



## BRIEF REPORTS

### *Evaluating the motifs and pigments of Mehrdad pictograms in Kuhdasht, Lorestan, Iran*

By SARA SADEGHI, ARDESHIR JAVANMARD ZADEH, MANIJEH HADIAN DEHKORDI and REZA REZALOO

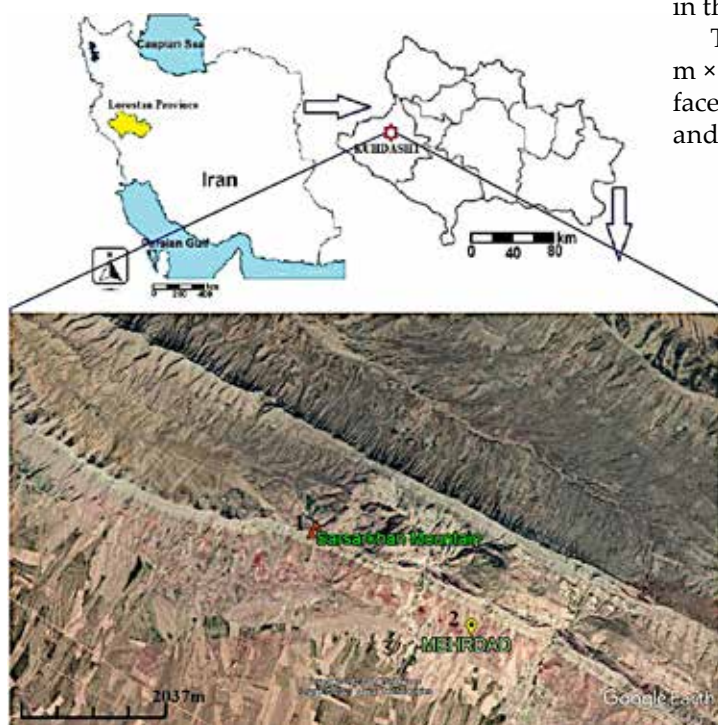
The Mehrdad pictograms are located in western Pishkooch, Homian, Kuhdasht, a western city of Lorestan Province (Fig. 1). The pictograms were found in a rockshelter formed in a huge, 6 m high limestone boulder (Fig. 2). The shelter was filled with numerous colourful motifs in red, but a large portion of the pictograms was destroyed by sediments washed in by rainwater over time. The sediments have risen to the middle of the pictograms. Unaffected by rainwater, sections of the rock are still covered with them. Therefore, it can be assumed that many more pictograms are hidden under the sediments. The Mehrdad pictograms include 'animal', 'human' and presumed tools motifs made on the limestone rock. The primary technique for creating the pictograms was painting. It seems that the paintings were made using the end of a straw or other

plant part shaped into a brush. The motifs are either semi-naturalistic or stylised. They can be compared to pictograms found in central Zagros, such as the paintings of Timre (Jamali 2015: 262; Naserifard 2016: 282; Farhadi 1998: 21) and Songun (Rafiafar 2005: 83).

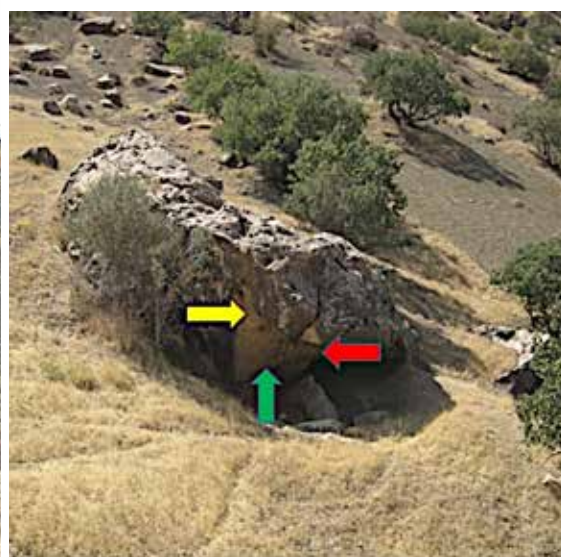
The paintings are in danger of damage and erosion from the passage of local inhabitants and the high impact of weathering at the site. There is an urgent need to document and protect the site, and this paper attempts to describe its rock art, rock material and type of pigments used.

The Mehrdad pictograms are located in the Homian region along Sarsarkhan Mountains, which nomads traditionally occupied. Goff (1971: 133) went to the Noorabad summer highland pasture along with Rumshakan tropical nomads in 1967. She passed through the Sarsarkhan and Homian Mountains and assessed the habitats and cemeteries along the way, from the Neolithic to the Islamic era. She proved that from a long time ago, the nomads had a proper habitat to settle as a semi-sedentary or migrating community to which most cemeteries belonged. In the explorations by the authors in 2021, it was found that even today, Kuhdasht nomads still used the place as a temporary habitat, with some earthenware and bones remaining in the region (Fig. 3).

