

INTEGRATING ARCHEOLOGICAL AND GEOMORPHOLOGICAL DATA TO EVALUATE THE LATE HOLOCENE EVOLUTION OF THE KARTALINI BASIN (GEORGIA)

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ABSTRACT: Furlani S. *et al.*, *Integrating archaeological and geomorphological data to evaluate the late-Holocene behaviour of the Kartalini Basin (Georgia)*. (IT ISSN 0349-3356, 2011)

A multidisciplinary approach has been used to evaluate the Late-Holocene modifications of the Kartalini basin (Georgia). Data from satellite images (Corona, Landsat, Russian aerial images, etc) and field surveying allowed to reconstruct the neotectonics in the area of Aradetis Orgora archaeological site.

RIASSUNTO: Furlani S. *et al.*, *Comparazione di dati archeologici e geomorfologici per la valutazione del comportamento del bacino di Kartalini (Georgia) dal tardo-Olocene*. (IT ISSN 0349-3356, 2011)

Per studiare le modificazioni tardo Oloceniche del bacino di Kartalini (Georgia) è stato utilizzato un approccio multidisciplinare. I dati provenienti dalle immagini satellitari (Corona, Landsat, foto aeree russe, ecc) e i rilievi di campagna hanno permesso di ricostruire l'evoluzione neotettonica nell'area del sito archeologico di Aradetis Orgora.

Key words: Geoarchaeology, active tectonics, late Holocene, Kura River, Georgia

Parole chiave: Geoarcheologia, tettonica attiva, tardo Olocene, fiume Kura, Georgia

Archaeological and geomorphological data are very useful to study Holocene river meandering because of the close relations between the presence of water and human settlement. In the meantime, both the geomorphological evolution and the development of human settlements could be heavily conditioned by active tectonics effects (differential uplift, seismicity)

In this study we aim to outline the late Holocene evolution of the Aradetis Orgora site, through the analysis of archaeological and morphological data. The site is located in the Transcaucasian basin, historically characterized by active tectonics (ADAMIA *et al.* (1977), GAMKRELIDZE *et al.* (1986) e PHILIP *et al.* (1989), GUDJABIDZE, 2003) and it is poorly studied from a geomorphological point of view.

1. THE STUDY AREA

The study area is located in the Shida Kartli Region, a hundred kilometres West from Tbilisi. The Kura River crossed the area following a NNW-SSE direction, while the Liakhvi River represents an important tributary, which flows into the Kura near the modern city of Gori. The site of Aradetis Orgora-Dedopolis Gora is located at the junction of a system of rivers (Kura, Western Prone, Eastern

Prone). In particular, Aradetis Orgora lies on an isolated portion of the fluvial terrace (660 m a.s.l.), about 20 meters above the recent Kura floodplain (640 m a.s.l.).

The site hosted an important settlement Roman/Medieval in age, which was excavated by Georgian archaeologists under the direction of prof. Julon Gagoshidze (FÜRTWÄNGLER *et al.*, 2008). The Classical Antiquity occupational levels are underlain by a long sequence of earlier levels, which date back at least to the late 4th millennium BC, and are still virtually unexplored.

2. THE ARCHAEOLOGICAL SITE OF ARADETIS ORGORA

The stratigraphic analysis was carried out on an exposed section on the southern sector of the terrace slope, where the archaeological levels are superimposed to an alluvial stratigraphy related to the Kura River and its tributaries. Starting from the base, three main archaeological levels have been identified (Fig. 2):

1) An Early Bronze Age level characterized by a sequence of layers with abundant pottery and ceramics fragments of the Kura-Araxes and Bedeni periods (late 4th-mid 3rd millennium BC) in a muddy matrix. Radiocarbon dating of a wood

