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A preliminary study of the metallurgical ceramics from Kition, Cyprus with the application of pXRF

Demetrios Ioannides *, Vasiliki Kassianidou, Olivier Bonnerot, Andreas Charalambous

Department of History and Archaeology, University of Cyprus, P.O. Box 20537, Nicosia CY1678, Cyprus

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ABSTRACT

Cyprus is considered to be one of the main sources for copper for the Old World since the second millennium BC. Yet we are still far from fully understanding the dynamics, which govern the organization of copper production and distribution on the island. The discovery of a complex of workshops during the excavation of the sacred precinct at the site of Kition — *Kathari* located in south-east Cyprus led some scholars to suggest that copper ores were smelted in these workshops while others have more recently suggested that the workshops were dedicated to casting and recycling votive artifacts. In order to address this issue and to determine the nature of the metallurgical process taking place at Kition a collection of 57 metallurgical ceramics and crucible slags from the site dating from the 13th to the late 4th century BC, was analyzed chemically with the use of a handheld pXRF instrument. Also, the same technique was employed to distinguish the existence of different fabric groups in the assemblage.

1. Introduction

The remains of ancient Kition lie under the modern city of Larnaca, on the southeast coast of Cyprus (Fig. 1). The acropolis of Kition was partially excavated as early as the early 20th century at which time Phoenician and later period strata were unearthed (Karageorghis, 1976). Subsequently, four areas were selected for systematic excavations undertaken by the Department of the Antiquities, under the direction of Prof. Vassos Karageorghis, between the years 1959 to 1983 (Karageorghis, 2005; Karageorghis and Demas, 1985).

All the areas, excluding Area IV, include Late Bronze Age strata, while only Areas I and II have evidence of metallurgical activity (Karageorghis, 1976, 2005; Karageorghis and Demas, 1985). The evidence from Area I is confined in several rooms interpreted as copper workshops on Floor IV, which covers the Late Cypriote (LC) IIC and extends to the transition period of LC IIIA (ca 1300-1190/1175 BC) (Karageorghis and Demas, 1985). The presence of two furnaces, a possible casting pit and some metallurgical byproducts associated with them suggest the processing and working of copper in a small scale (Stech, 1982; Stech et al., 1985). Further, the non-industrial character of the adjacent rooms and the apparent connection of the complex with the tombs found in Area I, imply the private nature of the facilities, perhaps within the residence of a local craftsman (Karageorghis and Demas, 1985; Stech, 1982; Stech et al., 1985). Importantly, Area I did not give any evidence of use during the Phoenician habitation, but several architectural remains of the Hellenistic and Roman period were found there (Karageorghis, 2005).

Area II has yielded the best evidence for copper production at Kition, with documented activity ranging in date from the 13th century B.C. into the Classical period (Karageorghis, 2005; Karageorghis and Demas, 1985). The earliest metallurgical finds date to the period of Floor IV, but no buildings or installations related to metalworking were identified (Karageorghis and Demas, 1985; Karageorghis and Kassianidou, 1999). In the following period, Floor IIIA, which corresponds to LC IIIA (1190–1125/1100 B.C.), a grand scale anamorphosis of the sacred precinct of Area II is attested, including the establishment of a set of rooms between the north wall of the Temple 1 and the city wall, which were clearly connected to metalworking (Karageorghis and Demas, 1985). During the next periods, the so-called "Northern Workshops" were remodeled and were in constant use, until they ceased to exist in the period of Floor I. This corresponds to the Cypro-Geometric I, namely the last half of the 11th century B.C. (Karageorghis and Demas, 1985). Particularly, the material record and the architectural features demonstrate that intensification of copper production must have taken place during the last half of the 12th century (Floor III), which according to Karageorghis and Demas corresponds to the LC IIIA2. Notably, a significant number of the metallurgical evidence occurs scattered throughout the sacred precinct and inside the temple rooms and not in the rooms identified as copper workshops (Fig. 2).

After a period of abandonment from the late 11th to the late 9th century BC (Karageorghis, 2005), Area II was reconstructed. In the framework of this development, metallurgical activity is evident in the form

* Corresponding author.
E-mail address: demetrio@ucy.ac.cy (D. Ioannides).

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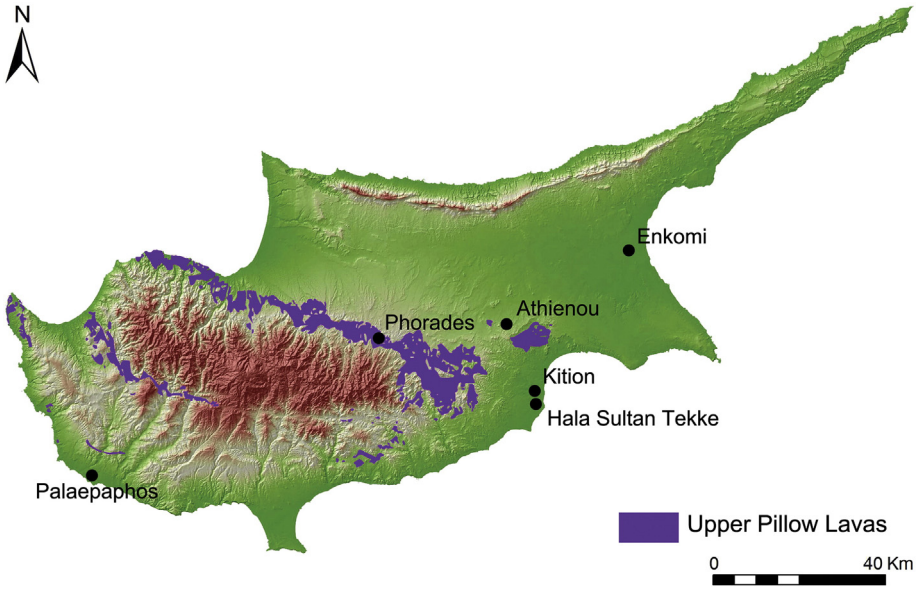

