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The procurement of obsidian at Arslantepe (Eastern Anatolia) during the Chalcolithic and Early Bronze Age: Connections with Anatolia and Caucasus

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ABSTRACT

Arslantepe is a höyük (= tell) located within the fertile Malatya Plain, near the right bank of the Euphrates River. The site is excavated since more than 55 years by the Italian Sapienza University archaeologists and reveals periods from at least the sixth millennium BCE until the final destruction of the Neo-Hittite town. This long sequence records the changing relations and connections with various civilizations and regions of the Near East.

Using the chemical characterization of a large group of artefacts (388 analysed), we propose, in this paper, a new sourcing of the obsidian used by the inhabitants of Arslantepe from the beginning of the Late Chalcolithic to the end of the Early Bronze Age. The method is based on the portable XRF analyse of the artefacts and their attribution to a geological source using our database collected within the ongoing “GeObs” project (resp. D. Mouralis) in the Eastern Anatolia as well as previous published data in Central Anatolia and Caucasus. Moreover, the chemical characterization is coupled with the techno-functional determination of the artefacts.

The present study conducted by an interdisciplinary research group allows to precise the procurement of obsidian in Arslantepe and to better understand the external relations of the site over time. This research also questions and discusses the preferential choice of the obsidian sources through time, in relation with various factors such as distance, quality and abundance of the raw material as well as socio-cultural influences.

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1. Introduction

Arslantepe is a tell located within the fertile Malatya Plain, some 12 km from the right bank of the Euphrates River. The long sequence of the site covers several millennia, from at least the sixth millennium BCE until the final destruction of the Neo-Hittite town and its long history records the changing relations and connections with various civilizations and regions of the Near East (Frangipane,

2011). Arslantepe is also one of the longest on-going excavation projects in Turkey, with more than 55 years of uninterrupted field research by the Italian Sapienza University expedition.

In this paper, we propose a new study of the obsidian sources used by the inhabitants of Arslantepe from the beginning of the Late Chalcolithic to the end of the Early Bronze Age. The method is based on the geochemical analyses of a large group of artefacts (388 analysed) compared with a new database of the Eastern Anatolian geological sources. This new database is collected within the ongoing “GeObs” project (resp. D. Mouralis) and is based on an intensive fieldwork aimed at identifying and sampling all geological sources and sub-sources within the 13 volcanic areas in Eastern

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Anatolia, where obsidian outcrops are geographically positioned.

Located at a nearly equal distance from the Central and Eastern Anatolian sources of obsidian (Fig. 1), Arslantepe offers the opportunity to study the exploitation of various sources of obsidian, from the late Chalcolithic to the end of the Early Bronze Age.

In this framework, and using the accurate stratigraphy unearthed at Arslantepe, three main issues are discussed in the present paper:

1. Which were the regional connections indicated by the procurement of obsidian during the Chalcolithic and Early Bronze Age? How does the obsidian procurement allow to better understand the external relations of the site over time?
2. Does the obsidian procurement indicate the same regional and socio-cultural connections as indicated by the remaining archaeological evidence during these periods?
3. How can we explain the preferential choice of some obsidian sources? Was this determined by the distance to the source, or by techno-functional purposes? Otherwise, could it depend on different social or political factors (regional connections, territorial control, etc.)?

1.1. The chrono-stratigraphical sequence at Arslantepe and the related socio-cultural developments

Arslantepe is the largest artificial mound of the Malatya plain in Eastern Anatolia and records the longest cultural sequence unearthed so-far in the region of the Upper Euphrates stretching from the second half of the fifth millennium (Late Chalcolithic 1–2) to the first half the first millennium (Early Iron Age). This long sequence, which is possibly much longer than known until now, is testified by the 30 m height of the mound above the surrounding fertile alluvial plain.

The earliest fairly extensively exposed **Period VIII**, which corresponds to Late Chalcolithic 1–2 in the regional Northern Mesopotamian chronology (Rothman, 2001a) dates to the second half of the 5th millennium BCE and is characterized by a sequence of superimposed domestic buildings and small living quarters. The presence of a few seals in the houses suggests that some form of distribution of goods was organised by the local households, perhaps in continuity with a system dating back to Ubaid (Balossi Restelli, 2012). Amongst the ceramics, the presence of mass-produced bowls in the *Coba* tradition is a reflection of the technological and social developments that were characterizing the whole North Mesopotamian world at that time. Pottery production further evidences strong links of the site with the regions to the southwest of the Malatya plain (Balossi Restelli and Helwing, 2012) and only to a lesser extent with the Tigris and Khabour regions to the East and South East.