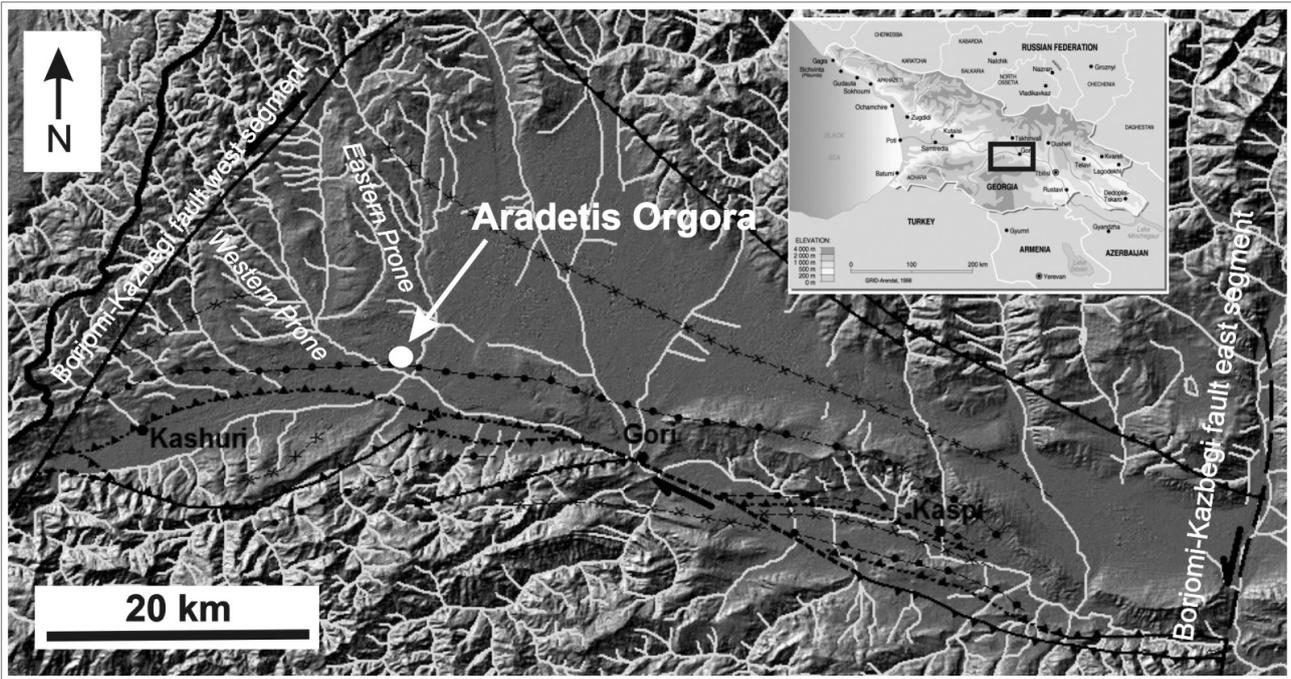


Fig. 1 The study area / *L'area di studio*

fragment from the base of the sequence yielded the age of the layer ($\pm 1\sigma$ 3025-2920 BC.). The level had been buried by a coarse alluvial event characterized by 1,5 m thick gravel body;

- 2) a Late Bronze Age layer characterized by muddy matrix with abundant pottery fragments;
- 3) a Roman Age and later layer at the topmost part of the site, characterized by abundant pottery

and brick fragments. The presence of alluvial deposits between the two Bronze Age levels indicates a channel fluvial activity on the terrace after 4300 BP. We suggest two possible hypothesis about the drainage evolution:

- a) The gravel layer covering the Early Bronze Age could represent the last phase of aggradation of

