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## Reports

- An inscribed basin of the 18<sup>th</sup> dynasty (reign of Amenhotep III) from the fortress of Shalfak in Lower Nubia** 1  
W. Vivian Davies
- Angareeb-bed production in modern Nubia: Documenting a dying craft tradition** 11  
Manuela Lehmann
- The biocultural heritage and historical ecology of date palm cultivation in Nubian villages, northern Sudan** 24  
Philippa Ryan, Mohammed Hassan, Mohamed Saad, Marcus Jaeger, Caroline Cartwright, Dorian Fuller and Neal Spencer
- The archaeological and heritage survey of the Northern el-Mahas region. First season's report (2020)** 40  
Abdelrahman Ibrahim Said
- Preliminary report for the Western Desert of the Third Cataract Region Project (Wadi Gorgod - first season 2018-2019)** 49  
Hamad Mohamed Hamdeen, Altayeb Abdalla Hassbrabo, Safa Gamal Idres, Samar Salah Mustafa, and Fatima Idris Mahmoud
- Starting anew at Old Dongola** 67  
Artur Obłuski and Dorota Dzierbicka
- From development displacement and salvage archaeology in Nubia to inclusive sustainable heritage and development crafting in Old Dongola** 82  
Peter Bille Larsen
- Dialogue Community Project in Old Dongola (2019-2021)** 95  
Tomomi Fushiya
- Wadi Abu Dom investigations: El Rum Oasis** 108  
Tim Karberg and Angelika Lohwasser
- Goldmines, nomad camps, and cemeteries: The 2018 season of the Atbai Survey Project** 121  
Julien Cooper
- Archaeological report on the excavation of a post-Meroitic necropolis at el-Madanab (Shahid Rescue Archaeological Project)** 135  
Fakhri Hassan Abdallah, Romain David and Iwona Koziaradzka-Ogunmakin
- The archaeological site of Damboya in the Shendi Reach. Second season** 154  
Marc Maillot
- Building E at Damboya, second season** 168  
Gabrielle Choimet
- (Re)examining the tomb of Queen Yeturow at Nuri** 184  
Meghan E. Strong, Susan Doll, Fakhri Hassan Abdallah, Helen O'Brien, Simone Petacchi, Abigail Breidenstein and Pearce Paul Creasman
- Dental insights into the biological affinities of the inhabitants of Gabati over a period of cultural transition** 195  
Emma L. W. Phillips, Joel D. Irish and Daniel Antoine
- Jebel Hawrā, a new archaeological site in Eastern Sudan** 209  
Enrico Giancristofaro

## Studies

**Was the individual buried in MOG012.4 a Christian, a pagan, or both? Evidence for the appropriation of Christianity from a Late Antique-Early Medieval tumulus grave on Mograt Island** 221  
Claudia Näser, Alexandros Tsakos and Jens Weschenfelder

**After ‘InBetween’: Disentangling cultural contacts across Nubia during the 2<sup>nd</sup> millennium BC** 230  
Aaron de Souza

**Skeuomorphism in Kerma metal vessels** 243  
Carl Walsh

**Heart scarabs and other heart-related objects in New Kingdom Nubia** 252  
Rennan Lemos

***Sheikh and Melik* 1925: A short note** 270  
Paul T. Nicholson

**Book reviews** 274

## Obituaries

**Peter MacKenzie Smith (1946-2020)** 279

**Professor Abdelgadir Mahmoud Abdallah (1937-2021)** 279

**Sandro Salvatori (1948-2020)** 280

**George Hart (1945-2021)** 283

**Biographies** 284

**Miscellanies** 289

Front cover. Cattle and two goats\gazelle from Site GRD-14 in the Wadi Gorgod (photo Hamad Mohamed Hamdeen).

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# Wadi Abu Dom investigations: El Rum Oasis

Tim Karberg and Angelika Lohwasser

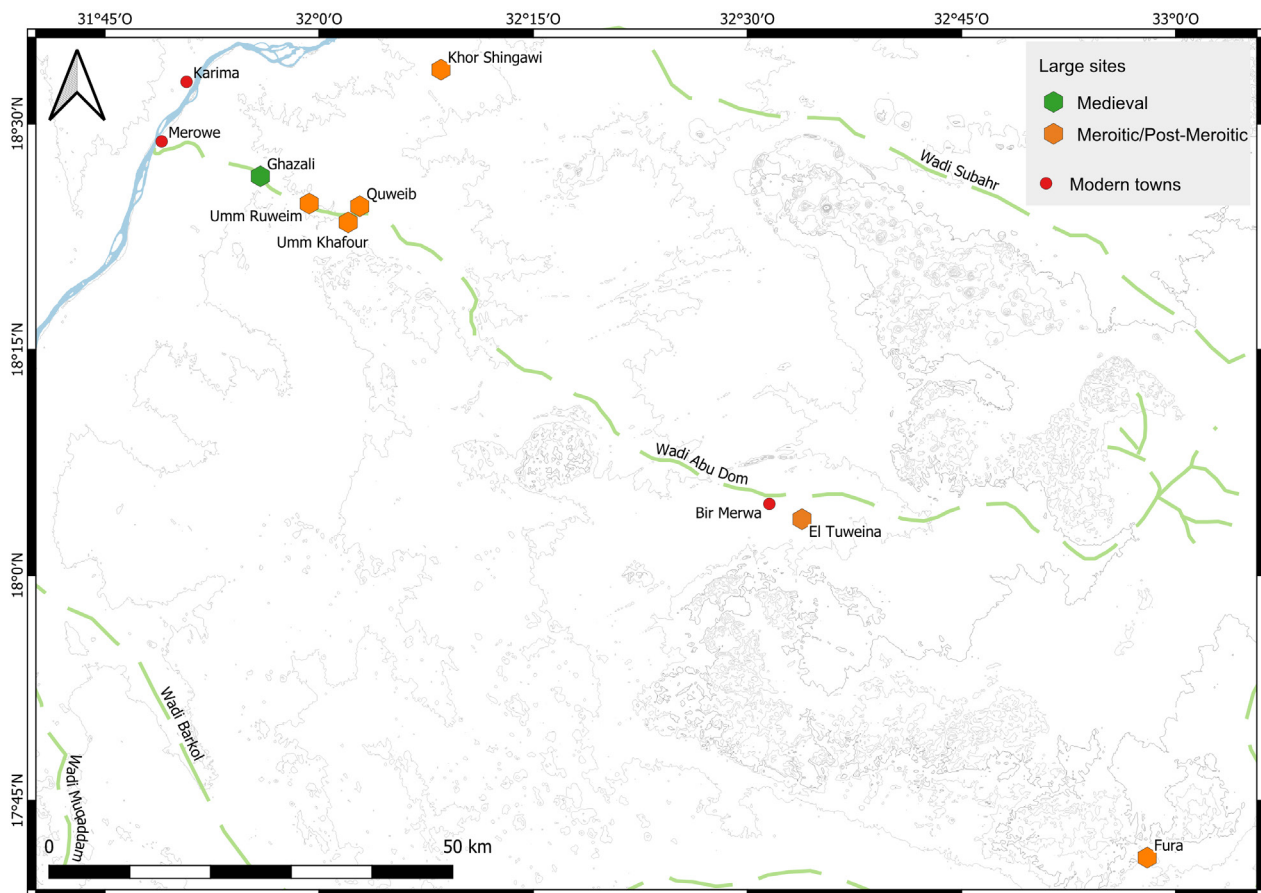


Figure 1. Map of the central Bayuda (map: Tim Karberg; terrain data: ALOS DSM, © JAXA).

