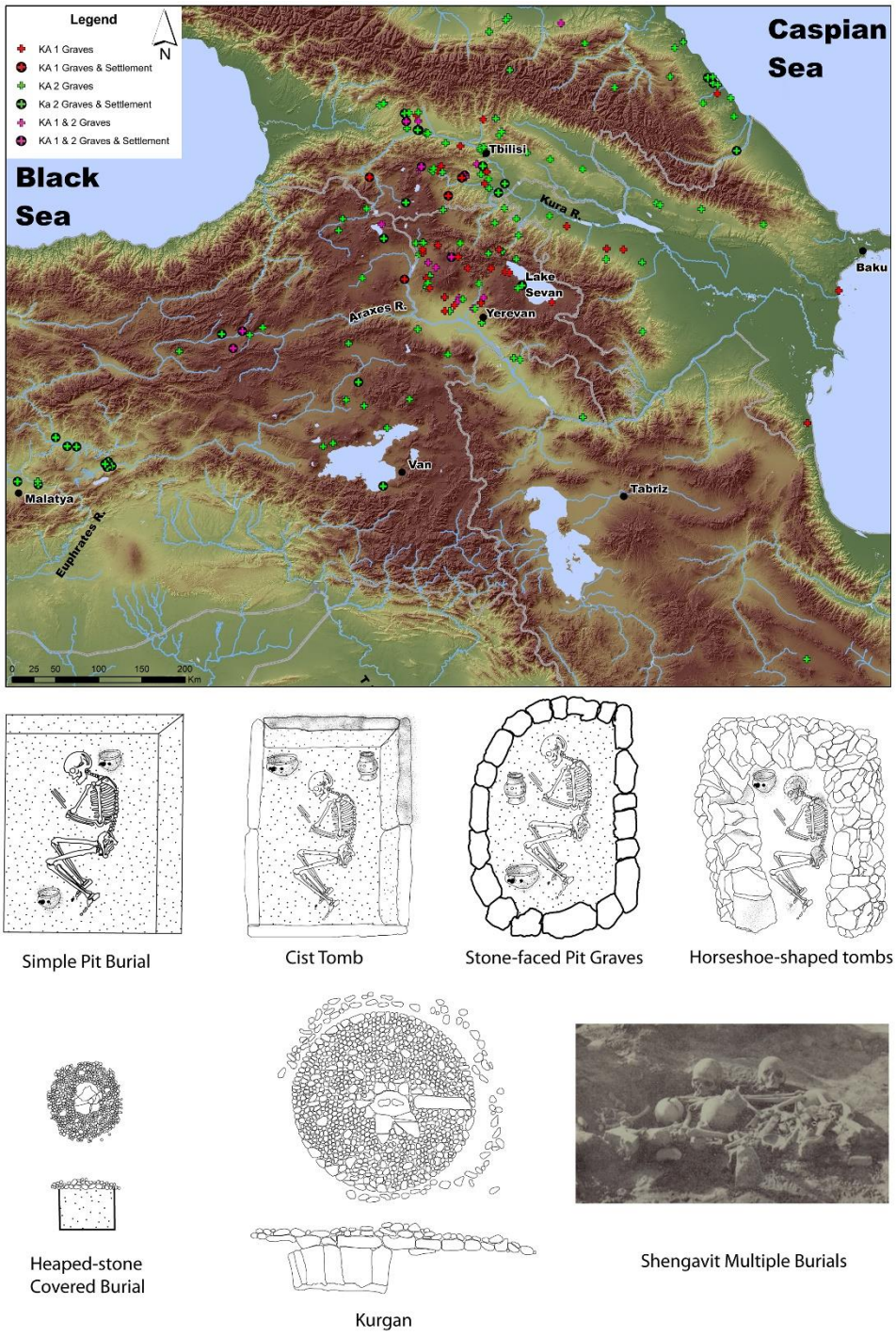


Fig. 5. Burials location and burial types in the Kura-Araxes: Shengavit multiple grave (after Sardarian 1967, Fig. 38.2); rectangular and horseshoe-shaped stone constructions (Nachivchavedi, Chobareti, Kiketi, Amiranis Gora, Horom, Gegharot, Keti, Karnut, Lanjik, Aragats, Dzori Berd, Samshvilde, Kiketi, Ozni et cetera); cist burials (Takhtidrizi, Kiketi, Treli, Koda, Elar, Berkaber, Teghut, Karchaghbyur); and kurgans lined with raw brick and with wooden floors, sometimes up to 35–40 m2 in diameter (Mentesh Tepe, Uzun Rama), or simple smaller stone heaped kurgans, sometimes covering a small shaft grave 5–15 m in diameter (Natsargora, Tqviavi, and Akçakale, Hasankent and Bozkent in Eastern Turkey).

of burials are concentrated more or less directly on the border of the settlements,[170] such as the necropolis outside the wall at Shengavit,[171] the cemetery of Köhne Shahar which is located approximately 350 m northwest of the walled settlement,[172] and at Karnut (Armenia) where several burials and the settlement are juxtaposed.[173]In other rare instances, people placed inhumations under the floors of domestic structures, such as at Chobareti, Amiranis Gora, and Ortsklebi in the Samtskhe-Javakheti plateau area of Georgia south of Shida and Kvemo Kartli.[174]

Kura-Araxes burial structures are quite diverse. Burial types include 1) "surface" burials—i.e. the body was placed on cleared surface, surrounded and covered by stone or simple pit graves (Aradetis Gora, Natsargora, Kvatskhela, Kalavan, Jrarat, Lchashen, Jrvezh / Avan,Talin, Tsaghkalanj); 2) rectangular and horseshoe-shaped stone constructions, (Nachivchavedi, Chobareti, Kiketi, Amiranis Gora, Horom, Gegharot, Keti, Karnut, Lanjik, Aragats, Dzori Berd, Samshvilde, Kiketi, Ozni, etc.); 3) cist burials (Takhtidrizi, Kiketi, Treli, Koda, Elar, Berkaber, Teghut, Karchaghbyur); and 4) kurgans lined with raw brick and with wooden floors, sometimes up to 35–40 m2 in diameter (Mentesh Tepe, Uzun Rama), or simple kurgans with heaps of smaller stones sometimes covering a small shaft grave 5–15 m in diameter (Natsargora, Tqviavi, Akçakale, Hasankent and Bozkent in Eastern Turkey).

Multiple burials, such as those at Elar, Berkaber, and Shengavit can be found using all of these techniques. For inhumations that were intended for repeated use (see below), a dromos was arranged with corridor-like aisles (for example, Jrvezh, Talin, Tsaghkalanj, Mentesh Tepe). Entrances were sometimes decorated with two stone pylons, and a threshold covered with a slab (e.g. Karnut, Gegharot, Horom, Keti, Samshvilde, Kiketi, Chobareti, Balichi-Dzedzwebi). As a rule, the bodies were laid on their backs or crouched on their sides with bent arms and legs. Evidence is also slowly accumulating for the practice of secondary exposure burials at Tsaghkalanj, Talin, Gegharot, and Aparani-Berd.[175]

In the Kura-Araxes tradition crypts containing collective burials that accumulated more bodies over time are also well attested. They range from three to several dozen (Karchakhbyur - about 25, Mentesh - 39, Berkaber - 50, Uzun Rama - about 80, Shengavit). In these crypts, burials were made sequentially for some period of time, and the remains of previous buried people were raked over before making the next burial. Crypts contain the remains of men, women and children, and most researchers believe they belonged to related individuals. Whether they were related awaits genetic testing. The soil crypts with wooden floors characteristic of the Kura Basin graves were burned at a stage of operation after the relocation of the community (e.g Mentesh Tepe, Uzun Rama). Collective burials are recorded in all types of burials in the Kura-Araxes tradition: simple holes, stone boxes (cist), unpaved chambers, and catacombs.

This varied picture does not directly correlate with the locally chronological structure of the Kura-Araxes; in each subregion at the same time (and, as noted, within the same monument) several types of structures and burial customs coexisted, and the same type of structure with its attendant

[170] Rova 2014.
[171] Simonyan and Rothman 2015.
[172] Alizadeh *et al.* 2015; Kleiss and Kroll 1979.
[173] Aghikyan 2020.
[174] Poulmarc'h *et al.* 2014.
[175] Badalyan and Avetisyan 2007.

ritual is found in both KA1 and KA2. This alone suggests a lack of central planning and organized cultic tradition regarding the treatment of the body.

Kura-Araxes burials lack any evidence of conspicuous wealth. The grave goods are rather modest and to some extent standardized. They include ceramic vessels (as a rule, one to three with a maximum of six per person), obsidian (less often flint) arrowheads, bone spindle whorls, paste and stone beads. Copper-bronze objects in the burials are mainly represented by decorations (beads, pendants, spiral bracelets, pins with volute-shaped topping, rings and tubules), and to a lesser extent, weapons (usually daggers). Although the number of bronze artifacts in funerary complexes varies considerably, the observed differences are quantitative rather than qualitative in nature. Separate finds of rare, obviously prestigious objects such as a bronze lamellar ornamented diadem from Burial 2 at Kvatskhelebi[176] are not found in extraordinary graves. The difference in status, if it existed, was not symbolically marked.

Kura-Araxes graves generally have an egalitarian character, reflecting the dominant horizontality rather than a hierarchy of social relations. Thus, it is probable that the burials of the Kura-Araxes culture expressed, first of all, the kinship ties of the deceased, due to their origin, marriage, or community ties. If so, the dearth of identified Kura-Araxes cemeteries in the diaspora is perplexing. As isolated pockets of the culture group surrounded by other social and ethnic communities, and given the effort otherwise expended to maintain their separate identity, one would expect that cemeteries expressing kinship ties would be all the more important as a way of maintaining that identity.

IV. Economics of production and exchange

To understand what the origin, the nature, and trajectories of change among the societies in the homeland were and potentially why people migrated, we need to understand the elements that structured them economically, socially, and politically; that is, what Anthony calls conditions for migration.[177] Pottery style alone is not sufficient.

What were the basic lifestyles of different Kura-Araxes groups within the homeland zone and in the diaspora? This defines the kinds of relationships which are at the heart of all societal structures. What resources were available for production, was that production domestic or workshop; that is, specialized production? Who were ultimately the consumers of the end products? Were they made for domestic subsistence or for short- or long-distance trade?

The answers to these economic questions of production, consumption, and trade are related to the societies' political relations and organization. To Sagona, "the remains of village communities of stockbreeders and farmers [...] in terms of social complexity may be best described as heterarchical. There is no evidence of rigid hierarchy or political centralization. Instead, we have communities whose decision- making processes were collective and based on horizontal kinship networks."[178] Certainly, the KA1 homeland zone societies were very small in scale, with a scatter of sites mostly of one hectare or less. This was the model for the westward migration. The buildings

[176] Shanshavili and Narimanishvili 2016; Engibaryan *et al.* 2013
[177] Anthony 1990.
[178] Sagona 2017, p. 213.

were separate and somewhat disorganised in their placement, like Halaf sites in Mesopotamia.[179] Their uniformity of size, distribution and apparently mostly domestic functions suggests what Frangipane calls horizontal egalitarianism.[180] On the other hand, the KA2 in the homeland zone saw the beginnings of a more complex society, according to Areshian.[181] In the Ararat Valley and its neighbouring areas, the population grew significantly in size, measured by the total occupied hectares.[182] Some sites like Dvin grew to 12 ha, and others like Shengavit to 6 ha or Mokhra Blur to 4 ha. Nearby are some smaller sites. Size differentials alone will not prove an increase in societal complexity. The question is what unique functions these sites had within their polities and what sorts of control they may have had outside their site boundaries. Shengavit seems to have been a small centre because of its intensification of agricultural products and large-scale storage, production of salt for distribution well beyond its local polity, possible recruitment of labour for building a significant stone settlement wall, possible role in mutual defence, and other centralised functions.[183] Yet, Rothman sees its leadership using such influence they had not through authority control mechanisms or hierarchy, or even control of larger groups within the society, but as vertical egalitarian societies.[184] Godin IV by its position on communication routes, its founding on a high moundd near the center of the Kangavar Valley, its role as a possible central feasting centre, and a metal and maybe wine production centre qualifies it, too, as a small vertical hierarchical centre.[185]

Plant and Animal Production over space and time.

The most fundamental of productive enterprises in every society involves food. Food choice is often seen as a sign of identity.[186] For the Kura-Araxes, its mode of food production, both animal husbandry and agriculture, was an adaptation of the particular highland environments where it originated before spreading to the lowlands.[187] "The highlands of Eastern Anatolia, Northwestern Iran and the South Caucasus may have provided more rainfall and a more stable base for agro-pastoral economies" in the period of the Kura-Araxes than today.[188] Climate studies paint a very varied picture of what plant communities and conditions were like in the second half of the fourth and first half of the third millennium BC.[189] The environmental zones within the South Caucasus also varied from montane steppe to semi-desert, and the Araxes River basin had stretches of riparian vegetation. In other words, there was no single uniform set of environmental conditions within the South Caucasus or in the diaspora. Certainly, in some areas there was an expansion of forests and increased wetness during the KA2.[190]

[179] Rothman 2021.
[180] Frangipane 2007.
[181] Rothman 2015b.
[182] Areshian 2007.
[183] Rothman 2015b.
[184] Rothman 2021.
[185] Rothman 2011; 2021.
[186] Barth 1969; Dietler 2007; Beaudry and Parno 2013, Hovsepyan *et al.* 2016.
[187] Hovsepyan 2015.
[188] Connor and Kvavadze 2014, p. 19.
[189] Connor and Kvavadze 2014.
[190] Connor and Kvavadze 2014, 2008; Sayadyan 2019; Connor 2011; Masi *et al.* 2015, and Joannin *et al.* 2014.

Animal husbandry. One of the most discussed Kura-Araxes subsistence practices has been animal management. Faunal data is only available for 25 Kura-Araxes sites, but the growing number of ongoing faunal analyses suggests that we will soon have access to a much larger pool of zooarchaeological studies. The existing reports, a few of which date to the Soviet period, range from more meticulous re-analyses of older, previously studied assemblages to first-time investigation of newer assemblages.[191]

There were serious differences in site formation processes and bone preservation conditions, excavation and recovery methods, and bone identification and analyses techniques. Still, the existing dataset points to key spatial and temporal patterns in animal management that demonstrate a tradition of largely household-based subsistence animal economies, particularly in the homeland. This tradition permitted flexible herd management practices in response to unique environmental and demographic conditions of various areas within the homeland and the diaspora.[192]

Kura-Araxes herders throughout their geographical range and in both KA1 and KA2 kept taxonomically diverse herds. Herding different animals with different physiological, behavioral, and productive traits is a key subsistence strategy among non-specialized subsistence economies and is aimed at reducing the susceptibility of herds to the damaging effects of specific zoonotic diseases and the impact of environmental stressors. The seasonal and dry Mediterranean climate of much of the South Caucasus and the Near Eastern highlands, unreliable access to water, and the possibility of long dry spells or droughts were probably decisive factors in Kura-Araxes animal management strategies.

These strategies combined the species used and the age at which the herd was culled. Kura-Araxes people did not herd all animals in equal proportions. They primarily kept caprines, especially sheep. Cattle played an important secondary role—though rarely exceeding 50% of the herds—and pigs came a distant third. This stands in stark contrast to the preceding Late Chalcolithic period in the South Caucasus, when cattle were rare or altogether absent, and animal husbandry focused almost exclusively on managing caprines, particularly goats.[193] This secondary reliance on cattle relative to caprines is characteristic of risk-averse animal economies that prioritized herd security.[194] Although cattle yield significantly more meat and milk per animal than sheep or goat, the costs related to their slower reproduction, greater susceptibility to changes in water availability, and significantly higher feed requirements, outweigh their benefits when herd security is paramount.[195] In other words, sheep and goats provide a more effective hedge against stock loss, because they have a higher reproductive capacity, reach sexual maturity earlier, and reproduce faster than cattle.[196] Their management also requires much less investment; goats are nimble in the rugged terrain of the highlands, and as non-obligate drinkers are more immune to the hot and dry summers or prolonged

[191] Berger 2013, 2018; Boessnek and von der Driesch 1975, 1976; Morales 1997; Hesse and Wapnish 2001; Howell-Meurs 2001; Rova *et al.* 2010; Berthon *et al.* 2013; Kovacs *et al.* 2013; Badalyan *et al.* 2014; Mohseb and Mashkour 2017; Piro and Crabtree 2017; Samei 2019; Samei *et al.* 2019; Samei and Alizadeh 2020; Crabtree and Piro *forthcoming*.
[192] Samei 2019.
[193] Samei 2019; Samei and Alizadeh 2020.
[194] Redding 1981; Dahl and Hjort 1976; Kuznar 2001.
[195] Dahl and Hjort 1976; Redding 1981.
[196] Franklin 1980, p. 141; Halstead 1992, p. 151.

droughts, while sheep are better protected against the cold winter months.[197] On the other hand, one cow provides much more meat than many sheep. Also, cattle played an important role in settled agricultural life through their use as traction for ploughing fields, for towing carts across distances, and for secondary dairy, bone and leather products. Given the lack of exploitation of oil-producing plants by the Kura-Araxes (see below), cattle (or even caprines) could have been an important source of oils in the form of a clarified butter or rendered fats for cooking and of protein intake.

With some notable exceptions, the species composition of the herds and the rank order of animals are consistent throughout the Kura-Araxes world. This is a testament to the resiliency of a subsistence strategy which, like the use of plants described below, allowed for a greater degree of adaptability in the different regions to which the bearers of the Kura-Araxes went. This consistency, however, did not entirely suppress regional differences. Data from Gegharot, the highest-elevation site for which faunal data is available, suggests that high altitude communities, particularly those residing above the tree lines, may have kept more cattle than lower-elevation settlements.[198] Cattle at Gegharot are most abundant in KA1, and drop by nearly 50% in KA2, reaching the same percentage as most other sites in the homeland. Analyzing the role of cattle must be approached with caution, however, because there is statistical evidence that cattle abundance in the Kura-Araxes dataset is negatively correlated with assemblage size. This suggests that the abundance of large cattle bones is in part driven by bone preservation or recovery methods.

Another pattern is in sheep and goat ratios. Within the homeland, goats are more abundant at the more northern sites along the Kura River valley and in Dagestan (Natsagora, Kvatskhelebi, and Velikent),[199] while sheep play a more prominent role further south in the Araxes River watershed (for example, Shengavit, Köhne Shahar, Ovçular Tepesi, Sos Höyük).[200] With the exception of a notable shift in cattle management at Gegharot, there were no discernible shifts in the species composition of herds between KA1 and KA2 in the homeland or between the homeland and the diaspora; a pattern that speaks to the stability of this subsistence strategy for at least a millennium.

Cattle abundance in the diaspora in KA2 is also not significantly higher than in either KA1 or KA2 in the homeland. But, there are discernible patterns of change in their abundance within the diaspora. Most notable is the data from Anatolia and the Levant, where assemblages from Arslantepe, Korucutepe, Tel Bet Yerah, Tel Yaqush, and Tülintepe show a slight but steady increase in cattle abundance relative to caprines through time along the east-west axis;[201] although with the exception of Tel Bet Yerah, cattle never make up more than 50% of the assemblages. This pattern of increased reliance on cattle may be a sign of greater sedentism and intensification of agricultural production through time. But it could also be due to increased dependence on cattle during the westward migration of Kura-Araxes people. Figurines of cattle with the appearance of holes for a yoke, as well as model wagon wheels throughout the Kura-Araxes world suggest that cattle were used for pulling two-wheel carts.[202]

[197] Samei *et al.* 2019.
[198] Badalyan 2014.
[199] Morales 1997; Rova *et al.* 2010; Samei 2019; Samei *et al.* 2019; Paz, personal comm.
[200] Berthon *et al.* 2013; Piro and Crabtree 2017; Samei 2019.
[201] Samei 2019.
[202] Kohl 2007, 2009; Greenberg *et al.* 2014.

Despite this overall pattern in Anatolia, Siracusano and Bartosiewicz[203] argue that a three-fold drop in cattle abundance in Arslantepe from the Late Chalcolithic (VII) to the KA1 occupation of the site (VIB1 from 3200–3100 BC) signals a shift to a more mobile pastoral economy that specialized in caprine management. By their calculation, cattle make up less than 10% of the faunal assemblage in VIB1. This calculation, however, aggregates finds from very different contexts. In VII, cattle consumption was 10% higher in the elite contexts compared to the commoner areas.[204] Calculations in VIB1 also include bones recovered from a feasting context (Building 36) where cattle were less abundant than other areas. These differences suggest that changes in cattle abundance at Arslantepe through time were greatly impacted by critical socio-cultural variables unique to each time period, and that the decline in cattle abundance may not have been as dramatic. Indeed, the exclusion of bones from the elite contexts of VII and the feasting contexts of VIB1 results in a 15% decline in cattle abundance through time, an important but substantially less striking pattern than the proposed three-fold reduction.

It is possible that the greater reliance on caprines in VIB1 may be a sign of greater human and herd mobility in this period than in VII or VIA, given sheep and goat's better adaptability to movement in the rugged terrain of the highlands and the piedmont zone. Also relevant is the need to move them away from the farming zone during the harvest season to avoid grazing damage to the agricultural yield. Siracusano and Bartosiewicz[205] also argue that meat and milk were the primary caprine products exploited at Arslantepe, based on the high mortality of caprines in the first year of life (sign of milk exploitation) and then again in the third year of life (sign of meat exploitation). Siracusano and Bartosiewicz argue that such a mortality profile may be the result of a transhumant lifestyle, as the excess yearlings were slaughtered before the seasonal migration.[206]. Hypotheses about seasonal transhumance, though plausible, must ultimately be tested through stable isotope analyses. Very high percentages of caprine remains, particularly sheep, were also used by Piotrovsky[207] to argue for a highly mobile and specialized form of pastoralism at the highland site of Elar in Armenia. In the absence of stable isotopes and sheep survivorship and mortality data, it is difficult to test Piotrovsky's argument empirically. It is also unclear what proportion of the Elar assemblage was made up of other animals such as goats and cattle.

Unlike at Elar, there is more robust evidence for a specialized caprine economy at Godin IV where cattle make up less than 10% of the assemblage; the lowest among all Kura-Araxes assemblages, not besides the feasting context at Arslantepe VIB1. Sheep were the dominant herd animal at Godin IV.[208] The slaughter of most of the Godin IV sheep as adults is a tell-tale sign of a specialized wool production economy.[209] It is unclear for whom this fleece was produced, but historically, the sheep of the Zagros mountains provided thick, high quality wool that was exploited during the Uruk expaemmernsion in the Zagros before the Kura-Araxes migration.[210] This more variegated picture of animal exploitation in the diaspora demonstrates that despite their

[203] Siracusano and Bartosiewicz 2012.
[204] Siracusano and Palumbi 2014.
[205] Siracusano and Bartosiewicz 2012.
[206] Siracusano and Bartosiewicz 2012.
[207] Piotrovsky 1964.
[208] Pirot and Crabtree 2017, Samei 2019.
[209] Payne 1973.
[210] Algaze 2001; Rothman 2017.

conservative and risk-averse animal economies, Kura-Araxes people were able to adapt to the unique social and environmental conditions of the new areas into which they arrived.

Data from other sites in the homeland and the diaspora demonstrate that in general sheep and goats were exploited for all of their products, including the critical secondary products of milk, wool/hair, and bone.[211] In the homeland, in both KA1 and KA2, caprines were almost exclusively slaughtered as sub-adults between the second and fourth years of age.[212] Killing male sheep and goats as subadults provides people with access to meat, all the while preserving the female core of the herd, who then provide a community with milk, wool, and hair it needed.[213] It is also interesting that goats were consistently slaughtered younger than sheep.[214] This may have been due to goats' poor adaptability to the extreme cold of the winters, as a result of which they were slaughtered younger in late fall to maximize milk availability in the long winter months.[215] Slaughtering goat kids at a young age in anticipation of feed shortage in the winter would also ensure feed access to breeding and lactating females, lambs, and cattle.

Cattle exploitation data is scant, but it hints at a strategy that maximized milk and meat take-off, with the secondary use of cattle as beasts of burden. Although cattle survivorship and mortality data are not available from the Anatolian and Levantine sites to test the aforementioned hypothesis of the use of cattle to pull carts, the use of cattle for labour is supported by osteopathologies found on weight-bearing bones at a number of sites in the homeland, including Sos Höyük and Köhne Shahar,[216] and the possible horn cores of steers (castrated bulls) at Köhne Shahar.[217] Osteopathologies are, however, rare in the Kura-Araxes world and are altogether absent at most sites. At the same time, the presence of possible digging stick weights and the small number of plough shares (in the Chalcolithic, mostly made from deer antlers) suggest that the picture of agricultural practices may be varied.

Additional data is needed to present a more conclusive narrative and to answer several key questions. Researchers still debate the question of how Kura-Araxes exploited animals for food and by-products. Is Godin IV a special case or will ongoing faunal analyses reveal instances of specialized animal management at other Kura-Araxes sites? What was the role of herd mobility in Kura-Araxes animal economies? Normally, Kura-Araxes people conducted a village life as farmers and herders, as Sagona suggests (see above), but did a portion of their population move seasonally with their sheep and goats, as may have been the case at Arslantepe VIB1? Did some portion of Kura-Araxes people engage in full-time nomadic pastoralism as they migrated beyond the homeland and spread across the Near Eastern highlands? The zooarchaeological data, particularly the conclusive evidence for generalized exploitation of caprines for all of their products, provides little support for specialized, separate societies of pastoral nomads across the Kura-Araxes homeland zone and diaspora, as are documented in ethnographic studies of the region. Sheep and goat management

[211] Badalyan 2014; Morales 1997; Crabtree and Pirot *forthcoming*; Siracusano and Bartosiewicz 2012; Mashkour and Beech 2017; Pirot 2009; Bökönyi 1983.

[212] Samei 2019.

[213] Redding 1981; Payne 1973.

[214] Samei 2019; Siracusano and Bartosiewicz 2012.

[215] Payne 1973; Arbuckle *et al.* 2009.

[216] Pirot 2009; Samei *et al.* 2019.

[217] Samei and Alizadeh 2020.

and herd mobility may be incorporated into a range of pastoral strategies without the adoption of the specialized migratory strategies of pastoral nomads[218]. Most probably a number of pastoral strategies were used at different times and in different places. Ultimately, these possibilities must be tested with stable isotope analyses, particularly large-scale and well-designed strontium isotope studies.

Agriculture. Agriculture in the South Caucasus started in the Late Neolithic period at the beginning of the sixth millennium BC in the settlements of the Aratashen-Shulaveri-Shomutepe culture. This period was marked with mounded settlements located in the lowlands of the Kura and Araxes River valleys. The Late Neolithic and entire Chalcolithic periods of the South Caucasus from the end of the seventh to the mid-fourth millennium BC can be characterized by diverse or broad-spectrum agriculture.[219] People cultivated various species of cereals, pulses, and oil-producing plants during the Neolithic period. The local agriculture was less diverse in the Chalcolithic period: cereals and some pulses were cultivated. In sharp contrast, the agricultural traditions of Kura-Araxes people in the South Caucasus built upon practices that started to emerge in the Chalcolithic, but it relied on the near-exclusively cultivation of cereals, commonly free threshing wheat and hulled barley.[220] In the Chalcolithic, populations used upland hills and terraces often preferring them to valley bottoms. This use of different higher elevation and terrace agriculture yielded a new emphasis on a risk-averse cereal cultivation pattern, better suited to the more extreme bio-climatic of highland environs. Within the Kura-Araxes world this agricultural signature is identified in both highland and lowland settlements in both the homeland and the diaspora. This subsistence pattern required less effort and was less risky,[221] but it was also more adaptable to the different regions to which the bearers of the Kura-Araxes migrated. One also wonders whether the introduction of cattle as plough animals in heavier valley-bottom soils would have replaced the human labour able to break up looser terrace soils.[222]

The grape was another crop of importance to local Kura-Araxes communities in the middle and lower elevations. Evidence from Areni-1 Cave in Armenia includes all the stages of wine production from the late fifth millennium BC.[223] The use of the grape for wine continued into the Kura-Araxes. Batiuk[224] proposes that expertise in wine production was one of the skills that made the settlement of Kura-Araxes groups in the diaspora both possible and peaceful, filling an economic niche that provided a desired good to the indigenous inhabitants. This suggestion was much debated in our workshop. Since grapes were common throughout the Near-Eastern world,[225] local peoples were familiar with its fruit and its possible products. Like metallurgy (see below) the important element may have been technical skill in the technique of growing and processing the

[218] Cribb 1991; Samei 2019.
[219] Hovsepyan and Willcox 2008; Decaix *et al.* 2016; Kadowaki *et al.* 2015; Flannery 1969.
[220] Hovsepyan 2010; Decaix *et al.* 2016; ; Dietler and Herbich 1998.
[221] Hovsepyan 2015.
[222] Geoffrey Summers, personal communication.
[223] Wilkinson *et al.* 2012; Batiuk 2013; Smith *et al.* 2014; Hovsepyan 2015.
[224] Batiuk 2013.
[225] Miller 2008.

right grapes for a good product. This kind of expertise is rarely passed from mouth to mouth; it requires the physical presence of experts to teach people these sorts of skills.

To reiterate, the population of Kura-Araxes culture in the South Caucasus cultivated mainly cereals, mostly varieties of bread wheat, hulled barley, and grapes. Pulses and oil-plants were cultivated elsewhere in the Near East at this time, but not in the Caucasus.[226] The absence of pulses in the archaeological record of the South Caucasus as well as at Arslantepe VIB1,[227] and even among Kura-Araxes migrants at Tel Bet Yerah[228] in the southern Levant is a distinctive, repeated pattern.

This compares with ethnographic studies in Armenia. Nowadays, the cereals under discussion (bread wheat, hulled barley, emmer) are the main or the only crops cultivated in high mountainous zones of Armenia. In many places people cultivate those cereals mixed in the same fields, use the crop as fodder and buy wheat grain or flour from regions situated at lower altitudes. As mentioned by one of Nikolai Vavilov's students,[229] who worked on the ethnobotany of Armenia at the beginning of the twentieth century, the population of the high mountainous zone practiced mixed cultivation of cereals consisting mostly of wheat and barley. Stoletova argues that people preferred mixed cultivation of cereals so as to ensure at least a moderate harvest as barley and wheat have slightly different ecological preferences and are susceptible to different factors that cause crop failure.

There are many environmental and anthropogenic factors that could have influenced the formation of such a specific agricultural regime in South Caucasian societies. Amongst environmental factors the limiting one for plants is first and foremost climate. Changes in the plant economy of the South Caucasian people at the beginning of the Bronze Age overlapped with the beginning of the Subboreal period of the Holocene (see above). Generally, major climatic events correspond with the beginning of prehistoric periods.[230] A change in climate coinciding with the onset of the Early Bronze Age is clearly observable in late Quaternary palaeoclimatic trends from Western Asia[231] particularly in Armenia and Georgia.[232]

This climatic difference as reflected in the diversity of crop exploitation is evident at Shengavit and Gegharot, for example. The difference in elevation between those two sites is approximately 1200 m, even though they are a mere 75 km apart. Although the principal crops are the same at both sites, there are some additional cultivated plants recorded only at Shengavit in the lower elevation: naked barley, flax, and grape. Additionally, the ratio of wheat to barley was also dependent on the environment of the two sites. The higher elevation of Gegharot yielded a greater proportion of hulled barley (80–90%) over wheat (20–10%). The site of Aparan III, situated at a mid-elevation between Gegharot and Shengavit (at an altitude of 1860 m asl), had a barley to wheat proportion of approximately 56–44%, while Shengavit, situated at 990 m asl, had a barley to wheat proportion of

[226] Zohary *et al.* 2012; Lisitsina 1984; Lisitsina and Prishchepenko 1977; Hovsepyan 2015; Jacomet 2006; Lukyanova *et al.* 1990; Gandilyan 1976, 1998.
[227] Follieri and Coccolini 1983.
[228] Berger 2013, 2018; Longford 2015.
[229] Stoletova 1930.
[230] Mayewski *et al.* 2004; Staubwasser and Weiss 2006; Andersen et al. 2006; Weninger *et al.* 2009; Raspopov *et al.* 2013; Avetisyan and Bobokhyan 2012, fig. 2.
[231] Hovsepyan 2015; Connor and Kvavadze 2008, fig. 10.
[232] Joannin *et al.* 2014.

about 24–38%. These patterns appear across the entirety of the KA1 and KA2. Nonetheless, differences in assemblages and proportions of cultivated plants in settlements of different elevations and environmental settings serve as evidence of the role that the climate could play in agricultural strategies of the Kura-Araxes.

Carbonised remains identified at Early Bronze Age settlements such as Kültepe II in Naxçivan,[233] Gegharot,[234] Aparan III,[235]and Shengavit[236] reveal a mixture of hulled barley, free threshing bread wheat, club wheat, emmer, and rye grains, but a complete lack of pulses and oil plants.

The choice of free threshing wheat and naked often stands in opposition to local contemporary societies in the diaspora who prefer glume wheats and appears to be an important part of the Kura-Araxes package. In the southern Levant, archaeologists recovered free threshing wheat from the Khirbet Kerak quarters of Tel Bet Yerah[237] and at Tel Yaqush[238], both in the Central Jordan Valley. This pattern suggests that highland agricultural signature of the Kura-Araxes occurred in both highland and lowland settlements of the homeland as well as the diaspora communities. The use of free threshing wheats will come to replace glume wheats across the Near East after the end of the Kura-Araxes.[239]

The use of free threshing wheat may, of course, shed light on food preferences for the Kura-Araxes. Similar to modern bread wheat, the hexaploid free threshing wheat is more ideal suited for leavened bread (as opposed to a *lavash*-like flat bread)[240]. This is also supported by the preponderance for grinding stones and pestles in the lithic assemblages, with the seeds being ground or pounded into a flour within each household for bread production. Paz has noted that the ceramic assemblage of the Kura-Araxes is dominated by larger serving and small individual consumption vessels, and suggested that they may reflect a diet with more liquid foods like stews or gruels[241]. A leavened bread may have been an ideal companion to add carbohydrates, and sop up the liquid contents of the vessels.

Wilkinson, building on Paz's observation, suggested that the high proportion of wheat and liquid focused vessels may reflect a preference for beer drinking among the Kura-Araxes[242]. Longford notes that this proposal is unlikely given the lack of evidence of malting or germinated embryos in the botanical remains at Sos Höyük[243]. Perhaps a more mundane explanation can be proposed for the preference of free threshing wheat.

Free threshing wheat involves a greater level of risk as it is more vulnerable to animal and insect predation as well as fungal attack[244], and is perhaps better stored in smaller domestic batches where they can be more easily cared for. Additionally, as all the processing is done at harvest, the stored

[233] Earley-Spadoni 2012.
[234] Hovsepyan 2008, 2015.
[235] Hovsepyan 2010.
[236] Hovsepyan *forthcoming*; Tumanyan 1948; Wilkinson 2014.
[237] Berger 2013, Longford 2015.
[238] Chantel White, personal communication
[239] Longford 2015, p. 133.
[240] Longford 2015, p. 143.
[241] Paz 2009.
[242] Wilkinson 2014.
[243] Longford 2015, p. 144.
[244] Hillman 1984a, b

grain is cleaner, resulting in less work processing the grains for consumption in a domestic setting[245]. This focus on the domestic sphere could be seen as a form of "social storage within Kura-Araxes communities"[246], or simply more evidence of the importance of domestic production in Kura-Araxes economies.

According to Riehl[247] in her summary of archaeobotanical data from the Early and Middle Bronze sites of Near East, cultivation of pulses and oil-producing crops dropped considerably in the Bronze Age overall, but lentil, bitter vetch, pea, grass pea, chickpea, and linseed were still cultivated there. Accounting for the similarity of cultivated plants assemblage in all investigated Kura-Araxes culture sites in the South Caucasus, and the attribution of that assemblage to mountainous zones, it is possible that the origin of the agricultural traditions of Kura-Araxes people in the South Caucasus, dominated by cereal cultivation to the exclusion of most other crops, stems from its high mountains.

In terms of uncultivated plants, the assemblage of recorded prehistoric and modern native weedy species is the same in the studied region, which suggests there have been no substantive changes in phytoagrocenoses (the agricultural plants of an area). The number of archaeologically known weedy taxa increases every year as a result of systematic excavations and subsequent archaeobotanical studies, but the plants are the same ones that grow in the environs of the present day. Other crops found in Kura-Araxes sites in the homeland were millet and flax as well as apricots, peaches and sweet cherries[248]. The crop assemblage is practically the same from site to site and within each site. This raises the question of why people from lowlands started to follow the agricultural, household, and dietary traditions of high mountainous populations starting from the end of the Chalcolithic period. Perhaps, during a time of climate aridification, the higher rainfall and increasing forest[249] in the upland regions permitted those people to have a better quality of life, and more chances to survive more drought-like conditions. People living in lowlands would have periodically lost their crops to droughts and later obtained seed material from neighbors from highlands via trade and barter and may have adapted the more resilient highland agricultural regime accordingly. Alternatively, as Longford notes:

> The cultivation of hexaploid cold-adapted free threshing wheats may possibly have eased the Kura-Araxes agricultural expansion into new regions. Modern studies have shown that cold tolerant hexaploid wheats planted as summer crops at high altitudes in Eastern Anatolia can produce higher yields when sown at lower altitudes [. ..] Whether this applied to the wheat varieties grown by the Kura-Araxes in the fourth and third millennium is unknown but it is an intriguing possibility that may also have contributed to the Kura-Araxes preference for free threshing wheat[250].

[245] Alonso et al. 2013.

[246] Longford 2015, p. 166.

[247] Riehl 2008, 2009.

[248] Lisitsina and Prishchipenko 1977, pp. 64-67; Radiometric dating of millet findings from Neolithic EBA sites in the South Caucasus revealed that those are later intrusions, Matin et al, 2022.

[249] Connor and Kvavadze 2014.

[250] Longford 2015, p. 169.

As populations grew in the homeland zone during the KA2, evidence exists of intensification of agricultural production. This is documented by the construction of irrigation canals on the Aragats Mountains, Geghama Mountains, and a dam on the Kasakh River near Mokhra Blur[251]. The use of plows powered by draft animals and terraced farming systems also testify to an intensification of agriculture[252]. Plows were mostly made of deer antler[253]. Archaeologists have not found many of these in Kura-Araxes sites. Digging stick weights indicate other techniques of planting as well[254]. At Shengavit large, stone-lined grain pits suggest the production and storage of surpluses. These developments indicate a greater coordination of effort in supplying food to the growing Kura-Araxes population, and the possibility that surpluses of grain were being used by emerging people of influence to recruit labour and establish new social statuses[255].

Overall, the pattern of agricultural production that is very consistent over the wide range of Kura-Araxes occupations, shows clear adaptations to local circumstances and is clearly focused on lowering the risks of getting sufficient yields for subsistence. The argument for a highland origin of this pattern seems plausible. The maintenance of this specific highland mode of agricultural production and animal husbandry throughout the diverse environments of the diaspora, even when different crop choices are available, is fascinating, and appears to be an intentional choice that served as an instrument of social boundary-making.

Pottery production.

Above we discussed the style of Kura-Araxes pottery as a symbol of identity and shared view of tradition. In the chronology section above (Section II), pottery style was used as a marker of time and place. In this section we examine the manufacture of pottery. In part this process of manufacture also represents the conservative traditions of Kura-Araxes potters[256]. Perhaps, more importantly for understanding the economy of the Kura-Araxes societies are answers to questions of how they made the pottery, who made it, and where it was made. Was it, in other words, made by households for their own subsistence or at specialized workshops, for local use or for exchange outside the site?

With the Kura-Araxes, a new and surprisingly conservative *chaîne opératoire* (process of manufacture) emerged, with a different paste composition and construction technique from the preceding period. Slab construction was dominant, with some cases of coiling. Potters did not use the potter's wheel, which had emerged in the Near East at this time, even in the diaspora regions where local producers utilized it. After forming and thinning, vessels were dried, slipped, burnished, dried, sometimes slipped and burnished again, and dried. After drying, they were fired at relatively low temperatures (c. 800°), usually in an alternating oxidizing and reducing atmosphere, and often polished. As the Kura-Araxes had the ability to smelt copper, they had the capabilities of reaching kiln temperatures well in excess of 1000°C, yet they never fired their ceramics higher than 800°C.

[251] Simonyan 2013.

[252] Javakhishvili *et al.* 1962; Munchaev 1975, 397; Kushnareva 1997; Lisitsina and Prishchepenko 1977.

[253] Kushnareva 1997.

[254] Kushnareva 1997; Rothman *forthcoming* a.

[255] Rothman 2015b.

[256] Iserlis *et al.* 2010.

Pottery makers sometimes added slips, but wet smoothing was a common technique that sometimes looks like a thin slip. Another theory for the bi-chrome coloring was that potters painted grease or some carbon rich paste or liquid on the outside, whose carbon reacted with the red ferric oxide in the surface of the vessel coverting it to a black ferrous oxide, leaving the untreated clay its original reddish color. Since many black pots have an uneven area of a different coloration at the rim, often with signs of uneven brushing, this method does seem plausible, although perhaps not the only way of obtaining the red-black finish.

Petrographic and archaeometric studies were initially employed to establish provenance of the vessels[257]. They more importantly revealed patterns of local production, as opposed to emerging claims of trade or emulation[258]. Beginning with Mason and Cooper[259] new investigations began to examine the production technologies at a macro scale, identifying patterns of similarities within regional Kura-Araxes-related traditions and a consistent divergence from non-Kura-Araxes traditions. These processes were repeated throughout the diaspora zone[260]. Ceramic production appears to have been undertaken at a household level, utilizing clays and tempering agents found near the settlements without any general preferences. Some local archaeologists in the South Caucasus, however, think that pottery was made by "professional" craftspersons. Simonyan points to a kiln found at Mokhra Blur[261], and excavators uncovered a large pottery kiln at Kültepe II[262], Kultepe Jolfa[263], and Velikent[264], but pit or bonfiring can yield as many pots as a kiln. The question is one of investment in the production materials and control of the pottery makers.
Iserlis and Greenberg, building on these initial studies, initiated a wide-ranging comparative study of Kura-Araxes ceramics to refine the understanding of these emerging technological patterns[265]. They examined close to 1100 Kura-Araxes vessels and sherds from 26 sites in the Caucasus, Eastern Anatolia and the Levant. The study reinforced and more fully defined the emerging understanding of the *chaîne opératoire* employed in all Kura-Araxes production, showing it to be repeated consistently at a supra-regional level across the greater Near East. This *chaîne opératoire* in all probability served as yet another instrument of social boundary-making between the Kura-Araxes potters of the diaspora and the local producers, resulting in a strong, conservative set of traditions among the potters. The sharing of these technological traditions is consistent with the existence of a community of practice; that is, a learning network that allowed variation while promoting the fundamental ideas of the tradition. A community of practice can be seen as an information-sharing group that creates common experiences between its members, independent, in some cases, of other communities[266]. Where the artisan learns a repertoire of skill sets that contributed to the perpetuation of certain skills or when patterns that

[257] Chazan and McGovern 1984; Esse and Hopke 1986.
[258] Todd 1973.
[259] Mason and Cooper 1999.
[260] Batiuk 2000; Mazar, Ziv-Esudri and Cohen-Weinberger 2000; Trojsi *et al.* 2002; Batiuk 2005; Kibaroğlu 2015; Hayrapetyan 2008; Iserlis *et al.* 2010; Manoukian 2015; see Kibaroğlu 2015 for an extensive listing of Archaeometric studies on KA Wares.
[261] Simonyan and Rothman *forthcoming*.
[262] Sagona 1984.
[263] Abedi and Omrani 2015.
[264] Kohl 2007.
[265] Iserlis 2009, 2015; Iserlis *et al.* 2010.
[266] Lave and Wenger 1991.

they become deeply embedded in the craftsperson's methodologies and technologies; they are extremely resistant to change[267]. The perpetuation of these practices allowed these communities to both to develop new dialects of style while at the same time preserving traditions that reinforced self-identification. At Shengavit, potters constructed pots of the same type in very different sizes[268], indicating a strong tradition but a lack of specialisation for exchange outside the orbit of their community.

