

Study and Enhancement of the Archaeological Site of Sarqala (KRG, Iraq): a New Project of MiSAK, the Italian Historical-Archaeological Mission in Kurdistan of ISMEO and IICK.

The Report of the 2021 Preliminary Mission

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Nel 2021 l'ISMEO e l'Istituto Internazionale di Cultura Kurda di Roma hanno deciso di avviare congiuntamente una nuova missione archeologica nel Kurdistan iracheno: la MiSAK - Missione Storico Archeologica Italiana nel Kurdistan. La MiSAK ha iniziato le sue attività nel dicembre 2021 con un progetto dedicato allo studio, salvaguardia e valorizzazione del sito archeologico di Sarqala, nell'area di Garmian. La prima campagna di questo progetto ha visto la realizzazione di una ricognizione topografica, propedeutica a tutte le future attività archeologiche; l'avvio della raccolta e studio dei materiali archeologici di superficie e la raccolta di una nuova documentazione fotografica della tomba di periodo partico scoperta nel 2013.

MISAK AND THE MISAK SARQALA PROJECT

MiSAK, the Italian Historical-Archaeological Mission in Kurdistan (Missione Storico Archeologica Italiana nel Kurdistan di ISMEO e IICK),² was established in 2021 as a result of the common interest and desire of ISMEO – The International Association for Mediterranean and Oriental Studies (Associazione Internazionale di Studi sul Mediterraneo e l'Oriente),³ and IICK, the International Institute of Kurdish Culture in Rome (Istituto Internazionale di Cultura Kurda di Roma),⁴ to contribute directly and effectively to the study, protection, and enhancement of Kurdish historical, archaeological and cultural heritage.

Under the scientific direction of the author, the mission has been active since its creation in the Autonomous Region of Iraqi Kurdistan (KRG). In December 2021 it signed, together with ISMEO and IICK, a three-year renewable agreement with the

¹ Sections “The Archaeological Site of Sarqala” and “Conclusions” were written by all authors; Luca Colliva wrote sections “MiSAK and the MiSAK Sarqala Project” and “Collection of Surface Archaeological Material at the Qalla Kon tell;” Domenico Andreucci wrote section “Implementation of the Sarqala Parthian Vault-Tomb Documentation: the Photogrammetry of the Tomb and the Study of the Archive Photos.” Veronica Castignani wrote section “The Topographic Survey.”

² <https://misak.it/>; <https://www.facebook.com/MiSAK.Missione.Archeologica.Italiana.nel.Kurdistan/>; https://www.instagram.com/misak_missione_archeologica/.

³ <https://www.ismeo.eu/>; <https://www.facebook.com/ISMEO-301314406884294>.

⁴ <http://istitutokurdo.org/>; <https://www.facebook.com/IstitutoKurdo>.



Fig. 1 - The archaeological site of Sarqala (KRG, Iraq). © Google Earth.

KRG General Directorate of Antiquities and the Garmian Directorate of Antiquities, respectively represented by the Director General of Antiquities of the KRG, Kaifi Mustafa Ali, and the Garmian Director of Antiquities, Salih Mohammed Sameen, to carry out an archaeological project concerning the historical and archaeological study, protection, and enhancement of the Sarqala archaeological site (KRG, Iraq).⁵

The archaeological site of Sarqala includes a possible necropolis of the Parthian period, referred to as the “Parthian Vault-Tomb Area,” which was identified thanks to the fortuitous discovery of a Parthian-period chamber tomb, and the *Qalla Kon tell*, a probable multi-phase site that was possibly part of a larger settlement connected with the nearby necropolis (Figs. 1-4).⁶

⁵ All MiSAK activities take place thanks to the patronage of ISMEO – The International Association for Mediterranean and Oriental Studies, and IICK, the International Institute of Kurdish Culture in Rome, and the contributions of the MAECI, Ministry of Foreign Affairs and Italian Development Cooperation, and the Alma Mater Studiorum University of Bologna (AlmaScavi 2022). MiSAK would also like to thank the Italian Embassy in Baghdad and the Italian Consulate in Erbil for their continuous assistance; the ASOR, American School of Oriental Studies, for its endorsement and support; and the Department of Cultural Heritage of the Alma Mater Studiorum University of Bologna, the Geophysics Laboratory of the University of Roma Tre, and the “PAST - Public Archaeology and Social Transmission” and “Ancient DNA Laboratory” laboratories of the University of Bologna, Ravenna Campus, for their valuable collaboration. The MiSAK team and in particular the scientific director of the mission, Dr Luca Colliva, would like also to thank the President of ISMEO, Prof. Adriano V. Rossi; the President of IICK, Soran Y. Ahmad; the KRG Director General of Antiquities, Kaifi Mustafa Ali, the Garmian Director of Antiquities, Salih Mohammed Sameen, the Director of the Garmian Civilisation Museum, Sarwat H. Majeed, and their teams for their invaluable and continuous support.

⁶ Studies on the archaeological landscape of the area started by MiSAK in December 2021 have led to the identification of other possible archaeological contexts, also located in the Sarqala area, which will be the subject of subsequent investigations (see sections “The Archaeological Site of Sarqala” and “Conclusions”).



Fig. 2 - The archaeological site of Sarqala (© Google Earth) with the orthophotomosaics of the Qalla Kon *tell* (left) and the “Parthian Vault-Tomb” (right) (elaboration V. Castignani and L. Colliva – MiSAK 2022).



Fig. 3 - The Qalla Kon *tell*. Aerial photo N.A. Abdul-Karim – MiSAK 2021.

The MiSAK Sarqala project envisages a first phase including topographic survey, geophysical prospecting, landscape studies and collection, documentation, and cataloguing of the surface archaeological material (summer 2022 campaign), to be com-



Fig. 4 - The entrance to the Parthian-period tomb of Sarqala created when the site was musealised.
Photo D. Andreucci – MiSAK 2021.

plemented by stratigraphic excavations, both in the necropolis and in the settlement sector (from autumn 2022 to the end of 2024). The excavation areas will be selected based on data collected during the first phase.

The project, which officially started in January 2022, was preceded by a two-week preliminary campaign authorised by the KRG General Directorate of Antiquities in December 2021, which aimed to collect site archaeological, topographic, and photographic data.⁷

This preliminary two-week campaign in December 2021 involved a photographic and topographic survey of the site and the collection, documentation, and cataloguing of the surface archaeological material in the probable settlement area (Qalla Kon). These activities were preparatory to the study of the site and its landscape, the planning of the geophysical survey conducted in spring 2022 (Camarano, Colliva, Mohammed Sameen forthcoming; Colliva forthcoming), and the stratigraphic excavations scheduled to start in autumn 2022.