## Introduction

The micro-oasis of El Rum is situated in the lower Wadi Abu Dom, on the western edge of the Bayuda desert. It can be seen as a transitional area between the immediate hinterland of Napata and the peripheral rangelands in the interior of the great Nile bend of Abu Hamed.

Since archaeological material recorded around the oasis of El Rum indicates that it was inhabited from at least the Meroitic period, but also during the Middle Ages, it might have been connected with the Kushite urban centre around Napata and Jebel Barkal (especially the town of Sanam on the eastern bank of the Nile) as well as the early Makurian centre established subsequently around the sites of Tangasi and Zuma (Figure 1).

Surprisingly, neither the detailed archaeological survey of the banks of the Wadi Abu Dom and its immediate hinterland (Karberg and Lohwasser 2018; Karberg and Lohwasser 2019) nor the wide-meshed overview survey of the Bayuda in general (Paner 2018; Paner and Pudło 2010) revealed any archaeological material from the Napatan or Meroitic cultures. Cultural remains of the Christian culture of the Makurian period are very limited, and in most cases restricted to the immediate vicinity of the monastery of Ghazali situated downstream of the Wadi Abu Dom from the El Rum oasis, close to the Nile. The degree of Christianisation of the Bayuda rangelands is questionable: although there are Christian customs like box grave cemeteries documented into the central Bayuda, there are no traces of elaborate Christianity like churches or inscriptions with a religious content (Eger *et al.* 2019). Nevertheless, the 1<sup>st</sup> millenniums

BC and AD are clearly visible through cemeteries, and thus one can by no means assume an absence of population, although no evidence of kingship or elites – especially temples or scripts – have been found so far. In this respect, the Bayuda contrasts clearly with the Keraba region east of the Nile, where evidence of Meroitic core culture (like stone temples and urbanised settlements) can be found reaching far into the hinterland. There is nothing comparable yet recorded in the Bayuda. Although the structures at Umm Ruweim, Quweib, Umm Khafur, Khor Shingawi, El Tuweina and Fura are worth mentioning, none of them can be assigned as a Meroitic temple or palace. Whatever these structures were, they cannot be compared with the temples of Amun or lion temples known from the Nile Valley or the Keraba. Therefore, there must have been reasons that the Bayuda played a far more peripheral role than the eastern hinterland of the Nile, and we conclude that the Bayuda was not politically and ritually dominated by the Meroitic royal house. This is consistent with observations handed down by ancient writers. After describing the inhabitants on the right bank of the Nile as far as the Red Sea, Strabo (quoting Eratosthenes) stated: ‘To the left of the course of the Nile, in Libya, live the Nubai, a large ethnic group, beginning at Meroe and continuing as far as the bends [of the river]. They are not subject to the Aithiopians but are divided into several peculiar kingdoms.’<sup>1</sup> This clearly shows that several clans or other types of politically organised units were living in the northern Bayuda and were not subordinate to the royal house of Meroe. Furthermore, it explains that even if it was ethnically one tribe, it was divided into independent petty kingdoms or chiefdoms. This was the situation in the time of Eratosthenes (mid 3<sup>rd</sup> century BC), thus exactly in the Meroitic phase of the Kingdom of Kush. Therefore, at least for this section of the Bayuda, a break in the influence of the respective central states, the Kingdom of Kush – and we argue the Kingdom of Makuria as well – can be assumed in the immediate hinterland of their core areas.

The findings of the survey project now raise the question of whether the inhabitants of the oases and pastoralists of the Wadi Abu Dom, or the Bayuda in general, were representatives of an independent Bayuda culture – i.e. whether the people are to be fundamentally distinguished from the Meroitic or Makurian culture not only politically and ritually, but also culturally. Against the background of the possible co-existence of petty kingdoms, this raises the question of whether the structures in the oasis of El Rum (Umm Ruweim, Quweib and Umm Khafur) and those situated to the north (Khor Shingawi), and southeast (El Tuweina and Fura), can be fundamentally distinguished chronologically, functionally and/or with regard to their suzerainty (Figure 1). Excavations within the Oasis el Rum, especially the investigation of the large structures of Umm Ruweim, Quweib and Umm Khafour, the irrigation installations, and landscape elements of agricultural significance will help to resolve this question.

### **Results of the ‘Wadi Abu Dom Itinerary’ survey (2009–2016) in and around the El Rum oasis**

The El Rum oasis is defined by a basin-shaped widening of the wadi bed, forming a natural ecologically favoured zone, which during its settlement history was at least partly augmented by artificial irrigation from a well system. Since the Wadi Abu Dom drains rain and surface water from its dendritic offspring in the hills of the central Bayuda towards the Nile (with its mouth close to the modern town of Merowe), the surface and ground water resources feeding the oasis depend completely on the hydrological situation in the upper parts of the Wadi Abu Dom and its main tributaries. Therefore, the water supplies for the oasis reflect the climatic circumstances not only of its immediate vicinity, but also the central Bayuda hills as their main rain drainage area.

The quality of the data recorded during the close meshed survey of the Wadi Abu Dom (regarding density as well as consistency) allows for multiple forms of qualitative as well as quantitative processing

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<sup>1</sup> Eratosthenes in Strabo XVII, Ch. 1.2 (quoted after Eide *et al.* 1996, 560, with literal adaptations).

and analysis, enabling us to evaluate the role of the oasis in several respects.

The area of the oasis of El Rum was surveyed in detail between 2009 and 2013. Along the wadi banks and in the immediate hinterland around the oasis, approximately 1500 archaeological sites were recorded (from a total of 8376 sites discovered in the whole Wadi Abu Dom).<sup>2</sup> Regarding the general density of sites and features, the oasis of El Rum exceeds all other areas of the Wadi Abu Dom by several magnitudes: while the general average density of archaeological features along the banks of the wadi is approximately 12 features per square kilometre, it is almost 50 features per square kilometre at the oasis of El Rum and in its direct vicinity. For most categories of archaeological records, the chronology of this finds-concentration of El Rum remains vague, but the more clearly datable archaeological category of burial superstructures allows for at least some assumptions concerning the chronology of El Rum as an ecologically (and therefore also socio-economically) favoured zone.<sup>3</sup>

A comparison of the respective densities of different types of burial superstructure provides a basis to estimate the relative density of the population of the oasis compared to the upper parts of the Wadi Abu Dom. During the 1<sup>st</sup> millennium BC, represented in the Bayuda by different forms of tumuli situated in rocky terrain, cleft burials, and dome graves, the feature density immediately around the oasis is approximately four times higher than in the whole survey area along the Wadi Abu Dom. During the medieval period, mostly represented by box graves and a few specific forms of tumuli, the feature density ratio between the oasis and the Wadi Abu Dom in general is almost the same (~4:1). The most significant deviation can be measured in the flat ‘terrace tumuli’, which are associated with the (late) Meroitic and post-Meroitic period: here, the density of features at the oasis of El Rum is more than 20 times higher than the average of the Wadi Abu Dom in general (whole wadi: ~0.9 tumuli per km<sup>2</sup>; El Rum oasis and direct vicinity: ~22 tumuli per km<sup>2</sup>). This indicates the disparity between the oasis and its desert and wadi hinterland during this period regarding habitation density and, therefore, is presumably when economic productivity reached its peak. This observation, derived from the quantitative analysis of the survey records, corresponds to the fact that during this time, the five main architectural structures to be found around the oasis were probably erected (cf. below). The existence of these large-scale complexes indicated the existence of a stable surplus production during the period of their construction and maintenance, sufficient to support the labour force necessary for the excess workload.

