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Empires and resources: Central Anatolian obsidian at Urkesh (Tell Mozan, Syria) during the Akkadian period

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ABSTRACT

Almost all of the obsidian used to craft stone tools in the Near East from the Palaeolithic onward originated from volcanoes in two geographic regions: Central Anatolia and Eastern Anatolia. Five decades of obsidian sourcing has led to the view that Central Anatolian obsidians largely followed the Mediterranean coast and rarely reached farther east than the Middle Euphrates, whereas Eastern Anatolian sources almost exclusively supplied sites east of the Euphrates. This paper discusses the identification of Central Anatolian obsidian artefacts at the Bronze-Age site of Tell Mozan (Urkesh) in northeastern Syria. Most of the obsidians at Tell Mozan (97%) came from the Eastern Anatolian sources, as expected from established distribution models. Artefacts of Central Anatolian obsidian, however, were excavated from one well-constrained context: the deposits on a palace courtyard that date to the height of the Akkadian empire's influence at this third-millennium Hurrian religious and political centre. In particular, the obsidian came from the Kömürcü source of Göllü Dağ. Potential explanations for this exotic obsidian are discussed. This obsidian might have "piggybacked" on the distribution of Central Anatolian metals or arrived at this city as royal gifts or prestige items. Other discussed mechanisms include Akkadian-linked changes in either territoriality involving pastoral nomads responsible for the arrival of Eastern Anatolian obsidians or identity construction of elites based on involvement in Central Anatolian economic and political networks.

1. Introduction

Across Mesopotamia and the Levant, nearly all of the obsidian used to craft stone tools from the Palaeolithic onward originated from volcanoes in Anatolia (i.e., modern Turkey; Fig. 1). The Anatolian obsidian sources occur in two geographic regions: the Central Anatolian sources (Acıgöl, Göllü Dağ, Nenezi Dağ, and Hasan Dağ) and Eastern Anatolian sources (the Bingöl sources, Muş, Nemrut Dağ, Meydan Dağ, and Tendürek Dağ, among others). Five decades of sourcing Near East obsidian artefacts has led to the view that, outside of Anatolia, use of Central Anatolian obsidians is a principally Levantine phenomenon. These obsidians primarily followed the Mediterranean coast and rarely reached farther east than Middle Euphrates sites, whereas the Eastern Anatolian sources almost exclusively supplied sites east of the Euphrates. This trend was first recognised by Renfrew and colleagues (Cann and Renfrew, 1964; Renfrew et al., 1966, 1968). They showed, by the start of the Bronze Age, the Eastern Anatolian obsidian "interaction zone" was Mesopotamian, whereas the Central Anatolian zone was Levantine and Anatolian. Later regional studies reinforce these trends (e.g., Cauvin and Chataigner, 1998; Chataigner, 1998, Chataigner et al., 1998). Simply put, Central Anatolian obsidians are extremely rare in Mesopotamia. Out of about 1000 sourced and published Mesopotamian obsidian artefacts, the number with Central Anatolian origins can be counted on one hand, and most of them have no spatiotemporal context.

Here we discuss the discovery of Central Anatolian obsidian at the Bronze-Age site of Tell Mozan (ancient Urkesh). Located in the northeastern corner of Syria, this early Hurrian political and religious centre lies within the proposed "supply zone" for Eastern Anatolian obsidians (Dixon et al., 1968). This site also lies near the mouth of the Mardin Pass between the Anatolian highlands and Mesopotamian lowlands, permitting ready access to Eastern Anatolia and its resources (Fig. 2). Indeed most of the obsidians at Tell Mozan (97%) came from the Eastern Anatolian sources, as anticipated from the established regional distribution patterns (Fig. 1; Renfrew and Dixon, 1976; Chataigner et al., 1998). We identified,

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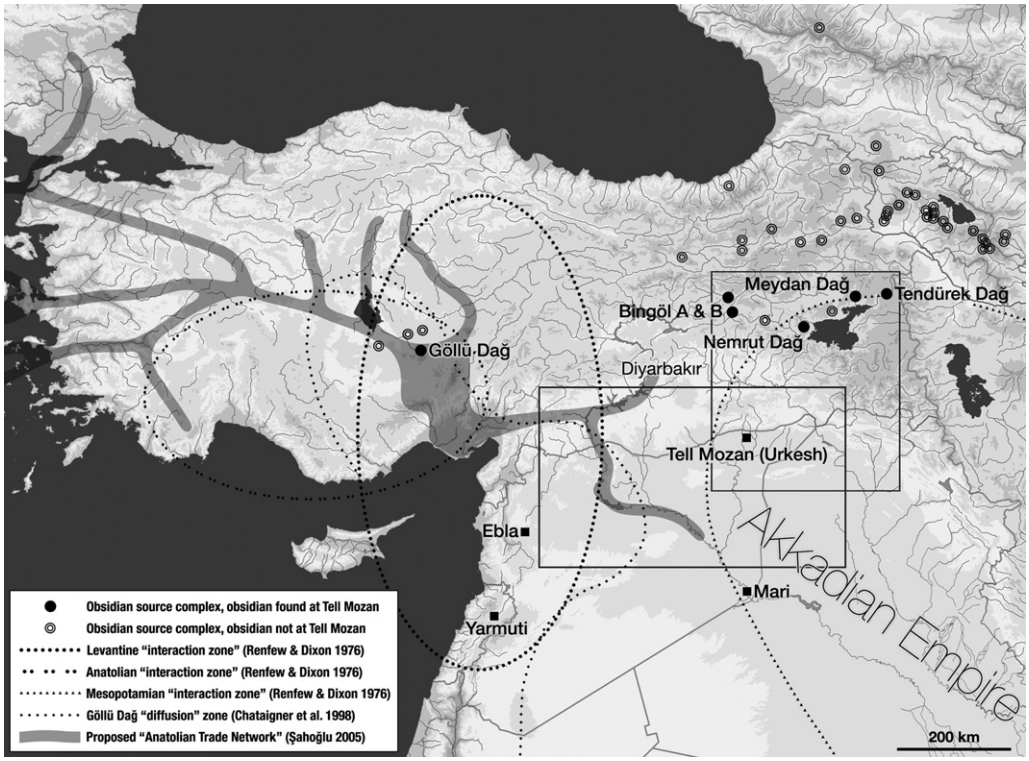

Fig. 1. Near Eastern obsidian sources, their established distribution patterns, and locations mentioned in the text. Sources of obsidian artefacts at Tell Mozan are marked by full black circles and labelled. The insets correspond to Figs. 2 and 10.

however, three Central Anatolian obsidian artefacts from a well-constrained context: deposits on a palace courtyard that date to the known height of Akkadian influence at this city. The presence of *any* such obsidian in this assemblage represents an anomaly in the accepted patterns. Tell Mozan and Göllü Dağ are 600 km apart (linearly), three times farther than the nearest obsidian sources: Nemrut Dağ and the Bingöl sources (200 km to the north; Fig. 1). This is a rare, if not unique, discovery in Northern Mesopotamia that enables new insights into changing Bronze-Age economics and/or geopolitics.

We identified not only the Central Anatolian volcano where these artefacts originated (Göllü Dağ) but also the particular obsidian-bearing lava flow of the volcano: the "Kömürcü" source on its northeastern flanks. Binder et al. (2011) identified this specific source as the remnants of the Paleo-Kabak Tepe lava dome. High-quality obsidians are accessible near Kömürcü village, where streams and erosion have cut into the obsidian-bearing layers of the dome. Balkan-Atlı et al. (1999) refer to this location as "the most spectacular and the best known of the obsidian sources of Göllü Dağ with its abundant outcrops and several workshops or knapping

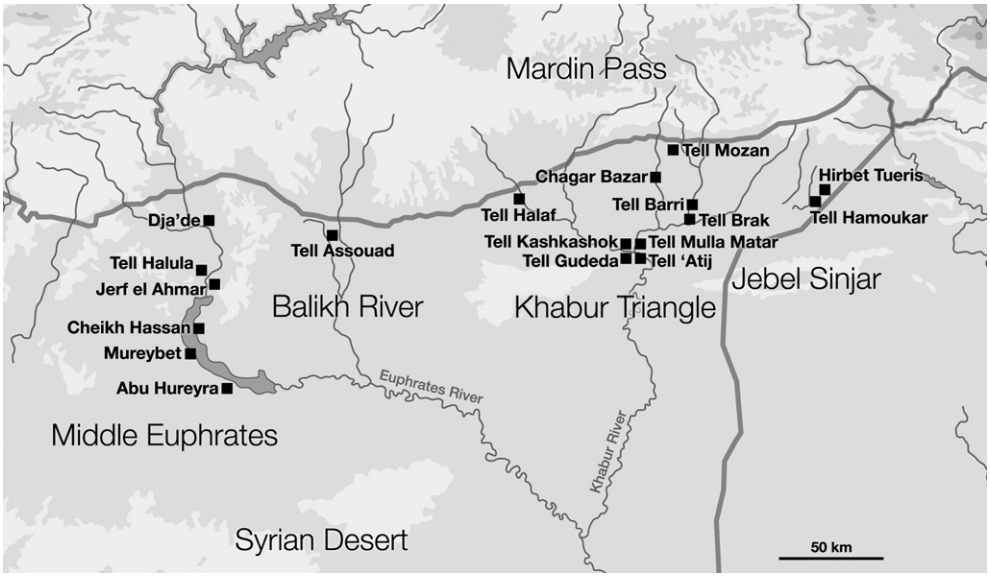

Fig. 2. The Middle Euphrates, Balikh River, and Khabur Triangle archaeological sites with prior obsidian sourcing results; also listed in Table 1.