The MiSAK team for the preliminary campaign included the author, archaeologist and scientific director of the mission; Domenico Andreucci, archaeologist and photographer; and Veronica Castignani, archaeologist and topographer. The MiSAK team was accompanied by the representatives of the Garmian Antiquities Directorate, the archaeologists Nawzad Abdullatif Abdul-Karim, Emad Ismael Madhat, and Sarwat H. Majeed. The campaign lasted two weeks.

⁷ All project activities, including the preliminary mission in December 2021, are carried out with support from and in close cooperation with the Garmian Antiquities Directorate and its staff.



Fig. 5 - The different archaeological complexes identified so far by MiSAK in Sarqala.

During the preliminary campaign, MiSAK pursued and achieved three main objectives: a preliminary topographic survey of the “Parthian Vault-Tomb Area” and the Qalla Kon *tell*, a collection of surface archaeological material at the Qalla Kon *tell*, and the implementation of the documentation on the Parthian Vault-Tomb found at Sarqala in 2013.

LC

THE ARCHAEOLOGICAL SITE OF SARQALA

The village of Sarqala (Nahiya of Sarqala) is located about 13 km North-East of the city of Kalar. Near the village, two archaeological complexes were preliminarily identified: a Parthian Vault-Tomb, located East of the village and probably part of a yet-to-be-investigated larger necropolis, and a *tell* called Qalla Kon located immediately South of the village. During MiSAK activities in December 2021 and 2022, other possible archaeological complexes have been identified, together with representatives of the Garmian Antiquities Department. They will be the subject of future investigations: the remains of a baked brick culvert in the centre of the village, a second *tell* located South-West of Qalla Kon and named Karaba by the local population, and a new archaeological area—still unidentified—known as the “Jewish Cemetery” (Fig. 5).⁸

⁸ The presence of archaeological remains in the “Jewish Cemetery” area was also confirmed by the engineer Aram Mohammad, who worked on the construction of the masonry fence enclosing the modern village cemetery; see also section “Conclusions.”



Fig. 6 - The Parthian tomb (PVT01) at the time of the fortuitous discovery. Photo courtesy of the Garmian Directorate of Antiquities – Karim, Abdul-Karim 2019.

The Parthian Vault-Tomb Area

The Parthian Vault-Tomb (PVT01) was discovered in 2013 when workers broke through the vaulted roof of a chamber tomb during work on the construction of a new water cistern (Fig. 6).

The Vault-Tomb was excavated by the archaeologists of the Garmian Antiquities Directorate, who found a rectangular room (3×2.40 m) approximately North-South orientated, whose barrel-vaulted roof reaches a maximum height of almost 2.10 m.⁹ The room is accessed through a small opening in the Western wall, c. 0.45 m from the South-West corner, which is approximately 0.75 m in width and 1.01 m in height. There are four benches about 0.65 m wide on all sides of the room and interrupted only in line with the entrance. There are two arched niches in the middle of the North and South sides. The structure is made of fired bricks measuring about 30×30×7 cm.

Inside the tomb, the archaeologists of the Garmian Directorate of Antiquities found ten human skeletons, of which some were placed on the East and West benches, some in the North and South niches, one inside a glazed clay sarcophagus located on the North bench (Fig. 7) and one in a large clay basin placed on the floor of the room in front of the sarcophagus (Karim, Abdul-Karim 2019).

⁹ Karim et al. 2014; Karim, Abdul-Karim 2019. The measurements reported here are those collected during the MiSAK campaign in December 2021 and implement, partly correcting, the measurements reported in the previous publication.



Fig. 7 - The glazed sarcophagus found in the Sarqala Parthian tomb (PVT01) and on display at the Garmian Civilisation Museum. Photo D. Andreucci – MiSAK 2021.

In the tomb, there were also glassware, ceramics including monochrome glazed ceramics, metal tools, jewellery in gold, bronze and semi-precious stones, and Parthian coins. All the collected material is now stored, and to a large extent exhibited, at the Garmian Civilisation Museum of Kalar (Karim, Abdul-Karim 2019).

Comparisons with coeval Parthian necropolises, such as Susa (Boucharlat, Haer-inck 2011) or Kilizu/Qasr Shemamok,¹⁰ clearly indicate that such a tomb was usually not an isolated construction but more likely part of a necropolis that must have occupied the hills East of the modern village.

Qalla Kon

The Qalla Kon *tell* is in the Southern part of the village of Sarqala. Occupied by a military post during Saddam Hussein's regime, it has never been the subject of archaeological excavations, but was recognised during the activities of the Sirwan Regional Project.¹¹ According to the preliminary data collected while studying archaeological surface materials,¹² the *tell* appears to be a multi-period site.

LC, SMS, DA, VC

¹⁰ Furlani 1934; Martini 2021 and related bibliography.

¹¹ Personal communication of the archaeologists of the Garmian Directorate of Antiquities. The report of this survey is still unpublished.

¹² See section "Collection of Surface Archaeological Material at the Qalla Kon *tell*."

The MiSAK team carried out a preliminary topographic survey in December 2021, both on the Qalla Kon *tell* and in the “Parthian Vault-Tomb Area,” to better plan the forthcoming fieldwork and create a network of known coordinate points in preparation for future archaeological investigations. The research commenced with an initial analysis of remote-sensing data and a preliminary examination of cartography available from the Garmian Directorate of Antiquities and Sarqala local authorities. They provided a Gazprom Shakal Licence boundaries map. As far as archaeological data is concerned, however, the only available information is from the *Atlas of the Archaeological Sites in Iraq* (Map 104) (General Directorate of Antiquities 1976) and a dedicated database by the Sirwan Regional Project.¹³ Nevertheless, the most useful source for contextualising topographic and archaeological data is the satellite imagery database freely provided by Google, Esri and Bing. Satellite images achieve an adequate ground resolution for the area of interest and represent the base map where all archaeological and geophysical data from the MiSAK Sarqala Project will be managed, visualised and analysed. Declassified CORONA satellite images have also been consulted, since the KH-4A series (acquisition period 1963-1969) and KH-4B series (acquisition period 1967-1972) have wide coverage of the investigated area. The CORONA dataset has ground resolution (9-6 feet = 2.74-1.93 m) too low for detailed archaeological investigations, but adequate to observe diachronic landscape transformation and the gradual impact of modern Sarqala’s urbanisation since the second half of the 1960s (Fig. 8). The creation of a database using a GIS platform, populated with all available products related to the investigated areas, allowed for a multi-thematic base map useful for collecting and managing both the previous documentation and datasets from new fieldwork.

In order to increase the resolution of the base map to more effectively manage and visualise the data collected, the topographic documentation of both sites was enhanced through proximal sensing techniques (GNSS applications, drone).