Interestingly, outside the oasis of El Rum only two more large-scale architectural constructions were recorded: the Christian medieval monastery of Ghazali (located downstream from the wadi, close to the Nile in a similar, but smaller, micro-oasis), and the residence of El Tuweina, dated to the late Meroitic period.

There are also other quantitative and qualitative aspects of the archaeological survey record that separate the oasis of El Rum from the other areas of the Wadi Abu Dom. Besides the different general density of burial superstructures from different time periods already mentioned, the internal spatial distribution patterns of these burials differ significantly between the oasis of El Rum and the other parts of the Wadi Abu Dom. Around the oasis, the average number of burials per graveyard is significantly less than in the other parts of the Wadi Abu Dom (especially the middle wadi between Umm Beida and Bir

<sup>2</sup> During the first phase of the survey, all pre-modern anthropogenic remains were recorded, even if it was not possible to determine their exact age and/or function. During the second phase, experiences gained from the first preliminary analyses of the archaeological record from the Wadi Abu Dom enabled us to categorise the archaeological sites and features more clearly, and to record only material with cultural, economic, or socio-historical significance (cf. Lohwasser *et al.* 2014, 178). Nevertheless, all statistical details mentioned in this paper exclude these so called ‘stone features’, and are limited to structures where date and/or specific function could be determined.

<sup>3</sup> Disregarding the fact that the burial traditions in the Bayuda differ from the well-known customs in and around the Nile valley in many respects (cf. Lohwasser and Karberg forthcoming), a rather clearly defined relative chronological succession of different burial styles can at least be estimated.

Merwa). Three out of four exceptionally large terrace tumuli graveyards (~50 or more tumuli) are situated on the banks of the middle Wadi Abu Dom outside the oases. Interestingly, the only large terrace tumulus cemetery of the lower Wadi Abu Dom (~65 tumuli) is situated directly opposite the large buildings of Umm Ruweim on the opposite southern bank of the wadi – nevertheless, the exact character of the connection of this cemetery site with the large architectural structures at the opposite bank still remains unclear, and will be investigated in more detail in the future. Globally, the fact that the burial places directly around the oasis of El Rum seem to some extent to be decentralised, while more centralised and concentrated in the other parts of the Wadi Abu Dom, indicates that sedentary lifestyle was more widespread inside the oasis, and groups living outside in the rangelands were more mobile.<sup>4</sup>

However, these observations, indicating a settlement density and productivity peak during the Meroitic and post-Meroitic period, are to some extent contradicted by the pre-modern wells observed so far.

Wells are a category of archaeological features with particular significance for the reconstruction of the diachronic ecological and socio-economic development of the oasis (Figure 2). Qualitatively, the pre-modern wells of the oasis differ significantly from the wells recorded in the middle and upper Wadi Abu Dom. Inside the oasis, most wells are lined with a rather elaborate stone construction, providing two platforms at different levels. The presence of these platforms as well as the diameter of the wells are specific to the irrigated agricultural and horticultural land within the oasis, and are obviously adapted to continuous water delivery. In the rangelands besides the middle and upper Wadi Abu Dom, wells look completely different, consisting of a single, stone lined, comparably narrow cylindrical shaft. Wells of this

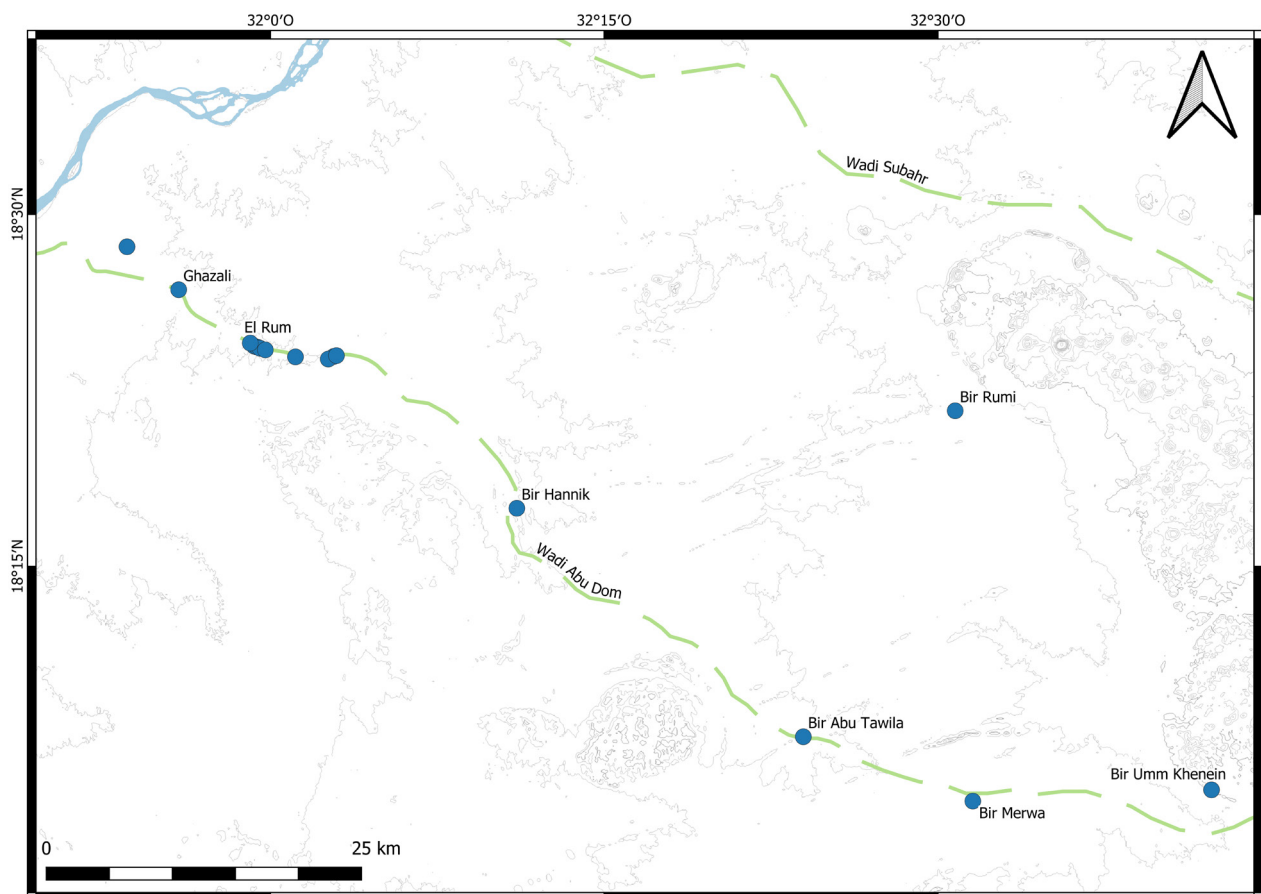


Figure 2. Wells in and around the Wadi Abu Dom (map by Tim Karberg; terrain data: ALOS DSM, © JAXA).

