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Neolithic settlement sites in Western Turkey — palaeogeographic studies at Çukuriçi Höyük and Arvalya Höyük

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ABSTRACT

Çukuriçi Höyük and Arvalya Höyük are two prehistoric settlement mounds (tells) located in parallel striking valleys in the environs of Ephesus, W Turkey. They were studied with geoarchaeological methods in order to reconstruct their environmental setting, areal extension and distinct settlement phases, as well as the vegetation history. Both tells are situated on small ridges flanked by rivers and their alluvial plains which were suitable for cultivation. The Neolithic coastline was located at a distance of c. 1.5–2 km to the north. Çukuriçi Höyük covers an area of c. 200 m × 100 m; its strata have a total thickness of at least 8.50 m. The oldest remains, dating from the 7th millennium BC, represent an advanced Neolithic culture closely linked to the sea. The oldest foundations reveal that the site was intentionally chosen on the ridge within the still naturally wooded vegetated landscape. Other than Çukuriçi Höyük, Arvalya Höyük has not yet been excavated. However, geophysical measurements and corings revealed that it covers an area of c. 100 m × 60 m, and that it is constructed of several settlement layers with a total thickness of at least 3.50 m. Radar and geomagnetic images show building structures including fireplaces and pits, surrounded by a rampart-ditch construction as a potential enclosure.

1. Introduction

Several Neolithic settlement sites have been excavated in Western Anatolia, especially in the last two decades (Özdoğan et al., 2012, 2013). However, until recently, systematic research concerning the prehistory in the broader area has been lacking. With the excavations of the Neolithic sites of Dedeçik Heybelitepe, Ege Gübre, Ulucak, Yeşilova, and Çukuriçi Höyük in the İzmir region (e.g. Çilingiroğlu, 2011; Çakırlar, 2012; Derin, 2012; Lichter and Meriç, 2012; Sağlamtimur, 2012), broader extensive studies of early farming cultures are possible for the first time in this particular region. It has been argued that these partially contemporaneous settlements make up a regional cluster in the 7th millennium BC, and are defined as a Neolithic group at the centre of the Anatolian Aegean coast (Horejs, in press). Systematic prehistoric research has just recently been initiated around the ancient metropolis of Ephesus with excavations and interdisciplinary investigations at Çukuriçi Höyük and its environment starting in 2006. Due to extensive agricultural land use, this settlement mound (tell) was already partially destroyed when research started.

Several studies and excavation reports about the tell have been published (e.g. Galik and Horejs, 2009; Horejs et al., 2011; Galik, 2014; Horejs, 2008, 2012, 2014). Neolithic occupation started in the early 7th millennium BC with several radiocarbon-dated settlement phases; the chronological sequence continues until the early 6th millennium BC. From excavations at Çukuriçi Höyük it is known that agriculture was practised already from the Neolithic period on in the surrounding alluvial plain (approximately 10 km^2; Horejs, 2014). Archaeobotanical remains are represented by finds of barley and wheat as well as lentils, flax and figs (Thanheiser, 2008; Horejs et al., 2011). Moreover bones of domesticated animals were found (Horejs et al., 2011; Galik and Horejs, 2009; Galik, 2008, 2014). These results combined with other elements of the 'Neolithic package' (Horejs, in press) indicate a fully developed farming community. Finds of fish bones, echinoid spines, crabs as well as many molluscs from sandy and rocky habitats have proven that the inhabitants used the sea intensively (Galik, 2008; Galik and Horejs, 2009; Horejs et al., 2011). The coastline was located 1.5–2 km north of the tell site (Stock et al., 2014).

The neighbouring Arvalya Höyük has neither been excavated nor studied in detail yet. It is located 1.5–2 km south of the coastline (Stock et al., 2013) within am alluvial plain about 3 km^2 (Horejs, 2014). Only Evren and İcten (1998) published surface finds of the site,

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and Stock et al. (2013) investigated the potential tell based on a drill core and described a few survey finds.

Geoarchaeological and geophysical research has been conducted on both settlement sites and their environs since 2008. For this study, drill cores were analysed according to sedimentological and geochemical properties. Georadar and geomagnetic measurements were conducted on Arvalya Höyük. In addition, a first palynological examination of a core from the Belevi swamps close to Ephesus reveals the early vegetation history for this area. The chronostratigraphy relies on AMS-^{14}C ages from the drill cores and relative chronological dating of the survey finds by comparison with artefacts of the excavated Çukuriçi Höyük.

This study aims (i) to reveal the geoarchaeological context of the mounds by determining the thickness, extent and age of the settlement layers throughout the periods of settlement; (ii) to reconstruct their palaeoenvironmental setting; (iii) and to detect the vegetation history including the human impact during Neolithic and Bronze Age times.

