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Concepts of Centrality and Models of Exchange in Prehistoric Western Anatolia

Central Place; Melos; obsidian; trade network; gateway; Early Bronze Age.

An exchange of goods corresponds to an interaction between humans. Centrality is the measure of the concentration of such interactions—a central place its spatial manifestation. The absence of these regional or super-regional interactions is considered as marginality. In the prehistoric archaeological context, interactions are assessed using e.g. findings of ceramics and resources that are not present at the focused location, indicating connections and functions of more than local importance.

We investigate the interaction in terms of obsidian exchange at two different Early Bronze Age 1 (EBA1, ca. 3000–2600 BC) locations in Western Anatolia. The first, Çukuriçi Höyük, a settlement dating from the Neolithic to the Early Bronze Age, has been being excavated since 2006 and is interpreted as a central place for obsidian exchange or trade¹ while the second, Yeni Yeldeğirmentepe, which was the subject of a field survey in 2009 and only showed traces of occupation from the Early Bronze Age, is interpreted 2008 and 2009 as a marginal, subsistence based location, which, at present, seems not to be integrated in the obsidian exchange network.² Of course the different methods of investigation, survey and excavation at the two sites offer different degrees of insight, but the achieved results are noteworthy and shall be discussed. Moreover, the results from Yeni Yeldeğirmentepe are taken as a selected case study and should be understood as *pars pro toto* for all EBA 1 sites in the valley analyzed and published so far.³

Natural Environmental Conditions

The general environmental characteristic at both sites can be seen as comparable. They are characterized by a temperate climate, classified as Cs after Köppen and Geiger,⁴ with wet winters and hot and dry summers. In combination with the soils,⁵ especially in the alluvial plains, the area is favourable for agricultural purposes.

At a site specific level, the Çukuriçi Höyük is located in a tributary valley of the Küçük Menderes while the Yeni Yeldeğirmentepe is located on a small geological hill within the valley of the Bakırçay. In terms of agricultural use the location of the former may be seen as more suitable, since the area is less liable to seasonal floods and, due to geomorphological characteristics, is better drained (Fig. 1c).⁶ The latter location within the floodplain of the Bakırçay is in this regard less suitable, since recent sedimentologic

1 Horejs et al. 2011, 48–50.

2 Horejs 2010, 64–65.

3 Horejs 2010.

4 The transition to today's climate model was around 4.6 ka BC (Schulz and Paul 2002, 46), thus these general climatic characteristics may be understood as comparable. Kottek et al. 2006, 261.

5 Common soils are Rubefacient or Chromic Cambisol and Luvisols (Walter and Breckle 1991, 12–14) as well as fertile Fluvisols in the alluvial plains and valleys (Spaargaren 2008, 281).

6 Grund 1906, 8–9 map; Horejs et al. 2011, 37–38.

investigations indicate swampy conditions throughout time (Fig. 1b).⁷ These differences in the local supply, indicated by suitability for agricultural production, are important, since specialized activities, such as trade, are just possible when a certain surplus is produced to facilitate the effort of exchange.⁸

A crucial factor is the dynamic Holocene landscape development. The floodplains have been filled with alluvial sediments of several meter thickness over the last 6000 years,⁹ thus many sites may be buried under these. Furthermore, due to the high sediment load of the rivers, their deltas prograded towards the sea. In this context, the Çukuriçi Höyük may be seen as a seaside location during the time of its occupation, with a several square kilometer large hinterland for local supply (Fig. 1c).¹⁰ The conditions around the Yeni Yeldeğirmen-tepe are different and less clear. Many meters of alluvial sediments were accumulated around the site, making assumptions about prehistoric conditions difficult.¹¹ Nevertheless, its location within the floodplain indicates that the direct hinterland was prone to floods or backwater, influencing the reliability of annual agricultural production. Due to the different geomorphological and geological conditions, the site may not have had direct access to the sea in its history.

Obsidian Occurrence and Exchange

Different studies, investigating the occurrence of obsidian in Western Anatolia, indicate that obsidian was exchanged as raw material or already flaked tools at least since the Neolithic.¹² The obsidian in Western Anatolian sites comes from different sources: besides the majority that is from the Cycladic island of Melos also obsidian of Yali in the Dodecanese and from Central Anatolia is known.¹³