<sup>4</sup> Cf. the ideas of Rebecca Bradley (Bradley 1992) about the difficulties concerning the visibility of pastoral, non-sedentary groups in the archaeological record.

type serve the requirements of pastoral users better, since they are narrow enough to lift water without technical assistance by a simple construction consisting of a bucket attached to a rope and threaded over a beam of local acacia wood. Not only does the different construction of these wells indicate their significance for the oasis, but so does their number: from the 14 pre-modern wells recorded in the Wadi Abu Dom and its drainage area, nine are situated within the small area of the oasis of El Rum. Nevertheless, the first preliminary insights into the chronology of the well-based irrigation in El Rum contradict the observation of the archaeological features, and therefore presumably the population and productivity peak during the Meroitic and post-Meroitic period. In particular, soundings in the debris cones around the wells provided large amounts of finds dating to the medieval period, but, so far, no older material. This led to the working hypothesis that the construction of the wells only became necessary when the general productivity of the oasis was already declining, due to the decreasing accessibility of surface water. But, because this hypothesis is based only on solitary test soundings, systematic excavations around the wells, as is intended during the ongoing 'El Rum Oasis Project', could potentially change this view.

### The 'El Rum Oasis Project'

After completing the Wadi Abu Dom survey and the subsequent excavation of the residence building at El Tuweina, the detailed archaeological investigation of the oasis of El Rum developed as a follow-up project. Its activities focus on the diachronic development of the oasis as an ecologically favoured zone and its effect on the political, cultural, and socio-economic history of the region. The project is based on three pillars: the clarification of the chronology and function of the large buildings around the oasis (starting with Umm Ruweim); reconstruction of the development of land use (mainly by analysing the pre-modern wells); and large-scale landscape archaeological investigations in order to clarify the diachronic biogeographical and climatic changes affecting the oasis' economic productivity.

#### Large-scale architecture<sup>5</sup>

The structures at Umm Ruweim 1 and 2 have been known since the 1950s.<sup>6</sup> First sketched by H. N. Chittick and P. L. Shinnie in 1955, Lenoble produced an improved plan in 2004 (Lenoble 2004). After the first preliminary soundings were carried out in 2011 (Eigner and Karberg 2011), extensive excavations started in spring 2020 (Karberg *et al.* 2020). A late and/or post-Meroitic date for the building was already indicated by C<sup>14</sup> dates from punctual soundings (Eigner and Karberg 2011, 81-82). For the other large buildings around El Rum, only indirect indications of a similar date were documented: besides the buildings of Umm Ruweim 2 and Umm Khafour, box grave cemeteries dating to the Christian medieval period were obviously erected using wall debris from the buildings (Eigner and Karberg 2012, 58), and at Quweib comparable architectural design features indicate a connection with the building of Umm Ruweim 1 (Eigner and Karberg 2012, 52-55). Additionally, the smaller building at Umm Ruweim 3 shows some similarities in construction techniques with the building of El Tuweina, which has been dated from C<sup>14</sup> analysis and excavated material to the late Meroitic period (Eigner and Karberg 2013, 57-58).

After the first extensive excavation campaign, the function of the building of Umm Ruweim 1 still remains unclear. It cannot be interpreted as a military installation – as presumed before (Welsby 2002, 87) – because it lacks clearly identifiable fortification elements like bastions, and its tactically inferior position within the landscape surrounded by hills overlooking and dominating the building. The general layout of the building shows some similarities to Roman watering stations in the Egyptian Eastern Desert (hydreumata); this was already noted by Chittick and Shinnie (Chittick 1955, 90-91) and by Alfredo and

<sup>5</sup> In spring 2020, a first excavation campaign was due to take place in Umm Ruweim 1. Due to the Covid-19 pandemic, it had to be terminated prematurely and an autumn campaign was also cancelled.

<sup>6</sup> For a history of research and preliminary investigations in Umm Ruweim see Lohwasser 2012, 112-116.

Angelo Castiglioni (Negro *et al.* 2006, 416). But the courtyards of the building show no traces of a well, and water is easily available from the nearby Wadi bed, so there is little to support the interpretation of the structure as a *hydreuma*.<sup>7</sup>

One of the major objectives of the ‘El Rum Oasis Project’ is the clarification of the chronology and function(s) of the building. The aim is to investigate building history and internal chronology – including the search for earlier buildings and evidence of possible medieval reuse. Subsequently, the insights are to be augmented and contextualised with the other large-scale buildings around the oasis. Do they serve the same function, but differ in their chronological position? Or do the buildings serve the same function, but belong to different spheres of power and access rights? Or are they roughly contemporaneous, but differ in function? In addition to direct architectural-archaeological indications, landscape archaeological questions will help to clarify the working hypotheses of chronological succession or functional differentiation of these buildings, or their possible role of competing manifestations of rivalling emanations of power.

Umm Ruweim 1 measures roughly 75x65m and consists of two rectangular segments and a third central building. A number of very small windows can be regarded as for ventilation of the rooms. These elongated rooms could be interpreted as living quarters as well as storage rooms. Thus it could be seen as a complex with a primary economical function (like storage and re-distribution of goods), or as an elite settlement. A massive platform within the central complex might hint at an ideological or ritual function of this part of the building (Figure 3).

Our first excavation focused on the central courtyard and the western central casemate of Umm Ruweim 1 (Karberg *et al.* 2020). Within the parts of the building excavated so far, we have documented one

