

TORO MUERTO

DOCUMENTING THE LARGEST ROCK ART SITE IN PERU

PRELIMINARY REPORT

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SUMMARY

This paper concerns the research done in the framework of the Toro Muerto Archaeological Research Project (TMARP) that has resulted in registration of 1,664 boulders covered with petroglyphs, probably made by the representatives of the several cultural traditions developing in this region of Peru, from about the middle of the first millennium to the middle of the second millennium AD. The individual decorated panels of some of the larger boulders are frequently covered with dozens of various representations made using various techniques. They include geometric motifs, zoomorphic and anthropomorphic representations. The documentation works were carried with the use of both traditional and modern technics used in archaeology.

RIASSUNTO

L'articolo affronta la ricerca condotta all'interno del progetto Toro Muerto (TMARP) che ha permesso di classificare 1664 rocce incise da popoli diversi che hanno abitato il Perù fra il 500 e il 1500 d.C. I pannelli individuali sono spesso decorati con decine di raffigurazioni realizzate con tecniche diverse. I soggetti più rappresentati sono: motivi geometrici, zoomorfi e antropomorfi. Il lavoro di documentazione è stato eseguito utilizzando sia tecniche archeologiche tradizionali che moderne.

In 2015 and 2016, a group of Polish researchers from the Institute of Archaeology of the University of Warsaw conducted two bi-monthly field works in Toro Muerto, an exceptionally complex rock art site in southern Peru. The research done in the framework of the Toro Muerto Archaeological Research Project (TMARP) has resulted in registration of approx. 3.5 km² area with 1,664 boulders covered with petroglyphs. The research revealed also new features of the site, which had either not been noticed by earlier researchers or considered in earlier analyses. This work was made possible by the funding from the Polish Ministry of Science and Higher Education (Diamond Grant No. DI 2013008843) and the help of the local authorities, represented by Ramón Zegarra Prado - mayor of the Uraca-Corire District. The main objective of the project was to elaborate documentation methods, which could be most useful for documenting large-scale rock art sites. Karolina Juszczuk was the TMARP Manager, its director from the Peruvian Ministry of Culture was Abraham Imbertis Herrera and the academic supervisor was Janusz Z. Wołoszyn.

The Toro Muerto site is located in the central part of the Majes Valley near Corire (Uraca-Corire District, Province of Castilla, Region of Arequipa). It is approximately 4 km from the river as the crow flies, situated on a hilly, desert area west of the foothills of the Andes at altitudes ranging from approx. 500 to 1200 meters above sea level. The area of the site is covered by exceptionally numerous randomly scattered boulders of volcanic origin of between several dozen centi-

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metres and several metres in size. Most of them, estimated by earlier researchers at approx. 5000 (LINARES MÁLAGA 2005), are decorated with petroglyphs of various subjects, probably made by the representatives of the several cultural traditions developing in this region of Peru, from about the middle of the first millennium to the middle of the second millennium AD¹. The individual panels (decorated rock faces) of some of the larger boulders are frequently covered with dozens of various representations made using various techniques. They include geometric motifs, zoomorphic and anthropomorphic representations, as well as probable images of plants or heavenly bodies. Taking into account the very number of the petroglyphs, as well as the size of the site, Toro Muerto is considered to be the largest concentration of rock art in Peru (GUFFROY 1999, p.77), and possibly also in the whole of South America.

HISTORY OF RESEARCH

Toro Muerto, well known to the local population since at least the first half of the 18th century (unfortunately, mainly as an easily available source of building materials), was discovered for science as late as in 1951. Its first researcher was the outstanding Peruvian archaeologist from Arequipa, Eloy Linares Málaga, who completed his doctorate and published numerous papers and books on the Toro Muerto rock art (LINARES MÁLAGA 1960, 1967, 1968, 1974, 1990, 1993, 2005, 2013). The site itself and its surroundings in the 1950s and 1960s were also visited, photographically documented and studied by foreign scholars, representatives of German and French scientific missions, including Hans Dietrich Disselhoff, Hans Horkheimer and Henry Reichlen. In the 1980s, important documentary work at Toro Muerto was done by one of the most outstanding rock art researchers of those times, the Cuban archaeologist Antonio Núñez Jiménez (1986a, 1986b). Unfortunately, his photographs and drawings of hundreds of petroglyphs significantly differ from current standards (e.g. most of the drawings are lacking scales, furthermore, the drawings were done on the basis of photographs). At the International Rock Art Congress, which Antonio Núñez Jiménez organized in Havana in 1986, he promoted Toro Muerto as the biggest repository of rock art in the world, arguing that to be professionally protected it should be inscribed on the UNESCO List of World Heritage Sites. Unfortunately, this postulate, despite being raised several times on various occasions also by other scholars (like Federico Kauffmann Doig in 2011), has, so far, not come to fruition.