areas" (137). These workshops, however, are all Palaeolithic through Chalcolithic. Despite extensive surveys, Bronze-Age obsidian quarries remain unknown (Balkan-Atlı et al., 2011). Our findings, using rock magnetism as a means of high-resolution intra-flow obsidian sourcing, suggest these Göllü Dağ artefacts at Tell Mozan came from at least *two* quarrying locations of the Kömürcü obsidian source.

The occurrence of this exotic Central Anatolian obsidian at Tell Mozan represents a change in Northern Mesopotamian regional dynamics during the Akkadian period (circa 2350–2150 BCE). The movement of Göllü Dağ obsidian to Urkesh at this time was most likely accompanied by – or triggered by – some other phenomenon involving the material (e.g., objects, technologies, people) and/or social (e.g., ideas, identities) world. The mechanisms and route by which the artefacts were brought to Urkesh are presently ambiguous, but their arrival is synchronous with the known height of the Akkadian empire's influence at the city. A variety of explanations and contexts are explored here. The Akkadians may have effected a period of exchange among Khabur-Triangle and Middle-Euphrates settlements, tapping into what Şahoğlu (2005) terms the Anatolian Trade Network (ATN; Fig. 1) and perhaps even driven by access to Central Anatolian metals. Considering the similar occurrence of Göllü Dağ obsidian in Bronze-Age Cretian palaces (Carter and Kilikoglou, 2007), the artefacts may have arrived at Urkesh as prestige items, royal gifts, or similarly "active agents in the maintenance of complex social relations" (Gero, 1989: 103). This "exotic" obsidian may also reflect Akkadian-tied changes in either identity construction of the Urkesh royals or territoriality involving pastoralists responsible for the arrival of Eastern Anatolian obsidians at Tell Mozan.

2. The people: Hurrians and Akkadians

Knowledge regarding the Hurrians, who lived in Northern Mesopotamia during at least the third and second millennia BCE, is so fragmentary that many authors use words like "mysterious" and "enigmatic" to discuss them. As explained by Wilhelm (1989), Hurrians had "one of the most important ancient Eastern civilizations, and yet we have far less information, linguistic as well as historical and cultural, about them than we do about the Sumerians, the Babylonians, the Assyrians, the Hittites, or the Canaanites" (v). Until recently, information about the Hurrians was essentially limited to glyptic and epigraphic sources (e.g., name lists, seal impressions, texts, and inscriptions) and subsequent linguistic analyses. Based on such evidence, the Hurrians were an ethnic minority in Northern Mesopotamian settlements along the transitional zone between Anatolia and Southern Mesopotamia. Thus Kurht (1995) reports, at the time, "sources for the Hurrians are exclusively linguistic: there are no artefacts or buildings that can with any certainty be defined as 'Hurrian' in type" (284). That year, Tell Mozan was identified as the city of Urkesh, the political and religious centre of third- and second-millennium Hurrian culture, previously known from texts preserved in Hittite archives (Buccellati and Kelly-Buccellati, 1995). For example, a myth identifies the Hurrian ancestral god Kumarbi as the "father" of Urkesh, where he resides, and it suggests kinship between the Hurrians in Urkesh and populations in the mountainous north (Hoffner, 1990: 46–47). Therefore, Tell Mozan is one of very few archaeological sites where the Hurrians were known to have been the rulers and a majority of the population.

The Akkadian empire, centred in the city of Akkad somewhere in Southern Mesopotamia, reached a political apex from the 24th to 22nd centuries BCE after a series of purported conquests by Sargon of Akkad and his successors. Some suggest this dynasty established the first empire in history (Liverani, 1993), but its extent is much debated. A Sumerian tablet, unearthed at Nippur in central Iraq by the joint expedition of the American Schools of Oriental Research and the Oriental Institute of Chicago, famously describes Akkadian territory, attesting that the god Dagan gifted Sargon "the upper land, (namely) Mari, Yarmuti, (and) Ebla, up to the Cedar Forest (and) up to the Silver Mountain" (translated by Kramer, 1963; see Fig. 1 for site locations). Thus it is generally held that the Akkadian empire extended from Southern Mesopotamia into Northern Mesopotamia and westward to the Eastern Mediterranean coast (and perhaps Cyprus).

There are, however, large uncertainties about Akkadian geopolitical interests and the nature of their "control" across Northern Mesopotamia. Adams (1966) proposes that Akkadian influence across the north "fell decisively short of full imperial control" during the reign of Naram-Sin (159). Some researchers maintain that the Akkadians exerted full control over agricultural production in the region (Weiss and Courty, 1993). Others propose their empire primarily exerted influence over neighbouring polities' distribution routes for strategic natural resources, particularly to gain access to such valuable highland materials as metals and timber (Nissen, 1988; Michalowski, 1993; Marcus, 1998; Van De Mieroop, 2007). Trade under the Akkadians is thought to have been principally state-controlled, becoming a private endeavour during the subsequent Old Assyrian Trade Colony period (OTAC, circa 1950–1750 BCE; Mallowan, 1965; Veenhof, 1997).

Readers interested in broader historical contexts of Hurrians and Akkadians are directed to general books about this region and period: Kurht (1995), Akkermans and Schwartz (2003), Snell (2005), and Van De Mieroop (2007). Additionally, an edited book on the socioeconomics of third-to second-millennium Northern Mesopotamia and Anatolia is newly published: Laneri et al. (2012).

3. The Site: Tell Mozan as Urkesh

Tell Mozan sits at the north-middle of the Khabur Triangle in northeastern Syria (Fig. 2), a transitional region between the Anatolian mountains to the north and Mesopotamian plains to the south. The settlement was inhabited since the Halaf Period (sixth millennium BCE) and abandoned around 1300 BCE, when Assyrians assumed control across Northern Mesopotamia. Covering over 130 ha (1.3 km^2) during the Early and Middle Bronze Ages, it was among the largest cities in the region (Buccellati and Kelly-Buccellati, 1988; Pustovoytov et al., 2011). In addition, it sits near the terminus of the Mardin Pass into the Taurus mountains' front range, the Tur Abdin. Akkermans and Schwartz (2003) propose "Mozan's location at the northern edge of the Khabur plains near the Mardin saddle may indicate control of the route to the copper mines of eastern Anatolia" (285–286), in particular deposits near Diyarbakır (Turkish for "realm of copper").

The political importance of Urkesh is manifested in the palace complex on the tell's western side (A in Fig. 3). The complex has two key components: a service wing and a formal-residential wing, both with courtyards. It was constructed during the site's Phase 2a and the reign of Tupkish, a Hurrian king, circa about 2260 BCE. The next two kings lived in this palace as well. The site's religious significance is reflected in a temple (B), which sits atop a terrace that rose 30 m over the plains, and a monumental stone staircase that links the temple terrace to a plaza (J).

Despite such political and religious significance, Urkesh did not develop beyond a city-state (Buccellati, 2003). Instead, mountain villages in the region likely had Hurrian inhabitants who were culturally linked to Urkesh. Such ties facilitated access to the highland resources "even if the kings exerted no direct administrative or military control over the rural hinterland" (Buccellati and Kelly-Buccellati, 2001: 27). Such an organisation of resource control

Fig. 3. The locations of Units A7 and A9 relative to the palace excavations (left) and Areas A, B, and J on the tell (right). Compiled and redrawn from various Urkesh expedition maps.

may have been a reason that Urkesh might not have fallen under Akkadian conquest (Buccellati and Kelly-Buccellati, 2002). Instead, an Akkadian king, Naram-Sin (the grandson of Sargon), may have established an alliance with Urkesh through the marriage of his daughter Tar'am-Agade to an unknown Hurrian ruler.