The chaîne opératoire (process of manufacture) as identified by Iserlis may be encoded in the following principles[269]:

1. Coarse clays (mainly soils) were obtained from the immediate environs of the site, requiring the development of independent raw material selection strategies for every site;
2. At least two main clay types were used, with additional, secondary clay types;
3. Grog and/or different organic (including chaff, hair, or dung) materials were added as Temper;
4. Special local mineral tempers were added: volcanic ash, obsidian, limestone sand, shale, river sand, graphite, crushed quartz/feldspar; and some of this may be in the local soils or retrieved from river banks;
5. Multiple fabrics were used contemporaneously at same site (that is, for the same type within the same phase);
6. There need be no consistent correlation between form/function and fabric;
7. Only hand-molding and slab and coil techniques are used;
8. Vessels normally receive intensive surface treatment, including one or two slips and considerable burnish; materials like graphite were sometimes included in the slip[270].
9. Rules marking the extent, technique and content of decoration existed in different subregions, but sometimes seems somewhat random;
10. Complex firing procedures were used, exhibiting skillful control of temperature and, often, intentional 'aging' (blackening) in a reducing firing atmosphere;
11. Traditional pot-lids and supports were produced, but no standardized cooking pots, except the brown and gray cooking pots of the southern Levant.

The household production may also explain the great variation in shapes, decoration, and inclusions in the clay body within the same style corpus; however, this understanding might change should broader studies of standardization in constructing pots of similar function. Such studies would compare, for example, the thickness of pots of the same function and time.

A final variable for pottery, the least discussed, is function. Function describes a critical factor in identity: cuisine[271]. The primary eating vessel of the homeland zone and some of the diaspora, in the opinion of Rothman[272], are smallish s-shaped pots or large cups (**Fig 2** final column). Braidwood

[267] Gosselain 2000.
[268] Rothman forthcoming.
[269] Iserlis 2015.
[270] Martino 2017.
[271] Wilkinson 2014; Stein 2012.
[272] Rothman 2011b.

and Braidwood[273] and later Wilkinson[274] compare them to cyma recta bowls in northern Mesopotamia. These are best used for liquid-dominated meals like stews or porridges, and for drinking[275]. At Godin IV, griddles, a holdover from Godin VI, seem most common, and excavators found more open bowls than s-shaped pots. At Shengavit, flat cooking surfaces on stands designed like ceramic hearths indicate some other cooking methods. In the southern Levant the cooking pots often sat on the hearth and were transferred to andirons. In contradiction to many assumptions in regard to ethnicity and cuisine, as noted earlier, there are no standard cooking pots found throughout the diaspora regions. Cooking involved the use of locally obtained pots or occasional unburnished Khirbet Kerak Ware vessels topped with traditional Kura-Araxes conoid lids, which were often ornately decorated. Hundreds of andirons found in 'Amuq H–I and in the southern Levant have long been viewed as stand-ins for the fixed Kura-Araxes hearth, which does not appear south of the Amuq[276]. Ishoev's recent experimental study of over 100 fragments from Bet Yerah indicates that the Khirbet Kerak Ware andirons occupied a mediating position between the hearth, whatever its form may have been, and the eating areas[277]. They served most often as a stand upon which large cooking pots or smaller serving vessels were placed. The contents of these pots would have been transferred to the ubiquitous carinated bowls that would have been used for personal consumption. The sinuous-sided kraters, presumably, would have been used for mixing or even storing beverages. The interiors of many of these kraters show evidence of surface spalling, which can be an indicator of the vessel having once contained a fermented beverage[278].

Differences in pot function are a critical indicator of adaptations to food getting and food preparation. The particular foods cooked or served in them were as much of a habitus as their making. So, even if the process of production were the same, the functional categories of pots indicate that outside the homeland, different cooking traditions or available resources determined different shapes to meet differences in cuisine or cooking techniques.

Overall, although there is room for disagreement, the evidence currently available suggests that pottery was domestically made for immediate use. However, it would be hard, given the conservatism of the production technical traditions based on shape or small details, to tell an imported pot from a locally made one. Petrographic or chemical characterization studies have begun to resolve the issue, but they are not available in the density and coverage necessary to determine the degree to which pottery was traded. All evidence for the time being points toward a decentralized pottery production, for the most part done in domestic or household settings, but by someone with an intimate knowledge of the traditional pottery making techniques and who steadfastly adhered to the established conventions. These ceramic traditions stand in contrast to most of the local ceramic industries in the diaspora, which appear to be another tool in social boundary-making in the Kura-Araxes world.

[273] Braidwood and Braidwood 1960.
[274] Wilkinson 2014.
[275] Paz 2009.
[276] Takaoğlu 2000; Shimelmitz 2003; Smogorzewska 2004.
[277] Ishoev and Greenberg 2019.
[278] Skibo and Blinman 1999; Skibo 2013, p. 134.

Resource exploitation and trade.

The South Caucasus has important deposits of many mineral and other natural resources that were necessary for the developing societies of the ancient Near Eastern world. Attempts to understand the distribution of the Kura-Araxes populations have long been linked to its migrants' ability to utilize one or more of these resources, particularly metal ores.[279] In addition to metals, three other resources, obsidian/flint, salt, and bitumen, were used for production and were exchanged in the ancient world as raw materials and finished products.

To understand how these raw materials and the products made from them constituted an important part of Kura-Araxes economic life, we need to answer the following questions: 1) what was the geographical distribution of the sources of these raw materials, 2) what was made from them, 3) who produced and who consumed them 4) what were the networks through which raw materials were distributed to local producers, 5) were the producers mostly domestic and small scale, as we proposed for the pottery, or did they work in specialized workshops; and 6) if goods were being produced for exchange, what was the geographical extent and organization of their trading networks? 7) Was there some level of central coordination or control? The data to answer these questions to the degree we would like is not yet sufficient, although new work is on-going. What follows is a summary of what we know now, as it was discussed at the workshop.

Metal sources and metal artifacts. The Caucasus in general is exceptionally rich in metal ore deposits, particularly copper and gold, but also silver, lead, zinc, and iron.[280] There is growing evidence for the experimentation with the smelting of copper and the creation of arsenical bronzes beginning already in the terminal part of the Neolithic.[281] In Armenia copper is found mainly in two locations: the far south (the Zangezur group) and in the northeast, the Aghstev-Debed (Alaverdi-Vanadzor) area, which adjoins the source of the Bolnisi ore district of southern Georgia as well as the Gedabek copper region in western Azerbaijan (**Fig. 6**).[282] Georgia has other copper-bearing regions, including the Adjara/ Guria, the upper Rhioni region in Lower Svaneti/ Racha, South Ossetia, and the northern regions of Mtskheta/ Mtianeti and Kakheti. Copper sources also existed in the diaspora. Among them were Ergani Maden[283] and other mines near Palu southeast of the modern city of Elaziğ, and a series of copper deposits and pre-modern mines north of Tabriz, and east of Hamadan including the Toroud district and the ancient mine at Chah-Messi.[284]

The well documented ancient Deh Hosein copper/tin mining complex lies not far from Godin Tepe, and another excavated ancient mine is found at Arisma and Veshnaveh near Qom.[285] Aside from the Bolnisi region, gold is found in the Samegrelo/ Upper Svaneti regions, and the Mtskheta/ Mtianeti region north of Tbilisi, in the Zagros north of Lake Urmia, and in Central Anatolia.

[279] Rothman 2005.
[280] Godabrelidze 1933; Nazarov 1966; Adamia *et al.* 2011.
[281] Kavtaradze 1999; Hamon 2008.
[282] Iessen 1935; Gevorgyan 1980; Meliksetian and Pernicka 2010.
[283] Bamba 1976.
[284] Emami 2014.
[285] Nezafati *et al.* 2009; Nezafati and Stoellner 2017.

Kura-Araxes metal artifacts fall generally into two categories: tools, including weapons, and ornaments (**Fig. 6b**). Tools and weapons include four-section long points (spears?), flat blades (originally leaf-shaped and later elongated into dagger shapes), awls, and flat or socketed axes.[286] In addition, archaeologists have recovered a few curved blades that some call sickles,[287] but that Sagona[288] thinks were leather scrapers.

The next category of metalwork consists of personal ornaments. These include spirals, which are often called earrings, but Sagona proposes were hair ornaments.[289] In addition, crafts workers made some beads, flat pins (some with double spiral ends), and amulets. Lastly, excavators from Kvatskhelebi recovered a flat band with etchings of animals that is usually described as a diadem.[290] A similar object came from the VIB2 "Royal" Tomb at Arslantepe,[291] although it probably post-dated the Kura-Araxes (see Section IVF).

Kura-Araxes metal artifacts displayed skilled workmanship, which is what has led to the linking of the culture to advances in metallurgy. Growing evidence points towards a complex model of widespread mining and processing of ores within the Kura-Araxes landscape, although

production seems, for the most-part, to have been relegated to the household or arsenical bronzes, formed from local copper sources with higher levels of arsenic, but also from the addition of it during smelting. However, the number of bronzes found in Kura-Araxes contexts are significantly lower compared to the later contradiction in all probability is Middle Bronze Age cultures in the region. This reflective of the context of the finds. Many of the Middle Bronze Age caches were funerary deposits, a funerary tradition not shared by the Kura-Araxes. Additionally, the utilitarian nature of most of the Kura-Araxes metals would lend them to being recycled and thereby vanishing from their original context in the archaeological record.

Metallurgy. The topic of metal production in Caucasus has received considerable scholarly attention as of late.[292] Courcier[293] suggests that the date of much of the more advanced smelting of these tools should be placed in the early third millennium (KA2). However, there is growing evidence that some of the earliest experimentation of hammered metal crafts and even smelting in the region dates to the Neolithic,[294] with a floruit emerging in the Chalcolithic with the Leilatepe culture.[295] The Kura-Araxes culture reveals complex smelting and molding of finished metal products including all the previously mentioned shapes. Most archaeometallurgists believe the — existed in many sites of the KA1 and KA2.[296] This conclusion is supported by the results of lead

[286] Sagona 2018.
[287] Courcier 2014.
[288] Sagona 2018.
[289] Sagona 2018.
[290] Palumbi 2008.
[291] Frangipane 2008.
[292] Moritz *et al.* 2016; Mederer *et al.* 2014; Erb-Satullo *et al.* 2015, 2017.
[293] Courcier 2014.
[294] Courcier 2014; Bobokhyan *et al.* 2014.
[295] Akhundov 2007; Courcier 2014.
[296] Courcier 2014.

isotope analyses, which linked the copper deposits of northeastern Armenia and, possibly, the isotopically close ores of eastern Turkey as the sources of ores for at least some arsenical-copper artifacts from the Kura-Araxes settlements of the Ararat Valley and Shirak.[297]

The settlement at Balitshi-Dzedzvebi, near the gold mines at Sakdrisi appears to be a specialized primary processing installation.[298] The ores were first crushed and refined there before being transported to other sites where workshops would create the final metal products, although some evidence of on-site metallurgy has also been identified. A number of houses revealed tools for crushing and processing the ores, crucibles, slag, and metal enriched soils. Interestingly, this pattern fits Yener's specialized metallurgical settlement model,[299] which identifies a two-tiered system of metal processing. The first type of production occurred in the immediate vicinity of the ore sources where the metals are processed. The resultant metals are then sent on to a second tier of settlements where they were further refined and cast into metal tools and other finished products. Production activities within the sites in the Caucasus are normally recovered in association with domestic contexts at most sites,[300] and a similar pattern is evident at Arslantepe during the later KA1 and at Godin IV in the KA2.[301] Simonyan,[302] on the other hand, has identified an area excavated in 2000 at Shengavit as an actual workshop site. It contained the processing material including two sizable pots with remains of smelted arsenical-copper, crucibles, and other remains of production, although he excavated only one small corner of the metallurgical context.

Another possible workshop site was excavated at Köhne Shahar in the production area within the central walled district.[303] The Central Zagros sites at Deh Hossein and Arisman indicate fairly large-scale production.[304] In general, production remains included vessels with remnants of metallurgical slag and oxidized copper in their linings, tuyeres,[305] crucibles,[306] a furnace, molds for casting ingots, tools, weapons,[307] pestles,[308] and hammers for grinding ore and metal forging (**Figs 2a** and **6**).[309]

The techniques in manufacturing metal are best described by Tedesco.[310] She found that those techniques, such as the production of Kura-Araxes pottery and Maikop/Novosvobodnaya metals, were very conservative for each category of metal artifact produced.

The evidence for Kura-Araxes mining is slowly growing. Miners were seeking the easiest to obtain arsenic-rich copper and other polymetallic ores.[311]

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[297] Meliksetian *et al.* 2009.
[298] Stöllner and Ġambašiże 2011.
[299] Yener 2000; Lehner and Yener 2014.
[300] Tedesco 2006, Courcier 2007.
[301] Frame 2010, 2011.
[302] Simonyan 2002.
[303] Alizadeh *et al.* 2018a; Stein 1996.
[304] Maliksetian *et al.* 2019; Helwing 2005, 2013, 2016.
[305] Alizadeh *et al.* 2018a, fig. 6g.
[306] Alizadeh *et al.* 2018a, fig. 4b-d; Badalyan *et al.* 2015, Pl. 17, 188.
[307] Koşay 1976, Pl. 110; Hauptmann 1979, Pl. 32; Badalyan *et al.* 2015, Pl. 10, 22.
[308] Alizadeh *et al.* 2018a, fig. 6c–d.
[309] Bayburtian 2015, Pl. 10a.
[310] Tedesco 2006.
[311] Courcier 2014; Courcier et al. 2012.

In terms of the mining and exchange of copper in particular, one can see an example of how this local system worked at the Fioletovo Kura-Araxes site in the upper Aghstev River. There researchers found ore deposits as well as traces of mining work.[312] The Deh Hosein mining complex in the central Western Zagros of Iran is also well documented,[313] as is that at Arisma and Veshnoveh.[314] Copper and its alloys, mostly of arsenic, were traded over relatively short distances. This is confirmed, because while crafts persons used some northern Caucasian (Maikop) metallurgical techniques,[315] Caucasian ores were not being exploited outside of its homeland zone. Locally, the area covered by Ayrum-Teghut sites correlates with control of the ore-yielding district.[316] Armenia and Georgia were not just mining and exchanging, but they were receiving ores or finished products from each other. A metal necklace found at Gegharot in Armenia had metal alloys foreign to the South Caucasus;[317] it was imported. In eastern Turkey, there is possible evidence of early copper mining at the Anayatak mine in Murgul near the town of Artvin on the Georgian border dating to the KA1.[318] Two radiocarbon dates retrieved from ancient slag heaps provide dates of between 3789–3321 BC and 3376–2908 BC suggesting processing of these copper ores at an early date, perhaps the earliest in eastern Turkey. However, no ceramics were uncovered associated with the slag heaps, and given its distance from any Kura-Araxes site (contra Kavtaradze) its link to the Kura-Araxes should be made with some hesitation.

Gold items are not characteristic of the Kura-Araxes culture. Individual gold finds are dated to late KA2 and the subsequent Early Kurgan period. Yet, paradoxically, archaeologists have found a KA1 gold mine: the Sakdrisi mine in the Bolnisi area.[319] Contrary to the common view,[320] this example demonstrates that in the Early Bronze Age gold could be extracted not only from alluvial river deposits, but from complex copper deposits that lie in direct association with numerous Kura-Araxes sites. This South Caucasian work in gold is among the earliest in the region.[321] Perhaps, the dearth of Kura-Araxes gold is again due to contexts; it is generally not deposited in tombs as in the later Kurgan cultures, and as a result it stays in circulation and may get reused and re-smelted by later peoples.

In terms of settlement, Upper Province settlements (see below) tended to develop around gold mines, whereas Lower Province settlements tended to develop around copper mines.

In general, then, evidence of metallurgy suggests a widespread, largely small-scale and possibly domestic use of metal ores for making tools, weapons and ornaments. Compared to the number of lithic and ground stone[322] artifacts found; metal tools are a relatively small percentage of the overall corpus of tools. Like pottery making, the technology is conservative. Evidence for the

[312] Gevorgyan 1980, 1973; Meliksetian *et al.* 2009; Goginyan 1964; Trifonov and Karakhanyan 2004; Gevorgyan *et al.* 2011; Mkrtchyan 1967.
[313] Nezafati *et al.* 2008, 2009.
[314] Nezafati and Stoellner 2017.
[315] Hauptmann *et al.* 2002; Palmieri and DiNocera 1999.
[316] Badalyan 2014.
[317] Meliksetian *et al.* 2009.
[318] Kavtaradze 1999, Wagner *et al.* 1989.
[319] Gambaschidze *et al.* 2010; Hauptmann *et al.* 2010; Stöllner *et al.* 2010.
[320] Gevorgyan and Zalibekyan 2007.
[321] Sagona 2018.
[322] Rothman *forthcoming* a.

Fig. 6. Mineral resources from the South Caucasus and adjoining regions. a) map showing deposits of metal ores, obsidian, salt, and bitumen; b) metal manufacturing tools, tools made from metals, and metal ornaments; c) obsidian, flint knapping tools, and finished tools; d) other trade goods.

exportation of large quantities of ores outside the homeland is minimal, but the movement of processed ores within the homeland from a number of widely scattered mines and associated processing sites must have been common and easy. The smelting of mostly arsenical copper was widely distributed regionally and within KA sites. Most scholars suggest that this means local production was domestic. Certainly, the sorts of specialization typical of metal workers attached to central institutions is not evident. Specialization in workshops or at least production specifically for exchange is possible, but in only a few places. For the most part, production seems to be centered, like in other industries, on the household.

Still, studying the techniques of Kura-Araxes metal workers may be key to understanding their role in the diaspora. Clearly, they were not bringing metal ores from the South Caucasus. On the other hand, if, potentially like wine-makers, they were permitted to move into diaspora settlements, because they brought technical expertise,[323] was one of those areas of expertise metallurgy? The use of fire for pottery was long known in the broader region. However, the process of metal smelting is a different one.[324] The importance of charcoal for smelting in metallurgy implies that one of the first skills needed was to learn how to make charcoal.[325] Learning these new techniques would not happen by mouth, but through intensive, inter-personal instruction, perhaps through the movement of actual metal workers to teach the methods. Metallurgy, requiring, as it does, many steps from mining (importing?) to making charcoal, to developing the tools of production, to the actual processes, would likely have involved many people in the community. Metallurgy may force us to look at the organization more closely.

When we speak of household production, most people think of a single house. When one sees the many tasks involved in producing metal from mining and transporting ores, to separating out ores, to making charcoal for the smelting process, to the making of crucibles, tuyères, molds and so forth, this is a complex task that requires different industries each with their own skill set. Perhaps, however, we have to define the domestic sphere as a multiple (or extended) family of workers with different small-scale industrial activities. In Rice's examination of 16th century Spanish wine production at *bodegas* in southern Peru,[326] she noted that they were self-sufficient units, combining both residential, agricultural, and industrial elements including such manufacturing activities as ceramic production, lime production, metal working, livestock management, and horticulture. A more holistic approach to small settlements in antiquity might be necessary, seeing them less as a collection of independent household units dependent on the markets of larger centers, and more as integrated economic units working together to provide all the necessary goods of the community independently.

Further, the meaning of metal in these societies might be more than their utilitarian or decorative function. Renfrew[327] argues that new technologies tend to emerge out of social needs more than out of new knowledge. A few iron pieces have been found long before iron was a commonly used metal. Therefore, one can speculate that it was the social needs of increasingly complex societies that made metal production important. A careful study of their use in grave

[323] Batiuk 2013.

[324] Roberts *et al.* 2009.

[325] Cradock 2000.

[326] Rice 1996.

[327] Renfrew 1986.

goods versus their use in living areas might clarify this idea further. In that light it is also interesting to note that the fuel used in the ritual hearths (see IIIC. Ritual) was likely charcoal, not wood, because it left little soot. It is tempting to suggest that the connection between metallurgy and the ritual fire was significant; a mere speculation, as it is hard to verify whether the ancients saw it that way.

Bitumen. The uses of bitumen in the Caucasus, including binding of sickle blades to wooden or bone hafts and attaching arrowheads to shafts go back to the Neolithic.[328] Bitumen was also used to repair pottery vessels and similar items by covering cracks, gluing fragments, and filling chipped edges. A unique Kura-Araxes application was to make the body and neck/rim of larger jars separately and attach them with bitumen[329] (see IVB. Kura-Araxes Pottery above).

Deposits of natural bitumen exist in the South Caucasus, the Zagros, alluvial Mesopotamia, and the Levant.[330] They are not as widespread as copper sources, so some kind of exchange was likely. There is widespread use of bitumen in repairing pottery at Köhne Shahar in northwestern Iran.[331]. Alizadeh[332] believes that the production of goods in its walled district were in part in exchange for bitumen. The analyses of bitumen samples from Chalcolithic and Early Bronze Age sites in various regions of Armenia by Tozalakyan and Gazumyan[333] have shown that the latter is a metamorphosed bitumen of asphaltite grade, and the samples differ in their compositions from the Pambak ridge (Gegharot, Aragatsi-berd), Aragats (Tsakhkasar), and the Ararat Valley (Aragats), on the one hand, and Teghut and Areni-1, on the other. It is probable that bitumen was systematically supplied from multiple sources.

This implies that trade in bitumen was necessary for sites over parts of the southern stretches of the homeland zone. Unknown are the networks through which bitumen passed. In Mesopotamia trace analysis of bitumen at Hacınebi was able to demonstrate changing patterns of trade with implications for increasing centralization.[334] The density of data does not permit any such conclusions for the South Caucasus or the diaspora.

Obsidian/flint. Obsidian and flint were essential elements in the Kura-Araxes economy. Unlike metals, for which there are surprisingly few remains, lithics were materials for everyday use, and there are large amounts recovered from every site. They are rarely fully reported, however. They were used in productive processes from potting to animal butchering, farming, leather, wood and cloth working, and cooking, to name but a few. Most attention has been paid to arrowheads. At Shengavit the differing styles, whether they had tangs, recessed or flat bases seem to be randomly found, suggesting a household craft. These may be for hunting or for military attack, but they were also used in ritual contexts. They, therefore, have some special meaning among Kura-Araxes populations. Their size and shape are fairly uniform. They differ largely in how the base is treated, whether straight, concave, or with a tang. Aside from arrowheads, blades (especially sickles), cutters,

[328] Batiuk *et al.* 2019.
[329] Pkhakadze 1963; Khanzadyan 1967.
[330] Khetsuriani *et al.* 2020; Moorey 1999; Connan 1999; Schwartz and Hollander 2008.
[331] Alizadeh *et al.* 2015.
[332] Alizadeh personal communication.
[333] From footnote 26, Badalyan 2014.
[334] Schwartz and Hollander 2008.

scrapers, gravers for incising, and other small tools (**Fig**. 6), obsidian was used as a temper in ceramic production.[335] Not surprisingly, people in the Kura-Araxes homeland also put obsidian in graves.[336]

In general, most of the lithic corpus in the Kura-Araxes homeland was obsidian. The remaining lithic tools, mostly sickles, they made from flint. In the diaspora, obsidian was rare, even when its sources were relatively close. The low levels of obsidian in the diaspora could shed some light on the nature of the relationship between the communities of the diaspora and of the homeland, suggesting the links between them were not as strong as might be supposed.

At Arslantepe "obsidian is not common in any period and decreased progressively across time. It is more common in Period VII, it decreases in VIA and from VIB to VIC and VID it is practically only used for arrowheads. It is a very specialized use" (Frangipane, personal communication). In the Levant, obsidian is rare, with most tools made of flint. At the eastern end of the diaspora, obsidian at Godin Tepe was also rare.[337] Like metals, obsidian was not a raw material widely carried into the diaspora with local materials being prefered for production. Analysis of Caucasian sources matched obsidian artifacts at Tal-e Malyan in Fars Province, but only after the end of the Kura-Araxes period.[338] At Norşuntepe in the Taurus diaspora residents made extensive use of obsidian starting in the Late Chalcolithic.[339] Norşuntepe shared most of the elements of the Kura-Araxes cultural package with the homeland. Supplies were readily available from nearby Bingöl.

The production techniques used are interestingly quite varied from homeland to diaspora. At Shengavit during the KA2, a study[340] showed that obsidian was mostly made from flakes by hammering either blocks of obsidian, or more commonly pebbles of obsidian that washed down the Hrazdan River (**Fig. 6**). These were used as is or were retouched into the desired tool, often with two different working edges on the same tool.[341] Obsidian tool production was somewhat impromptu, and tools were made quickly as needed. Excavators recovered a few production sites, but none seem large or specialized in a particular category of tool. The techniques used at Godin and Taurus sites appear to follow the Chalcolithic bifacial blade core tradition, not the one found in the homeland. The most technically difficult are the arrowheads. It is hard to say that they are specialized products, but certainly a limited number of experienced flintknappers made them.

As far as sources, many existed in a band of highland ridges stretching across Armenia into Georgia (**Fig. 6**).[342] Within these areas, geologists have identified more than twenty obsidian sources representing at least fourteen chemical groups. They also identified sub-sources of obsidian, including deposits of pebble beds, terraces, and alluvial fans that formed through tumbling material downstream as far as a dozen kilometers from their primary sources. The colour of the obsidian varied from black to a striped black and brown to black and clear, and finally red. There were at least ten sources of obsidian for the Kura-Araxes settlements of Ararat Valley, and two for those in Javakheti and Kvemo and Shida Kartli. Chemical source analysis suggests that each site in the

[335] Palumbi *et al.* 2014.
[336] Mirtskhulava 1975, pp. 76–77.
[337] Rothman 2011a.
[338] Blackman *et al.* 2002.
[339] Schmidt 1996.
[340] Rahimi *forthcoming*.
[341] Rahimi *forthcoming*.
[342] Karapetyan *et al.* 2010; Badalyan *et al.* 2004; Frahm *et al.* 2016.

homeland drew its obsidian raw materials from one or two sources.[343] These were maintained over a long period of time. In the diaspora, a number of sources from which ancient materials were used and transported include the Suphan Dağ north of Lake Van, Nemrut Dağ west of Lake Van and Bingöl Dağ near Elaziğ. Most Mesopotamian obsidian came from these latter sources.[344] There is little evidence of South Caucasian obsidian in Mesopotamia.

Overall, the clear picture that emerges is remarkably similar to the ones from the preceding and subsequent eras: for a given area, the primary sources remain stable throughout all of the periods examined. Yet, it is equally clear that obsidian from these sources was traded. For example, all samples at the Velikent settlement on Daghestan's Caspian coast originated from different sources: Chikiani, Arteni, Geghasar.[345] In other words, the movement of obsidian occurred at various spheres of interaction from the local to the more distant. Yet no sites seem to have exclusive control over particular local sources. Inside the volcanic highland zones, the main volume of raw material was distributed within a range of 20 to 60 km, while on its periphery trade tended to extend 200 to 300 or more kilometers. The sourcing of flint is less clear. At Shengavit, it appears to be mined at Mushakan near the obsidian mountain mentioned before eight kilometers from Yerevan. Blanks appear to be made there, and then they were transported to Shengavit, where archaeologists found evidence of retouch sharpening.

As far as these networks of exchange are concerned, the production of small containers with a typical circle within a circle design made at Köhne Shahar,[346] appear on a spindle whorl and amulet-like object at Shengavit (**Fig. 6d**) and in the Amuq[347] suggest that some other kinds of finished goods may have traveled with the raw materials. Whether these were shared designs, or actual trade goods remains to be tested.

Production of objects from obsidian and sickles from flint appears to be local, with less trade in finished products. Specialization may be represented in arrowheads, but this does not so much mean workshop production of particular products, but rather expertise of individual flintknappers within one production unit, probably once again, at a domestic level. These proposals about production still need much more data and analysis. One interaction sphere was within the Lower Province, a different one in the Upper Province. These spheres tend to correlate with the corpus of pottery style in each.

Woodworking, basketry, cloth and leather. A set of productive tasks that at best receive secondary mention in most reports from Kura-Araxes homeland and diaspora sites are those related to wooden objects, basketry, cloth and leather. Perhaps, because the actual products are rarely found, they have not been given the attention that they deserve. What mostly remained are the tools used to make them. Many bronze tools that have been recovered were suitable for woodworking. These include axes, adzes, hatchets, wedges, awls and gouges, which were all well suited to carving wood or bone. Wedges and other lithic tools, as well as bone or ground stone tools, can also be used for

[343] Blackman *et al.* 2002; Chataigner and Gratuze 2014; Badalyan 2001, 2010; Badalyan *et al.* 1996.
[344] Wright 1969; Blackman 1984.
[345] Gadzhiev *et al.* 2000.
[346] Alizadeh *et al.* 2018a.
[347] Braidwood and Briadwood 1960.

woodworking, especially for realising finer details.[348] While there has been much discussion of some pottery shapes representing skeuomorphs of metal vessels, one could also make the argument that for the Kura-Araxes assemblage, many shapes, and in particular the straight-sided and hemispherical bowls, could be seen as more reminiscent of simple wooden vessels. Many of the sinuous-sided shapes, which are often seen as being based on metal prototypes, can also easily be achieved in wood, providing another potential source of inspiration for vessel forms. Polished and oiled wooden vessels would achieve a similar shine to that seen in burnished ceramics, which are frequently (and possibly erroneously) assumed to represent polished metals. Wooden crockery of various shapes and sizes has had a long history of use in zones where timber is abundant. It is perhaps a Near Eastern bias (or more specifically Mesopotamian bias) that materials like wood are a finite resource and a specialised material. Coupled with the fact that wood rarely lasts long enough to be recovered archaeologically, its importance is minimised in the archaeological literature. Where does the use of ceramic vessels fit in when wooden vessels are readily accessible and perhaps easier to make?

Evidence for basketry has been found in impressions on the bases of ceramic vessels. The tools utilised for this craft are mostly bone awls with long, narrow, curved points.[349] These tools are amazingly unchanged from the Mesolithic to modern times, so we can get some idea of their uses from ethnographic studies. Awls were often made from the ulna of sheep or from pieces of cow femurs. Archaeologists have recovered these kinds of awls at Shengavit, Sos Höyük, Pulur Sakyol and elsewhere.[350]

Cloth manufacture is another very common activity. Wool was certainly one fibre that was used, but flax is also evidenced at sites like Shengavit.[351] Loom weights and other tools like bone spacers for lifting the warp to allow easier transit of the shuttle cock carrying the weft are common in many sites. Spindle whorls to make the yarn used in weaving are also common. Cloth was made on a loom, but evidence also exists for knitting,[352] and wools could also easily be felted.

Leather as clothing, perhaps as light armour, footwear and certainly as straps was a very likely product. The types of tools that were likely used for leatherwork are abraders and scrapers. Pumice scrapers are too soft for grinding rough materials like seeds or tempering. Ethnographically, in describing leather tanning Wulff specifically mentions the use of a pumice grinder.[353] The steps in tanning include soaking, liming, swelling, salting, tanning, grinding and burnishing. Grinding happens when tanned hides are sun-dried and polished with a pumice stone to burnish them through pressure.

All these activities are likely to have been local, if only because of the commonality of the tools used for them at most Kura-Araxes sites. Paying greater attention to the tools necessary for various forms of craft production, as well as the full range of material resources available for these productions, reveals hidden industries that can challenge the current understandings of economic organisation in the past. Many of these activities can be undertaken efficiently at a domestic level. No evidence exists for centralised organisation of the craft industries discussed in this section. As

[348] Rahimi forthcoming a.

[349] Rothman forthcoming c.

[350] Koşay 1976, plates 104 and 105.

[351] Kvavadze and Ayotants forthcoming.

[352] C. Sagona 2018.

[353] Wulff 1966, pp. 230f.

Rice noted, the 16th-century wine-producing villages in Peru were agriculturally and industrially self-sufficient, undertaking locally many of the tasks under discussion here. They even produced a surplus that they sold at a regional level. At the small, self-sufficient agro-pastoral settlements, people needed the products from a wide array of crafts, and what we deem "household craft production" does not preclude variability between households nor these small settlements' ability to self-organise production in an organic manner; that is, distributing different crafts to different households. Peru's wine villages demonstrate that production at the household level can supply an entire community with the full array of products necessary for self-sufficiency without higher-level organisation or intra-community or intra-regional economic specialisation. Moreover, this mode of organisation can produce a surplus that can be exchanged at a regional or supra-regional level.

Salt. Relatively recently, archaeologists have documented the mining of salt. Salt is a critical resource for many functions:[354] for cooking, producing cheese, preserving food, improving the milk of sheep and cows, tanning leather, producing medicine, and separating gold from silver. Work carried out at the Duzdağı salt mines in Naxçivan[355] has confirmed the importance of salt in the Early Bronze Age. Additionally, it has shed further light on the skills of Kura-Araxes miners, revealing a complex tool kit for mining and processing of rock. As the researchers noted, in the South Caucasus salt deposits are located almost everywhere. In particular, significant deposits of rock salt in Armenia are concentrated within the Yerevan (Yerevan-Sevan) and Armavir-Massis salt basins. The first and second Yerablur dome-shaped mounds of salt deposits are an important element of this basin.[356]

Among the dozens of Kura-Araxes settlements recorded on these territories, perhaps only Shengavit, located opposite the Yerablur dome-shaped mounds, displays a direct spatial link to a potential source; although there is no definitive archeological evidence to suggest the utilization of these salt mines. Its exploitation was documented only in the second half of the nineteenth and the first half of the twentieth centuries AD. Simonyan[357] has argued that the mines could have been one of the preconditions for the establishment and development of the Shengavit settlement. In this context, the heterogeneity of Shengavit's ceramic corpus, represented by an unusual combination of contemporary Kura-Araxes style groups, can be explained not only through the site's location at the intersection of three cultural areas[358], but also through salt's appeal as an important resource for human and animal food and as a technical product that was much desired. The ability to control this and other resources could have been the basis for some increased complexity at the site (see Section IVA).

In conclusion, the mining and processing of mineral resources into finished products was one critical element of the Kura-Araxes economy. A wide variety of tools and uses of this material were a necessity for daily life. Production appears to have been local, as were the sources of material with which to make them. Where exchange was likely, it tended to be in raw or initially processed materials, not finished products. Production seems to be localized in domestic units. This might not mean individual houses, but larger kinship or communal units. Still, overall, the clear evidence

354 Tonussi 2017.
355 Marro *et al.* 2010.
356 Arzumanyan 1962.
357 Simonyan 2013.
358 Simonyan 2013.

for specialized workshop production thus far is limited to the walled craft area of Köhne Shahar.[359] Certainly, the relation between production and centralization of control in the South Cucasus remains unclear.

V. Summary of sub-regions

Populations bearing the Kura-Araxes cultural tradition spread over a vast area of the Middle East.[360] The exact distribution of the Kura-Araxes continues to be fully documented. Sagona's initial 1984 gazetteer of 471 sites was updated in Batiuk's dissertation[361] to list over 750 sites in the Near East. With the explosion of work undertaken in the region, the database has now been further updated, identifying over 1585 settlements that had Kura-Araxes ceramics in varying percentages. Many of these settlements have been identified by survey, and therefore the degree, nature, and chronology of settlement is not known, especially in the diaspora region. Batiuk created a categorization of settlements, breaking down Kura-Araxes finds by settlements that are 1) dominated by Kura-Araxes ware, 2) sites with mixed assemblages and funerary remains, and 3) settlements that have only a few samples that might not represent actual Kura-Araxes settlement, but either traded items or emulation of Kura-Araxes forms in local ceramic repertoires.[362]

The limited number of good radiocarbon dates, the imprecision of those dates with more than a half a century range in confidence intervals for most dates, and the division of KA1 from KA2 traditions makes models of migration and inter-cultural contact far from precise. However, some patterns are still discernible in the settlement data.[363] The Kura-Araxes homeland consists of three distinct provinces of identifiably distinct forms of tradition (**Fig. 1**): 1) a "Lower Province" centered on the Araxes River in Armenia, Turkey, and parts of Azerbaijan and Iran, 2) an "Upper Province" in Georgia and parts of Azerbaijan focused on the Kura River, and 3) the area along the Araxes River north of Lake Urmia in the Caspian Sea lowlands (**Figs. 7** and **8**).

Kura-Araxes communities in the diaspora can also be subdivided into several regions (**Figs** 7–14), based on variations in material culture and environmental settings. These include 1) Dagestan and the Caspian littoral; 2) the Zagros mountains east and south of Lake Urmia; 3) the Zagros mountains west of Lake Urmia toward Muş and Lake Van; 4) The Western Taurus Mountains into the Upper Euphrates River valley; and 5) the Amuq and Levant.

Climate and environment clearly play a role in the settlement of Kura-Araxes settlement. Each region is different topographically, but there is a remarkable amount of similarity climatically, and in each subregion's potential for agricultural, pastoral, and craft production. The common assumption that the South Caucasus was significantly cooler than the Levant, in fact, is a somewhat inaccurate assumption, and obviously depends on the time of the year. For example, the Ararat

[359] Alizadeh *et al.* 2018a; Samei and Alizadeh 2020.

[360] Sagona 2014a; Smith and Rubinson 2003.

[361] Batiuk 2005, pp. 295–415.

[362] Sites in the diaspora sometimes vary in the number of examples of KA wares found. This is particularly acute in the southern Levant where sites found outside the core of the north Jordan Valley only prodeuce isolated examples. Although identified on the maps as a site with KA wares, in these cases probably does not represent Kura-Araxes settlement, rather examples of trade. See Batiuk 2005: 76-86 for detail.

[363] Sagona 2018; Rothman 2003a; Batiuk 2005, 2013; Batiuk and Rothman 2007.

Valley's mean temperature is quite similar except for three months of the year, and it receives 36% less precipitation than northern Jordan Valley.

Within the homeland zone, a lack of Kura-Araxes settlements in Western Georgia is perhaps linked to environmental conditions. Generally, there are no settlements west of the Likhi Range in Imereti, with the exception of the few settlements in the foothills of the Greater Caucasus on the opposite side of the Jvari Pass, near the towns of Sachkhere and Chiatura in the eastern Imereti region. Further west, the regions of central and western Imereti and Samegrelo/Zemo Svaneti, what was traditionally the region of Colchis, appears to be devoid of any Kura-Araxes settlement. The Likhi range traps most of the humid air from the Black Sea, resulting in a significantly different environment — warmer, wetter, and marshier. Sagona has argued that the absence of Kura-Araxes settlements is the result of the region's marshy nature, or the result of indigenous communities that "posed a formidable barrier that thwarted the expansion of Kura-Araxes values."[364]

Within the diaspora, there are also many significant gaps in clusters of Kura-Araxes settlement that we can now more comfortably say are not the result of problems in survey coverage. These gaps may prove to be as important as the settlement clusters. The lack of settlements bearing any Kura-Araxes wares in the Khabur region of Northern Syria (with the sole possible example of Tell Mozan) must have something to do with the social and economic organization of the region, not the environment. Additionally, the Hakkâri region between Lake Urmia and Lake Van shows no evidence of Kura-Araxes settlement or even presence. Rather this region seems to be culturally affiliated with northern Syria/Iraq, which is logical considering the river valleys are oriented in this direction. The same can be said about the heavily investigated region between Hakkâri and Dıyarbakır. Conversely, the gap in settlement in the Bingöl region, between Muş and Elazığ has not been surveyed because of security issues and will probably reveal extensive occupation whenever it is properly investigated.

The gap between the Malatya/ Elazığ region and the Amuq may represent a similar issue to the Hakkâri/ Dıyarbakır zone. The Upper Euphrates had been integrated into the north Syrian/ Mesopotamian world since the Chalcolithic[365]. Textual data from the later parts of the Early and Middle Bronze Ages show this trend was true then as well. The Upper Euphrates between Malatya and the Turkish border saw local indigenous urban societies emerge that were oriented towards the Mesopotamian world. Kura-Araxes ceramics are generally found in minimal numbers suggesting that, while it may have been a region of intensive contact, it was never a region of Kura-Araxes "settlement." The examples on the Euphrates just south of the Turkish border are usually only a few scattered remains, the result of trade or minimal contact.

Other minor gaps are identified within the subregion descriptions. In the Zagros, for example, no Kura-Araxes presence is evident west of the high mountains in the Mahi-Dasht. But the largest gap is within the confines of modern Lebanon. Sites with some form of Kura-Araxes contact can be found close to the Syrian-Lebanese border. But with the exception of a few sherds found at Tell Arqa, not a single sherd has been identified west of the Anti-Lebanon Mountains. Logic would suggest that this is the result of the lack of proper surveying within Lebanon. However, more recent work has yet to identify any further examples up to the site of Rosh Haniqra in Israel. The gap curiously fits the traditional borders of Phoenicia, which in turn may be reflective of the Early

[364] Sagona 2018, p. 219.

[365] Rothman and Fuensanta 2003.

Bronze Age Kingdom of Byblos within the Egyptian sphere of influence already by the First Dynasty (c. 3100–2900 BC) which may have resulted in another "political" barrier, similar to the Khabur region.

In other words, people bearing the Kura-Araxes cultural tradition did not migrate beyond certain boundaries. Some of these boundaries may have consisted of environments where their economic adaptations did not work. Others, like those connecting the highlands to Mesopotamia, appear to have been political. This is particularly interesting, since the precursors of the Kura-Araxes (see section VI) have clear connections to northern Mesopotamia.