The painted area of the site is approximately 2.5 m × 3.5 m, bearing 23 surviving paintings. All motifs face south and include presumed depictions of tools, and zoomorphs and anthropomorphs in front or



**Figure 1.** Mehrdad Pictogram Site, Kuhdasht City, Lorestan Province. (1) Sarsarkhan Mountain, (2) Mehrdad pictograms.



**Figure 2.** Panels of Mehrdad pictograms in the shelter.

side views. On the north-western part of the rockshelter, zoomorphs and 'riding motifs' are drawn (Fig. 4).

On the southwestern part of the shelter, many 'riders' are riding towards the right (except for one). The animal motifs include 'horses', 'camels' and 'wild goats'. Four animal motifs can be seen in the eastern part of the shelter. These are painted in a side view, moving towards both the left and right directions.

The pictograms of Mehrdad were painted in red. Almost all the natives of the region believe they were made using blood and oak sap. We tested this belief using different devices. First, thin sections were made to study the rock samples, and the samples were analysed using polarised light microscopy (PLM) (equipment provided by James Swift Co., U.K.). The magnification used in this study was 4 $\times$ . The main objective of petrography on samples was to identify background texture and pigment type. Scanning electron microscopy with energy dispersive x-ray spectroscopy (SEM-EDS) was used for point elemental analysis of the samples, which requires a very small sample. Sample preparation involves no particular chemical or physical methods. The SEM-EDS was a VEGA3 TESCAN made in the Czech Republic equipped with a Sirius SD elemental analysis device made in the U.K.

The analyses were conducted in the Central Laboratory of Tehran. The same red colour had been used in all motifs of the Mehrdad pictograms. Red colour has been used since ancient times, and it is one of the first artificially-produced pigments (McBride 2002: 235). It should be noted that in some Parthian sites, such as Yazdegerd Castle, the red ochre was used for colouring. For example, Bollati (2008: 118) identified the pigment on clay sculptures found in the Nesa site. The experiments of Britain Museum researchers showed that artists of Uruk used the same pigments for colouring plasterwork in the Parthian site (Simpson et al. 2012: 213). It seems that a similar pigment was used in Khajeh Mountain pictograms around the same time.

To determine what pigments were employed by the Mehrdad artists to create the red colour, the ends of damaged pictograms were sampled due to the sampling limitations, and the samples were prepared for SEM-EDS analysis (Fig. 5). For all samples, point tests were conducted to achieve more accurate results. Four points (A, B, C and D) were selected for the tests. Microscopy photos showed that the colour layer was directly applied to the rock without any substrate preparation. The analyses of red colour samples and their elemental percentage are reported here.

The studied petrographic sample was a powder obtained from limestone, containing different parts of crushed fossils, which comprised 10% of the sample



Figure 3. Map of movement and passage of nomads living in Houmian and Mehrdad regions.

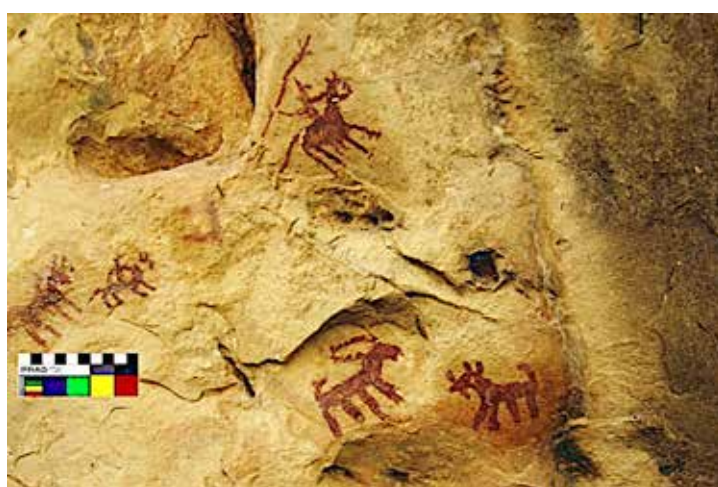


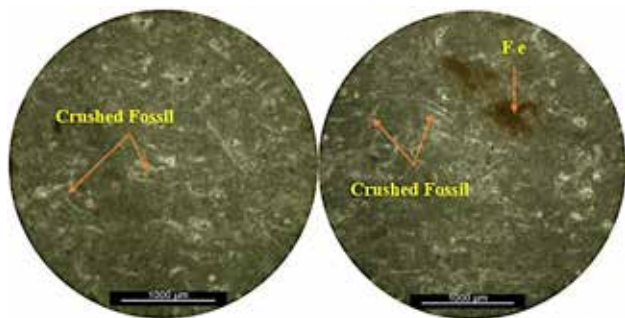
Figure 4. The motifs of the first panel, Mehrdad pictograms.



