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A GIS analysis of Early Bronze Age settlement patterns in Armenia



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ABSTRACT

This paper presents an analysis of Early Bronze settlement patterns in the territory of Republic of Armenia, based on 128 sites, which have been mapped in GIS software. The analysis of land use pattern reveals that the establishments are from 500 m to 2200 m of altitude, during the all period of Kura–Araxes culture (~3500–2500/2400 bce) and are distributed in six clusters. Three main types of establishments have been distinguished: the mound, the top of natural hill and the slope of hills or promontories. Some flat areas (Tsaghkahovit plain, Shirak plain, Masrik plain) lacked establishments during the Early Bronze Age but are flanked by establishments on the slope of hills or promontories. More than 70 sites have been dated based on ^{14}C , pottery style, and stratigraphy. Comparison of two phases of Kura–Araxes culture does not reveal any land use or establishment type change, except its inter-regional organization with major sites surrounded by a few smaller sites during EB II, which raises the problem of the evolution of the regional organization of sites. Furthermore, the distribution of settlements and the natural resources (especially obsidian and copper) reveals a concentration of sites during EB II around the resources in northeast Armenia, and highlights the problem of economy and trade during the Early Bronze Age in Transcaucasia. These results also show the interest of interdisciplinary collaboration and the necessity to clarify the chronology of the Kura–Araxes culture, because of some problems which turn out only when we consider the different phases of Kura–Araxes culture separately.

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1. Introduction

During the Early Bronze Age (~3500–2500/2400 bce), a large number of settlements of Kura–Araxes culture, with intensive agricultural activities, emerged in South-Caucasus. This cultural phenomenon, the Early Transcaucasian, Shengavit or Karaz culture, was characterized by new material, architectural and social-economic traditions. During the second half of the 4th millennium, a large number of new settlements have been created in this area and during the 3rd millennium bce this culture became one of the most extensive cultural horizons of the Near-East. For major publications about Kura–Araxes culture, see: Bayburtyan (1939 [2011]); Kuftin (1944); Khanzadyan (1967); Kushnareva and Tchubinishvili (1970); Sagona (1984); Munchaev (1994); Kushnareva (1997); Palumbi (2003, 2008); Rothman (2005); Badalyan and Avetisyan (2007); Smith et al. (2009); Summers (2013); and Chataigner and Palumbi (2014). For recent excavation

reports, see: Badalyan et al. (2008); Marro et al. (2011); Lyonnet (2012); Tumanyan (2012); Puturidze and Rova (2012); Kakhiani et al. (2013); and Simonyan (2013).

Since the first finds of archaeological reminds of this cultural phenomenon, more than 200 sites have been discovered in the territory of Republic of Armenia. The spatial organization of these Kura–Araxes sites has always been an issue on which the scholars focused particular attention (Khanzadyan, 1967; Kushnareva and Tchubinishvili, 1970, pp. 60–61; Whallon, 1979; Munchaev, 1994, pp. 13–30; Sagona and Sagona, 2004, pp. 238–239; Areshian, 2005; Ökse, 2005; Di Nocera, 2005; Çevik, 2005; Badalyan and Avetisyan, 2007, p. 303; Erarslan, 2011; Batiuk, 2013). The complexity of landscape structure and heterogeneity of environment of the territory of Kura–Araxes culture, comprising high plains, deep valleys, massif mountainous areas and imposing lakes and complex river systems (Badalyan and Avetisyan, 2007; Smith et al., 2009), highlights the problem of landscape impact on the organization of these settlements and on the land use patterns. The environment in which the Kura–Araxes culture developed was characterized by a continental climate, with cold winters and hot summers. In some

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regions, such as Southern Georgia, this period corresponds to a deciduous forest maximum extent (Connor and Kvavadze, 2014).

In Armenia, the research about the distribution of Kura–Araxes settlement patterns has a long history. Since the first studies by Y. Bayburtyan in Shengavit (Bayburtyan, 1937, 1939[2011]), the geographical distribution of Kura–Araxes sites has attracted archaeologists' interest. The first attempt of mapping Kura–Araxes sites was by Bayburtyan (1939[2011]). However, the tragic end of his life left his work unfinished. A victim of Stalinism, Bayburtyan was arrested the day before his dissertation defense and sent to the Gulag where he died a few years later. (For more details about the history of research, see Bayburtyan, 1939[2011], p. 5–9 (edited and annotated by Ruben Badalyan); Lindsay and Smith 2006; Sagona 2014). It was only at the end of the 1960s that the distribution was taken into consideration, in the research by Khanzadyan (1967), and Kushnareva and Tchubinshvili (1970). However, in recent decades, more than one hundred new sites have been discovered in the territory of Armenia, especially in the north, one of the most studied areas of Armenia. At this stage of research there is no Kura–Araxes site known in the south or east of Armenia, but these regions are less studied, and archaeological sites are still probably to be discovered.