The proximity of the site to a Gazprom refinery caused difficulty, due to security reasons, in finding benchmarks in real-world coordinates for the absolute positioning of the survey area, and initially prevented us from working in a global coordinate system. A series of fixed ground control points were placed, eleven for the “Parthian Vault-Tomb Area” and five for the Qalla Kon *tell*, to create a secure topographic network and precise positioning of the area (Fig. 9).¹⁴ Cooperation with the Geophysical Lab of the Department of Science (Roma Tre University) during the July 2022 fieldwork season enabled the previous survey results to be georeferenced via Differential GPS.¹⁵

Thanks to the kindness of the Garmian Antiquities Directorate and the archaeologist Nawzad Abdullatif Abdul-Karima, a photogrammetric survey was carried out

¹³ Concerning the database, see Laugier, Abdullatif, Glatz 2022 and related bibliography. Regarding the Sirwan Regional Project, see the project website: <https://www.gla.ac.uk/schools/humanities/research/archaeologyresearch/currentresearch/sirwanregionalproject/#d.en.424935>.

¹⁴ At first, all control points were surveyed via Trimble 5605 DR 200+ Total Station.

¹⁵ A part of the ground control points was surveyed through a Topcon HiPer SR Differential GPS.

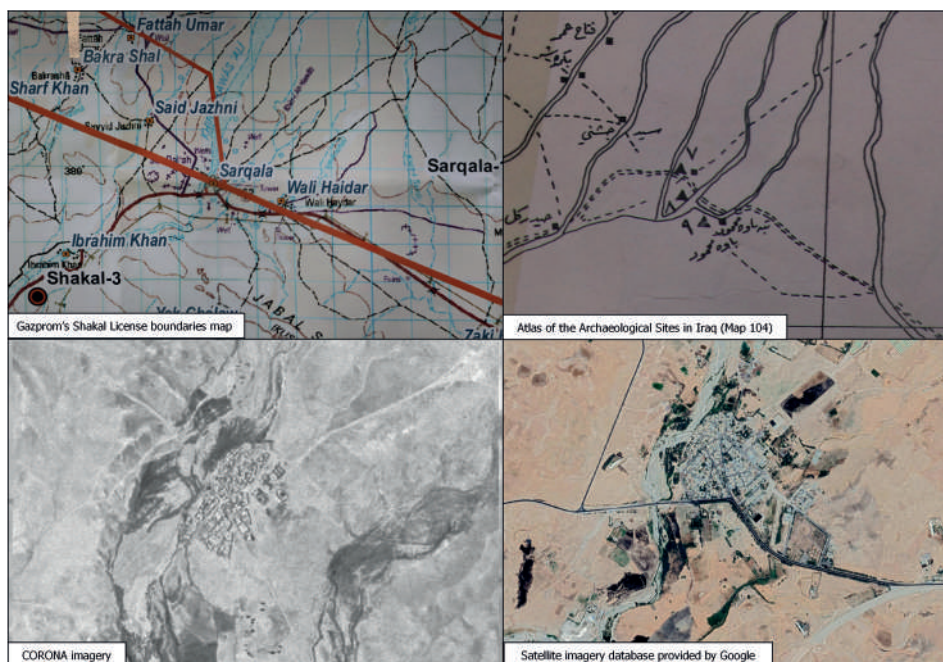


Fig. 8 - Cartography and satellite imagery available for the village of Sarqala. Assembly by V. Castignani – MiSAK 2022.

using an unmanned aerial vehicle (UAV).¹⁶ The drone flight in the “Parthian Vault-Tomb Area” had an altitude of approximately 80 m and captured 360 images; the flights covered an area of 0.152 km² and achieved in post-processing a ground resolution of 1.8 cm/pix. The drone survey at the Qalla Kon *tell* had an altitude of approximately 60 m and captured 189 images, covering an area of 0.066 km² and achieving in post-processing a ground resolution of 1.3 cm/pix. Processing (via Agisoft MetaShape professional software) of the photographic datasets produced accurate point clouds, meshes, textured three-dimensional models and high-resolution zenithal orthomosaics (Fig. 10). Following this, it was possible to build a Digital Elevation Model (DEM) and generate contour lines for the “Parthian Vault-Tomb Area” and the Qalla Kon *tell* (Fig. 11). A DEM is a graphic representation where each pixel stores the position and elevation values derived from the 3D model. Information from each point is then interpolated to obtain a digital surface with elevation data that represents terrain and objects on the ground. East of the modern village, the DEM clearly illustrates a sequence of hills (350-370 masl) oriented North-East to South-West, of similar morphology to the hill where the Vault-Tomb was found and perhaps of comparable archaeological potential (Fig. 11).

To conclude, the MiSAK Sarqala Project aims to maintain an integrated and multi-scale approach in studying the landscape where the archaeological sites are located. Analysis of data from remote sensing will enable better insight into the

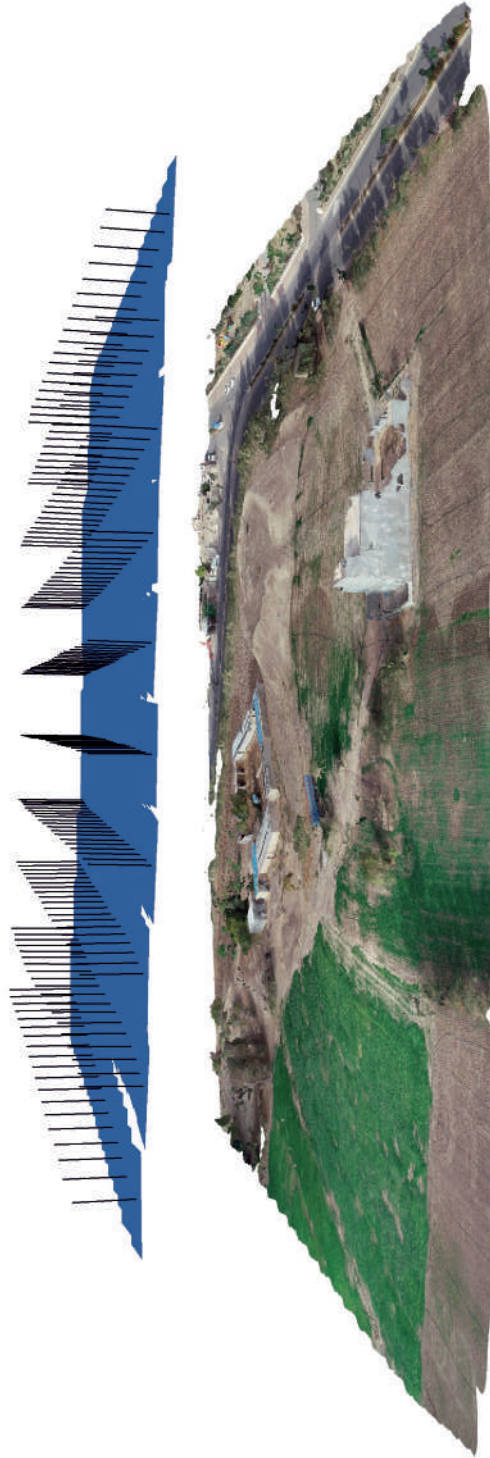
¹⁶ A DJI Phantom 4 Pro.



