Journal of Archaeological Science: Reports 21 (2018) 406–412

Contents lists available at ScienceDirect

Journal of Archaeological Science: Reports

journal homepage: www.elsevier.com/locate/jasrep

The provenance of Kul Tepe obsidian artifacts: Syunik and the highlands of Armenia as possible seasonal pastureland

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ARTICLE INFO

Keywords:
Kul Tepe
Obsidian
Provenance
pXRF
Syunik
Prehistoric trade

ABSTRACT

Excavations at the site of Kul Tepe in the Jolfa region in north-western Iran have unearthed various archaeological materials from Late Neolithic/Early Chalcolithic to Achaemenid periods (end of 6th millennium to 3rd century BC). During the Chalcolithic and the Bronze Age most lithic tools used in Kul Tepe were made of obsidian. From the first and second excavation seasons, 53 and 32 obsidian samples were selected and analyzed by pXRF. According to the results, the main source of obsidian for the workshops in Kul Tepe was Syunik, but other sources in the Lake Sevan Basin like Ghegam, Bazenk, Choraphor and Gutansar and the Lake Van region (Nemrut Dağ and Meydan Dağ) were utilized also.

1. Introduction

The site of Kul Tepe (E 45° 39′ 43″ - N 38° 50′ 19″, 967 m asl), as shown in Fig. 1, is located near the city of Jolfa (Hadishahr). It is a multi-period Tepe and covers an area of c. 6 ha with a preserved height up to c. 19 m. It is one of the larger prehistoric sites of the region, lying in a strategic position in the middle Araxes valley. It is located next to a broad valley at the crossroads of major routes linking the Iranian plateau to Anatolia, the Southern Caucasus and northern Mesopotamia. Based on cultural materials recovered during the first and second excavation seasons and according to radiocarbon dating, the following cultural phases at Kul Tepe are present: the Late Neolithic/Early Chalcolithic (Dalma), Late Chalcolithic (Pisdeli = LC1; LC 2 and 3 = Chaff-faced Ware), Proto-Kura-Araxes and Kura-Araxes I, Early, Middle, Late Bronze Age, Iron III, Urartian and Achaemenid periods (Abedi et al., 2014) (Table 1).

Almost all the lithic industry of Kul Tepe utilized obsidian, although there are a few rare flint and chert pieces. Obsidian was brought to Kul Tepe in the form of nodules and pebbles for processing locally, as suggested by numerous waste and core fragments, indicating various steps of the chaîne opératoire. Many different types of tools are present, including flakes, blades, scrapers, borers and points. Twenty sickle blades, displaying gloss on one edge, are present. Utilized flakes and blades as well side-scrapers and sickle blades appear in high frequency as mentioned in Table 2.

During the second season, 2120 lithic artifacts were recovered from Trench I (557 specimens) and Trench IV (1563 specimens). Out of these samples, 2013 artifacts were obsidian and 107 artifacts were chert/flint. A total of 1493 of the obsidian specimens were from the Early–Late Chalcolithic period, and 520 specimens belong to the Early Bronze Age (Table 2). In total, 32 obsidian samples were selected from Chalcolithic and Bronze Age layers of Kul Tepe for chemical analyses by portable ED-XRF in the Archaeometry Department of Tabriz Islamic Art University. The results suggest three main sources: Syunik, Geghasar and Meydan Dağ. The chemical results will be discussed along with archaeological implications. The analysis and results of the first season are published already (Khademi Nadooshan et al., 2013) and will be discussed for a final conclusion also.

2. Background of archaeological research and obsidian studies in the region

2.1. Archaeological research

The site was originally discovered by an expedition to the East Azerbaijan province in 1968 under the supervision of Kambakhsh Fard (1968) and later reported by Kleiss and Kroll (1992), Kroll (1984), Edwards (1986), and Omrani (1994). Kul Tepe is located precisely in the northwestern corner of Iran which is a gateway between the Southern Caucasus and northwestern Iran. The first excavation season

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https://doi.org/10.1016/j.jasrep.2018.08.027
Received 10 April 2018; Received in revised form 26 July 2018; Accepted 13 August 2018