Melian obsidian and produced goods are found at seaside locations, while at sites located further inland, usually only finished products are found.¹⁴ Findings of large amounts of produced tools at the Çukuriçi Höyük support this idea of local production and their regional exchange.¹⁵ Roughly two thirds of the knapped stone artifacts from that site were, despite available local chert resources, made of obsidian and it seems likely that it was dispersed from the Çukuriçi Höyük to other sites in the region. The quite constantly large amount of roughly 60 to 70%, sometimes even more, of tools made of obsidian is constant throughout the excavated settlement phases, from the Neolithic to the Early Bronze Age. There is no evidence for a declining obsidian industry in the Early Bronze Age despite obviously available metal resources. A large amount of ovens and casting tools show that the settlement produced and probably distributed copper and copper objects at least in the Early Bronze Age, underlining its role as a production and trading location.¹⁶ The Yeni Yeldeğirmen-tepe (as also all other EBA 1 sites in the valley) on the other hand showed no signs of a sophisticated stone or metal industry or imported resources. Apparently this settlement did not participate in any raw material exchange network since there is no obsidian and no signs of local metallurgy. The different spectrum of artifacts recovered at the two sites shows that the settlements were of different importance. This might be due to their different geographical locations, knowledge and attachment to

7 Schneider, personal communication; Schneider, Bebermeier, and Schütt 2010.

8 Sieferle 1997, 95.

9 Kayan 1999, 542.

10 Kraft et al. 2003, 370–371, Fig. 8; Horejs et al. 2011, 37.

11 Schneider, Bebermeier, and Schütt 2010, 184–185.

12 Perlès, Takaoglu, and Gratuze 2011, 42–43.

13 Bergner, Horejs, and Pernicka 2009; Georgiadis 2008; Perlès, Takaoglu, and Gratuze 2011.

14 Perlès, Takaoglu, and Gratuze 2011, 44–46.

15 Bergner, Horejs, and Pernicka 2009, 255; Horejs et al. 2011, 48–49.

16 Horejs 2010.

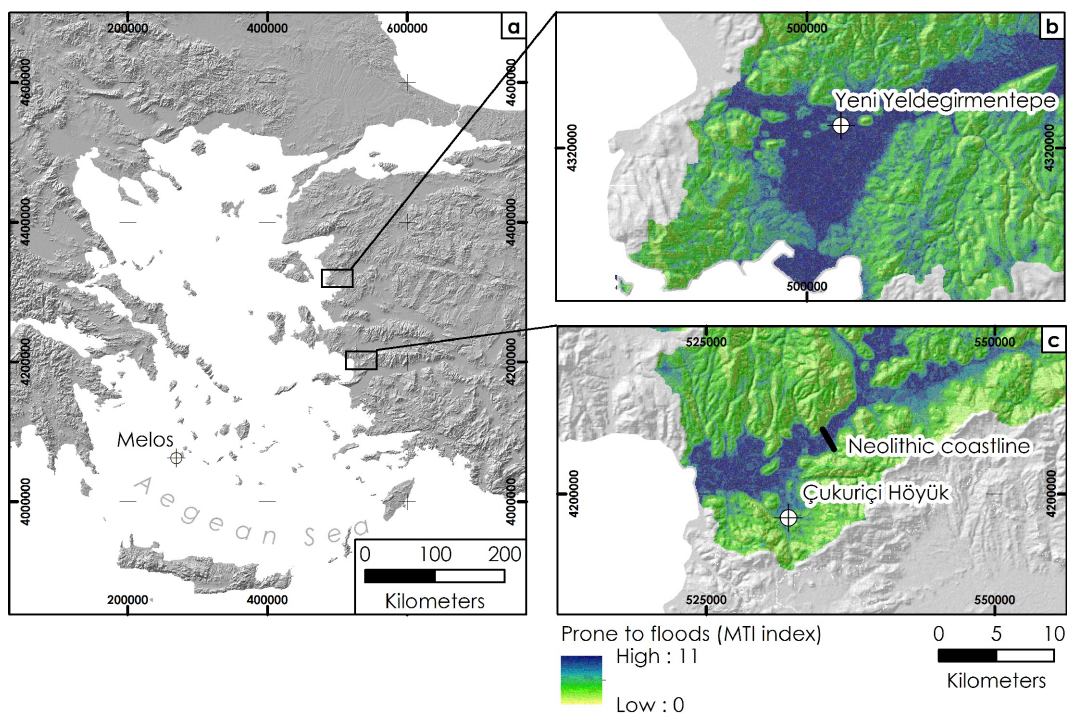


Fig. 1 | (a) General overview of the research area with findings of obsidian; (b) Yeni Yeldeğirmen Tepe in regional context, showing its location in a strongly flood prone area; (c) Çukuriçi Höyük in regional context showing its location in a secured, weakly flood prone area. Furthermore, the reconstructed Neolithic coastline (based on Kraft et al. 2003, 371) advocates the assumptions of the site's role as a seaside location (elevation data based on Jarvis et al. 2008; calculation using GRASS GIS software of GRASS Development Team 2011; MTI index (modified topographic index) based on Manfreda, Di Leo, and Sole 2011—it is an advancement on the Topographic Index developed by Beven and Kirkby 1979 for the delineation of areas exposed to flooding using information on the basin topography).

exchange networks, which might to some degree also be due to the apparently shorter occupation of the Yeni Yeldeğirmen Tepe.

