



A geophysical investigation of a newly discovered Early Bronze Age site near Petra, Jordan



Thomas M. Urban^{a,*}, Clive Vella^b, Emanuela Bocancea^b, Christopher A. Tuttle^c, Susan E. Alcock^b

^a University of Oxford, United Kingdom

^b Brown University, United States

^c American Center of Oriental Research, Jordan

ARTICLE INFO

Article history:

Received 7 December 2012

Received in revised form

25 October 2013

Accepted 18 November 2013

Keywords:

Petra

Bronze Age

Geophysics

Ground-penetrating radar (GPR)

Magnetometry

Potential-field transformation

Reduction to the pole (RTP)

Pseudo-gravity transformation

Upward continuation

ABSTRACT

The hinterland of the famed Nabataean city of Petra in southwestern Jordan has yielded archaeological remains ranging from the Paleolithic to the Medieval Period, with a time-span of approximately one-million years of human and hominin activity represented in the archaeological record of the region. Bronze Age sites, however, have been grossly underrepresented for reasons that are not presently well understood, even to the extent that some past researchers have assumed that the region was sparsely occupied during this period. Our team has conducted a preliminary investigation at a previously undocumented Early Bronze Age site, located on an isolated hilltop in the northern hinterland of Petra. The site was recently noted during a pedestrian survey in the area as part of the Brown University Petra Archaeological Project (BUPAP). Follow up documentation and investigation included the production of a site plan, a geophysical survey with magnetometry and ground-penetrating radar, and small scale exploratory excavation. The geophysical results revealed a number of archaeological features in addition to yielding information about site taphonomy. Qualitative examination of the survey results indicated evidence of structures, burnt features, and modern disturbance, while potential-field transformations offered additional insights on the distribution of some of these features.

© 2013 Elsevier Ltd. All rights reserved.

1. Introduction

The Early Bronze Age (EBA) in the Levant has typically been seen from a uni-linear evolutionary perspective (Philip, 2008: 160). This period is characterized by growing urban centers in several parts of the Levant, but, the region surrounding Petra has provided only small, dispersed EBA settlements (Lindner and Genz, 2000). The recent discovery of Jabal al-Qarn (Vella et al., 2012, <http://www.antiquity.ac.uk/projgall/vella334/>) adds another settlement to only five Bronze Age sites previously documented in the Petra region. The subsequent investigation of Jabal al-Qarn relied heavily on non-invasive geophysical methods. While geophysical methods have been used successfully in past investigations at Petra, these studies have focused primarily on the Nabataean and Roman history of the ancient city rather than earlier periods of occupation (Hammond 1973; Conyers et al., 2002; Urban et al., 2012, <http://www.antiquity.ac.uk/projgall/urban331/>; Urban et al., 2013a).

* Corresponding author.

E-mail address: thomas.urban@rlaha.ox.ac.uk (T.M. Urban).

Studies in the broader Levant region, however, have seen success with geophysical investigations of sites ranging from the Neolithic through Late Bronze Age (e.g. Witten et al., 2000, 2003; Rowan et al., 2012, <http://www.antiquity.ac.uk/projgall/rowan334/>; Urban et al., 2013b).

Here we describe the geophysical investigation of Jabal al-Qarn, an Early Bronze Age site recently discovered in the northern hinterland of Petra. The site was surveyed with magnetometry and ground-penetrating radar (GPR), followed by two small-scale excavations, in order to assess both archaeological potential and the current state of site preservation. Interpretation of the geophysical survey results is the focus of this article.

1.1. Site description

The Early Bronze Age site, Jabal al-Qarn, occupies a free-standing hill several kilometers north of Petra, Jordan (Fig. 1). The hill is situated strategically as a vantage point from which all avenues of approach through surrounding natural corridors may be easily observed. The southern side of the hill declines steeply towards a wadi, which is fed by the Shara mountain range. As