The general plan of the site was elaborated in 1998, using the methods available at that time, as a result of the work of National Institute of Culture of Peru – Arequipa Branch (INCA). This project encompassed a significant proportion

1. Current research (e.g. LINARES 2005) suggests that rock art at Toro Muerto was created over a period of approx. 800 years by the representatives of at least three different cultural traditions: Wari (approx. 800–1200 C.E.), Chuqui-amba (approx. 1000–1400 C.E.) and Inca (from approximately the second half of the 15th century to the early colonial era). The presence of each of these cultures is well-documented archaeologically (materials mainly obtained from cemeteries) in region of the central part of the Majes Valley (JENNINGS 2003, FARON-BARTELS 2011, ISBELL AND SILVERMANN 2006) and even at the Toro Muerto site itself and in its immediate vicinity. Symbolic sphere of these cultures is mainly studied through analysing fabrics and pottery, whereas rock art is decidedly less researched. Stylistically and thematically, the petroglyphs in Toro Muerto show certain similarities to the iconography (in other media than rock art) of the cultures mentioned above. Some images in the Toro Muerto rock art however are unique and have no correspondences. In the 1960s, some materials from cemeteries located in the vicinity of the site were dated by C-14 analysis (ANDES 1994; LINARES 2005, p. 16), so they can be used as a reference point for chronology of the complex.

of the area of Toro Muerto, while a large proportion of the boulders (approx. 2000) received inventory numbers. At the beginning of XXI century, the site was further studied: first by Maarten van Hoek (2003, 2005), a member of the Scandinavian Society for Prehistoric Art, who focused on the interpretation of selected motifs of the petroglyphs and the techniques of their production; and then by Daria Rosińska from the University of Wrocław and Luis Héctor Rodríguez Díaz (2008, 2016), who, in turn, focused on the cultural landscape of the site distinguishing such features like residential sector of the site, a cemetery, a resting place known as *pascana* and traces of irrigation channels (ROSIŃSKA and DÍAZ 2008, ROSIŃSKA 2016). Toro Muerto is today listed as an important site in catalogues on Peruvian rock art (NÚÑEZ 1986a, 1986b; RAVINES 1986; GUFFROY 1999; HOSTNIG 2003).

Despite all of the research endeavours, which surely provided numerous important data, and the fact that Toro Muerto is one of the largest rock art complexes in South America, it is truly surprising how scarce is scientific literature devoted to this site. Comprehensive documentation of the site has never been done, its dating is uncertain, and the questions why the place was chosen to produce there rock art and why the petroglyphs have been created there for so long time are still unresolved. Only general hypotheses have been proposed that this was a “cult site” or “ceremonial pilgrimage centre” associated with the “fertility magic - to assure an abundance of the plants and animals”.

Today Toro Muerto is subject to the legal protection of the state. Official protection provided by the Peruvian Ministry of Culture is however hardly sufficient as there is only one permanent guard (with an all-terrain vehicle) whose possibility to monitor the situation at the site is certainly limited. As a result, rock art in Toro Muerto is continuously being subject to natural and anthropogenic destruction, which has been noted by leading Peruvian and foreign researchers. These factors convinced us that there is an urgent need to take up a project encompassing the full and modern documentation of this site, including the surrounding cultural landscape. We hope it will also help to see how the site is changing, and, as a consequence, will help in developing management strategies concerning conservation (through analyses of weathering of the rocks and the use of the site for cultivation and irrigation processes) and tourist traffic.

DOCUMENTATION ON THE SITE – GIS DATABASE

Significant part of the fieldworks done in 2015 and 2016 involved land-survey measurements. Result of this work is the GIS database of a part of Toro Muerto, which is available on the project website www.toro-muerto.com. The database was created on the basis of a satellite map, which was furthermore correlated with an orthophoto map made with photographs taken by a drone. The GIS database also contains information from aerial photographs taken in 1955, which were used by the National Geographical Institute of Peru to create topographical maps of the country, as well as the plans of the site prepared by the National Institute of Culture of Peru – Arequipa Branch in 1998. The current database contains a detailed plan of the part of the site, including the location of all the recorded boulders with petroglyphs, as well as information about the state of preservation of the petroglyphs and their iconography (Fig. 1).



Fig. 1 - View of the GIS database presenting the satellite map of the area of the Toro Muerto site with the orthophoto map and the documented boulders with rock art

Thanks to the database, preliminary conclusions concerning distribution of boulders with petroglyphs can be drawn. First, all the boulders, both those carved with petroglyphs and the 'empty' ones, are unevenly distributed. Second, they are concentrated at the foot of the hills and in the passes between them.

Furthermore, the higher location of the boulders (towards the north-western direction) the bigger number of the petroglyphs on them². This, in turn, is probably caused largely by the removal of stones from the site by local inhabitants of the Majes Valley, for whom the site is more easily accessible from its southern part. As we already mentioned, the stones removal has been practiced since the first half of the eighteenth century - they were used, among others, as a building material for the local hacienda and the church constructed in 1722. We also noticed that most acts of 'vandalism' (i.e. 'contemporary' engravings or inscriptions) are present in the central part of the site, which is most easily accessible and the most frequently visited by tourists.

Every individual panel of each of the registered boulders has been described from the perspective of its orientation with respect to the cardinal directions, the state of preservation and the iconography. These information along with photographs of the boulders and their decorated panels were placed in the GIS database in the form of attributes. Such a database enables easy location and search for particular features (boulders, particular images) as well as sets of features. The creation of this tool also enables a geospatial analysis based on selected features of all documented boulders.

