



Landscapes of warfare: Intervisibility analysis of Early Iron and Urartian fire beacon stations (Armenia)



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ABSTRACT

Intervisibility analysis provides valuable insight into the sociocultural significance of archaeological features such as tombs, settlements, signaling installations and other landscape markers. Yet, it is difficult to determine whether these observed patterns are intentional. Archaeological remains that are highly visible in general may be inter-visible with other constructions only by coincidence. The present study analyzes Early Iron and Urartian (Biainili) fortified architecture in the Lake Sevan region of Armenia (1100–700 BCE). A Social Network Analysis (SNA) approach to classic GIS intervisibility analysis demonstrates that these ancient people constructed an elaborate fire beacon system. Random-point simulation, statistical validation and historical documentation support these findings, and show that the spatial organization of these fortress-states was the result of regional coordination. The analysis described in this paper constitutes a novel method for discerning the agency of social actors. Moreover, the study reveals that a fire beacon system was already in place by the Early Iron period, and its continuation during the Urartian period betrays a preoccupation with persistent conflict in this ancient landscape of warfare.

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1. Introduction and objectives

Fire beacon signaling is a widespread cultural practice that began in the tell landscapes of the ancient Near East, and such systems can, furthermore, be understood as a social response to the violent realities of ancient life. The world's earliest examples come from Middle Bronze Age Syria (c. 1800 BCE), with the most ample documentation pertaining to the kingdom of Mari located in the Middle Euphrates region (Dossin, 1938). Defensive communication networks are historically well-attested during the Iron Age across the region as evidenced by references in Neo-Assyrian letters, the Hebrew Bible and Lachish ostraca (Albright, 1969). The most detailed historical account of fire beacons is of particular relevance to this investigation. The Neo-Assyrian text called "The Eighth Campaign of Sargon" recounts a lengthy military incursion to the highland empire of Urartu where the panicked response of the resident army was to light their elaborate beacon system while making a strategic retreat late in the 8th century BCE (Foster, 2005). This paper constitutes the first examination of archaeological data to determine the feasibility of signaling systems among the fortified sites of this epoch utilizing survey data from Lake Sevan region in Armenia.

Despite a renewed scholarly interest in archaeologies of warfare (Arkush and Stanish, 2005; Gilchrist, 2003; Keeley, 1996) and the relevance of these stations to such histories, fire beacon systems are archaeologically under-explored, though a number of recent investigations

have made important contributions to their study (Arkush, 2011; Kay and Sly, 2001; Panagiotakis et al., 2013; Swanson, 2003). In part, the paucity of systematic investigation can be attributed to the regional scope of fire beacons. A single pyrotechnic feature or signaling station discovered at a site may not be related to other members of its group, and its function may be misidentified. Moreover, ethnographic evidence indicates that signaling stations are sometimes small, stand-alone structures located on remote hilltop locations (Panagiotakis et al., 2013); as such, these suffer from under-recognition in survey due to a more ephemeral archaeological signature. In other cases, signaling installations are embedded in larger fortified structures, e.g. ramparts, and may be misunderstood as lookout towers only. Additionally, archaeological interpretation tends to underutilize historic and ethnographic evidence, and moreover to be unusually skeptical regarding the existence of warfare in the past (Arkush and Stanish, 2005; Keeley, 1996). The necessity of understanding the effects of pervasive warfare on regional settlement is brought into relief especially in the ancient Near East where there is a disconnection between the graphic and bellicose nature of the historical documentation when compared to the primarily economic and ecological models proposed in archaeological interpretation (Hritz, 2014).

This paper aims to integrate social theory with a GIS approach, a need that has been expressed in reviews of spatial analysis in archaeology for decades (Llobera, 1996, 2001; McCoy and Ladefoged, 2009; Richards-Rissetto and Landau, 2014). Accordingly, the present study combines visibility analysis and SNA to look for evidence of intentional placement of features in the distribution of archaeological features in

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these ancient landscapes. To accomplish this goal, the investigation first employed point-to-point GIS intervisibility analysis to evaluate whether or not fortified installations could have constituted a fire beacon network. When the results of this examination suggested the presence of an elaborate system, these “networks” were subjected to rigorous examination utilizing tools from the field of SNA. In particular, the evaluation of network density, or the number of inter-connections that a feature shares among others in its evaluation group, as well as inclusivity, the number of isolates in a network, are useful metrics to characterize social systems. Moreover, to assess if the observed patterns were the result of chance or deliberate placement, randomly-simulated fire beacons were produced, and the archaeological and random-population distributions were compared with Kolmogorov–Smirnov statistical testing.

2. Background

2.1. The Early Iron period

The Early Iron (EI) period in the southern Caucasus is characterized by increasing complexity and an array of local kingdoms that competed for regional supremacy (Badalyan et al., 2003). These kingdoms are a continuation of local trends that began by the Late Bronze Age, as is particularly evident in the data from the ArAGATS project in the Tsaghkahovit plain of Armenia (Smith, 2012). Fortified architecture made of stone is a prominent feature of EI and Urartian landscapes in the southern Caucasus (Biscione and Dan, 2011). These cyclopean

structures vary in size from modest forts measuring forty meters on each side to massive fortresses measuring hundreds of meters across (Biscione, 2012). Certainly, residential settlements played an important role in the development of EI kingdoms though a paucity of data relating to them renders it difficult to characterize these important interactions (Hammer, 2014; Smith, 2012). Compared to the concentration of forts and fortresses discovered for these periods in nearby northwestern Iran, the presence of fortified architecture along the southern Sevan shore is unusually dense (Biscione et al., 2002a; Kroll, 1994). Though it is possible that the fortified architecture observed in the Sevan survey area constituted more than one distinct state, the settlement pattern on the plain does not indicate this (Biscione, 2003), and the data presented below suggest that these structures form a coherent and unified system during this period.

2.2. The Urartian period

The armies of Biainili arrived in the southern Caucasus during the first half of the 8th century BCE, eventually annexing the territories of numerous EI kingdoms (Salvini, 2002, p. 45; Smith, 1996). This empire, known in the Assyrian sources as Urartu (Fig. 1), coalesced at the mountainous intersection of modern-day Turkey, Iran, Azerbaijan and Armenia around 900 BCE (Kroll et al., 2012). Three rock-face inscriptions along the southern shore of Lake Sevan, the first of these from the reign of Sarduri II, fix the date of Urartian incursion in the Lake Sevan territory to the first half of the 8th century (Salvini, 2002, p. 45). The process of conquest was surely complete by the time



Fig. 1. Map of Urartian Empire with notable fortress sites indicated; study area south of Lake Sevan highlighted.

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