A. Homeland: Lower Province

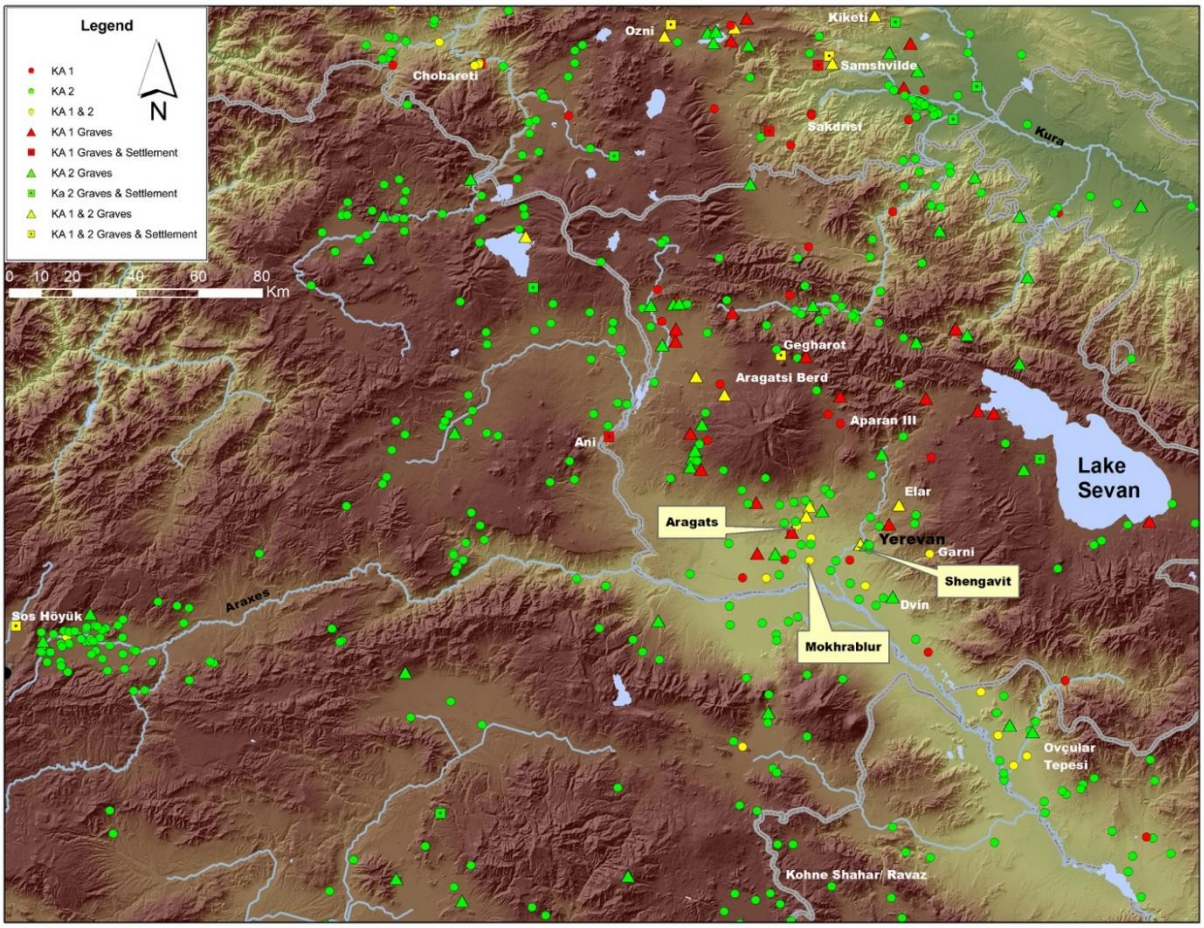

Fig. 7. Distribution of sites in the Lower Province.

The Lower Province runs along the axis of the Araxes River basin, which flows from Erzurum and Pasinler Plains in the west through the Ararat Plain into the Mughan Steppe bordering the Caspian Sea to the east. The more important northern tributaries, particularly the Kasakh and Hrazdan Rivers, snake from the highlands, connecting the Lesser Caucasus mountains along the foothills of Mount Aragats to the Ararat Plain and the Araxes River Valley.

The region's climate is framed by the mountains at its edge. These mountains encircle a subtropical zone. They block humid air masses, so the higher elevations receive 800 mm of rain compared to the lower plains, which receive, on average, 300 mm or less of precipitation per year. The weather is typified by hot, dry summers and cold, wet winters and springs. The soils, too, vary from light brown alluvial soils with little humus in the Ararat Valley to richer and darker ones in the highlands, and black chernozem soils in the higher steppe. The region is one of volcanic outcrops. The need to clear volcanic rocks from the soil limits the hectares of field available for farming. Residents utilized the lower elevations for agriculture, horticulture, and animal husbandry, whereas the higher elevation plateaus, intermontane valleys, and the piedmont zone could be exploited for more limited farming, while providing ample pasture for animal herding.

The Lower Province appears to have been a system of higher and lower elevation sites. The altitude gradient ranges from 2100 m above seal level (asl) at Geharot to 990 m asl at Shengavit to below 800 m asl in Naxçivan. All of this change is over a distance of less than 150 km. But most settlements are confined to the alluvial zones of the Araxes River Valley (c. 600–900 m asl), as well as the high intermontane valleys, gorges, and plateaus (c. 1700–2200 m asl). These sites are primarily found in three locations: 1) on natural hills or terraces along the edges of river valleys (for example, Duzdağı, Gegharot, Ovçular Tepesi, Shengavit, Köhne Shahar); 2) on natural bluffs, elevated, volcanic outcrops, and river terraces (for example, Armavir Blur and Metsamor); and 3) as traditional mounds on alluvial flatlands, valley floors, and floodplains (For example, Aygavan, Jrahovit, Maxta, Kültepe II, Mokhra Blur, Sev Blur, Dvin, and Voske Blur). All three areas provided residents with easy access to reliable water sources, whereas the choice of bluffs and hilltops may have had the advantage of a more defensible position. The occurrence of armed conflict, however, is not well documented.

Settlement during KA1 was primarily concentrated in the Ararat Plain, in the middle Araxes River Valley (on either side of the river), and highlands around Mount Aragats. By KA2, many of these sites were abandoned, as occupation shifted to the higher terraces around the valley, and farther north into the intermontane plateaus of the Lesser Caucasus Mountains, such as the Kotayk Plateau, in Armenia, and the Iğdır, Doğubeyazıt and Çaldıran highland plains in Turkey. One possible reason for abandoning stetches of the Ararat Valley was salinization of the soils making agriculture unproductive.[366]

The nature of economic production and exchange in this province is evidenced by both the location of the sites and artifactual remains. Settlements in the Lower Province were situated along strategic nodes and routes of communication and near key natural resource areas. The major east-west route was along the Araxes River. North to south routes existed from near modern Yerevan in the center of the Lower Province and modern Tbilisi in the Upper Province, snaking through valley bottoms, around the Pambak Ridge north of Lake Sevan and then northward toward the Upper Province through a limited number of passes. Later, KA2 settlements such as Aragatsi-Berd, Lusaghbyur, and Meghradzor were able to control critical communication routes along the Spitak, Jajur, and Meghradzor passes, respectively. These routes crossed areas where locals extracted various critical resources.

[366] Areshian 2005.

Several key sites in this province provide us with a snapshot of the nature of craft activities and patterns of social and economic change through time. One of the best known of those sites is Shengavit.[367] As a result of Soviet and later building activities, only about 35% of the estimated six hectares remains today. In that space, archaeologists recovered evidence of pottery, wine, and bead making, copper smelting and molding of items of personal adornment, ax blades, and short pikes, as well as in all likelihood leather and cloth making, and salt production. Many tons of cereals were stored in large, lined pits with tufa lids.[368] An analysis of pollens by Elisio Kvavadze[369] indicates a very active agricultural production regime at Shengavit. The recent excavators[370] argue that the population of the site was probably not big enough to require the amounts of grain stored. A possible polity in its local area is suggested by three smaller sites, now destroyed, in Shengavit's area, as possibly were others bulldozed during the expansion of the city of Yerevan. Its functions in storage and production made Shengavit a local center. Despite some disagreement between Rothman and Simonyan, the radiocarbon dates and pottery data indicate that the site was founded in the early KA2 and lasted until about 2450 BC. Its architecture evolved from round houses with fairly thin walls to somewhat more substantial walls in a round or square center room (**Fig. 3D**). Attached to these more substantial houses were often squared adjoining rooms (see Section IIIB). The residents also built a massive wall with rounded towers.[371] The wall is four meters thick on the northern edge of the site overlooking the slope to the Hrazdan River and wider away from the slope on the west and south. There a triple wall spans sic meters. The residents made the wall of unmodified stone that had to be dragged up to the bluff.[372]

Likewise, the sequence at Mokhra Blur evolves from a hamlet of small, curvilinear, and free-standing houses in Levels XI to IX (KA1) to a larger village of multi-chambered houses made with thicker walls in Levels 8–4 (KA2). The site had a mudbrick encircling wall. At its center lay a mammoth stone tower topped by a basalt monolith. Both the tower and the monolith have survived to a height of four m each.[373]

Elements from both sites are found at Köhne Shahar (Ravaz).[374] Although the site is within the borders of modern Iran, it is clearly a part of the Lower Province sitting near Ovçular Tepesi (**Fig. 1**). The site is located at 1905 m asl. It is on a bluff along a tributary of the Araxes River. At 15 ha, it is among the larger Kura-Araxes sites. It consisted of a walled district and an unwalled outer set of neighborhoods. Earlier residences in occupation phases I–III (KA1) were largely round wattle and daub buildings replaced by a larger and densely packed mix of rectilinear and round buildings of stone in KA2 in occupation phases IV–V.[375] This later town was designed in a spoke and wheel layout facing a large central plaza and a mudbrick platform walled in by shaped stones.[376]

[367] Simonyan and Rothman 2015; Simonyan 2015, 2013; Sardarian 1967; Badalyan *et al.* 2015.
[368] Simonyan and Rothman 2015; Simonyan 2015, p. 127.
[369] Kvavadze *forthcoming*.
[370] Simonyan and Rothman 2015; Simonyan 2015.
[371] Düring 2011.
[372] Simonyan and Rothman in press.
[373] Areshian 2007; Areshian and Kadarian 1975.
[374] Alizadeh *et al.* 2018a; Samei and Alizadeh 2020; Kleiss and Kroll 1979.
[375] Alizadeh *et al.* 2018a.
[376] Alizadeh *et al.* 2015; Kleiss and Kroll 1979.

Archaeologists find evidence of many productive activities throughout the Lower Province. The site of Duzdağı in Naxçivan was the focus of specialized salt mining and production.[377] Metal production is also evidenced by the large hoard of bronze pickaxes and adzes found at Jrashen,[378] but metalworkers' tools appeared at most sites. Whereas the level of craft production at sites like Shengavit are still open to interpretation, the excavators of Köhne Shahar claim to have evidence of community level production.[379] Köhne Shahar in KA2 was organized into several workshops that engaged in a variety of craft and industrial activities, including textile production, making objects from the horns of cattle, and the manufacture of a range of small, possibly ornamental objects including beads, metals, and ground stone objects.[380] Evidence of craft production activities there consists of pyrotechnologic installations, piles of slags, crucibles, tuyères, anvil stones, flat and round-ended pestles, hammer stones and pounders/grinders, many bone and antler tools, numerous finished and unfinished stone beads, ore fragments, and thick homogeneous ash deposits and waste materials accumulated in associated architectural spaces near production units. Alizadeh (personal communication) believes that bitumen was one of the goods received in exchange for these goods.

Some argue for an increase in societal complexity in the Lower Province during the KA2.[381] The degree of increase is much debated. The assumption is that the scale of surplus food production and the extraction and exchange of raw materials and finished products created a need for comptrollers or at least gave those who desired to grasp some level of instituted control a vehicle to do so. This centralization was evidenced in the recruiting of labour to build town walls, and the possible centralizing of religious practice at places such as Mokhra Blur. Areshian[382] believes that control of this system created a three-tiered settlement pattern in the Ararat Plain. However, the lack of concurrent evidence of any administrative control system on which the three-tiered model is based makes such a conclusion questionable (see Section VI below). The smelting and molding of metal goods was not at the scale apparent in the Middle Bronze Age and later. However, metal hoards, such as the one at Jrashen, may signal an accumulation of wealth in Kura-Araxes society.[383]

The Lower Province in many ways seems to have been a network for exchange of raw materials and finished goods. So, there is a real possibility that in the KA2 societies in the Lower Province were evolving toward more complex organization. There is, however, little evidence that they were organized and coordinated hierarchically. The absence of social stratification is directly evidenced by the uniformity of architectural remains and lack of differentiation in burial practices. The lack of any signs of social inequality would suggest that either excavators did not find the buildings associated with central institutions or perhaps, like the Pueblos of Southwest United States,[384] a group known for administering central activities of building and trade used a model of outward kinship and egalitarian symbolism to exert unequal sway. Social inequalities are also detectable in food production and preparation practices. Archaeobotanical and zooarchaeological studies show

[377] Marro *et al.* 2010
[378] Areshian 2007.
[379] Alizadeh *et al.* 2018a; Samei and Alizadeh 2020.
[380] Samei and Alizadeh 2020.
[381] Rothman 2015b; Alizadeh *et al.* 2015; Areshian 2007.
[382] Areshian 2007.
[383] Areshian 2007.
[384] Rothman 2015b.

conclusively that in the Lower Province food production took place at the household-level and catered in large part to the immediate subsistence needs of communities.[385] Various crafts appear to have been made by households. This also extends to the specialized production of gromwell root-derived pigments at Mokhra Blur where, Areshian believes, production took place at the household level.[386]

The household-centric organization of society and economy is also reflected in ritual practices. The most conspicuous signs of ritual practices are the central hearths of Kura-Araxes houses from the KA1 ceramic hearths of Sos Höyük with small holes to the well-designed three-lobed hearth in the early phases of Shengavit, and elsewhere. Square M5 at Shengavit yielded a complete ritual emplacement with the ceramic hearth (see Section IIIC), a standing altar with channels for run-off of sacrificed animals, bins with burnt material, steps down into the room, and a specially designed bowl sitting on one of the lobes of the hearth. Simonyan[387] sees this as a fire temple, but its small size and almost identical layout to a series of adjoining houses at Pulur Sakyol suggest to Rothman that this was simply an elabourate household shrine.[388] It could have been visited by people outside the immediate residents like the divination center at Late Bronze Gegharot,[389] but it does not indicate public ritual. Not all ritual activities, however, were centered around the household. The platform and stelae of Mokhra Blur may present such a public ritual, but unfortunately, the adjoining building was not excavated[390].

B. Homeland: Upper Province

The Upper Province is located along the Kura River valley and its tributaries. The Kura flows from the Kars highlands of eastern Anatolia in the west, through the length of the Republic of Georgia and the Gəncə-Gazax region of Azerbaijan, to the central flatland of Azerbaijan and ultimately into the Caspian Sea. The province is delineated to the north by the Greater Caucasus Mountains, to the west by the Colchis region of Georgia; and to the south by the northern slopes and piedmonts of the Lesser Caucasus Mountains and the Javakheti and Tsalka Plateaus.

The climate is defined, as was the Lower Province, by the mountains. In this case, the Greater Caucasus protected the area from the colder weather to its north. Warmth and humidity flow off the Black Sea, creating a subtropical maritime climate in the western regions of Georgia. The Likhi range, which bridges the Greater and Lesser Caucasus, moderates the humid winds from the Black Sea, creating a cooler and drier climate, and appears to form a *de facto* western barrier to Kura-Araxes settlement.

The greater concentration of Kura-Araxes sites in this province are located in the middle Kura River in eastern Georgia, particularly in the modern provinces of Shida Kartli, Kvemo Kartli, with minor concentrations in the Mtskheta-Mtianeti and Kakheti regions.The other main locus of occupation is the highland Samtskhe-Javakheti region adjacent to Shida and Kvemo Kartli, of which

[385] Samei 2019.
[386] Areshian 2007.
[387] Simonyan 2013.
[388] Simonyan and Rothman 2015.
[389] Smith and Leon 2014.
[390] Areshian 2005.

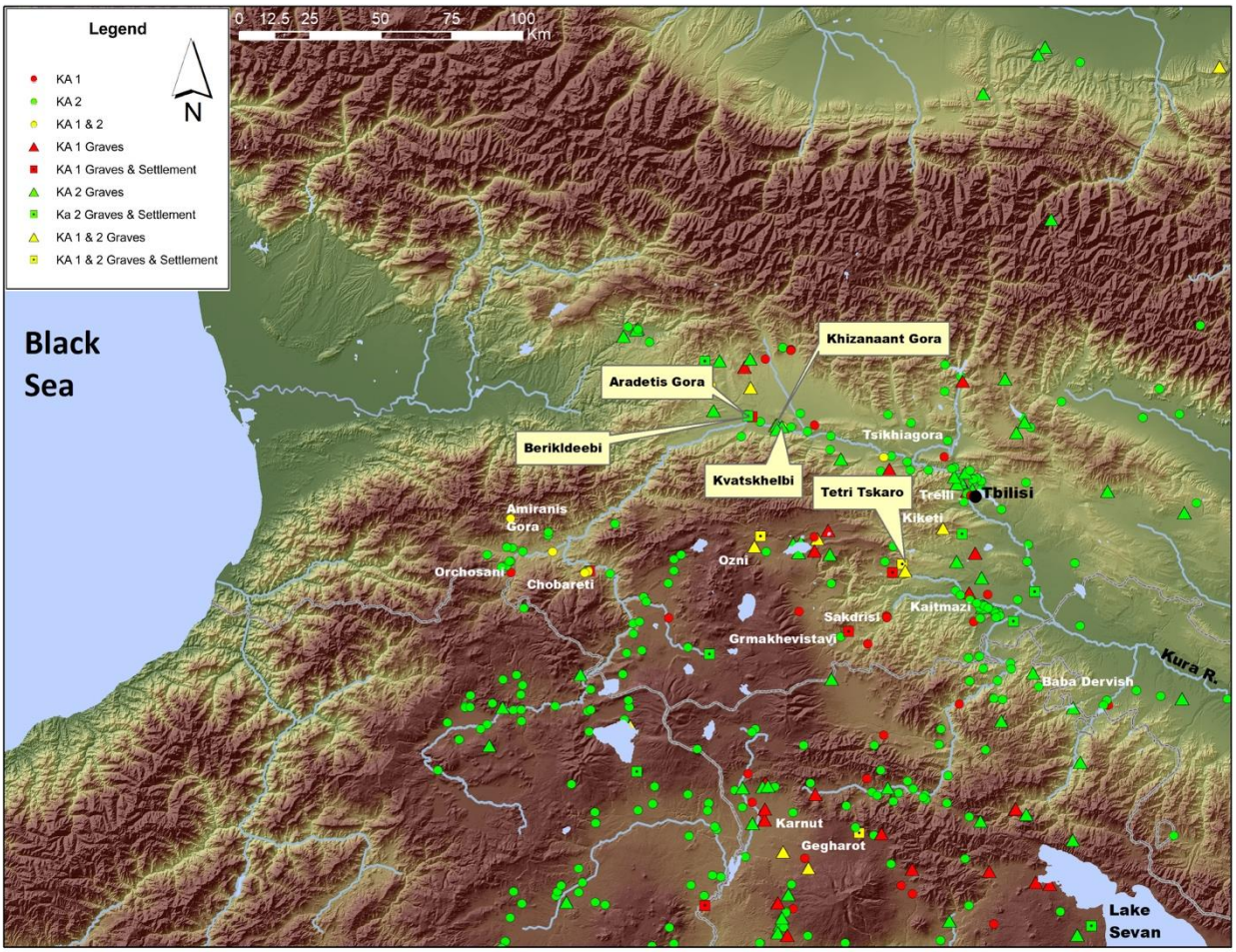

Fig. 8. Kura-Araxes site distribution in the Upper Province.

the Tsalka Plateau is part. The vegetation of the region includes montane, subalpine, and alpine forests, as well as nival (glacial) and subnival zones. The region has an incredibly high biodiversity with 6300 identified species.[391] Similar to the Lower Province, residents utilized the lower elevations for agriculture, horticulture, and animal husbandry, and the higher elevation plateaus, intermontane valleys, and the piedmont zone for some farming but more for pastureland.

In Kvemo and Shida Kartli and the regions to the east, even at the same elevation, the temperatures are on average no higher than 32° C, dropping to 5° C in the winter. Rainfall in the plains is 400–700 mm a year, with a higher number in the surrounding slopes. Whereas today these regions are typified more by scrub than deciduous trees, during the Kura-Araxes the climate was wetter as the area was covered by expanding deciduous forests.[392] In these areas, most sites—these include Berikldeebi, Khizanaant Gora, Koda, Kiketi, Kvatskhelebi, and Natsagora—were located in the lowland regions (200–900 m asl) on river terraces surrounding the Kura River and its numerous tributaries, particularly Aragvi, Debeda, Liakhvi, and Khrami Rivers. Western Kvemo Kartli

[391] Gagnidze *et al.* 2002.

[392] Connor and Kvavadze 2014.

includes the Tsalka plateau, a continuation of the Javakheti Plateau (see below). It served as the upper catchment area of the Khrami River, a major tributary of the Kura that runs through the Marneuli region. It is in this region of the Kvemo Kartli Province where the highest concentration of KA1 sites can be found. The river valleys that drain the Javakheti Plateau cut through rolling hill slopes that run east where the early hominid site of Dminisi as well as the ancient gold mines of Sakdrisi are located. The region also contains several passes leading into the mineral and metal-rich Armenian highlands north of Lake Sevan with which it has cultural connections.

The eastern parts of the province, particularly the areas between the Kura River and the southern slopes of the Greater Caucasus Mountains had a comparatively low number of settlements; however, this may be more the result of lack of intensive research in the Kakheti region of Georgia, and the Şəki-Zaqatala region of Azerbaijan. In contrast, a number of key Kura-Araxes kurgans were recovered along the right bank of the Kura River in the Quba-Xaçmaz region of Azerbaijan.

The Samtskhe-Javakheti area is located to the south of Shida Kartli and west of Kvemo Kartli. It borders Armenia and the northeastern corner of Anatolia. Geologically, it lies in the Akhaltsihje depression; it is predominantly alpine and mountainous (800–3200 m asl) with numerous deep valleys and volcanic reliefs. Abandoned terraces throughout the region testify to significant grain agriculture in the past, which had been abandoned for intensive sheep herding in the Soviet period. The climate of the region is considered continental, with an average annual precipitation of 700 mm, mild summers (average 20° C), and moderately cold winters (lows of –1.5° C). The Javakheti area, the southern continuation of the Tsalka Plateau, is a large volcanic grassland plain which dominates the region at an average elevation of 2000 m asl. The plain was created from lava flows from the volcanic cones of the Abul-Samsari range, and contains numerous wetlands and six major lakes, the largest of which is Lake Paravani. From a topographic standpoint, Samtskhe-Javakheti represents a true highland occupation. Surveys have not been conducted extensively and, until recently, with the exception of Amiranis Gora and Chobareti, few excavations had been undertaken in the region.

Mot settlements in the Upper Province are small, two to four hectares in size, although larger settlements do exist, especially in KA2, and can reach seven hectares or more (e.g. Kaitmazi). The terraces above the Kura River were only sporadically occupied before the Kura-Araxes, and those sites look more like temporary encampments. During the Kura-Araxes more permanent settlements existed, perhaps because of the period's warmer and wetter climate.[393] Much like in the Lower Province, settlements were primarily located near sources of water or at strategic spots along main communications routes across the plain, which link the Tbilisi region and the western region of Imereti, but more importantly the mountain valleys leading to the highland zone of Javakheti.

The overall small size of the sites, and their layouts suggest that most are remnants of small, agropastoral settlements, with some smaller sites in the highlands serving as temporary camps of mobile pastoralists. These pastoralists might have been a small segment of the settled population who were seasonally transhumant or pastoral nomads, although there is less evidence of the later unless they are the groups with early kurgans. In contrast to the Lower Province, a dearth of zooarchaeological and archaeobotanical information precludes any in-depth study of economic and social organization of the region. However, similar to the Lower Province, temporal changes in

[393] Palumbi 2016; Ollivier *et al.* 2016.

architectural layout from small, round, free-standing structures in KA1 to larger rectilinear structures in KA2, is suggestive of a change in social structure through time.

The site of Berikldeebi, excavated by Javakhishvili between 1979 and 1992,[394] appears to be one of the main sites that preserve the transition from the Chalcolithic to the Early Bronze Age Levels IV1and IV2. They were heavily damaged by post-Kura-Araxes Level III Bedeni pitting, but they appear to have covered the entire settlement. A circular wattle-and-daub structure (Building 1) roughly nine meters in diameter was established directly on top of the Level V large rectangular mudbrick "temple" building. It was the sole coherent structure belonging to the IV1 level that archaeologists recovered. The remainder of the excavated IV1 consisted of pits, hearths, and wall fragments. Level IV2 was better preserved, revealing an additional six structures. The material all belong to early KA1, and the remains' stratigraphic position directly above the Chalcolithic remains are "pivotal in determining the stratigraphic relationship" between the Kura Araxes and the previous Late Chalcolithic occupation.[395] Similarly, the KA1 sites of Tetriskaro and Samshvilde in the Marneuli Plain of Kvemo Kartli produced circular architecture of wattle-and-daub (with Tetriskaro producing key-hole or *tholos* shaped structures). The site of Ozni, excavated by Kuftin in the hills rising toward the Javakheti Plateau, was also another KA1 site characterized by circular architecture. In contrast, Khizinaant Gora, excavated by Kikvidze,[396] revealed nineteen wattle-and-daub structures over four phases of Kura-Araxes occupation that appear to show a transition between an earlier circular tradition and a later rectilinear one. The predominance of rectilinear structures in KA2 is further supported by excavations at Kvatskhelebi from 1954 to 1964 by Berdzenishvili, Glonti, and Javakhishvili.[397] The site is located on a terrace overlooking the left bank of the Kura River and represents perhaps the largest horizontal exposure of a Kura-Araxes settlement excavated in Georgia (see Section IIIC). A typical Kvatskhelebi house consisted of a main square room and attached rectangular annex. The annex was wattle and daub, while the main room was often made of mud brick.

The interiors of the houses were painted with a bright red ochre and focused on a clover-leaf hearth or *ojagh* set into the center of the floor. The two sites provide some of our widest exposures of a Kura-Araxes village. Aradetis Orgora (Dedoplis Gora), excavated by Gagoshidze and Rova, is a settlement mound and a cemetery located on three hills approximately 500 m from the Kura River in the Kareli district.[398] Recent excavations at Dedoplis yielded four meters of Kura-Araxes occupation that produced a similar pattern of round and rectilinear architecture as seen at Khizanaat Gora[399].

Excavators found thirteen stone-lined tombs and pit graves on the flanks of the mound that were dated to the early part of the KA2 period.[400] A number of similar cemeteries have been identified in Shida Kartli and are most frequently found along the banks of the Kura or isolated on the slopes of multi-period tells and natural hills. Most graves are single interments of simple earthen pits

[394] Javkhishvili 1998.
[395] Sagona 2018, p. 229.
[396] Kikvidze 1972.
[397] Javkhishvili eand Glonti 1962.
[398] Gagoshidze and Rova 2017.
[399] Gagoshidze and Rova 2017.
[400] Koridze and Palumbi 2008.

and/or stone-lined cist tombs and isolated kurgans. Their sameness implies an egalitarian social structure.[401]

The adaptation of the Kura-Araxes people in this region suggests that for the most part they were long-term, settled agricultural and pastoral people[402]. It appears they grew crops in the valley bottoms and to some extent on the slopes, and raised a variety of cows, sheep/goat, and pigs. Evidence for any kind of specialized pastoralism is meager. As Sagona[403] explains, these very simple villages with food production and craft production at the household level were typical. The exception might be metallurgy. The quality and importance of metal production in the Upper Province and the networks of trade it developed with the Lower Province created a number of avenues for increasing political control and societal restructuring.

One question remaining is what the place of Sos Höyük is in these subregions. It usually is considered to be of the Lower Province. As we will discuss below for Malatya, the likely route north along the Kara Su River, would have passed near Sos. The pottery (**Fig. 2**) suggests it had a hybrid of Lower and Upper Province styles. So, it may be a mediator between the two provinces.

C. Homeland: Eastern Araxes

The eastern end of the Araxes River runs into the Mughan steppe, where it joins the Kura River and flows into the Caspian Sea (**Fig. 9**) . At one level it is a continuation of the Lower Province, but it may also be part of the diaspora.

Environmentally, the area along with the South Caucasus experienced a significant increase in forest land. At the same time, the elevation of the sites is lower than much of its adjoining territory. Sites go from 330 m asl at Köhne Pasgah Tepesi to 968 m asl at Kültepe Jolfa.[404] The precipitation at 300 mm annually here is sufficient for rainfall agriculture, although historically the area was pasture for nomadic groups.[405] Residents here experience mild winters and dry summers. The hydrology of the subregion varies a one moves from west to east from a "water gathering area" to the Khoda-Afrin and Mughan stepee, which is an "irrigation zone."[406] The Araxes

River has meandered up to a kilometer in the past 60 years and eroded large areas. At the same time the valley bottoms are rich with native plants. The obsidian sources in Syunik provide one clear resource for exploitation.

Evidence for the Kura-Araxes in northwest Iran is relatively recent. It come from small soundings at sites such as Kültepe Jolfa,[407] Köhne Pasgah Tepesi in the Araxes River Valley near Khoda Afarin,[408] and Nadir Tepesi in the Mughan Steppe.[409] A number of surveys accompanied these excavations.

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[401] Sagona 2014b.
[402] Sagona 2014b.
[403] Sagona 2014b.
[404] Maziar 2016, Table 86.
[405] Alizadeh *et al.* 2018a.
[406] Maziar and Zalaghi 2020.
[407] Abedi et al. 2014.
[408] Maziar 2010, 2016.
[409] Alizadeh et al. 2018a.

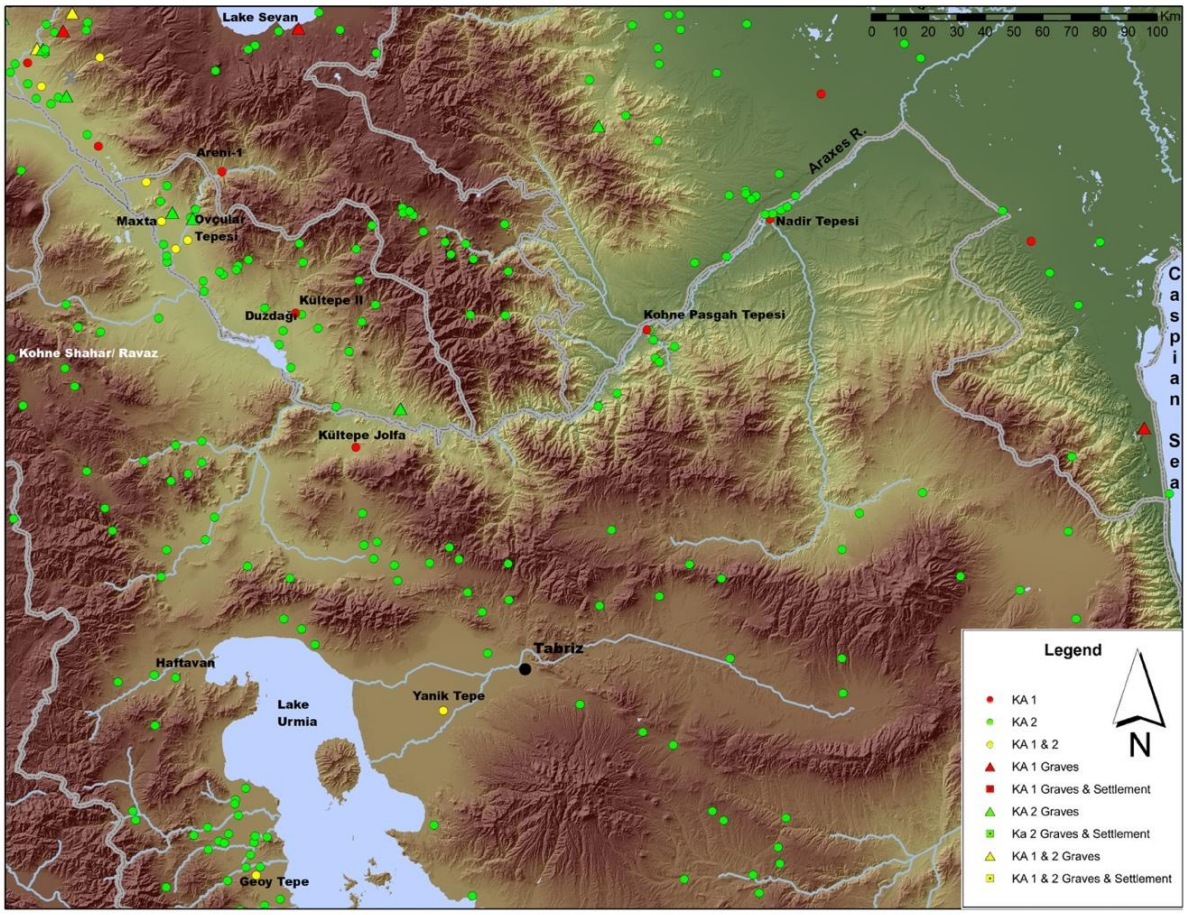

Fig. 9. Kura-Araxes site distribution in the eastern Araxes north of Lake Urmia.

Therefore, we know little in detail about various aspects of the culture and organization of its population. The stylistic connections are not so much to the homeland in KA2. Based on published material, the surfaces and some shapes are the same, but the incised designs as well as the incised designs with lime inclusions of Yanik ware are absent. Some dimple and line designs west of Lake Urmia existed,[410] but a systematic study is not yet available.

Economically, exploitation of animal bones from Köhné Pasgah Tepesi emphasized sheep and goat. A much smaller percentage of animal remains were cows and equids[411]. Plant foods include wheat and barley as well as grape and hackenberry, but none of the tree fruits. At Köhné Pasgah Tepesi only 8% of stone tools were obsidian, but at Köhne Tepe the percentage was much higher. Excavators recovered little evidence of metal working in the far eastern part. At Küültepe Jolfa level IV, closer to the Lower Province, archaeologists recovered a pyrotechnologic installation and smelting molds[412] indicating that craft production activities were present at Küültepe Jolfa as well. The scale and geographical extent of these exchange networks remains to be clarified.

[410] Rothman 2003b; Maziar et al. 2010.
[411] Maziar 2016.
[412] Abedi *et al.* 2014, fig. 38.

One critical aspect of the Kura-Araxes story is evidenced there: its end. Results from excavations at Kültepe Jolfa[413], Köhné Pasgah Tepesi in the Araxes River Valley near Khoda Afarin[414], Nadir Tepesi in the Mughan Steppe[415] provide us a more nuanced understanding of it. Little evidence of a violent end is evident in the Lower Province. In the Mughan steppe, Nadir Tepe may, on the other hand, suggest a violent end a few hundred years later than other Iranian sites. It all suggests that different Kura-Araxes settlements may have ended differently. There is not a uniform scenario for the end of the Kura-Araxes culture[416] (see below).

D. Diaspora: Central Caspian littoral

The northeastern face of the Greater Caucasus borders the Caspian plain to the west and runs up to the Caspian Sea at Derbent. Consisting of the Republics of Dagestan, Chechnya, and Ingushetia in the Russian Federation and the northernmost point of Azerbaijan, some scholars regard it as part of the Kura-Araxes homeland, but, in reality, it might be best considered as part of the diaspora or even just Kura-Araxes influenced.

The Caspian littoral (**Fig. 10**) is a narrow gateway linking the Eurasia and the Iranian plateau and represents a complex landscape of coastal plains with an elevation from −28 m asl near Xudat in Azerbaijan to 4 m asl around Derbent, with the piedmonts to the west of Derbent rapidly reaching heights of 600–1000 m asl. From there the Greater Caucasus reach heights between 2800 and 4480 m asl, cut frequently by steep intermontane valleys with fast moving rivers. Precipitation similarly varies from between 250–380 mm on the coastal plain, 800 mm per year in the piedmont, and 2360 mm in the mountains. The climate of the coastal plain has warm, relatively dry summers with a maximum temperature of 29° C, and cool, relatively moist winters with lows of 2° C. The mountains, in contrast, have a temperature profile with average highs of around 18° C, lows of −8° C, and receive significant snowfall.

Surveys have identified a significant number of occupation sites and cemeteries that yielded Kura-Araxes material, but also evidence of funerary rituals that are not within the norm for"classical" Kura-Araxes features. A number of researchers describe it as a Kura-Araxes variant.[417] Understanding how this culture relates to the Kura-Araxes is still being untangled. Kohl prefers to see Velikent as a "component" of the Kura-Araxes.[418] Others see it as an independent culture that had its antecedents in the little explored Chalcolithic cultures of Dagestan, combined with Kura-Araxes elements as well as Maikop elements from the northwest.[419] It is known as the Velikent II culture after the site of Velikent on the Caspian Sea coast. Originally investigated in the 1950s, the Soviets continued its excavations in the 1970s and 80s. The Daghestan-American Velikent Expedition excavated several settlements and cemeteries have been partially in more recent years.[420]

[413] Abedi *et al.* 2014.
[414] Maziar 2010.
[415] Alizadeh *et al.* 2018b.
[416] Alizadeh *et al.* 2018b.
[417] Gadzhiev *et al.* 2000.
[418] Kohl 2007.
[419] Kohl 2007, p. 103; Gadzhiev *et al.* 2000, p. 199.
[420] Kohl and Magomedov 2014.

Fig. 10. Kura-Araxes site distribution in Daghestan and the Caspian Sea littoral.

The coastal plain was not settled before this Velikent phase in the KA1/KA2 transition.

The site of Velikent is in the village of the same name, 25 km northwest of the city of Derbent. It consists of five separate mounds established on an ancient terrace that was occupied from the Late

Chalcolithic to the Middle Bronze Age (c. 3500–1800 BC). The Soviet expeditions focused on the Middle Bronze settlement on Bronze Mound I and the Early Bronze catacomb cemetery on Mound III, while a later American expedition focused on the Early Bronze settlement of Mound II, and a number of other settlements in the subregion including Kabaz-Kutan and Novo-Gaptsakh.

Based on these various excavations and the radiocarbon dates that have been recovered from them, Magomedov divided occupation in the region into four phases: phase I, 3500–2900 BC; phase II, 2900–2500 BC; phase III, 2500–2200 BC; and phase IV, 2200–1900 BC.[421] Phase I comprises the Velikent II culture, which has been identified at the site of Serzhen'-yurt in Chechnya and other Chalcolithic and Early Bronze Age settlements in the mountainous regions of Dagestan and adjacent piedmonts (see below). Advanced metallurgy is readily apparent in these Velikent II sites, and many of the sites were founded near known copper deposits.[422] Phase II is associated with the Kura-Araxes based on burnished pottery forms and has the greatest number of settlements in the subregion. Phases III and IV saw a marked contraction in settlement numbers to a narrow strip on the coastal plain and reveals a culture that seems to be derived from the Velikent II culture.

Excavations at Mound I of Velikent (known as Karasu-Tepe) reveal the similar pattern of transition from circular semi-subterranean houses to rectangular wattle-and-daub structures over time. Interior surfaces in many of the structures had large monochrome storage jars that were not of typical Kura-Araxes shapes but displayed typical Kura-Araxes relief decorations. Evidence of storage and production of ceramics and metals is evident in the houses. Velikent II ceramics are a heavily slipped, wheel-finished, burnished red ware that is well fired in an oxidized kiln, creating a metallic clinky fabric. The pottery often has incised and impressed decoration that has interesting comparisons to ceramics from Northern Mesopotamia in the early 4th millennium. It might point to a source of North Caucasian contacts with the Mesopotamian world.[423] Munchaev first identified this distinctive ware at his excavations of Serzhen'-yurt in Chechnya, and it is often over-represented in publication. In reality it never makes up more than 10% of the pottery corpus.[424] The same is true at other sites, such as Kabaz-Kutan.[425] This fine ware is restricted to settlements and is not found in funerary contexts.

Velikent exhibits the burnished pottery "variant" of the Kura-Araxes in the KA2 and the square wattle and daub architecture common elsewhere in the homeland zone, especially in the diaspora. It also has the andirons related to the Kura-Araxes ritual of the hearth, but not the ceramic hearths of the homeland.[426] The coastal plain was not settled before the KA1/KA2 transition, although radiocarbon dates from Velikent do suggest the Velikent II culture having its beginnings at about the same time as the Kura-Araxes, c. 3500 BC.[427] Archaeologists found most of the metals in tombs.[428] Close to 1500 copper, arsenical bronzes, tin bronze, and silver objects came from the

[421] Kohl and Magomedov 2014, p. 155.
[422] Kohl and Magomedov 2014, p. 103.
[423] Kohl 2007, p. 106.
[424] Munchaev 1975.
[425] Kohl and Magomedov 2014, p. 103.
[426] Kohl 2007.
[427] Kohl and Magomedov 2014, pp. 97–99.
[428] Kohl and Magomedov 2014.

communal Tomb 1 with close to 100 individuals on Mound I at Velikent.[429] This is one more bit of evidence that the metals of the Kura-Araxes were used more for their symbolic meanings than as common tools (see IV. Metals above). The cemetery tombs produce goods that have significant connections with early third millennium communities in the Eurasian steppes and northwestern Caucasia.[430]

Sources of the metals used for the objects have not been presently determined but are assumed to be from mines in Dagestan in the area to the northwest where archaeologists identified Velikent II culture[431]. Metallurgical activities have been identified not only at Velikent, but also at Kabaz-Kutan. These include copper prills and hammer stones, suggesting metallurgy was widespread[432]. It also suggests a similar production methodology to that observed in the Kura-Araxes (see above) with only secondary smelting/ processing occurring in the settlements on the Caspian littoral. Metal object morphology, however, is unique to the region and the same as Kura-Araxes metals, with a larger selection of jewelry, in particular ringlets and bracelets. An unusual, if small, sample of tin-bronze is among these metals and may represent a re-smelting of an import. They are distinct from their other cuprous examples for their high level of lead and nickel, but also share chemical signatures with other tin bronzes found in other Early Bronze sites in the Near East[433]. It may again point to the greater inter-regional connections of this region.

Cultivated plants mostly consisted of barley, although the ratio of barley to various wheats decreased over time. Grape pips found there may have been from wild plants. Unlike the homeland zone, the Velikent population used more cows than sheep/goat, although see Section IIID above about the problems associated with analyzing cattle remains from Kura-Araxes sites. Earlier attribution of the equus bones as true horses are no longer accepted as such; rather, they were wild asses (onager)[434]. The same was true at Shengavit in KA2.

