Surveying the Black Desert: Investigating Prehistoric Human Occupation in North-Eastern Jordan

PAR STEFAN L. SMITH · PUBLIÉ 3 NOVEMBRE 2017 · MIS À JOUR 20 NOVEMBRE 2017

The "Black Desert" of north-eastern Jordan is part of the Harra't al-Sham, a basaltic plateau of around 50 000 km² that stretches from southern Syria across the eastern "panhandle" of Jordan and into the north-west corner of Saudi Arabia (Fig. 1). This region comprises an undulating surface of a 1-2 metre deep silt deposit which is almost entirely covered by a dense paving of basalt blocks and stones of varying dimensions (Fig. 2; Kempe & Al-Malabeh 2010: 47-49). This landscape, known as Harra in Arabic, is only interspersed by seasonal rainfall runoff valleys (wadi, pl. awdiyan), and irregular large playas (qa'a, pl. aqwa') – flat areas created when silt wash forms a muddy deposit during the seasonal rains and settles in landscape depressions. These also form the only natural, though intermittent, access points to the region from the surrounding undulating desert plains known as Hamad, as the dense basalt makes travel extremely difficult, even for modern vehicles. The climate of the region is one of extremely low levels of precipitation (below 100mm per year), which is furthermore invariably focussed in occasional bursts of rainfall during the winter season of around November to March (Frumkin et al. 2008: esp. 360-361).

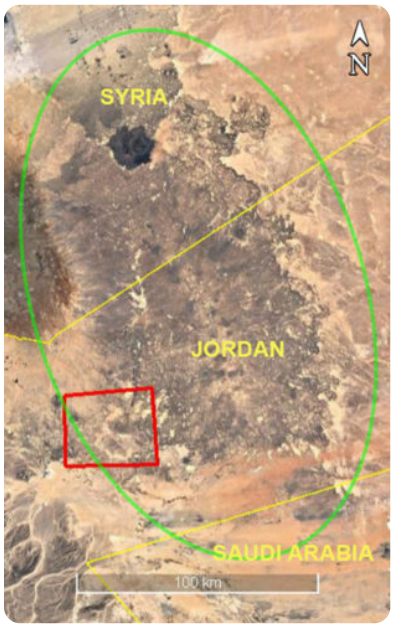

Fig. 1: GeoEye satellite image of the Harra't al-Sham with the Black Desert (Harra) indicated in green and the Western Harra Survey area in red.

Fig. 2: Photograph of the typical landscape of the basalt desert.

Notwithstanding these seemingly harsh conditions and access difficulties, human occupation is documented for the Harra from at least the Epipalaeolithic (Late Natufian) period onwards (ca. 9000 BC; Betts 1998), and lasted, presumably more or less continuously, until the beginning of the Early Bronze Age (ca. 2900 BC; Müller-Neuhof 2014a). In large part, the evidence for this occupation consists of stone structures, constructed from local basalt rocks, which cover the landscape in an unparalleled density. These structures are hard to discern on the ground, but can clearly be observed from the air; thus their first documentation coincides with the first aerial transits of the region, most notably by Percy Maitland (1927) in the 1920s. With the recent availability of large datasets of aerial archaeology online, including several free-of-charge options such as Google Maps, the number and variety of identified stone features has increased enormously (Kennedy 2011). It therefore became clear that they could be subdivided into a number of distinct categories of differing shapes and sizes (from a few metres to several kilometres across), including so-called "kites", "wheels", "pendants", "meandering walls", and simple enclosures (Fig. 3; ibidem). However, large portions of the Harra for which high-resolution imagery exists remain undocumented, and despite numerous recent projects conducting high-quality research in the region (see Müller-Neuhof 2014b for an overview) the majority has never been archaeologically investigated on the ground. These factors have led to some lack of clear typologies of site types and sub-types based on the study of aerial images, and a "keyhole" pattern of ground truth data, often based around the edge of the Black Desert for reasons of difficulty of access.