The GIS database enabled us to analyse the orientation of the surfaces of the boulders, on which the petroglyphs were made. Preliminary observation suggests that none of the directions was particularly preferred by the prehistoric artists, in any of the parts of the Toro Muerto till now analysed.

One of the most interesting results of the use of the GIS database has been observation that there are some concentrations of certain iconographic motifs in individual parts of the site (all conclusions concern the area till now analysed). A good example of this is finding that anthropomorphic figures of so-called 'dancers' (Spanish: *danzantes*) are mostly concentrated in the northern part of the area (Fig. 2c). This concentration covers an area of approx. 14 hectares, both the eastern and western sides of the site. In turn, an accumulation of images of birds (Fig. 2a) is noticeable in the north-eastern part of the area. Interestingly, this motif dominates in a precisely defined area of approx. four hectares. The geospatial analyses also led to conclusion that the representations of Andean camelids (primarily of domesticated species, probably llamas, caravans of which are depicted on some boulders) are more frequent in the central and northern parts of the area than in its southern part (Fig. 2b). Although the images of camelids do not form such explicit concentration as the representations of 'dancers' or birds, their frequency increases toward the northwest. Other iconographic motifs are spread more or less regularly over the entire area of the site.

The observations just mentioned are preliminary. Number of boulders documented so far within the TMARP is still too small to be a reliable sample to al-

2 Only 294 boulders have been documented in the southern part of the site, on an area of 1.9 km²; while 1370 boulders have been documented in the central and northern part on an area of 1 km².

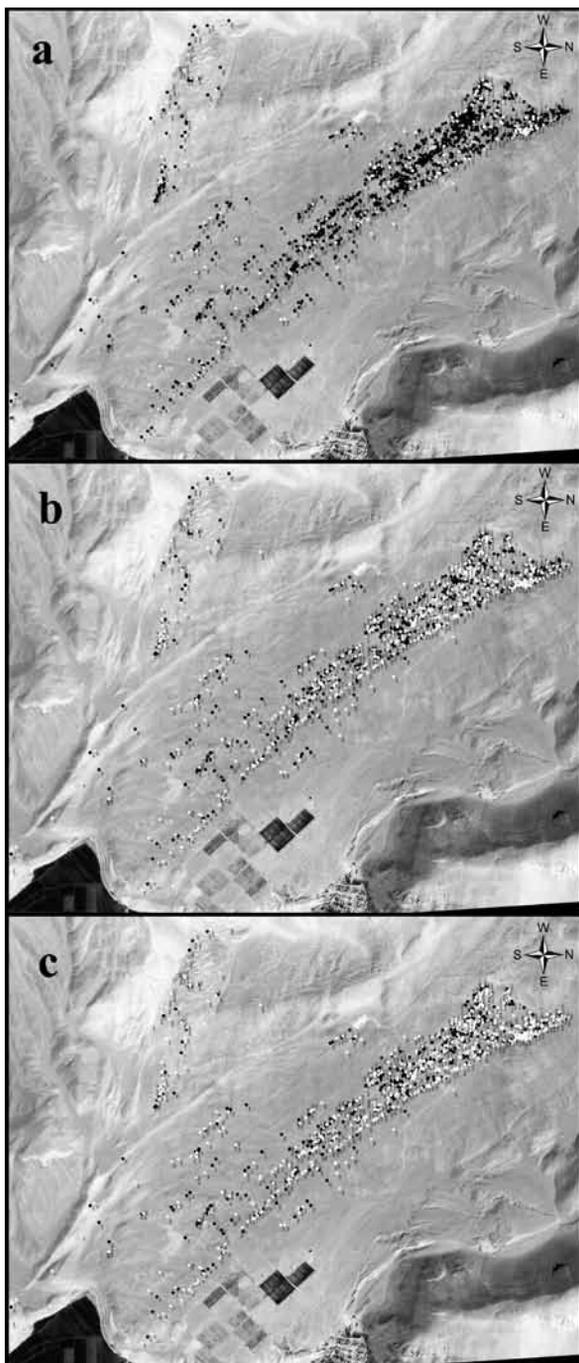


Fig. 2 - Presentations of the layout of the concentrations with highlighted motifs: a. birds, b. camelids, c. 'dancers'

low to draw final conclusions about the existence of alleged concentrations of individual motifs throughout the site. However, the analysis of the material obtained in the course of the work conducted in 2015 and 2016 shows a large potential of this method. We hope that further research (aiming at collecting data of the whole site) will result in defining further sectors of a non-standard densities of certain motifs, which may also help to discuss symbolic sphere of the rock art in Toro Muerto, as its symbolism may be shaped both by individual images as well be their arrangements in the landscape.

DOCUMENTATION OF THE PETROGLYPHS – STATE OF PRESERVATION, ICONOGRAPHY, TECHNOLOGY OF PRODUCTION

One of the main objectives of the TMARP was also to document as many petroglyphs as possible. We used traditional methods, namely the written description, photography and drawing on transparent material. The most interesting (from the point of view of their complexity) samples of the rock art were additionally registered by 2D and 3D photogrammetric photographs (Fig. 3). All the information was digitalized and directly entered into the database, which enabled progress of the work to be monitored, any possible errors to be corrected and any necessary supplementary information to be added on site (Fig. 4). Within two 2-month seasons of work, we succeeded in documenting a total of 1664 decorated boulders, which we estimate at over 1/3 of all monuments of the site.