Fig. 9 - Orthoimage of the two investigated archaeological complexes in Sarqala with the positioning of the ground control points: on the left the “Parthian Period Vault-Tomb Area;” on the right the Qalla Kon *tell*. Processing V. Castignani – MiSAK 2021.

Perspective 30°

Snap: Axis, 3D



faces: 1,500,948 vertices: 755,691

Fig. 10 - Location of UAV cameras at the Qalla Kon tell. Assembly by V. Castignani – MiSAK 2022.

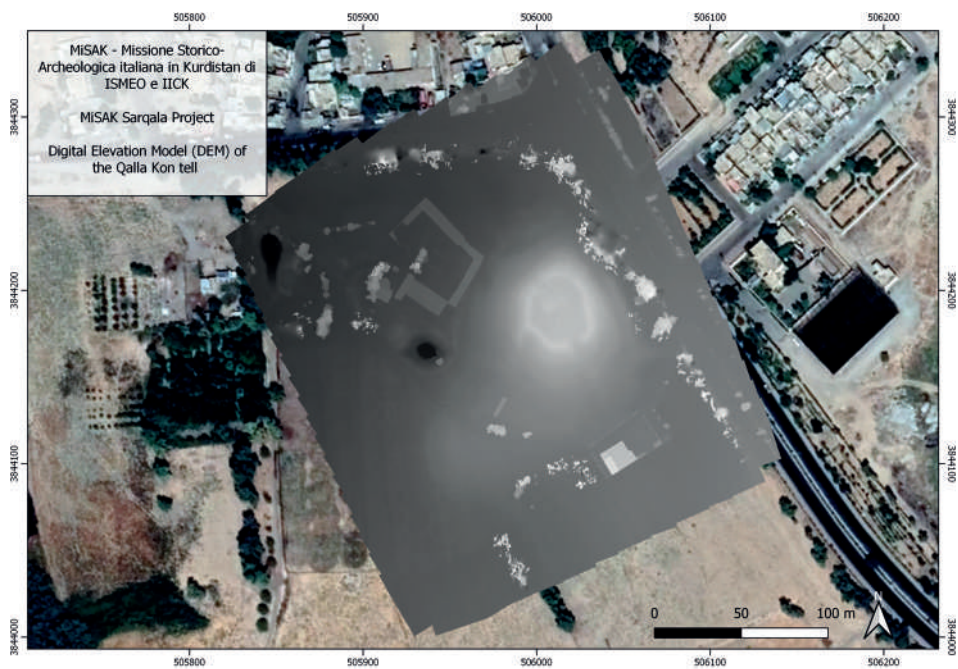
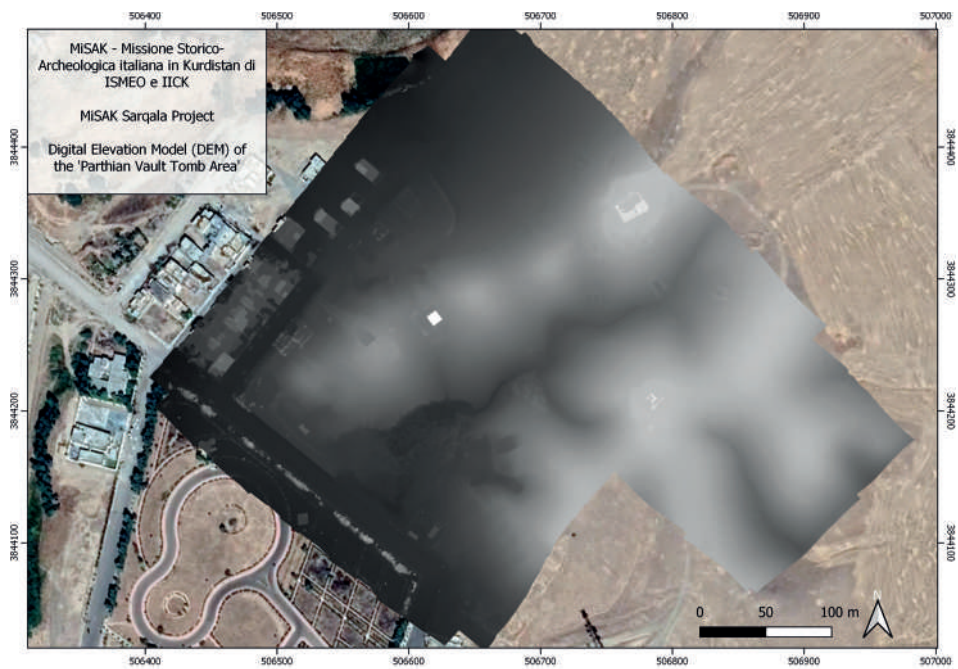


Fig. 11 - DEM of the two investigated archaeological complexes of Sarqala: on the left the “Parthian Period Vault-Tomb Area;” on the right the Qalla Kon *tell*. Processing V. Castignani – MiSAK 2021.

geomorphological characteristics of the landscape, which is necessary for a correct topographical framework of the research areas. Integration with data from the aerophotogrammetric survey will allow more detailed documentation of archaeological features throughout the next fieldwork seasons.

VC

COLLECTION OF SURFACE ARCHAEOLOGICAL MATERIAL AT THE QALLA KON *TELL*

The collection of surface archaeological materials on the Qalla Kon *tell* started during the MiSAK December 2021 campaign.¹⁷

To study the surface material and its shifting processes, a 5×5 m North oriented grid was created and used during collection.

The secondary deposition of the surface materials is manifest. It is at least partially caused by the evident disturbance of the archaeological stratigraphy of the *tell* in the superficial layers and especially on the top of the hill by the several anthropic activities, mainly agricultural and military, that affected the area. For this reason, more precise positioning of the surface materials would not provide valuable data. It was decided to avoid any study linked with the spatial distribution of the surface pottery material, except in relation to the already mentioned shifting processes, as in view of the above the data obtained would be strongly altered and substantially unreliable.