Fig. 1. Map of Cyprus with the location of Kition and other Late Bronze and Iron Age sites. Map based on digital geological data from the Department of Geological Survey drawn by Dr. A. Agapiou.

of copper slag and scrap metal and in a lesser extent in the presence of technical ceramics. Although the excavator acknowledges the creation of a metallurgical workshop on Floor 2 (ca 550–350 BC), which continues to function during Floor 1 (ca 350–312 BC), the current study of the excavated material now in the store rooms of the Department of Antiquities, has revealed that in fact the stratum which demonstrates the highest number of sherds from metallurgical ceramics is Floor 3 (ca 800–725 BC) (Fig. 3). According to the excavation records, the majority of the refractories were found in pits. Although, one could assume that they represent waste material from previous periods, that was

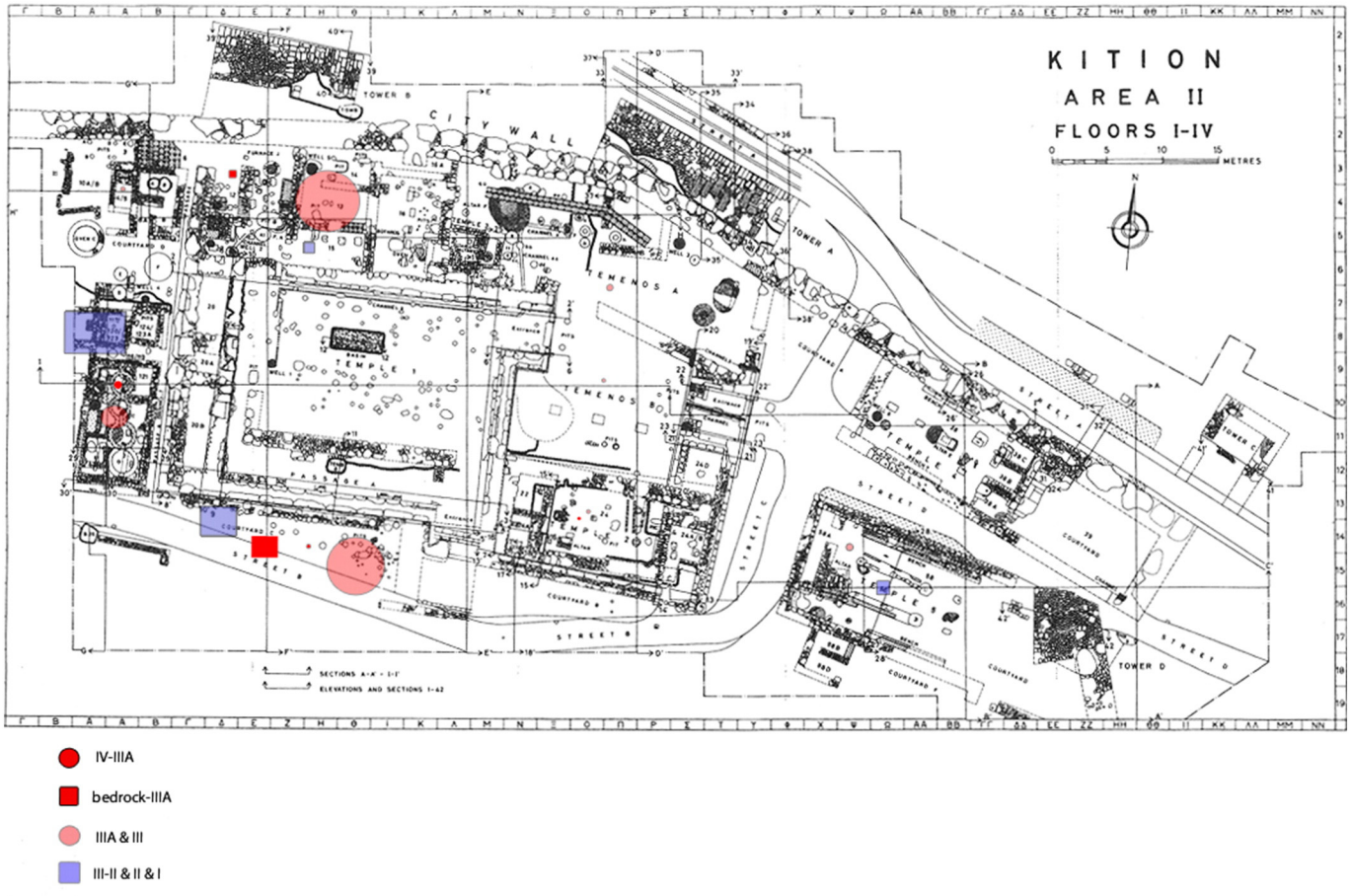

Fig. 2. Plan of Area II. Floors IV–I. Distribution of the metallurgical ceramics of the Late Bronze Age.

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