Every database record – which is also available on the project website – contains basic inventory information, namely: the numbering of the individual boulders (the numbers assigned by

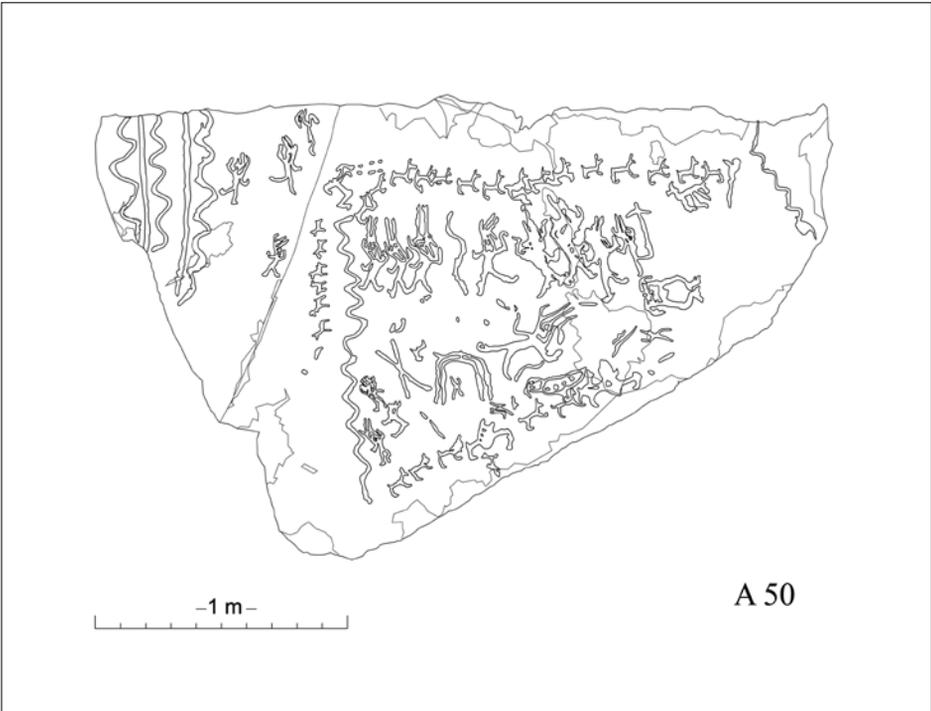
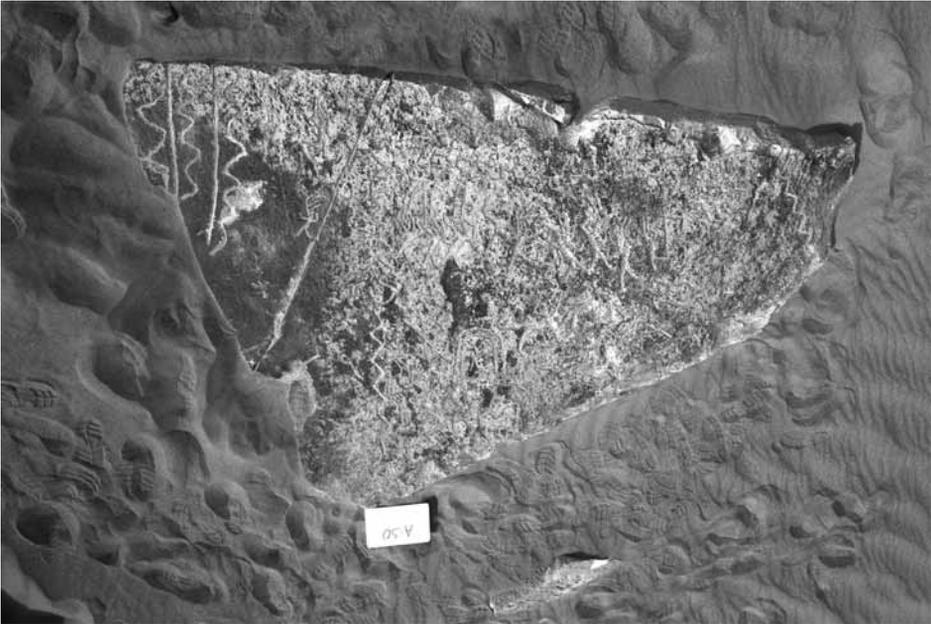


Fig. 3 - Documentation of the monuments using a 2D photogrammetry technique and tracings (boulder No. PTM 1364)

Piedra

Número de piedra: ❶	181
No. PTM: ❷	0181
No. INCA: ❸	51
No. ELM: ❹	Tm95
No. otros: ❺	
No. GPS: ❻	181
Coordenadas geográficas: ❼	S: 8203388.83
	W: 767740.56
	Alt. 571.56 msnm
Tipo de roca: ❽	Granodiorita
No. de las caras decoradas: ❾	3 [+]
Orientación de las caras decoradas: ❿	(SE, NE, W)