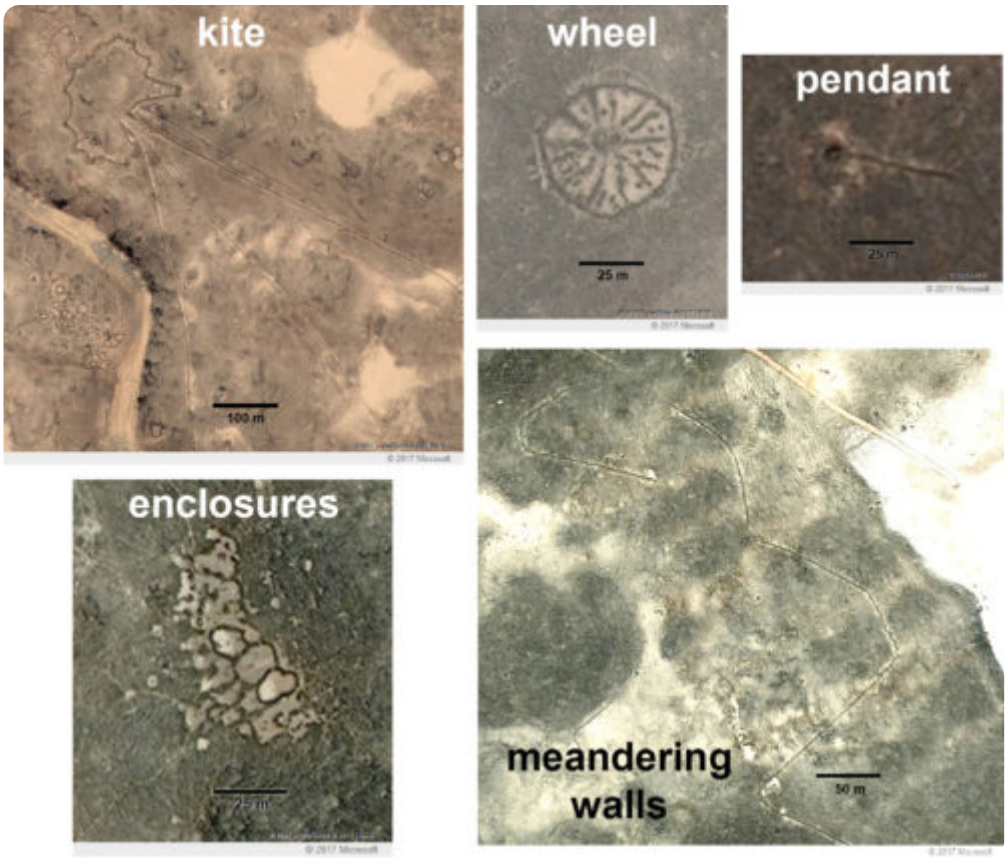

Fig. 3: GeoEye satellite images of some of the major site types found in the Harra.