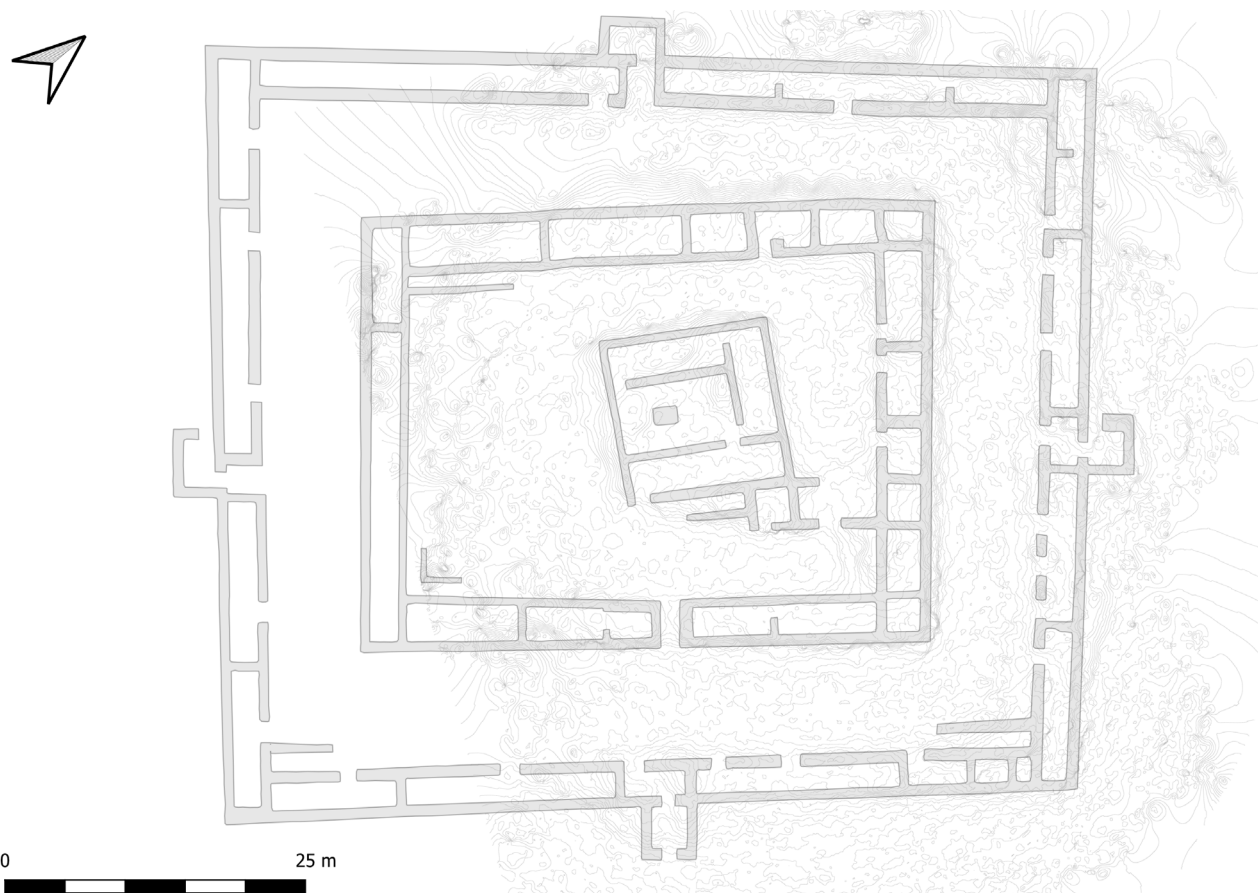


Figure 3. Ground plan and digital terrain model of Umm Ruweim 1 (plan and model by Tim Karberg).

<sup>7</sup> See Sidebotham 2003, for the general appearance of *hydreumata* in the Eastern Desert.



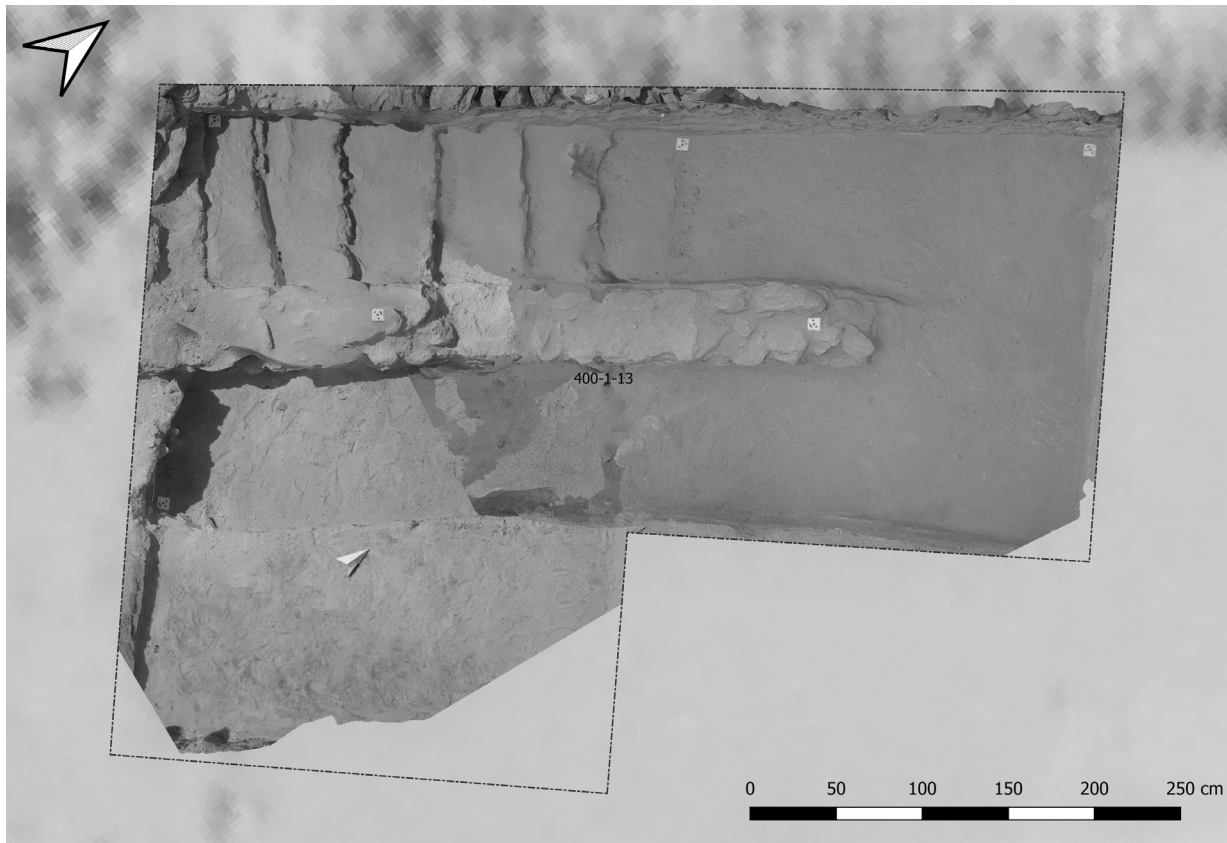


Figure 4. Orthophoto of stairs at Trench 400-1-13, spring campaign 2020 (orthophoto by Tim Karberg; trench photos by Loai Shamsalola).



Figure 5. Stamped ceramic from Trench 400-1-8 (photo by Angelika Lohwasser).

construction phase and two primary usage phases, as well as some later squatter occupation. It became clear that the central building was erected contemporarily with the central casemate walls. In the first primary usage phase, lightweight architecture was present inside the central courtyard documented by dense post-hole settings, while during or at the end of the second primary usage phase, a large scale fire occurred. Secondary squatter occupation phases are characterised by wall debris and remains of animal herding. The stairs in the western corner of the central casemate wall were erected contemporarily with the wall structure (Figure 4). Their purpose remains unclear, since no traces of a second storey of the building were recorded. The terraced rooms of the central casemate were filled intentionally with rubble and settlement debris.