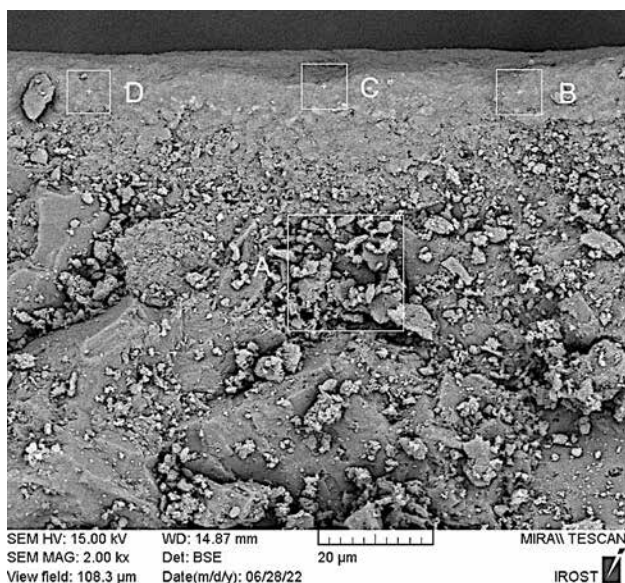
Figure 5. Sampling location in a Mehrdad pictogram.

volume. The substrate was made of fine-grained micrite calcite and a minor content of microsparite. Iron compounds were found scattered and low in numbers in the rock context. The voids were very limited in the sample. A portion of the voids was filled with sparite and secondary cement, and the sample texture was homogenous (Fig. 6).

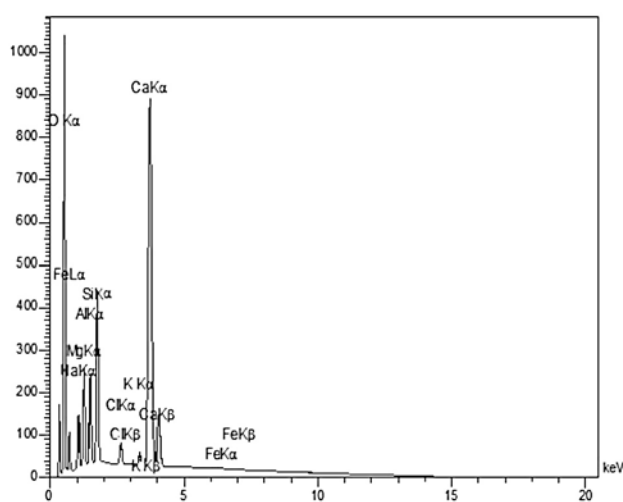
The main element of the sample was Ca, with



**Figure 6.** Left: microscopic image of sample E-1, XPL light, 4× magnification, numerous fossil remnants on a micrite substrate. Right: another view of sample E-1, crushed fossil parts and iron oxide.



**Figure 7.** SEM image of a red sample of a Mehrdad pictogram.



**Figure 8.** Elemental analysis spectrum of the red colour sample of a Mehrdad pictogram.

some Mg belonging to the rock base. Al, Si and K are elements usually found in the soil (Table 1). Their distribution map shows that they are more concentrated

Elt	W%			
	3-6-A	3-6-B	3-6-C	3-6-D
O	55.05	62.94	61.20	59.37
Na	-	-	2.05	2.18
Mg	15.20	0.70	2.62	2.88
Al	-	1.05	2.18	2.40
Si	1.11	4.27	4.04	4.46
Cl	-	-	0.82	0.76
K		0.14	0.60	0.51
Ca	28.64	30.23	25.89	26.89
Fe		0.66	0.61	0.55

**Table 1.** Elemental analysis table in the Mehrdad pictograms.

in the outer layer. Although Fe was found in points B, C, and D in the surface layer of the rock (Fig. 5), the distribution map shows a small content in other areas, which can be attributed to limestone impurities. The presence of Fe in the surface layer is manifested as red pigments of iron (III) oxide (haematite) (Fig. 7).

