WADI SURA

3

Field Report
Season 2010

University of Cologne

Cologne University of Applied Sciences

Deutsches Archäologisches Institut
Cairo Department

Deutsche
Forschungsgemeinschaft
DFG

“Wadi Sura” is
a joint archaeological project of

University of Cologne (UoC),
Institute of Prehistoric Archaeology and
Heinrich-Barth-Institut e.V. (HBI)

Cologne University of Applied Sciences (CUAS)
Cologne Institute for Conservation Sciences (CICS)

Deutsches Archäologisches Institut (DAI),
Cairo Department

Funded by
Deutsche Forschungsgemeinschaft (DFG)

Cooperation and support:

Egyptian Supreme Council of Antiquities (SCA)

Egyptian Environmental Affairs Agency (EEAA),
Nature Conservation Sector (NCS)

Z+F | 3D Laserscanning
Zoller+Fröhlich GmbH

onefile database + internet application development
Reinhold Goss, Cologne
www.onefile.de

Claudia Gornik Kommunikationsdesign,
Cologne
www.fun-k.de

Kunstwerkfotograf, Jürgen Seidel, Bonn,
www.kunstwerkfotograf.de

Report on the third field season of the Wadi Sura Project (Gilf Kebir, SW Egypt) in spring 2010

Rudolph Kuper, Hans Leisen, Heiko Riemer, Frank Förster, Sabine Krause & Jürgen Seidel

1. Introduction

With the third field campaign in spring 2010, the "Wadi Sura Project" continued the archaeological and conservation studies at Wadi Sura in Egypt's Southwest **(Fig. 1)**. The project which started in 2009 is a joint archaeological mission of the University of Cologne, the Cologne University of Applied Sciences, and the German Archaeological Institute in Cairo, funded by the German Research Council (DFG).

The third field campaign of the Wadi Sura Project took place from March 18 until April 28, 2010. Except for a short break for provisioning, the expedition camp was based at Wadi Sura II (the so-called "Cave of Beasts" discovered by the son of M. Foggini in 2002). Field work was continued in the Wadi Sura II shelter by the rock art recording team and the conservation team, while the survey team explored the eastern part of the survey area under investigation, north of the Wadi Sura I shelter (the so-called "Cave of Swimmers" discovered by L. Almasy in 1933). A four days trip by members of the cooperating EEAA conservation section was carried out to the upper Wadi Hamra and to Wadi Abd el Malik, both which form the northern concession area of the Wadi Sura Project **(Fig. 1)**.
The main objectives of the studies in the Wadi Sura II shelter (A) and the archaeological survey in the surrounding (B) were:

(A) Wadi Sura II shelter:

- Detailed photographic documentation of the rock art at Wadi Sura II
- Geological setting and investigations into rock composition and physical properties
- Mapping of the state of preservation, of the paintings and of traces of alteration
- Non-destructive pigment analysis of paints in the rock art
- Computer-aided rock art recording and test excavation at Wadi Sura II

(B) Archaeological Survey:

- Continued archaeological survey in the Wadi Sura region
- Test excavation and field school at Wadi Sura 10/29-1

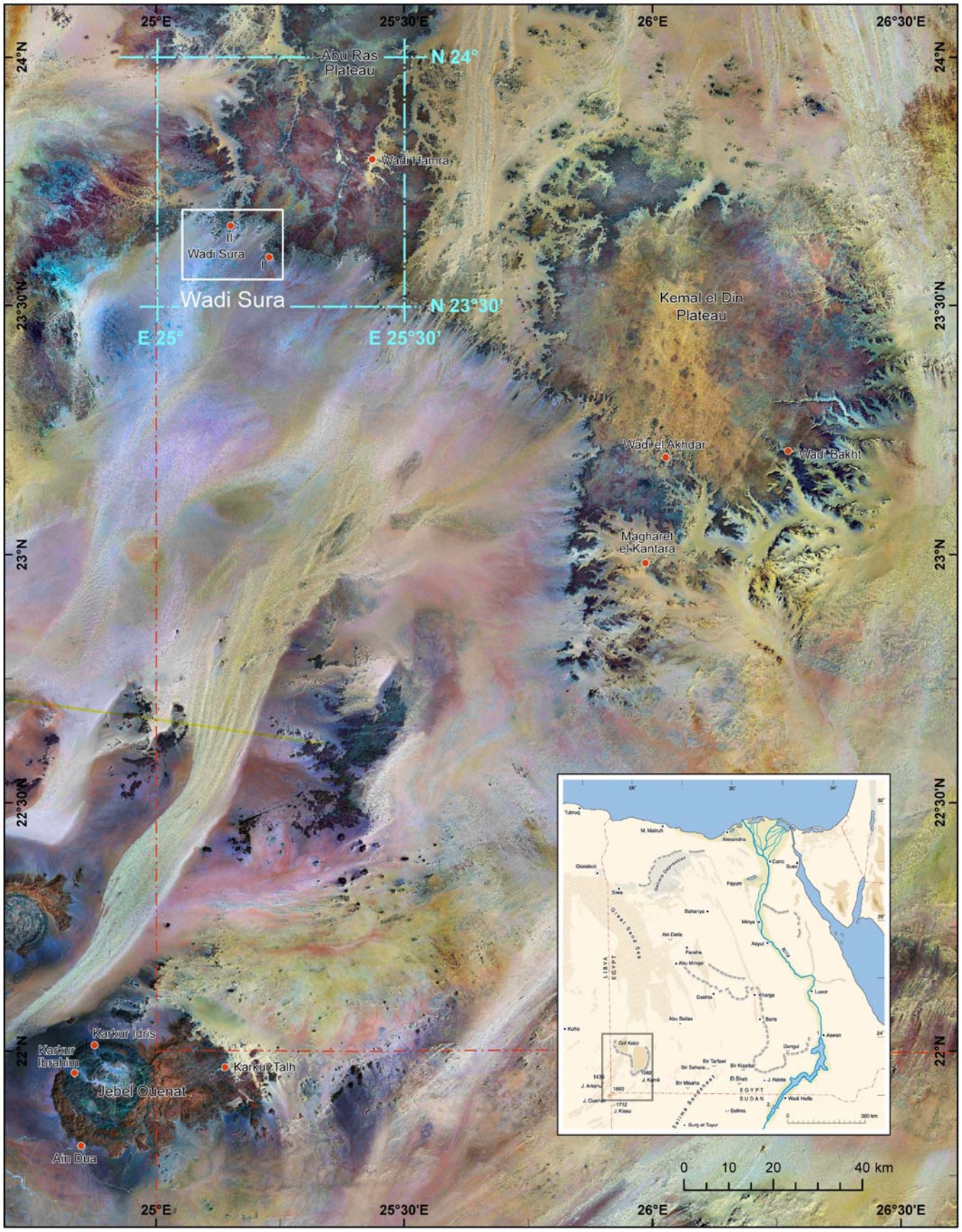
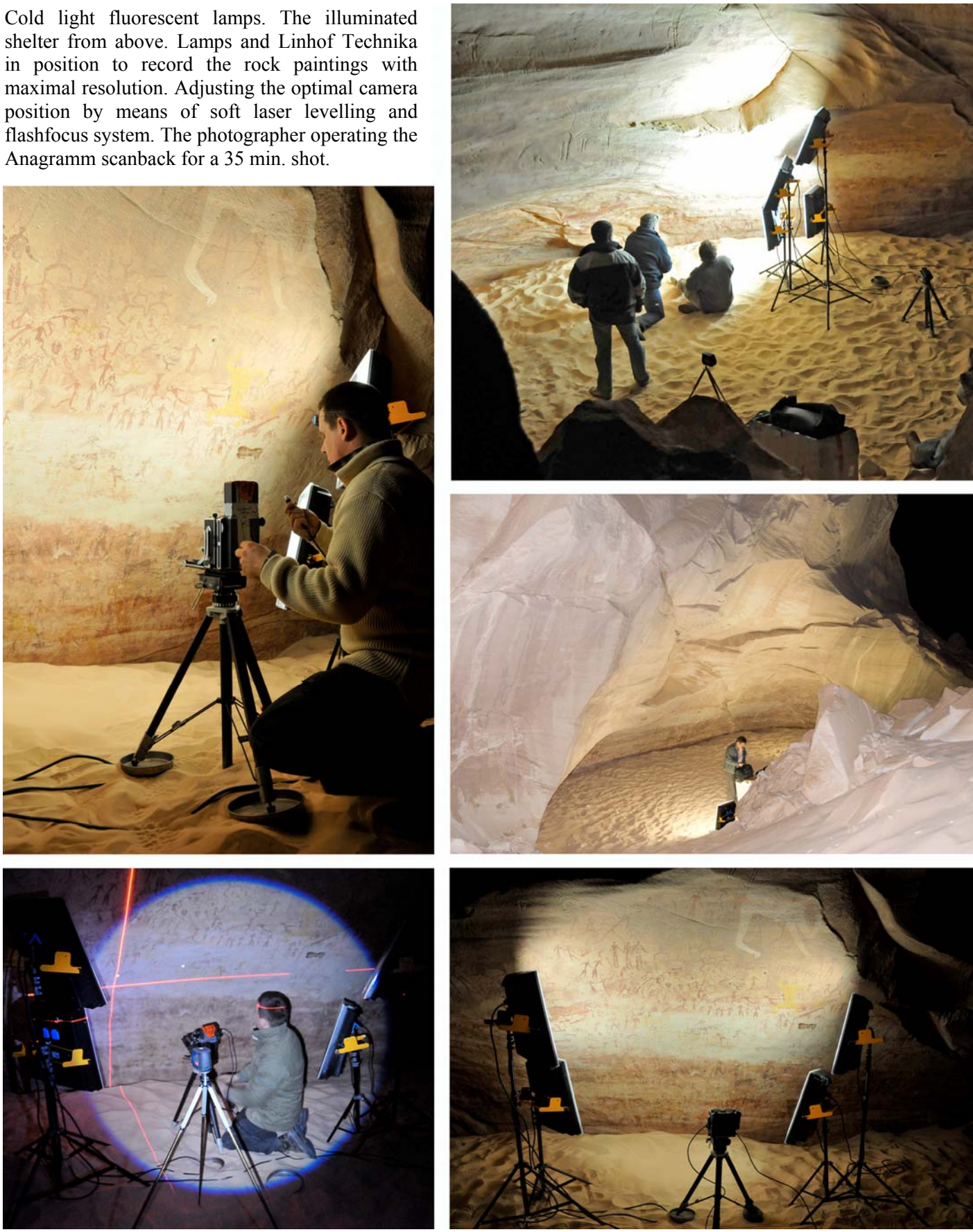


Fig. 1 Satellite map of the Gilf Kebir / Jebel Ouenat region showing the extension of the Wadi Sura Project‘s concession area (pale blue frame), including Wadi Hamra and Wadi Abd el-Malik, as well as the area surveyed in 2009–2010 (white frame).