The finds, especially the pottery and animal bones, have not yet been processed. However, after a first cursory inspection of the pottery, it can be noticed that some of the sherds bear impressed stamps (Figure 5). While these are not Meroitic fine ware sherds and the stamps identified so far are not instruments specially made for decorating pottery, but rather simple tools used to make regular impressions, this type of decoration is nevertheless remarkable and resembles vessels found at the 4<sup>th</sup> Cataract (el Tayeb 2012, fig. 30). Remains of paint occur on two sherds (a white *ankh* on a red ground), which have parallels

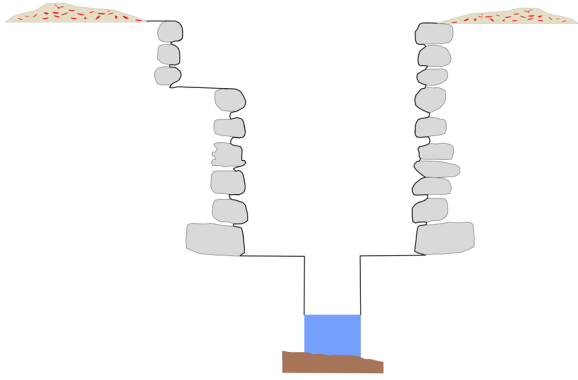


Figure 6. Schematic drawing of an oasis well with debris cone (drawing by Tim Karberg).



Figure 7. Re-used ancient oasis irrigation well at El Rum (photo by Harriet Berkhahn).



Figure 8. Bir Umm Kheinein, typical pastoralists' well at the upper Wadi Abu Dom (photo by André Beuger).

in the Nile Valley.<sup>8</sup> We cannot yet use these sherds to determine whether this indicates the presence of Meroitic inhabitants of the Nile Valley or not, since it is still uncertain whether the pottery is actually from the Nile Valley or the sherds are imitations from the Bayuda. In any case, it suggests that there may have been an earlier habitation phase inside the building or nearby, not yet identified in the architectural record. From the same context, remains of small animal figurines were found, which are similar to several examples of (especially cattle) figures made of unburnt clay from El Tuweina, indicating a cultural link between different parts of the Wadi Abu Dom.

### Wells

Besides the excavation of large-scale architecture, understanding their embedding in various micro- and macro-ecological and -economical contexts is also an aim of our investigations, especially the water supply. The selective archaeological and pedological investigation of wells carried out so far will be continued and expanded. The wells were apparently decommissioned for a long time (Gleichen 1905, 179-180), but were put back into operation during the 20<sup>th</sup> century, likely between 1975 and 1984 (see below). We have already sampled the debris cones from some wells. During the ongoing field project, systematic excavation of the debris cones and in the vicinity of the wells is intended to clarify whether the oasis of El Rum was irrigated by wells during its peak of activity in the Meroitic and post-Meroitic period, or whether the construction of the wells was, on the contrary, the result of an attempt to slow an already decreasing productivity of the oasis between late antiquity and the medieval period (Figures 6-8).

### Landscape archaeology

Besides the ground investigations at and around the wells, large scale landscape archaeological investigations complement the geo-archaeological aspects of the project. Pedological drillings inside

<sup>8</sup> Adams (1986, vol. 1, 270) presents the *ankh*-sign as a 'distinctive representational design' of the Meroitic style N.1A.

the oasis and its vicinity are planned, but have not yet been conducted. Therefore, the first results of the landscape archaeological component can only be based on satellite data.

The survey results acquired during the Wadi Abu Dom Itinerary project are contextualised with different digital terrain models. For the entire Bayuda and therefore the complete catchment and drainage area of the Wadi Abu Dom, the ALOS DTM (available from the Japanese Space Agency JAXA) provides the most accurate and up-to-date digital terrain model freely available, with a resolution of 30m per pixel. Additionally, data from the German radar satellite system TanDEM-X SAR (with a resolution of 12m per pixel) will be incorporated into research on landscape archaeology and historical hydrology in the area.<sup>9</sup>

From the first results, the ALOS DTM shows a comparably low potential of in-flow drainage from the areas north and south of the oasis of El Rum. The drainage potential of the side khors leading from the immediate hinterland of the lower Wadi Abu Dom is far too low for feeding the oasis. Therefore, water to support agricultural activities had to be transported from the rocky areas of the central Bayuda, where alluvial fans – the remains of large quantities of surface water draining from the catchment areas and sealed by base-rock into the Wadi Abu Dom – are clearly visible in satellite imagery. If, as proposed above as a working hypothesis, the construction of wells during the medieval period was a response to decreasing availability of surface water, this former natural water supply during the Meroitic and post-Meroitic activity peak needed to come from floating surface water and therefore would require the Wadi Abu Dom to have seasonal water on a regular basis. Estimation of the previous existence of natural artesian springs or pools in the area of El Rum oasis, allowing access to subterranean aquifers without artificial installations, is contradicted by the fact that – unlike other oases – El Rum is not in a natural

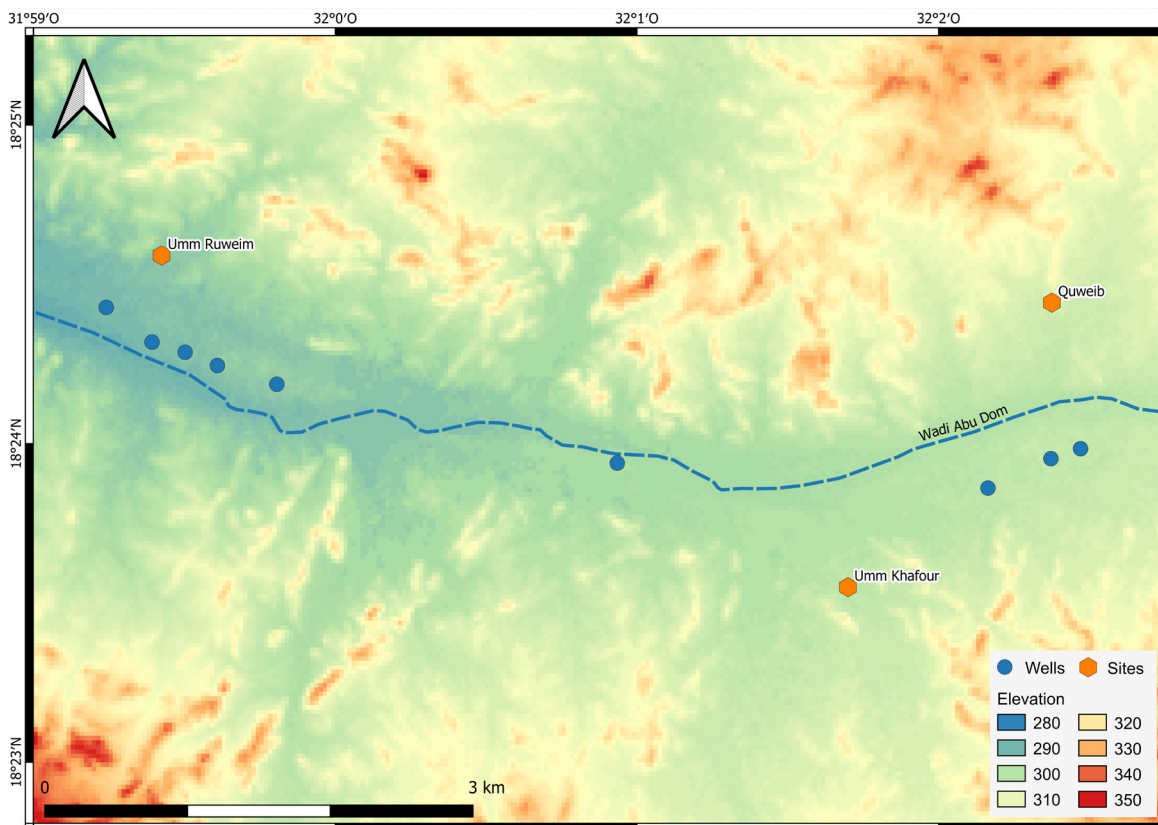


Figure 9. Terrain elevation of the area of El Rum oasis, showing the wadi course gradually sloping down towards the Nile without forming a depression (map by Tim Karberg; terrain data: ALOS DSM, © JAXA).