The spectrum obtained by elemental analysis of the red pigment in the pictograms of Lorestan province showed that due to the presence of high content of Fe in the sample, the red colour of iron oxide or red ochre was used in rock paintings (Fig. 8). Iron and manganese oxides are mostly used as rock art pigments. These are naturally found in different parts of the world in different shapes and forms. For the pigments of red rock paintings, iron oxide, usually in the form of red ochre or haematite and magnetite, where used, while manganese oxide was often adopted for black colour, which has been identified in many recent studies (Goodall et al. 2009).

Zoomorphs and anthropomorphs account for most of the Mehrdad paintings. The motifs are similar to Hamadan, Kurdistan, Kermanshah and Temireh pictograms. 'Human' motifs are drawn with thick lines in front view, and the 'animal' motifs are drawn in side view in different poses, sometimes apparently stationary and sometimes in motion. All pictures are drawn in red as paintings in the limestone shelter. The laboratory studies revealed that the pigments used were mineral colours, comprising Fe (as haematite), Al and Si. The pigment was directly applied to the rock, with no sign of substrate preparation. Since the pigment was of mineral compounds, it can be asserted that this is one of the major reasons the pictograms have been preserved.

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RAR 40-1426

## Multi-view 3D recording of Jiangjunya rock art

By YIN JIE, WU SHUANG, ZHANG KAIYUE and WANG TAO

### Introduction

The Jiangjunya rock art is situated on the eastern coast of China, on Mount Jinping in Lianyungang, Jiangsu Province (for location, see Tang et al. 2017: Figs 1, 6; Jin and Chao 2020: Fig. 1). Due to the littoral nature of its geographical location and its unique pictorial contents, Jiangjunya rock art bears significant meaning for the historical and archaeological research on the pre-Historic Dongyi people in eastern China, especially on their living patterns and religious culture. However, due to weathering effects of the adjacent Jinping phosphate mine, the physical preservation of Jiangjunya rock art is now under severe threat (Fig. 1).

To facilitate the preservation and research of Jiangjunya rock art, we decided to build 3D models for the Jiangjunya petroglyphs, aiming to produce high-quality 3D models for the petroglyphs as well as their natural surroundings. In this project, we also aim to produce high-resolution orthophotos, aerial images and digital drawings for the petroglyphs. Our team has rich experience in the 3D modelling of immovable cultural relics. For example, we have applied 3D multi-view reconstruction techniques to the digital reconstruction project of the stone sculptures



Figure 1. Jiangjunya rock art (see the multiple cracks and traces of reinforcement on the surface). Photo taken in October 2022 by YJ.

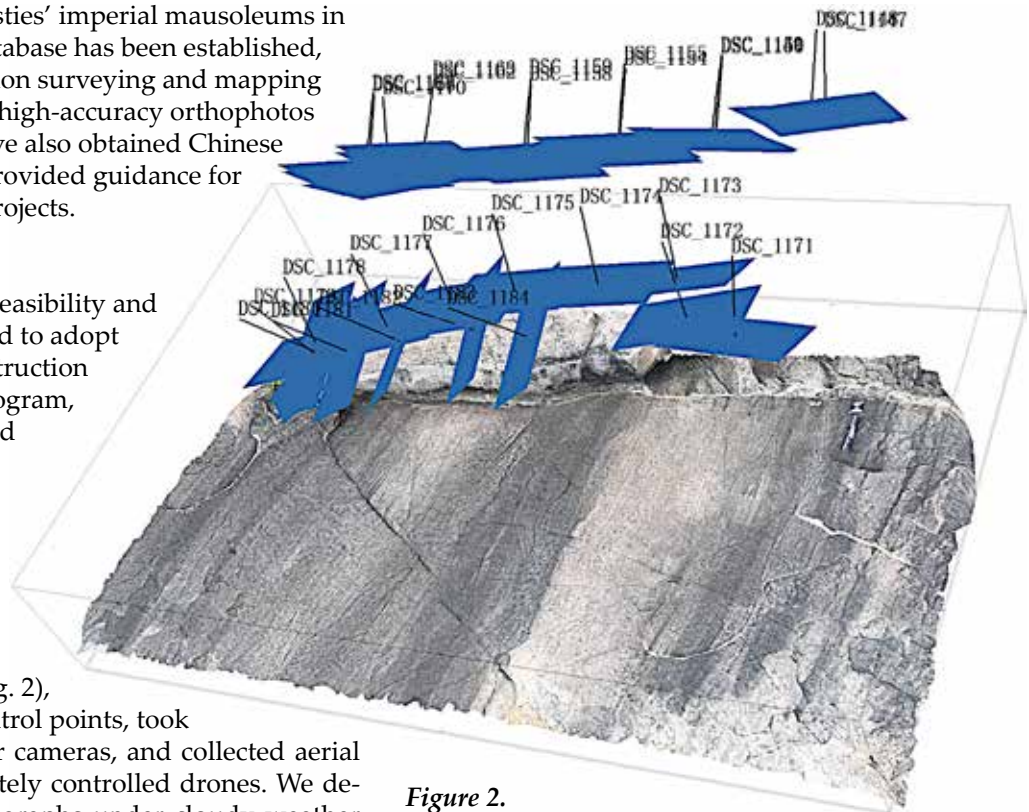
of the Southern Dynasties' imperial mausoleums in Jiangsu; a relevant database has been established, including high-precision surveying and mapping data, 3D models, and high-accuracy orthophotos and drawings. We have also obtained Chinese national patent and provided guidance for other 3D modelling projects.