4. Theory: Akkadian influence

The precise nature of Akkadian influence at Urkesh has been a topic of considerable debate. The discussion centres on seal impressions that read "[Of] Naram-Sin, the king of Akkad, Tar'am-Agade, his daughter" (Buccellati and Kelly-Buccellati, 2002: 13). Her sealings were excavated from Phase 2b strata of the palace complex, meaning that she would have lived there soon after Tupkish, whose rule dates to the initial portion of Naram-Sin's reign or a bit earlier. Hence strata before the palace date to the Early Akkadian period (circa 2260 BCE; Phase 2a), Tupkish and Tar'am-Agade date to the mid-Akkadian period (circa 2240 BCE; Phase 2b), and the last king before the palace's abandonment, Ishar-kānum, dates to the Late Akkadian (circa 2200 BCE; Phase 3).

The implications of Tar'am-Agade at Urkesh are uncertain. Buccellati and Kelly-Buccellati (2002) argue that she was married to the king who succeeded Tupkish. This interpretation supports the proposed alliance between Akkad and Urkesh. The alternative, that Tar'am-Agade was there to either accompany or serve as an Akkadian administrator, cannot be discounted. Such an official at Urkesh might indicate Akkadian control if not conquest. Akkermans and Schwartz (2003) contend that the "discovery [of her sealings] is of considerable historical importance, but the significance of Tar'am-Agade's presence is, as yet, elusive" (285). The situation regarding Tar'am-Agade reflects the aforementioned uncertainties about Akkadian "control" across Northern Mesopotamia. It seems most likely, however, if the Akkadians indeed sought control over resources, changes at Urkesh may be expected when their influence was greatest, that is, during Tar'am-Agade's presence.

5. Methods and materials: artefacts and analyses

Our identification of Kömürcü obsidian artefacts at Tell Mozan began with an on-site survey of the lithic assemblage, and we compared artefacts to geo-referenced geological specimens using a multidisciplinary approach involving geochemistry (as a means to identify "source" on the scale of individual obsidian-bearing lava flows at a volcano) and rock magnetism (as a means to distinguish "source" on the scale of individual quarrying locations at a flow).

5.1. Obsidian assemblage and sourcing sample

Obsidian accounts for a third of the Tell Mozan lithic assemblage while the other two-thirds are cherts. Whereas obsidian must be obtained from Anatolia, cherts are available as nodules along river and stream beds throughout the region. Though Tell Mozan was continuously inhabited since the Halaf period (circa 6200–5300 BCE), our work focused on the Early Bronze Age III (2700–2200 BCE) to Late Bronze Age II (1400–1300 BCE). During this period, the assemblage is dominated by two tool types: (1) *ad hoc* flake tools and (2) blade tools, including prismatic blades, segments, and blade-based tools such as geometric microliths, scrapers, and points. Chert and obsidian tools were retained beside copper and its alloys, which were used to craft objects such as spear points and pins. Fragments of an obsidian vessel and other carved/ground objects, including incised beads, dating to this period have also been discovered at Tell Mozan.

After an on-site survey of 820 obsidian artefacts, a sample of 97 artefacts was approved for export by the Syrian Directorate General of Antiquities and Museums. Thus 12% of the obsidian assemblage was chemically sourced. To gain export approval, artefacts were non-diagnostic chip debris (Figs. 4 and 5). The spatiotemporal span of these artefacts reflects the site's most recent excavations: 81 artefacts from Area A (the palace complex), 13 artefacts from J (the temple terrace and adjacent plaza), and three artefacts from B (the temple complex). The 97 artefacts span more than a millennium, from about 2400 BCE to the site's abandonment circa 1300 BCE. The export agreement specified only non-destructive analyses of the artefacts.

5.2. Geochemical analyses for source identification

The artefacts' chemical compositions were compared to over 900 geo-referenced geological obsidian specimens, including over

Fig. 4. Sourced artefacts from Unit A7: (left) obsidian from Göllü Dağ (specifically Kömürcü) in Central Anatolia and (right) obsidians from Eastern Anatolian sources.

450 from Eastern Anatolia, 280 from Central Anatolia, and 170 from the Caucasus. These artefacts and geological specimens were geochemically analysed using two analytical techniques: electron microprobe analysis (EMPA; using the procedures published in Frahm, 2012a) and portable X-ray fluorescence (pXRF; Frahm, in press). EMPA has been previously used for obsidian sourcing by Merrick and Brown (1984) in East Africa, Weisler and Clague (1998) in Hawaii, and Tykot (1995) in the Mediterranean and elsewhere (Tykot and Chia, 1997; Rosen et al., 2005). Obsidian sourcing using pXRF has been mainly tested in East Asia (Phillips and Speakman, 2009; Jia et al., 2010), the Americas (Craig et al., 2010; Nazaroff et al., 2010; Millhauser et al., 2011), and Oceania (Burley et al., 2011; McCoy et al., 2011; Sheppard et al., 2011). A combination of these analytical techniques and subsequent data analyses allowed us to detect subtle distinctions amongst geochemically similar sources (Frahm, 2012b). Many prior studies report difficulties distinguishing Kömürcü from other lava flows on the eastern flanks of Göllü Dağ (i.e., East Kayırlı, East Bozköy) and use a combined "East Göllü Dağ" source identification (e.g., Pernicka et al., 1997; Bellot-Gurlet, 1998; Chataigner et al., 1998; Poidevin, 1998; Abbès et al., 2001, 2003; Bressy et al., 2005; Carter and Shackley, 2007; Poupeau et al., 2010).

5.3. Magnetic analyses for quarry distinction

Conventional geochemical sourcing techniques are often able to identify the particular lava flow from which an obsidian artefact originated. Such flows, however, may cover a dozen or more square kilometres, and layers of high-quality obsidian are buried across much of the flow (Fig. 7 in Frahm, 2012b). Obsidian is available where this layer was exposed by erosion, tectonics, and/or slope processes. The Kömürcü source, as noted in the Introduction, consists of obsidian exposures where streams and erosion have sliced into the Paleo-Kabak Tepe lava dome. Hence people would have collected high-quality obsidian from discrete locations, such as the aforementioned workshop sites near the obsidian exposures. These quarries, as we call them here, are specific locations within a chemically homogeneous (or nearly so) obsidian flow. Thus archaeologically important activities, including the first stages of the reduction sequence, occurred at spatial resolutions that conventional geochemical sourcing studies cannot typically resolve. Different groups and/or lithic traditions may also be associated with different quarries of a single flow (Davis et al., 1992).

Different portions of an obsidian-bearing flow cooled at different rates and thus experienced different ranges of temperatures, viscosity, and oxidation conditions. Within obsidian, microscopic minerals are suspended in the glass, and their sizes, shapes, physical arrangements, and mineralogy are highly sensitive to the local cooling history. This, in turn, affects the rock magnetic properties of the obsidian. Magnetic analysis of obsidian with the goal of artefact sourcing is not new (e.g., McDougall, 1978; McDougall et al., 1983; Hammo, 1984, 1985; Schmidbauer et al., 1986; Urrutia Fucugauchi, 1999; Vásquez et al., 2001;

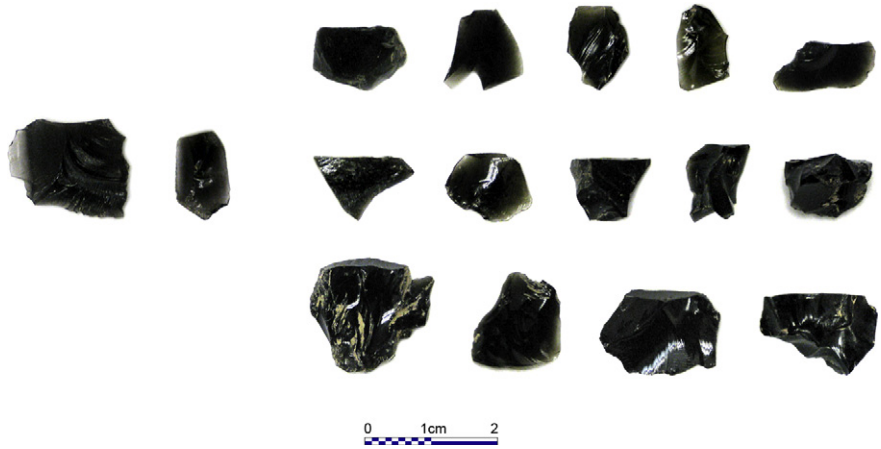

Fig. 5. Sourced artefacts from Unit A9: (left) obsidian from Göllü Dağ (specifically Kömürcü) in Central Anatolia and (right) obsidians from Eastern Anatolian sources.