Overall, the occupation of the Caspian coast occurred during the KA2, although the routes of the Velikent II culture began in KA1, either locally or in the foothills of the Greater Caucasus where some Earlier Chalcolithic and some earlier Kura-Araxes sites were located. This subregion represented one corridor northward across the Greater Caucasus Mountains, and southwards to Azerbaijan, Iran, and the greater Near Eastern World. Other passes existed in the Upper Provinces. The remains have some cultural elements of the Kur-Araxes– these include andirons, square wattle and daub houses, arrowheads of a particular style– and elements of the Maikop/Novosvobodnaya. At the same time, there are elements that are very much local, including the use of the wheel for finishing, the firing of pottery, etc. These elements, coupled with the repeated pattern of the Velikent II material never exceeding 10%, suggest the cultural makeup of the Caspian littoral is more an amalgam of different cultural groups living together and influencing each other. These newly founded set of sites, sitting at a nexus of the east and west Lake Urmia diaspora, the Lower and Upper homeland provinces, and the area of Eurasia north of the Greater Caucasus, are best described as having a new hybrid cultural tradition.

[429] Peterson 2004, 2007.
[430] Kohl 2002, pp. 169–170.
[431] Gadzhiev and Korenevskii 1984.
[432] Kohl 2002, pp. 165–166.
[433] Weeks 1999.
[434] Kohl and Magomedov 2014.

E. Diaspora West of Lake Urmia, Lake Van, and Muş

To the west and immediate north of Urmia Lake and further into the Taurus around Lake Van, Kura-Araxes material culture is documented at several sites (**Fig. 11**) . The density of sites is low. What ties them together, aside from their geographic position is a shared pottery style that reflects neither the Ararat Valley nor the eastern side of Lake Urmia typified by Yanik Ware.[435]

The environment of this region is one of limited arable land, especially north of Lake Van in Ağrı and Patnos and southeast in Hakkâri. Both Patnos and Hakkâri are notable because of the absence of Kura-Araxes sites. Some early Bronze Age sites exist around Mount Ağrı (Ararat).[436] Lake Van has expanded and contracted many times over the millennia. The Muş Plain was part of its earlier lake bottom. The whole subregion is underlain by sandstone conglomerate, which prevents proper drainage.[437] Soils in modern times may be even poorer because large-scale cutting down of forests in historical times denuded them.

Elevations of the plains and valley bottoms are higher than in the Ararat Valley. Geoy Tepe is 1312 m asl, and the lowest point in the Muş Plain is 1300 m asl. The surrounding hills and mountains rise to 2950 m. Lake Van is 1650 m asl, and Suphan Dağı, a primary source of obsidian for the whole region, is 2230 m asl. Thus, this subregion is closer to the elevation of the Aragats highlands than to the Ararat Plain.

Mediterranean-influenced, humid continental climate. The average annual rainfall in the basin of Lake Van, ranges from 400 to 700 mm. The climate, as a result, is cold and heavily snowy in the winter. In January the average temperature is between −3 °C to −12 °C. On particularly cold winter nights the temperature reaches −30 °C. In July the temperature averages between 22 and 25 °C. Overall, the subregion has a Kura-Araxes material culture first was documented from burial contexts at Geoy Tepe west of Lake Urmia.[438] It had six meters of Kura-Araxes deposits. A deep sounding at Gijlar Tepe, Period B, revealed about 11 m of Kura-Araxes deposits.[439] These were probably the earliest Kura-Araxes occupations in the subregion. They both have Chalcolithic materials below, but it is not clear due to the small size of the excavation square and minimal publication that the Kura-Araxes materials are KA1 or KA2. Contrary to earlier analyses, reevaluation of materials from Hasanlu demonstrated that there was also a Kura-Araxes presence at Hasanlu in the southern side of Urmia Lake basin.[440] However, again due to small exposure in the U22 deep sounding, the sequence and transition from Chalcolithic to the Early Bronze Age, as well as the nature of the Kura-Araxes occupation remain unclear. Based on ceramic parallels found at

[435] Rothman 2003b; Rothman and Kozbe 1997; Summers 2014.

[436] Özfirat 2010.

[437] Rothman 2000a.

[438] Burton-Brown 1951.

[439] Belgiorno *et al.* 1984; Pecorella and Salvini 1984.

[440] Danti et al. 2004.

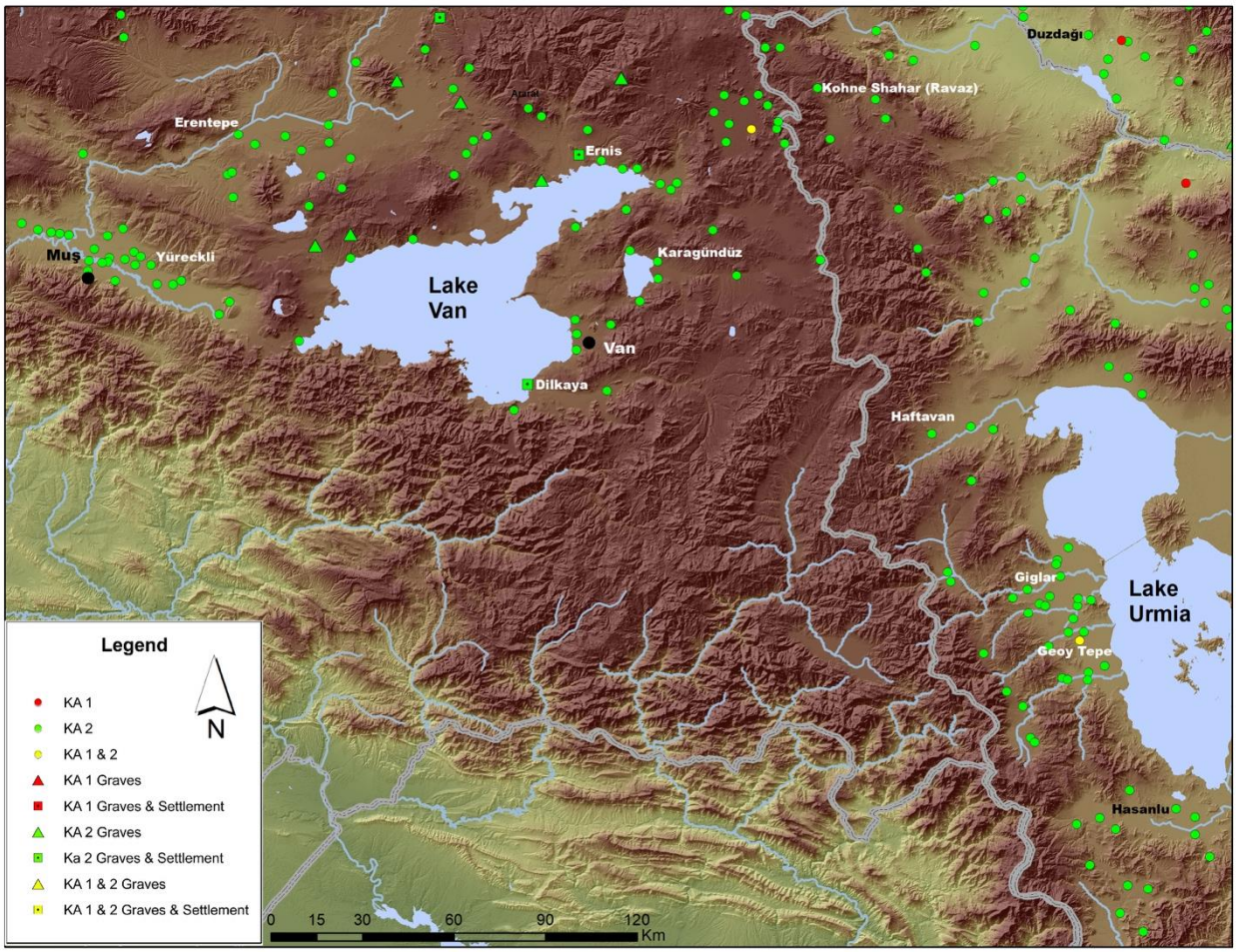

Fig. 11. Kura-Araxes site distribution in the subregion west of Lake Urmia.

Geoy Tepe K1 and K2 with dimples and lines impressed designs,[441] Danti et al. [442] argued that Hasanlu was occupied during KA1 and KA2. At the same time, recent surveys in Solduz, one of the richer agricultural valleys near Lake Urmia, found no sites with Kura-Araxes remains.[443]

Transport in this subregion is either from the Araxes north of Lake Urmia southward or along the Murat River. The Murat River was clearly one of the routes of communication, flowing from the edge of the South Caucasus toward Muş/Van, and then swinging west of Lake Van where it joins the Euphrates River in Malatya. It is not a navigable river for a transport vessel. In Muş around 3000 BC there were a number of sites in the highlands above the valley bottom, marked by deeply incised black burnished forms. Maybe 100 to 200 years later, Kura-Araxes sites dotted the valley bottom. Most were newly founded. Only two were built on top of Late Chalcolithic sites.[444] However, the potters appear to have blended local and Kura-Araxes techniques.[445] Many pots were more of a gray color and were decorated with a dimple or dimple and line design (**Fig. 2**) like that

[441] Rothman 2003b.
[442] Danti *et al.* 2004.
[443] Abedi *et al.* 2019.
[444] Rothman 2003a.
[445] Rothman and Kozbe 1997.

described for Geoy Tepe. This dimple and line design extended to the subregion around the Mughan steppe (see IVC. Above). It also appeared in an area that was later the limits of the Urartian Empire of the first millennium BC.[446] Not included in the empire were the highlands of Shida and Kvemo Kartli, the Tsalka Plateau or Aragats (see **Fig 7** and **8**). The climate at this elevation and the soils suggest that the area was not widely used for farming and perhaps was not occupied year-round, except nearer Lake Urmia. This subregion was often associated with pastoral groups.

No Kura-Araxes sites have been excavated in Muş. However, east of Lake Van Özfirat and Sevin[447] excavated the site of Karagündüz. Van-Dilkaya, another site east of Lake Van, was surveyed, and some graves were dug, although little has been published.[448] Karagündüz had six meters of Kura-Araxes deposits.[449] The deposits were mostly square mudbrick buildings. Excavators did not find any doorways, so they infer that entry was through the roof. Each of the buildings had a square hearth and a round one; the square one was in the middle of the room. They recovered no andirons.[450] The contents of the buildings suggest an agro-pastoralist community with production of plant and animal food and by-products. Bone awls, spindle whorls, and a narrow corpus of bowls, jars, and storage jars were typical finds. Their designs were mostly incised double spirals and broad triangles. However, potters also used raised spiral designs.[451] The designs are closest to Shengavit and sites in the Tsalka Plateau. In Sevin and Özfirat[452] it looks like lime may have been put in the incisions, although the technique and designs are very different from Godin or Yanik Tepe. Van-Dilkaya had square buildings with the same square and round hearth as Karagündüz. Little else about the artifactual remains is published.

The patterns, again, suggest that a small-scale, egalitarian agro-pastoral settlements seem the most likely interpretation of what remains archaeologists have explored. Pastoral production probably was among the most important activities, and some pastoral groups probably moved their flocks to warmer areas in the winter. In general, this broad subregion demonstrates how variable the circumstances and their manifestations economically and socially were within a relatively small area on the map.

F. *Diaspora: East and southeast of Lake Urmia*

East of Lake Urmia, from Yanik Tepe down the spine of the mountains to the central Western Zagros and extending east onto the plateau south of the Caspian Sea appears to be a separate culture area (**Fig. 12**). In pottery terms, the latter area may be defined by black burnished Yanik Ware with deeply incised designs filled with lime (Godin Tepe,[453] Yanik Tepe).[454] At the same time, the shapes of many pots at Godin show connections with the broader Kura-Araxes cultural tradition.[455]

[446] Rothman 2003b; Maziar and Zalaghi 2020.
[447] Sevin and Özfirat 2001.
[448] Çilingiroğlu 1992.
[449] Sevin *et al.* 1997.
[450] Kozbe 2004.
[451] Rothman, personal observation in Van.
[452] Sevin and Özfirat 2001, fig. 8.
[453] Rothman 2011a.
[454] Burney and Lang 1971, pl. 31, 32.
[455] Rothman 2011a, table 5.3.

Double carinated shapes, typical of Badalyan's Karnut-Shengavit[456] are common in the Godin IV:1 phase, dating to the middle to late KA2. The range of this specific style element crosses the high plateau into Manzanderan,[457] and near Teheran.[458] This traces a line up the spine of the western Zagros that turns east toward Afghanistan. It does not extend all the way east over the Dasht-i Kavir as the gray ware of Tepe Hissar is not Kura-Araxes.[459] What the distribution suggests is that this was a trade and migration route in the interior of the Iranian highland plateau and possibly further toward Afghanistan.

The environment of this subregion is that of high mountain valleys. The Zagros is a series of folds of rock running north to south with anticlines (upward thrusting folds) and valley bottoms (basins between folds).[460] Yanik Tepe sits at 1350 m asl, Godin at 1450 m asl, Qazvin province at 1350 m asl. Surrounding mountains rise as high as 4300 m asl, but the folds that define the subregion tend to be located at around 1800 m asl. The anticlines in antiquity dumped as much as 10 meters of silt into the valley bottoms. This made places like the Kangavar Valley, where Godin Tepe is located, among the richest agricultural spaces in the western Zagros Mountains. Precipitation at modern Kermanshah from November to May is 64 mm. The temperature ranged from 2° C in January to 27° C in July. In Kura-Araxes times the climate was wetter and a bit warmer. Those conditions permitted an expansion of deciduous trees like oak and caused the Iranian glacier to melt. Winters see heavy snow in the mountains, which runs off into streams in the valley bottom in the Spring at the time of planting. The valleys are somewhat shielded from extremes in temperature by the mountains. Routes through the mountains, especially east to west are limited. Armies in historical antiquity that have traversed this territory complain of its difficulty.[461]

Since some of the Kura-Araxes levels at sites west of Lake Urmia were earlier and deeper than those east of it, the idea of a separate migrant stream along this eastern route seems plausible.

The two concentrations of Kura-Araxes ware sites from survey cluster fairly tightly around Lake Urmia, and in the central Western Zagros: Kangavar, Hamadan, Malayer, and then a small scattering due east, northeast nearer the Caspian Sea and near Tehran.[462] The Kura-Araxes migrants did not penetrate to the Mahi Dasht to the west, bordering the Mesopotamian piedmont[463] or far to the east in Iran. Yanik and Haftavan likely had KA1 strata, but Kura-Araxes migrants appeared in the central Western Zagros at the beginning of the KA2 after about 2900 BC.

There are sources of copper and other minerals in this area (a mine near Sialk, see IVC. above), and there are signs of smelting at Godin VI:1 and in IV:1a and b.[464] In general, this rea west of the Dasht-I Kavir is especially rich in metallic ores. Among the sites in this area, Godin IV and Yanik Tepe[465] were the most extensively excavated. Each excavation had its problems. The excavators at

[456] Badalyan 2014.
[457] Fahimi 2005.
[458] Piller 2012.
[459] Gürsan-Salzmann 2016.
[460] Rothman 2011b.
[461] Xenophon 1972 Book IV, 1.
[462] Omrani *et al.* 2012; Maziar 2016.
[463] Levine 1975.
[464] Frame 2011.
[465] Summer 2013, 2014.

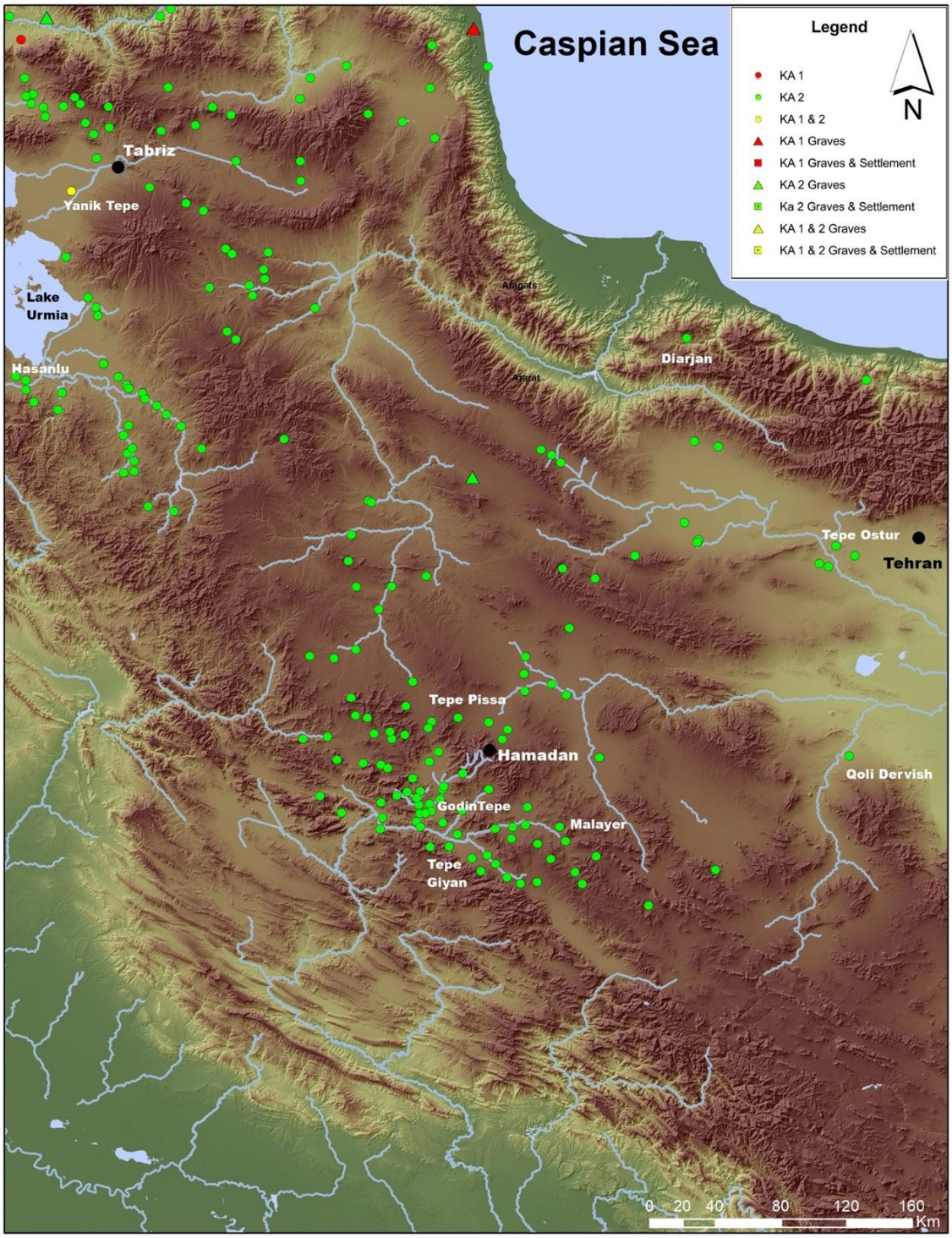

Fig. 12. Map of the distribution of Kura-Araxes sites in the inner Zagros Mountains.

Godin were in a rush to reach the VI:1 Oval[466] and did not give enough care to excavating and recording level IV[467]. Excavators at Yanik Tepe were limited to the outer edges of a village that sat on the mound and had very limited time and a small crew to do the work[468]. Summers[469] writes

that excavators found few artifacts. He interprets this as a sign of a technologically unsophisticated and conservative trend among its occupants.

However, it is hard to understand how this paucity of remains is possible, unless the residents cleaned out their houses before they abandoned them. This lack of information makes it difficult to interpret the organization and practices of the people living there.

Still, from what we do know, the trajectory of the Kura-Araxes occupations east of Lake Urmia had elements that very much mirror similar trends at Arslantepe VIB1. After the last of level VI:1 was abandoned, a meter of water and wind-blown deposit covered it. The first Kura-Araxes settlement, Godin IV:2, began about 2,850 BC. A similar period of abandonment, although probably shorter, happened at Arslantepe VIB1 after the destruction of the temple-palace structures after 3,200 BC.

The initial post-Arslantepe temple/palace (Arslantepe VIB1) and post-Godin VI:1 occupation (Godin IV:2)[470] was rather disorganized, and it was characterized by less sturdy wattle-and-daub structures. It is possible that the site was not occupied year-round at this time, which leaves open the possibility of a pastoral nomadic element. However, everywhere these populations arrived, evidence of agriculture alongside pastoralism and extensive pottery production makes the probability of a fully pastoral nomadic organization less likely. We may need to create a new category, not fully nomadic, yet reliant on pastoral production with some seasonal mobility. At least we need to decouple the idea of wattle-and-daub structures and impermanence, as this appears to be a favored construction technique for Kura-Araxes settlements that were occupied year-round. Evidence exists of a dividing wall around part of the mound at Yanik Level II, as also occurred at Arslantepe.

The first stage of Kura-Araxes pottery at Godin, IV:2, consisted of wattle and daub buildings building against a solid windscreen. The second stage of occupation in IV:1 had more permanent, substantial mudbrick construction. Residents built both square buildings, and a series of long narrow houses adjoining one another in a semi-circular plan. These latter are reminiscent of Pulur Sakyol (**Fig. 3**). One of the buildings, which alone lasted through the remaining phases of IV:1 is of particular importance. Building 3 (**Fig. 3**) at Godin parallels Building 36 at Arslantepe in many ways.[471] Both have two rooms, although the second room at Arslantepe seems to have been for storage, while at Godin, it appears to have been a kitchen.[472] Both yielded very large numbers of bones from good cuts of meat, suggesting they may have been feasting sites.

What was the larger picture of Kura-Araxes migration in this area? In the Taurus, the pattern was of small numbers of Kura-Araxes migrants in central sites followed by more sites in the outskirts of those central sites with predominantly Kura-Araxes remains.[473] In Kangavar only three Kura-Araxes sites sit on previously occupied Godin VI sites. They all are along the routes into the

[466] The dissertation in progress by Rasha Elenari at University of Toronto suggests that there actually was no Oval wall.
[467] Rothman 2011a.
[468] Burney 1961.
[469] Summers 2013, 2014.
[470] Rothman 2011a, fig 5.14.
[471] Frangipane 2014; Palumbi *et al.* 2017.
[472] Rothman 2011a.
[473] Batiuk and Rothman 2007.

valley.[474] Our suggestion is that the other sites were the remains of the old Godin VI population. New excavation of sites in the Kangavar valley bottom would tell us. Perhaps they adopted the pottery style of the new heads of the Kura-Araxes migrant groups. Certainly, Kura-Araxes populations peaceably replaced the Godin VI ones in key sites. This pattern contrasts with that of the Taurus into the Amuq, where the first evidence of Kura-Araxes settlers mixing with the older population, and only a few newly founded sites of Kura-Araxes migrants are evident. Here in the Kangavar Valley there are signs of an actual take-over of the centers and probable control of routes in and out of the valley. The administrative mechanisms from Godin VI:1 ceased to be used. Yet, the lack of any evidence of Kura-Araxes occupation to the west in the Mahi-Dasht implies that the site's centrality was not built on exchanges with Mesopotamia as in VI:1, but avoidance of it.

Further, there is not much evidence of specialized production or administrative control. Artifacts suggest the same sorts of domestic activity found at most of the other homeland and diaspora Kura-Araxes sites. The ceramics of Godin IV are generally crude in their fabric; they look not at all like specialized or workshop made objects. Ceramic hearths did not exist; the residents seem to have used the typical Chalcolithic griddle hearths,[475] although there were some simple andirons. The specialized metal production as occurred in the Chalcolithic in the pyrotechnic installation in Building 8 (**Fig. 3**) appears to be important. Trade with Mesopotamia, as was common in the Chalcolithic did not continue. Despite similarities in pottery style with the Lower Province of the homeland, obsidian from sources there are absent at Godin, and the lithic technology more closely represents the bifacial core and blade knapping of the Chalcolithic and Mesopotamian flint knappers than the ad hoc style of places like Shengavit in the homeland. This suggests that there was a continuity of Kura-Araxes social identity, but little actual continuing contact with the homeland.

When the Awan Proto-Elamite leaders took over the area of the Kangavar Valley in about 2600 BC[476] those vestiges of the Kura-Araxes newcomers vanished. In this period, (Godin III:6), 10% of the pottery is black burnished ware, although without the incised symbols of the Kura-Araxes or the normal range of functional shapes[477]. Andirons did, however, continue. Rothman[478] suggests that the Yanik Tepe square building phase was, in fact, contemporary with Godin III:6.

G. Diaspora the Upper Euphrates River valley and the western Taurus Mountains

This subregion contains two different environments, the highland portion of Malatya and Elaziğ Provinces and the large Malatya plain along the Euphrates River where Arslantepe is located (**Fig. 13**).

As should be evident from the other subregions, elevation appears to correlate with the density of Kura-Araxes occupation across its geographical extent. Arslantepe, the primate center of the fourth millennium BC, sits at 892 m asl like the Ararat Valley sites, although the alluvial plain surrounding the Euphrates, which contains a dense Kura-Araxes occupation, averages at about

[474] Rothman 2011a.
[475] Rothman 2011a, fig. 5.29.
[476] Potts 1999, p. 92.
[477] Henrickson 2011.
[478] Rothman 2014.

675m asl. The highland, alluvial Elaziğ Plain is a 16 km-long valley running northeast to southwest at an elevation of 1050 m asl.[479] It is surrounded by volcanic ridges that separate it from the Altınova. The Aşvan basin is in the lower Murat valley close to where it joins the Euphrates at the Keban (site of the dam of that name). This basin is at 720 m asl, and its soils are among the best for agricultural production in the highlands. Population density there is among the highest in the mountainous zone outside of Shida and Kvemo Kartli and the Ararat Valley. The exception is Bingöl where winters are significantly colder than the valleys, more like Muş/Van. Solhan, the center of modern pastoral nomad activity in Bingöl Province, is situated at 1350 m asl. This area has not been surveyed, and no Kura-Araxes sites are known there, although it is very likely there are some, because migrants would have to cross the mountains there.

Climatically, summers of the region are hot. It is classified as a dry continental climate. Winters are less severe than those at the highest elevations to the east. Modern temperatures vary from 3.5° C in January to 34° C in July in Malatya. Bingöl's modern temperatures vary from 0° C in January to a high of 26° C in August. The Malatya Plain receives one of the lower levels of precipitation, however, the Euphrates River and the significant number of feeder streams provided ample sources of water. Rainfall in upland Malatya and in Elâziğ in modern times fluctuates from 270 to 572 mm, so rain-fed agriculture is possible. As in the east, there is evidence of expanded forest, which likely made the temperatures lower in summer and higher in winter.

Arslantepe

Most studied in this subregion is the site of Arslantepe in the Malatya Plain. It is a unique site in our narrative for two reasons. First, it sits at the intersection of communication and trade routes to and from Mesopotamia, the central Anatolian Plateau, the highlands of Eastern Anatolia, the Lower Province, and the Upper Province and the area north of the Caucasus Mountains. Second, it is the only subregion of the Kura-Araxes landscape that was the center of a state-level society.[480] Before the appearance of any remains associated with the Kura-Araxes or the eastern subregions, the site housed central institutions represented by a series of palace/temple complexes in levels VII and VIA from 3900 to 3200 BC. Leadership institutions there developed through staple finance of local raw materials and products, and also wealth finance in the transfer of logs, metals, and metal ores, among other goods. These could be floated down the Euphrates River, making transport cheap and quick.[481] During VIA, the external relations appear to be most clearly with Mesopotamia to the south. The site was not a colony of the Uruk expansion, but certainly was influenced by its trade contacts in that network.[482] A survey on the plain found no sites with remains like VIA,[483] although alluviation may have hidden them. A black burnished ware associated with Central Anatolian sites was common during this period.[484] Unfortunately, the excavation team calls this ware Red Black Burnished Ware (RBBW), although unlike the RBBW of the later Kura-Araxes

[479] Yakar 2000.
[480] Fragipane 2010.
[481] Frangipane 2001, 2010.
[482] Frangipane 2001.
[483] Di Nocera 2000.
[484] Çalışkan 2012.

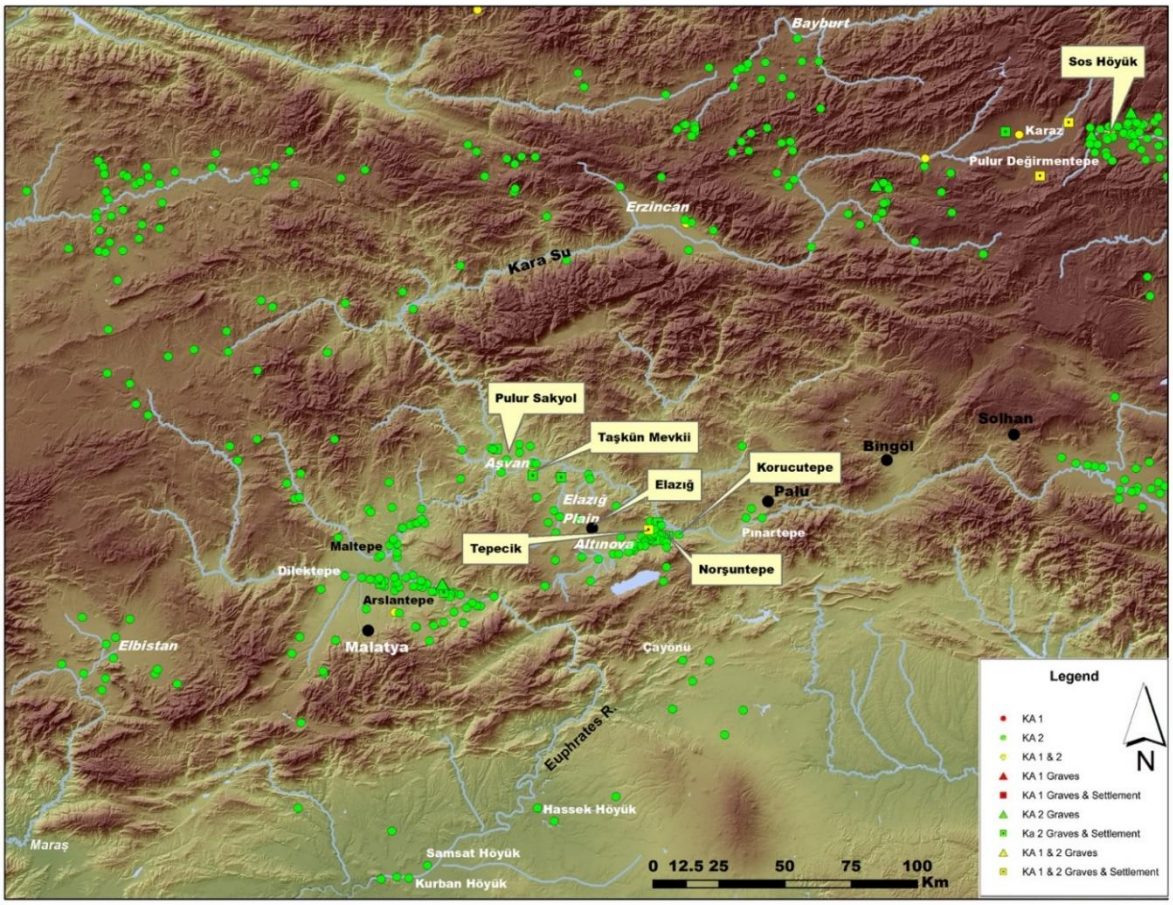

Fig. 13. Kura-Araxes site distribution in the Upper Euphrates, highland Malatya, and Elaziğ subregions.

cultural tradition, the black color is often on the inside and the red is on the outside. Pottery forms are also different (**Fig. 2**). This has confused analysis of the site's cultural interconnections. A third interaction sphere was northward. The ores in a collection of arsenical bronze weapons and ornaments from the VIA palace are chemically identical with the Black Sea and Central Anatolian metal sources.[485]

The cultural pattern of that earlier Mesopotamian LC1–4 society was part of the political and cultural DNA of this locality. As the excavation team views it, the widespread specialization in the VIA state included pastoral specialists who were summering in the highland.[486] The connection with pastoral groups was based on interactions between the residents of higher and lower elevation areas.

This subregion's relation with the Kura-Araxes cultural tradition began after the Palace/Temple complex was burned at about 3200 BC. It consisted of three strata of level VIB1, which, according to Frangipane, covered the last century of KA1 (Table 1).[487] Over the top of the

[485] Çalışkan 2012.
[486] Palumbi 2012; Palumbi *et al.* 2017; Palumbi 2008.
[487] Frangipane personal communication.

destroyed Palace/Temple complex in VIB1 excavators found evidence of a series of wattle and daub houses.[488] The excavators argue that these people were local pastoral nomadic people, who had contact with Kura-Araxes migrant groups and adopted some of their style corpus, and not necessarily Kura-Araxes people per se. The basis for this conclusion is the increase in the percentage of sheep/goat they raised and the wattle and daub housing.[489] Physical evidence for pastoral nomad encampments in the plain or highlands is, however, lacking. We question whether this was the case. As far as the animals, the same pattern is evident in the Lower Province (see Section IIID), where there is little reason to argue that pastoral specialization occurred. Sheep and goat have shorter gestation, are more productive, and more adaptable than cows. In other words, they are less risky than cows. Similarly, there were long-term settlements of wattle and daub and similar materials in houses among many agro-pastoralist societies. By analogy, Medieval European farm buildings were often of a similar, seemingly "temporary" type, yet they were occupied for generations by serfs who were largely farmers for feudal estates with their own animals as part of their subsistence. In addition, the comparisons between Arslantepe level VIA and VIB1[490] are questionable. On the one side is a temple/palace complex, the other side a community of small houses. We know very little about the domestic spaces of level VIA, which would be more apt comparisons.

In our opinion, the connections of those dwelling at the site during VIB1 shifted. The Mesopotamian route was temporarily interrupted. Finds there, especially the contents of the "Royal" Tomb (see below), indicate interaction northward toward the North Caucasus Maikop/Novosvobodnaya culture area and the Upper Province, and still with Central Anatolia. The Kara Su extension of the Euphrates River was a major route to and from the homeland zone. There the route connected to Erzurum near Karaz and Sos Höyük and continued into the Upper Province (see pottery style connections in **Fig. 2**). Access to Maikop would have run along the Black Sea shore or via the Upper Province through a number of long-used passes across the Greater Caucasus Mountains. Perhaps, it was the population of the Upper Province who had the contact northward, and the traders of Arslantepe who dealt with agents there, like the Uruk expansion used northern Mesopotamian sites as "trading beaches".[491]

In period VIB1 wheel-made ceramics were completely replaced by hand-made Red-Black and Monochrome Burnished Wares[492] both of Kura-Araxes and Central Anatolian types, with many new forms. The impact of the Kura-Araxes ceramic traditions over the VIB1 repertoires is clearly visible in the appearance of two-handled jars with truncated conical necks and circular lids and some decorations with Kura-Araxes motifs (crescent shaped or animal horns) (**Fig. 2**). However, not the entire Kura-Araxes functional repertoire is present in period VIB1, and this is especially the case with the open shapes. The latter are almost exclusively represented by Central Anatolian hemispherical bowls with black interior surfaces and red exterior surfaces perpetuating the same red-black alternate pattern as that already in use in the fourth millennium.[493] Cylindrical pot-stands, perhaps a replacement for the andiron, a form common in the western Kura-Araxes diaspora, were an

[488] Frangipane 2012.
[489] Palumbi 2008.
[490] Frangipane 2014; Palumbi 2012.
[491] Rothman 2001.
[492] Palumbi 2008.
[493] Sarı 2007; Palumbi 2012.

addition to the period VIB1 ceramic repertoire. An analogous hybrid picture characterizes the ceramics from levels 2 and 1 at Tepecik, where double-handled jars and circular lids of Kura-Araxes types coexisted with red-black hemispherical bowls linked to the Central Anatolian traditions.[494]

The full Kura-Araxes package was, however, missing. Excavators did not find evidence of the ritual of the hearth (both the ceramic hearths and andirons). The architecture was not particularly like the architecture of the homeland, either. The pottery forms, despite some of the commonalities that were represented, did not reproduce the homeland forms in large measure. It was an admixture with other pottery traditions.

Some signs of political organization beyond a horizontal egalitarian type were evident (see below). The third level of occupation at Arslantepe VIB1 shows a more tightly organized spatial layout. While the southern slopes of the mound were occupied with wattle-and-daub huts and fences for animal pens, further north the excavators have exposed an imposing mud-brick building. Building 36, dating to the very end of the fourth millennium,[495] stands out from the surrounding huts not only for its dimensions and building techniques, but also for the greater quantity and higher quality of materials (**Fig. 3**). Building 36 was organized into two main rooms: a spacious hall with a large circular fireplace and a storage room containing more than 50 vessels accounting for a total capacity of about 2000 litres of foodstuff or liquids. This large storage capacity and the materials found in and around Building 36—these included two metal spear-heads, special drinking vessels, and a dump of several thousand animal bones (most of which included the best meat parts)— point to ceremonial and feasting functions of this large building.[496] In some ways this building is very reminiscent of Building 3 at Godin Tepe IV:1[497] (see above). North of Building 36, a thick palisade delimited another space occupied by a large hut interpreted by the Italian team as the residence of the community's leader.[498] From this point of view Building 36, which was constructed just on the top of the courtyard of the monumental audience room of period VIA, represented some social inequality.[499] VIB1 therefore does not appear to represent a very evanescent occupation of pastoral nomads. Simple interaction with Kura-Araxes people was unlikely to cause to adopt these people's styles in pottery.

Level VIB2, begun at about 3100 BC, returned to a pattern more familiar to the Arslantepe of VIA. A large mudbrick wall surrounded a medium-sized settlement of mudbrick houses. The pottery no longer included the Kura-Araxes corpus. By VIC (KA2) Arlanstepe had no real connection to what was happening in the KA2 homeland or other parts of the diaspora.

One of the more spectacular finds originally associated with VIB1 is what the excavators called the "Royal" Tomb.[500] "The upper part of the burial pit had been cut away from later period terraces, but on the basis of the new C14 dates and the material comparisons, we think that the tomb was completed at the very end of Period VIB1 or during the transition to the beginning of VIB2 (phase 1), when the big fortification wall was built at the top of the mound. It must have been the

494 Palumbi 2012.
495 Palumbi *et al.* 2017.
496 Siracusano and Palumbi 2014; Palumbi *et al.* 2017.
497 Rothman 2011a.
498 Frangipane 2014; Palumbi *et al.* 2017.
499 Frangipane 2014, p. 74; Palumbi *et al.* 2017.
500 Frangipane 2001.

apex of a period of troubles and conflicts after the destruction of the Palace (the only signs of violence on human bones belong to this period in the history of the site)."[501] The tomb's ceramics combined northern Mesopotamian Late Reserved Slip jars and burnished jars with black on the outside, but their shapes copy KA1 Kura-Araxes forms from the Upper Province (**Fig. 2**). Many metal tools, vessels, weapons, and ornaments of a Maikop/Novosvobodnaya type filled the stone-lined cist tomb.

Overall, as the excavators argue, the collapse of the fourth millennium BC state, represented by the Palace/Temple institutions, left space for a number of competing groups, associated with north Syria, the Kura-Araxes, Central Anatolia, and the North Caucasus to exert influence over this important link on trade routes. Materials like metal ores or smelted metal ingots continued to flow south in significant numbers, aas did wooden logs for building. It took the better part of a hundred years for the older institutions to re-emerge as somewhat less grand and with a less centralized political structure than in the VIA state.

The Uplands

The higher elevation, more mountainous part of the subregion in Malatya and Elaziğ supported a very different set of societal groups than at Arslantepe in the Malatya Plain. Whereas Arslantepe in VIB1 seems to have had closer connections to the Upper Province, this highland area seems to be much more related to the Lower Province. Their pottery shows more style comparanda with the east, although there are clear differences between them, Muş/Van, and the western side of Lake Urmia[502]. Also, pottery analysts see some connections to the Central Anatolian corpus. As described above, there were three distinct mountain valleys: Altınova, Aşvan, and the Elaziğ Plain.

The densest occupation of Kura-Araxes migrants was in the Altınova[503]. The plain was a former lake bottom like Muş, but it had better drainage. The expansion of forest evident in the homeland also occurred there.[504] Significant, well-watered agricultural land was available. Tepecik, Norşuntepe, and Korucutepe are three key excavated sites. All were occupied in the Neolithic and Mesopotamian Chalcolithic with cultural connections to the piedmont and steppes of northern Mesopotamia.[505] All appear to have had short hiatuses before the appearance of Kura-Araxes populations. Of the three, Norşuntepe was clearly the largest. It ended any connection with the Kura-Araxes at about 2500 BC with the construction of the "Palas."[506] The earliest Kura-Araxes occupation in L19, level XVII was one of wattle and daub houses with ceramic hearths.[507] This is the level Hauptmann equates with Arslantepe VIB1 (his FBIA).[508] By K/L 19, level XIX (FBIIB), the buildings were made of mudbrick. As for Korucutepe, it was a thriving town, which was largely abandoned at the end of the Late Chalcolithic to be replaced in Phase C by the package of Kura-Araxes cultural elements from pottery to decorated andirons and wattle and daub housing.[509] Van

[501] Frangipane, personal communication.
[502] Rothman 2014.
[503] Whallon 1979.
[504] van Loon 1978.
[505] Rothman 2002.
[506] Hauptmann 1982, p. 336; Di Nocera 2000.
[507] Hauptmann 1979, Pl. 26.
[508] Hauptmann 2000.
[509] van Loon 1978.

Loon comments that in Phase D, still with many elements of the Kura-Araxes, "contacts with regions south of the Taurus Mountains were at low ebb."[510]

Economically, these dwellers in the mountain valley were closest to a large copper mine at Ergani Maden and smaller copper mines near Harput, Sivirice, and Palu (**Fig. 6**).[511] Tepecik produced significant evidence of metal smelting from the middle of the fourth into the 3rd millennia BC.[512] In scale the site was smaller than Korucutepe or Norşuntepe. Excavators at Norşuntepe Levels XVIII and XIX uncovered mudbrick houses along with wattle and daub houses.[513] One XIX house had benches, and its excavators interpreted it as a metal workers' shop with ladles, a smelting oven, molds for shaft-hole axes, and copper slag. Norşuntepe had a wide variety of metal daggers, pins, hair decorators, and axes. In addition to metals, the people made and used significant collections of lithic tools. Among these were objects of obsidian, quartzite, and flint. Classic bifacial blades from prepared cores were common, many with sickle sheen.[514] So, too were typical Kura-Araxes obsidian arrowheads, scrapers, gravers, and the like. The large number of spindle whorls and bone awls indicate the importance of cloth-making.[515] Değirmentepe, a fourth site with limited excavation, appears to follow the same pattern. It probably began in the Chalcolithic, on which three strata of Kura-Araxes building were constructed.[516] A gravity interaction model of the Altınova sites suggests that there was little political or economic integration outside of small clusters of sites around these three or four key sites.[517]

Unlike Arslantepe, evidence of the elements of the Kura-Araxes cultural package was common. At Norşuntepe the 6.5 x 6.5 m wattle and daub building as well as others had a tripartite, grape leaf (?) ceramic hearth.[518] The architecture had precursors in the homeland as well. Finally, the pottery was until the end very much within the corpus of Kura-Araxes styles, especially those of the Lower Province (**Fig. 2**). At the end of this period a new painted pottery with a buff surface and black painted decoration in Kura-Araxes motifs became common. The "Palas," however, may be just beyond the end of the Kura-Araxes phase when the political and economic systems of the subregion were changing.