	I - SE	II - NE	III - W
Condiciones de preservación: ❶	Buen estado Erosión	Buen estado Erosión	Buen estado Erosión
Forma de superficie: ❷	Rugosa	Ondulada	Ondulada
Motivos representados			
Antropomorfos: ❸	Otros	-	-
Zoomorfos: ❹	Cánidos Camelidos Otros	Cánidos Camelidos	Félidos Cánidos Otros
Geométricos: ❺	Líneas verticales Puntos Zigzag Otros	Líneas verticales Puntos Círculos Zigzag Otros	Líneas verticales Puntos Otros



Fig. 4 - Example of a database sheet (boulder No. PTM 181)

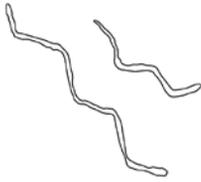
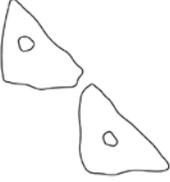
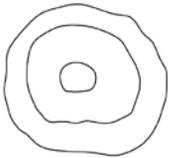
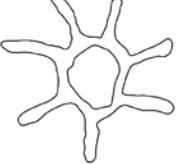
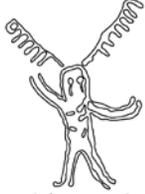
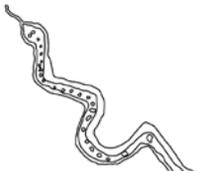
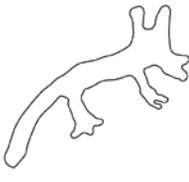
			
dots	vertical lines	horizontal lines	curve lines
			
zigzags	triangles	squares	circles
			
crosses	stars	circles with rays	'dancers'
			
'shamans'	anthropomorphic without attributes	arachnids	fishes
			
amphibians	reptiles	snakes	birds
			
camelids	canidae	felines	other tetrapods

Fig. 5 - The examples of each category of rock art image described in our iconography database

both TMARP and earlier researchers working at the site, if they registered the given boulder at all), the detailed location of the boulders (longitude, latitude and their absolute altitude), the type of rock on which the petroglyphs were made (this was determined on the basis of geochemical analyses of samples of analogous but undecorated boulders³), the state of preservation of the rocks, including natural (e.g. erosion) and anthropogenic (e.g. vandalism) factors. Each record possesses also a detailed description of rock art motifs (Fig. 5) appearing on individual surfaces of every boulder with an indication of which images have been preserved in whole and which only partially (e.g. as a result of rock erosion, subsequent modification or others).

Our research showed that the protection, conservation and preservation of Toro Muerto rock art for future generations is a huge challenge (Tab. 1). Of all the registered boulders, the petroglyphs have survived in a very good condition on only 33% of them, while as many as 87% of the boulders have clear signs of damage caused by thermal and eolithic weathering of the boulders. This is primarily caused by the strong sunlight on the whole of the site, sometimes with significant daily temperature variations, strong sand storms, as well as mud and rock slides caused by the climate fluctuations of El Niño. All of these factors – fortunately, not always – seriously affects the state of preservation of the petroglyphs and, in the longer term, lead to a decomposition of rock surfaces of the boulder covered with petroglyphs. Erosion makes some of the petroglyphs are today hardly visible, and in nearby future are expected to disappear completely. This is best observable on several boulders we have documented, which were marked with numbers by INCA at the end of the 1990s, and today any image can be seen on them anymore. It is worth noting that the INCA project did not include photographic documentation of the boulders – digital cameras were not used yet at that time and recording thousands of petroglyphs on photographic films would have implied very high costs. As a result it is currently no longer possible to assess either the causes of destruction or the pace of the processes taking place and finally the scale of the loss of important information. The anthropogenic destruction (vandalism) is also a significant problem, having been observed on as many as 12% of the decorated boulders. These are both marks left by local residents looking for construction raw materials in Toro Muerto (e.g. signs of crowbars on large boulders and their fragments) as well as by tourists visiting this place.

It is worth emphasizing that previous inventories of the site were very inaccurate. As many as 36% of 1664 boulders that we registered did not have any

3 Four rock samples of different external appearance – which could indicate different geological origin – were taken during our fieldwork. The samples were analysed under a polarizing microscope at the Institute of Geochemistry, Mineralogy and Petrology at the Faculty of Geology of the University of Warsaw. The analyses showed that all samples are varieties of the same volcanic rock – quartz andesite tuff. As the rocks differ macroscopically in their shade and state of preservation, the objective of the study was to determine the reasons for this state of affairs. The precise analysis of the samples shows that the cause of the different state of preservation of the rocks lies in the degree of their secondary transformation. This is most clearly noticeable in the preservation of the matrix of the sample and the changes in the crumbs of the andesite rocks in which the enamel is strongly transformed. In two of the four samples, the fragments of andesite (constituting crumbs of several millimetres) are heavily modified (clay minerals and zeolites most probably replace the enamel in places) which strongly weakens the integrity and strength of such fragments of rock. The crystals of the minerals combined with ashes (especially plagioclases) do not have such explicit secondary changes, which would affect the mechanical properties of the tuffs studied. The analyses conducted explain why, despite homogeneous rock material appearing at the Toro Muerto site, some of the decorated boulders are very well preserved and some are strongly eroded (Dr. Boguslaw Bagiński 2017, personal communication).