The methodology applied to the study of surface archaeological material is to collect all ceramic material within the grid quadrants; all stone fragments with clear traces of workmanship are collected in the same way; metal objects and glasses are considered only if not contemporary, and since this is a surface material study, bones are only considered when they show traces of working or “tool” use.¹⁸

During the preliminary campaign in December 2021, 32 quadrants were investigated, to which a further 7 quadrants were added in July 2022. The survey will continue during the November-December 2022 campaign (Fig. 12).

To obtain data on the shifting processes, the weight of the pottery from each 5×5 square was measured and compared with that of adjacent quadrants. However, the data is still highly preliminary as only part of the area has been investigated.

In addition to a large number of pottery fragments, 9 fired brick fragments, 20 lithic blades, a vague necklace, one grooved weight, and one glass fragment of uncertain date have been collected and are under study (see Tab. 1).

The collected data is still largely incomplete, and the detailed study of the materials found will only begin in autumn 2022.¹⁹ Nevertheless, a very preliminary analysis of the findings seems to confirm the multi-period nature of the site. Indeed, the

¹⁷ In the “Parthian Vault-Tomb Area,” the surface archaeological material is almost completely absent, which probably prevented the clandestine excavation of the necropolis.

¹⁸ Regarding the applied methodology, see also Colliva, Matin 2022: 231-234.

¹⁹ In this first phase, in addition to the weight, we collected photographic documentation of all the diagnostic fragments using a Canon 70D and a lightbox (equipped with unidirectional LED lighting) to obtain greater homogeneity of the photographic documentation. All fragments that can be considered significant for identifying ceramic production due to their shape and or technological features are considered diagnostic (see Colliva, Mancini 2021: 148-149; forthcoming).

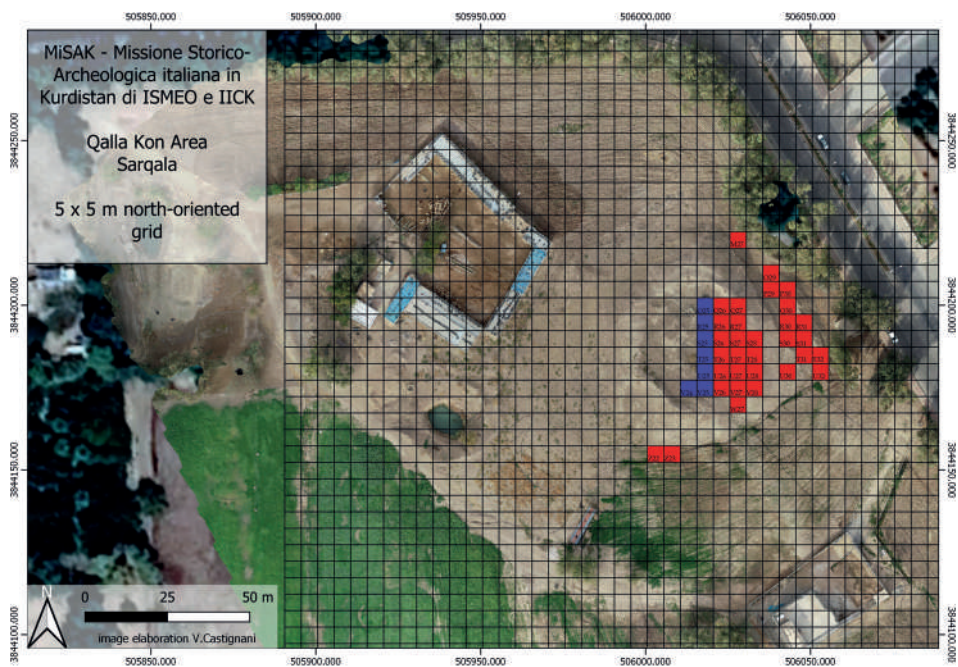


Fig. 12 - The ortophotomosaic of the Qalla Kon *tell* with the 5×5 grid and the investigated quadrants. Image elaboration V. Castignani – MiSAK 2022.

ceramic material suggests a range from the 5th millennium BCE to the Islamic or even the Ottoman period. Finds considered to be diagnostic include: a fragment of red-painted pottery with geometric motifs and two fragments of black-painted pottery, also with geometric motifs, preliminarily dated between the 6th and 5th millennium BCE (Halaf Period and Northern Ubaid Period?);²⁰ two possible incurved-rim bowls



Fig. 13 - An Ottoman clay pipe from Qalla Kon (Example of documentation for materials from the Qalla Kon surface survey; photo D. Andreucci – MiSAK 2021).

preliminarily dated to the Hellenistic period;²¹ one sherd with incised comb decoration and a piece of monochrome turquoise glazed ware, which have been preliminarily attributed to the Islamic period (Colliva, Mancini 2021; forthcoming); and an Ottoman clay pipe fragment (Fig. 13). An optical pre-analysis shows similarities between the brick fragments collected in Qalla Kon and those employed in constructing the Parthian tomb (see Tab. 1 and Fig. 14).

²⁰ Gavagnin, Iamoni, Palermo 2016: 122-127 and related bibliography.

²¹ *Ibid.*: 147-150 and related bibliography.

TABLE 1

Major findings and weight of pottery found in the investigated quadrants (December 2021 - July 2022)

Year of survey	Quadrant	Ceramic material weight ²²	Other archaeological materials attested in the quadrant
December 2021	M27	1150	
	O29	2800	Flint fr.
	P29	1650	
	P30	250	Baked brick fr.Ottoman clay pipe fr.
	Q26	250	Glass
	Q27	900	Flint blade fr.
	Q30	1250	
	R26	900	
	R27	950	
	R30	1000	Flint fr.Two baked brick fr.
	R31	200	
	S26	1700	Three flint fr. Two baked brick fr.
	S27	350	Baked brick fr.
	S28	800	Two flint fr.
	S30	1250	Baked brick fr.
	S31	350	
	T26	2400	
	T27	1100	
	T28	750	Flint blade fr.
	T31	400	
	T32	350	Flint fr.
	U26	1750	Three flint fr.
	U27	1750	
	U28	1500	Flint fr. Grooved weight
	U30	1100	Three flint blade fr.
	U32	600	
	V26	1050	Flint blade fr.
	V27	600	Flint fr.
	V28	1050	
	W27	500	Baked brick fr.
Z22	400		
Z23	1400		
July 2022	Q25	300	Flint fr.
	R25	550	
	S25	1000	Three flint blade fr.
	T25	1250	Flint blade fr.
	U25	1350	Four flint blades fr.Four flint fr.
	V25	1750	Baked brick fr.
	V24	750	

²² The weight of the ceramic fragments for each quadrant is expressed in grams (g) and has been rounded to the nearest 50 g.