The biggest problem is coordinating the timing of the sites of this subregion in terms of their Kura-Araxes occupations. Arslantepe's connection to the cultural tradition of the Kura-Araxes was dated between 3200 and 3100 BC. DiNocera illustrates the problem. For Norşuntepe "the phase [EB I] cannot be earlier than 3000 BC, if we consider the cultural relations with Arslantepe VIB to be valid"[519]. The VIB2 could be contemporary with Norşuntepe, but not VIB1. So, Norşuntepe Level XVII has a broad date that could be as early as 3100 BC, but it looks more like it was after 3000 BC (KA2). The actual dates for levels XVIII–XIX discussed above are more likely 2900 to 2700 BC

[510] van Loon 1978, p. 272.
[511] Rothman 2014.
[512] Koşay *et al.* 1975; Esin 1982, 1979.
[513] Hauptmann 1979, 1982.
[514] Schmidt 1996.
[515] Schmidt 2002.
[516] Duru 1979.
[517] Lupton 1996, pp. 83–84.
[518] Hauptmann 1982.
[519] Di Nocera 2000, p. 75.

(336: Table 1). This fits what Hauptmann[520] sees as FBIB (EB IB), which he equates with Arlantepe VIB2 and Amuq G(H). FIA (EB IA) he equates with Arslantepe VIB1, which could be equivalent to Norşutepe VII, although the dates do not correspond to the radiocarbon dates. The Palas level, which he terms EB IIIA, is 2500–2400 BC. Pulur Sakyol (see below) has dates closer to 2920 to 2490 BC. This places it firmly in the KA2, contemporaneous with Shengavit. It would seem, therefore, that a smaller migration happened during Aslantepe VIB1, but the major Kura-Araxes migration to the Altınova or visible take-over of previously established sites was later than Arslantepe VIB1.[521] Perhaps, what we are seeing at Arslantepe is an earlier migration from the Upper Province. The later migration or ripple in the stream[522] was from the Lower Province, which avoided Arslantepe, most likely because its political circumstances had changed.

The relevant Aşvan basin sites are Pulur Sakyol[523] and Taşkun Mevkii.[524] Pulur Sakyol, unlike the Altınova sites, was founded in the KA2 and extended the full duration of the Early Bronze Age. Construction was of mudbrick in a number of two-room buildings that shared common walls arranged in a circle or semicircle like Godin IV:1a. The second room of many buildings had a hearth and andiron, and in some a raised platform with runnels for fat or wine to run off. These rooms, especially in Level X,[525] are virtually identical in layout to Shengavit M5. The pottery (**Fig. 2**) lacks the Naxçivan lugs and has the triangular handles similar to those in the Upper Euphrates Valley. The objects recovered, including sickles, spindle whorls, flint and obsidian blades, gravers, obsidian arrowheads, ground stone hammers, pestles, and mallets, bone awls and arrowheads, grain stamps, and metal molds, pins, and dagger blades all suggest a settled agricultural population with animals. Taşkun Mevkii is in the highland zone of the Aşvan basin, good for pasture and agriculture. Its architecture was of wattle and daub, which Sagona attributes to Shida Kartli.[526] Overall, the pottery of Kura-Araxes type is dominated by a rounded deep bowl, and storage jars. Otherwise, there were no handles. The latest of these Kura-Araxes strata had painted wares. Lacking radiocarbon dates, the likelihood is that the site was occupied from the later part of the KA1 through most of the KA2. Imikuşağı on the Euphrates River, so part of the lowland, had a small sample of pottery from this time frame.[527] The jars that were recovered fit the upland Taurus types with rail rims and triangular lugs at the rim, a common feature of Euphrates Valley Plain Simple Wares. Rail rims also occur at Shengavit, so in the KA2.[528]

Much less information is available for Aşvan than for the Altınova. From what we do know, Kura-Araxes migrants arrived in the KA 1 and stayed throughout the KA2. There was a pastoral element in their economy, but they do not appear to have been pastoral nomads. Metallurgy was probably more important as a basis for status.

[520] Hauptmann 2000.
[521] Conti and Persiani 1993.
[522] Rothman 2003a.
[523] Koşay 1976.
[524] Sagona 1994.
[525] Koşay 1976, Pl. 37.
[526] Sagona 1994, p. 6.
[527] Özfirat and Sagona 1996, p. 97.
[528] Simonyan and Rothman *forthcoming* b.

Diaspora: Amuq and the southern Levant

This subregion consists of two geographically separated areas (**Fig. 14**), the former in the Hatay of Turkey, and the latter in the southern Levant (northern Israel and Jordan). The environment in the Amuq and southern Levant are in some ways very different from the rest of the locales in the Kura-Araxes landscape. In other ways they are the same. One difference is certainly the elevation. In the Amuq Valley elevations average about 70 m asl. In the north Jordan Valley the elevation drops to –220 m below sea level. Other parts of the Kura-Araxes (Khirbet Kerak Ware) southern Levantine area are at somewhat higher elevations (see below).

The Amuq is divided into a number of environmental zones.[529] The valley is a geologically complex basin resting between the Amanus Mountains to the west and low hills to the east. It is fed by three rivers: the Kara Su, the Orontes, and the Nahal al-Afrin. The largest, longest occupied sites, Tell Tay'inat and Atchana, are on the banks of the Orontes leading into north Syria. The valley has a mild Mediterranean climate. The central part of the plain is infilled with rich alluvial soils. However, the eastern half including the Afrin Valley is characterized by rich terra-rossa soils. In antiquity, the whole region was an important producer of olive oil and wine; however, today most fields are utilized for cotton, although the terra-rossa soils in the east are once again the focus of horticulture, including vineyards. The summers are dry, and the winters quite rainy with an average annual rainfall of 500–700 mm. Rainfall agriculture is possible; however, water from the rivers and numerous streams and springs from the upland permit irrigation in dry seasons. The hottest month is August with an average of 29.6° C, but with highs of 46° C. January averages 13° C. In modern times, the valley is largely treeless, and in the 1930s the region was quite marshy. However, in antiquity the Amanus mountains and surrounding foothills would have been covered in forests, and Wilkinson's studies have shown that in the third millennium, the hydrology of the region was dryer, and the Lake of Antioch was significantly reduced in size.[530] As a result, a more forested environment in the plain is probable.

The topography of the Kura-Araxes in the southern Levant is more limited than the presence of a few sherds of Khirbet Kerak Ware at numerous sites would suggest.[531] Its center was the central Jordan Valley from Beth Shean in the south to Tel Bet Yerah by the southernwestern bank of the Sea of Galilee. Routes northward crossed the highlands of the Galilee area near Tel Hazor, one of the Khirbet Kerak Ware sites at 223 m asl. Megiddo and Afula in the Jezreel Valley at 159 m asl are others of these sites, defining the extent of the Kura-Araxes subregion in the southern Levant.[532] The eastern Jezreel valley forms a narrow corridor connecting Megiddoh to Beth Shean in the Jordan Valley.[533] Rain falls mostly in the winter; summers are usually very dry. At the time of the Kura-Araxes estimates are of 425 to 610 mm of rain annually.[534] There is evidence of a somewhat drier climate, with the oak forest retreating and the olive steppe expanding at the time. The soils in this area are terra rosa in the Jezreel, but alluvial in the Jordan Valley bottom. The heat of the Jordan

[529] Yener *et al.* 2000.
[530] Yener *et al.* 2000.
[531] Greenberg 2019.
[532] Esse 1991, table 4.
[533] Esse 1991, p. 30.
[534] Wilkinson 2003, Tab 7.2

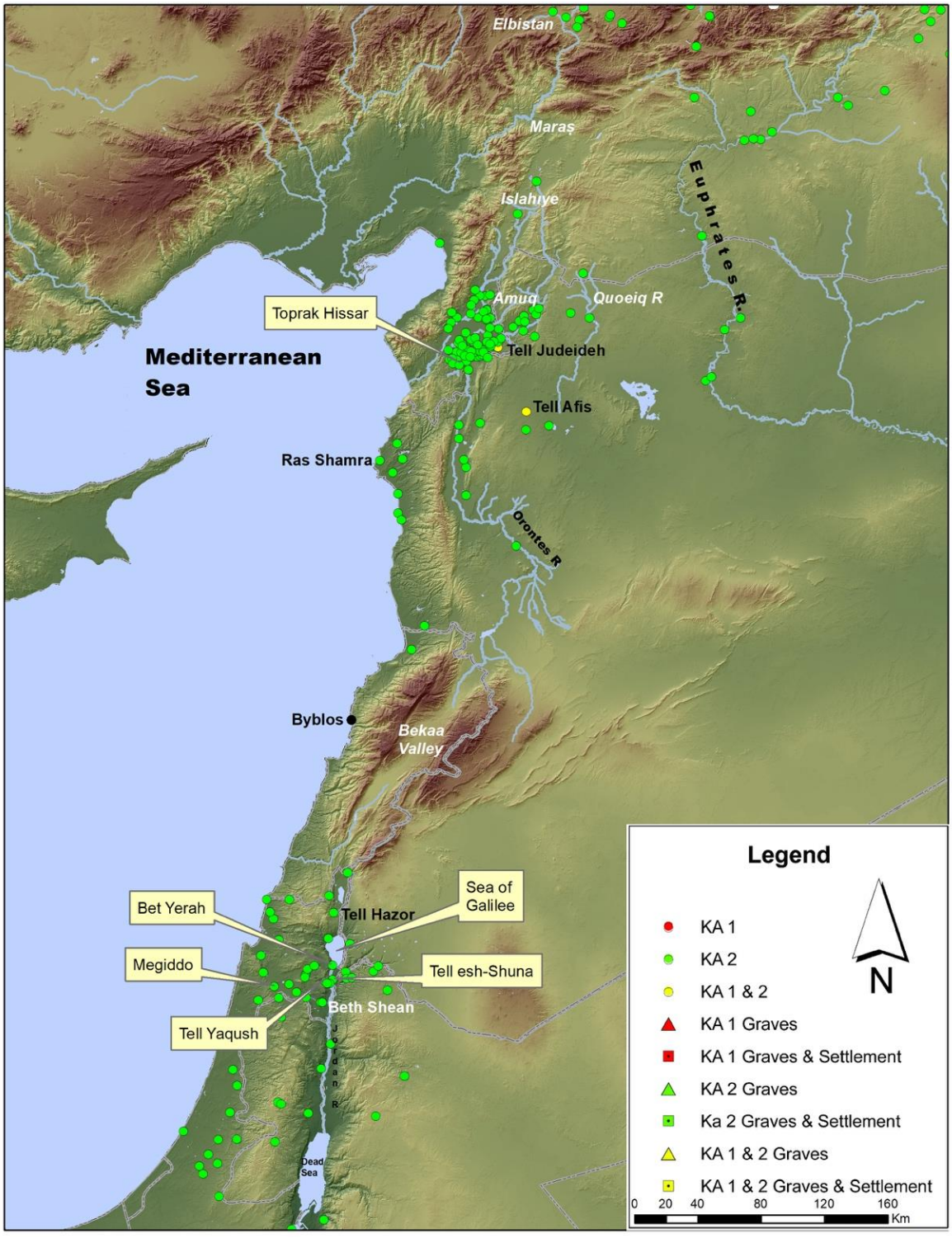

Fig. 14. Distribution of Kura-Araxes sites in the Amuq Plain and the southern Levant.

Valley makes agriculture without irrigation difficult. The Jezreel Valley is in the Mediterranean climate zone, which "is well suited for the classic wheat-vine-olive combination." However, the Jordan Valley has a drier Irano-Turanian climate. Access to water is problematic. As Esse[535] explains,

the problem of growing classic wheat-barley crops led to a more diversified agricultural economy, using the hills to grow olives, grapes, figs, and pomegranates. Not until much later in time did farmers have the technology to raise the water of the Jordan River to irrigate large areas of fields.

The general connections between the Kura-Araxes Red-Black Burnished ceramic traditions of the northern Levant (RBBW) and the Khirbet Kerak Ware tradition of the southern Levant, was already understood as early as the 1930s when the major excavations were being undertaken in the region.[536] By the 1960s the connections between these ceramics and the South Caucasus were beginning to be understood.[537] Sagona cataloged these patterns more extensively.[538] The Anatolian sources for this ware and other elements of the Kura-Araxes package are well documented.[539]

The route of migrants into this region appears to begin from the western Taurus Mountains into the Amuq Plain, either via Elbistan, the Maras plain, and Islahiye and Kirikhan Valleys; or via the Euphrates into the Gaziantep, Kilis, and Qoueiq areas by way of the Afrin corridor east of the Amuq or continuing west to the Islahiye and Kirikhan valleys to the north. From there routes went either through the Orontes and Bekaa Valleys to the Hula Basin and the Galilee region or via Ras Shamra near Latakia on the Syria coast (see below).

In the northern Levant, where archaeologists have not conducted extensive excavations of settlements with Kura-Araxes levels since the early 20th century, Kura-Araxes elements are confined to the North Orontes Valley and portions of the Mediterranean coast. Surveys have shown a gap in Kura-Araxes settlement between the middle Euphrates and the northern portion of the Amuq Valley in southern Turkey near the town of Kırıkhan. The absence of Kura-Araxes sites along the most direct path into the region, through the plain of Islahiye and Karasu Valley are clearly not the result of survey coverage. The lack of sites bearing the remains of this cultural tradition, even though it was occupied in the Early Bronze, may be the result of the deliberate avoidance of swampy territories to which the Kura-Araxes migrants were not pre-adapted; a similar pattern as seen western Georgia (see above). The string of settlements up the Afrin Valley, on the other hand, might point towards a more easterly route of entry into the region. Surveys by Mathers in the Quoieq region to the east found Amuq G, H, and I ceramics (Reserved Slipped Ware, Multiple Brush Painted, and Smeared Wash Ware), but also the Red Polished wares of the cultures found in the Islahiye valley. According to Matthers, not a single potsherd of Red Black Burnished Ware was found in the surveys.[540] This void is particularly curious considering the aforementioned evidence of deep connections between the two regions, and points to a possible deliberate avoidance of the Qoueiq region. Mellaart repeats this claim; however, he later notes that a single sherd was found at Tell Rif'at and one from Tell Malid.[541] It should also be noted that the only other example of Kura-Araxes in the region is at the site of Oylum Höyük, near the modern town of Kilis, and on the Söğütü Dere, one of the major tributaries of the Qoueiq River. Although the regions of Kilis and Gaziantep have been surveyed in the past, the focus of research was on the classical periods, and

[535] Esse 1991.
[536] Braidwood 1937.
[537] Amiran 1965; Hennessy 1967.
[538] Sagona 1984.
[539] Greenberg and Palumbi 2015; Greenberg *et al.* 2014.
[540] Mathers 1978, p. 136.
[541] Mellaart in Mathers 1981, pp. 157–60.

Bronze Age settlement was not properly documented.[542] Presently there is no evidence of Kura-Araxes remains between Oylum Höyük in Kilis and the northern reaches of the Amuq Valley. Aside from Braidwood's initial survey of the Afrin Valley as part of his original Amuq survey.[543] The greater Afrin watershed has never been investigated. Over forty mounds can easily be seen in the various highland plains and river valleys, and the region may have been the more likely entry point for either proposed migration route into the Amuq.

Researchers have identified the Amuq Red Black Burnished Ware as an important pivot between southeast Anatolian Kura-Araxes traditions and Levantine Khirbet Kerak Ware, because it is the terminus of several northern ceramic forms (for example, flat lids and collared stands), and the origin of several new red-slipped forms.[544] In the Amuq basin, where we are still bound to the schematic relative chronology of the Chicago expedition,[545] Kura-Araxes Red Black Burnished Ware began in the terminal parts of Phase G (Anatolian Late Chalcolithic/ EB I, Levantine Early Bronze I–II (KA1) see Table 1) and rapidly increased in Phase H (Levantine Early Bronze III [KA2]), when there is a marked growth in the number of new small, one to two hectare settlements.[546] A consistent pattern emerges in the settlement data with the small, newly founded settlements that produce only Kura-Araxes ceramics while the larger sites often have a longer occupation sequence and contain an assemblage dominated more by the indigenous ceramic industries, similar to what is observed in the southern Levant (see below). The Kura-Araxes Red Black Burnished Ware tradition continues into Amuq Phase I (Levantine Early Bronze IVA [KA2]). The late appearance of this ware in Phase J (Levantine Early Bronze IVB),[547] associated with the peak of the 'caliciform' horizon in western Syria, was perhaps residual, since the period was marked by a reorganization of society and production, during which most other markers of the Red Black Burnished Ware /Khirbet Kerak Ware culture (see below) were less frequent. The new salvage excavations at the Toprakhıssar Höyük, presently under the receding waters of the Avsuyu dam, are revealing a more complex pattern of Kura-Araxes material, complete with some of the markers of the Kura-Araxes Red Black Burnished Ware /Khirbet Kerak Ware types retained until the end of the third millennium in the Amuq.[548] Apart from ceramics, Kura-Araxes markers in the Amuq include horseshoe andirons and cattle figurines (discussed above) and rectangular mudbrick structures with clay and mud-plastered installations (benches, bins and central hearths) introduced in Phase H. Nearly the whole publication of the architectural description of this phase, as well as numerous illustrations, is devoted to the 'elabourate accessories' lined with fired marl clay that are its hallmark. They include bins, basins, round hearths, and possible rectangular and horseshoe-shaped ovens.[549] That these had clear South Caucasian antecedents is difficult to deny.[550]

The highland valleys in the Altınözü Yayladağı region, south of the Amuq Plain and southeast of the modern city of Antakya have yet to be surveyed, although many mounds are visible in satellite

[542] Archi *et al.*1971 where no differentiation is made between Early, Middle, and Late Bronze Age.
[543] Braidwood 1937.
[544] Batiuk 2005.
[545] Braidwood and Briadwood 1960.
[546] Yener *et al.* 2000, p. 184; Batiuk 2005, p. 171.
[547] Welton 2014.
[548] Akar and Kara 2018.
[549] Braidwood and Braidwood 1960, pp. 346–350, figs. 259–268; Hood 1951, pp. 113–147, fig. 3.
[550] Greenberg *et al.* 2014.

imagery. Surveys by Wilkinson and Casana have shown RBBW settlements in the river valleys connected to the Amuq Valley to the southwest.[551] This would have been a conceivable route to the Syrian coast as well. Heading upstream from the Amuq plain, a few sites have been identified in the narrow Orontes Valley leading south. The Turkish side has not been investigated due to security reasons, and again a number of mounds can be seen in satellite imagery before the river valley narrows near the town of Darkush. Further to the east, a few examples have been found in the plain of Idlib, in the EB I–II levels of Tell Afis, and the Mardikh IIA levels (contemporary to Amuq Phase H) at Ebla, the major centre of the region in the Early Bronze Age.

Surveys in the Lower Ghab have identified a small number of sites on the east side of the Orontes Valley around the town of Jisr ash-Shugur in the Ghab region.[552] This important site sits at the mouth of the Bdāma pass between the Orontes Valley and the Mediterranean coast through the Jebel Ansariye. Settlements bearing Kura-Araxes wares are found in smaller concentrations on the opposite side of the aforementioned pass, at Ras Shamra/ Ugarit, where they appear in period IIIA, after a lacuna that appears to cover the EB II period (Phase G in the Amuq). From there, it has been identified at a limited number of sites on the Mediterranean coast before it is found in high concentrations again in the southern Levant suggesting a possible route of communication/ transmission.[553]

Continuing down the Orontes, Kura-Araxes/ Red Black Burnished Ware occurred at the important site of Qarqur just south of Jisr ash-Shugur, as well as a few sites on the eastern side of the valley leading to Qalat al-Muqiq and as far south as Hama, where it is only found in limited numbers at the site based on the excavations.[554] Recent surveys in the upper Orontes Valley confirm the complete absence of Red Black Burnished Ware or Khirbet Kerak Ware sites there.[555] This region as well was quite marshy in antiquity, suggesting either the marshy environment of the upper Orontes was again an unfavorable region for settlement of Kura-Araxes migrants. Marfoe's initial survey of the Bekaa Valley in eastern Lebanon did not produce a single potsherd of Kura-Araxes wares[556] and subsequent surveys have yet to change this picture,[557] suggesting Phillips proposed coastal route a more probable one, although there is still an equally sizeable gap in Kura-Araxes Wares on the Lebanese coast. A possible explanation for the lack of settlements in Lebanon could be the connection of this region to the coastal zone and its integration into the Byblos–Egyptian economic axis, and again perhaps representing an intentional avoidance of this region (see above).

The remains, especially from the earlier Amuq excavations of Braidwood and Braidwood indicate that residents using Kura-Araxes pottery (Amuq H) in KA2 had a similar corpus to other Kura-Araxes sites. Ritually, they had the decorated andirons like the Altinova. They also had cattle figurines. Economically, they had many sickles and common ground stone tools. Their metals were few, but they followed the pattern elsewhere in the Kura-Araxes world: pins, daggers, shaft-hole axes. The few architectural remains are square rooms with central, round hearths. We do not have

[551] Casana and Wilkinson 2005.
[552] Graff 2006.
[553] Philip 1999.
[554] Fugmann 1948.
[555] Philip and Bradbury 2016; Fortin 2007a, 2007b.
[556] Marfoe 1978.
[557] Fischer-Genz and Ehrig 2005; Bonatz *et al.* 2002.

any information on plant or animal remains. Not clear is the degree of production, storage, and trade, although patterns in ceramics production and technology conform to what is seen elsewhere.[558]

Comparatively, more data is available for Kura-Araxes settlement in the southern Levant due to the extensive history of excavations in the region. Extensive stratigraphic sequences have been obtained at Beth Shean,[559] the type site of Tel Bet Yerah (Khirbet Kerak),[560] Tel Yaqush,[561] Hazor,[562] and Tel esh-Shuna,[563] among others. Studies have shown that Kura-Araxes occupation in the southern Levant is in reality significantly more constricted than its presence in the region suggests.[564] Presently, 46 settlements have been identified in the southern Levant bearing Kura-Araxes wares, although the amount varies significantly across the region. As mentioned above, only nine or ten sites have a really significant population using Khirbet Kerak Wares and other elements of the Kura-Araxes cultural package.[565]

Understanding the political and economic landscape into which the cultural tradition and we believe actual migrants came requires us first to look at the evolutionary trajectory of this area of the Amuq/southern Levant subregion. KA1 is equivalent to Levantine Early Bronze IB and the first half of EB II. The EB II, which lasts only a couple of hundred years, ends in the first century or century and a half of the KA2. The EB III is equivalent to the largest stretch of the KA2.

The Early Bronze Age is usually considered a period of exclusive small, autonomous, self-sufficient settlements. Mostly, sites of one or two hectare dot the Jordan Valley. No evidence of centralization in economic or political organization existed. However, the coastal region proliferation of small villages in the hill country, appears to be more economically integrated with the emerging powers in Egypt. Its producers might have specialized in viticulture and supplying the growing demand in Egypt.[566] In the Dynasty 0 tomb U-j of King Scorpion at Abydos (c. 3150 BCE), three store rooms were filled with 700 jars that produced botanical and chemical evidence of resinated wine estimated at a volume of 4500 litres.[567] The vessels that had contained the wine were identified as Syro-Palestinian EB I Line Group Painted wares, whose production was traced chemically to well defined groups from the Gaza area.[568] The volume of wine from the one single tomb would suggest that wine was being transported to Egypt for consumption by the elite groups in significant quantities from Syro-Palestine, probably via the traditional 'Way of Horus'.

The beginning of EB II at about 3100 BC signals a very different type of society. Egyptian economic interest has shifted north to the Byblos region, which is attested to by the decline in settlement in the hill country and reinforced by petrographic analysis of imported ceramics in

[558] Batiuk 2005.
[559] Mazar 2012.
[560] Getzov 2006; Greenberg *et al.* 2006; 2012, 2017; Greenberg 2014b.
[561] Rotem *et al.* 2019.
[562] Ben Tor 2017; Zuckerman 2013.
[563] Philip and Baird 2000.
[564] Miroschedji 2000; Greenberg 2019.
[565] Esse 1991, Greenberg 2019.
[566] Finkelstein and Gophna 1993, p. 12.
[567] McGovern 2003, pp. 391–94.
[568] McGovern 2003, p. 100.

Egypt, which show fewer southern Levantine wares and more northern Levantine ones.[569] Population agglomerated in central, often walled sites. Local pottery production, defined by Metallic Ware and Golan cooking wares, was mass produced somewhere in northern Levant and the Golan. There is growing evidence for centralization and mass production of ceramics in the period. In the case of Metallic Ware in the north, Greenberg suggests it might represent a manifestation of an exploitive ideology with over-riding collective goals – specifically related to "the production, storage and transportation of liquids – particularly olive oil."[570]

The agglomeration in sites like Bet Yerah was accompanied by the abandonment of sites like Beth Shean, Tell esh-Shuna, Tel Yaqush, and Tel Kitan, among others, all of which show signs of large-scale burning.[571] Some evidence of this increasing centralization and societal complexity is evident in EB IB, but it clearly reached a different level in EB II. The Golan, Hula Valley and in general, the Upper Galilee area saw a growth in site numbers during the EB II, including Tell Dan and Tell Hazor.[572] The growth in the size of towns like Bet Yerah and the abandonment of village sites suggests that there was some pressure on agricultural production. The lack of household grain storage and the cleanliness of the grain used suggests to Greenberg that a centralized grain storage system with some product coming from more distant places is a possibility. One possibility for the Bet Yerah Circles Building was as a central grain storage unit, although it was not completed, and its function remains unclear.[573] Despite the centralization that occurred, few signs of inequality followed.

Within a century or two, the world of the EB II townships had ended. Many of the sites that were newly established throughout the southern Levant, but especially in the north, were abandoned.[574] Overall population measured in occupied hectares declined significantly. Large portions of towns like Bet Yerah emptied. The Circles Building was not completed. Individuals returned to abandoned sites like Tel Yaqush, Beth Shean, Megiddo, and Tell es-Shuna.

Into this mix people bearing the Kura-Araxes cultural tradition appeared for the first time. In many places the evidence of their presence appears near the beginning of the EB III now dated to around 2900 BC. Mostly, they disappear before the end of the EB III by about 2700–2600 BC. Some believe that this population was already in the area, and locals adopted some of their cultural markers.[575] However, as a group they maintained a symbolic social distance from the local EBIII population.[576] They made their pottery in forms easily connected to the Kura-Araxes Red Black Burnished Ware of the Amuq. Its separate name was assigned because it was first encountered at Bet Yerah (originally called Khirbet Kerak). Its similarity was recognized by Amiran[577] and others.

[569] Porat 1989, p.87.
[570] Greenberg 2000, p. 184.
[571] Rotem et al 2019; Mazar 2012.
[572] Greenberg 2019.
[573] Greenberg *et al.* 2017.
[574] Greenberg 2019.
[575] Iserlis 2015.
[576] Iserlis 2009; Rothman 2015a.
[577] Amiran 1965.

Its technology was at odds with that of the local EB III population, even in choices of clays. It had very similar technology to the homeland zone.[578]

They moved into the towns and re-occupied villages in a way that suggests squatters.[579] At Tel Bet Yerah they occupied abandoned houses and set up wattle-and-daub structures in the plaza near the Circles Building. At Tel Yaqush they made small, square mudbrick houses on the lower flank of the hill. They made their own distinctive pottery, grew grains typical of their northern homeland as opposed to those favored by the indigenous groups.[580] Unlike typical EB III builders, they continued the Kura-Araxes tradition of plaster floors. Another typical Kura-Araxes architectural feature was plastered bins at Tel Bet Yerah[581] and at Hazor.[582] They used andirons with bumps for faces, one of the key characteristics of the Kura-Araxes cultural package. New to the subregion, they created small figurines of cattle made out of pottery clay.[583] These may be an indication of the presence of highland, two wheeled carts.[584] Within the EB III society, they had a food-producing regime different from locals. They grew and butchered their own animals. Their strategy for herding and culling seems to emphasize the use of mostly sheep and goat as sources of meat, milk, and byproducts, following the familiar Kura-Araxes risk aversion strategy.[585] Like the homeland, they emphasized the growing of wheat and barley, but not pulses. They ate fewer of their sheep and goat than local EB III people,[586] and used fishing hooks, not known elsewhere in the southern Levantine Early Bronze Age. Like the homeland they tended to use flake tools and not bifacial, "Canaanean" blades and tabular scrapers.[587]

The question of what pulled them to this area is still much discussed. The EB III saw the decline of the town sites with few signs of social status differences. However, the rise of palaces or large, extended family residences in the EB III implies a continuing evolution of social inequality.[588] When these migrants did arrive, some lived alongside local EB III communities at Bet Yerah, Hazor, Megiddo, Tel Yaqush, and at others like Beth Shean, they seem to have taken over, like Kura-Araxes people did at Godin Tepe at a contemporaneous date. Philip[589]has suggested that they were drawn into the collapse of the EB II order because of their labour. As the local people attracted or forced into the towns dispersed, the need for new labour sources was met with immigrants. This is possible, but what their work was and why they maintained symbolic separation from the local population remains to be researched in more detail. At the beginning of Khirbet Kerak occupation at Tel Yaqush, the Khirbet Kerak Ware-using people spent much time on making the surface of pottery follow Kura-Araxes traditions. Over time, however, they and the local EBIII apeear to have

[578] Iserlis *et al.* 2010.
[579] Paz 2009.
[580] Berger 2013.
[581] Greenberg *et al.* 2006, fig. 7.16.
[582] Greenberg 1997, pp. 184–186; Zuckerman 2013.
[583] Bladt-Knudsen and Greenberg 2020.
[584] Greenberg 2014a.
[585] Mauer 2017.
[586] Berger 2018.
[587] Greenberg *et al.* 2014
[588] Greenberg 2019.
[589] Philip 1999.

begun making pottery together and hybridizing their forms. They stopped making much effort on decorating the surface through burnishing and other design elements.[590]

When one considers what was happening in the contemporary homeland sites in the KA2, these Khirbet Kerak Ware-using people seem like rather poor, small-scale groups. As from their own subsistence, it remains unclear what the basis of their relationship to the local EBIII people was.

VI. Conclusions

The picture painted in Sections I–IV above is of immensely complex, heterogeneous societal and cultural forms, developing and re-developing over a millennium. No single narrative can explain the development of the Kura-Araxes cultural tradition in every place in either the homeland zone or its migrant diaspora. While migration certainly occurred, its timing and its rhythms cannot be reduced to a simple unitary story. There does seem to have been, as Rothman[591] asserted, multiple migrations, or ripples in the stream. Each of those population movements, even within the homeland, was structured by its own particular societal and environmental conditions, interactions with local populations, and a matrix of cultural, economic, and political adaptations.

In this section we address some of the larger issues we discussed, some perspectives upon which we can build, and what data we still need to answer the core questions about the origins, dispersal, development, and end of the Kura-Araxes cultural tradition.

Chronology and its impact on interpretation

Our first contribution at the Toronto workshop was a new chronological framework for the study of this complex cultural and societal picture. The new KA1 and KA2 subdivisions and the bracketing dates of 3500 and 2500 BC were built primarily on radiocarbon or absolute dates and stratigraphy. These absolute dates remain somewhat fuzzy, since all radiocarbon dates carry with them confidence intervals that at best equal a quarter of a century and at worst more than a century. A fairly small number of new radiocarbon dates can change the sub-divisions and bracketing dates significantly. Also, the radiocarbon curve after 2900 BC is relatively flat, making finer time distinctions difficult. Few settlements contained the whole millennium of Kura-Araxes occupation. Many excavations have not yielded dates from secure proveniences or analyzed by good labs. Nonetheless, it makes sense to have a scale independent of the relative chronologies' reliance on changing stylistic trends to establish a single framework of time. Without time as an independent variable, the landscape of change and migration becomes a confusing mishmash of contradictory patterns.

Our chronological framework already has led to new understandings of the Kura-Araxes in the diaspora. For example, the assumption has been that the migration began at the beginning of the KA2. If the KA2 started between 3050 and 2950 BC, it is not believable that the farthest outliers of the migration in the southern Levant and the central-western Zagros could be of the same date. The

[590] Mark Iserlis, personal communication.
[591] Rothman 2003a.

logical conclusion is that the migrations began earlier in the KA1. Interestingly, the new diaspora communities show little evidence of continued communication with the homeland. This is in part evidenced by the frequent parallels with the homeland KA1 pottery and the lack of such parallels from the KA2, particularly to the west. So, the vectors of migration that began in the KA1 would have had to start after the emergence of the red-black color tradition in the Kura-Araxes ceramic repertoire, sometime after 3300 BC, which is supported by the radiocarbon data. The area east of Lake Urmia, with its Yanik Wares, which shows a different pattern than the western Taurus, appears to have a somewhat later first migration at about 3100 BC, or perhaps did retain closer active ties to the homeland in the KA2. The influence of the Kura-Araxes in Velikent and the broader Lake Van area west of Lake Urmia would appear to begin at about that date. The second set of migrations in the Zagros, marked by Yanik Wares, appear to have happened at a somewhat later date. Tony Sagona in his landmark 1984 published dissertation proposed that the pottery styles he associated with different subregions could be followed to track the migrants' paths. The picture we now see is much more complex than his brilliant early model suggested.

Subsistence and Economic Organization

As noted above, the subsistence economy of the Kura-Araxes was structured on a modification of what we understand of the preceding Chalcolithic cultures in southern Georgia, Azerbaijan, and Armenia. It was a narrower, risk-averse "highland" economy both in cereal and animal husbandry, which was then carried with the Kura-Araxes migrants to diaspora communities. There it was replicated, irrespective of local economies. The higher proportion of cereals versus pulses with a preference for free threshing wheat often contrasted with local practice. A diversification in domesticated animals was another part of a strategy that allowed for a greater degree of adaptability in the different regions to which the bearers of the Kura-Araxes went. As KA2 progressed, archaeologists noted clear signs of agricultural intensification. This is evidenced by the remains of irrigation works and large-scale grain storage pits at places like Shengavit, Mokhra Blur and Metsamor. Contrary to former claims, reliance on sheep and goat did not increase significantly. This contradicts one of the grounds for claiming that the Kura-Araxes were specialized pastoral nomads.

This agricultural and pastoral strategy was only one aspect of the economy. Production and exchange of metals, lithic tools, bitumen, and salt, as well as finished products made from these materials and ground stone at most excavated sites is evidence of an economic network. We need much more data to be able to assess the scale and geographical range of this network and the various directions goods moved. Additionally, the Kura Araxes were not the sole cultural group in the Caucasus in the Early Bronze Age, and different groups may have had their own independent and/or overlapping networks. From what we know, the Lower Province constituted one such network. Raw materials moved, but as evident in obsidian, not far from their source. The sources used did not vary much over time. Nonetheless, there was some movement of goods across the edges of the Lower Province. Bitumen, a good likely exchanged for Köhne Shahar's products, is readily available in the Upper Province and at the edge of the Muş/Van subregion. A number of metal-producing sites in the Upper Province lie just north of rich copper mines north of Lake Sevan in Armenia. Gold had to be imported into the Lower Province. The metal used in a necklace at Gegharot was made from metal ores atypical of the South Caucasus suggesting supra-regional networks were engaged. The diaspora sites often developed their own local networks. They settled

near metal sources like the sites of the Altınova and the central Western Zagros and were largely independent of the South Causian sources. So, they were not bringing metal ingots with them; they brought their knowledge and expertise. The absence of obsidian at some diaspora sites and the use of flint indicates this lack of a trade connection between the diaspora communities and those of the homeland. Even if we can establish trade connections, we still need to define the nature of the networks. Were they down-the-line trade in which a smaller and smaller amount are passed from its source? Were they formal networks like the Uruk expansion seems to have been?

The resulting organizational structure in the homeland zone varied over time. In the KA1 it was limited to a few small communities of farmers and herders and perhaps nomadic pastoralists in similar small houses with no signs of any inequality or control beyond consensual agreement. [592] The KA2 in the homeland zone, however, was quite different. An increase in diversity of the corpus of pottery and its decoration developed. The heterogeneity of style suggests that there were new, more bounded units in different geographic and ecological areas, the networks referred to above. The ceramic, three-lobed hearths of the homeland zone were present in the Altinova, but nowhere else outside of the homeland. Andirons decorated with faces, however, were common throughout the diaspora, as they were in the homeland zone. Pots may have been put on andirons from the hearth for serving, so they are of a different function from hearths. Nonetheless, a symbolic language of fertility in nature and less often of human beings (phalluses, female figurines) was shared by each of these Kura-Araxes populations. In the diaspora, aside from frequently maintaining physical distances, migrants maintained the cultural traditions, in part to serve as social markers to distinguish their Kura-Araxes identity from local populations in their new homelands. This is, in effect, why the concept of ethnicity is appropriate for the diaspora. The local societies west of the homeland may have required ethnic separation as the price for peaceful acceptance of Kura-Araxes migrants.

In the KA2 a number of key changes occurred in demographic, economic, and political structures. Population represented by occupied hectares increased dramatically, as Figures 7–14 illustrate, although the abandonment and re-ocupation of sites may cause a significant overcount.[593] The increase was particularly noteworthy in the Ararat Valley[594] and its nearby uplands on the Kotayk Plateau, as well as the Kura River Basin. The question, of course, is what the source of this population increase was. The rise of walled towns can be dated to the KA2. Why did only some regions produce walled settlements, and others do not? Some sites grew larger, reaching a maximum of 20 ha, although they were still small by contemporary Mesopotamian standards. Possible polities formed with these larger sites as town centers. In the Altınova and the Amuq, rank size analyses indicated little integration in the area as a whole, rather sugesting small enclaves around the larger towns. Such analysis still needs to be done for the South Caucasus.

The political organization was not at the state level evident in Mesopotamia nor or in Arslantepe during the palace/temple period (VII and VIA). The description by Frangipane of pre-state society in Mesopotamia fits well here:[595]

[592] Rothman 2021.
[593] Batiuk *forthcoming*.
[594] Areshian 2007.
[595] Rothman *forthcoming* a.

> variation existed "between totally egalitarian societies (horizontal egalitarian systems) and basically egalitarian societies which are ideologically and politically represented by their "chieftain" members (vertical egalitarian systems). In the former case, in addition to the absence of differences between resource distribution and access, all the members of the community were essentially of the same status and decision-making tasks were horizontally distributed both within each group [...] and between 'related' communities in a given territory [...]. Conversely, in the vertical egalitarian system, substantial equality and economic self-reliance were accompanied by a system of social and kinship relations which gave and legitimized a kind of privileged status to certain members of the community depending upon their genealogical position, true or presumed, entitling them to represent the community and take up its governance."[596]

The dispersed, small scale society of the KA1 in the homeland zone fits the description of a horizontal egalitarian society. In the KA2, society in the homeland zone seems to have changed, and is a good fit for a more vertical egalitarian society. Site layouts in the homeland zone, the effort necessary to recruit and control labour to build walls, possibly some centralization of grain storage, and trade in metals and other goods make sense in the model of vertical egalitarian society. Some level of coordination or even control of this exchange would promote such informal leadership, similar to the Pueblo societies of the American Southwest.[597] However, the domestic space was still the most socially important—at sites like Shengavit architectural plans changed, but within each stratum no significant difference in size or furnishings is evident.[598] Our definition of domestic production versus workshop or administered production needs to be refined. By domestic we do not mean a single house necessarily. Given the complexity of some productive activities like metallurgy and pottery making, a household may be a set of relatives or cooperating neighbors in more than one house. That effort was not controlled by a central coordinator, but it remained independent and consensually governed. Even when surplus is produced, the exchange is not controlled by a central authority but by the group. Greenberg[599] proposes that commoditization—the existence of a class of traders between the producer and consumer—occurred does not fit the societal structure we see.[600] At the same time, there was some evidence of centralized efforts in feasting or ritual buildings at Mokhra Blur, Kvatskhelebi, Godin, and Arslantepe VIB1. The Chief's house at Arslantepe VIB1, should it be Kura-Araxes, may be another evidence of this vertical egalitarian organization.

The assumption that all the early migrants were full-time pastoral nomads has confused the picture we have of the Kura-Araxes. Anthropologically and historically, from the nomadic tribes of second millennium BC Mari[601] to the modern Basseri,[602] Kurdish,[603] Yörück,[604] and Yomut[605]

[596] Frangipane 2007, p. 153.
[597] Rothman 2017; Mills 2000.
[598] Simonyan and Rothman 2015.
[599] Greenberg 2011.
[600] Rothman 2000b; *forthcoming* b.
[601] Matthews 1978.
[602] Barth 1976.
[603] Cribb 1991.
[604] Bates 1973.
[605] Irons 1975.

pastoral nomads on the landscape occupied by ancient Kura-Araxes populations, all are uniquely different in their organization and use of space than settled farmer-herders. There is a continuum in the use of pastoralist resources from farmer-herders, part of whose population migrate to winter pastures,[606] to fully pastoral nomadic groups. Specialist nomadic pastoralists at times are involved in agriculture, but it is agriculture like the date orchards grown by the pastoral nomads of Baluchistan.[607] Pastoral nomads are not constantly on the move. They settle for shorter periods, although they do not tend to reside near the crops from preparing the soil to planting and weeding, and finally harvesting and storing. The primary focus of the pastoral nomad is their flocks. Like ethnically different groups residing in the same area, it is not merely pastoral nomads who set up cultural boundaries.[608] Wattle and daub building can and do last a long time, and unlike the tents of pastoral nomads are meant to be occupied for long periods. The elevations and other climatic data provided for each subregion in Section V shows that in the diaspora and homeland, sites for settlement tended to favor those areas with agricultural potential,[609] in addition to nearby pasture. This alone raises questions about the claims that the Kura-Araxes migrants were pastoral nomad groups.