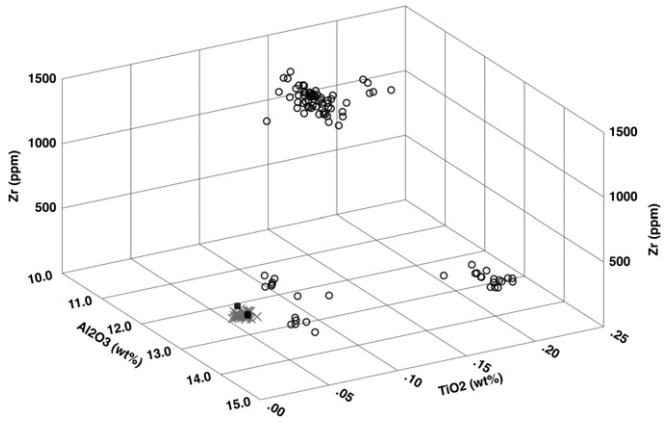

Fig. 6. EMPA measurements of Al_2O_3, TiO_2, and Zr distinguish three artefacts (full black circles) that match the geological specimens from Göllü Dağ (grey Xs).

Stewart et al., 2003; Weaver et al., 2005, 2009; Sternberg et al., 2010, 2011; Zanella et al., 2012); however, its application has been minor compared to conventional geochemical techniques. Many of these studies have had mixed success, usually due to large variability in obsidian magnetic properties within a single flow. Because these studies attempted to distinguish amongst different sources (that is, the same goal for which geochemical techniques have excelled for the last five decades), such a high degree of intra-flow variation has been problematic (but not necessarily detrimental).

Our approach is novel and uses thermal-dependent – and thus spatial-dependent – magnetic properties of obsidian to distinguish amongst different quarries (Feinberg et al., 2009; Johnson et al., 2009; Hillis et al., 2010; Frahm, 2012c; Feinberg and Frahm, in preparation.). Thus, some of the variations that hinder inter-flow differentiation are the very mechanisms that make intra-flow differentiation possible. In particular, magnetic parameters such as susceptibility (χ) and natural remanent magnetisation (NRM) are often too dependent on the mere abundance of magnetic mineral grains to be useful (and hence contain little, if any, spatial information). In contrast, hysteresis parameters – saturation magnetisation (M_s), saturation remanence (M_{rs}), coercivity (H_c), and coercivity of remanence (H_{cr}) – are affected more directly by the local cooling history (and hence contain spatial information as different parts of a flow cooled at different rates). These magnetic parameters were determined for all 97 Tell Mozan artefacts and 704 of the geological reference specimens via major hysteresis loops and back-field measurements. A paper on our techniques is currently in preparation (Feinberg and Frahm, in preparation), but here we present the first archaeologically significant results.

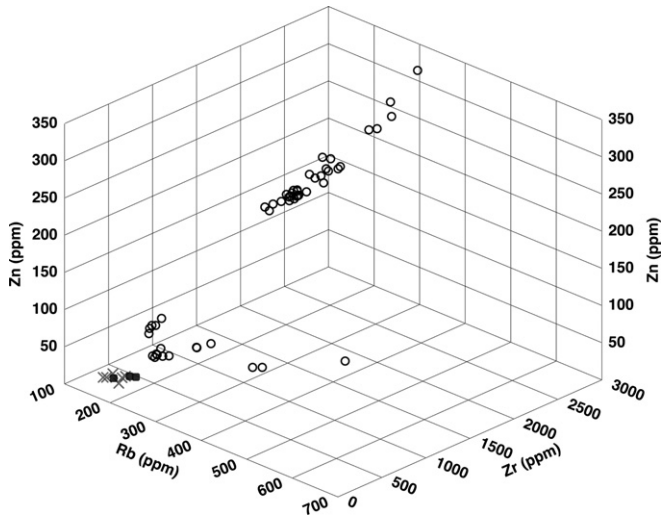

Fig. 7. pXRF measurements of Rb, Zn, and Zr distinguish three artefacts (full black circles) that match the geological specimens from Göllü Dağ (grey Xs). The pXRF data were calibrated using a set of 18 Anatolian obsidian specimens analysed using neutron activation analysis (NAA) and laboratory-based XRF at the University of Missouri's Research Reactor Centre.

6. Results: sourced artefacts and their contexts

The results of our geochemical and magnetic analyses revealed the unexpected presence of Central Anatolian obsidian at Tell Mozan, potentially from *two* quarries at the Kömürcü source of Göllü Dağ; however, their stratigraphic contexts are equally important.

6.1. Geochemical results: Kömürcü at Göllü Dağ

All Tell Mozan obsidian artefacts were expected to have Eastern Anatolian origins. Previous studies for Bronze-Age and Chalcolithic sites in the Khabur Triangle attributed artefacts only to the Eastern Anatolian obsidian sources (Table 1). Only one artefact found on the surface of Tell Halaf, lying on the westernmost fringes of the Khabur Triangle (Fig. 2), came from Göllü Dağ, although the precise source there is not known (Francaviglia and Palmieri, 1998).

Three of the sourced artefacts from Tell Mozan, however, came from Göllü Dağ, specifically the Kömürcü source on the volcano's eastern slopes. Figs. 6 and 7 reveal, based on both EMPA and pXRF measurements, three obsidian artefacts are chemically distinct from the others but match the Göllü Dağ geological specimens. Table 2 shows that, when the same EMPA and pXRF data are analysed in multi-dimensional space, Kömürcü obsidian is the best match for all three artefacts. As mentioned previously, prior studies have had difficulties distinguishing Kömürcü obsidian from the surrounding sources. Our two independent analytical techniques both identified Kömürcü obsidian as the best match, corroborating the result. One key to success was our reference collection, which includes 82 specimens from Göllü Dağ and 20 from three Kömürcü locations.

6.2. Magnetic results: two quarries at Kömürcü

After Kömürcü was geochemically identified as their exact source, the three artefacts were compared magnetically to the geological specimens from three Kömürcü outcrops. Nine of the 20 specimens were suitable for measuring the aforementioned hysteresis parameters. Fig. 8 shows the artefacts and Kömürcü geological specimens plotted using three of these parameters. Note the geological specimens from three different Kömürcü locations fall into three discrete clusters. One of these locations (the black squares) was the famed Kaletepe workshop area, where obsidian was worked from the Palaeolithic to Chalcolithic (Balkan-Atlı et al., 1999, 2011). The magnetic results suggest the Tell Mozan artefacts did not originate from any of these collection locations, including the Kaletepe workshop, which is consistent with a lack of Bronze Age material there. Furthermore, the artefacts fall into two clusters, suggesting the obsidian came from at least two different quarries. Without additional sampling at the Kömürcü source, we cannot be more precise about the quarrying locations. At present, though, we can propose that obsidian for the Tell Mozan artefacts came

Table 1
The results from published obsidian sourcing studies in Northern Mesopotamia (Fig. 2). As shown in Fig. 1, the Middle Euphrates sites fall near the edge of reconstructed Central Anatolian obsidian distribution zones. In the Khabur Triangle, just one artefact found on the surface of Tell Halaf, on the westernmost border of the basin, originated in Central Anatolia. Central Anatolian source assignments are highlighted in bold.