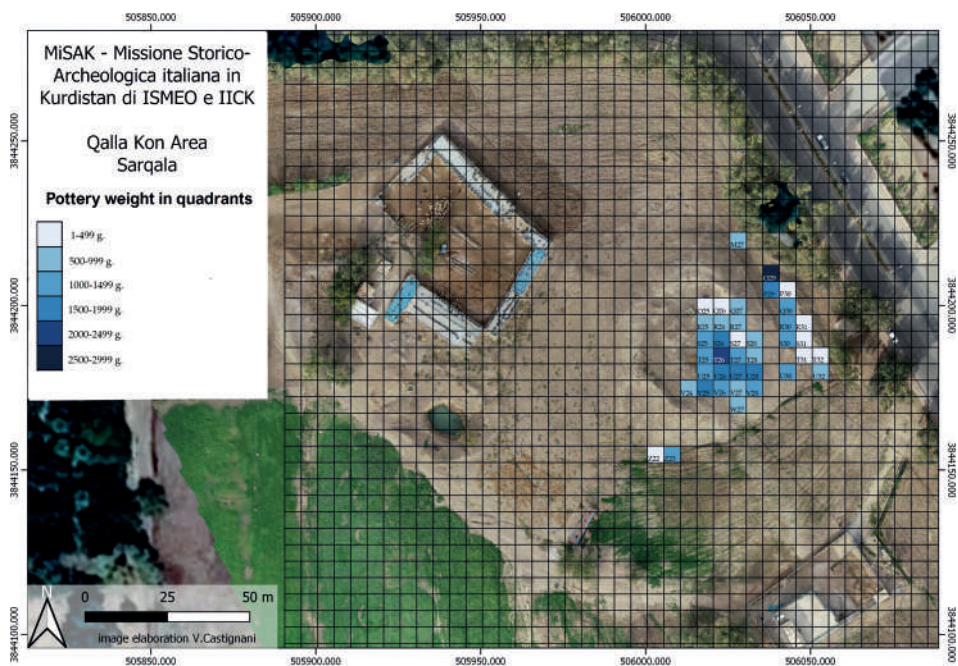


Fig. 14 - The orthophotomosaic of the Qalla Kon *tell* with the pottery weight in each investigated quadrant. Image elaborations V. Castignani – MiSAK 2021/G. Giubergia – MiSAK 2022).

LC

IMPLEMENTATION OF THE SARQALA PARTHIAN VAULT-TOMB DOCUMENTATION: THE PHOTOGRAMMETRY OF THE TOMB AND THE STUDY OF THE ARCHIVE PHOTOS

To obtain a new photogrammetric survey of the Parthian tomb of Sarqala (PVT01), new complete and detailed photographic documentation of the structure was collected during the MiSAK December 2021 campaign. This survey aimed to gather precise data on the structure of the tomb. At the same time, it will be beneficial for monitoring the tomb deterioration processes and checking future interventions (Fig. 15).

The choice for conducting the survey fell on photogrammetric practice, due to the cost-effectiveness, immediate availability, ease of transportation and the very narrow and cramped dimensions of the environment.²³

The photographs were collected over three days. They were collected and processed several times to ensure the survey had the greatest possible coverage and accuracy.

The data collection addressed numerous challenges that arose from the environment's morphology.

²³ For instance, the use of a laser scanner would have had many more technical limitations due to the very restricted location and the necessity of a complete survey.



Fig. 15 - Shooting session for the entrance wall of PVT01. Photo V. Castignani – MiSAK 2021.

The first was related to the small size of the structure, which due to the instrumental capacity limitations required a large number of shots to obtain the maximum surface coverage possible and sufficient overlap of the shots.

The second was related to the ambient lighting, which was insufficient and inhomogeneous. The only light source was the structure's entrance, a natural light directional that was insufficient to illuminate the room. Photographic planning, corrected over the days through daily processing of the collected data, was needed to overcome these problems.

Thirty-five markers were placed inside the tomb to be used as control points when processing and elaborating the collected photographs to facilitate data collection and image overlay.²⁴

Manual measurements were taken of the distances between all the markers. Moreover, the closed environment allowed the use of the same markers for several days. Two LED spotlights (20W, 6500K) were placed along the wall opposite the one being captured, oriented diagonally to overcome the problem of lights. To achieve a more balanced illumination of surfaces, a measurement of grey cardboard at 18% was taken, using the camera's exposure meter to correct the exposure.

In order to achieve accurate surface coverage, it was necessary to develop a working flow. A tripod was prepared for shooting by identifying four positions along each short side of the room (2.40 m), at 40 cm, 1 m, 1.50 m, and 2 m respectively.

²⁴ Markers provided by the software were used for automatic point detection in processing.

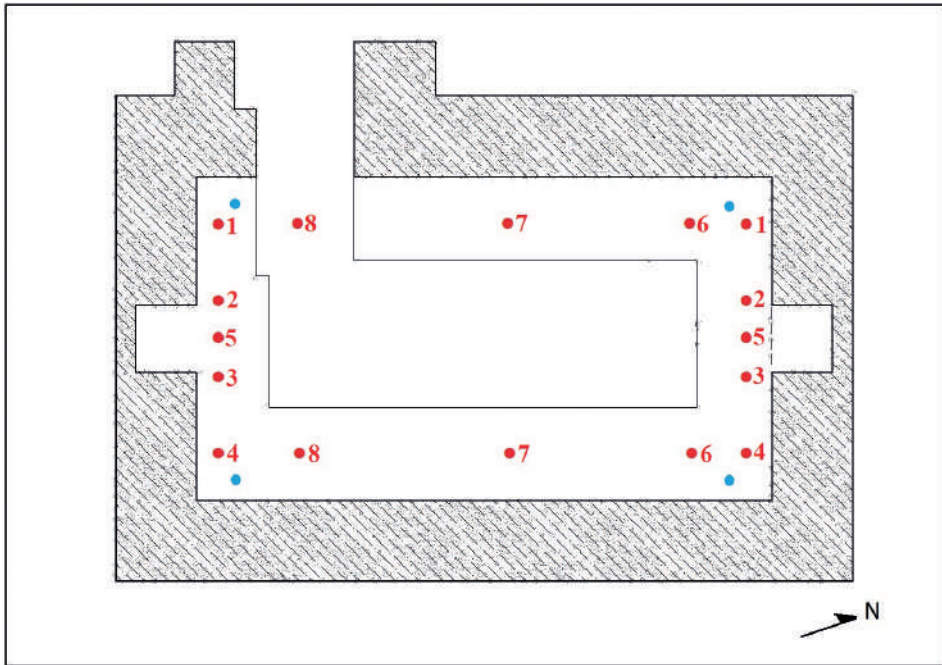


Fig. 16 - Floor plan of PVT01, in red, the camera positions. The positions of the lights are in blue. Drawing from Karim, Abdul-Karim 2019; elaboration D. Andreucci – MiSAK 2021.