Many of our current analyses focus on the distribution of pottery styles, and do not spend enough effort analyzing other equally important elements of the so-called Kura-Araxes cultural package like housing, ritual and symbolism, foodgetting, production, and settlement patterns. Some at the workshop felt that new data is needed that emphasizes the adaptations and organization of the homeland zone and diaspora societies. In addition to style, analysis of the function of pottery might help us better understand food preferences, cooking techniques, and other activities. Better relating their function to their style (cooking pot versus cooking pot, eating vessel vs. eating vessel, et cetera) (**Fig. 2**) could help clarify why some forms changed. Newly available residue analysis on pots can also help in this regard. Analysis of production will define the *habitus* (traditional practices and mental maps). This may further clarify whether a small domestic group or a workshop produced goods. It might help us define the nature of the household group. Studying other classes of tools and mapping of activity areas will enhance our understanding of the lifestyles of the Kura-Araxes population. A more landscape approach that focuses on a reconstructed environment will add one of a number of other factors that would help us make sense of how and why changes in the economic, political and cultural sphere happened. Some of this analysis is being done, but not uniformly. Similarly, a comparative analysis of household construction will help clarify the tasks that needed doing, and what level of expertise was required. A wider horizontal exposure is needed for the small villages, particularly in the diaspora zone. The claim that wattle and daub houses are short-lived and an indication of a mobile population like nomads is far from confirmed. The effort Kura-Araxes populations made in plastering and re-plastering floors, maintaining roofs, et cetera do not seem like the activities of people who would move on seasonally.

Origins of the Kura-Araxes

[606] Samei 2019.
[607] Salzman 2000.
[608] Barth 1969.
[609] see also Batiuk 2013.

The question on which we found the least agreement regards the origins of the Kura-Araxes cultural tradition. In part this is because of sparse data. The KA2 is better documented than the KA1, and the transition from the Caucasian Chalcolithic also is in need of significantly more data. Based on what we do know, most, not all, workshop members did not favor the idea of a new group of people entering the picture near the end of the Chalcolithic period. The questions in all such changes —historically, they occurred frequently; for example, the migration of the Seljuk Turks[610]— are where the migrants came from, and what happened to the former people? Did they simply adopt the symbols and ways of life of the new migrants, were they forced out, did the migrants adopt the cultural practices of the older population, creating a new hybrid culture? Did cultural boundaries between groups harden into distinctions our modern models would call ethnicities?[611]

In case of the origin of the Kura-Araxes cultural tradition, if they were coming from the west or northwest, as some suggested, we need to find more evidence of the Kura-Araxes cultural package in those regions. Kohl[612] sees their movements in the more global history of Eurasia. He cites three interrelated trends. The first is the demise of the Tripolye mega-settlements (really a massive agglomeration of small settlements) near the end of the Uruk expansion in the final years of the fourth millennium BC, which was followed by a more mobile society using ox-driven carts in western Eurasia. The second was the abandonment of the earlier exchange networks, mostly in metals, from the Carpatho-Balkans to the Volga River regions. This was replaced by the Maikop/Novosvobodnaya and Kura-Araxes metals trade and the use of new metallurgical techniques at the same time as the Uruk expansion was present in the Upper Euphrates in the second half of the fourth millennium BC. The third involved the movements in and out of the North Caucasus in the second half of the third millennium. These movements from the steppes into the South Caucasus along the Caspian corridor and passes into the Upper Province after 2500 BC marked the end of the Kura-Araxes. They are associated with Bedeni, Martkopi, and later Trialeti style groups, whose physical markers on the landscape were the tombs in Georgia and Armenia whose grave goods included wagons with wooden wheels,[613] jewellery made with precious stones and metals, and perhaps human sacrifice. A number of these groups continued to use black burnished pottery. However, we feel that they lacked the full Kura-Araxes cultural package, and their lifestyle was so different from the Kura-Araxes of the second half of the fourth and first half of the third millennium BC that they should not be called Kura-Araxes.

In addition, as Kohl[614] himself writes,

> "ethnographic and historical sources both make it patently clear that the same people can change its way of life, including its basic subsistence economy—more agriculture, more pastoral nomadic or whatever— within a single generation. As that is true, it means the material culture of a group or people can profoundly change as well quite quickly. Sudden

[610] Rothman 2003a.
[611] Rothman 2015a.
[612] Kohl 2006.
[613] Lyonnet 2014.
[614] Kohl 2006, pp. 5–6.

> shifts in the archaeological record need not necessarily involve the replacement of one people from another, but simply represent the transformation of the lifestyle of the same people."

That being said, the South Caucasus provides a unique case study. Many migrations appear in the historical record of the Near East, but few have left as entrenched a mark in the archaeological record as the Kura-Araxes. The archaeological record of the Caucasus indeed records a number of such movements. But more frequently, it reveals a pattern of cohabitation between many cultures in the region, each maintaining a coherent identity: Maikop/Novosvobodnaya, Velikent, Upper Euphrates Groups, Amuq Phase G, Levantine Early Bronze. Many of these overlapped chronologically and geographically, and each left a distinct archaeological signature. Multiculturalism seems to have been a facet of life in the region both before and after the Kura-Araxes, so why not in the Caucasian Early Bronze Age during the Kura-Araxes as well? Indeed, the overlap between the Maikop/Novosvobodnaya, and the Kura-Araxes at the beginning of the third millennium would suggest this was so. There was in all probability, overlap between the emerging Kura-Araxes, and the indigenour Chalcolithic cultures in the middle of the fourth millennium. Different groups lived together in the South Caucasus at the same time, perhaps exploiting different eco-niches. This tradition appears to have continued in the diaspora regions, where the Kura-Araxes migrants cohabitated with indigenous societies, yet still maintained their cultural identity. This pattern of cohabitation was yet another part of the Kura-Araxes cultural signature.

An alternative view we discussed was that a trend that developed within parts of the homeland zone met the needs of a wider set of people there, becoming the Kura-Araxes cultural tradition. One of the clearest lines of evidence for a major change was their food production choices. A narrower set of options replaced the broad-spectrum agriculture of the Caucasian Neolithic and Chalcolithic periods of the lowlands, and the missing resources were replaced with animal products to fill people's nutritional needs (Section IVA). The evidence above of production of animals for their meat, if not exclusively, reinforces this idea (Section IVA). As described above, a pattern of agricultural production was first noted in the intermediate elevations of the homeland zone. Interestingly, the same zone is the putative center of production of Sioni and Tsopi styles of pottery in the Chalcolithic period, which share some elements of the Kura-Araxes types. Should that be the reason for its adoption, presumably a new set of environmental conditions or human-nature relationships had developed. The inability of migrants to adjust and live in Colchis, the Islahiye Plain and the Middle Orontes Valley, which were swampy, gives credence to this theory. We know that such climatic changes occurred,[615] but those changes seem to have affected different areas within the homeland zone somewhat differently. The overarching kinds of change in climate seen in pollen cores, et cetera are often too general and their timing is somewhat imprecise. Still, emphasized in both the section on plants and animal production, the idea of risk minimization and flexibility in what foods were produced is essential should researchers favor such an explanation. This implies that from the Neolithic period on, populations in the South and North Caucasus alternated from settled to more mobile societies.[616] The same happened at the end of the Kura-Araxes in the homeland zone. This change was not necessarily a rapid and uniform response. We can see a variety of patterns of settlement throughout the prehistory of the Caucasus. What

[615] Connor and Kvavadze 2014.
[616] Simonyan and Rothman *forthcoming* c

Adams[617] described as a strategy of resiliency—in his case, Mesopotamians' occasional transformation from settled to more mobile, pastoral societies was due to political changes—certainly fits the risk averse and flexible nature of the Kura-Araxes adaptations. As mentioned above a landscape approach may help to discover patterns of practice and adaptation. Again, more effort is needed to discover the temporary settlements, not just the funerary sites, of more mobile people.

Overall, we agreed that having more data and more kinds of data would be necessary to create a more convincing narrative for the origin of the Kura-Araxes cultural tradition.

Current Models of Kura-Araxes Migration/ Intercultural Contact

The case for migration of Kura-Araxes people, as opposed to the diffusion of Kura-Araxes pottery style, is made by the pattern of when people carrying the suite of characteristics appeared and where.[618] The likelihood is that there were a series of vectors of movement away from the homeland zone ("ripples in the stream") rather than a single broad wave like the spread of agriculture into Europe during the Neolithic.[619] This suggests migration was the primary reason for expansion. This is not to say that there were not cases where locals adopted some of the symbols of foreign Kura-Araxes people. Some of the best examples of emulation of Kura-Araxes material come from the southern Levant, such as those found at the citadel of 'Ai, as well as tombs at Jericho.[620] Palumbi[621] suggests that in the period after the burning of the temple/palace complex at Arslantepe, the remains of Uruk influence as well as that of newly introduced Central Anatolian and Kura-Araxes cultures defined the organization and symbol-sets of the people living there. This assumes that Kura-Araxes groups were in contact with them through a network in the diaspora. So, whether there were actual Kura-Araxes people or diffusion of Kura-Araxes ideas, movement out of the homeland is the most likely. In a number of instances, the progress of this migratory pattern can be verified.[622] However, the marked differences between what was happening in the South Caucasus and in the southern Levant in the KA2, for example, would seem to contradict the idea of continued contact with the homeland throughout that period. When one compares the organizational nature of the South Caucasus and of the southern Levant at 2850 BC, they are stunningly different. The societies of the South Caucasus had evolved into vertical egalitarian societies with the likelihood of some centralization. The southern Levantine Kura-Araxes is clearly organized as horizontal egalitarian societies, described by the excavators of Tel Beth Yerah as temporary and as if they were temporary squatters.[623]

Parenthetically, the mechanism that causes people to adopt foreign symbol sets is a complicated one. Often, it involves emulation of a more highly organized or colonial societies by less complexly organized or colonized people. Sometimes, conversely, it is the expropriation of a native population's symbols by colonial powers. The adoption of symbols by foreigners of independent

[617] Adams 1978.
[618] Batiuk 2005; Batiuk and Rothman 2007; Rothman 2003a; Greenberg and Palumbi 2015.
[619] Rothman 2003a.
[620] Callaway 1972, p. 193 ('Ai); Garstang 1932 pl. VI: 1,2,3,9 (Jericho).
[621] Palumbi 2017.
[622] Rothman 2003a; Batiuk 2005.
[623] Paz 2009.

and equal status is less easy to explain. Often, groups that want to maintain their distinctive identities or are prevented from adopting the symbols of local societies to which they migrate avoid such copying. An ethnographic example of this is the Romani among the pastoral nomad Basseri of South Persia.[624] There the Romani are required to have differently designed tents, cannot own sheep or marry a Basseri woman, even though they lived among the Basseri for many generations.

If we are speaking about migration, two big questions still need to be answered: who were these people, and why did they migrate in the first place? Certainly, demographers speak of a "push" and a "pull"[625] in all migrations. The initial causes of migration probably lie in the homeland zone. Therefore, an older suggestion about the push for out-migration[626] was overpopulation. Both Areshian[627] and our maps (**Figs 7–14**) show such a dramatic increase in population in the KA2, but not in the KA1. Climate change, the increasing wetness and forest development, needs to be researched more. How the highland environment affected the Kura-Araxes populations is also key.[628] Less easy to determine might be changes in land ownership in light of these changes, or the avenues of some individuals to establish their group by finding new territories away from home[629] like theVikings did much later in time. Those more economic and political factors could have impelled more politically marginal people looking for new opportunities. It may explain the 'impoverished' or opportunistic settlement in the archaeological record, such as moving into empty buildings at Tel Bet Yerah. They do not seem to have been a cause of major societal change. The Kura-Araxes migrants tend to appear in significant numbers after societal decline or collapse, such as at Arslantepe, Tepecik, Godin Tepe, Tel Bet Yerah, etc. When they do migrate, they avoid swampy areas. They seem to be consciously avoiding contact[630] with specific regions or even societies, such as the whole of northern Mesopotamia. As some see the Kura-Araxes migrants as pastoral specialists, even nomads, one of the opportunities that pulled them could have been pasture. The weight of the evidence, however, makes this unlikely as it suggests that they were better classified as small clans of settled agro-pastoralists.

What did the Kura-Araxes migrants provide to locals in the places to which they migrated throughout the diaspora with no real signs of violence? One thing may have been expertise in some productive activity. Technology is best taught by example by an expert on site rather than through information passed on by word of mouth. Batiuk[631] suggested that wine-making, known very early at Areni-1, was one such technology. Another commonly suggested technology was metallurgy.[632] Although grapes have a wide distribution in the Middle East[633] and metal deposits are scattered throughout the Caucasus, Taurus, and Zagros Mountains, the issue may not be availability of resources, so much as techniques for production that were less known outside the homeland zone.

[624] Barth 1976; Rothman 2017.
[625] Rothman 2003a; Batiuk 2005; Palumbi 2017.
[626] Burney and Lang 1971.
[627] Areshian 2007.
[628] Rothman 2018.
[629] Rothman 2003a; Batiuk 2005.
[630] Batiuk 2013; Rothman 2018.
[631] Batiuk 2013.
[632] Burney and Lang 1971; Sagona 1984; Courcier 2007.
[633] Miller 2008.

Philip[634] suggests that what they provided was labour. The third millennium saw the development of an intensive urban landscape in the Khabur region[635]. Where did the population come from to build and settle these cities? Could the conditions of the Khabur have attracted (or coerced) groups from northwestern Syria to come east, creating a labour vacuum in northwest Syria to be filled by the Kura-Araxes? Evidence from the southern Levant suggests the Kura-Araxes people moved into a disrupted landscape evidenced by the numerous abandoned settlements, with the fall of the EB II's first experiment with complex organization. Abandoned settlements (or neighborhoods) would suggest a decrease in population. Certainly, the Kura-Araxes migrants did not create the disruptions, but they came afterwards. Arriving when they did, the Kura-Araxes people could have provided the necessary labour for the economies of the region. How this model could apply to the other regions will need significant more research, but there is evidence elsewhere. The Kura-Araxes arrive after the burning of the Arslantepe VIA palace/temple, or after the hiatus after the end of the VI:1 at Godin Tepe.[636] They may have filled in where there was a loss of population or of expertise. The Kura-Araxes migrants could opportunistically be filling those new openings. This pull is also suggested, because the Kura-Araxes migrant populations clung to travel and communication routes, and either moved into established sites, often the larger and more complex ones, or more likely founded new sites on previously unoccupied places near current or former centers.

What became clear to us was that there was a different story in each case. In the homeland, a radical change emerges in the local social order. This change is often linked to the arrival of the proliferation of earthen burial mounds that cover wooden funerary chambers adorned with incredibly rich funerary deposits, including wheeled wooden wagons. This Early Kurgan Culture emerged in the homeland about 2600 BC and would slowly expand as the Kura-Araxes lifestyle and cultural tradition began to fade. By about 2500, many Kura-Araxes villages were abandoned—archaeologists have found no kurgans in the Ararat Valley—, and there is a marked shift to what is understood to be less permanent occupation. The presence of wheeled vehicles accentuates the mobility of the new culture, with a focus on a pastoral economy[637]. The subsequent Middle Bronze Cultures have their roots in North Caucasus Maikop and Novosvobodnaya cultures, but still share a number of Kura-Araxes traditions, especially in ceramic production and decoration. Whatever the mechanism was for the end of the Kura-Araxes in the homeland, the new social order, clearly more vertically aligned, with a political economy that focused production and trade of prestige items, represented an abrupt change to the established and more horizontal social order of the Kura-Araxes.

The organization of Kura-Araxes societies was built around the homestead. Production, for the most part, was domestic. Whereas an increasing technical sophistication is evident, indications of specialisation – this means not only concentration of production into a smaller number of workshops, but also supplying a larger pool of consumers beyond the local community – are not present. Typical production of agricultural goods tended to follow a pattern developed in the more highland areas in the preceding Chalcolithic period. Pulses and oil-producing plants, common in the Neolithic but diminishing in the Chalcolithic, disappeared in the Kura-Araxes diet. Animal

[634] Philip 1999.
[635] Ur 2004.
[636] Rothman 2011.
[637] Smith 2015.

protein and fats, the focus of pastoral production, replaced them. This pattern originated in the highest elevations in the homeland, where the Sioni and Tsopi cultural traditions first appeared, and was a consistent model for the Kura-Araxes economy throughout time and space. Even in the diaspora, where the local groups grow and consume pulses and oil-producing plants, they do not enter the Kura-Araxes diet. Production of pottery, wood, metals, lithics, ground stone and bone tools all follow this domestic pattern. While the Maikop/Novosvobodnaya cultures north of the Greater Caucasus Mountains seem to produce more sophisticated metal objects with deep social symbolism, the role of metal in the Kura-Araxes cultural tradition is much more difficult to interpret, given the scarcity of metals that have been preserved in the archaeological record. We must assume that much of the metal, especially gold, was probably recycled by contemporary or later cultures, thus obscuring a proper understanding of the role of metals in the Kura-Araxes. In the Lower Province at least there appears to be a greater emphasis on ornamentation found in graves, while the Upper Province seems to emphasise tools and weapons, most of which are found in settlement contexts.

The lack of explicit symbols of status suggests that the Kura-Araxes populations did not develop real social differentiation, as represented in mortuary practice and centralisation of control mechanisms, past what we would call a vertical egalitarian level. Overall, the Kura-Araxes societies can best be described as small settlements of agro-pastoralists with little internal social differentiation, political centralisation, or military strife, directed to fulfilling local needs and desires. That does not mean that there was never any increase in societal complexity over time. During the KA2, population grew significantly in the homeland, and some sites grew in size (though still very small by Mesopotamian standards) and may have formed small local polities. The heterogeneity of style in the KA2 reflects this growth and local focus.

As mentioned, one of our biggest questions was why the Kura-Araxes populations left the homeland in the first place. They did not leave in a single wave like the Neolithic populations of famers into Europe. Rather they were like ripples in the stream, continually seeing the departure of small groups (clans?). Since the migration began in the KA1, population pressure does not seem to have been the major factor. Pulls of various types to pursue some economic goal or establish the independence of extended kinship groups was probably the driving force of the migrations. Kura-Araxes populations do not appear to have caused any major disruption where they went, settling among local people with little to no evidence of violence. In fact, they tended to arrive after a major societal disruption had already happened. In some places, they may have brought with them technologies in metallurgy or winemaking, or other technological skills. On the other hand, they may just have been labourers. In the Amuq and Levant they appear to have had no control of local societies, whereas south and east of Lake Urmia, they appear to have arrived later and been more of a local force. In the Taurus they integrated into local societies, and in the Lake Van (Urmia and Southern Levant sub-regions) they eventually hybridised.

Finally, we ask why did the Kura-Araxes end? As we said above in Section II, we do not believe that some superficial continuities in pottery style mean the Kura-Araxes cultural tradition continued after 2500 BC in the so-called Early Kurgan Period. In the homeland an abandonment of settled life and greater mobility, in addition to new organizational elements,[638] marked its end.

[638] Smith 2005.

The occasional re-use of Shengavit in the Early Kurgan Period, for example for burials, grain pits, and probably short-term occupation that left no archaeological traces makes it likely that this was not a new foreign population, but a local one with memory of the Kura-Araxes past. Only at Nadir Tepe in the Mughan steppe north of Lake Urmia along the Araxes is there any evidence of violence in its final days.[639] In the diaspora, the elements of Kura-Araxes cultural tradition disappear at about 2600 BC subsumed by new local cultural traditions or as in the Zagros by a pastoral state.[640]

The conclusion really is that the case of the Kura-Araxes cultural tradition and Kura-Araxes populations is a rich one for those interested in migration, intercultural interaction, adaptation to environments very different from their Mesopotamian neighbors. Running parallel to the resource-poor, organizationally complex Mesopotamian case that has long been studied and is familiar to more scholars, this resource rich, but environmentally more marginal area presents a vehicle to contrast and explain the processes underlying cultural and organizational evolution.

Thus, we have as a workshop group and as a larger field made great progress in understanding the subtleties of this unique cultural tradition and societal type. However, we are fully aware of the great distance we have to go to explain it more fully, and of the necessity of sharing more raw data to make our arguments and interpretations based in fact. We believe that in not using terms like village, town and city, we are setting the first step in creating new models for the Kura-Araxes, and not just imposing the Mesopotamian model on it.

Finally, in dedicating this report to Tony Sagona, we hope to have raised the interest of younger scholars to pursue these questions and answers as he did, in effect founding the study of the Kura-Araxes in the West.

[639] Alizadeh et al. 2018a.
[640] Potts 1999.

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Supplementary Data - Radiocarbon

In one of our final exchanges with Tony Sagona, he had expressed that he had always wished to pull together a comprehensive list of radiocarbon dates for the Caucasus, but he had never the time or resources to complete it himself. He hoped it would be one of the outcomes of the Toronto meetings. While the participants had brought together a significant amount of radiocarbon data, it was focused more on the diaspora. The rough chronological model we had agreed to was based on Badalyan's earlier work in Armenia[641] and the general collective knowledge of the group. Discussion that occurred after the meeting revealed still significant disagreement on some of the details, specifically the Late Chalcolithic-KA1 transition. In the intervening periods, however, Passerini et al. published their work,[642] building on the tremendous leg work of Passerini in her M.A. thesis.[643] This study was combined with some of the data collected during the workshop, as well as material that had either been overlooked, or had emerged or been clarified since their work into a new chronologic model.

The resulting work shed significant light on the chronology of the South Caucasus, and while Passerini et al's chronological division of the Upper and Lower Provinces is intriguing and fits well with our archaeological interpretation of the region we decided not to pursue it. We also disagree on some of her methodological approaches,[644] and handled some of the data slightly differently, resulting in a slightly different outcome.

Although we had access to dates from the Euphrates and the southern Levant, as well as most dates from Iran, they were not included in the model as the greater focus was on the transitions from the Chalcolithic to the KA1 and the KA1 to KA2, which could only be observed in the homeland. We did not separately model the north versus the south. Rather because of the scope of this larger project, we looked for an overall dating scheme. Clearly, the transitions were not uniform across the regions, as is best seen at Gegharot, where stratigraphically the material is KA1 and comes from a level immediately below KA2, but the dates are clearly KA2. Two dates (AA-66888 and 56969) were removed on advice from Badalyan due to some issues with context. A further two dates (AA-72213 and 72214), although identified by Badalyan as prime KA1 contexts, consistently undermined the model's agreement, and reveal that the transition to KA2 occur later at Gegharot and perhaps Armenia in general. Therefore, a more geographically nuanced model such as in Passerini et al. would be useful, but for the purposes of this study, which were to answer larger questions about migration, cultural interaction, and societal evolution, we did not pursue it. Ultimately, the answers to these questions require that we employ models with real time, as opposed to pottery style, culturally relative time.

We similarly modelled a sequence, using of chrono-cultural phases as the a-priori knowledge used in Bayesian approach; however, we differed in our phasing. Utilizing the new "Toronto Chronology", built on larger absolute dating patterns, we focused on a Late Chalcolithic and two Kura-Araxes phases, while Passerini worked from Rova's preferred three-phase system

[641] Badalyan 2014.
[642] Passerini *et al.* 2018.
[643] Passerini 2015.
[644] Passerini *et al.* 2018, pp. 101–7.

built on the excavations of Natsagora, following more on Kavtaradze's work.[645] In this chronology the KA I started just before 3600 BC, the KA II beginning just before 3200 BC and the KA III just before 2800 BC.

One of the largest problems, aside from the rather anemic level of radiocarbon dates for the subregions, is that there have been so many chronologies that have been used over the years,[646] and the phases have been defined in different ways. When using the phasing to build their Bayesian model, Passerini and her associates did not always critically examine the phasing of the individual sites and how it may fit into their specific phasing model. This is best exemplified by the site of Gegharot, where Badalyan's publication of the radiocarbon data uses his two-phase system[647] and some of his KA2 dates actually should have been put in Passerini et al's KA III from a relative and absolute chronological standpoint. Similarly, his KA1 would cover both their KAI and KA II, but they were all put in KA I. This happened with Sos and Aparan as well. This could account for many of the outliers that were discarded. Similarly, we had to re-shuffle some of the dates in switching between chronological schemes for Natsargora, one of the primary sites of the study. It is dated by Rova as KA II. However, but based on the appearance of buff wares and red-black wares, they should be in the KA1 of the Toronto Chronology, and chronologically it fits best there. As a result, these and some other data had to be re-parsed and placed in the proper phase according to the Toronto sequence before the model could run.

With the scale of the project, we found Passerini's aggressive culling of dates for reliability somewhat excessive. From a methodological standpoint many of the eliminations are logical, but while employing a Bayesian approach to these dates, the model by Passerini et al. is not in a strict sense a Bayesian model. Given chronological and geographic scope, and the fact that the model was built on radiocarbon dates that are not specifically stratigraphically linked but built on more ephemerally related chrono-cultural phases, some flexibility can be shown. For example, eliminating samples merely because the 1.5 x 1.5 m trench they were recovered from was "too small," even though the samples were "fully respond to radiocarbon reliability criteria," could be deemed as unnecessary.[648]

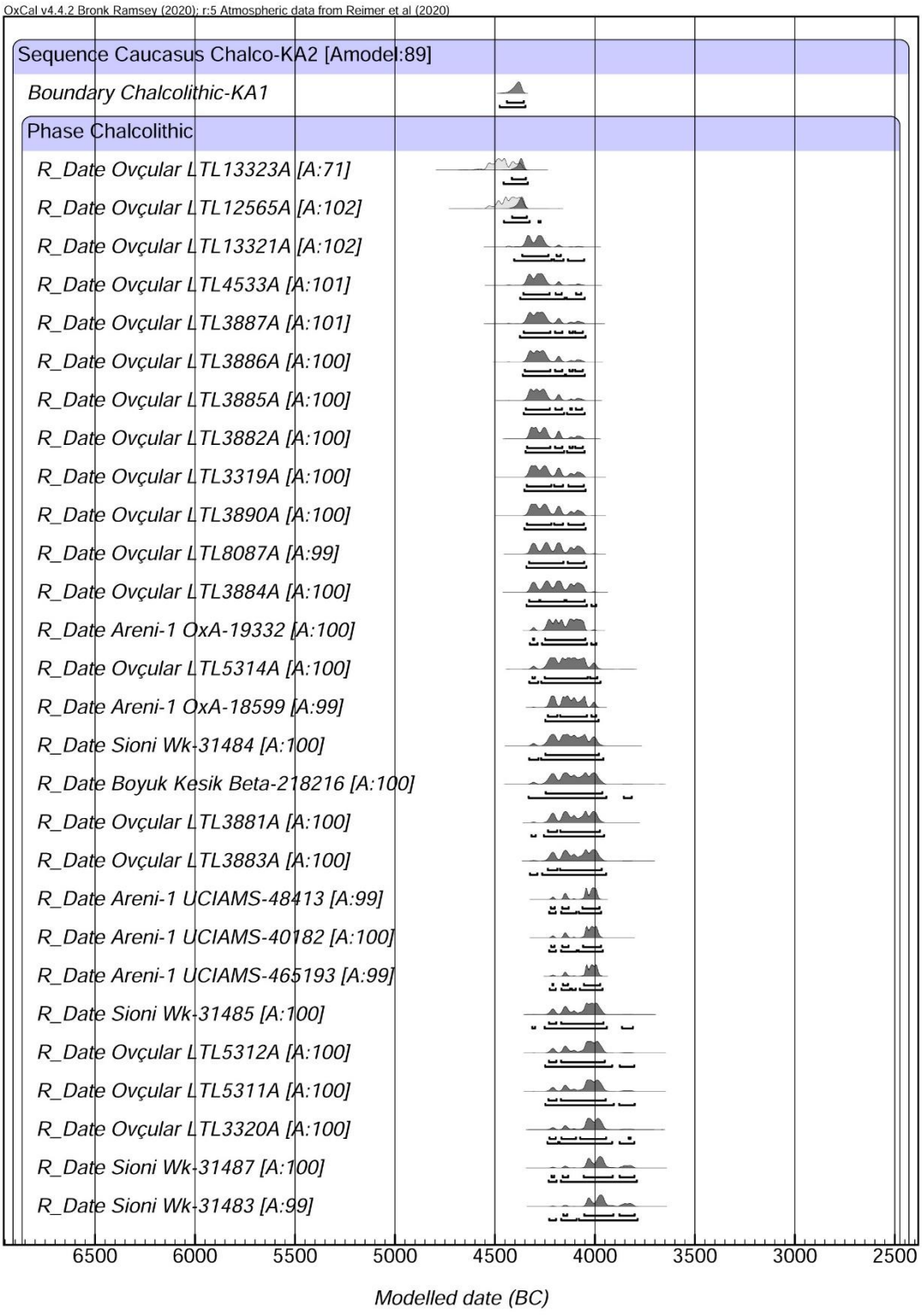
We added dates from a number of other Chalcolithic sites, as well as unpublished dates from Chobareti and Sos provided by Tony for the conference. The Velikent dates were also added,[649] cognizant that their Kura-Araxes attribution is complicated, and we also included the Godezor data in the Late Chalcolithic phase,[650] which were left out of Passerini's study due to the "uncertainty" of cultural association.[651] New dates from Azerbaijan, Iranian Azerbaijan, Georgia and Armenia were also added (See Table 5 in the Supplementary Data for sites and bibliography).

We similarly eliminated all dates with a standard deviation of equal to or over 100. Then we approached the analysis by first running the dates, examining it for outliers, and then looking for an explanation for its status. Between the addition of the new dates and the less rigorous elimination

[645] Kavtaradze 1983.
[646] see Palumbi and Chataigner 2014, p. 248, fig. 1.
[647] Badalyan 2014.
[648] Passerini *et al.* 2018, p. 103.
[649] Gadzhiev *et al.* 1995, 2000.
[650] Palumbi and Chataigner 2014, p. 252, table 1.
[651] Passerini *et al.* 2018, p. 91.

of dates, we created a much more continuous sequence, resulting in fewer outliers. Where we did have outlying dates with poor agreement (usually with a dramatically poor agreement of < 20), most coincided with problems in underlying data identified by Passerini et al. and could therefore be explained. This approach allowed for significantly more dates to be included in the more robust model. Since species identification was not possible, the Charcoal Plus Outlier Model[652] was used on all charcoal samples to account for varying built-in age (ie. old wood) effect[653] and the General Outlier model was applied to Short-life samples to assure quality control on the dates.[654]