For this research, 128 archaeological sites, representing general characteristics of Kura–Araxes settlements have been mapped using GIS software with their exact coordinates. The data of this research is based on the work of Ruben Badalyan, head of Early Archaeology Department at the Institute of Archaeology and Ethnography, National Academy of Sciences of Republic of Armenia, who created an inventory of Kura–Araxes archaeological sites, taking the geographical coordinates of each site (For the list of sites, see Badalyan, 2014, p. 77, table 2 and p. 82, table

3). Until now, only a few dozen of sites have been systematically excavated and known in detail with the exact occupation surface area, so this research is limited to the general location of settlements. From the sites taken into consideration, 70 sites are dated with radiocarbon analysis, pottery style, or stratigraphy. The remaining 58 sites have not been dated because of the absence of radiocarbon dating or any characteristics for relative chronology.

The goal is to highlight the organization of Kura–Araxes sites, taking into consideration the chronology and dynamics of evolution during the Early Bronze Age. The interest and the particularity of studying the Kura–Araxes settlement patterns in Armenia can be summarized in three points:

- The homogeneity of available data. The modern countries' borders make it difficult to take into consideration all the countries where Kura–Araxes culture was present. In order to consider homogeneous data, this research is limited to the territory of Republic of Armenia.
- Environment and relief. Despite the fact that a small area is taken into consideration in this study, the contrast of the landscape raises the possibility to compare different landscapes, including valleys, high plains and mountainous areas.
- Chronology. The presence of sites which were occupied during several phases of Kura–Araxes culture gives the possibility to evaluate the chronology and dynamics of occupation.

The density of site concentration was used to visualize the clusters and analyze the different occupation type. The dynamics of chronological evolution of landscape occupation of Kura–Araxes sites was analyzed. Finally, the organization of sites linked with

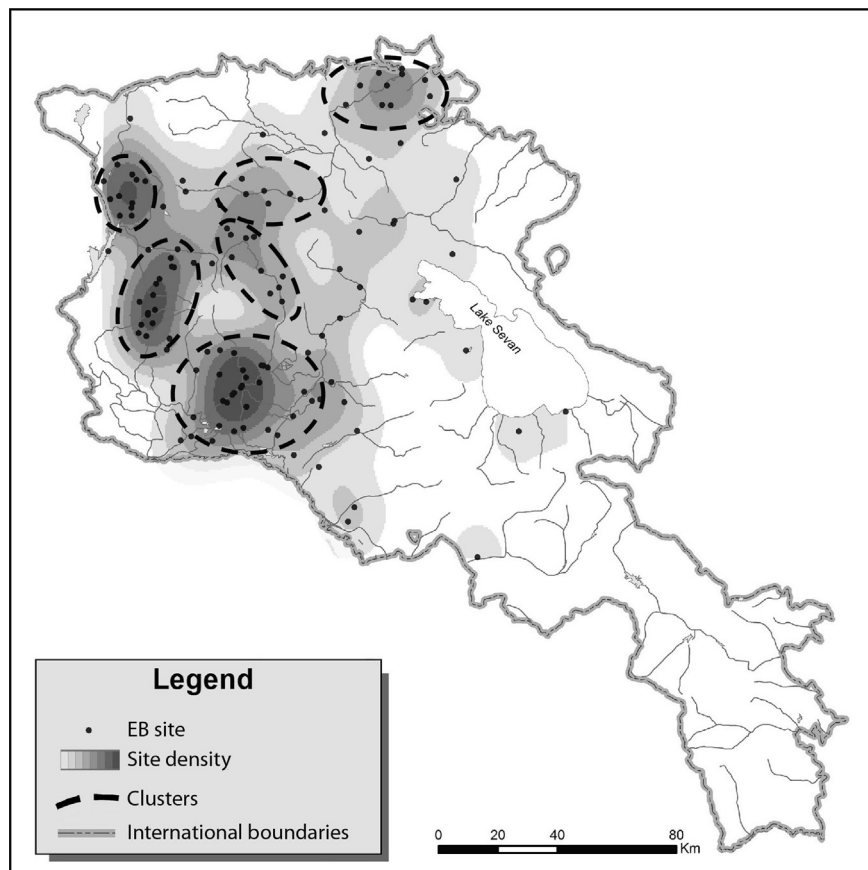


Fig. 1. Heat map of Kura–Araxes sites and cluster density analysis.

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