Region (West to East)	Site	Period	Reference	Artefacts' source assignments		
				n	Region	Source
Middle Euphrates (North to South)	Dja'de	Neolithic	Pernicka et al., 1997	***3***	***Central Anatolia***	***Göllü Dağ***
				2	Eastern Anatolia	Bingöl B
				1	Eastern Anatolia	Bingöl A/Nemrut Dağ
	Tell Halula	Neolithic	Pernicka et al., 1997	7	Eastern Anatolia	Bingöl A/Nemrut Dağ
				6	***Central Anatolia***	***Göllü Dağ***
				4	Eastern Anatolia	Bingöl B
				2	undetermined	
				1	***Central Anatolia***	***Nenezi Dağ***
	Jerf el Ahmar	Neolithic	Pernicka et al., 1997,	23	Eastern Anatolia	Bingöl B
			Abbès et al., 2001, 2003	***22***	***Central Anatolia***	***Göllü Dağ***
	Cheikh Hassan	Neolithic	Gratuze et al., 1993,	***17***	***Central Anatolia***	***Göllü Dağ***
			Pernicka et al., 1997,	5	Eastern Anatolia	Bingöl B
			Abbès et al., 2001, 2003	1	Eastern Anatolia	Bingöl A/Nemrut Dağ
				1	Undetermined	
	Mureybet	Neolithic	Gratuze et al., 1993,	***53***	***Central Anatolia***	***Göllü Dağ***
			Pernicka et al., 1997,	5	Eastern Anatolia	Bingöl A/Nemrut Dağ
			Abbès et al., 2001, 2003	2	Eastern Anatolia	Bingöl B
	Abu Hureyra	Neolithic	McDaniels et al., 1980	47	Eastern Anatolia	Bingöl A/Nemrut Dağ
				28	Eastern Anatolia	Bingöl B
				24	***Central Anatolia***	***Göllü Dağ***
Balikh River	Tell Assouad	Neolithic	Gratuze et al., 1993	3	Eastern Anatolia	Bingöl B
				2	Eastern Anatolia	Bingöl A/Nemrut Dağ
Khabur Triangle (West to East)	Tell Halaf	surface finds	Francaviglia and Palmieri, 1998	2	Eastern Anatolia	Bingöl A/Nemrut Dağ
				2	Eastern Anatolia	Meydan Dağ
				1	Eastern Anatolia	Bingöl B ?
				1	***Central Anatolia***	***Göllü Dağ***
				1	undetermined	
	Tell Kashkashok	Late Neolithic	Gratuze et al., 1993	4	Eastern Anatolia	Bingöl A/Nemrut Dağ
				4	Eastern Anatolia	Bingöl B
	Tell Gudeda	Early Bronze Age	Chabot et al., 2001	4	Eastern Anatolia	Bingöl A/Nemrut Dağ
	Tell Mulla Matar	Bronze Age	Pernicka et al., 1997	1	Eastern Anatolia	Bingöl A/Nemrut Dağ
	Tell 'Atij	Early Bronze Age	Chabot et al., 2001	4	Eastern Anatolia	Bingöl A/Nemrut Dağ
				2	undetermined	
	Chagar Bazar	Chalcolithic	Cann and Renfrew, 1964	1	Eastern Anatolia	Bingöl A/Nemrut Dağ
		Late Neolithic	Cann and Renfrew, 1964	1	Eastern Anatolia	Meydan Dağ ?
	Tell Brak	unknown	Forster and Grave, 2012	4	Eastern Anatolia	Bingöl A/Nemrut Dağ
		Late Chalcolithic	Khalidi et al., 2009	4	Eastern Anatolia	Bingöl A/Nemrut Dağ
				3	Eastern Anatolia	Bingöl B
				1	Eastern Anatolia	Meydan Dağ
		Surface finds	Francaviglia and Palmieri, 1998	4	Eastern Anatolia	Bingöl A/Nemrut Dağ
				1	Eastern Anatolia	Bingöl B ?
	Tell Barri	Surface finds	Francaviglia and Palmieri, 1998	18	Eastern Anatolia	Bingöl A/Nemrut Dağ
				2	Eastern Anatolia	Meydan Dağ
				2	Eastern Anatolia	Bingöl B ?
	Tell Hamoukar	Surface finds	Hall and Shackley, 1994	9	Eastern Anatolia	Bingöl A/Nemrut Dağ
				1	undetermined	
		Late Chalcolithic	Khalidi et al., 2009	27	Eastern Anatolia	Bingöl A/Nemrut Dağ
				2	Eastern Anatolia	Bingöl B
				2	undetermined	
				1	Eastern Anatolia	Meydan Dağ
		Surface finds	Francaviglia and Palmieri, 1998	16	Eastern Anatolia	Bingöl A/Nemrut Dağ
	Hirbet Tueris	Surface finds	Hall and Shackley, 1994	11	Eastern Anatolia	Bingöl A/Nemrut Dağ

from two different quarries, neither of which was the Kaletepe workshop.

6.3. Stratigraphic context: service courtyard of the palace

The artefacts' contexts are as significant as their origins. Two of the artefacts were found in Unit A9 and one in Unit A7 (Fig. 3), both of which include the palace's service courtyard and its foundations as well as strata from later phases (in particular Phase 4, the first post-palace settlement period circa 2100–2000 BCE, and Phase 5, the second such period circa 2000–1800 BCE). Unit A2 separates A7 and A9, and it has been excavated only through the Phases 4 and 5 strata. Hence, the stratigraphic links between A7 and A9 remain somewhat conjectural in that their continuity cannot yet be shown in a single exposed profile. Table 3 summarises the stratigraphic, chronological, and historical data for A7 and A9 as well as the quantities and types of obsidian artefacts in their strata. Note that, for both units, almost one-third of the excavated obsidian artefacts were sourced. Most important are the contexts for the Göllü Dağ obsidian. In A9, for example, two obsidian artefacts were recovered from Feature 156, an accumulation on a pebble surface likely deposited while craft activities were conducted in the courtyard, and both artefacts are assigned to Göllü Dağ. The strata above and below contained only Eastern Anatolian obsidians. The same is true in A7: Göllü Dağ at the service courtyard entrance with Eastern Anatolian obsidians above and below. Additionally, the magnetic

Table 2
Three artefacts' source assignments based on pXRF and EMPA data. Göllü Dağ is the best match for the source complex, and among the Göllü Dağ sources, the Kömürcü source is the best match. Best matches are determined by the highest proportion of nearest neighbours (%NN) based on multi-dimensional Euclidean distance matrices.

Artefact	pXRF source assignments				EMPA source assignments			
	Source complex		Source/outcrop		Source complex		Source/outcrop	
	Best match	%NN	Best match	%NN	Best match	%NN	Best match	%NN
A7 q892 f261 k12	Goöllü Dağ	100%	Kömürcü	32%	Goöllü Dağ	96%	Kömürcü	95%
A9 q463 f156 k3 piece 1	Goöllü Dağ	100%	Kömürcü	38%	Goöllü Dağ	93%	Kömürcü	80%
A9 q463 f156 k3 piece 2	Goöllü Dağ	100%	Kömürcü	30%	Goöllü Dağ	43%	Kömürcü	31%

data suggest (1) the two A9 artefacts originated from different quarries and (2) the one A7 artefact might have come from the same quarry as one A9 artefact.

These results are stratigraphically shown in Fig. 9, highlighting use of Göllü Dağ obsidian soon after the service courtyard's construction despite use of Eastern Anatolian obsidians before and after. Therefore, Göllü Dağ obsidian, potentially from two different quarries at Kömürcü, coincides with the presence of Tar'am-Agade. Given the limitations of negative evidence, we cannot strongly assert that use of Göllü Dağ obsidian was exclusive during this period. As of yet, however, no other sourced artefacts can be timed so precisely with Tar'am-Agade, so mechanisms for a decrease in the arrival of Eastern Anatolian obsidians are given some consideration. It is equally likely, if not more so, that obsidian in the palace service courtyard arrived at Urkesh through mechanisms distinct from obsidian in other contexts. Several possible explanations are discussed below.

7. Interpretation and discussion

Determining the nature of Akkadian influence at Urkesh is a heavy burden to place on three exotic obsidian artefacts. We can, though, consider a number of hypotheses regarding mechanisms for the artefacts' arrival in the palace complex. We stress that, when discussing "obsidian trade" in third-millennium Northern Mesopotamia, such exchange should not necessarily be conceptualised as obsidian-*driven*. Instead, it should be understood more broadly as some phenomenon in which obsidian played either a primary or secondary role. Obsidian distribution might not reflect its own trade *per se* but instead the trade of another material or object, the movement of people, or another phenomenon altogether, including territoriality, diplomacy, or elite identity.

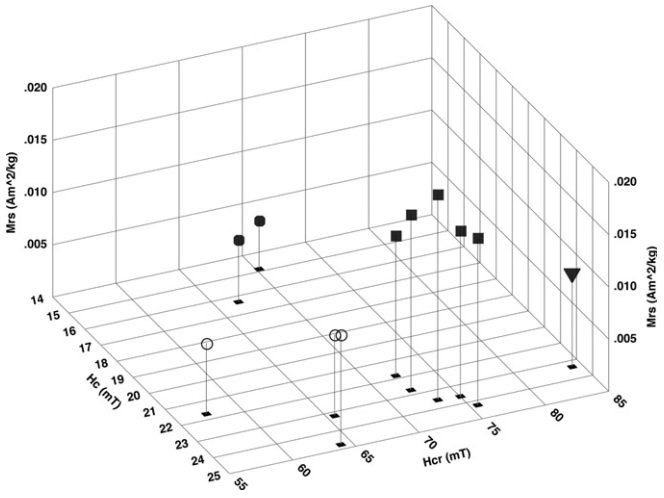

Fig. 8. A plot of three magnetic hysteresis parameters – saturation remanence (M_{rs}), coercivity (H_c), and coercivity of remanence (H_{cr}) – reveals that the geological specimens from three different Kömürcü locations (solid circles, squares, and triangle) fall into discrete clusters. The three Tell Mozan artefacts (open circles) fall into two distinct clusters, suggesting that they came from at least two quarries different from the three geological collection locations.