Fig. 2 Night shots at Wadi Sura II (clockwise from upper right):

Cold light fluorescent lamps. The illuminated shelter from above. Lamps and Linhof Technika in position to record the rock paintings with maximal resolution. Adjusting the optimal camera position by means of soft laser levelling and flashfocus system. The photographer operating the Anagramm scanback for a 35 min. shot.



1. Detailed photographic documentation of the rock art at Wadi Sura II

Having executed the terrestrial 3D laser scanning of the shelter and the surroundings combined with digital photogrammetry in autumn 2009, a detailed photographic documentation with a high resolution photographic system (Linhof Master Technika and digital ANAGRAMM Scanback David²) has been carried out **(Fig. 2)**. The scanback is a digital scanner which provides very high resolution pictures (up to 16,000 x 25,000 Pixel per RGB-channel). Ca. 100 scans cover the whole shelter and have been used for the recording and mapping of the different scientific topics of the project such as: registration of the different figures and scenes and mapping of the state of preservation of the paintings and the supporting rock as well as for the documentation of traces of natural and man-made alterations of the surface such as paint layers, painting technology, scrub marks etc. They will also serve as basis for texturing the 3D model.

2. Geological setting and investigations into rock composition and physical properties

Non destructive tests have been carried out to describe the composition of the stone and its physical behaviour. Stone samples from the surrounding area have been collected to investigate the mineralogy by microscopic analysis. The components of the painting bearing rock are mainly whitish coarse grained quartz; the stones are badly sorted and poorly compacted with only little binder, which explains the low hardness of the material **(Fig. 3)**.

The surface of the shelter is formed by a very thin limonitic crust, easily distinguishable under the microscope **(Fig. 4)**; a surface layer of limonitic iron minerals can be observed as well as the pore filling with limonitic iron in a depth up to 2 millimetres. It can be assumed that iron is enriched in the surface zone of the shelter. This crust builts up the solid layer under the painted rock art.

Some non and low destructive tests concerning thephysical and mechanical behaviour of the sandstone, such as water absorption with the so-called ‘Karsten Pipe’, drilling resistance tests and measurements with ultra sound equipment, have been executed in the surrounding (outside) of the shelter and on stone samples of fallen blocks **(Fig. 5)**.

The sandstone is very porous, which can be shown by ‘Karsten Pipe’ intrusion test: on the crust the absorption is up to 1.25 ml in 1 minute, on surfaces without the brownish crust the absorption is up to 5 ml in 20 seconds. These values respond to an average water absorption coefficient between 10 and 28 kg/m²√h and a water intrusion value of up to 22 cm/√h which are both extremely high **(Fig. 6)**. Correspondent density values below 2 g/cm³ are very low **(Fig. 7)**. These results give a clear hint for the amount of consolidation agent which has to be allocated for the consolidation of the sanding stone.

Strength measurements by a drilling resistance tool, which provides strength profiles to a depth of 4 cms and ultrasound measurement wave velocity and Young’s modulus of elasticity (E-mod) correspond reciprocal to these data: the drilling resistance readings reach maximum values of 4 to 5 (theta/10). The values of the ultrasound velocity of the p-wave range between 1.8 a 2.0 km/s, those of the Young’s modulus of elasticity oscillate between 6 and 15 kN/mm² **(Fig. 7)**. All these values are extremely low and give a picture of a very soft, porous and low resistant rock.

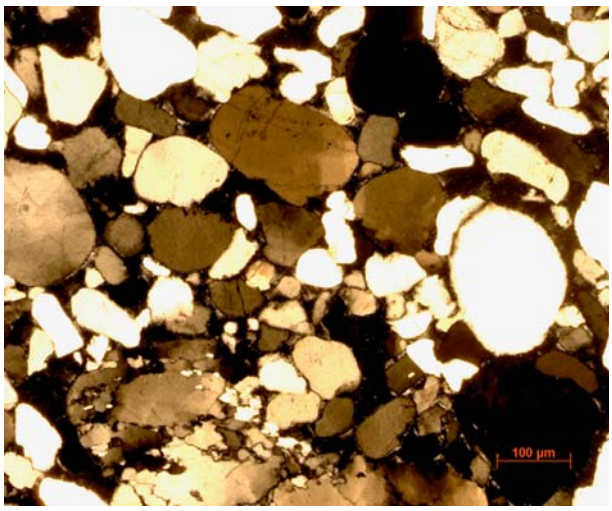


Fig. 3 Microscopic picture of the sandstone, which shows a very high porosity and a badly sorted structure; components are quartz.

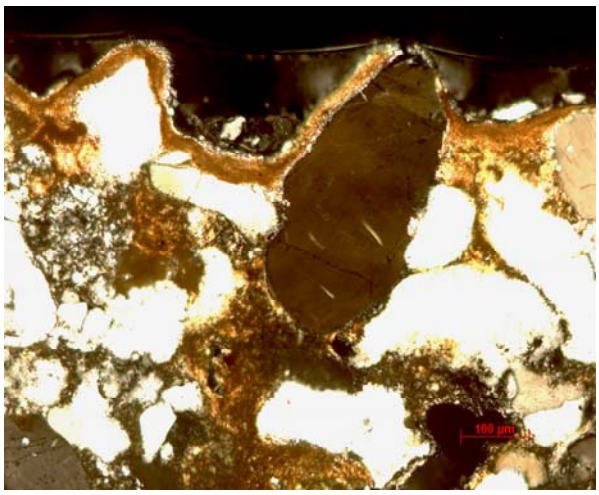


Fig 4 The picture shows the limonitic crust and pore fillings of the sandstone at the outer side of the rock (surface is at the top).

3. Mapping of the state of preservation, of the paintings and of traces of alteration

The various mappings of the conservation related subjects are in progress and will be continued in the next field campaign; one example is already included in the report on the second field season (Kuper et al. 2009b). The mapping in **Fig. 8** shows details of the surface condition of the shelter.

In specific horizons the paintings are significantly reduced. The study of the surface roughness, executed during night time with raking light led to the assumption, that the scrub marks which can be observed are most probably man made. This gives a hint that the surface was abraded before the figures have been painted.

Fig. 5 Recording and testing of climatic conditions and physical properties of the rock (from left to right): Meterological station; drill-resistance measurement; water absorption measurement; test areas for conservation measures.

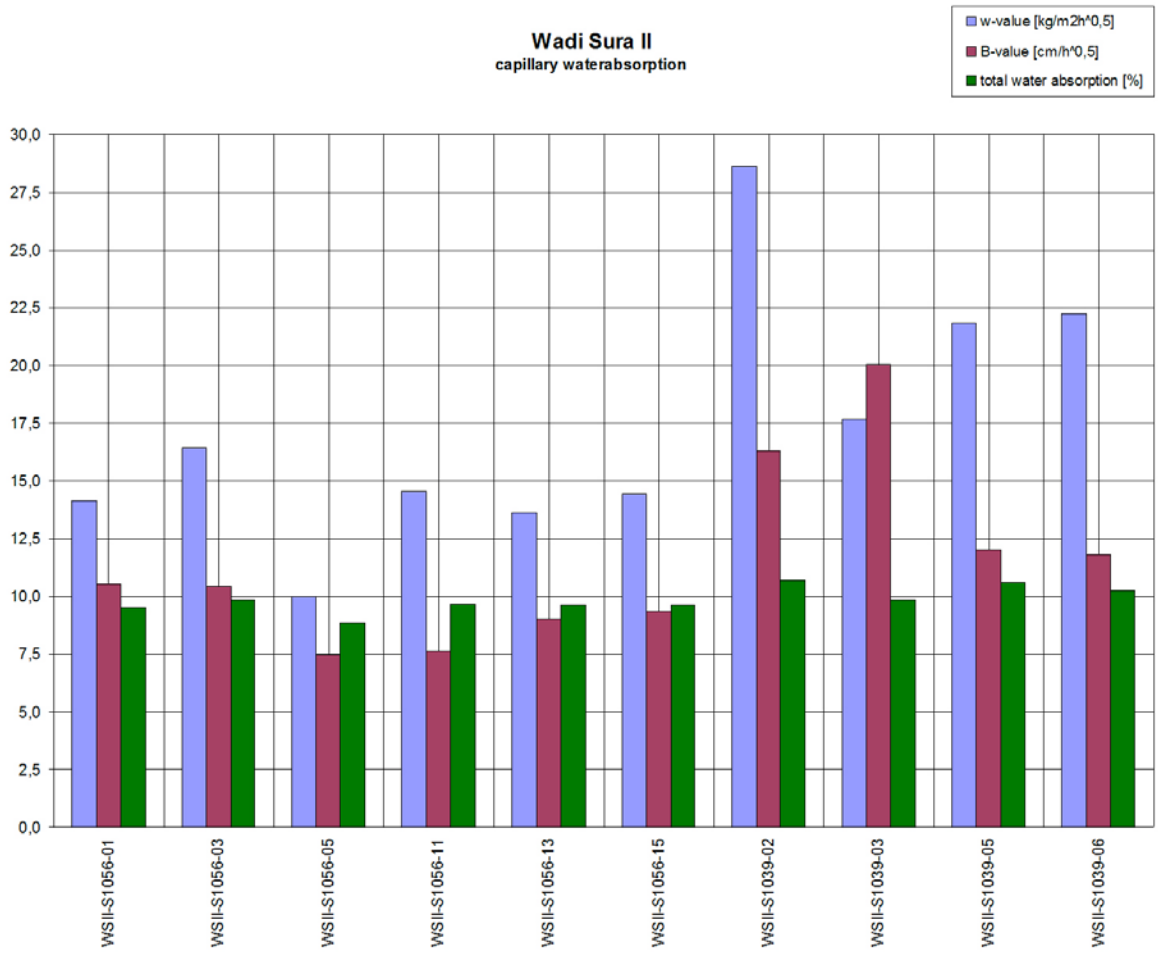


Fig. 6 Water transport and storage parameters of the Wadi Sura sandstone

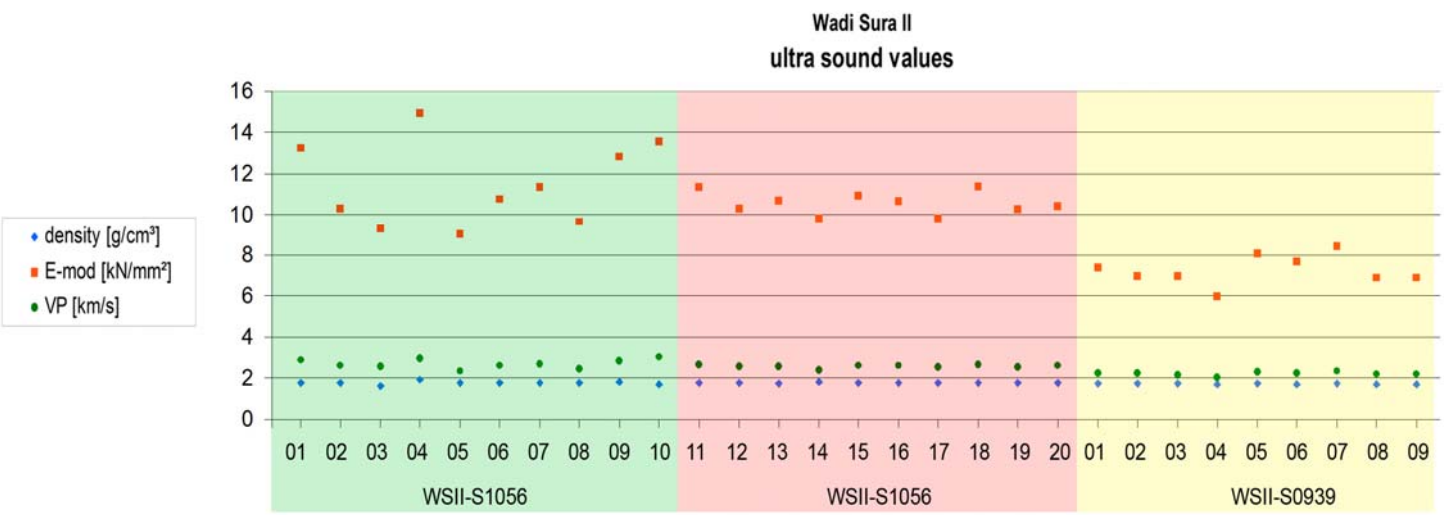


Fig. 7 Values of ultrasound velocity, elasticity modulus and density of the Wadi Sura II sandstone.

