

Field Report from 'Uqdat al-Bakrah 2023 Field Season

A pivotal season of fieldwork was undertaken in 2017 by the Archaeological Water Histories of Oman (ArWHO) project team, involving geophysical survey using Ground Penetrating Radar (GPR) with a 400 MHz antenna. This work allowed the discovery of many new subsurface pits as well as the identification of a shallowly buried channel-like feature with a northeast / southwest trajectory, which has been interpreted as a paleochannel (Wiig et al. 2018). The continuation of this fieldwork followed in 2018 when the ArWHO team excavated four areas in order to verify the GPR data and associated Synthetic Aperture Radar interpretations. These excavations support the hypothesis that the pits were used for charcoal production as well as possibly secondary metal production and the interpretation of the paleochannel was confirmed (Harrower et al. 2018).

The object of this season's work at 'Uqdat al-Bakrah was to test a custom experimental 330 MHz GPR pulled by a robotic Rover (Figure 1) across a broader area in order to better define the site boundaries and find any additional subsurface features. Due to the remoteness of 'Uqdat al Bakrah, we camped in the desert (Figure 2) and recharged the rover and GPR with a portable battery that could be charged from the vehicle.

Unfortunately, a number of difficulties were encountered during the fieldwork. Despite the thought and preparation put into the Rover system, it turned out to not be robust enough for the desert environment. The Rover itself required either more power and/or a lighter GPR sled to turn corners sufficiently and power through loose sand. The sled design did not stand up well to abrasion and requires a thicker plastic bottom and more rounded front edge. There were several issues with the GPS: it did not space the transects evenly, did not create a tracklog for later viewing and most importantly did not collect spatial data during the transects, although this was not known until later. In addition, despite the proliferation of chargers and batteries, they were not adequate for the task.

However, we were able to collect 0.8 ha of GPR data (Figure 3), some of which is from the previous GPR survey area and some over new ground. Although the GPS was not working properly, the data has been uploaded into a cloud-based processing platform for analysis and in theory our GPR specialist should be able to rectify the data for analysis.

It is hoped that a future student will take on the project of rebuilding the Rover system as it became obvious that it is possible to collect large amounts of GPR data in less time and with less physical effort using the Rover if it can be made suitable for the desert environment. Although the battery and charging issues could be mitigated with additional backups and more power, this season of fieldwork showed that the best use of time would not entail camping in the desert, but instead driving to the site each day which would allow all parts of the system to be fully charged every day back at the accommodation.



Figure 1. GPR Rover System



Figure 2. Camping in the desert at 'Uqdat al-Bakrah



Figure 3. Transects with the GPR Rover system