7.1. Arrival via the Middle Euphrates?

Obsidian from Göllü Dağ certainly did not follow a 600-km straight line to Urkesh. Instead, a likely path seems a west-east route from the Middle Euphrates, where settlements frequently used Göllü Dağ obsidian, at least during the Neolithic (Table 1, Figs. 1 and 2). No post-Neolithic sourcing studies are published for Middle Euphrates sites, so concurrent data are unavailable. Such a route is consistent with the Göllü Dağ artefact from the surface of Tell Halaf, on the far western edge of the Khabur Triangle. It is also congruous with the Akkadians accessing, what Şahoğlu (2005) terms the Anatolian Trade Network (hereafter ATN; circa 2500–2100 BCE; Fig. 1). Göllü Dağ lies near the nexus of the ATN, which reached the Middle Euphrates. It has been suggested that Tell es-Sweyhat, located in Middle Euphrates (near Jerf el Ahmar, Fig. 2), was the location of an Akkadian trading enclave, providing support for such a route. Most recently, though, the excavators have interpreted the area in question as a production centre and caravanserai on a west-east trade route (Zettler, 1997; Holland, 2002), remaining consistent with our hypothesised path.

By taking advantage of the ATN, Naram-Sin, under whose rule the Akkadian empire reached its greatest extent, could have gained access to various Central Anatolian resources (including Göllü Dağ obsidian), even without extending Akkadian influence far beyond the Middle Euphrates. When the ATN (2500–2100 BCE) and later OATC system (1950–1750 BCE) are considered together, there was an established trade network between Central Anatolia and Northern Mesopotamia for much of the span between 2500 and 1750 BCE. In the latter period, exchange was intensive and managed in "modern" ways (Veenhof, 1997). Yet, despite these known long-distance routes, Göllü Dağ obsidian is only known at Urkesh concurrently with Naram-Sin's reign and Tar'am-Agade in the palace. The Akkadians, directly or indirectly, may have been an impetus for exchange amongst Khabur-Triangle (e.g., Urkesh) and Middle-Euphrates (e.g., Tell es-Sweyhat) settlements.

Consider that the Göllü Dağ obsidian artefacts were unearthed in the service courtyard of the palace complex. Urkesh likely had, at least in part, a palace economy. The complex, particularly its service courtyard, may have served as more than just the royal residence and centre of government. It also possibly served as a craft production centre, a marketplace that administered distribution of goods, and a caravanserai that facilitated long-distance exchange. Deposition of obsidian artefacts might have occurred through any of these activities. Although the mechanism cannot be identified, each scenario implies some degree of palace control or oversight. This raises the distinct possibility that obsidian arrived at Urkesh embedded within some other palace activity.

Table 3
Summarised stratigraphy, chronology, and obsidian artefacts (including artefact types and proportion sourced) for units A7 and A9. The features with Central Anatolian obsidians are highlighted in bold.

Unit	Feature	Phase	Approx date (Middle Chron)	Period	Relevant individuals	Obsidian	Basic artefact types	Sourced artefacts		Feature/stratum comments
						n		*n*	%	
A7	f56	Phase 4/5	2100-1800 BCE	Ur III/Old Babylonian		2	Flake/debitage (1), blade (1)	1	50%	Post-palace settlement period; houses and burials reveal an intensive settlement over former palace
	f63					2	Flake/debitage (1), blade (1)	1	50%	
	f69					2	Flake/debitage (1), scraper? (1)	1	50%	
	f121	Phase 3?	2200-2100 BCE	Late Akkadian		6	Flake/debitage (5), blade (1)	5	83%	Accumulations in courtyard area while it was an open space soon after the palace was abandoned
	f148					2	Flake/debitage (1), blade (1)	1	50%	
	f261	***Phase 2b***	***2240 BCE***	***mid-Akkadian***	***Tar'am-Agade***	***2***	***Flake/debitage (1), blade (1)***	***1***	***50%***	***Accumulation at entrance to service courtyard***
	f465	Phase 2a	2260 BCE	Early Akkadian	Tupkish	4	Flake/debitage (3), blade (1)	3	75%	Foundations of the palace complex and its service courtyard; both date to the palace's construction
	f480					1	Flake/debitage (1)	1	100%	
						21	*A7 totals - sourced strata*	*14*	*67%*	
						48	*A7 totals - all strata*	*14*	*29%*	
A9	f126	Phase 4?	2100-2000 BCE	Ur III		8	Flake/debitage (7), core? (1)	3	38%	Scattered post-palace occupation; sparse houses
	f98	Phase 3	2200-2100 BCE	Late Akkadian		10	Flake/debitage (9), scraper (1)	6	60%	Accumulation, open space after palace abandoned
	f156	***Phase 2b***	***2240 BCE***	***mid-Akkadian***	***Tar'am-Agade***	***2***	***Flake/debitage (2)***	***2***	***100%***	***Accumulation on the courtyard's pebble surface***
	f247	Phase 2a	2260 BCE	Early Akkadian	Tupkish	5	Flake/debitage (3), blade (2)	3	60%	Foundations of service courtyard; f247 sits directly atop f260; both date to the palace's construction
	f260					2	Flake/debitage (2)	2	100%	
						27	*A9 totals – sourced strata*	*16*	*59%*	
						56	*A9 totals – all strata*	*16*	*29%*	

7.2. Aegean Parallels: "piggybacking" on metals?

A similar situation occurs in Bronze-Age Crete, where Göllü Dağ obsidians have been rarely found alongside artefacts from the abundant Aegean obsidian sources (Melos and Giali). Carter and Kilikoglou (2007) sourced 60 Middle Bronze Age artefacts (circa 20th century BCE) from Malia in central Crete and identified five artefacts of Göllü Dağ obsidian. They propose Göllü Dağ obsidian reached Crete due to exploitation of a "crucial metalliferous zone" surrounding the volcano (Yener and Vandiver, 1993: 238; see also Wiener, 1991: 327–328). Indeed, the Taurus mountains near Göllü Dağ volcano have deposits rich in silver and copper (Yener et al., 1989; Yener and Vandiver, 1993). Hence Carter and Kilikoglou (2007) suggest that Göllü Dağ obsidian arrived on the island through "piggybacking" on the metals trade via a network such as the ATN or OATC.

This proposal is supported by lead isotope analyses of Cretan copper artefacts, which have signatures consistent with Central Anatolian ores beginning in the Middle Bronze Age (Soles and Stos-Gale, 2004; Poursat and Loubet, 2005). Thus, as metal moved from Central Anatolia to Crete, so too may have obsidian. Furthermore, they state obsidian distribution may have been embedded in

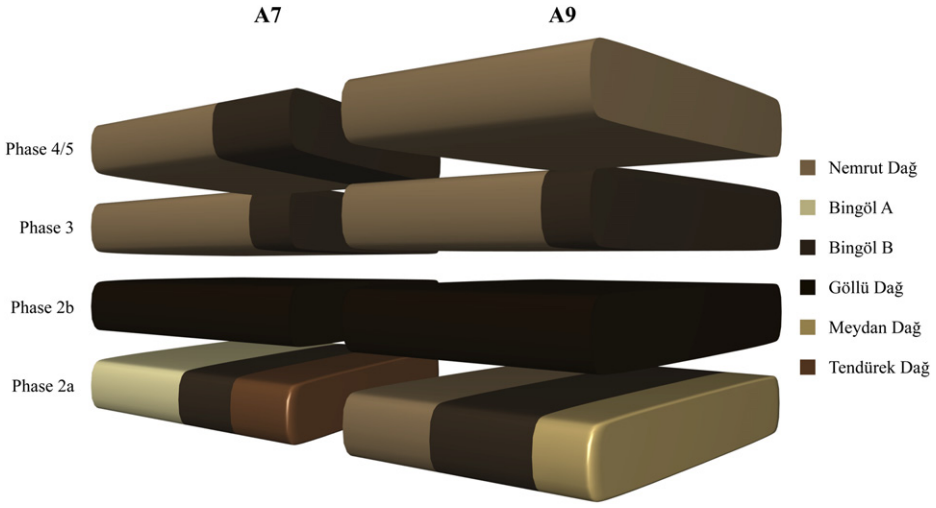

Fig. 9. A simplified stratigraphy of the sourced obsidian artefacts in Units A7 and A9. Only Göllü Dağ obsidian was identified soon after the palace service courtyard's construction despite use of Eastern Anatolian obsidians before and after.

diplomatic contacts between Crete's first "Minoan palaces" and Central Anatolian kingdoms. In other words, the obsidian arrived on Crete, they hypothesise, in the form of "royal gifts" or prestige objects. Göllü Dağ obsidian has been chemically identified at one other Proto-palatial Cretan site: Knossos, specifically within the Central Palace Sanctuary (Wiener, 1991; Panagiotaki, 1998, 1999). They also note that Göllü Dağ lies near Kültepe, a major regional trading centre that served as a key node of the OATC network (Veenhof, 1972; Sherratt and Sherratt, 1991; Dercksen, 1996, 2005), and a storehouse in the Kültepe royal temple complex held 3000 kg of obsidian sourced, at least in part, to Göllü Dağ (Katsuji Kobayashi in Carter and Kilikoglou, 2007; Özguç, 1996).