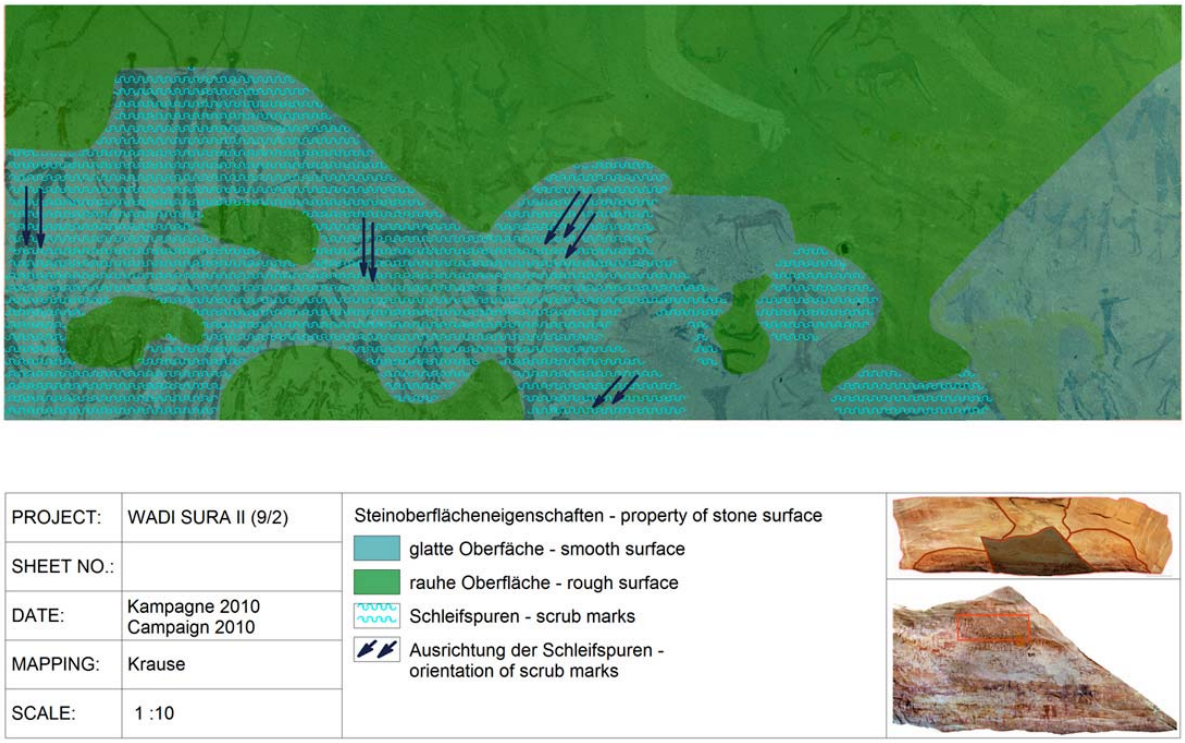


Fig. 8 Exemplary mapping of the surface roughness in the shelter indicating areas with scrub marks and scrub mark direction.

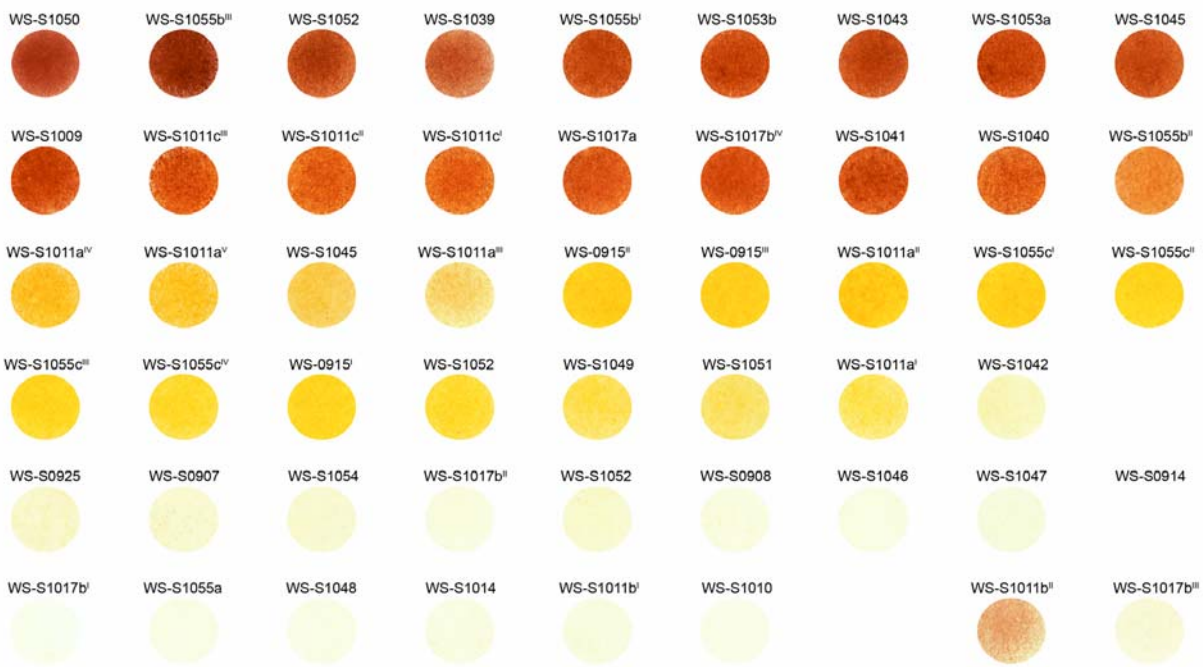


Fig. 9 Samples of colour pigments collected from outcrops, archaeological sites and exfoliated paintings illustrating the range of colour values of the white, red, and yellow kaolinites (Pigments ground on paperboard).

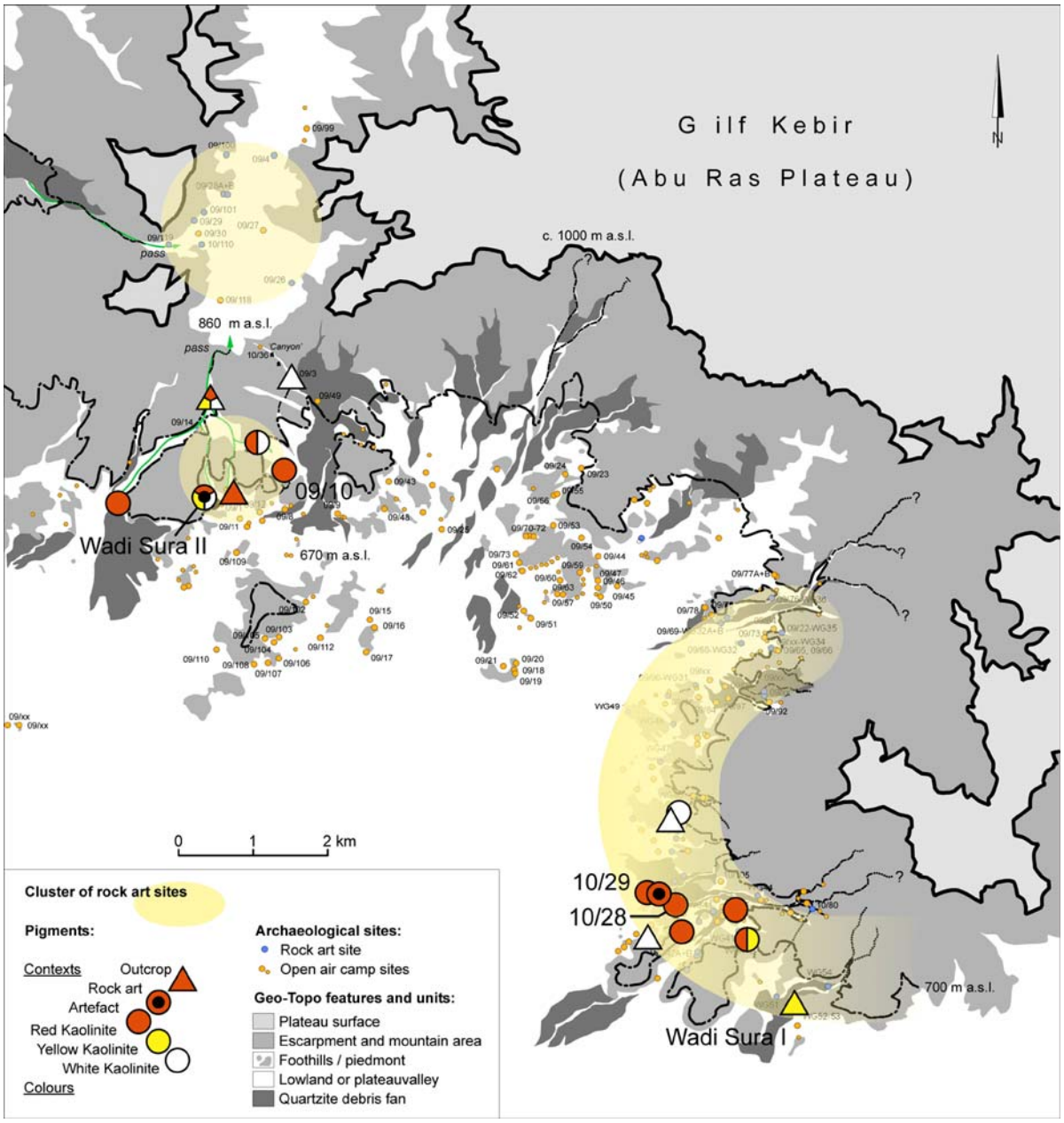


Fig. 10 Map showing the positions from where colour pigments were collected in outcrops and archaeological sites, as well as the general distribution of rock art sites. "Rock art" indicates paints on exfoliated pieces; "Artefacts" indicates other pieces of pigments found in archaeological excavations or surface collections.