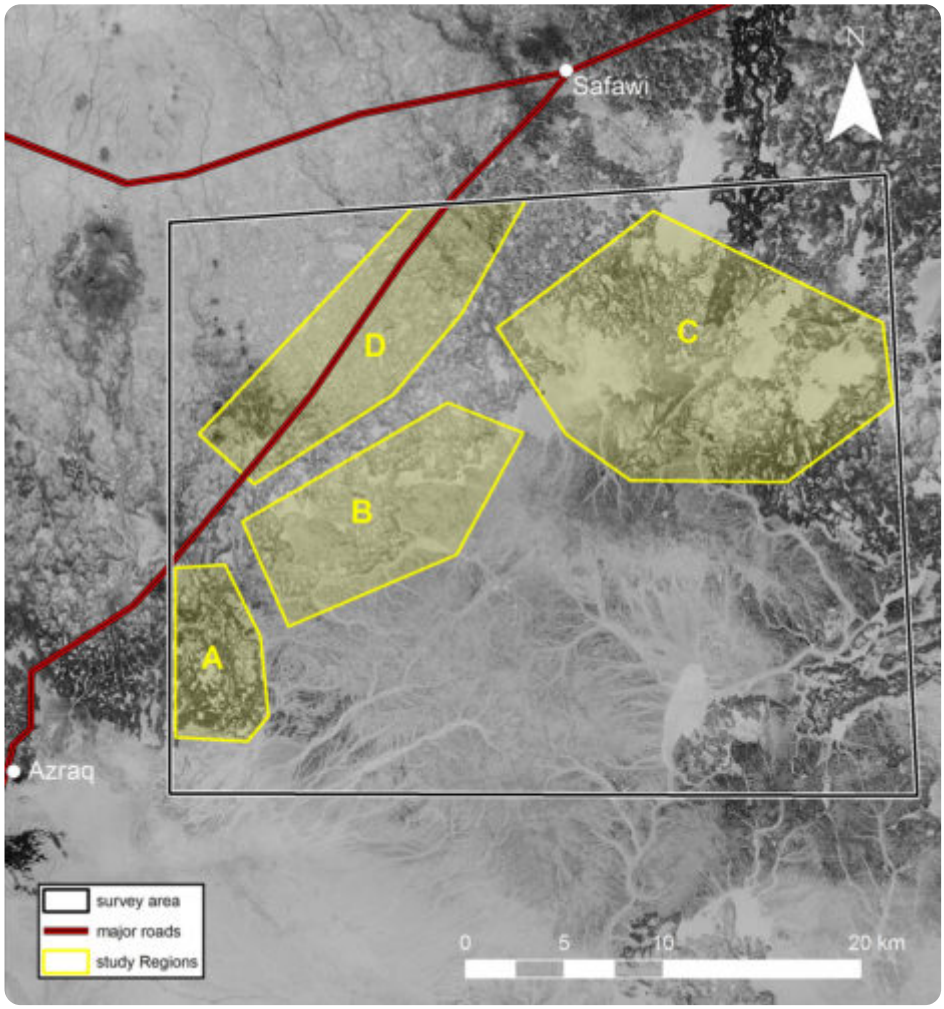

Fig. 4: CORONA satellite image of the Western Harra Survey area and its study Regions.

The "Western Harra Survey" was therefore devised as an archaeological project to study the interior of the Black Desert, its prehistoric structures, their material remains, their dates of occupation, and the overall shifting patterns of settlement and nomadism in the region. Its first season of fieldwork took place in October-November 2015, and the second was recently completed in September 2017. Since the Harra covers a vast area (ca. 11 400 km² within Jordan), a specific survey region was selected that firstly contains a representative sample of stone feature types and typical landscape varieties, and secondly provides a balance between a location within the interior of the basalt desert and feasible accessibility (Fig. 4). It also comprises a manageable size for a ca. 5-season fieldwork plan. This area, measuring 30 by 36 km (ca. 1100 km²), was first analysed in detail on satellite imagery using Google Maps and Bing Maps, allowing the identification of a variety of landscapes and over 2400 individual sites. As a result, the area was further subdivided into four separate "study Regions", each representing a type of landscape found within (Fig. 5):

- Region A) Dense basalt stone desert; difficult to access, therefore area close to asphalt roads was chosen;
- Region B) Boundary area between basalt desert and large wadi beds; easier to access via awdiyan and track used by quarry vehicles, also basalt is less dense here;
- Region C) Boundary area between dense basalt desert and large qa'a mud flats; easy to access across aqwa' when they can be reached from outside the Harra;
- Region D) Sparse basalt desert, mostly in hilly areas; still difficult to access.

By focussing on these four Regions, it is possible to cover a representative sample of Black Desert landscapes within manageable and accessible areas covering a total of ca. 385 km².

Fig. 5: Photographs illustrating the typical landscapes of study Regions A-D.

In an area that has seen little to no previous study on the ground, basic goals of obtaining ground truth data in the form of site records (photographs, drawings), artefact records (types and quantities of surface finds), and landscape observations (topography, geology) have value in themselves.

Fig. 6: Selection of typical lithics found in the survey area.

The first two seasons of the Western Harra Survey have already gathered a wealth of information. In total, 63 sites were visited, including 47 "wheels", eight enclosures, five pendants, and two kites. The vast majority of material recorded at all sites was lithics (flint stone tools), comprising points, knives, scrapers, flakes, and cores (Fig. 6).

Ceramic remains were by far in the minority (see Table 1), an expected result for sites in the Harra, as the same is observable in survey results from prehistoric settlements of similar types elsewhere in the region (e.g. Akkermans et al. 2014; Rollefson et al. 2014). Meanwhile, the landscape investigations of the project identified paths across the Black Desert that have clearly been created by the deliberate moving of basalt boulders (Fig. 7). These appear to both connect different sites, sometimes over a distance of tens of kilometres, and to provide access to sites from awdiyan or aqwa'. In the latter case, paths sometimes appear to have been constructed with steps in order to cope with steep slopes, preventing erosion. It is thus likely that the prehistoric inhabitants had a significant desire to move around the landscape on a regular basis, as the construction of these paths would have been a considerable undertaking. In addition, the natural landscape survey identified areas of surprisingly abundant vegetation, especially along wadi beds (Fig. 8). This illustrates that low levels of precipitation may be offset to a certain extent by groundwater availability, an important factor to keep in mind when considering the ability of prehistoric inhabitants to subsist in the Harra.

LITHICS	
cores	627
flakes	3694
points & arrowheads	5923
scrapers	5425
knives	4273
total lithics	**21 177**
CERAMICS	
rims	15
bases	5
handles	9
total ceramics	**584**

Table 1: Counts of artefact numbers across all sites visited during the two fieldwork seasons.