Period VII at Arslantepe, which corresponds to Late Chalcolithic 3 and 4, dates to the first half of the fourth millennium (3900–3400 BCE ca). In this period, the settlement recorded a significant expansion of the occupation that was accompanied by a social and functional differentiation of the inhabited areas including large residential elite buildings and two monumental tripartite temples (Temple C and Temple D) (Frangipane, 2016b). The hundreds of mass-produced ration-bowls associated with the numerous clay sealings found in these temples (Guarino, 2008; D'Anna and Guarino, 2010; Frangipane, 2016a) also witness public, possibly religious, institutions and forms of administrative control. Moreover, a complex of four large rooms connected to Temple C was probably used for hosting craft activities as it is confirmed by the discovery of ochre, fragments of metalliferous minerals, a large number of unused obsidian arrowheads, and, under the floor of

room A850, by a rich “cache” of several obsidian cores and hundreds of pieces of debitage.

During this period, various pieces of archaeological evidence witness a socio-political development similar and parallel to that of the contemporary Mesopotamian Early and Middle Uruk societies, but with a predominantly local material culture, most closely linked to the south-eastern Anatolian regions west of the Euphrates (Frangipane, 2002, 2016b). It is interesting to observe that, in Period VII, the appearance of a few pieces of the so-called Red-Black Burnished ware is documented for the first time and highlights connections with Central Anatolia (Frangipane, 2011, 2017; Frangipane and Palumbi, 2007; Palumbi, 2008).

The following **period VI A**, that corresponds to the Late Chalcolithic 5 in the regional chronology (Rothman, 2001a), dates to the second half of the fourth millennium (3400–3100 BCE). Period VI A records the construction of a monumental palace (Frangipane, 2012a, 2016b) that hosted a political organisation founded on centralised economy and administered redistribution of staple products that were accumulated and controlled by a local elite. This process of economic centralisation was contemporary with, and possibly related to, analogous socio-economic trajectories that sprung up from the early-urban centres of the Mesopotamian alluvium, among which the city of Uruk (Rothman, 2001b). A selected set of traits of material culture, such as those visible in a new ceramic taste and repertoire, and the whole system of administrative practices in a centralised economy show **affinities with the Greater Mesopotamian world** and witness an involvement in the so-called “Uruk system” (Algaze, 1993; Frangipane, 2001). At the same time, the hand-made Red-Black Burnished ware in period VIA accounts for about 10% of the local ceramic assemblage (Palumbi, 2008) and points to an intensification of cultural relationships with Central Anatolia.

The similarities linking the Red-Black Burnished ware from Arslantepe with Central Anatolia are represented by shared morphological repertoires (fruit stands, handled jugs and handled mugs) and by a very specific technical-aesthetic feature represented by the “alternate” red-black pattern. In the “alternate” red-black pattern, the colour black ‘moves’ from the internal to the external surface according to the basic function of the container: open shapes feature black interior surfaces and red exterior surfaces, while on closed shapes this pattern is inverted with black exterior surfaces and red interior surfaces (Frangipane and Palumbi, 2007). It is important to stress that the “alternate” red-black pattern in use in Central Anatolia and at Arslantepe was different from the Kura-Araxes “fixed” red-black pattern (in use in Eastern Anatolia, Southern Caucasus and Iran) where the colour black always remains on the exterior surfaces of the containers, no matter if the shapes are open or closed.

These connections with Central Anatolia are also confirmed by lead isotopic analyses from five swords of Period VIA that have detected significant matching with the copper deposits in the Pontic region and in North-Central Anatolia (Hauptmann et al., 2002; Frangipane, 2017).

The destruction of the palace took place somewhere around 3100 BC (Palumbi et al., 2017) and was the result of the collapse of the centralised economic organisation (Frangipane, 2010, 2012a, 2012b). This collapse may reflect both local crisis in power relations (Frangipane, 2016b) and regional political changes occurring around the end of the fourth millennium: 1) The demise of the Uruk system in the Upper Euphrates region; and 2) the “expansion” of the Kura-Araxes culture that was the expression of small-scale village communities living and moving along the mountainous range of Eastern Anatolia and Southern Caucasus. This culture, characterized by a set of well codified ceramic, daily life, funerary and metallurgical traditions (Sagona, 1984; Smith, 2015) becomes,

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