4. Pigment analysis of paints in the rock art

During the past two campaigns a great number of data regarding colour pigments were collected in the Wadi Sura area which, according to sources and methods, can be subdivided as follows **(Fig. 9; 10)**:

(1) Non-contact colour identification of paintings in the field by means of computer integrated infrared spectrometry (see Kuper et al. 2009b: Fig. 14).

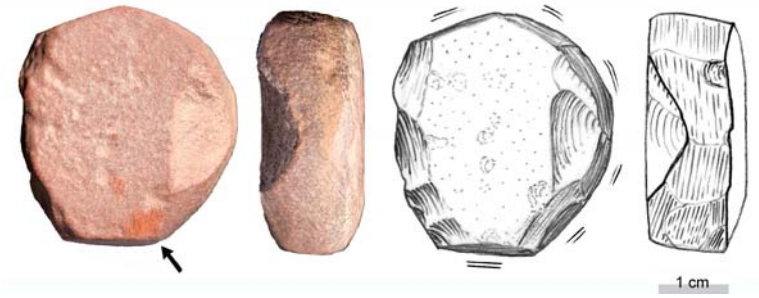


Fig. 11 Piece of red ochre with edges ground off (found at site 10/28; Gilf B context). The arrow marks a section of the surface where the original red colour is visible.

(2) Field and laboratory analysis of pigments on exfoliated rock surface fragments found in test excavations.

(3) Pieces of colour pigments brought by prehistoric people to the camp sites. Such pieces may include objects with artificial traces of use **(Fig. 11)** or the pigments found on a ceramic palette as processed paint.

(4) Colour pigments at sediment outcrops **(Fig. 12)**. While colour pigments in the cases mentioned above have eventually been used for paints and paintings, it is not clear which sediment outcrops have actually been exploited for the processing of paints. Therefore, pigment samples have been taken at outcrops during the survey wherever they were found to compare with the pigments from the archaeological sites.

Fig. 12 Red, yellow, and white kaolinites from an outcrop.

Fig. 13 Piece of exfoliated rock surface painted in red (found in the excavation at 10/29).
1 Reduced surface illustrates the original colour of the red pigment;
2 Darkened surface due to encrusting.

As a rapid test colour samples were rubbed off on a drawing board to identify the colour values by means of the Munsell Soil Color Charts **(Fig. 9)** the results of which can be compared with the spectrometric colour identification. Moreover, it was of interest to identify the mineralogical composition of the samples. This was carried out by 3D digital microscopy, X-ray defraction, and infrared spectrometry.

The preliminary results of the colour identification indicate a rather small number of colour types used in the paintings: dark and pale red, yellow, and white. Pigments from the paintings and archaeological sites are identical to what has been sampled at the natural outcrops, both in colours and mineralogical composition. This points to the fact that the prehistoric dwellers collected the pigments in the surrounding of the camp and rock art sites. The mineralogical analysis identifies the pigments as kaolinite which is a layered silicate mineral in clays. This is basically true for the white pigments, but also for the yellow and red pigments, the latter of which might have received their colouring by iron oxides. There is no evidence of organic substances (e.g. as binders) or charcoal in the pigments. This excludes any possibility of direct dating of the paintings, but also indicates that paintings have not been bleached by the sunlight.

Although it has been stated that we are dealing with only few basis colours, there is a great variation in the colour values, well represented in the reddish colours. Most variations result from surface weathering or encrusting of pigments. This can affect the colour values of outcrop pigments as well as those from paintings **(Fig. 13)**. To sum up, there is a complex system of various causes and processes impacting the colouring; therefore, it is hard to define the original colour values of the prehistoric paints. In turn, it is not possible to estimate the age of paintings simply by recording their colour values.

5. Computer-aided rock art recording and test excavation at Wadi Sura II

The systematic recording of the exceedingly rich rock art at Wadi Sura II has been continued in the central part of the shelter by using the database driven computer system “CaveOne”, developed by R. Goss, as described in the report on the second field season (cf. Kuper et al. 2009b: 10f., Figs. 9-11). All in all, about 1500 individual figures, or traces thereof, occupying an area of c. 12 m^2 **(Fig. 14)**, are now entered into the database according to their main characteristics, such as colour, size and style, orientation, shown posture and action, superpositions, body decoration, equipment, etc. High resolution digital photographs, taken by a scanback camera and processed on site in order to visually enhance faded colours (especially yellow and white), have been used to identify and number the drawings **(Fig. 15)**. The comparison on the spot of such image processed photographs with actual features on the rock face turned out to be the most efficient and reliable way for the recording.

The detailed, computer-aided recording of the figures – mostly painted but also engraved – will allow to search for the occurence and dispersal of specific motifs or characteristics, also in combination, in order to reveal possible decorational patterns that may contribute to a better understanding of the meaning of the rock art. As the following **table** shows, by far most of the figures so far recorded are humans, whereas representations of animals occur much less. Almost without exception, the latter consist of wild animals such as ostrich, giraffe and gazelle. Remarkably, not a single cattle representation, a motif otherwise often attested in the Gilf Kebir/Jebel Ouenat rock art, could be securely identified, and very few representations of dogs are currently the only possible indication of domesticated species. This as well as a number of humans shown with bows and arrows (39 attestations), and a few

hunting scenes, point to groups of hunter-gatherers rather than pastoralists as the creators of the drawings. As far as can be judged from the record now at disposal, the predominant theme of the representations seems to be the solidarity of the community. This view is supported by the occurence of a number of scenes made up by human pairs, families or groups, the latter often shown in what might be festive and/or ritual activities, and in some cases associated with representations of the mysterious "headless beast" (24 attestations). In contrast, scenes of human conflict are extremely rare.

Main class of representation	Attestations	Percentage
Human	882	59.4%
Animal	122	8.2%
Stencil (sprayed; mostly hand stencils)	123	8.3%
Separate item	19	1.3%
Others	9	0.6%
Undefined	329	22.2%
Sum	**1484**	**100%**

Tab. Main classes of representations among the recorded rock art at Wadi Sura II.

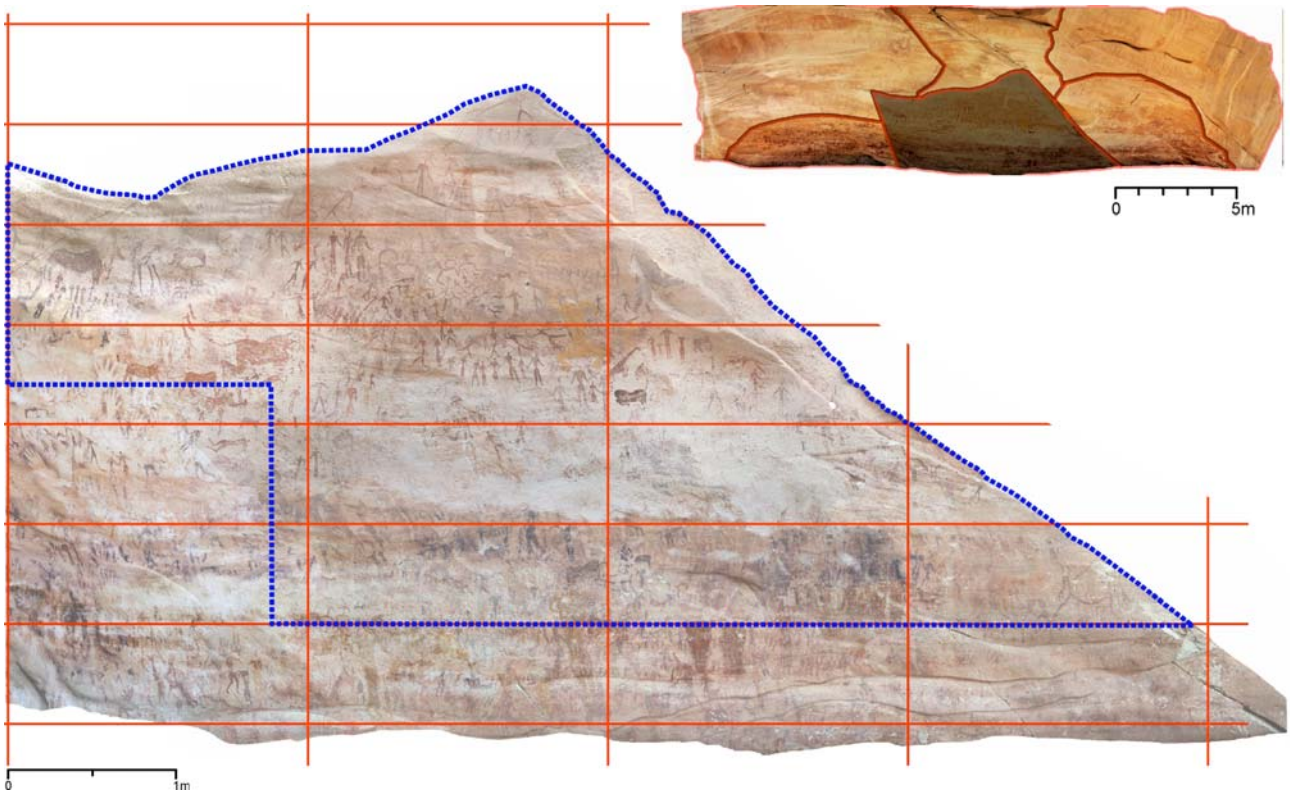


Fig. 14 Progress in computer-aided rock art recording at Wadi Sura II: Two field campaigns in 2009 and 2010 have been used to document about 1,500 figures within the area marked by the blue line. This area in the lower central part of the Wadi Sura II shelter exhibits the highest density of figures. The total number of figures in the six sections of the shelter (upper right) can be estimated to c. 8.000 figures.