Fig. 7: Example of one of the prehistoric paths discovered

Fig. 8: Photograph illustrating the occasional abundance of vegetation in the Harra.

Beyond these basic goals, the Western Harra Survey has several broader aims to both understand the past human occupation of the Black Desert and to help advance future investigations. Regarding this, one primary objective is to build a comprehensive typology of site forms and their dates. If definite correlations between a certain site type and a specific set of occupation dates can be made, preliminary dating of sites can be done rapidly and accurately across a large area from satellite imagery alone. While this method in no way removes the need for ground truth data to back up such remote analysis, it has proven successful in other parts of the Middle East for both large-scale analysis and background data upon which to plan targeted fieldwork (see e.g. Galiatsatos et al. 2009; Smith sous presse). To address this, firstly the visual form of sites on satellite imagery was examined in detail, with the presence and absence of individual features noted. This led to the discovery of a significant sub-division within the "wheel" site type. One variety truly resembles a wheel, with a circular or oval outline and linear walls running radially inwards, creating internal enclosures shaped like arc segments (Fig. 9a). A second variety, which I have termed "encircled enclosure clusters", is very different, being an irregularly-outlined grouping of circular or oval internal enclosures (Fig. 9b). This variety is also always encircled by very small rectangular enclosures whereas these are only sometimes present around the true "wheels".

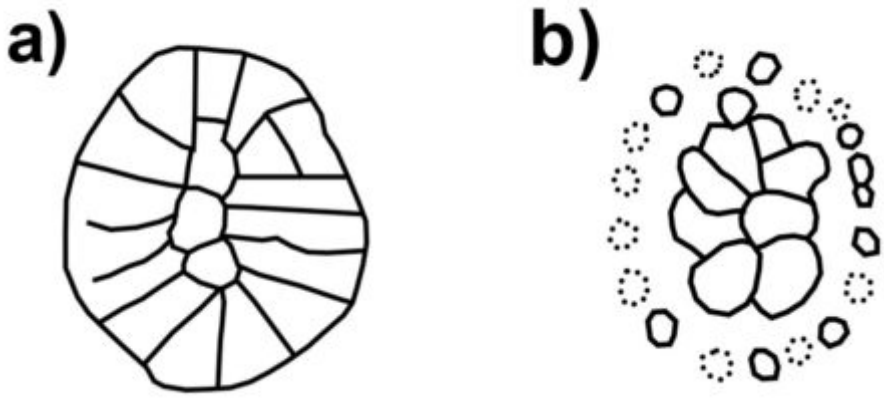

Fig. 9: Line drawings highlighting the differences between a) true "wheels", and b) "encircled enclosure clusters".

Secondly, the lithic typology from each site was analysed in order to date their occupation period. As regards these particular site types, 40% of "encircled enclosure clusters" visited in the first season were found to contain material indicating Late Chalcolithic to beginning of Early Bronze Age occupation (ca. 4400-2900 BC), whereas the true "wheels" mainly exhibited lithics from the Late Neolithic to Early Chalcolithic periods (ca. 6900-4400 BC). This could begin to indicate a significant temporal difference between varieties of "wheels" formerly grouped together as a single type. Further work is needed to confirm this hypothesis, however. To increase precision, the second survey season took samples for Optically-Stimulated Luminescence (OSL) dating. This method accurately dates when material was last exposed to sunlight. By collecting soil at night from underneath the lowest course of walls of stone structures in the Harra, a proxy date for their construction can be obtained (see Athanassas et al. 2015). The analysis of these samples is to be conducted over the next few months, and is hoped to significantly aid in building the desired site/date correlation typology.

As well as academic presentations and publications, the Western Harra Survey is keen to disseminate its goals and results toa broad public. One exciting way in which this will be achieved is through the production of three-dimensional models of sites and artefacts from the fieldwork. A photogrammetric method used by team member

David Burke during the second season allows for the construction of such 3-D visualisations from simple photographs, processed by modelling software that has only recently become affordable to individual researchers. These will appear in the near future on the project's YouTube channel at http://bit.ly/WHS_YouTube. Video presentations about the ongoing work will also be uploaded there in due course. Meanwhile, updates, photographs, and links to publications can be found on the Facebook page at http://bit.ly/WHS_Facebook. It is hoped that this combination of state-of-the-art recording and modern outreach methods will allow the Western Harra Survey to flourish as a holistic research project.