2. Study area

The settlement mounds of Çukuriçi Höyük and Arvalya Höyük are located close to the ancient city of Ephesus in the two parallel N–S-striking valleys of the Derbent (max. 3 km wide) and Arvalya (max. 1 km wide) rivers (Fig. 1). Both tells lie at a distance of about 2 km to the main fault system which created the Küçük Menderes graben. The latter developed over pre-Miocene basement rocks of the Menderes Massif along an E–W-trending syncline. It has been filled with mostly continental deposits since Miocene times (Rojay et al., 2005). Both the Derbent and the Arvalya valleys are bordered by mountains up to 358 m a.s.l. (above sea level), composed of mica schist, dolomitic marble and bedrock from the Menderes gneiss core (Vetters, 1989).

With the rising sea level at the end of the last glaciation, a marine embayment formed reaching at least 20 km inland up to the swamps of Belevi (Brückner, 2005) (Fig. 1). Stock et al. (2013, 2014) proved

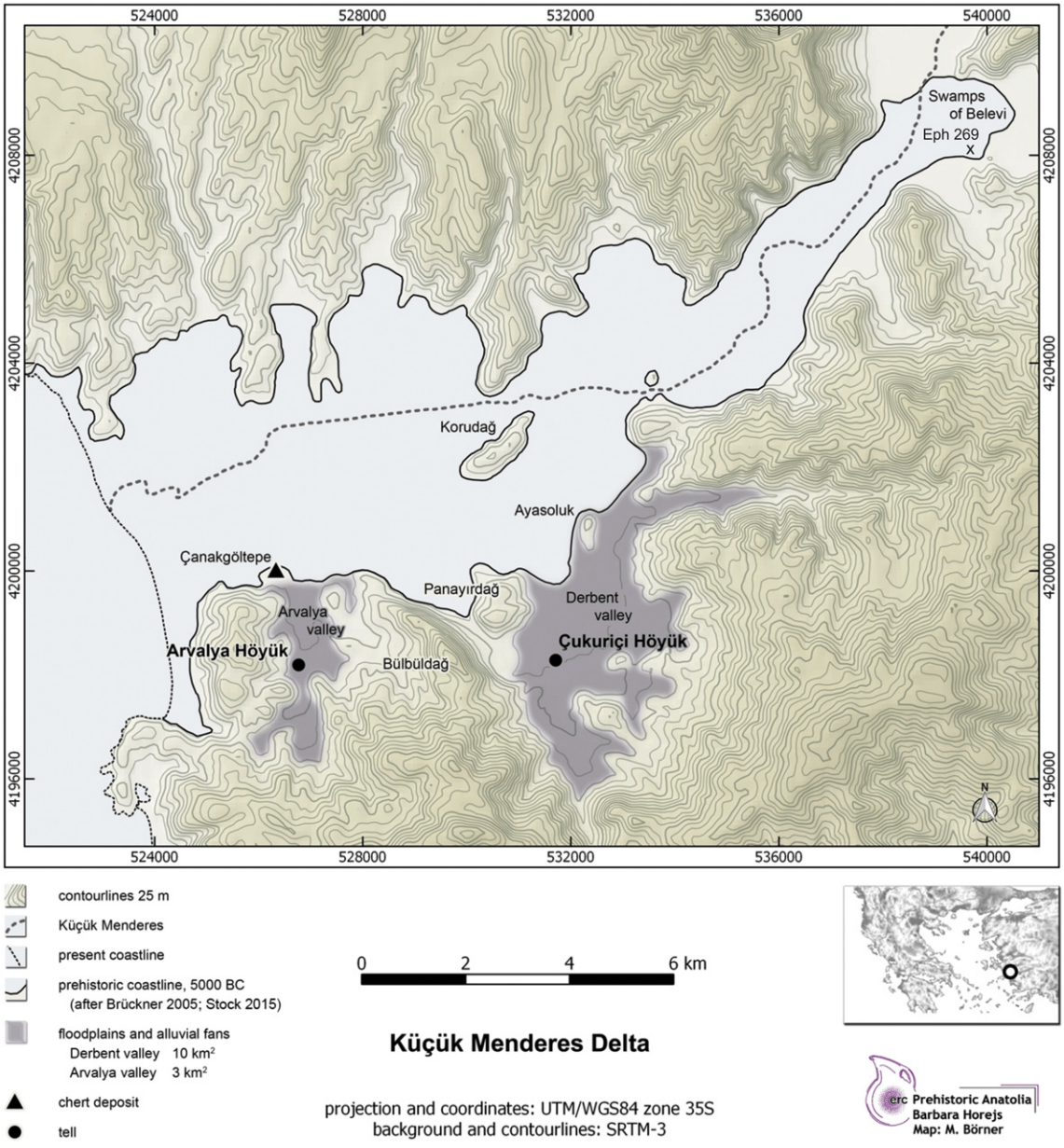

Fig. 1. Neolithic settlements and chert source within the lower Küçük Menderes basin. Reconstructed prehistoric coastline according to Brückner (2005). Location of drill core Eph 269 from the swamps of Belevi, marked by a cross. (Map: ERC Prehistoric Anatolia/M. Börner).