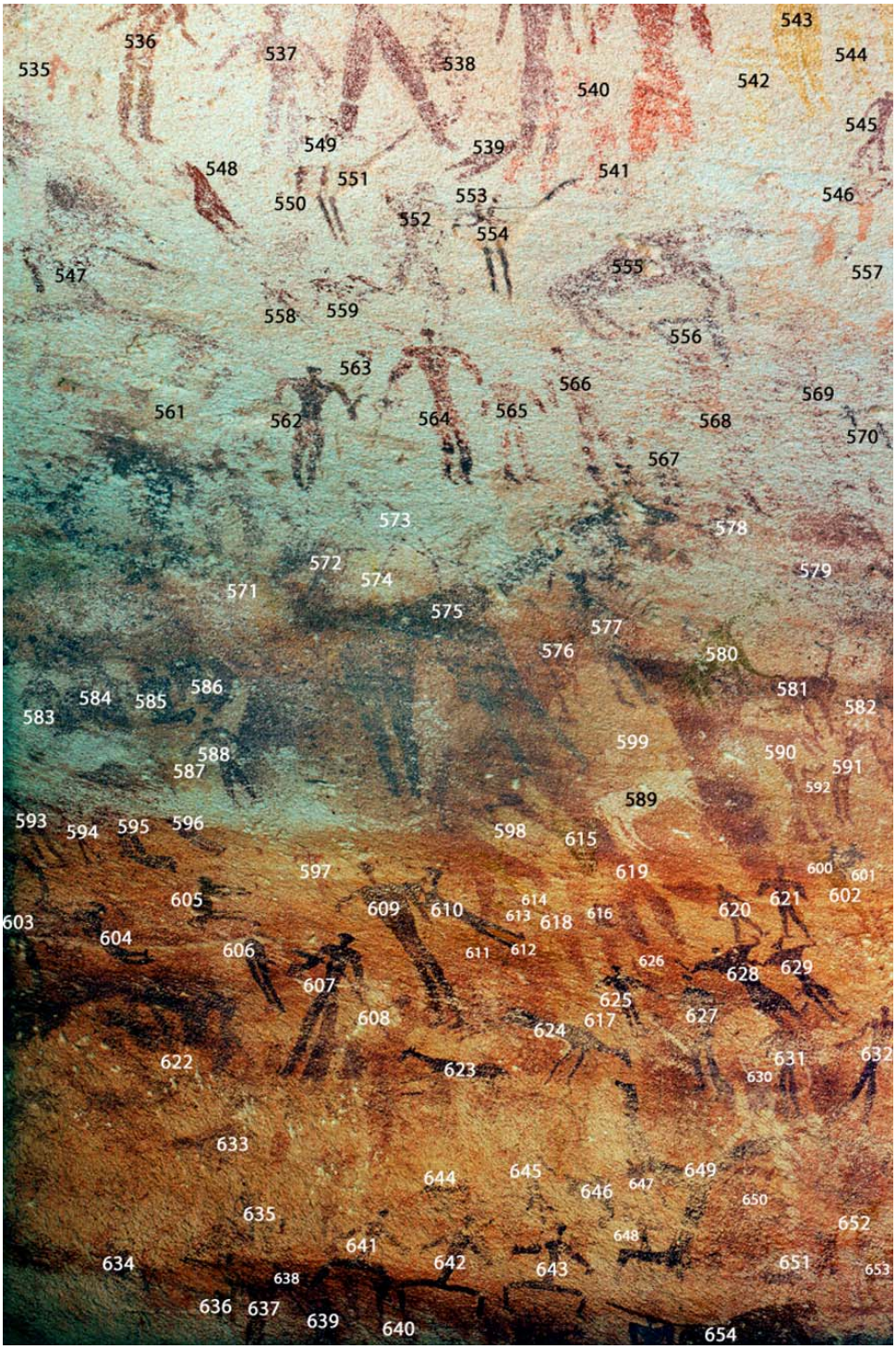


Fig. 15 Photo sheet with enhanced contrast and colour values in order to better identify the painted figures. The figures are numbered according to their documentation by means of the computer programme.

Of special importance, also in regard to the chronological affiliation of numerous other rock art sites in the Gilf Kebir/Jebel Ouenat region (cf. Zboray 2009), is the exceptionally high number of superpositions. When the ongoing computer-aided recording of the figures at this key site will be finished within the years to come, a statistical analysis of the identified superpositions will allow for a differentiaton of the various "styles" and/or motifs in terms of a relative chronology. Even by now it can be stated that most of the hand stencils belong to a period earlier than that of the human figures painted in red-brown, and most of the figures painted in yellow belong to a later one. The space of time, during which drawings have been produced in the shelter, is of course not easy to define.

The excavation of the sandfill of the Wadi Sura II shelter was one of the main objectives of the project when started in early 2009. Due to static reasons, it was, however, an hitherto unsolved technical problem how to guarantee that the rock fall in front of the shelter would not become destabilised during excavation. It was therefore decided, first of all, to test the sandfill regarding stability and slope angle to develop a feasibility plan whether and how an excavation could be carried out.
Secondly, the test excavation should check the extent of the decorated rock face below the present sand level and reveal possible cultural layers, in order to know how deep an excavation should be operated.
The test excavation has been conducted in the eastern part of the shelter **(Fig. 16; 17)**. Except for some wind-blown plant remains and animal droppings probably from sheep or goat, only sterile eolian sand came to light. Up to a depth of more than two metres, no artefacts appeared that could have indicated a former habitation floor. Nevertheless, it turned out that the drawings in this part of the shelter continue only for about 1.20 m below the sand level, less than suspected. In terms of motifs and style, the newly exposed figures (including hand stencils, human and animal representations in different colours, as well as some engravings) do not differ from those in the higher parts of the rock face, except for some very crude pecked engravings.

Fig. 16 Testing the stability and depth of the shelter's sandfill to check the possibility of a future excavation. It turned out that the parietal art continues only for about 1.20 m below the sand level.

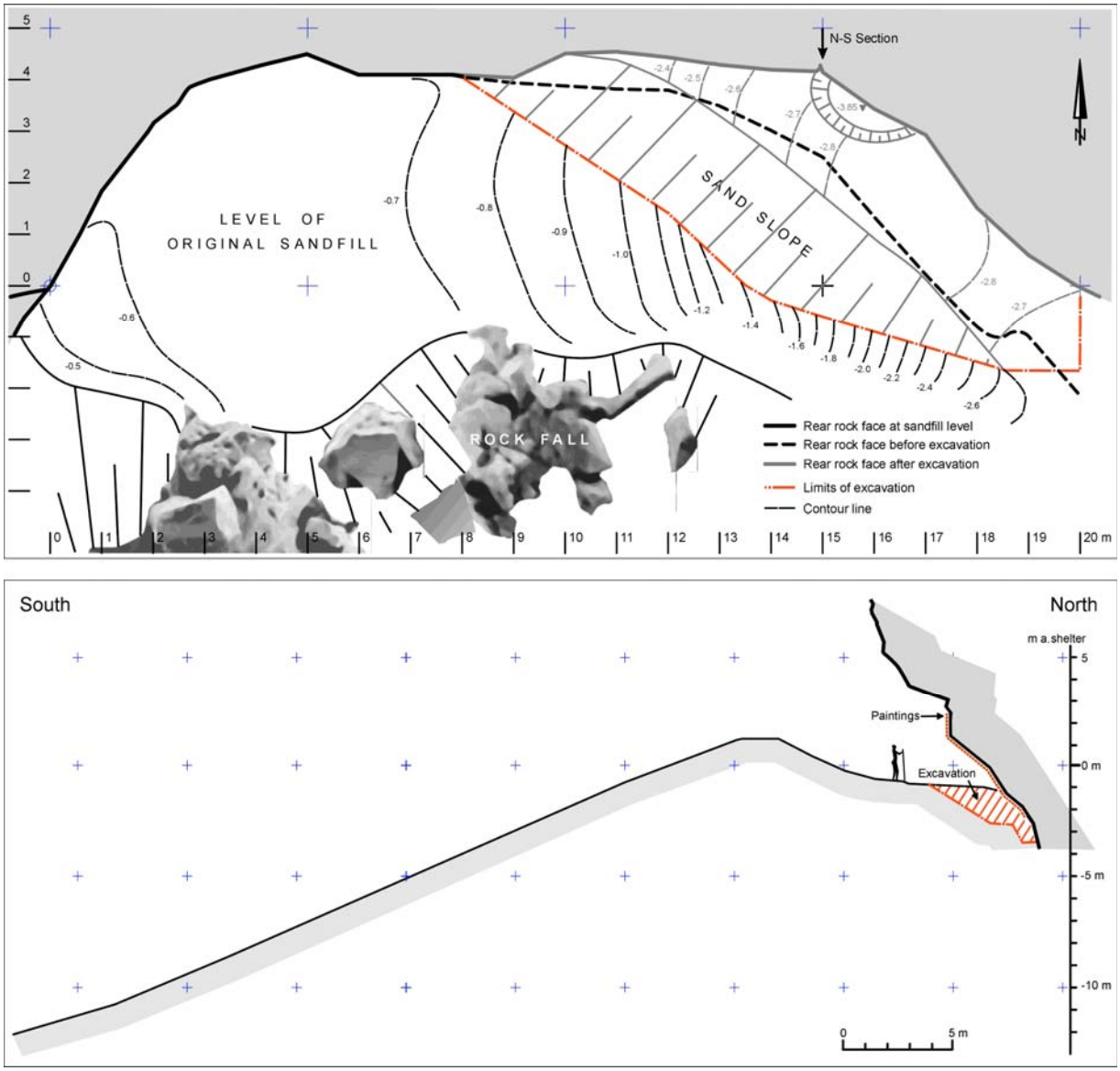


Fig. 17 Ground plan and section of the shelter illustrating the extension of the test excavation.

Assuming that the lower border of the decorated surface continues at more or less the same level to the western part of the shelter, it can now reasonably be estimated that the rock art at Wadi Sura II comprises about 8000 individual figures all in all.

The test excavation, for the most part carried out close to the rock face, showed that a step by step removal of the shelter's sand fill is a manageable, though time consuming challenge, and in accordance with aspects of site preservation and landscape protection. In order not to affect the present state of preservation and to keep the original appearance of the shelter, it is projected to continue the removal of the sand in consecutive sections in front of the rock face, to document the newly exposed rock art by high resolution photography as well as 3D laser scanning and digital photogrammetry, and to refill the sand in stepwise procedure.

6. Archaeological survey in the Wadi Sura area

The archaeological survey at Wadi Sura has been completed during the third field campaign in 2010. The areas surveyed during this campaign include primarily the south-eastern piedmont of the area under investigation, but also some remaining parts in the north-eastern escarpment zone **(Fig. 19)**. The 2010 survey has added more than 140 sites, eleven of which are new rock art sites. With the close of the survey activity the three campaigns in 2009 and 2010 have yielded a total of more than 340 archaeological sites systematically recorded by means of survey sheets; at about 220 sites further archaeological activities took place, e.g. recording of site structures, shelters, or artefacts, as well as sampling of artefacts.

Additionally, a brief excursion to upper Wadi Abd el-Malik by the cooperating EEAA group yielded poor information about archaeological sites in the area investigated (cf. **Fig. 22**).

6.1 Chronology: occupation, artefacts, and rock art

One third of the total number of sites at Wadi Sura yielded pottery. When finally examined, they will provide further information about the chronological position of the inventories. As a preliminary result, after having analysed 486 potsherds found during the 2009 campaigns, the pottery now highly supports the conclusion that the major occupation of the area took place during the Gilf B phase (c. 6600–4400 calBC), given the fact that c. 95% of the potsherds, and c. 85% of the inventories where pottery has been recorded, can be affiliated to this phase **(Figs. 18; 20)**. In contrast, there are only very few and short-termed occupation sites from the post-dating Gilf C phase (c. 4400–3500 calBC). The preceding Gilf A (c. 8000–6600 calBC) for which pottery is still lacking, both in Wadi Sura as well as in most parts of the Western Desert of Egypt, is evidenced at a very small number of sites by characteristic elongated microlithic elements and a typical blade technology in the lithic material.