Acknowledgements

The Western Harra Survey is a co-directed project between the author and Dr. Marie-Laure Chambrade of Archéorient. The fieldwork has been made possible by funding from the National Geographic Society (2015 season) and the Curtiss T. Brennan & Mary G. Brennan Foundation, managed by Archéorient and CNRS (2017 season). Thank you to all additional team members: Anne Binder, Lanah Haddad, Nina Mann (2015 season); David Burke, Imad Alhussain (2017 season). Thanks also go to the Department of Antiquities of the Hashemite Kingdom of Jordan, in particular HE Monther Jamhawi, Aktham Oweidi, Ahmad Lash, and Aisar Radaydeh. This research is associated with the author's postdoctoral project "Human Adaptation in Climatically Marginal Environments of late-5th to 3rd Millennium BC Syria and Jordan", which has received funding from the Research Foundation – Flanders (FWO) and the European Union's Horizon 2020 research and innovation programme under the Marie Skłodowska-Curie grant agreement No 665501.

References

Akkermans P. M. M. G., Huigens H. O., Brüning M. L. 2014. A landscape of preservation: Late prehistoric settlement and sequence in the Jebel Qurma region, north-eastern Jordan, Levant 46/2, 186-205.

Athanassas C. D., Rollefson G. O., Kadereit A., Kennedy D., Theodorakopoulou K., Rowan Y. M., Wasse A. 2015. Optically stimulated luminescence (OSL) dating and spatial analysis of geometric lines in the Northern Arabian Desert, Journal of Archaeological Science 64, 1-11.

Betts A. V. G. 1998. The Epipalaeolithic Periods, in: A. V. G. Betts (ed.) The Harra and the Hamad: Excavations and Survey in Eastern Jordan, Sheffield, Sheffield Academic Press (Sheffield Archaeological Monographs, 9), 11-35.

Frumkin A., Bar-Matthews M., Vaks A. 2008. Paleoenvironment of Jawa basalt plateau, Jordan, inferred from calcite speleothems from a lava tube, Quaternary Research 70/3, 358-367.

Galiatsatos N., Wilkinson T. J., Donoghue D., Philip G. 2009. The Fragile Crescent Project (FCP): Analysis of Settlement Landscapes using Satellite Imagery, CAA 2009: Making history interactive, Williamsburg, VA, 22-26 mars. [En ligne] http://dro.dur.ac.uk/6909/

Kempe S., Al-Malabeh A. 2010. Hunting kites ('desert kites') and associated structures along the eastern rim of the Jordanian Harrat: a geo-archaeological Google Earth images survey, Zeitschrift für Orient-Archäologie 3, 46-86.

Kennedy D. 2011. The "Works of the Old Men" in Arabia: remote sensing in interior Arabia, Journal of Archaeological Science 38/12, 3185-3203.

Maitland P. 1927. The 'Works of the Old Men' in Arabia. Antiquity 1/2, 197-203.

Müller-Neuhof B. 2014a. A 'marginal' region with many options: the diversity of Chalcolithic/Early Bronze Age socio-economic activities in the hinterland of Jawa, Levant 46/2, 230-248.

Müller-Neuhof B. 2014b. Recent research on the Late Prehistory of the arid regions in Jordan, Levant 46/2, 151-160.

Rollefson G., Rowan Y., Wasse A. 2014. The Late Neolithic colonization of the Eastern Badia of Jordan, Levant 46/2, 285-301.

Smith S. L. sous presse. The View from the Steppe. Using Remote Sensing to Investigate the Landscape of « Kranzhügel » in Its Regional Context, in: D. Lawrence, M. Altaweel, G. Philip (éds.) Studies in Honor of Tony J. Wilkinson. New Agendas in Remote Sensing and Landscape Archaeology in the Near East, Chicago, The University of Chicago (OIP, á préciser).

L'auteur

Stefan L. Smith est chercheur postdoctoral à l'Université de Gand (Belgique) et bénéficiaire d'une bourse dans le cadre du programme FWO [PEGASUS]² Marie Skłodowska-Curie. Son sujet de recherche, intitulé "Human Adaptation in Climatically Marginal Environments of late-5th to 3rd Millennium BC Syria and Jordan", examine les établissements humains des époques Chalcolithique final et Bronze ancien dans les régions arides et semi-arides du nord-est de la Syrie, de la Syrie centrale et du nord-est de la Jordanie.

Pour citer ce billet : Stefan L. Smith. Surveying the Black Desert: Investigating Prehistoric Human Occupation in North-Eastern Jordan, *ArchéOrient - Le Blog*, 3 novembre 2017, **[En ligne] https://archeorient.hypotheses.org/7882**