[652] Dee and Bronk Ramsey 2014.
[653] Schiffer 1986.
[654] Bronk Ramsey 2009.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Phase Chalcolithic
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4500
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3500
3000
2500
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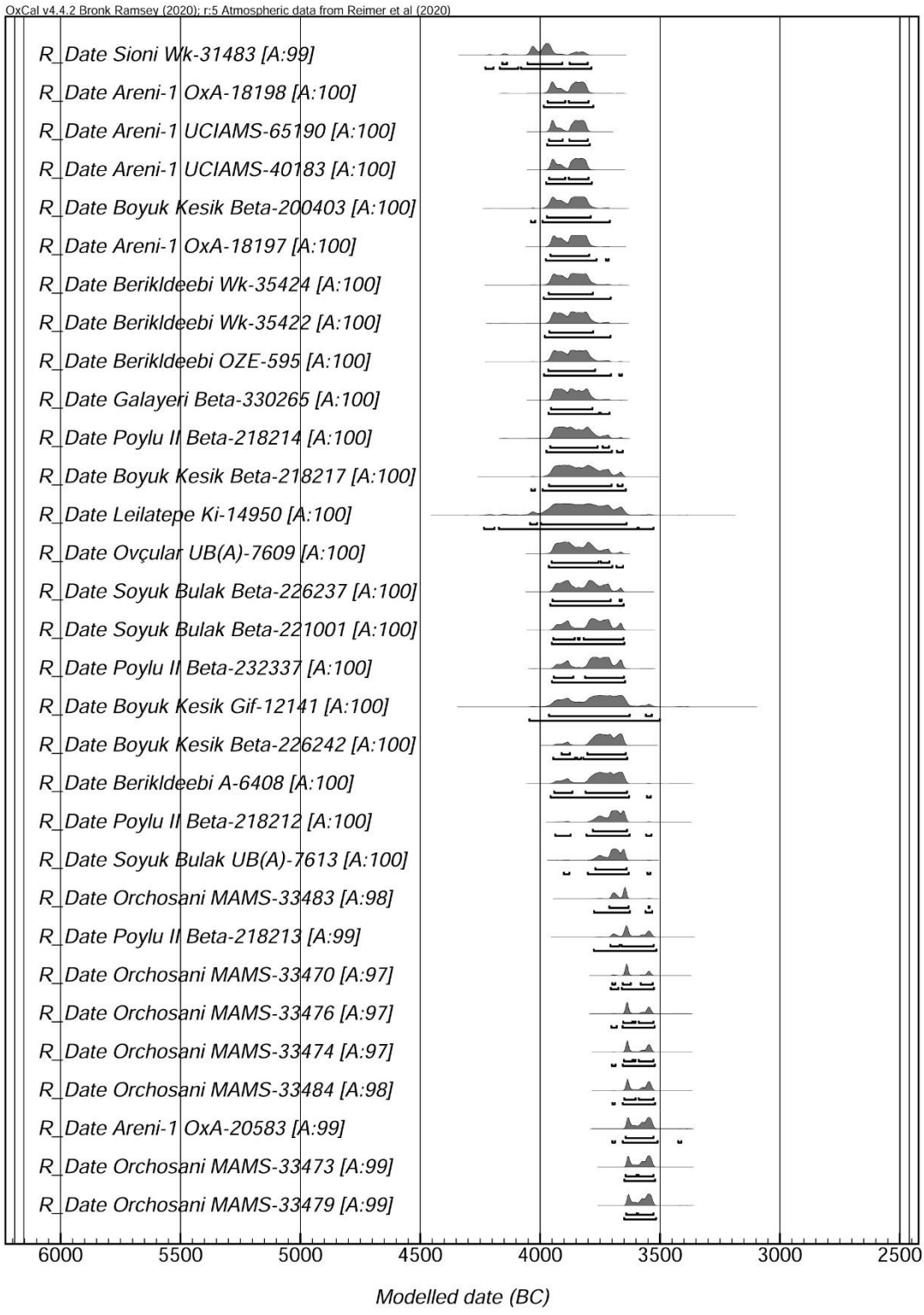
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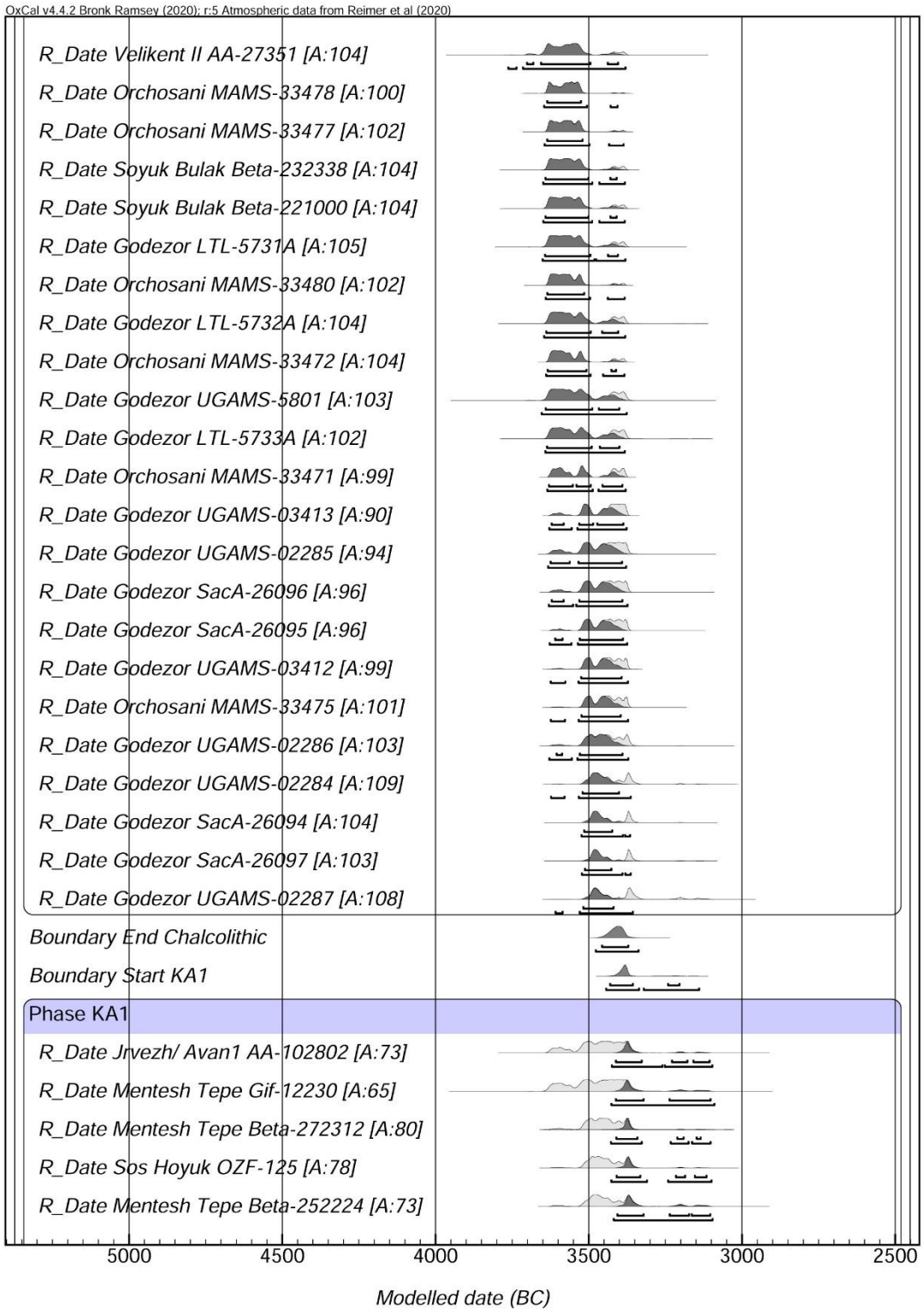
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R_Date Godezor UGAMS-5801 [A:103]
R_Date Godezor LTL-5733A [A:102]
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R_Date Godezor UGAMS-03413 [A:90]
R_Date Godezor UGAMS-02285 [A:94]
R_Date Godezor SacA-26096 [A:96]
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R_Date Godezor UGAMS-03412 [A:99]
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R_Date Godezor SacA-26097 [A:103]
R_Date Godezor UGAMS-02287 [A:108]
Boundary End Chalcolithic
Boundary Start KA1
Phase KA1
R_Date Jrvezh/ Avan1 AA-102802 [A:73]
R_Date Mentesh Tepe Gif-12230 [A:65]
R_Date Mentesh Tepe Beta-272312 [A:80]
R_Date Sos Hoyuk OZF-125 [A:78]
R_Date Mentesh Tepe Beta-252224 [A:73]
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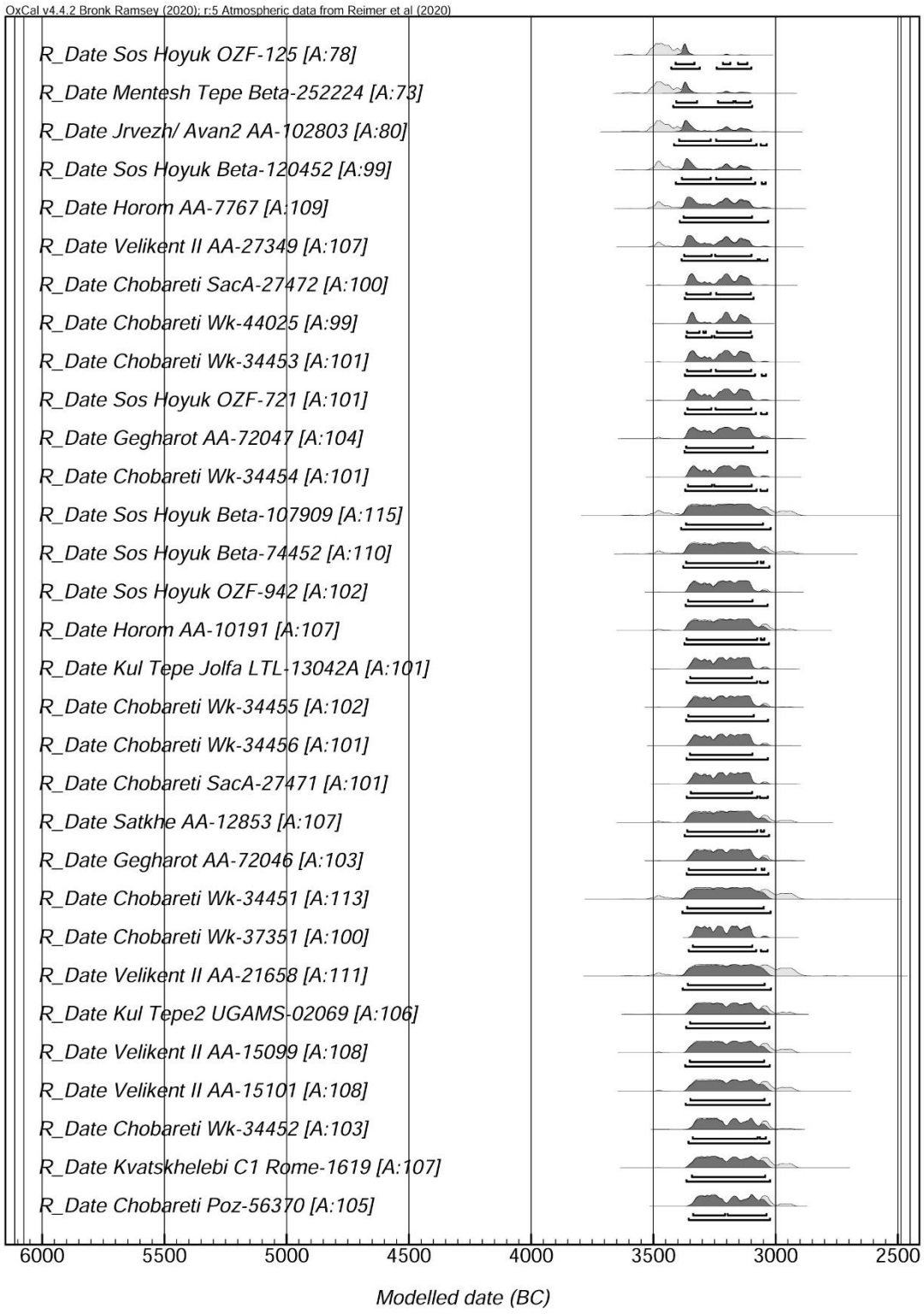
3500
3000
2500
Modelled date (BC)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R_Date Chobareti Wk-34452 [A:103]
R_Date Kvatskhelebi C1 Rome-1619 [A:107]
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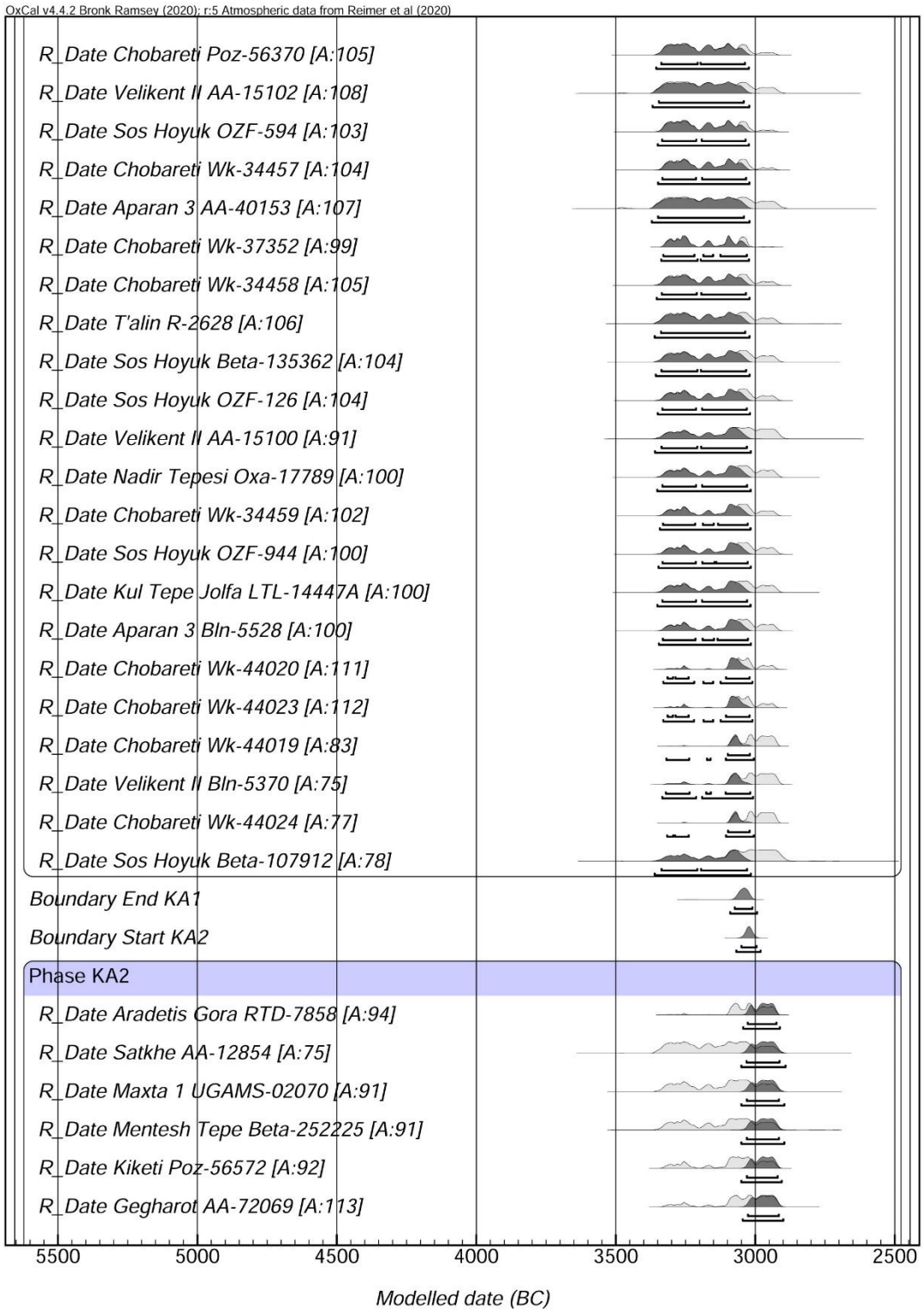
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R_Date Aparan 3 AA-40153 [A:107]
R_Date Chobareti Wk-37352 [A:99]
R_Date Chobareti Wk-34458 [A:105]
R_Date T'alin R-2628 [A:106]
R_Date Sos Hoyuk Beta-135362 [A:104]
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R_Date Chobareti Wk-44023 [A:112]
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Boundary Start KA2
Phase KA2
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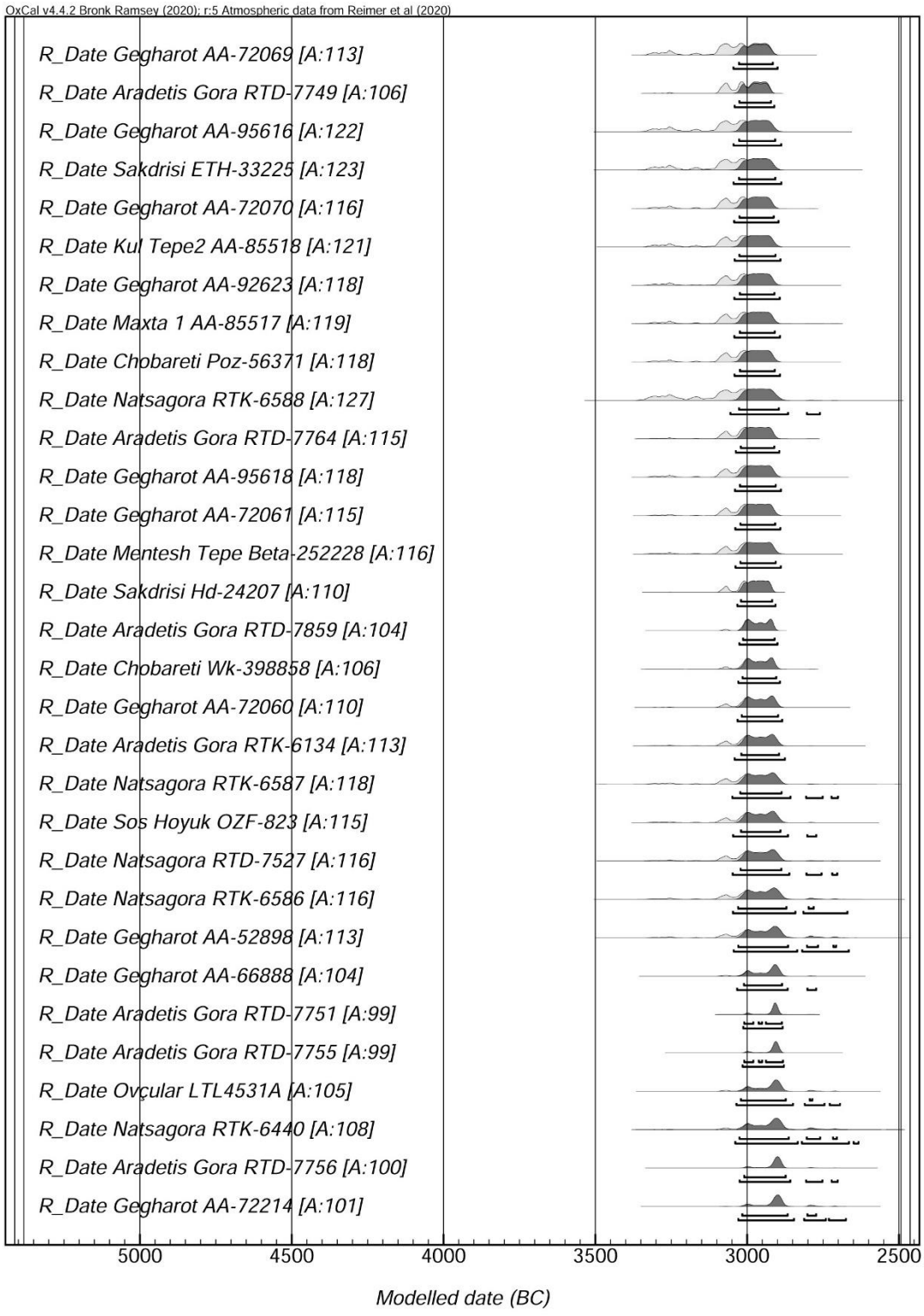
Modelled date (BC)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3000
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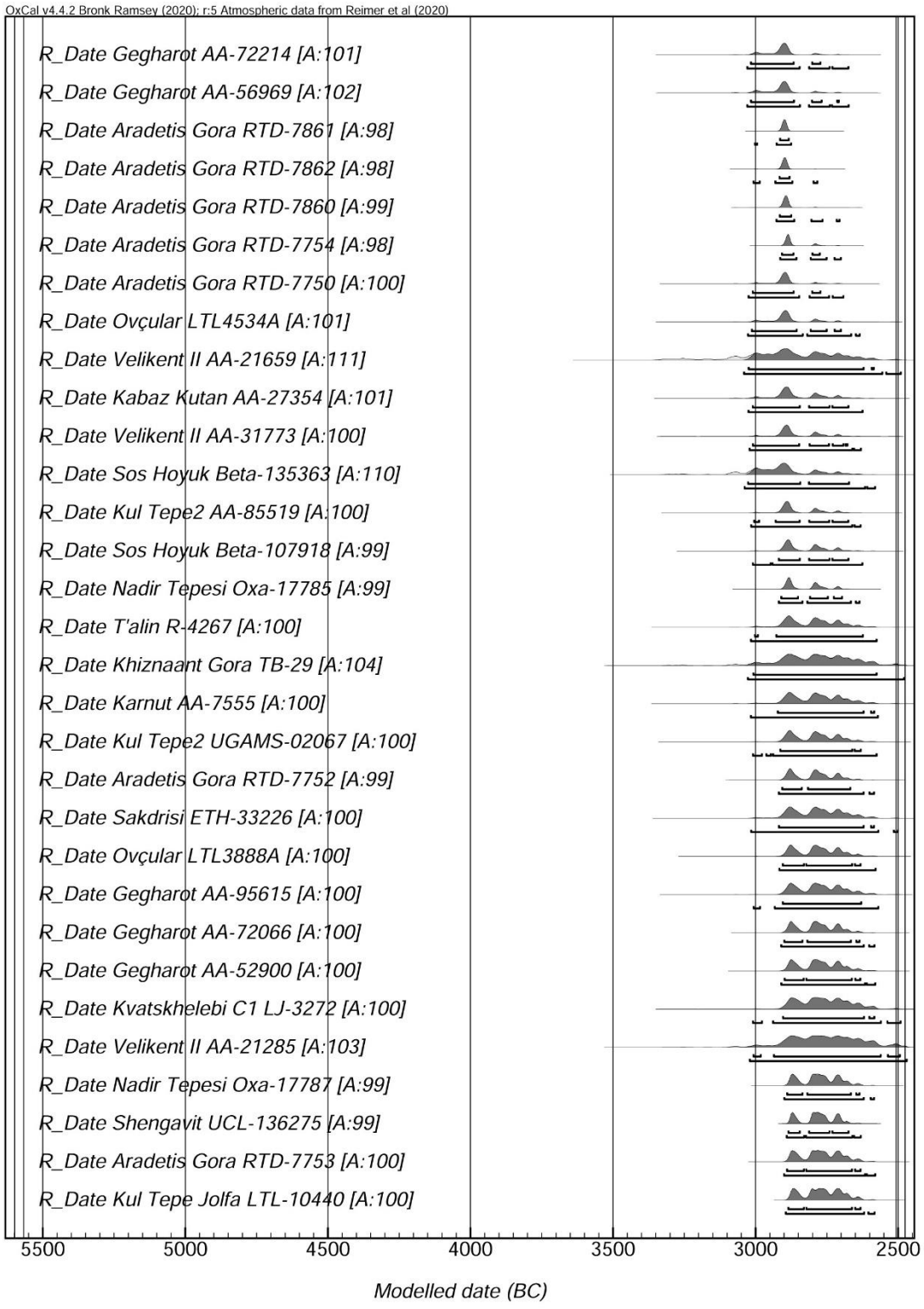
Modelled date (BC)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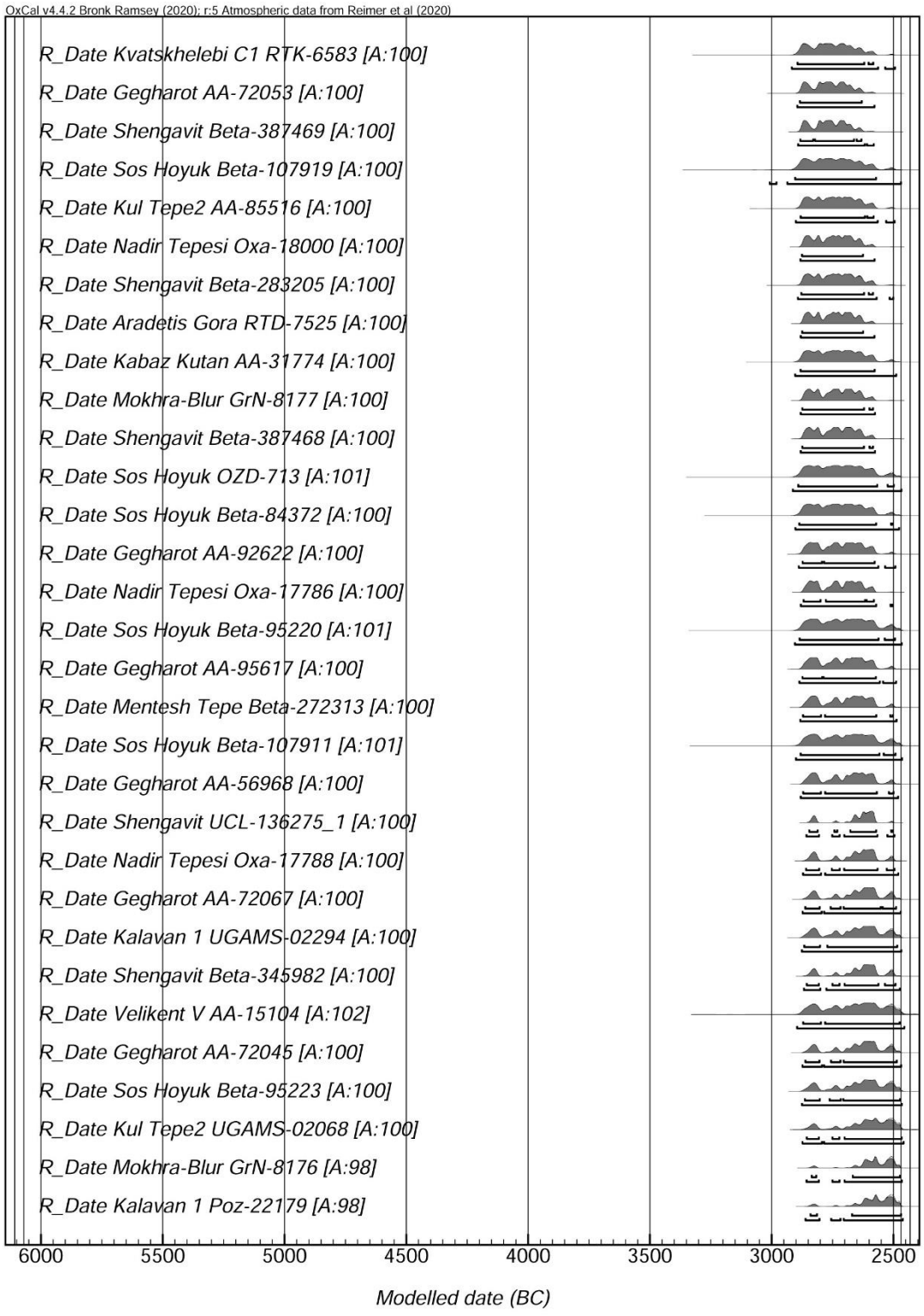
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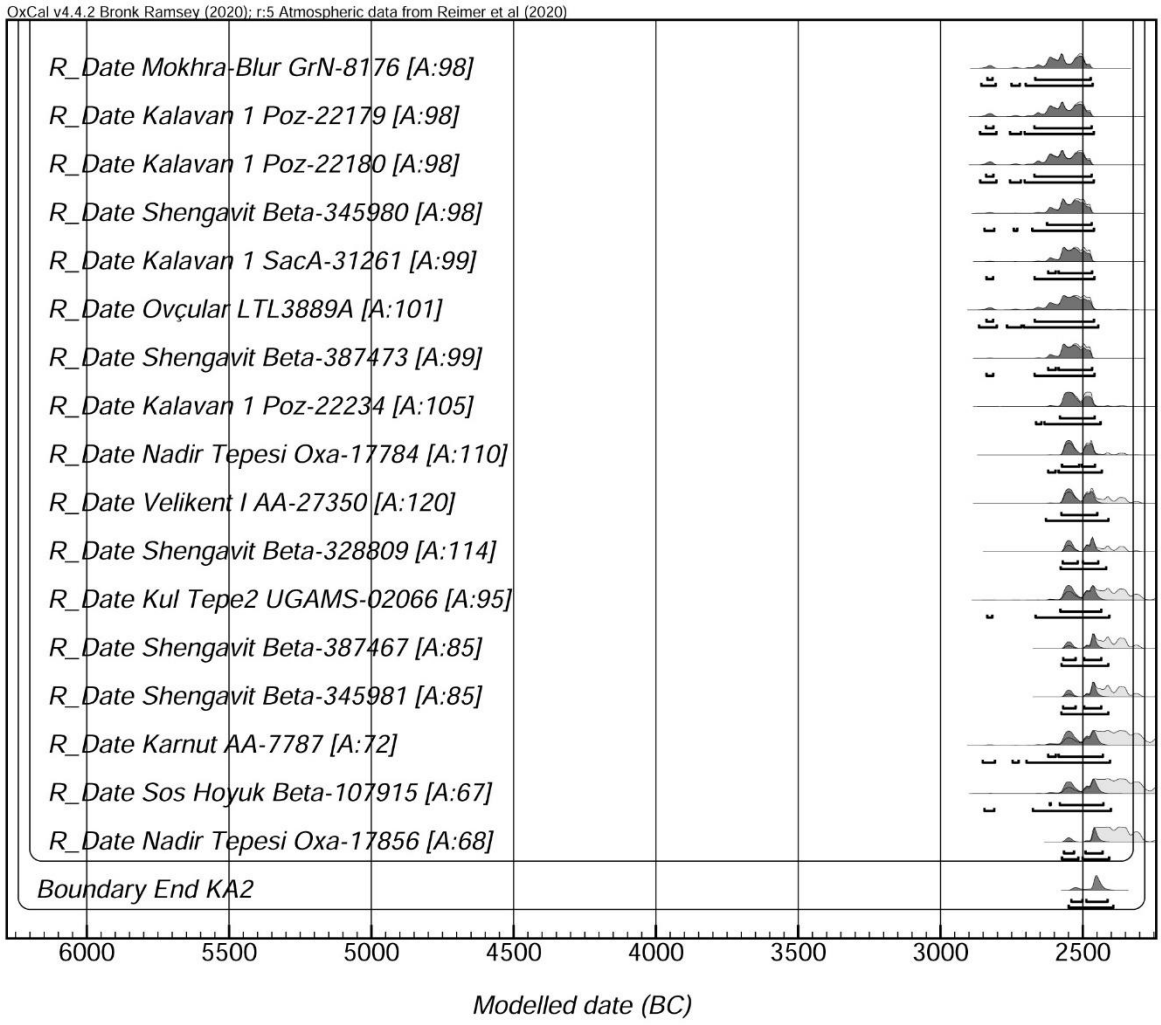
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R_Date Karnut AA-7787 [A:72]
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R_Date Nadir Tepesi Oxa-17856 [A:68]
Boundary End KA2
6000
5500
5000
4500
4000
3500
3000
2500
Modelled date (BC)

Table 5: Radiocarbon Dates in the Caucasus

Site	Lab Code.	Age BP	±	Sample Type	Context	Phase	Bibliography	Removed from Model	Reason
Agildere	Ki-14592	4350	110	Unknown	Unknown	Chalco	Passerini *et al.* 2018, p. 129; Badalyan 2003, p.33.	Yes	Error over 100
Amiranis Gora	TB-4	4835	180	Charcoal	Loc III, Mettallurigcal Workshop	KA1	Passerini *et al.* 2018, p. 129; Smith *et al.* 2004, p. 466.	Yes	Error over 100
	TB-9	4625	170	Charcoal	Loc XXIX	KA1	Passerini *et al.* 2018, p. 129; Smith *et al.* 2004, p. 466.	Yes	Error over 100
	TB-3	3720	165	Charcoal	Loc XIX	KA2	Passerini *et al.* 2018, p. 129; Smith *et al.* 2004, p. 466.	Yes	Error over 100
Aparan III	AA-40153	4455	75	Seed	Vessel in pit	KA1	Passerini *et al.* 2018, p. 129; Badalyan 2003, p.21.	No	
	Bln-5528	4428	39	Seed	Vessel in pit	KA1	Passerini *et al.* 2018, p. 129;	No	

							Badalyan and Avestian 2007, p. 58.		
	LY-10623	4321	33	Seed	Vessel in pit	KA1	Passerini *et al.* 2018, p. 129; Badalyan and Avestian 2007, p. 58.	No	Outlier but kept in. Possible problems with context. See Passerini et al. 2018, p.98, possibly from upper pit.
Aradetis Gora	RTD-7858	4405	21	Charcoal	Loc 2308	KA2	Passerini *et al.* 2018, p. 129; Passerini *et al.* 2016	No	
	RTD-7749	Manning et al. 20187	21	Seed	Loc 2315	KA2	Passerini *et al.* 2018, p. 129; Passerini *et al.* 2016	No	
	RTD-7764	4374	35	Charcoal	Loc 2308	KA2	Passerini *et al.* 2018, p. 129; Passerini *et al.* 2016	No	
	RTD-7859	4357	21	Charcoal	Loc 2296	KA2	Passerini *et al.* 2018, p. 129; Passerini *et al.* 2016	No	
	RTD-6134	4345	45	Charcoal	KA Level in W Section	KA2	Passerini *et al.* 2018, p.	No	

							129; Passerini *et al.* 2016		
	RTD-7751	4312	21	Charcoal	Locus 2294 (Burnt Layer)	KA2	Passerini *et al.* 2018, p. 129; Passerini *et al.* 2016	No	
	RTD-7755	4306	25	Charcoal	Locus 2294 (Burnt Layer)	KA2	Passerini *et al.* 2018, p. 129; Passerini *et al.* 2016	No	
	RTD-7756	4288	35	Charcoal	Locus 2299 (Floor, Charcoal, in situ under KA Vessel)	KA2	Passerini *et al.* 2018, p. 129; Passerini *et al.* 2016	No	
	RTD-7861	4284	18	Charcoal	Loc 4406	KA2	Passerini *et al.* 2018, p. 129; Passerini *et al.* 2016	No	
	RTD-7862	4281	21	Charcoal	Loc 2404 (Burnt layer)	KA2	Passerini *et al.* 2018, p. 129; Passerini *et al.* 2016	No	
	RTD-7750	4278	37	Charcoal	Loc 2294 (Burnt layer)	KA2	Passerini *et al.* 2018, p. 129; Passerini *et al.* 2016.	No	
	RTD-7860	4267	23	Charcoal	Loc 2296	KA2	Passerini *et al.* 2018, p. 129; Passerini *et al.* 2016.	No	

	RTD-7754	4242	20	Charcoal	Locus 2299 (Floor, Charcoal, in situ under KA Vessel)	KA2	Passerini *et al.* 2018, p. 129; Passerini *et al.* 2016	No	
	RTD-7752	4215	39	Charcoal	Loc 2296	KA2	Passerini *et al.* 2018, p. 129; Passerini *et al.* 2016	No	
	RTD-7753	4183	35	Charcoal	Loc 2406	KA2	Passerini *et al.* 2018, p. 129; Passerini *et al.* 2016	No	
	RTD-7525	4146	28	Charcoal	KA Level 2222	KA2	Passerini *et al.* 2018, p. 129; Passerini *et al.* 2016	No	
	RTD-7524	3823	28	Charcoal	KA Level 2217	KA2	Passerini *et al.* 2018, p. 129; Passerini *et al.* 2016	Yes	Implausible if Outlier model applied 25% probability too recent outlier.
Areni-1	UCIAMS-40181	7440	25	Charcoal	Unit 1006, From bottom of Deept test pit in T1	Chalco	Passerini *et al.* 2018, p. 129; Wilkinson *et al.* 2012, p. 23.	Yes	Too early for model
	OxA-19331	5366	31	Teeth	Unit 1003, Sq. R23, Burial 1. Tooth from	Chalco	Passerini *et al.* 2018, p. 129; Areshian *et al.* 2012, p.	Yes	Too early for model

					Skull of plastered head 2, 2nd Chalco level		121; Wilkinson *et al.* 2012, p. 23.		
	OxA-19332	5323	30	Teeth	Unit 1003, Sq. R23, Burial 1. Tooth from Skull of plastered head 2, 2nd Chalco level	Chalco	Passerini *et al.* 2018, p. 130; Areshian *et al.* 2012, p. 121; Wilkinson *et al.* 2012, p. 23.	No	
	OxA-18599	5285	28	Teeth	Unit 1004, Sq. P23, Burial 1. Tooth from Skull of plastered head 3, 2nd Chalco level	Chalco	Passerini *et al.* 2018, p. 130; Areshian *et al.* 2012, p. 121; Wilkinson *et al.* 2012, p. 23.	No	
	UCIA MS-48Glonti et al. 2008	5240	20	Other	Unit 1002, desicated grape vine from 1st or 2nd Chalco level	Chalco	Passerini *et al.* 2018, p. 130; Areshian *et al.* 2012, p. 121; Wilkinson *et al.* 2012, p. 23.	No	
	UCIA MS-40182	5230	25	Charcoal	Unit 1004, collected from the bottom of	Chalco	Passerini *et al.* 2018, p. 130; Areshian *et al.* 2012, p. 121;	No	

					the 2nd Chalco level		Wilkinson *et al.* 2012, p. 23.		
	UCIA MS-65193	5230	20	Organic tissue	Unit 1003, Sq. R23, Burial 1. Brain tissue from Skull of plastered head 2, 2nd Chalco level	Chalco	Passerini *et al.* 2018, p. 130; Areshian *et al.* 2012, p. 121; Wilkinson *et al.* 2012, p. 23.	No	
	OxA-18198	5098	29	Grass	Unit 2002, desicated grasses wrapping a jar from 2nd Chalco level	Chalco	Passerini *et al.* 2018, p. 130; Areshian *et al.* 2012, p. 121.	No	
	UCIA MS-65190	5095	20	Organic residue	Unit 1001, collected from a jar, 1st Chalco level	Chalco	Passerini *et al.* 2018, p. 130; Areshian *et al.* 2012, p. 121; Wilkinson *et al.* 2012, p. 23.	No	
	UCIA MS-40183	5090	25	Charcoal	Unit 1003, Sq. R23. Burial 1, found near plastered head 1. 2nd Chalco level	Chalco	Passerini *et al.* 2018, p. 130; Areshian *et al.* 2012, p. 121; Wilkinson *et al.* 2012, p. 23.	No	

	OxA-18197	5077	29	Seeds	Unit 1002, Prunus seed from 1st Chalco level	Chalco	Passerini *et al.* 2018, p. 130; Areshian *et al.* 2012, p. 120.	No	
	OxA-20583	4810	31	Grass	Square 32, Pit 3, locus 7 (spit 7). Taken from shoe inside storage bin of 1st Chalco level	Chalco	Passerini et al. 2018, p. 130; Areshian *et al.* 2012, p. 120.	No	
	OxA-20581	4725	32	Leather	Square 32, Pit 3, locus 7 (spit 7). Taken from shoe inside storage bin of 1st Chalco level	Chalco	Passerini *et al.* 2018, p. 130; Areshian *et al.* 2012, p. 120.	Yes	Outlier
	OxA-20582	4708	32	Leather	Square 32, Pit 3, locus 7 (spit 7). Taken from shoe inside storage bin of 1st Chalco level	Chalco	Passerini *et al.* 2018, p. 130; Areshian *et al.* 2012, p. 120.	Yes	Outlier
	UCIA MS-65192	4700	20	Leather	Square 32, Pit 3, locus 7 (spit 7). Taken from shoe inside	Chalco	Passerini *et al.* 2018, p. 130; Areshian *et al.* 2012, p. 120.	Yes	Outlier

					storage bin of 1st Chalco level				
	OxA-18601	4601	28	Charcoal	Squares N30/ O30, Spit 5/6, Loc 2. Charcoal of Tamarix. From Upper Chalco Level	Chalco	Passerini *et al.* 2018, p. 130; Areshian *et al.* 2012, p. 120.	Yes	Outlier
	OxA-18600	4460	29	Charcoal	Square L29, Spit 2, Charcoal of Acer. From Burt layer underneath structure 2 of 2nd Midieval level	Chalco	Passerini *et al.* 2018, p. 1; Marro et al 2011, p. 131; Areshian *et al.* 2012, p. 120.	Yes	Outlier
Aruchlo	TB-300	7650	70	Unknown	Unknown		Kiguradze 1986, p. 112.	Yes	Too early for model
	TB-277	6980	70	Unknown	Unknown		Goridze 1979, p. 425.	Yes	Too early for model
	TB-309	6970	60	Unknown	Unknown		Kiguradze 1986, p. 112.	Yes	Too early for model
Baba-Dervish 2	LE-780	3900	60	Unknown	From depth of 1m	KA2	Passerini *et al.* 2018, p. 131; Kiguradze 1986, p. 112.	Yes	Poor context & outlier. See Passerini et al. 2018, p.103

Bedeni	RTK-6585	3960	55	Seeds	Kurgan 5, hazel nuts	EK II	Passerini *et al.* 2018, p. 131.	Yes	Too late for model
	RTK-6584	3870	55	Textile	Kurgan 5 (excvavated in 1967)	EK II	Passerini *et al.* 2018, p. 131.	Yes	Too late for model
	TB-30	3330	60	Wood	Kurgan 5	EK II	Passerini *et al.* 2018, p. 131.	Yes	Too late for model
Berikdeebi	Wk-35424	5075	38	Charcoal	Pit 172, Level VI	Chalco	Passerini *et al.* 2018, p. 131; Sagona 2014 a or b, p. 32.	No	
	Wk-35422	5070	37	Charcoal	Pit 174, Level VI	Chalco	Passerini *et al.* 2018, p. 131; Sagona 2014 a or b, p. 32.	No	
	OZE-595	5070	40	Bone	Pit, Level VI	Chalco	Passerini *et al.* 2018, p. 131; Kiguradze and Sagona 2003, p. 93.	No	
	A-6408	4995	55	Charcoal	Level V	Chalco	Passerini *et al.* 2018, p. 131; Badalyan *et al.* 1993, p. 48.	No	
	LE-2197	4850	50	Charcoal	Level IV1	KA1	Passerini *et al.* 2018, p. 131;	No	Outlier with poor agreement.

							Kavtaradze 1983, p. 31.		But kept in model as it is one of few transition period dates, and kept others in agreement.
Buyuk Kesik	Beta-218216	5260	60	Charcoal	Kv8d	Chalco	Passerini *et al.* 2018, p. 131; Museybli and Huseynov 2008, p. 42.	No	
	Beta-200403	5092	40	Charcoal	Kv6, Outside the "roundhouse"	Chalco	Passerini *et al.* 2018, p. 131; Museybli and Huseynov 2008, p. 42.	No	
	Beta-218217	5040	60	Charcoal	Kv8c, 1.4m	Chalco	Passerini *et al.* 2018, p. 131; Museybli and Huseynov 2008, p. 42.	No	
	Beta-226242	4960	40	Charcoal	Kv7d, 1.6m	Chalco	Passerini *et al.* 2018, p. 131; Museybli and Huseynov 2008, p. 42.	No	

	Gif-12141	4960	90	Charcoal	Unknown	Chalco	Passerini *et al.* 2018, p. 131; Museybli and Huseynov 2008, p. 42.	No	
Chobareti	SacA-27472	4535	30	Cereal	Pit 2	KA1	Passerini *et al.* 2018, p. 131; Kakhiani *et al.* 2013, p. 22.	No	
	Wk-34453	4528	34	Charcoal	Pit 13 base	KA1	Passerini *et al.* 2018, p. 131; Kakhiani *et al.* 2013, p. 22.	No	
	Wk-34454	4517	35	Charcoal	Pit 14, base	KA1	Passerini *et al.* 2018, p. 131; Kakhiani *et al.* 2013, p. 22.	No	
	Wk-34455	4501	39	Charcoal	Pit 7, base	KA1	Passerini *et al.* 2018, p. 131; Kakhiani *et al.* 2013, p. 22.	No	
	Wk-34456	4501	33	Charcoal	Pit 15, 25-30 cm from base	KA1	Passerini *et al.* 2018, p. 131; Kakhiani *et al.* 2013, p. 22.	No	
	SacA-27471	4500	30	Cereal	Pit 1	KA1	Passerini *et al.* 2018, p.	No	

							131; Kakhiani *et al.* 2013, p. 22.		
	Wk-34451	4490	90	Charcoal	Structure 3, floor level	KA1	Passerini *et al.* 2018, p. 131; Kakhiani *et al.* 2013, p. 22.	No	
	Wk-34452	4470	36	Charcoal	Pit 7	KA1	Passerini *et al.* 2018, p. 131; Kakhiani *et al.* 2013, p. 22.	No	
	Wk-34457	4451	34	Charcoal	Structure 4, Sq. F42.1, Locus 103	KA1	Passerini *et al.* 2018, p. 131; Kakhiani *et al.* 2013, p. 22.	No	
	Wk-34458	4449	41	Cereal	Structure 4, Sq. F42, Locus 103	KA1	Passerini *et al.* 2018, p. 131; Kakhiani *et al.* 2013, p. 22.	No	
	Wk-34459	4434	35	Cereal	Structure 4, Sq. F42, Locus 103	KA1	Passerini *et al.* 2018, p. 131; Kakhiani *et al.* 2013, p. 22.	No	
	Wk-37351	4490	21	Cereal	F42.4, Locus 122	KA1	Passerini *et al.* 2018, p. 132; Sagona 2014a, p. 35.	No	

	Poz-56370	4460	40	Bone	Burial 6	KA1	Passerini *et al.* 2018, p. 132; Sagona 2014a, p. 35.	No	
	Wk-37352	4454	20	Cereal	F42.4, Locus 122	KA1	Passerini *et al.* 2018, p. 132; Sagona 2014a, p. 35.	No	
	Poz-56371	4380	40	Bone	Burial 9	KA2	Passerini *et al.* 2018, p. 132; Sagona 2014a, p. 35.	No	
	Wk-39858	4351	29	Human Bone	Burial 11, Q46	KA1	Sagona A., Personal Communication	No	
	Wk-44019	Manning et al. 20186	20	Animal bone	Structure 6, Square C41.4, Locus 830	KA1	Sagona A., Personal Communication	No	
	Wk-44020	4421	20	Animal bone	Structure 6, Square D41.3 & C41.4, Locus 830	KA1	Sagona A., Personal Communication	No	
	Wk-44023	4404	20	Charcoal	Structure 6, Square C40.1, Locus 849. Inside hearth	KA1	Sagona A., Personal Communication	No	
	Wk-44024	Manning et al. 20184	20	Animal bone	Structure 6, Square	KA1	Sagona A., Personal	No	

					D41.3, Locus 829		Communication		
	Wk-44025	4531	20	Charcoal	Structure 6, Square D41.3, Locus 853	KA1	Sagona A., Personal Communication	No	
Didube	OZF-720	4486	60	Charcoal	Unknown	KA1	Passerini *et al.* 2018, p. 132; Kiguradze and Sagona 2003, p. 93.	No	
Galayeri	Beta-330265	5060	30	Charcoal	Kv 4C, 2.4m	Chalco	Museybli and Galayeri 2019, p. 66.	No	
Gegharot	AA-72047	4523	49	Charcoal	Lower portion of the Early EB Deposit between pedestalled E616 wall and the early EB E661 wall, roughly w of EB tomb	KA1	Passerini *et al.* 2018, p. 132; Badalyan *et al.* 2008, p. 51.	No	
	AA-72046	4492	41	Charcoal	Lowest fill deposit abutting the locus E665 EB Wall to the west	KA1	Passerini *et al.* 2018, p. 132; Badalyan *et al.* 2008, p. 51.	No	

	AA-72069	4402	38	Seeds	Sample taken from within EB jar near hearth Loc 30	KA1	Passerini *et al.* 2018, p. 132; Badalyan *et al.* 2008, p. 51.	No	
	AA-95616	Manning et al. 20181	49	Charcoal	EBA Settlement	KA1	Passerini *et al.* 2018, p. 132; Badalyan 2014, p. 78.	No	
	AA-72070	4389	37	Charcoal	Sample found in the EB pit loc 13 - EB Room	KA1	Passerini *et al.* 2018, p. 132; Badalyan *et al.* 2008, p. 51.	No	
	AA-95618	4374	42	Charcoal	EBA Settlement	KA1	Passerini *et al.* 2018, p. 132; Badalyan 2014, p. 78.	No	
	AA-72061	4371	38	Seeds	Sample found at elevation 2290.680m on the floor of the EB room near the vessels 2,3	KA1	Passerini *et al.* 2018, p. 132; Badalyan *et al.* 2008, p. 51.	No	
	AA-72060	4346	38	Charcoal	Sample found at elevation 2290.650m on the floor of the EB room	KA1	Passerini *et al.* 2018, p. 132; Badalyan *et al.* 2008, p. 51.	No	

	AA-105130	4416	33	Charcoal	T30.81.C14.04	KA1	Manning *et al.* 2018.	No	
	AA-105128	Manning et al. 20187	37	Charcoal	T30.81.C14.04	KA1	Manning *et al.* 2018.	No	
	AA-105129	4363	33	Charcoal	T30.93.C14.02	KA1	Manning *et al.* 2018.	No	
	AA-102808	4359	51	Charcoal	T30.65.C14.03	KA1	Manning *et al.* 2018.	No	
	AA-109432	4340	22	Charcoal	T38.07.C14.03	KA1	Manning *et al.* 2018.	No	
	AA-102816	4337	43	Charcoal	T30.67.C14.01	KA1	Manning *et al.* 2018.	No	
	AA-105121	4389	25	Charcoal	T30.88.C14.02	KA1	Manning *et al.* 2018.	No	
	AA-52898	4314	60	Bone	Op T10a Loc 3	KA2	Passerini *et al.* 2018, p. 132; Smith *et al.* 2004, p. 20.	No	
	AA-66888	4313	39	Charcoal	T15	KA1	Passerini *et al.* 2018, p. 132; Badalyan 2010, p. 266.	Yes	Outlier. Issues with context according to Badalyan personal comm

	AA-72213	4293	4 4	Bone	Human bone, collective burial	KA 2	Passerini *et al.* 2018, p. 132; Badalyan *et al.* 2008, p. 51.	Yes	Outlier. Transition clearly occurs later at Gegharot. Inclusion in model lowered agreement too much for macro model. Include in more regional models
	AA-72214	4286	4 2	Bone	Human bone, collective burial	KA 2	Passerini *et al.* 2018, p. 132; Badalyan *et al.* 2008, p. 51.	Yes	Outlier. Transition clearly occurs later at Gegharot. Inclusion in model lowered agreement too much for macro model. Include in more regional models

	AA-56969	4285	43	Charcoal	EBA round construction floor	KA2	Passerini *et al.* 2018, p. 132; Badalyan *et al.* 2008, p. 51.	Yes	Outlier. Issues with context according to Badalyan personal comm
	AA-92623	4383	40	Charcoal	Upper EBA layer	KA2	Passerini *et al.* 2018, p. 132; Badalyan 2014, p. 83.	No	
	AA-95615	4204	52	Charcoal	Upper EBA layer	KA2	Passerini *et al.* 2018, p. 132; Badalyan 2014, p. 83.	No	
	AA-72066	4201	37	Charcoal	Found under the south wall of Ebroom	KA2	Passerini *et al.* 2018, p. 132; Badalyan *et al.* 2008, p. 51.	No	
	AA-52900	4197	40	Charcoal	Fortress, Op. To2 Loc C10	KA2	Passerini *et al.* 2018, p. 132; Smith *et al.* 2004, p. 20.	No	
	AA-72053	4171	37	Charcoal	Area of dark mottled matrix, devoid of most material except some large sherds	KA2	Passerini *et al.* 2018, p. 133; Badalyan *et al.* 2008, p. 51.	No	

					that might be the same as vessel .80cm from the N baulk, 138cm from W end of trench				
	AA-66894	Glonti et al. 2008 0	45	Charcoal	Unknown	KA2	Passerini *et al.* 2018, p. 133; Badalyan *et al.* 2008, p. 51.	No	No context info but kept in.
	AA-92622	4128	41	Charcoal	Upper EBA layer	KA2	Passerini *et al.* 2018, p. 133; Badalyan 2014, p. 83.	No	
	AA-95617	4119	42	Charcoal	Upper EBA layer	KA2	Passerini *et al.* 2018, p. 133; Badalyan 2014, p. 83.	No	
	AA-56968	4105	41	Charcoal	From the floor in the southern part of the EBA building	KA2	Passerini *et al.* 2018, p. 133; Badalyan *et al.* 2008, p. 51.	No	
	AA-66895	4104	47	Charcoal	Unknown	KA2	Passerini *et al.* 2018, p. 133; Badalyan *et al.* 2008, p. 51.	No	Poor context info. See Passerini et al. 2018, p.103
	AA-92621	4104	40	Charcoal	Upper EBA layer	KA2	Passerini *et al.* 2018, p.	No	

							133; Badalyan 2014, p. 83.		
	AA-72067	4080	38	Charcoal	Eastern part of pit 1	KA2	Passerini *et al.* 2018, p. 133; Badalyan *et al.* 2008, p. 51.	No	
	AA-72045	4077	41	Charcoal	EB living surface above Loc E661 (all) throughout T2E south and central	KA2	Passerini *et al.* 2018, p. 133; Badalyan *et al.* 2008, p. 51.	No	
	AA-109433	4459	3	Charcoal	T38.41.C14.01	KA1	Manning *et al.* 2018.	No	
	AA-102809	4389	43	Charcoal	T30.63.C14.01	KA2	Manning *et al.* 2018.	No	
	AA-109435	4267	22	Charcoal	T38.32.C14.02	KA2	Manning *et al.* 2018.	No	
	AA-109436	4372	25	Charcoal	T38.32.C14.01	KA2	Manning *et al.* 2018.	No	
	AA-109427	4156	31	Tooth	T38.18.C14.01	KA2	Manning *et al.* 2018.	No	
	AA-109428	4169	28	Tooth	T38.18.C14.02	KA2	Manning *et al.* 2018.	No	