The very small amount of Gilf C pottery, on the one hand, and the fact that the minority of rock art sites in the Wadi Sura area represent the “Cattle herders style”, on the other hand, suggest that this rock art style has been developed during the Gilf C phase. In turn, taking into account that most of the rock art found in the Wadi Sura area can be affiliated to the “Wadi Sura style” featuring “beasts”, “swimmers” and hand stencils (cf. Zboray 2009), it is highly suggested that most of the paintings in the area date to the Gilf B phase **(Fig. 21)**.

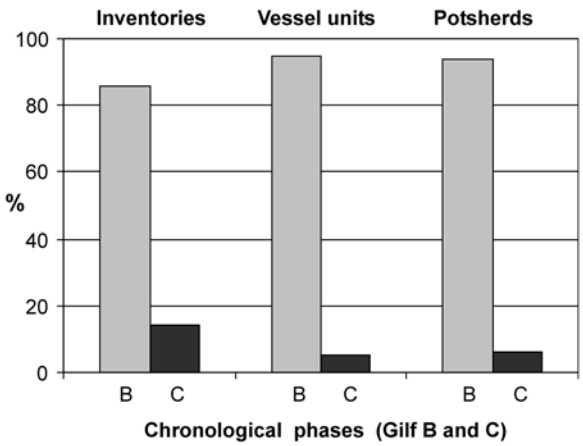


Fig. 18 Chronological affiliation of 486 potsherds and related inventories recorded at Wadi Sura during the 2009 campaigns.

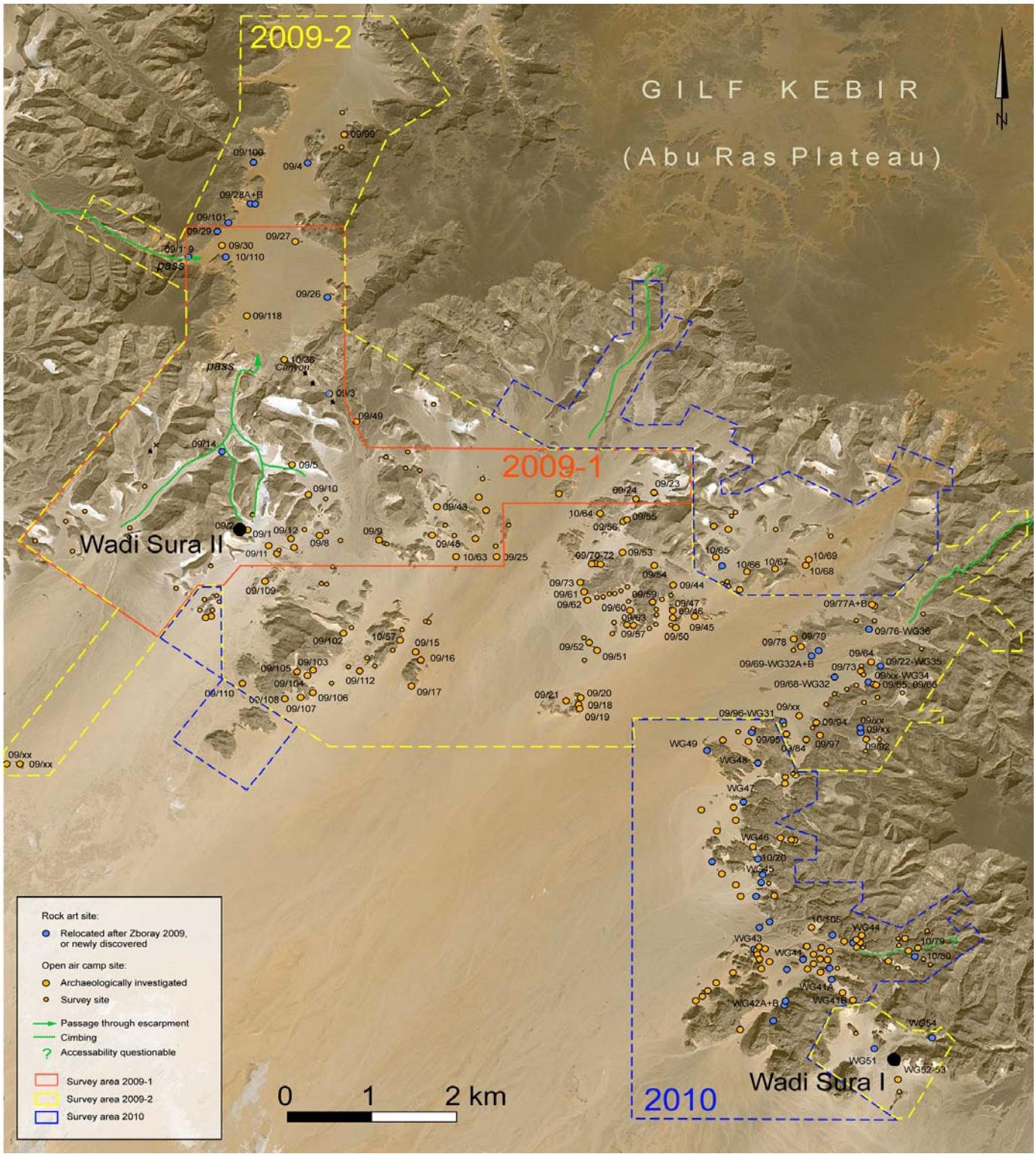


Fig. 19 Updated map of the Wadi Sura survey area showing the sites investigated during the three field campaigns in 2009 and 2010. The "Cave of Swimmers" (Wadi Sura I) and the "Cave of Beasts" (Wadi Sura II [=09/2]) are marked in black.

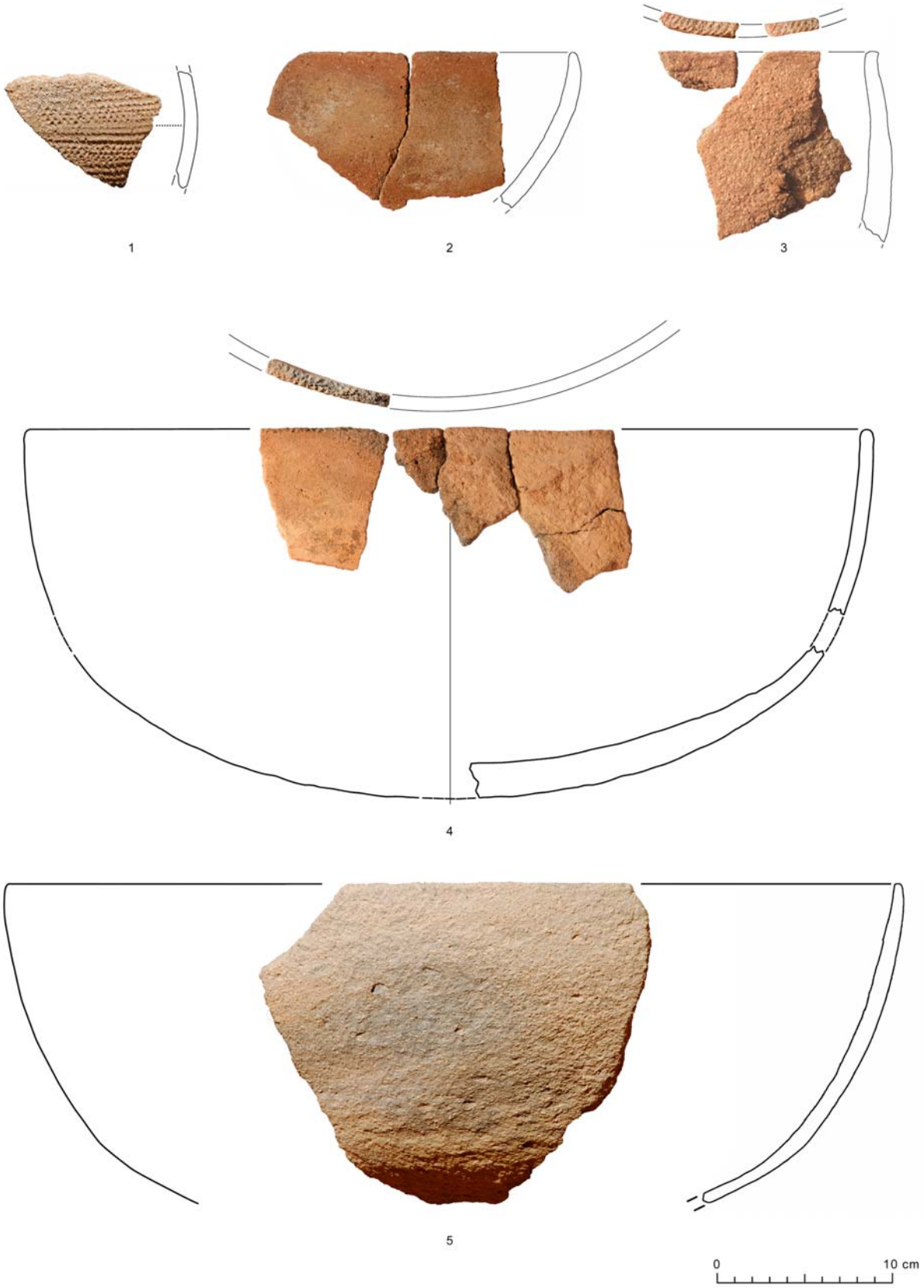


Fig. 20 Pottery of Gilf B phase recorded during the Wadi Sura survey in 2009 and 2010.