<sup>9</sup> The first results on landscape archaeology and historical hydrology presented here are to be understood as preliminary. In-depth analysis of the diachronic hydrological development of the area is intended in close cooperation with Patricia Göbel and Patrick Cantauw (Institute for Geology and Palaeontology, WWU Münster).

depression (Figure 9).

In addition to the DTM and satellite-based radar data, multispectral and panchromatic optical satellite imagery provided useful sources for landscape archaeology. The data from the ESA Sentinel-2 satellite system provided multispectral imagery, including near infrared bands, in time slices of around 2 weeks with a resolution of up to 10m (depending on the spectral band). The satellites were launched in 2015 and 2017. For earlier periods, the less accurate data from NASA's Landsat series (which provides multispectral resolutions between 30 and 60m per pixel) had to be used in order to generate middle-ranged timelines for the development of vegetation cover and agricultural irrigation. The Landsat data dates back to 1972, allowing for comparisons with aerial photography from the 1970s provided by the Sudan Survey Office.

Preliminary analysis of this imagery shows that up to 1972, no traces of irrigated agriculture can be found either in the Sudanese cartographical aerial images or the Landsat data. The earliest traces of irrigated fields and gardens at El Rum date from the mid 1970s, starting at the western fringe of the oasis of El Rum near the ruins of Umm Ruweim<sup>10</sup> (Figures 10-13). In 1984, during an exceptional drought all over the Sahel, irrigation was completely interrupted.

In 1988, the irrigated oasis land extended eastwards almost to the wadi bend at Umm Beida. This is perhaps connected to the major flooding in summer 1988.

These preliminary examples of temporary variations in the amount of irrigated land within the oasis demonstrate the possibility of similar, short-term changes in the past. Systematic investigations of this might – together with excavations of the large buildings – help to understand the possible role of other comparable structures within different parts of the oasis.



Figure 10. Irrigated land around El Rum Oasis in 1975 (map by Tim Karberg; data source for vegetation cover classification: Landsat 2 Multispectral Scanner © NASA; terrain data: ALOS DSM, © JAXA).

<sup>10</sup> This corresponds to the description of the spatial distribution of irrigated land in the lower Wadi Abu Dom provided by Gleichen based on data from the late 19<sup>th</sup> century (Gleichen 1905, 178-180).

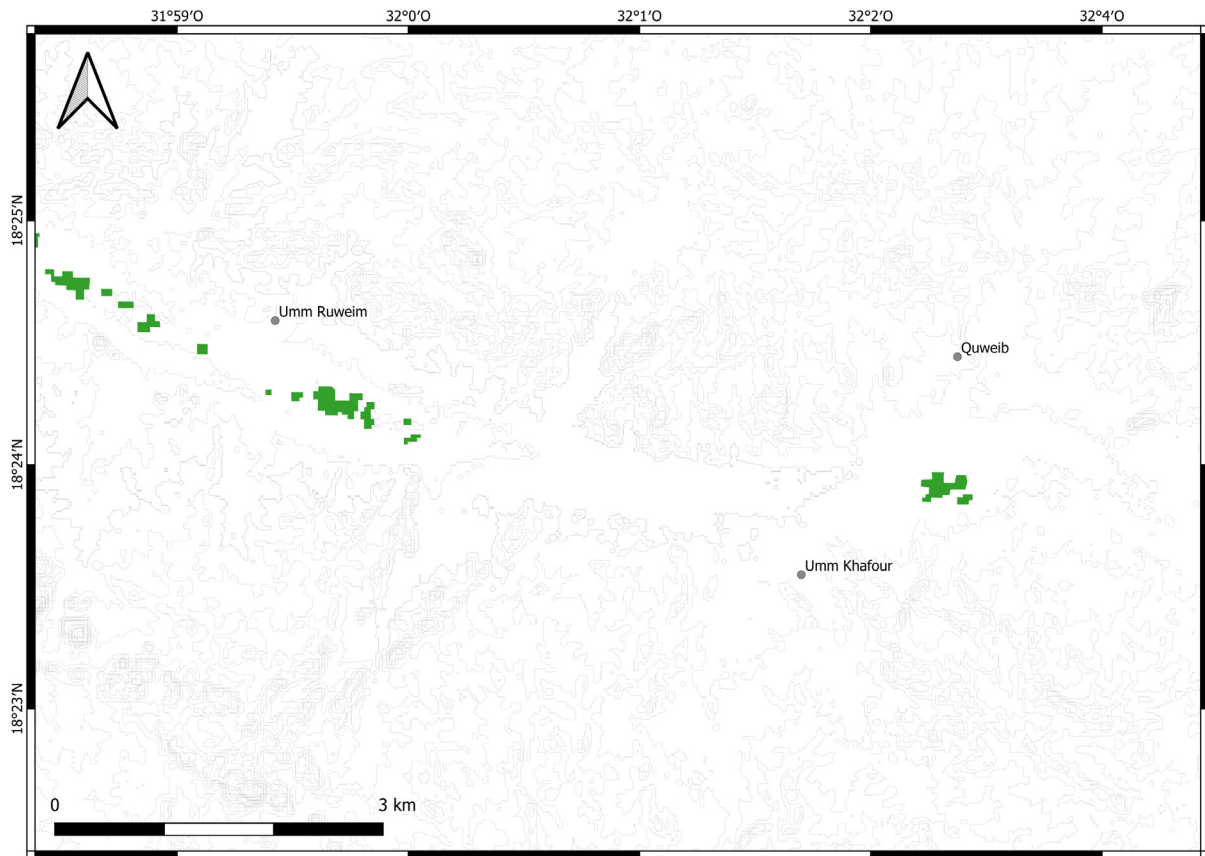


Figure 11. Irrigated land around El Rum Oasis in 1988 (map by Tim Karberg; data source for vegetation cover classification: Landsat 5 Thematic Mapper © NASA; terrain data: ALOS DSM, © JAXA).