The Göllü Dağ obsidian at Urkesh may represent a very similar phenomenon. The artefacts may not reflect a west-east "obsidian trade" so much as a metals trade in which Göllü Dağ obsidian was an embedded element either deliberately or incidentally. The obsidian still could have been an important component of exchange although not what compelled the Akkadian empire to participate in Central Anatolian networks. The impetus may have been metals.

Much has been made of the reference to "the Silver Mountain" regarding Akkadian territory in the aforementioned tablet from Nippur; however, it does hint at an interest in this metal. In fact, Mesopotamian silver artefacts may support this interpretation. Almost all silver known in the Near East is derived from silver-rich galena, a lead sulphide ore used in antiquity (Moorey, 1985: 107–126, Ebeling and Meissner, 1997: 130). Therefore, all silver artefacts contain trace quantities of lead, and a number of third-millennium silver Mesopotamian artefacts have lead isotope signatures consistent with Central Anatolian ores (Yener et al., 1991: 561). It is possible, under Naram-Sin, the Akkadians tapped into the ATN to access silver and other metals from ore deposits within the vicinity of Göllü Dağ, and obsidian distribution was instead a secondary phenomenon.

Because the Göllü Dağ obsidian was discovered in the palace complex, it is possible that the artefacts did not arrive at Urkesh via simple "down-the-line" exchange but instead as gifts or other prestige items intended for royalty. Later second-millennium Akkadian-language tablets also refer to obsidian (*ṣurru*) having economic, apotropaic, and symbolic value and being suitable as a kingly gift (Gelb et al., 1962: 257–258). Analogous to the situation at Malia on Crete, obsidian might have been a component of "international relations" in the Bronze Age and served as a gift between elites to accompany metal shipments and/or diplomatic communiqués. This possibility raises a series of questions. To whom at Urkesh would the gifts be sent? An Akkadian administrator in appreciation for trade conducted for the good of the empire? A Hurrian king resisting against it? As a royal gift, obsidian becomes less about trade and more about diplomacy.

7.3. A metals paradox?

Considering the circulation of metal and other materials with the movement of obsidian in the Near East is not a new suggestion (e.g., Wright, 1969), and given the proximity of the Diyarbakır copper mines to the Mardin Pass and Tell Mozan, the potential for interwoven distribution has been considered before. In the case of Akkadians potentially accessing Central Anatolian metals such as silver, lead, and copper (and thus Göllü Dağ obsidian), there is an apparent paradox. There was not only copper ore in the Tur Abdin highlands near Diyarbakır but also silver (and lead). In fact, one Hurrian myth relates the tale of a young god, Silver, who lives in the mountainous hinterland and travels to Urkesh in search of his father (Hoffner, 1990: 46–47). Copper, silver, and lead apparently were readily available via the Mardin Pass; however, Göllü Dağ obsidian artefacts at Urkesh (and some lead isotope signatures in silver) imply the Akkadians may have accessed these metals from Central Anatolia via a supra-regional exchange network. Would, though, Central Anatolian metals have supplemented or replaced Diyarbakır resources? The sole evidence we have at present (albeit only negative evidence with all the associated caveats) is that Eastern Anatolian obsidians are not yet identified in the same stratum as the Göllü Dağ obsidian. Thus it is worth at least considering scenarios whereby Eastern Anatolian obsidians might have decreased at, or even disappeared from, Urkesh (although the burden on our artefacts may now be too great). To do so involves discussing probable mechanisms by which Eastern Anatolian obsidians arrived.

7.4. Eastern Anatolian obsidians and transhumance

Eastern Anatolian obsidians were likely brought to Urkesh, at least in part, by transhumant nomads. The roles of transhumance in obsidian distribution, particularly in Eastern Anatolia, have been long discussed (e.g., Hole, 1968; Wright, 1969; Crawford, 1978; Williams-Thorpe, 1995; Cauvin, 1996; Chataigner, 1998, Chataigner et al., 1998). Archaeological evidence supports this subsistence model in the region for millennia (Ur and Hammer, 2009) and even suggests a widespread return to nomadism in the third millennium BCE (Sallaberger, 2007). In addition, we have third- and second-millennium accounts of nomadic and semi-nomadic peoples in Northern Mesopotamia (e.g., Edzard, 1976; Postgate, 1976). Consequently, regarding Hurrian populations living in the mountains through the Mardin Pass, Wilhelm (1989) asserts that they most likely practiced "varied forms of 'mountain nomadism'" supplemented by trade with villagers and city-dwellers (16).

While acknowledging differences in politics and climate between the Bronze Age and today, we can consider ethnohistorical accounts from this region. Cribb (1991) documents interactions of Alikan nomads, who summered at Nemrut Dağ volcano, with villagers to the south:

> During the winter months, the tribe is dispersed in small units of two to five tents pitched within or on the outskirts of villages to the south of the Taurus Mountains. Although the villagers have no tribal or kinship connection with the Alikan Aşiret, the wintering nomads become a temporary part of the village community, drawing on its services and land resources, and coming under the authority and protection of the [governor]. (198)

The Alikan were integrated into Tur Abdin villages and their economies during winter, and natural resources from their summer pastures may have been used for barter. Crawford (1978) points out, based on historical records, migrations of nomadic groups readily produce a criss-crossing *de facto* exchange network. Surveys of nomadic pastoralists, conducted during the 1930s French occupation of Syria, mention Kurdish pastoralists who seasonally migrated between Lake Van and Jebel Sinjar (Fig. 10; Haut-Commissariat, 1930). Other groups migrated between Jebel Sinjar and central Iraq (British Naval Intelligence, 1944). Yet other nomads moved east-west and intersected these groups, enabling an intersecting exchange network amongst them. Furthermore, they traded with villagers along their routes. Likely mechanisms for exchange also include religious festivals and gatherings such as the annual trading bazaars described by Crawford (1978).

7.5. States, nomads, and territoriality

These mechanisms of obsidian distribution could have changed if territoriality also changed under Akkadian influence. To use an ethnohistorical analogy, consider the aforementioned Kurdish

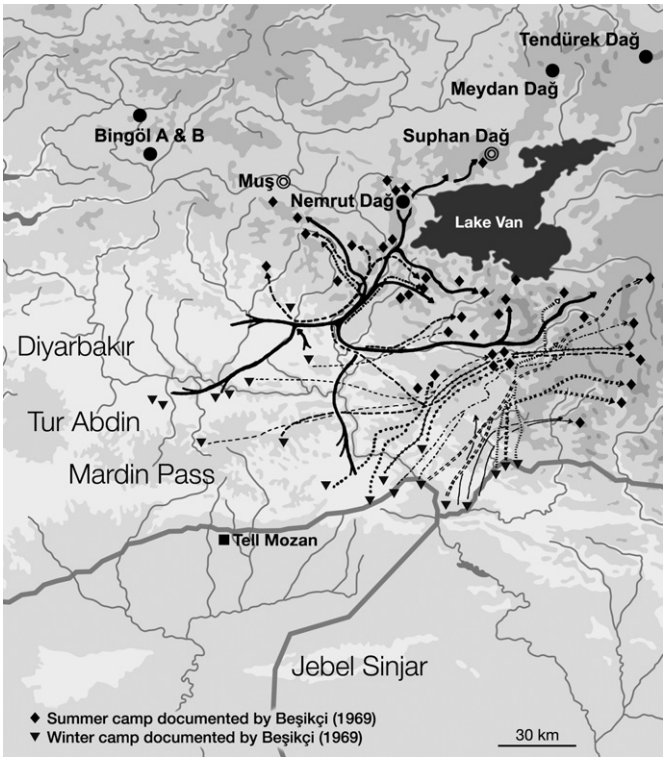

Fig. 10. Annual migration routes of several nomadic groups mapped by Beşikçi (1969), forming a *de facto* exchange network. Records from the 1930s reveal that pastoralists summered near Lake Van in Turkey and wintered near Jebel Sinjar on the Iraq-Syria border. Three decades later, their winter camps lay just within the Turkey border due to state-level changes in territoriality. Redrawn and edited from Beşikçi (1969).

pastoralists who migrated between Lake Van (in Turkey) and Jebel Sinjar (on the Syria-Iraq border) in the 1930s. Beşikçi (1969) documented their migrations three decades later (Fig. 10), and no longer did the tribes winter in Syria and Iraq. Instead, the winter camps lay just inside the Turkey border due to a change in how the states delineated and defended their territories. Thus, the spatial organisation of the groups changed, and their resources were no longer traded with villagers across borders. Similarly, nomadic groups who decades ago traded Dead Sea salt with villagers in Turkey no longer do so (Ashkenazi, 1938; Maxwell-Hyslop in Crawford, 1978).