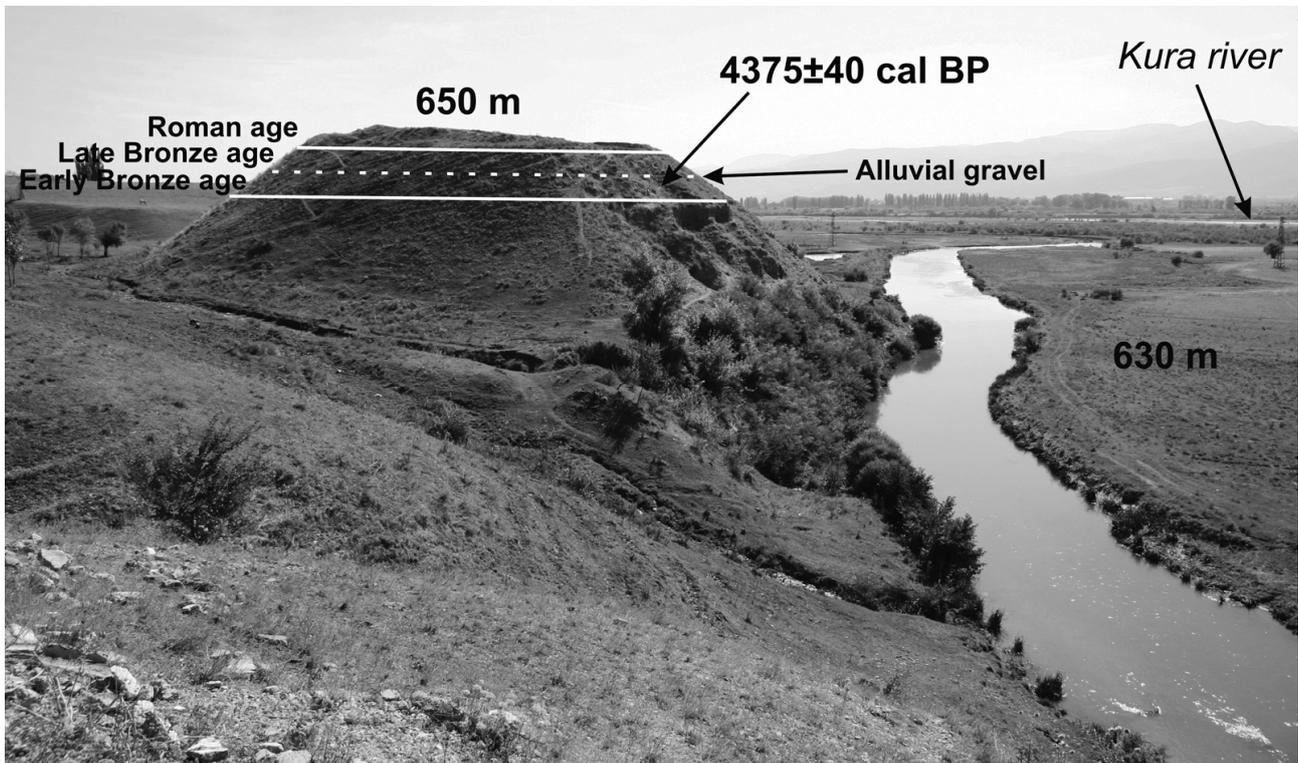


Fig. 1 The Aradeti Orgora archaeological site / *Il sito archeologico di Aradeti Orgora*

the Liakhvi alluvial fan and its progradation toward south. Subsequently the deepening of the Kura riverbed and its northward migration triggered the small incisions of the trenches surrounding the site. The Roman Age site was probably chosen for the isolated position derived from the geomorphological evolution of the terrace. According to the present difference in elevation between the Liakhvi alluvial surface and the present Kura riverbed, the estimated total erosion is about 5 mm/year, that is the result of a joined effect between river incision and active uplift of the area.

b) The gravel layer may be ascribed to a palaeo-Kura (present Western Prone River) running waters. After about 4000 BP, the Kura was forced to migrate toward south because of an active uplift of the Transcaucasian region. In this case, most of the 20 metres in the elevation difference between palaeo and present Kura should be related to tectonic activity.

The importance of tectonic activity in the area is furthermore supported by the high seismicity of the Transcaucasian Basin (PHILIP *et al.*, 1989; TRIEP *et al.*, 1995) and the low fluvial erosion expected in a time span in which no great climatic changes occurred. Local uplift within the basin possibly related to a contractional step-over along the Borjomi-Kazbegi fault zone or the southern propagation of the Greater Caucasus belt.

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