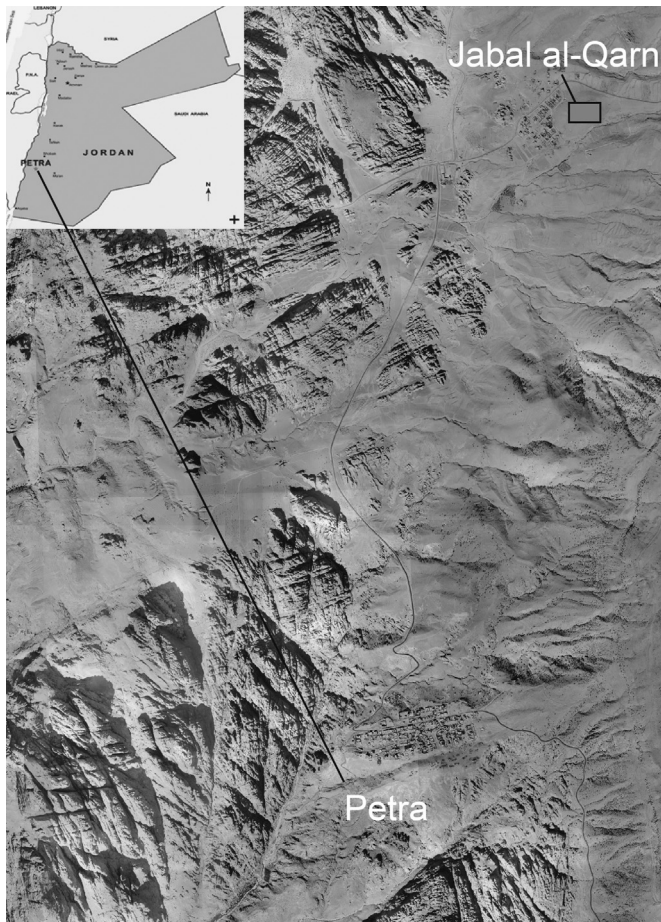


Fig. 1. Site location. The Early Bronze Age site of Jabal al-Qarn was recently located in the northern hinterland of Petra, Jordan.

discovered by our team during the course of the site investigation, the hilltop, with no natural breaks nearby, is also subject to strong, unchecked winds. The settlement of Jabal al-Qarn appears to have included the construction of a perimeter wall, presently interpreted as a boundary demarcation. Indeed, it appears that the wall, largely comprised of sub-angular sandstone, would not have originally been higher than 1.5 m (Fig. 2). The construction style of the wall could therefore be taken to imply that it was not meant for defensive reasons, but rather, for containment. Jabal al-Qarn presently exhibits the remains of multiple stone walls that encircle the hill, while on the apex of the hill some discernible structural alignments could be identified in the current surface (Fig. 3). To ground truth the results of the geophysical survey, described below, a trench (2 × 2 m) was placed in the southernmost portion of the

hilltop, over what originally appeared to be a structural wall visible in the surface. However, as soon as excavations began it became clear that the uppermost topsoil deposit ran underneath the apparent surface alignment, demonstrating that it was nothing more than a fortuitous placement of rubble. Within this top layer, it became obvious that the majority of recovered ceramics and lithics were typical of the Early Bronze Age, quite similar to artifacts previously published at nearby Umm Saysaban (Lindner et al., 2001: 302–303). Beneath the topsoil, a rubble deposit appears to have been a collapse of structures that contained some later residual ceramics (including at least two Nabataean sherds) in addition to an abundance of EBA ceramics and lithics.

After the removal of the rubble deposit, a linear structural alignment was uncovered as indicated by the geophysical survey. The uncovered portion of the alignment appears to be only a small part of a larger axis that seems to cross the southernmost part of the hilltop, whose function remains unknown (Fig. 4). After the construction of this wall, a burnt beaten surface was installed, as well as a chippings deposit that was contemporary to the wall, and a doorway that included a beaten lime surface (Fig. 4). The burnt surface, interpreted as a cooking feature, was well indicated in the magnetic survey results and included six discernible depressions (perhaps for placing stones to elevate foodstuffs), and a quern with pestle. Underneath this cooking surface, the remains of a hut structure was observed during the last day of fieldwork, which was left for future research at Jabal al-Qarn (Vella et al., 2012).

Evidence of modern use of the hill, which is on land owned by the Amareen tribe of Bedouin, is also apparent. This includes several modern burials on a lower terrace of the hill (work in this area was avoided), occasional modern trash, two areas where the remains of very small camp fires are evident, and at least one looting trench at the top of the hill. Surface observations also suggested that part of the hilltop had likely been filled with external limestone gravel to make a flattened surface, possibly for threshing activities. This latter observation was later supported by the results of the geophysical survey and excavation. In spite of these modern disturbances, however, the site appears to be incredibly rich with well preserved archaeological material.

2. Methods

The geophysical methods employed at the investigation of Jabal al-Qarn included magnetic gradiometry and ground-penetrating radar (GPR). These were undertaken respectively with a G-858 alkali-vapor magnetometer by Geometrics and a Noggin series 250 MHz GPR system by Sensors and Software.

2.1. Magnetic survey

The magnetic survey was conducted with the instrument in vertical gradiometry configuration. The lower sensor was

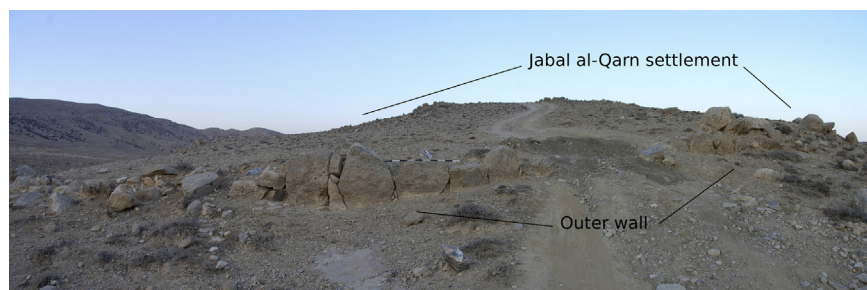


Fig. 2. Jabal al-Qarn settlement and perimeter wall. View looking west.

Download English Version:

<https://daneshyari.com/en/article/7443779>

Download Persian Version:

<https://daneshyari.com/article/7443779>

[Daneshyari.com](https://daneshyari.com)