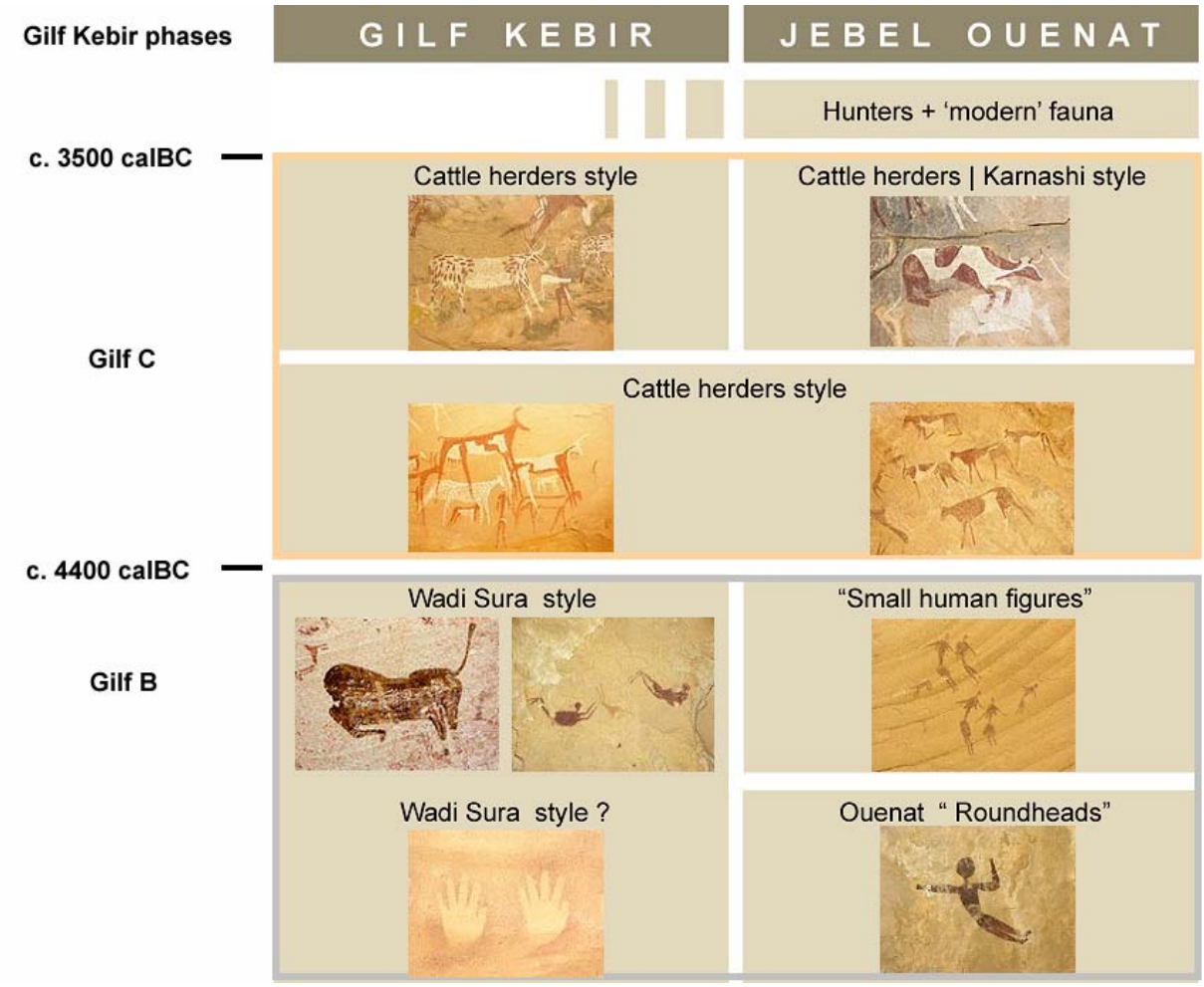


Fig. 21 Rock art chronology of the Gilf Kebir/Jebel Ouenat region as suggested by Zboray 2009 (characteristic photographs taken from Zboray 2009), and its correlation with the Gilf Kebir phases according to the dating of pottery at Wadi Sura.

The pottery recorded at Wadi Sura represents fabrics (types of tempering) most of which were known from other Gilf B sites in the Gilf Kebir/Jebel Ouenat, region ranging from early Gilf B mineral fabrics to highly plant tempered fabrics of the later Gilf B phase. With regard to the forthcoming analysis of the pottery, the fabric analysis of collected potsherds from Wadi Sura will help to develop a more detailed subdivision of the Gilf B phase, both at Wadi Sura, as well as for the entire chronology of the Khartoum style pottery of the Western Desert.

Pottery post-dating the Gilf C phase has as yet not been found in the Wadi Sura area. It is, however, not to be excluded that sporadic human activity in more favoured places in the Gilf Kebir took place in 'historical' times. An almost complete globular jar with a horizontal band of incised decoration was found in Wadi Abd el-Malik north of Wadi Sura during a survey carried out by the cooperating group of the EEAA who joined the Wadi Sura team during the second part of the campaign. Although the jar is not wheel-made, its shape may point to a rather recent age, as similar shapes in Islamic pottery may suggest **(Fig. 22)**.

Fig. 22 A globular jar with decorated shoulder found at site Wadi Abd-el Malik 10/200. This pottery clearly post-date the Gilf C phase (4400–3500/3000 calBC), but its exact chronological position is still unknown.

Regarding other prehistoric artefact classes found aton the Wadi Sura sites, the great number of grinding implements may allow for a better understanding of their morphological and functional development. Sites affiliated to the Gilf B phase, and in particular those which may belong to its later sub-phase yielded not only palettes with small elongated pestle stones **(Fig. 23)**, but also upper grinders (hand stones) which might represent a morphological pre-type in the evolution of the so-called "Gilf type" **(Fig. 24)**. The latter, for which very few examples are known from Wadi Sura, is suggested to date to the Gilf C phase (cf. Kuper 1993: 220–221).

6.2 Subsistence

Facing the fact that bone preservation in the hyper-arid Sahara is notoriously poor, there was initially little hope to find substantial evidence for the hunt on wild animals and the introduction of domesticates. Although the general preservation conditions at Wadi Sura are as poor as at other Western Desert sites, a small number of sites recorded during the 2010 survey yielded a small, but exceptionally good collection of bone material.

The bone material, for which further expert analysis is needed, as well as the chronological examination of the find contexts, will add some more details to the economic development during the Gilf B phase, in particular when and on which scale domesticates have been introduced to the hunter-gatherers' economy of the mid-Holocene.

Fig. 23 Palette and a pestle (quartzite) from the Gilf B sites Wadi Sura 10/85 and 10/93. It is possible that colour pigments have been processed with these implements, such as with the ceramic palette found at site Wadi Sura 09/10 in 2009 (cf. Kuper et al. 2009b: Fig. 15).

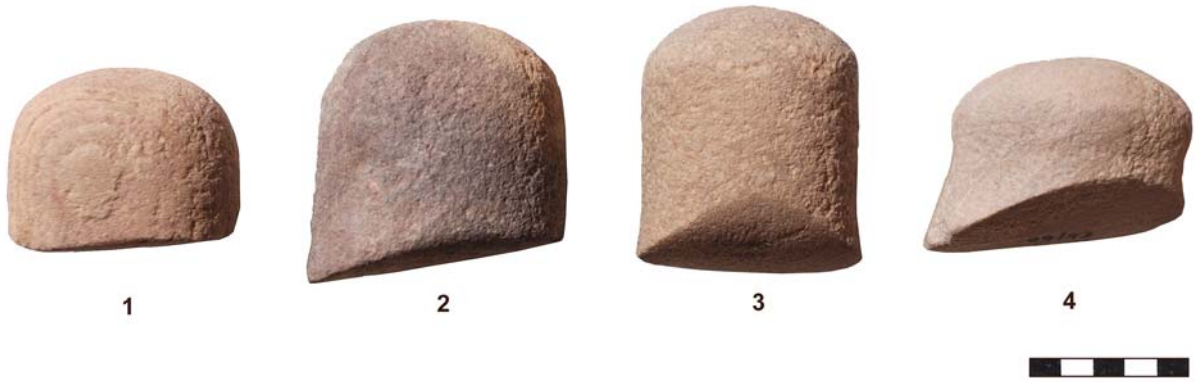


Fig. 24 Possible evolution of the "Gilf type" handstone (no. 4) from its 'knobbly' (late?) Gilf B forerunners (no. 1). The Gilf type probably dates to the Gilf C phase according to parallels in Wadi el-Bakht and Wadi el-Akhdar, as well as in the Laqiya region in northern Sudan (Kuper 1993: 220). Nos. 2 and 3 possibly represent transition types.

The same can be stated for the unexpectedly high number of shelter sites which yielded masses of herbivores dung which belong to animals of the Caprinae sub-family, e.g. goats, sheep, and Barbary sheep **(cf. Fig. 26)**. According to preliminary examination, it is suggested that most of it can be affiliated to small goats. It is, therefore, highly needed both to develop a more detailed analysis of the dung, as well as to gain further information about the dating of the dung deposits.

6.3 Landscape archaeology: settings and function of sites

The survey in the Wadi Sura area not only aimed to discover and record as many archaeological sites as possible, but also attempted to trace the function of specific sites in their landscape settings. Because of this, landscape features and their recording required a great deal of the survey field work. The mapping of sites in their landscape is exemplified in **Fig. 27** showing the close connection of sites and animal tracks in one of the larger valleys in the eastern mountain region (s. below).

The total number of sites recorded during the three survey campaigns in 2009 and 2010 now allows understanding the factors and conditions why prehistoric people occupied the Wadi Sura area, and how they managed their daily life. Although digitalizing of relevant survey data and computer-aided statistical analysis is still in its initial phase, some preliminary results can be deduced from the field observations:

(1) Large and artefact-rich sites ('Base camps'), are to be found in particular in the piedmont zone where playa sediments remained from small episodic lakes **(Fig. 25A)**, and where gueltas collected rain-water from vertical faults in the rocks **(Fig. 25B)**. Additionally, large valleys have charged wadis and fans in the same zone where artefact-rich sites along the channels were found. These sites comprise high numbers of grinding implements used for the processing of wild seeds **(Fig. 25C)**.

(2) Rock art shelters are usually to be found in the same area as the large base camps. Most of the latter are closely related to rock shelters, because characteristic artefacts, such as flaked stone artefacts, grinding implements, and pottery, often cover wadi terraces and sand sheets in front of such shelters.

Fig. 25 Water resources at Wadi Sura featuring prehistoric artefacts and sites (from left to right): A Grinder at the shore line of the episodic lake at 09/1; B Outflow of rainwater-charged guelta at 09/3; C One of the many grinders found on the banks of a large wadi channel at 10/21.

(3) Shelters are not only the preferred places to apply paintings or engravings to the rocks, but have also frequently been used to keep goats **(Fig. 26)**. Presumably, they were also used by humans as short-term habitation places to be sheltered from sunlight or strong wind during daily-life activities. Stone hooks to put up equipment, such as bags, baskets, or skins, have been found along the drip lines of almost all shelters where rock art has been found.

(4) Open-air sites as well as shelters are rare to be found in the mountain zone between the plateau and the piedmont; nevertheless they exist in some valleys which allowed to pasture herds and to hunt game. Evidence of goat dung in shelters at such places as well as animal tracks and trap stones in close conjunction to small habitation places supports this interpretation **(Fig. 26, upper left)**. Gueltas in the mountain area which may have been charged longer than water places in the piedmont during the dry season may have formed another important factor to visit the valleys.

Fig. 26 Wadi Sura 09/92 shows features of a typical shelter site (clockwise from upper right): Stone hooks along the drip line to put up equipment; rock art (giraffe engraved, and painted in white); stone enclosure interpreted as goat pen, because of distinctive animal dung found inside.