Melian Obsidian can be found in most western Anatolian sites, with declining quantities further inland, as for example in Aphrodisias¹⁷ or Beycesultan,¹⁸ but also in higher quantities at e.g. Liman Tepe or Bakla Tepe, altogether clear hints that obsidian industry does play a role in EBA. In northwestern Anatolia on the other hand obsidian artifacts are a rather rare commodity compared to various sites in the Izmir region and the Çukuriçi Höyük in particular, for instance in Troy¹⁹ or Demircihüyük.²⁰ This might be due to different exchange networks or harder transport routes. Also with a greater distance eastwards from the coast, other obsidian deposits in central Anatolia become available. Surprisingly, the Çukuriçi Höyük also received some obsidian from that region in the Early Bronze Age,²¹ which is another indicator for a wide ranging exchange network.

17 Leurquin 1986.

18 Lloyd and Mellaart 1962.

19 Gatsov 1998.

20 In our opinion, the amount of c. 15% obsidian in Demircihüyük seems not much in comparison to results at other sites discussed here, even more so if we would follow the published interpretations by Baykal-Seeher 1996 that the whole assemblage from EBA layers should possibly date in Chalcolithic periods. A detailed discussion of a complex chronological interpretation of Late Chalcolithic and Early Bronze Age lithic technologies cannot be undertaken here.

21 Bergner, Horejs, and Pernicka 2009, 255.

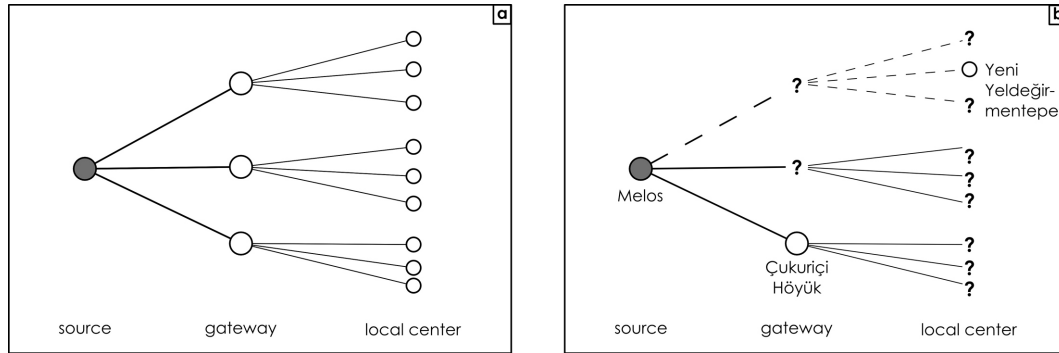


Fig. 2 | (a) Theory of a settlement network with gateway locations, (b) interpretation of the role of the investigated sites in a resource exchange network based on gateway locations.

Synthesis

Due to findings of obsidian throughout the Western Anatolian coast, marine trade may be seen as common since Neolithic times. To facilitate sustainable trade it is mandatory that the local supplying hinterland is productive and that the site has access to regional and super-regional traffic or exchange networks: conditions that are present at the Çukuriçi Höyük and absent at the Yeni Yeldeğirmentepe.

We presume that seaside locations on the Western Anatolian coast may be seen as gateway locations²² that function as focal points in the integration of its surrounding region into larger economic networks – in this regard obsidian exchange (Fig. 2a).²³ The Çukuriçi Höyük, with its local supplying hinterland and its location that combines marine and terrestrial traffic, may be understood as such a gateway location (Fig. 2b). In contrast, the Yeni Yeldeğirmentepe does not have this locational advantage concerning traffic and its environs seem less suitable for a permanent local supply, indicating that it was just of local importance without regional or super-regional connections (Fig. 2b).

At present this is just a hypothesis since the state of knowledge is fragmented. Nevertheless, ongoing research in the surroundings of the Yeni Yeldeğirmentepe²⁴ and Çukuriçi Höyük²⁵ as well as at other sites of Western Anatolia like Bakla Tepe²⁶ or Liman Tepe²⁷ may lead to further important insights in the understanding of obsidian exchange.

22 Burghardt 1971; Hirth 1978.

23 McKenzie 1967, 5.

24 Horejs (in press).

25 Horejs et al. 2011.

26 Erkanal 2008a.

27 Erkanal 2008b; Şahoğlu 2008.

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