During the first photo shoot, at the first location (no. 1 in Fig. 16) and the last location (no. 4 in Fig. 16), six series of photographs were taken, each consisting of five vertically overlapping shots (20%-40% overlap). Each series overlaps horizontally with the neighbouring series (60-70%). At each of the second and third stations, three photographs were taken, as described above.²⁵

As for the North wall shot, the exposure settings changed, and the lights were shifted 40 cm from the wall. Only one set was taken at location two, and two sets were taken at location three.²⁶

A further collection of shots was taken to implement the documentation previously obtained for an even more accurate digital model of the tomb. A group of photos was carried out, with two stations (no. 5 in Fig. 16) taking a series on each side to better document the two niches.

Furthermore, the documentation was enriched on the long sides with the addition of three other positions on each side, one series each. The series shot at stations 5, 6, 7, and 8 were carried out by holding the camera more orthogonally to the photographed surface. The series was shot by lowering and raising the tripod's height

²⁵ The shots were taken with the following setting: manual mode, 2000 ISO, f14, 1/2 sec. for the North wall shot and 1/6 for the South wall shot, 10 sec. timer, using a Tamron 18-200 mm f/3.5-6.3 zoom lens set to 19 mm.

²⁶ Due to lack of power in the battery of the lights. During the 2021 winter campaign, PVT01 was without any electrical connection.

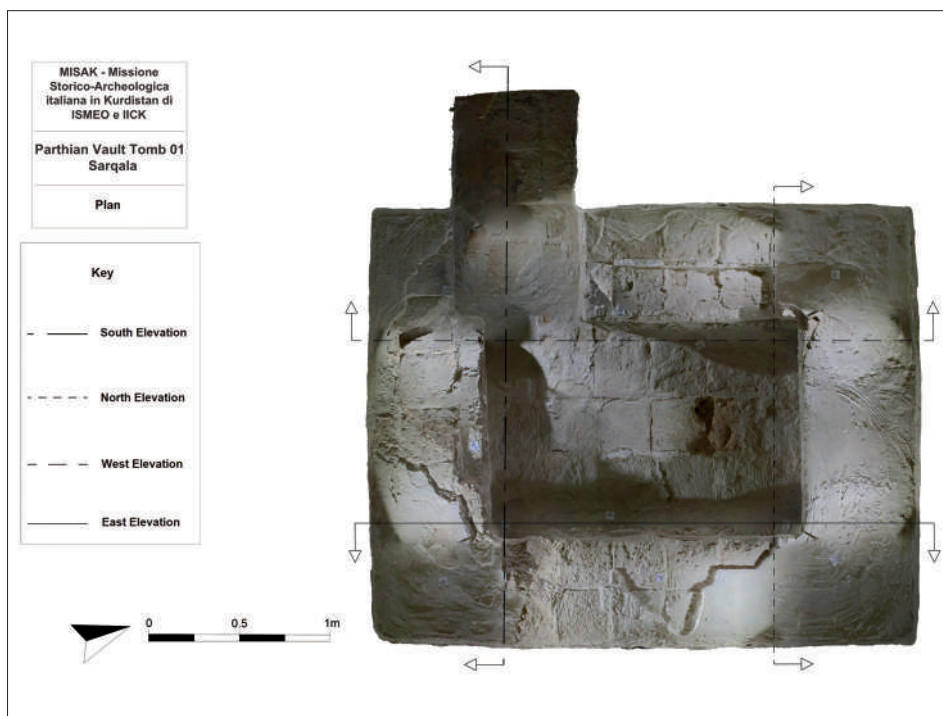


Fig. 17 - The photogrammetric relief of the Sarqala Parthian Vault-Tomb (PVT01), the floor plan with elevations shown in Fig. 18. Photo D. Andreucci – MiSAK 2021; elaboration V. Castignani – MiSAK 2021.

(38 cm, 1.05 m, 1.40 m), and the photographic documentation of the floor was also carried out by adding some shots facing the floor to the series.

The photographic documentation of the entrance wall was obtained by shooting two sets of three frames in two positions.

Final data processing took place in Italy²⁷ due to time constraints and instrumental limitations. The processing involved the creation of a model using Agisoft Metashape Professional software and a total of 315 photographs. At the end of processing, six prospects were made from the model by sectioning it (see Figs. 17-18).

Despite the planning accuracy and the complete structure coverage, some gaps emerged in the model during the processing phase. These gaps concerned some of the internal edges of the structure, where it was more challenging to obtain a sharp image even with the lighting. In some cases, such as in the niches, it will be appropriate to consider further data collection to fill in the gaps. Implementing the tomb floor plan using the 3D model presented another limitation caused by the unusual overexposure due to the spotlights, which almost exclusively rested on the ground. Despite these issues, the documentation turns out to be valuable and abundant both for research and preservation.

²⁷ Final data processing was carried out by Veronica Castignani.