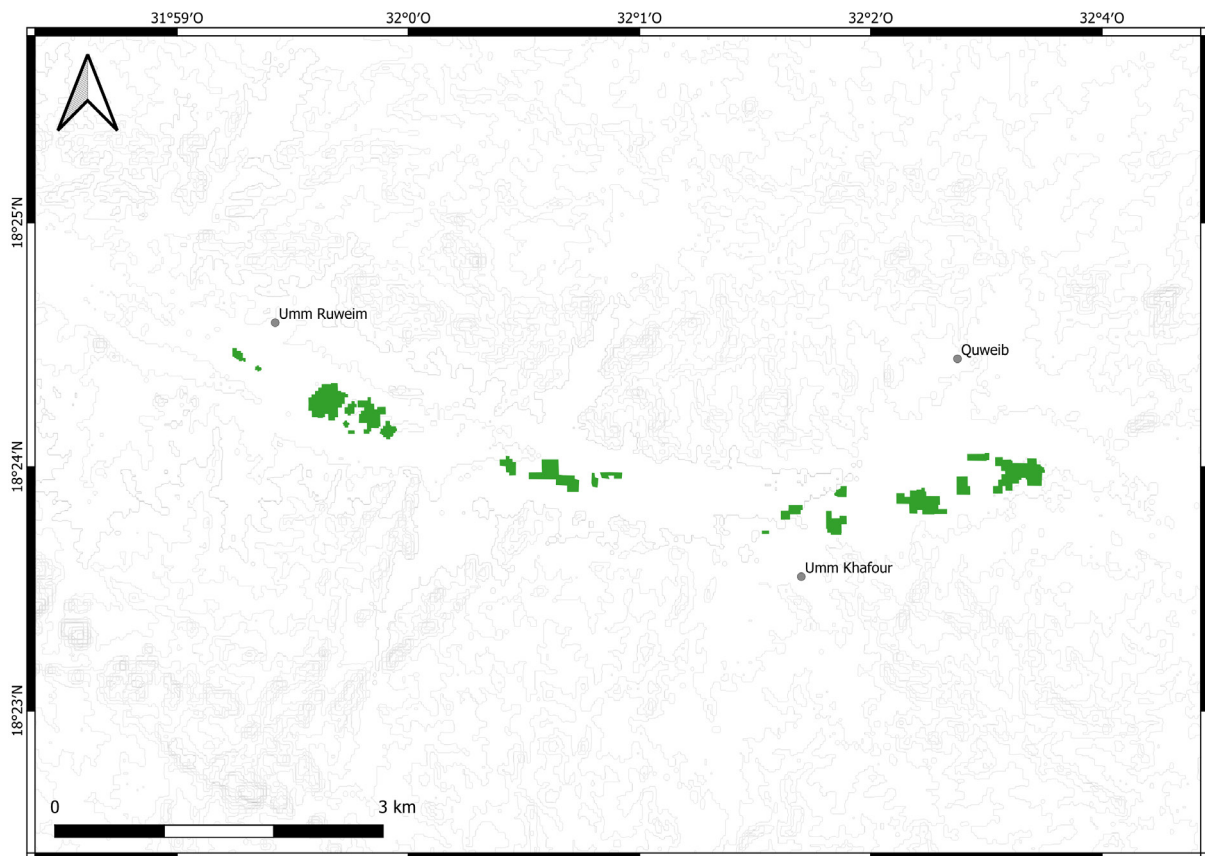


Figure 12. Irrigated land around El Rum Oasis in 2013 (map by Tim Karberg; data source for vegetation cover classification: Landsat 7 Enhanced Thematic Mapper Plus © NASA; terrain data: ALOS DSM, © JAXA).

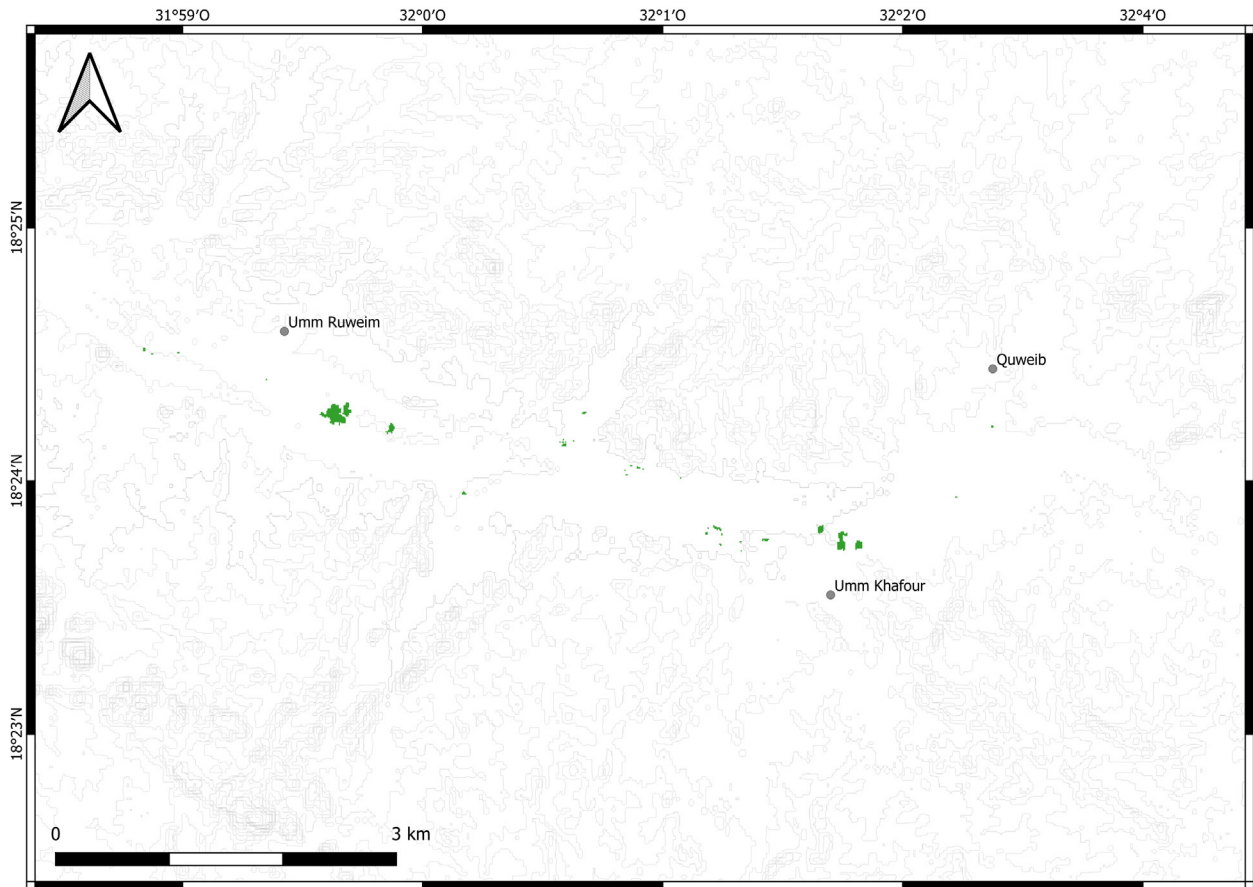


Figure 13. Irrigated land around El Rum Oasis in 2020 (map by Tim Karberg; data source for vegetation cover classification: Sentinel 2A Multispectral Instrument © ESA; terrain data: ALOS DSM, © JAXA).

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