numbers assigned by earlier researchers. Possibly some boulders have only now been noticed and documented for the first time, or the previous inventory applied only to selected boulders. It cannot be excluded however that more boulders were numbered but the numbers left on the stones had disappeared (or contemporarily are covered with sand). Actually only half of the whole number of the boulders (precisely 53%), which we were able to register till now, have markings of the National Institute of Culture (INCA). Taking into account that many numbers that have remained are really hardly visible, some of them could indeed disappear. It should be noted, however, that the way in which the boulders have been documented at the individual sectors of the site was different in the INCA project and ours, so we shall be able to provide the exact state of the numbering only after completion of the documentary work. Since the TMARP is a non-invasive project, we have not introduced our own additional markings on the boulders. Our measurements, photographs and drawings enable their precise location.

Inventarisation projects previously conducted at Toro Muerto	Number of documented decorated boulders at the TMARP study site	Percentage value
TMARP (2015-16)	1664	100%
INCA (1998)	876	53%
ELM (probably 1950s-1970s)	157	9%
Others (no data)	38	2%

Tab. 1. The number of registered boulders with petroglyphs at the site during the work of TMARP compared to the number of boulders documented by the previous projects⁴

Photographs of individual boulders were also included in the GIS database. Each of the panels (decorated faces of the individual boulders) was documented separately. The database then contains both a photograph of the whole boulder and its individual panels, as well as detailed photographs of the selected images. Such a database constitutes a good basis for the analyses we are conducting and, in the future – after its final completion, will be capable of also being used as research or comparative material for experts throughout the world.

A careful analysis of the petroglyphs at Toro Muerto has enabled us to highlight the motifs appearing most frequently at the site. We can initially state that the vast majority of the 1664 boulders registered by TMARP contain zoomorphic (1098 boulders, which constitutes 66% of the sample) and geometric representations (1064 boulders, 64%). Anthropomorphic representations appeared on 655 (39%) of the boulders. Among the zoomorphic images, most common are representations of Andean camelids, most probably belonging, as it should be expected, to domesticated species (lama - *Lama glama* and alpaka - *Vicugna pacos*). They were registered on 707 boulders (64% of all monuments with animal motifs). Birds (255 boulders, 23%) are relatively frequently represented, as are canids, most proba-

4 PTM - numbers assigned by TMARP, INCA - numbers assigned by the National Institute of Culture-Arequipa, ELM - numbers assigned by Eloy Linares Malaga, Others - numbers assigned by researchers who are unknown to us.

bly foxes (*Lycalopex culpaeus*), which were documented on 238 boulders (22%). In turn, the rare zoomorphic motifs include representations of a snakes (respectively 142 boulders and 13%) and felines (118 boulders and 11%), while the rarest are arachnids (seven boulders and 0.6%), amphibians and reptiles (four boulders and 0.4%) and fishes (three boulders and 0.3%). In the case of geometric motifs, the most common are vertical lines of various widths (626 boulders, 59% of all boulders with geometrics), zigzags (respectively 607 boulders and 57%) and dots (365 boulders and 34%), while horizontal lines (171 boulders and 16%), circles (126 boulders and 12%), crosses (40 boulders and 4%), squares (25 boulders and 2%) and triangles (three boulders and 0.3%) are represented less frequently. Of the anthropomorphic figures, the most common are so-called 'dancers' (368 boulders, 56% of all boulders with human representations), then the humans without attributes (respectively 155 boulders and 24%) and 'shamans' (26 boulders and 4%).

A Digital Terrain Model of the analysed part of the site was prepared and 44 3D models of entire boulders, as well as 13 detailed models of individual petroglyphs were made using 3D technique. The models of entire boulders give a complete overview of their all decorated and undecorated surfaces, while individual models of engravings (thanks to high resolution of the photographs) enable significant close-up of the petroglyphs details (Fig. 6). All information acquired in