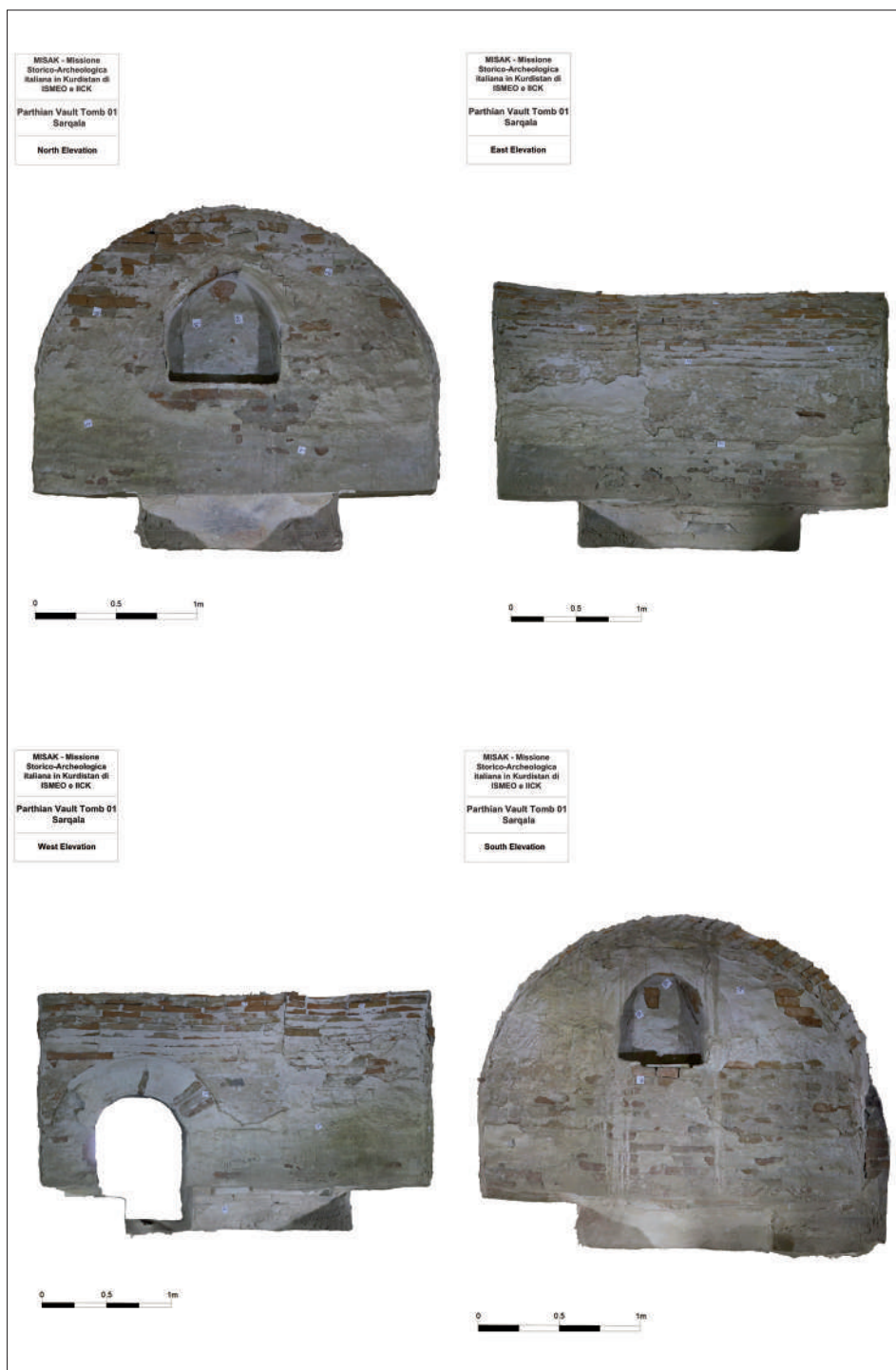


Fig. 18 - The photogrammetric relief of the Sarqala Parthian Vault-Tomb: the elevations of the four walls. Photo D. Andreucci – MiSAK 2021; elaboration V. Castignani – MiSAK 2021.

The publications concerning the discovery and excavation of the Parthian tomb are minimal: the aforementioned short abstract for the 9th ICAANE conference and the Kurdish-language publication issued in Erbil (KRG, Iraq) (Karim et al. 2014; Karim, Abdul-Karim 2019).

Therefore, in this case, collecting previous photographic documentation is an essential step in site knowledge, and studies on this material allowed us to gather more information than expected.

For example, when preserved, metadata tells us the equipment used and the chronology of archaeological interventions, as well as visible information regarding the institutions involved, the methodology and findings. Moreover, the achievable comparison between a photograph from 2013 and one from 2021 is crucial for facilitating the deductive process to better understand the consolidation and reconstruction interventions, which are unfortunately poorly documented (Fig. 19).

This process must then be guided, corrected, and calibrated, when still possible, by autoptic observation. Although it may seem very empirical, it leads to delineating the areas affected by interventions. This result is crucial for researching and monitoring the investigated structure and planning more accurate and innovative preservation activities.

DA

CONCLUSIONS

The December 2021 preliminary campaign at Sarqala (KRG, Iraq) resulted in the collection of crucial topographical documentation for both the “Parthian Vault-Tomb Area” and the Qalla Kon *tell*. The collected topographical documentation is preparatory to positioning the geophysical surveys carried out in July 2022 (Cammarano et al. forthcoming) and planning the stratigraphic excavations scheduled for November-December 2022.

The photographic documentation of the Parthian tomb excavated in 2013 by the archaeologists of the Garmian Antiquities Department (Cammarano, Colliva, Mohammed Sameen forthcoming; Colliva forthcoming) has provided important new data for the ongoing typological studies. It has allowed us to create a photographic archive that, together with the photographic documentation shared with us by the archaeologists who performed the excavation, will enable monitoring of the tomb’s degradation and implementation of the necessary preservation measures.

The collection of surface material at the Qalla Kon *tell*, which began in December 2021 and continued in July 2022, is still at an embryonic stage. However, preliminary analysis of the collected data already shows many points of interest. The irregular distribution of the pottery fragments in the different investigated quadrants of the Qalla Kon grid, as can be deduced from the data on the weight of ceramic materials collected (Tab. 1), confirms the secondary deposition of the materials and the heavy alteration processes which affected the surface of the *tell*. In addition to the agricultural activities still visible along the slopes of the *tell*, traces of excavation, levelling and soil movement are evident and confirmed. This is particularly manifest on the top of the *tell*



Fig. 19 - Left: a photo was taken during the emergency intervention in 2013 (courtesy of the Garimian Directorate of Antiquities); Right: a photo taken in 2021 (photo D. Andreucci – MiSAK 2021) with almost the same orientation. On the photograph, the outline of the breakthrough and gaps created when the site was discovered are marked in yellow, then the relevant replacements after 2013. In blue are some elements that were absent in 2013, probably connected with the consolidation interventions.

where, during Saddam Hussein's regime, there was a military position, now dismantled and of which only a few traces of walls and foundations are still visible in the centre of the clearing.

The quantity and richness of the material found and the size of the area in which surface material is visible, extending well beyond the slope of the *tell* especially on the South and West, hint at the site's importance. This is also proved by the impressive wealth of the Parthian period tomb found in 2013, the presence of a previously unknown archaeological complex in the "Jewish Cemetery" area and the discovery of a baked brick culvert that, as far as could be established,²⁸ seems to proceed to the South.

During the survey activities in Sarqala, the MiSAK team also had the opportunity to visit, together with representatives of the Garmian Directorate of Antiquities, a further archaeological site referred to by Sarqala's inhabitants as Kharaba. This *tell* is located about 500 metres South-West of Qalla Kon, and on very first inspection the surface material visible at Kharaba is similar to that found at Qalla Kon.

The proximity of the two sites, the scattering of archaeological material visible to the South and West beyond the limits of Qalla Kon, and the similarity of the visible material could perhaps suggest that, at least in some periods, the ancient settlement extended at least over the whole area between these two *tells*.

LC, SMS, DA, VC

²⁸ We thank the engineer Aram Mohammad who worked in the area and confirmed the presence of other sections of the same canal below the buildings between the still visible section and the Qalla *tell*.

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