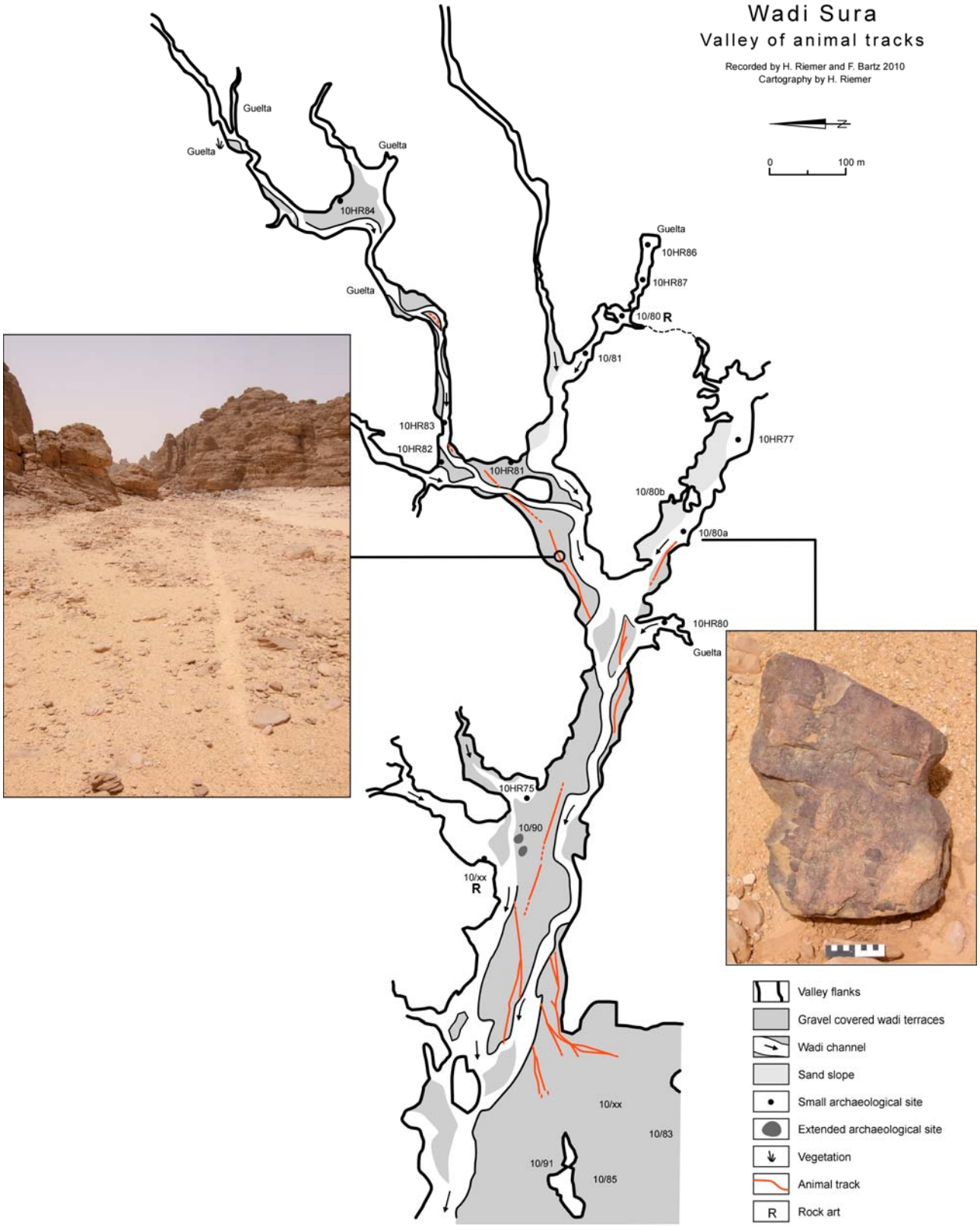


Fig. 27 An example of the Wadi Sura survey mapping of archaeological sites and landscape features, and their interpretation: The paths of gazelles or Barbary sheep connect archaeological sites in the 'Valley of the animal tracks'. Moreover, there is a typical trap stone found in one of the tributaries just where an animal path fades away in the sand (cf. Riemer 2009).



Fig. 28 Wadi Sura 10/29-1: Test excavation at a shelter site (left) yielded masses of microlithic stone artefacts during screening of the sediments (right). The excavation was part of a field school programme in cooperation with EEAA to train rangers in identifying archaeological sites and artefacts to better protect the archaeological heritage of the Gilf Kebir National Park (GKNP; cf. Kuper 2007).

(5) Valleys which allow access to the Gilf Kebir Plateau surface to the north may form another attractive factor, both for the agglomeration of large camp sites at the mouths of such valleys or for small resting places at locations inside of the valleys. The survey of the Wadi Sura area has evidenced only one definitive passage where the plateau surface could have been climbed from the lowland (taking into account that people probably ascended with the whole family and the stock). The position of the Wadi Sura II shelter at the foot of this passage to the plateau as well as the concentration of sites in its vicinity may be a result of this exceptional communication route that allowed reaching the green valleys of Wadi Abd el Malik and Wadi Hamra, some 50 km north of Wadi Sura.

8 Test excavation at Wadi Sura 10/29

The primary aim of the 2010 field campaign at Wadi Sura was to complete the survey activity. The large number of artefact-rich sites to be recorded during this survey prevented to examine selected sites of interest in more detail. The only exception is a small test trench excavated to a depth of 30 cm at site Wadi Sura 10/29, a site some kilometres north-west of Wadi Sura I **(Fig. 28)**. There, a dense artefact scatter of lithic material and some potsherds were found in front of a large rock shelter. The shelter as well as its opposite rock walls were already known, because of engravings and paintings of human figures, cattle, and ‘erratic’ signs (cf. WG43A–C in Zboray 2009). Among them is the engraved giraffe discovered by Clayton in 1931 which represents the first rock art discovered in the Wadi Sura area.

The excavation yielded charcoal, Caprinae dung, few potsherds, and a mass of lithic debris with an increasing frequency of microlithic elements towards the basis of the trench, comprising transversal arrow heads. Both, arrow heads as well as the pottery, can be affiliated to the Gilf B phase. The find material will be studied during the next campaign. It is also expected to develop detailed studies and excavations at other selected sites during the next field campaign.

Acknowledgements

The joint Wadi Sura Project is generously funded by the Deutsche Forschungsgemeinschaft (DFG). It is directed by Dr. Rudolph Kuper, University of Cologne (UoC), Institute of Prehistoric Archaeology/Heinrich-Barth-Institut e.V.; and co-directed by Prof. Dr. Hans Leisen, Cologne University of Applied Sciences (CUAS), Cologne Institute for Conservation Sciences (CISC); and Prof. Dr. Stefan J. Seidlmayer, Deutsches Archäologisches Institut (DAI), Cairo Department. Research assistants are Dr. Heiko Riemer, Frank Förster M.A. (UoC), and Dipl.-Rest. Sabine Krause (CUAS).

The team of the third field season in spring 2010 comprised(in alphabethical order): Franziska Bartz M.A. (prehistoric archaeologist, UoC), Dr. Frank Darius (botanist/ecologist, EEAA Cairo), Ahmed Ebaid B.A. (environmentalist/conservationist, EEAA), Frank Förster M.A. (Egyptologist/archaeologist, UoC), Dr. Karin Kindermann (prehistoric archaeologist, EEAA), Dipl.-Rest. Sabine Krause (conservator, CUAS), Dr. Rudolph Kuper (prehistoric archaeologist, UC), Prof. Hans Leisen (conservation scientist and geologist, CUAS), Esther and Oliver Palm (technicians), Dr. Heiko Riemer (prehistoric archaeologist, UC), Tarek Mohammed El Sagher (driver, EEAA), Dipl. art. Jürgen Seidel (professional photographer), Wail Ahmed Thabet (ranger, EEAA), Oliver Vogels M.A. (prehistoric archaeologist, UoC), and Tamer Ramadan Zayed (ranger, EEAA). The Supreme Council of Antiquities (SCA) was represented by inspector Mazhar Ezzet Abd el-Raheen.

We wish to thank the Permanent Committee of SCA for the permission to carry out the work. We also acknowledge the kind cooperation and support by EEAA, Z+F GmbH, Jürgen Seidel Kunstwerkfotograf, as well as Reinhold Goss onefile database + internet application development and Claudia Gornik Kommunikationsdesign. The next campaign of the project is scheduled for March/ and April 2011.

References

Klitzsch , E., F.K. List & G. Pöhlmann (eds.) 1987
Geological Map of Egypt 1:500000 (Cairo: Technische Fachhochschule Berlin).

Kuper, R. 1993
Sahel in Egypt: environmental change and cultural development in the Abu Ballas area, Libyan Desert. In: L. Krzyzaniak, M. Kobusiewicz & J. Alexander (eds.), Environmental change and human culture in the Nile basin and northern Africa until the second millennium B.C. Studies in African Archaeology 4 (Poznan: Poznan Archaeological Museum) 213–223.

Kuper, R. 2007
Desert Parks in the Eastern Sahara. In: O. Bubenzer, A. Bolten & F. Darius (eds.), Atlas of Cultural and Environmental Change in Arid Africa. Africa Praehistorica 21 (Köln: Heinrich-Barth-Institut) 118–121.

Kuper, R. 2009
A Paradise off Rules? Sahara 20: 7–12.

Kuper, R. & H. Riemer in press
Archaeological survey at western Jebel Ouenat, SE Libya. Libya Antiqua N.S.: 45–55.

Kuper, R., H. Riemer, F. Förster 2009a
Report on the first field season of the Wadi Sura Project (Gilf Kebir, SW-Egypt), spring 2009. Unpublished report submitted to the Egyptian Supreme Council of Antiquities.

Kuper, R., H. Leisen, H. Riemer, F. Förster, S. Krause, E. Büttner, F. Darius & K. Kindermann 2009b
Report on the second field season of the Wadi Sura Project (Gilf Kebir, SW Egypt) in autumn 2009. Unpublished report submitted to the Egyptian Supreme Council of Antiquities.

Linstädter, J. (ed.) 2005
Wadi Bakht. Landschaftsarchäologie einer Siedlungskammer im Gilf Kebir (SW-Ägypten). Africa Praehistorica 18 (Köln: Heinrich-Barth-Institut).

Riemer, H. 2009
Prehistoric Rock Art Research in the Western Desert of Egypt. Archéo-Nil 19: 31–46.

Riemer, H. 2010
Prehistoric trap hunting in the eastern Saharan deserts: A re-evaluation of the game trap structures. In: H. Riemer, F. Förster, M. Herb & N. Pöllath (eds.), Desert animals in the eastern Sahara: Status, economic significance, and cultural reflection in antiquity. Colloquium Africanum 4 (Köln: Heinrich-Barth-Institut) 175–188.

Rhotert, H. 1952
Libysche Felsbilder. Ergebnisse der XI. und XII. Deutschen Inner-Afrikanischen Forschungs-Expedition (DIAFE) 1933/1934/1935 (Darmstadt: L.C. Wittich).

Schön, W. 1996
Ausgrabungen im Wadi el Akhdar, Gilf Kebir (SW-Ägypten). Africa Praehistorica 8 (Köln: Heinrich-Barth-Institut).

Zboray, A. 2005
Rock Art of the Libyan Desert (Newbury: Fliegel Jezerniczky Expeditions) [DVD].

Zboray, A. 2009
Rock Art of the Libyan Desert. Second expanded edition (Newbury: Fliegel Jezerniczky Expeditions) [DVD].