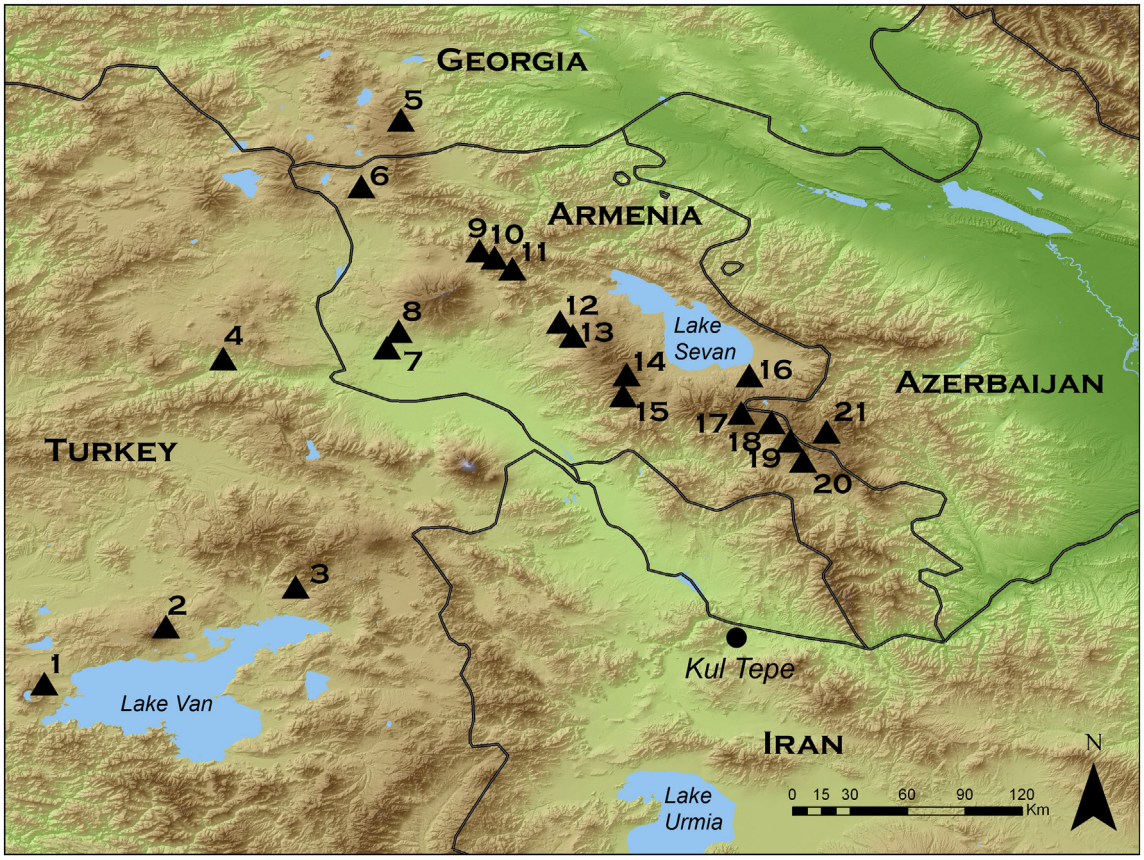

Fig. 1. Map showing the locations of Kul Tepe and obsidian sources from the Near East characterized by the Archaeometry Lab at MURR. Source names are as follows: (1) Nemrut Dag; (2) Suphan Dag; (3) Meydan Tepe; (4) Sarikamis; (5) Chikiani; (6) Ashotsk; (7) Pokr Arteni; (8) Metz Arteni; (9) Damlik-Hankavan; (10) Tsaghkunyats; (11) Kamakar; (12) Gutansar; (13) Hatis; (14) Geghasar; (15) Spitaksar; (16) Vardenis; (17) Choraphor; (18) Satanakar; (19) Syunik; (20) Bazenk; and (21) Kelbadzhar (After Khademi Nadooshan et al., 2013).

Table 1
Sequence of Kul Tepe according to 2010 and 2013 excavations ^{14}C cal BC.

Kul Tepe periods	Cultural phases	Range (cal BC)
VIII	Early Chalcolithic (Dalma)	5000–4500
VII	LC1: Pisdeli/Hasanlu VIII	4500–4200
VIB	LC2: Chaff-faced	4200–3900
VIA	LC3: Chaff-faced	4000/3900–3750
V	Kura-Araxes I	3400/3350–3100/3000
IV	Kura-Araxes II, III	3000/2900–2500
III	Middle Bronze Age (Urmia Ware)	1st half 2nd mill.
II	Iron Age III, Urartian	8th–6th c.
I	Achaemenid	6th–4th c.

at Kul Tepe was carried out in June–August 2010 (70 days of fieldwork) (Abedi et al., 2014). Because of the huge amount of material, Kul Tepe needed more excavation for a better understanding of the cultural relations and evolution of the region. The second season was conducted during August–October 2013 to investigate further archaeological questions and extending the studied area.

2.2. Obsidian studies

Obsidian artifacts were frequently used in prehistory and are found widely in archaeological sites around the world. Provenance studies of obsidian have been an issue of intense research and debate between archaeometry and geology. Different provenance studies were carried out in Anatolia and the Caucasus since the 1960s, but obsidian research in Iran is still at a very early stage. Recent research on obsidian sources in Iran accompanied by prehistoric obsidian provenance studies gave the opportunity to establish a database, and to outline a horizon and perspective for future obsidian studies in Iran (Abedi et al., 2018a,b).

In the mid-1960s, Renfrew et al. (1966, 1968) used geochemical methods to study obsidian from the Near East. Renfrew's research on obsidian sources in Anatolia and the Near East focused on sources located in central and eastern Turkey and Armenia. Later Blackman (1984) and other researchers demonstrated that long distance trade existed between ancient sites in Iran and the obsidian sources in Anatolia and the Caucasus (Renfrew et al., 1966, 1968; Renfrew and Dixon, 1976; Dixon et al., 1968; Wright, 1969; Dixon, 1976; Bigazzi et al., 1998; Chataigner et al., 1998; Poidevin, 1998; Frahm, 2010). More recently, additional sourcing and provenance studies have been carried out by Iranian scholars (Agha-Aligol et al., 2015; Khademi Nadooshan et al., 2007, 2010; Ghorabi et al., 2008; Niknami et al., 2010; Khademi Nadooshan et al., 2013; Abedi, 2015). Some of the publications (Ghorabi et al., 2010; Niknami et al., 2010) suggest that obsidian tools might came from an unknown source located in Iran (perhaps Sahand or Sabalan Mountains). However, the results provided by these studies were inconclusive. Characterizations displayed were sometimes clear overlaps with Armenian sources or provided values for SiO_2 that are never found in obsidian (Agha-Aligol et al., 2015; Ghorabi et al., 2010; Khademi Nadooshan et al., 2007). This paper will discuss the new analysis of 32 obsidian samples (Fig. 2) from Chalcolithic and Early Bronze Age layers from Kul Tepe in NW Iran.

3. Analytical method

For the measurements a portable ED-XRF device (Thermo Scientific Niton XL3t 950-HE GOLDD+ Serial nr. 89086 from the Eurasia