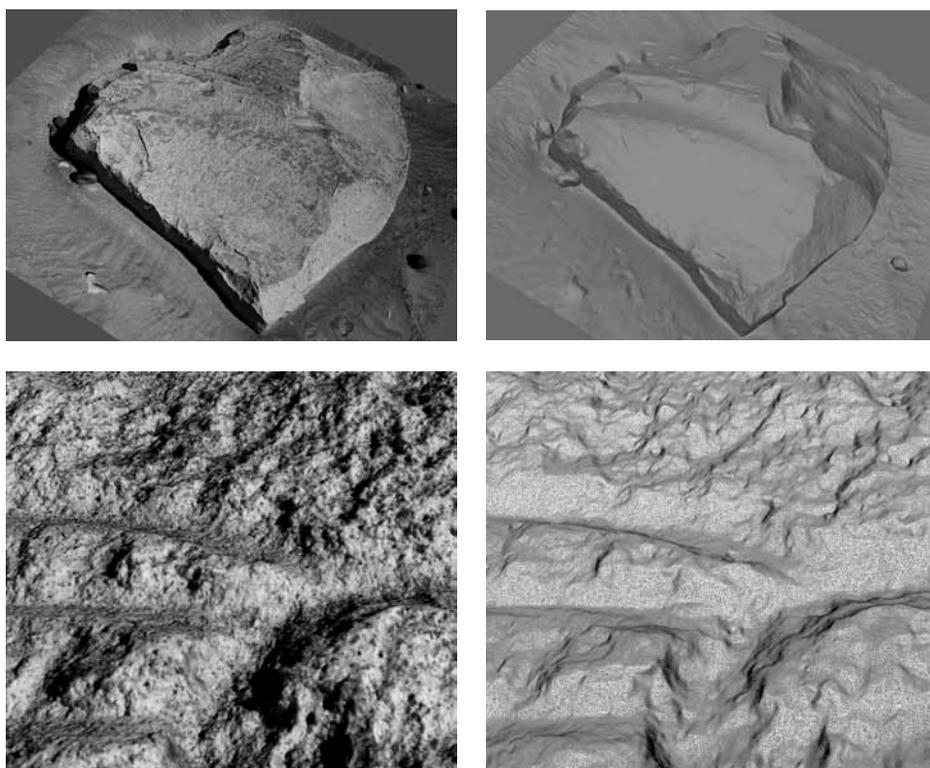


Fig. 6 - Example of 3D models of an entire boulder with rock art (boulder No. PTM 252) and an individual motif (boulder No. PTM 252)

Photograph	Boulder number	Description of the technique
	PTM 362	A spot minting, wide, shallow line constituting a contour of the representation, inside which is a positive surface constituting the filling of the given representation (these are primarily such details as spots marked on the body of feline animals).
	PTM 838	A shallow representation, without contour lines and without highlighting the details of the given motif in which the minting evenly fills the area of the whole petroglyph.
	PTM 785	Deep, narrow cuts with sharp edges. It can be presumed that the petroglyphs made using this technique were engraved using a fine, sharp tool.
	PTM 1146	Thin, smooth lines of a small width; carefully made.

Table. 2. Examples of various techniques of engravings at the Toro Muerto site

this way will finally be entered into the interactive database available online at the TMARP website upon completion of the project.

3D digital documentation of the petroglyphs, which allows to see the images in great detail, enables also to analyse the marks of tools by which the images were done. Future research will supplement the database with photographs taken using the RTI (Reflectance Transformation Imaging) technique. Insight into techniques used to make the petroglyphs at Toro Muerto should help to precise the chronology of the rock art of the entire site, the history of its development and the specifics of its individual sectors. Petroglyphs in Toro Muerto were made using various techniques, and one of the questions we plan to investigate is to examine whether there are any regularities in this respect (Tab. 2). Some petroglyphs in Toro Muerto were intentionally destroyed (VAN HOEK 2005), reworked or superimposed with new images. Superimpositions, which we plan to analyse at the next step of the project, should significantly help in establishing chronology of the rock art and perhaps also the functions of the given motifs⁵.

OFFERINGS

In 2016 we were lucky to discover a very well preserved deposit (most probably an offering) laid at the base of one of the boulders (Fig. 7). This was found accidentally while cleaning one of the surfaces of a boulder covered with petroglyphs. It was just several dozen centimetres under the present surface of the sand. The offering consisted of corn grains, coca leaves, animal bones and a set of small painted stone slabs (Spanish: *lajas pintadas*) (artefacts of this kind are frequent in this region and are usually associated with the Chuquibamba and Inca cultures; KAUFFMANN DOIG 1992, 2002; FARON-BARTELS 2001; JENNINGS 2003; JUSZCZYK 2013; CABRERA 2014). We hope that further research may lead to discovery of more such offerings, which may provide a new mode of insight into the meaning and social role of the Toro Muerto. Taking into account that such offerings often include organic materials, they can significantly contribute also to discussion on the chronology of the petroglyphs.

SURROUNDING LANDSCAPE

While documentation of rock art of Toro Muerto was the main aim of the project, we also conducted a survey in Majes Valley and other surrounding areas. As a result, in 2016 we found 13 boulders with petroglyphs south of the Mesana village and 51 boulders to the north of the main site of Toro Muerto (Fig. 8). These blocks were not documented during any of the previous projects. The petroglyphs found on these newly discovered boulders are diverse thematically and stylistically – there are geometric and zoomorphic images, some of them appear as individual motifs, other create more complex scenes. It cannot be excluded then there are other complexes of decorated boulders in those areas, particularly further to the south (apart from well-known sites of Pitis, Querulpa, Andamayo, Cantas, La Chimba; ROSIŃSKA 2016, pp. 361, 362). It is possible that they sig-

⁵ When determining the relative chronology of the petroglyphs, it cannot be excluded that the representatives of one or all of the cultural groups operating at the site could have made petroglyphs simultaneously using several different techniques and various types of tools.

ned local roads leading to the main concentration of the rock art in Toro Muerto.

During the survey we also discovered and documented several, largely looted, cemeteries. Some of them are located within the site itself (in its eastern and southern sectors), others outside it (e.g. in Mesana). These findings provide a great potential for investigating the cultural context and time span of the use of the Toro Muerto, as all the materials (grave structures, human remains, fragments of pottery and fabrics) point to the Wari and Inca cultures (GARCÍA MÁRQUEZ, KOONTX SCAFFIDI 2015, p.61).