Territoriality need not involve aggression to defend geographical perimeters. It may also be expressed through social boundaries. When territories are difficult to defend physically, groups can maintain boundaries socially through signals (e.g., elaborate greetings, distinctive material culture), kinship, exchange and reciprocity, language, and similar means (Dillian, 2002: 102). Hence, while it is possible that Akkadian territoriality may have affected nomadic migrations, it is equally possible highland populations, perhaps Hurrians groups, changed their territoriality in response to Akkadian encroachment. In such a case, territoriality may be a form of resistance against Akkadian influence (i.e., the Akkadian empire installing a queen or an administrator in the palace of a Hurrian political and religious centre). As mentioned earlier, Hurrian control over northern mountain resources may have been based on cultural ties. Considering reasons for a possible Akkadian alliance rather than conquest, Buccellati (2008) proposes that Urkesh controlled a northern hinterland through Hurrian cultural ties and "Naram-Sin realized that, while he could easily have conquered the city, he could not have overcome a mountain insurgency" (3). Resource and territorial control based on cultural ties, rather than state administrative controls, "would have made it difficult for an outsider, such as Naram-Sin, to replace with his own the control of the Urkesh [kings], and thus an alliance would have been a wiser political choice" (Buccellati and Kelly-Buccellati, 2000: 155). Perhaps, with the mere presence of Tar'am-Agade in the palace, Hurrians in the highlands indeed resisted Akkadian influence and endeavoured to limit access to resources within their purview, such as the Diyarbakır copper mines. In turn, Urkesh might have been forced to seek metal and other mountain resources elsewhere, increasing or initiating trade with Middle Euphrates settlements.

7.6. Exchange and elite identity

Another explanation is that, as has been shown in the Aegean (Day et al., 1998; Whitelaw et al., 1997), elite identity can, at least in part, be formed and sustained by involvement in exclusive economic and political networks, resulting in shared material culture amongst the participants. It is possible that the Akkadians simply focused on trade routes across the Mesopotamian plains, towards the Eastern Mediterranean, resulting in greater trade on a west-east route along the Tur Abdin and a linkage to the ATN. Could an Akkadian administrator or Hurrian king have bolstered their status at Urkesh by engaging with Central Anatolian kingdoms via trade and displaying prestige objects like obsidian vessels? Such vessels have been found at Bronze-Age Anatolian and Mesopotamian sites (e.g., Tobler, 1950; Childe, 1954; Woolley, 1955), and fragments were even discovered in the temple complex (B) at Urkesh. In a Bronze-Age palace complex at Acemhöyük, near the Central Anatolian obsidian sources, excavators discovered a series of obsidian vessels, including a broad bowl, a flask repaired using gold, a tall decorated vessel, and a fluted flask with two animal-head handles (Özten, 1988). At Tepe Gawra in Iraq, a vessel from a fourth-millennium royal tomb was sourced to Acıgöl in Central Anatolia (Renfrew et al., 1968; *cf.* Blackman, 1984 in Iran). As a "flashy" prestige object, obsidian becomes less about trade and more about status and identity.

Such a strategy could even have been used by the Urkesh governor, whether a Hurrian king or Akkadian administrator, to forge and sustain an identity independent of the Tur Abdin highlands. As previously discussed, Urkesh inhabitants are thought to have maintained cultural ties to Hurrian groups in the north (Buccellati and Kelly-Buccellati, 2001). Various scholars have proposed that the mountains of southeastern Anatolia were a Hurrian "homeland" (Speiser, 1953; Wilhelm, 1989; Stein, 1997; Steinkeller, 1998; Akkermans and Schwartz, 2003; *cf.* Benedict, 1960; Kurht, 1995; von Dassow, 2008). Given the likelihood that the Tur Abdin mountains were inhabited by Hurrians, an approach to elite identity construction based upon trade and contacts with Central Anatolian kingdoms seems more likely from an Akkadian governor seeking to distance their administration from the highlands and a possible Hurrian homeland. This is a potential resolution to the "paradox" of engaging in the Central Anatolian metals trade while copper, silver, and lead metals from Diyarbakır were available via the Mardin Pass.

8. Conclusions

As expected from established regional patterns, 94 sourced obsidian artefacts at Tell Mozan came from the Eastern Anatolian sources. Three artefacts, however, unearthed in the palace service courtyard, dating to the height of Akkadian influence at Urkesh (i.e., when Tar'am-Agade resided in the royal palace), are "exotic" obsidian from the Kömürcü source of Göllü Dağ in Central Anatolia. The precise mechanisms and route by which these artefacts were

brought to Urkesh are ambiguous; however, various explanations and contexts may be considered. The Akkadians may have initiated or increased trade with Middle-Euphrates settlements (e.g., Tell es-Sweyhat), tapping into the ATN and gaining access to Central Anatolian resources. This trade may have been driven by metals, and obsidian distribution was a phenomenon embedded within silver, lead, and copper acquisition from ore sources near Göllü Dağ. Based on the similar occurrence of Göllü Dağ obsidian in Bronze-Age Cretian palaces (Carter and Kilikoglou, 2007), these obsidian artefacts might have arrived at Urkesh as prestige items or royal gifts as an element of the metals trade. An apparent paradox, since metals were accessible from Urkesh near Diyarbakır via the Mardin Pass, is not yet resolved, but potential explanations include Akkadian-linked changes in territoriality involving pastoralists responsible for the arrival of Eastern Anatolian obsidians and elite identity construction of the Urkesh royals tied to involvement in Central Anatolian economic and political networks. Most explanations considered here suggest that Tar'am-Agade may have been more than a mere figurehead.

It remains unclear whether the Göllü Dağ artefacts, all non-diagnostic chip debris, represent lithic production debitage or simply broken pieces of obsidian tools or objects. If the form in which they arrived at Urkesh could be determined – whether tools (e.g., prismatic blades, points), prestige objects (e.g., vessels), or raw material (e.g., preforms, cores) – the reasons for their arrival could be elucidated. We see three approaches for future work. First, it should be determined whether Göllü Dağ obsidian is present amongst the formal tools and other objects in the same proportion (or even at all) as the chip debris. In this phase of research, the artefacts had to be studied in the Tell Mozan field laboratories, and only debris could be exported for sourcing. This was a reason the validity of pXRF for sourcing Near Eastern obsidians was tested during this research. With a capability to free chemical analyses from the analytical laboratory and bring powerful tools into the field, integration between obsidian sourcing and technology can increase. A starting point for pXRF-based sourcing will be the obsidian vessel fragments found in the temple complex.

Second, we propose additional magnetic analyses to identify the Kömürcü quarries (and the associated lithic reduction materials) and/or artefacts with matching signatures that may have come from the same quarries. Göllü Dağ has been well surveyed with the goals of obsidian sourcing and lithic workshop identification (Payne, 1975; Todd, 1980; Yellin, 1995; Cauvin and Balkan-Atlı, 1996; Balkan-Atlı et al., 1999, 2011; *inter alia*; Binder et al., 2011). Rock magnetic analyses of Kömürcü obsidian specimens would complement these studies. Ultimately, such research may prove useful for much more than identifying the quarries from which the Urkesh artefacts originated. Artefacts crafted of Kömürcü obsidian, dating from the Palaeolithic through Bronze Age, might be matched to the quarries and/or workshops where their reduction sequences began.

Third, Göllü Dağ obsidian at Urkesh is, at present, a discrete phenomenon. So far it has not been found synchronically at other Khabur Triangle sites. This is possibly due to small numbers of sourced artefacts (Pernicka et al., 1997; Chabot et al., 2001), sourcing artefacts from the surfaces of stratified tells (Hall and Shackley, 1994; Francaviglia and Palmieri, 1998), and sourcing artefacts with unknown contexts (Forster and Grave, 2012). As discussed here, the context (i.e., the palace's service courtyard) is significant, and this phenomenon may be linked to a palace economy and thus invisible in other contexts. Future research involving sourcing obsidian artefacts from Bronze-Age palace complexes may reveal whether the situation at Urkesh was unique or part of a regional trend. If it is regional, mapping the distribution of Central Anatolian obsidians during this period – and the types of artefacts they represent – may define different modes of Akkadian influence.

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