	AA-109429	4247	28	Tooth	T38.18.C14.03	KA2	Manning *et al.* 2018.	No	
	AA-109430	4174	28	Tooth	T38.43.C14.02	KA2	Manning *et al.* 2018.	No	
	AA-109431	4144	28	Tooth	T38.44.C14.01	KA2	Manning *et al.* 2018.	No	
Gododzor	LTL-5731A	4767	45	Animal bone	Trench B, UF 6	Chalco	Palumbi and Chataigner 2014, p. 252.	No	
	LTL-5732A	4753	45	Charcoal	Trench B, UF109	Chalco	Palumbi and Chataigner 2014, p. 252.	No	
	UGAMS-5801	4750	55	Charcoal	Trench A, UF 75	Chalco	Palumbi and Chataigner 2014, p. 252.	No	
	LTL-5733A	4740	45	Charcoal	Trench D, UF 13	Chalco	Palumbi and Chataigner 2014, p. 252.	No	
	UGAMS-03Glonti et al. 2008	4700	25	Charcoal	Trench A/B, UF 60	Chalco	Palumbi and Chataigner 2014, p. 252.	No	
	UGAMS-02285	4690	40	Charcoal	Trench A/B, UF 11	Chalco	Palumbi and Chataigner 2014, p. 252.	No	

	SacA-26096	4685	35	Charcoal	Trench B, UF 109	Chalco	Palumbi and Chataigner 2014, p. 252.	No	
	SacA-26095	4685	30	Charcoal	Trench D, UF 7b	Chalco	Palumbi and Chataigner 2014, p. 252.	No	
	UGAMS-03412	4680	25	Charcoal	Trench A/B, UF 54	Chalco	Palumbi and Chataigner 2014, p. 252.	No	
	UGAMS-02286	4660	40	Charcoal	Trench B, UF 12	Chalco	Palumbi and Chataigner 2014, p. 252.	No	
	UGAMS-00284	4630	40	Charcoal	Trench A, UF 07	Chalco	Palumbi and Chataigner 2014, p. 252.	No	
	SacA-26094	4625	30	Charcoal	Trench D, UF 16b	Chalco	Palumbi and Chataigner 2014, p. 252.	No	
	SacA-26097	4620	30	Charcoal	Trench B, UF 34	Chalco	Palumbi and Chataigner 2014, p. 252.	No	
	UGAMS-02287	4610	40	Charcoal	Trench A/B, UF 33	Chalco	Palumbi and Chataigner 2014, p. 252.	No	

Horom	AA-111130	5150	60	Charcoal	Burnt surface of the tomb	KA2	Passerini *et al.* 2018, p. 133; Badalyan *et al.* 1993, p. 14.	No	
	AA-77767	4565	60	Unknown	KA wall, exploratory trench	KA1	Passerini *et al.* 2018, p. 133; Badalyan *et al.* 1993, p. 3.	No	
	AA-101911	4505	50	Bone	KA tomb, human bone	KA1	Passerini *et al.* 2018, p. 133; Badalyan *et al.* 1993, p. 14.	No	
Jrveh/ Avan	AA-102802	4674	59	Tooth	Human tooth Burial 1	KA1	Passerini *et al.* 2018, p. 133; Badalyan 2014, p. 78.	No	
	AA-102803	4613	59	Tooth	Human tooth Burial 1	KA1	Passerini *et al.* 2018, p. 133; Badalyan 2014, p. 78.	No	
Kabaz Kutan	AA-27354	4260	45	Charcoal	Level 4	KA2	Gadzhiev *et al.* 2000, p. 106.	No	
	AA-31774	4145	55	Charcoal	Final Floor	KA2	Gadzhiev *et al.* 2000, p. 106.	No	
Kalavan-1	UGAMS-02294	4080	50	Bone	Tomb UF 5	KA2	Passerini *et al.* 2018, p. 133; Poulmarc'h	No	

							et al. 2016, p. 965.		
	Poz-22179	4045	35	Bone	Tomb UF 5	KA 2	Passerini *et al.* 2018, p. 133; Poulmarc'h *et al.* 2016, p. 965.	No	
	Poz-22180	4045	35	Bone	Tomb UF 5	KA 2	Passerini *et al.* 2018, p. 133; Poulmarc'h *et al.* 2016, p. 965.	No	
	SacA-31261	4020	30	Bone	Tomb UF 8	KA 2	Passerini *et al.* 2018, p. 133; Poulmarc'h *et al.* 2016, p. 965.	No	
	Poz-22234	3990	35	Bone	Tomb UF 9	KA 2	Passerini *et al.* 2018, p. 133; Poulmarc'h *et al.* 2016, p. 965.	No	
Karnut	LE-4488	4490	230	Bone	Habitation no 3	KA 2	Passerini *et al.* 2018, p. 133; Badalyan and Avestisyan 2007, p. 138.	Yes	Error over 100

	AA-7555	4220	60	Bone	Habitation no 4	KA2	Passerini *et al.* 2018, p. 133; Badalyan and Avestisyan 2007, p. 138.	No	
	AA-7787	3915	65	Bone	Habitation no 4	KA2	Passerini *et al.* 2018, p. 133; Badalyan and Avestisyan 2007, p. 138.	No	
	AA-109426	4463	32	Tooth	Tomb 2		Passerini *et al.* 2018, p. 133; Badalyan and Avestisyan 2007, p. 138.	No	
Khizanant Gora	TB-29	4220	90	Cereals	Level C1	KA2	Passerini *et al.* 2018, p. 133; Burchuladze et al. 1976, p. 356.	No	
Khramebi	TB-242	4030	50	Unknown	Unknown	EK II	Passerini *et al.* 2018, p. 133; Kavtaradze 1983, p. 29, 107.	Yes	Too late for model
Kiketi	Poz-56572	4420	35	Bone	Tomb 5, human cranium	KA2	Passerini *et al.* 2018, p. 133;	No	

							Poulmarc'h *et al.* 2014.		
Kultepe 1	LE-163	4880	90	Charcoal	8.5 depth, EB Layer	KA1	Passerini *et al.* 2018, p. 134; Butomo 1965, pp. 226-227; Kavtaradze 1983, p. 29.	Yes	Outlier. Poor context info. See Passerini et al. 2018, p.103
	LTL-16018A	4475	45	Seed	Loc G040	KA1	Marro *et al.* 2019, p. 84.	No	
	LTL-16016A	4471	45	Seed	Loc G008	KA1	Marro *et al.* 2019, p. 84.	No	
Kultepe 2	UGAMS-02069	4480	50	Charcoal	Ash deposit in front of lot 43 hearth	KA1	Passerini *et al.* 2018, p. 134; Ristvet *et al.* 2011, p. 52.	No	
	AA-85518	4383	45	Charcoal	Lot 47 hearth, floor 37	KA 2	Passerini *et al.* 2018, p. 134; Ristvet *et al.* 2011, p. 52.	No	
	AA-85519	4254	41	Charcoal	Concentration near hearth 28	KA 2	Passerini *et al.* 2018, p. 134; Ristvet *et al.* 2011, p. 52.	No	

	AA-85516	4151	48	Charcoal	Lot 21 hearth	KA2	Passerini *et al.* 2018, p. 134; Ristvet *et al.* 2011, p. 52.	No	
	UGAMS-02067	4220	50	Charcoal	Floor, lot 4, beside lot 3 firepit	KA2	Passerini *et al.* 2018, p. 134; Ristvet *et al.* 2011, p. 12.	No	
	UGAMS-02068	4050	50	Charcoal	Lot 7 firepit	KA2	Passerini *et al.* 2018, p. 134; Ristvet *et al.* 2011, p. 12.	No	
	UGAMS-02066	3940	50	Charcoal	Floor next to firepit (feature 1, lot 3)	KA2	Passerini *et al.* 2018, p. 134; Ristvet *et al.* 2011, p. 12.	No	
Kul Tepe Jolfa	LTL-14447A	4430	45	Charcoal	Trench III, Loc 2044	KA1	Abedi and Omrani 2015, p. 58.	No	
	LTL-10440	4175	30	Charcoal	Trench III, Loc 2030	KA2	Abedi and Omrani 2015, p. 58.	No	
	LTL-13042A	4502	30	Charcoal	Trench III, Loc F2036	KA1	Abedi and Omrani 2015, p. 58.	No	
Kvatskhelebi	LE-156	4760	90	Unknown	Level C-1	KA1	Passerini *et al.* 2018, p. 134; 20:52;	Yes	Outlier

							Kavtaradze 1983.		
	LE-157	4760	90	Seeds	Level C1; building 1	KA1	Passerini *et al.* 2018, p. 134; Butomos 1965, pp. 226–227.	Yes	
	Rome-1619	4465	55	Unknown	Level C1; building 1	KA1	Passerini *et al.* 2018, p. 134; Glonti *et al.* 2008, p. 156	No	
	LJ-3272	4190	60	Charcoal	Level C1; House 1	KA2	Passerini *et al.* 2018, p. 134; Kavtaradze 1983, p. 31.	No	
	RTK-6583	4175	55	Seeds	Level C1; House 1	KA2	Passerini *et al.* 2018, p. 134.	No	
Leilatepe	Ki-14950	5040	100	Unknown	Room 10	Chalco	Passerini *et al.* 2018, p. 134; Badalyan 2003, p.33.	No	
Maxta 1	UGAMS-02070	4430	50	Seeds	Lot 13 floor	KA1	Passerini *et al.* 2018, p. 134; Ristvet *et al.* 2011, p. 52.	No	Moved to KA1 based on observations by Badalyan.

	AA-85517	4382	41	Charcoal	Lot 11 floor	KA2	Passerini *et al.* 2018, p. 134; Ristvet *et al.* 2011, p. 52.	No	
Mentesh Tepe	Beta-273122	4660	40	Charcoal	Kurgan 4 wall	KA1	Passerini *et al.* 2018, p. 134; Lyonnet *et al.* 2012, p. 92.	No	
	Beta-252224	4630	50	Charcoal	Kurgan 4	KA1	Passerini *et al.* 2018, p. 134; Lyonnet *et al.* 2012, p. 92.	No	
	Beta-252225	4430	50	Charcoal	Funerary chamber, Kurgan 4, from pot	KA2	Passerini *et al.* 2018, p. 134; Lyonnet 2010, p. 36	No	
	Beta-252228	4370	40	Charcoal	Funerary chamber, Kurgan 4, from pot	KA2	Passerini *et al.* 2018, p. 134; Lyonnet 2010, p. 36	No	
	Gif-12230	4690	70	Charcoal	Str. 28	KA1	Passerini *et al.* 2018, p. 134; Lyonnet *et al.* 2017, p. 138	No	
	Gif-12531	Glonti et al. 2008 5	30	Charcoal	Loc 96, pot 2	KA2	Passerini *et al.* 2018, p. 134; Lyonnet *et al.* 2012, p. 92.	No	Poor context info. See Passerini et al. 2018, p.103

	Beta-272313	4110	40	Bone	Z.7 str. 28, human bone	KA2	Passerini *et al.* 2018, p. 134; Lyonnet *et al.* 2012, p. 92.	No	
	Beta-272308	4040	40	Charcoal	Z10, Loc 15, south part	KA2	Passerini *et al.* 2018, p. 134; Lyonnet *et al.* 2012, p. 92.	No	Poor context info. See Passerini et al. 2018, p.103
	Beta-272311	4010	40	Charcoal	Z10 in KA Cup	KA2	Passerini *et al.* 2018, p. 134; Lyonnet *et al.* 2012, p. 92.	Yes	Outlier, poor context info. See Passerini et al. 2018, p.103
	Gif-13002	4035	30	Charcoal	Str 54, NW Baulk	EKI	Passerini *et al.* 2018, p. 134; Lyonnet 2014, p. 119.	Yes	Too late for model
	Gif-12526	3975	30	Charcoal	Area K. Str. 61; timber from the chamber of the kurgan	EKI	Passerini *et al.* 2018, p. 134; Lyonnet *et al.* 2012, p. 92.	Yes	Too late for model
	Poz-63144	3970	30	Bone	Str. 54, human bone of indv. 2	EKI	Passerini *et al.* 2018, p. 134; Badalyan *et al.* 1994, p. 138.	Yes	Too late for model
	Beta-272309	3950	40	Charcoal	Timber from the chamber of the Kurgan	EKI	Passerini *et al.* 2018, p. 134; Lyonnet	Yes	Too late for model

							et al. 2012, p. 92.		
	Gif-12989	3930	30	Charcoal	Str. 54, timber from the Kurgan	EKI	Passerini *et al.* 2018, p. 134; Lyonnet 2014, p. 119.	Yes	Too late for model
	Poz-63143	3920	30	Bone	Str. 54, human bone of indv. 1	EKI	Passerini *et al.* 2018, p. 134; 4Passerini *et al.* 2018, p. 138.	Yes	Too late for model
	SacA 26238	5905	40	Charcoal	MT 11,CHARB 109	Chalco	Lyonnet *et al.* 2018, Table 2.	Yes	Too early for model
	SacA 32004	5855	35	Charcoal	MT 11,CHARB 26	Chalco	Lyonnet *et al.* 2018, Table 2.	Yes	Too early for model
	SacA 26239	5800	30	Charcoal	MT 11,CHARB 113	Chalco	Lyonnet *et al.* 2018, Table 2.	Yes	Too early for model
	SacA 26235	5780	30	Charcoal	MT 11,CHARB 56	Chalco	Lyonnet *et al.* 2018, Table 2.	Yes	Too early for model
	Beta-252227	5670	40	Charcoal	MT 08,CHARB −44	Chalco	Lyonnet *et al.* 2018, Table 2.	Yes	Too early for model
Mokhra-Blur	GrN-8177	4140	30	Charcoal	Upper leayer, Level IV	KA2	Passerini *et al.* 2018, p. 135; Passerini *et al.* 2018, p.52.	No	

	GrN-8176	4050	30	Charcoal	Level III	KA2	Passerini *et al.* 2018, p. 135; Badalyan 2014, p. 83.	No	
	GrN-8178	3825	30	Charcoal	Level IV	KA2	Passerini *et al.* 2018, p. 135; Passerini *et al.* 2018, p.52.	Yes	Outlier, see Passerini et al. 2018, p.102 for possible explanation.
	Bln-2762	?	?	Unknown	Unknown	?	Passerini *et al.* 2018, p. 135; Badalyan 2014, p. 83.	Yes	No BP Dates
	Bln-2763	?	?	Unknown	Unknown	?	Passerini *et al.* 2018, p. 135; Badalyan 2014, p. 83.	Yes	No BP Dates
	Bln-2780	?	?	Unknown	Unknown	?	Passerini *et al.* 2018, p. 135; Badalyan 2014, p. 83.	Yes	No BP Dates
	Bln-2781	?	?	Unknown	Unknown	?	Passerini *et al.* 2018, p. 135; Badalyan 2014, p. 83.	Yes	No BP Dates
	Bln-2799	?	?	Unknown	Level IX	?	Passerini *et al.* 2018, p. 135; Badalyan 2014, p. 83.	Yes	No BP Dates
	Bln-5607	?	?	Unknown	Unknown	?	Passerini *et al.* 2018, p.	Yes	No BP Dates

							135; Badalyan 2014, p. 83.		
	Bln-5608	?	?	Unknown	Unknown	?	Passerini *et al.* 2018, p. 135; Badalyan 2014, p. 83.	Yes	No BP Dates
	Bln-5609	?	?	Unknown	Level IX	?	Passerini *et al.* 2018, p. 135; Badalyan 2014, p. 83.	Yes	No BP Dates
	Bln-8179	?	?	Unknown	Unknown	?	Passerini *et al.* 2018, p. 135; Badalyan 2014, p. 83.	Yes	No BP Dates
	GrN-18117	?	?	Unknown	Unknown	?	Passerini *et al.* 2018, p. 135; Badalyan 2014, p. 83.	Yes	No BP Dates
	GrN-18118	?	?	Unknown	Unknown	?	Passerini *et al.* 2018, p. 135; Badalyan 2014, p. 83.	Yes	No BP Dates
	GrN-18119	?	?	Unknown	Level IX	?	Passerini *et al.* 2018, p. 135; Badalyan 2014, p. 83.	Yes	No BP Dates
Nadir Tepesi	OxA-17789	4391	31	Charcoal	TTB, L251	KA1	Alizadeh *et al.* 2018b, p. 471.	No	
	OxA-17788	4088	31	Charcoal	TTB L248	KA2	Alizadeh *et al.* 2018b, p. 471.	No	

	OxA-17787	4185	30	Charcoal	TTB, L242	KA2	Alizadeh *et al.* 2018b, p. 471.	No	
	OxA-17786	4128	29	Charcoal	TTB, L237	KA2	Alizadeh *et al.* 2018b, p. 471.	No	
	OxA-17785	4231	30	Charcoal	TTB, L234	KA2	Alizadeh *et al.* 2018b, p. 471.	No	
	OxA-18000	4148	30	Charcoal	TTB, L232	KA2	Alizadeh *et al.* 2018b, p. 471.	No	
	OxA-17784	3972	31	Charcoal	TTB, L227	KA2	Alizadeh *et al.* 2018b, p. 471.	No	
	OxA-17856	3990	32	Charcoal	TTB, L211	KA2	Alizadeh *et al.* 2018b, p. 471..	No	Often poor agreement in different iteration, but kept in as removal sent other dates out of agreement.
Natsargora	RTK-6588	4380	65	Seeds	Filling of KA pit (ashes 0388)	KA1	Passerini *et al.* 2018, p. 135; Rova 2014, p. 64.	No	
	RTK-6587	4340	55	Seeds	Burnt soil, just below topsoil	KA1	Passerini *et al.* 2018, p. 135; Rova 2014, p. 64.	No	

	RTD-7527	4338	53	Seeds	KA filling	KA1	Passerini *et al.* 2018, p. 135.	No	
	RTK-6586	4325	60	Seeds	Surface 0065	KA1	Passerini *et al.* 2018, p. 135; Rova 2014, p. 64.	No	
	RTK-6440	4300	55	Bone	KA pit	KA1	Passerini *et al.* 2018, p. 135; Rova 2014, p. 64.	No	
Norabts	Bln-2800	?	?	Unknown	Unknown	?	Passerini *et al.* 2018, p. 135; Badalyan 2014, p. 78.	Yes	No BP Dates
	GrN-18120	?	?	Unknown	Unknown	?	Passerini *et al.* 2018, p. 135; Badalyan 2014, p. 78.	Yes	No BP Dates
	GrN-18121	?	?	Unknown	Unknown	?	Passerini *et al.* 2018, p. 135; Badalyan 2014, p. 78.	Yes	No BP Dates
Orchosani	MAMS-33470	4845	25	Bone	PKP1. 55 pit no. 1, -4.94m	Chalco	Gambashidze *et al.* 2018, p. 258.	No	
	MAMS-33471	4730	26	Bone	PKP1. 55 pit no. 2, -5.15m	Chalco	Gambashidze *et al.* 2018, p. 258.	No	
	MAMS-33472	4752	26	Bone	KP 1.59 Pit no. 9, -4.98m	Chalco	Gambashidze *et al.* 2018, p. 258.	No	

	MAM S-33473	4809	26	Charcoal	KP 1.59 Pit no. 9, -5.13m	Chalco	Gambashidze *et al.* 2018, p. 258.	No	
	MAM S-33474	4830	26	Bone	KP 1.59 Pit no. 9, -5.58m	Chalco	Gambashidze *et al.* 2018, p. 258.	No	
	MAM S-33475	4676	27	Bone	KP 1.59, Pit No. 10, Vessel No. 1.59:368, -4.25m	Chalco	Gambashidze *et al.* 2018, p. 258.	No	
	MAM S-33476	4835	27	Bone	KP 1.60 Pit. No. 3, -5.3m	Chalco	Gambashidze *et al.* 2018, p. 258.	No	
	MAM S-33477	4773	28	Bone	KP 1.6, Pit No. 3, -4.65	Chalco	Gambashidze *et al.* 2018, p. 258.	No	
	MAM S-33478	4785	27	Bone	KP 1.61, Pit No. 14, -5.17m	Chalco	Gambashidze *et al.* 2018, p. 258.	No	
	MAM S-33479	4804	27	Bone	KP 1.67, Pit No. 2. -5.35m	Chalco	Gambashidze *et al.* 2018, p. 258.	No	
	MAM S-33480	4763	26	Bone	Unknown	Chalco	Gambashidze *et al.* 2018, p. 258.	No	
	MAM S-33483	4884	27	Charcoal	KP 1.61, Pit No. 14, Vessel No. 1.61: 429. -5.23m	Chalco	Gambashidze *et al.* 2018, p. 258.	No	

	MAM S-33484	4824	27	Charcoal	KP 1.59 Pit no. 9, -5.13m, Vessel no. 1.59:166, -4.2m	Chalco	Gambashidze *et al.* 2018, p. 258.	No	
Ovçular Tepesi	LTL-4534A	4273	45	Charcoal	Loc OT'09 12089, pit partly dug into virgin soil and lined with stone	KA2	Passerini *et al.* 2018, p. 135; Marro *et al.* 2011, p. 62.	No	
	LTL-4531A	4302	45	Unknown	Loc OT'09 6172, KA structure, hearth	KA2	Passerini *et al.* 2018, p. 135; Marro *et al.* 2011, p. 62.	No	
	LTL-3888A	4207	45	Unknown	Loc OT'09 6120, shay layer under stone hearth	KA2	Passerini *et al.* 2018, p. 135; Marro *et al.* 2009, p. 48.	No	
	LTL-3889A	4020	45	Unknown	Loc OT'08 6099, stone hearth	KA2	Passerini *et al.* 2018, p. 135; Marro *et al.* 2009, p. 48.	No	
	LTL-13323A	5635	45	Charcoal	Locus 11267; house 11.1	Chalco	Passerini *et al.* 2018, p. 135; Marro *et al.* 2014, p. 142.	No	Might be too early. Clear break between 13323A, 12565A and the next group

									starting with 13321A. Should model without.
	LTL-12565a	5600	45	Charcoal	Locus 5333; house 5.1	Chalco	Passerini *et al.* 2018, p. 135; Marro *et al.* 2014, p. 142.	No	Might be too early. Clear break between 12565, 13323A and the next group starting with 13321A. Should model without.
	LTL-13321A	5450	45	Charcoal	Locus 5333; house 5.2	Chalco	Passerini *et al.* 2018, p. 135; Marro *et al.* 2014, p. 142.	No	
	LTL-4533A	5431	45	Unknown	Locus OT'09 1287, pit	Chalco	Passerini *et al.* 2018, p. 135; Marro *et al.* 2011, p. 62.	No	
	LTL-3887A	5423	50	Unknown	Loc OT'08 1229, hearth, house 1	Chalco	Passerini *et al.* 2018, p. 135; Marro *et al.* 2011, p. 62.	No	
	LTL-3886A	5414	45	Unknown	Loc OT'08 1205, house 1	Chalco	Passerini *et al.* 2018, p. 135; Marro *et*	No	

							al. 2009, p. 48.		
	LTL-3885A	5408	40	Unknown	Loc OT'06 2070-2	Chalco	Passerini *et al.* 2018, p. 135; Marro *et al.* 2009, p. 48.	No	
	LTL-3882A	5393	35	Unknown	Loc OT'07 8052	Chalco	Passerini *et al.* 2018, p. 135; Marro *et al.* 2009, p. 48.	No	
	LTL-13319A	5389	45	Charcoal	Loc 5137, house 5.5	Chalco	Passerini *et al.* 2018, p. 135; Marro *et al.* 2014, p. 142.	No	
	LTL-3890A	5388	45	Unknown	Loc OT'08 5124	Chalco	Passerini *et al.* 2018, p. 135; Marro *et al.* 2009, p. 48.	No	
	LTL-8087A	5364	40	Charcoal	Loc 5194; house 5.3	Chalco	Passerini *et al.* 2018, p. 135; Marro *et al.* 2014, p. 142.	No	
	ltl-3884A	5356	45	Unknown	Loc OT'07 1070	Chalco	Passerini *et al.* 2018, p. 135; Marro *et al.* 2009, p. 48.	No	

	LTL-5314A	5298	45	Unknown	Loc OT'09 11041	Chalco	Passerini *et al.* 2018, p. 135; Marro *et al.* 2011, p. 62.	No	
	LTL-3881A	5257	45	Unknown	Loc OT'06 2070-1	Chalco	Passerini *et al.* 2018, p. 135; Marro *et al.* 2009, p. 48.	No	
	LTL-3883A	5250	50	Unknown	Loc OT'07 1069	Chalco	Passerini *et al.* 2018, p. 135; Marro *et al.* 2009, p. 48.	No	
	LTL-5312A	5215	50	Charcoal	Loc OT'09 5161, work dial, house 5.5	Chalco	Passerini *et al.* 2018, p. 135: 136; Marro *et al.* 2011, p. 62.	No	
	LTL-5311A	5210	50	Seeds	Loc OT'08 5077, floor of house 5.6; Pisum/Vicia	Chalco	Passerini *et al.* 2018, p. 136; Marro *et al.* 2011, p. 62.	No	
	LTL-1330A	5200	45	Charcoal	Loc 5212, house 5.5	Chalco	Passerini *et al.* 2018, p. 136; Marro *et al.* 2014, p. 142.	No	
	UB(A)-7609	5037	37	Charcoal	Kurgan 1; burial	Chalco	Passerini *et al.* 2018, p. 136; Lyonnet *et al.* 2018, p.	No	

							36; Museybli and Huseynov 2008, p. 19.		
Poylu II	Beta-218214	5050	40	Bone	Kv19 0.9m	Chalco	Museybli 2019, p. 66.	No	
	Beta-232337	4990	40	Bone	Kv18	Chalco	Museybli 2019, p. 66.	No	
	Beta-218212	4920	40	Bone	Kv1 1.8m	Chalco	Museybli 2019, p. 66.	No	
	Beta-218213	4850	40	Bone	Kv1 1.8m. Kv19 0.67	Chalco	Museybli 2019, p. 66.	No	
Sakdrisi	ETH-33225	Manning et al. 20180	60	?	Mine 1-3	KA2	Passerini *et al.* 2018, p. 136; Hauptmann *et al.* 2010, p. 128.	No	
	ETH-33226	4215	60	?	Maine 1-1	KA2	Passerini *et al.* 2018, p. 136; Hauptmann *et al.* 2010, p. 128.	No	
	ETH-33223	44120	65	?	Mine 1-2	KA2	Passerini *et al.* 2018, p. 136; Hauptmann *et al.* 2010, p. 128.	No	

	ETH-33224	44120	65	?	Mine 1-2	KA2	Passerini *et al.* 2018, p. 136; Hauptmann *et al.* 2010, p. 128.	Yes	Problems with BP Date
	Hd-24207	4380	21	?	Mine 1/2	KA2	Passerini *et al.* 2018, p. 136; Hauptmann *et al.* 2010, p. 128.	No	
Sachkhere	TB-416	4334	60		Floor upper building level	KA2	Passerini *et al.* 2018, p. 136; Burchuladze and Togonidze 1987, p. 253.	No	Poor context info
	TB-417	4060	40		Pit	KA2	Passerini *et al.* 2018, p. 136; Burchuladze and Togonidze 1987, p. 253.	No	Poor context info
Satkhe	AA-12853	4500	60	Unknown	B1, Loc. 10	KA1	Badalyan *et al.* 1994, p. 29.	No	Outlier, poor context info. See Passerini et al. 2018, p.103

	AA-12854	4445	60	Unknown	B1, Loc 2, pit Sq. Room A	KA1	Badalyan *et al.* 1994, p. 29.	No	Outlier, poor context info. See Passerini et al. 2018, p.103
Shengavit	Bln-5526	4462	47	Charcoal	Unknown	KA2	Passerini *et al.* 2018, p. 136; Badalyan *et al.* 2009, p. 51.	No	Poor context info. See Passerini et al. 2018, p.103
	Bln-5527	4116	38	Charcoal	Unknown	KA2	Passerini *et al.* 2018, p. 136; Badalyan *et al.* 2009, p. 51.	No	Poor context info. See Passerini et al. 2018, p.103
	LE-458	4020	80	Charcoal	Unknown	KA2	Passerini *et al.* 2018, p. 136; Badalyan *et al.* 2009, p. 51.	No	Possible outlier, see Passerini et al. 2018, p.102 for possible explanation.
	LE-672	3770	60	Charcoal	Unknown	KA2	Passerini *et al.* 2018, p. 136; Badalyan *et al.* 2009, p. 51.	Yes	Outlier, see Passerini et al. 2018, p.102 for possible explanation.
	Beta-387469	4170	30	Charcoal	K6 1171, above bedrock	KA2	Simonyan and Rothman 2015, p. 11.	No	

	UCL-136275_1	4185	20	Charcoal	K6 1170, above bedrock	KA2	Simonyan and Rothman 2015, p. 11.	No	
	Beta-387474	4160	30	Charcoal	K6 1168, above bedrock	KA2	Simonyan and Rothman 2015, p. 11.	No	
	Beta-283205	4147	40	Charcoal	K4/L4, Round building	KA2	Simonyan and Rothman 2015, p. 11.	No	
	Beta-387468	4140	30	Charcoal	K6 1155, Building 6 floor, 4 layers from bedrock	KA2	Simonyan and Rothman 2015, p. 11.	No	
	Beta-345982	4080	30	Charcoal	M524027, M5 Ojah	KA2	Simonyan and Rothman 2015, p. 11.	No	
	UCL-136275	4090	15	Bone	above timbers, room 2 with bones	KA2	Simonyan and Rothman 2015, p. 11.	No	
	Beta-345980	4030	30	Charcoal	M5 24012, "cult corner"	KA2	Simonyan and Rothman 2015, p. 11.	No	
	Beta-387473	4020	30	Charcoal	K6 1083, bricky fill, end Building 1, NS wall	KA2	Simonyan and Rothman 2015, p. 11.	No	

	Beta-328809	3950	30	Charcoal	M5 24027, M5 ojah	KA2	Simonyan and Rothman 2015, p. 11.	No	
	Beta-345981	3930	30	Seeds	M5 24020, Seeds from pit, room 2	KA2	Simonyan and Rothman 2015, p. 11.	No	
	Beta-387467	3930	30	Charcoal	J5 2047, Upper layer, main building	KA2	Simonyan and Rothman 2015, p. 11.	No	
Sioni	Wk-31484	5281	52	Bone	XVI-32, Structure 1	Chalco	Passerini *et al.* 2018, p. 136; Sagona 2014a, p. 43.	No	
	Wk-31485	5227	48	Bone	XVI-34, Structure 1	Chalco	Passerini *et al.* 2018, p. 136; Sagona 2014a, p. 43.	No	
	Wk-31487	5172	48	Bone	XVI-30, Structure 1	Chalco	Passerini *et al.* 2018, p. 136; Sagona 2014a, p. 43.	No	
	Wk-31483	5146	46	Bone	XVI-30, Structure 1	Chalco	Passerini *et al.* 2018, p. 136; Sagona 2014a, p. 43.	No	
Sos Hoyuk	OZF-125	4643	43	Charcoal	Level VA, M17, Loc 3770	KA1	Passerini *et al.* 2018, p. 136; Sagona 2014a, p. 43.	No	

	Beta-120452	4590	50	Charcoal	Level VA, L17d/M17c/ Loc 4223, basket 25, base of sondage	KA1	Passerini *et al.* 2018, p. 136; Sagona 2000, p. 351.	No	
	OZF-721	4524	34	Charcoal	Level VA, M17, Loc 3779	KA1	Passerini *et al.* 2018, p. 136; Sagona 2014a, p. 37.	No	
	Beta-74452	4510	70	Charcoal	Level VA, L17D, north sector	KA1	Passerini *et al.* 2018, p. 136; Sagona 2000, p. 351.	No	
	OZF-942	4510	40	Charcoal	L16C, Loc 4110	KA1	Passerini *et al.* 2018, p. 136; Sagona 2014a, p. 37.	No	
	OZF-594	4457	34	Bone	L16C, Loc 4110	KA1	Passerini *et al.* 2018, p. 136; Sagona 2014a, p. 37.	No	
	Beta-135362	4440	50	Charcoal	Level VA, L17B, Loc 4247	KA1	Passerini *et al.* 2018, p. 136; Sagona and Sagona 2000, p. 58.	No	
	OZF-1255286	4440	40	Bone	Level VA, M17, Loc 3766	KA1	Passerini *et al.* 2018, p. 136; Sagona 2014a, p. 37.	No	

	OZF-944	4430	40	Charcoal	Level VA, L17B, Loc 4287	KA1	Passerini *et al.* 2018, p. 136; Sagona 2014a, p. 37.	No	
	Beta-107912	Manning et al. 20180	70	Charcoal	Level VA, L17D/M17C, 4201	KA1	Passerini *et al.* 2018, p. 136; Sagona 2000, p. 351.	No	
	Beta-135363	4290	70	Phytolith	Level VA, Loc 4229, within are of curved wall	KA2	Passerini *et al.* 2018, p. 136; Sagona and Sagona 2000, p. 59.	No	
	Beta-107910	4910	70	Charcoal	Level VB, L17B, Locus 1593	KA2	Passerini *et al.* 2018, p. 136: 137; Sagona 2000, p. 351.	Yes	Error over 100
	Beta-107909	4510	90	Charcoal	Level VB, L17B, Locus 1590	KA1	Passerini *et al.* 2018, p. 137; Sagona 2000, p. 351.	No	
	Beta-107908	4230	120	Charcoal	Level VB, L17B, Locus 1586	KA2	Passerini *et al.* 2018, p. 137; Sagona 2000, p. 351.	Yes	Error over 100
	Beta-107911	4110	70	Charcoal	Level VB, L17b, Loc 1597, basket 322, 3rd plaster floor	KA2	Passerini *et al.* 2018, p. 137; Sagona 2000, p. 352.	No	
	Beta-107918	4240	40	Charcoal	Level VC, M15d, Loc	KA2	Passerini *et al.* 2018, p.	No	

					1853, basket 153, beneath plaster floor		137; Sagona 2000, p. 352.		
	Beta-107919	4170	70	Charcoal	Level VC, M15d, Loc 1854, basket 196, directly above plaster floor	KA2	Passerini *et al.* 2018, p. 137; Sagona 2000, p. 352.	No	
	Beta-120451	4160	60	Charcoal	Level VC, M16/N16, Loc 3645, basket 11, house with high stone foundations	KA2	Passerini *et al.* 2018, p. 137; Sagona 2000, p. 353.	No	
	OZD-713	4140	70	Charcoal	Level VC, M16/N16, Loc 3645, basket 11, house with high stone foundations	KA2	Passerini *et al.* 2018, p. 137; Sagona 2000, p. 353.	No	
	Beta-107917	4120	70	Charcoal	Level VC, M15d, Loc 1847, basket 139, west of pit and south of basin	KA2	Passerini *et al.* 2018, p. 137; Sagona 2000, p. 352.	No	
	Beta-95220	4120	70	Charcoal	Level VC, M16, Loc 3605, basket 201, below	KA2	Passerini *et al.* 2018, p. 137; Sagona 2000, p. 352.	No	

					rectilinear house				
	Beta-95223	4070	50	Charcoal	Level VC, M16, Loc 2610, basket 211, below rectilinear house	KA2	Passerini *et al.* 2018, p. 137; Sagona 2000, p. 352.	No	
	OZH-822	4430	50	Charcoal	Level VD, L16, Loc 4161	KA2	Passerini *et al.* 2018, p. 136; Sagona 2014a, p. 37.	No	
	Beta-84372	4140	60	Charcoal	Level VD, L17b, Loc 1515, basket 78, around portable hearth	KA2	Passerini *et al.* 2018, p. 137; Sagona 2000, p. 353.	No	
	Beta-107920	3950	50	Bone	Level VD, M15d, Loc 1855, basket 216, Burial 1	KA2	Passerini *et al.* 2018, p. 137; Sagona 2000, p. 353.	Yes	Outlier
	Beta-107915	3910	60	Bone	Level VD, Burial 3, M16	KA2	Passerini *et al.* 2018, p. 137; Sagona 2000, p. 353.	No	
	OZF-823	4340	50	Charcoal	L16, Locus 4144	KA2	Sagona A. Personal Communication.	No	
	Beta-95219	4600	90	Charcoal	M16, Locus 591	KA1	Sagona A. Personal	No	

							Communication.		
Soyuk Bulak	Beta-226237	5020	40	Unknown	Kurgan 11, burial	Chalco	Passerini *et al.* 2018, p. 137; Museybli and Huseynov 2008, p. 21.	No	
	Beta-221001	5000	40	Charcoal	Kurgan 8, burial	Chalco	Passerini *et al.* 2018, p. 137; Korenevskij 2011, p. 33.	No	
	Ki-14591	4970	180	Unknown	Kurgan 1	Chalco	Passerini *et al.* 2018, p. 137; Korenevskij 2011, p. 45.	Yes	Error over 100
	Ki-4970	4970	180	Charcoal	Unknown	Chalco	Passerini *et al.* 2018, p. 137; Lyonnet *et al.* 2008, p. 36; Museybli and Huseynov 2008, p. 21.	Yes	Error over 100
	UB(A)-7613	4978	35	Charcoal	Kurgan 4, burial	Chalco	Passerini *et al.* 2018, p. 137; Museybli and	No	

							Huseynov 2008, p. 21.		
	Beta-232338	4770	40	Bone	Kurgan 14, human bone from burial	Chalco	Passerini *et al.* 2018, p. 137; Museybli and Huseynov 2008, p. 21.	No	
	Beta-221000	4700	40	Bone	Kurgan 9, human bone from burial	Chalco	Passerini *et al.* 2018, p. 137; Museybli and Huseynov 2008, p. 21.	No	
T'alin	R-2628	4448	52	Bone	Tomb 11	KA1	Passerini *et al.* 2018, p. 137; Badalyan 2003, p. 22.	No	
	R-2627	4230	58	Bone	Tomb 10	KA2	Passerini *et al.* 2018, p. 137; Palumbi 2003, p. 98.	No	
Tsikhiagora	TB-831	4850	110	Unknown	Level B2 of the final period of the KA in Shida Kartli	KA2	Passerini *et al.* 2018, p. 138; Kavtaradze 1999.	Yes	Error over 100
Tvlepias Tsqharo	RTK-6582	4950	60	Bone	Grave 3, tooth	KA2	Passerini *et al.* 2018, p. 138;	Yes	Outlier, see Passerini et al. 2018, p.116-7

							Kavtaradze 1999.		
Uch-Tepe	LE-2300	4830	230	Unknown	Unknown	Chalco	Passerini *et al.* 2018, p. 138; Kavtaradze 1999	Yes	Error over 100
	LE-300	4830	230	Wood	Kurag 3	Chalco	Passerini *et al.* 2018, p. 138; Glumac, Anthony 1992, p. 167.	Yes	Error over 100
	LE-305	4500	120	Wood	Kurgan 3, covering the basic internment	Chalco	Passerini *et al.* 2018, p.138; Butomos 1965, p. 226.	Yes	Error over 100
Velikent	AA-15099	4480	60	Charcoal	MII B1, Loc 28, Fet 13 (or Locus 27, Feature 9)	KA1	Gadzhiev *et al.* 2000p. 106; Gadzhiev *et al.* 1995: 147.	No	
	AA-15100	4415	60	Charcoal	MII B1, Loc 21, Surface F	KA1	Gadzhiev *et al.* 2000p. 106; Gadzhiev *et al.* 1995: 147.	No	
	AA-15101	4475	60	Charcoal	MII B1, Loc 20:	KA1	Gadzhiev *et al.* 2000p. 106; Gadzhiev *et al.* 1995: 147.	No	

	AA-15102	4460	65	Charcoal	MII B1, Loc 19, Surf E	KA1	Gadzhiev *et al.* 2000p. 106; Gadzhiev *et al.* 1995: 147.	No	
	AA-31774	4145	55	Charcoal	Kabaz Kutan Final Floor	KA2	Gadzhiev *et al.* 2000p. 106; Gadzhiev *et al.* 1995: 147.	No	
	AA-31773	4460	60	Charcoal	MII Op II D Locus 27, Feature 9, -2.9m	KA1	Gadzhiev *et al.* 2000p. 106; Gadzhiev *et al.* 1995: 147.	No	
	AA-27354	4260	45	Charcoal	Kabaz-Kutan Level 4	KA2	Gadzhiev *et al.* 2000p. 106; Gadzhiev *et al.* 1995: 147.	No	
	AA-27351	4800	55	Charcoal	MII OP IID, Q D1, Loc 17 feature 15, from Hearth	Chalco	Gadzhiev *et al.* 2000p. 106; Gadzhiev *et al.* 1995: 147.	No	
	AA-27350	3960	40	Charcoal	MI Op IC, final floor, Hearth, Pit 1	KA2	Gadzhiev *et al.* 2000p. 106; Gadzhiev *et al.* 1995: 147.	No	
	AA-27349	4560	50	Charcoal	MII Op IIC, Q. D6 Loc 11	KA1	Gadzhiev *et al.* 2000p. 106;	No	

					(Above Floor 5)		Gadzhiev *et al.* 1995: 147.		
	AA-21659	4270	95	Charcoal	Trench IIC, Feature 5	KA2	Gadzhiev *et al.* 2000p. 106; Gadzhiev *et al.* 1995: 147.	No	
	AA-21284	4210	105	Charcoal	Trench IIC, Q C3, Feature 5	KA2	Gadzhiev *et al.* 2000p. 106; Gadzhiev *et al.* 1995: 147.	Yes	Error over 100
	AA-21285	4190	95	Charcoal	Trench IIC Q, A3 Pit 4, Spit 6	KA2	Gadzhiev *et al.* 2000p. 106; Gadzhiev *et al.* 1995: 147..	No	
	AA-21658	4470	95	Charcoal	Trench II C, Q. C5 Locus 8, Spit 1	KA1	Gadzhiev *et al.* 2000p. 106; Gadzhiev *et al.* 1995: 147.	No	
	Bln-5370	Manning et al. 20185	34	Charcoal	Probe 2	KA1	Gadzhiev *et al.* 2000p. 106; Gadzhiev *et al.* 1995: 147.	No	
	Bln-5372	4495	31	Charcoal	Probe 5	KA1	Gadzhiev *et al.* 2000p. 106; Gadzhiev *et al.* 1995: 147.	No	Vague context info.

	AA-15104	4079	74	Human Bone	M V Tomb 1	KA 2	Gadzhiev *et al.* 2000p. 106; Gadzhiev *et al.* 1995: 147.	No	BP date is 4080+-75 in 407
Zeyani	TB-329	4600	75	Unknown	Kurgan 1	Bedeni	Passerini *et al.* 2018, p.138, Kavtaradze 1983, p. 31.	Yes	Too late for model.
	TB-328	3825	80	Unknown	Kurgan 1	Bedeni	Passerini *et al.* 2018, p.138, Kavtaradze 1983, p. 31.	Yes	Too late for model.
Zhinvali	TB-289	3630	71	Unknown	Lower level in area in front of altar	Bedeni	Passerini *et al.* 2018, p.138, Kavtaradze 1983, p. 31.	Yes	Too late for model.