FURTHER WORKS

Thanks to the new grant founded by the Polish National Science Centre (Grant No. 501-D131-66-000), the research in Toro Muerto will be continued till 2020. The team will be headed by Janusz Z. Wołoszyn from the Institute of Archaeology of the University of Warsaw. The main objective of this stage of the project will be to complete the started research and to show Toro Muerto as a complex archaeological site. We intend to specify the real scope of the site and the actual number of rock art boulders, to define the time-frame of the use of the site, to continue research on iconography of the rock art (including formal and symbolic analyses). Basing on all of this research, including critical evaluation the conclusions drawn by previous research teams, we shall also try to answer the question, or at least to propose possible hypotheses, why people chose this remote and hardly accessible site to make petroglyphs. Last but not least, we will engaged in circulating information about the cultural significance of the site, both among the tourists and the local people. We strongly believe that Toro Muerto is a unique legacy of Peru and South America, and as such should be further studied and more accurately protected.

BIBLIOGRAPHY

- CABRERA J. E.
2014 *Diseño gráfico arcaico. Testamento histórico de Antimpampa, Perú, Virginia*.
- DÍAZ RODRÍGUEZ, L. H. ROSIŃSKA D.
2008 *Diversidad arqueológica en Toro Muerto, sur del Perú*, in SZYKULSKI J. (ed.), «Tambo. Boletín de Arqueología» No. I, Wrocław, pp. 83-98.
- FARON-BARTELS R.
2001 *Piedras votivas de Pampacolca. Nuevos datos sobre las lajas pintadas del sur del Peru*, unpublished doctoral thesis, Berlin.
- GARCÍA MÁRQUEZ M., KOONTX SCAFFIDI C.
2015 *Proyecto Arqueológico Uruca, Valle de Majes, 2014*, unpublished Informe Final para el Ministerio de Cultura - Perú, Lima.
- GUFFROY J.
1999 *El arte rupestre del antiguo Perú*, Lima, IFEA.
- HOSNIG R.
2003 *Arte rupestre del Perú. Inventario nacional*, Lima, CONCYTEC.
- JENNINGS J.
2003 *Inca Imperialism, Ritual Change, and Cosmological Continuity in the Cotahuasi Valley of Peru*, in «Journal of Anthropological Research» 59(4), pp. 433-462.
- JUSZCZYK K.
2013 *Analiza ikonograficzna i funkcje malowanych płyt z grobowca T26, stanowisko Maucallacta*, unpublished bachelor thesis, Warsaw.
- KAUFFMANN-DOIG F.
1992 *Pinturas mágicas sobre placas de cerámica (Chucu/Condesuyos, Arequipa)*, in *Arqueológicas*, No. 21, Lima, Museo Nacional de Arqueología, Antropología e Historia del Perú.
- 2002 *Historia y arte del Peru Antiguo*, Lima, PEISA.
- LINARES MÁLAGA E.
1960 *Notas sobre los petroglifos de Toro Muerto*, in MEJÍA BACA J. (ed.), *Antiguo Perú, Espacio y Tiempo*, Lima, pp. 297-301.
- 1967 *El arte rupestre en el Perú*, Lima.
- 1968 *El arte rupestre en el sur del Perú*, in «Actas y

- Memorias del XXXVII Congreso Internacional de Americanistas, Mar del Plata, 1966» II, Buenos Aires, International Congress of Americanists, pp. 379-389.
- 1974 *Arte rupestre: El arte rupestre en el sur del Perú. Introducción al estudio de los petroglifos de Toro Muerto*, un p doctoral thesis, Arequipa, UNSA.
- 1990 *Prehistoria de Arequipa, vol. I*, Arequipa, UNSA.
- 1993 *The Largest Site in the World: Toro Muerto, Arequipa (Peru)*, in «International Newsletter on Rock Art» 6, pp. 25-27.
- 2005 *Toro Muerto. Centro ceremonial más grande del Mundo con arte rupestre*, Arequipa, UNSA.
- 2013 [1973] *Anotaciones sobre las cuatro modalidades de arte rupestre de Arequipa (pictografías, petroglifos, arte rupestre mobiliario y geoglifos)*, in «Boletín APAR», pp. 611-652.
- NÚÑEZ JIMÉNEZ A.
1986a *Petroglifos del Perú. Panorama mundial del arte rupestre*, Havana, Editorial Científico-Técnica.
- 1986b *El libro de piedra de Toro Muerto*, Havana, Editorial Científico-Técnica.
- RAVINES SÁNCHEZ R. H. (ed.)
1986 *Arte rupestre del Perú. Inventario general (primera aproximación)*, Lima, Instituto Nacional de Cultura.
- ROSIŃSKA D.
2016 *Valle de Majes – un paisaje simbólico*, in SZYKULSKI J. (ed.), «Tambo. Boletín de Arqueología, No. 3», Wrocław, pp. 355-389.
- SILVERMAN H., ISBELL W.H.
2008 *Handbook of South American Archaeology*, New York, Springer.
- VAN HOEK M.
2003 *The Rock Art of Toro Muerto*, in «Rock Art Research» 20 (2), pp. 151-170.
- 2005 *Toro Muerto, Peru: Possible Prehistoric Deletion of Petroglyph Details*, in «Adoranten», pp. 73-80.