### Methods

Considering cost, feasibility and portability, we decided to adopt 3D multi-view reconstruction techniques for this program, using SLR cameras and drones as our major equipment for data collection, then building 3D models for Jiangjunya rock art via Agisoft MetaShape.

In the first step (Fig. 2), we set the ground control points, took photographs with our cameras, and collected aerial images through remotely controlled drones. We decided to obtain photographs under cloudy weather and soft light, ensuring the quality of the images by avoiding shadows, direct sunlight or backlighting. When shooting, the team maintained a high overlap rate for images taken from adjacent vantage points, ensuring that each photo covered the view of at least 60% to 80% of the previous one. Since the final model needs to emphasise the details and the contour outlines of the petroglyphs, overall pictures and detail photos were combined in our modelling input (Fig. 2).

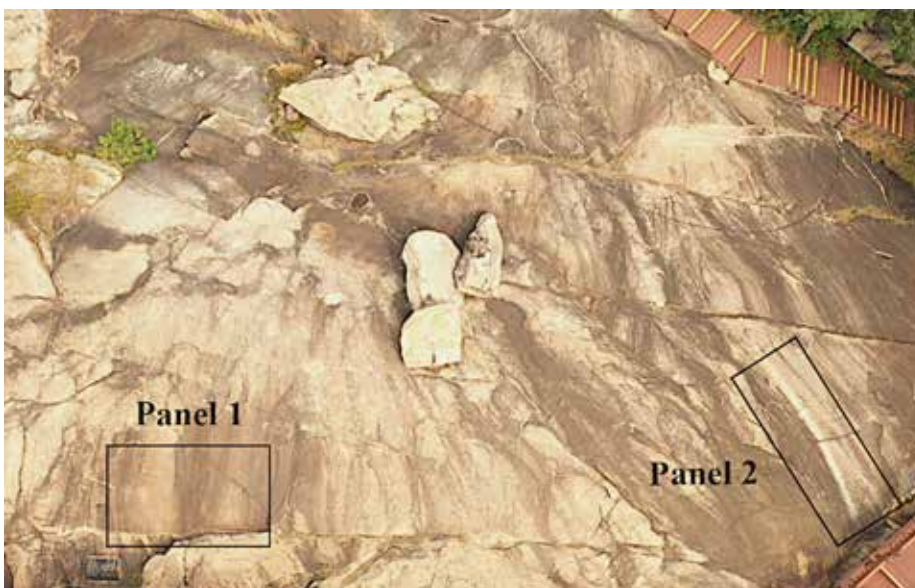
Drones were mainly used for taking overall pic-



**Figure 2.**

*Diagram for the photo collection of Jiangjunya rock art. The camera used is Nikon D850, effective pixels 45.75 MP, highest resolution 8256 × 5504, equipped with 24–70 mm lens. Photo taken October 2022 by YJ.*

tures of the rock massif (Fig. 3). With the data collected by our drones, we built a massif model for the hill, which we hope could become a part of future virtual tours.



**Figure 3.** *Aerial photo of Jiangjunya. Jiangjunya petroglyphs are widely distributed, and our work mainly focused on Panel 1, where the petroglyphs are concentrated. Photo taken October 2022 by WS.*

The drone we used is DJI Mavic 2 Pro, with vertical hover accuracy  $\pm 0.1\text{m}$  (when visual orientation works normally),  $\pm 0.5\text{m}$ ; horizontal hover accuracy  $\pm 0.3\text{m}$  (when visual orientation works normally),  $\pm 1.5\text{m}$ , maximum flying time around 30 minutes. The camera it carries has 20 MP effective pixels, a shutter speed of 8–1/8000s, supporting single or burst photos.

After finishing on-site data collection, we used Agisoft Metashape for model reconstruction. The modelling procedure begins by adding and aligning images from the workflow, followed by generating dense cloud, mesh and texture, eventually obtaining 3D models with

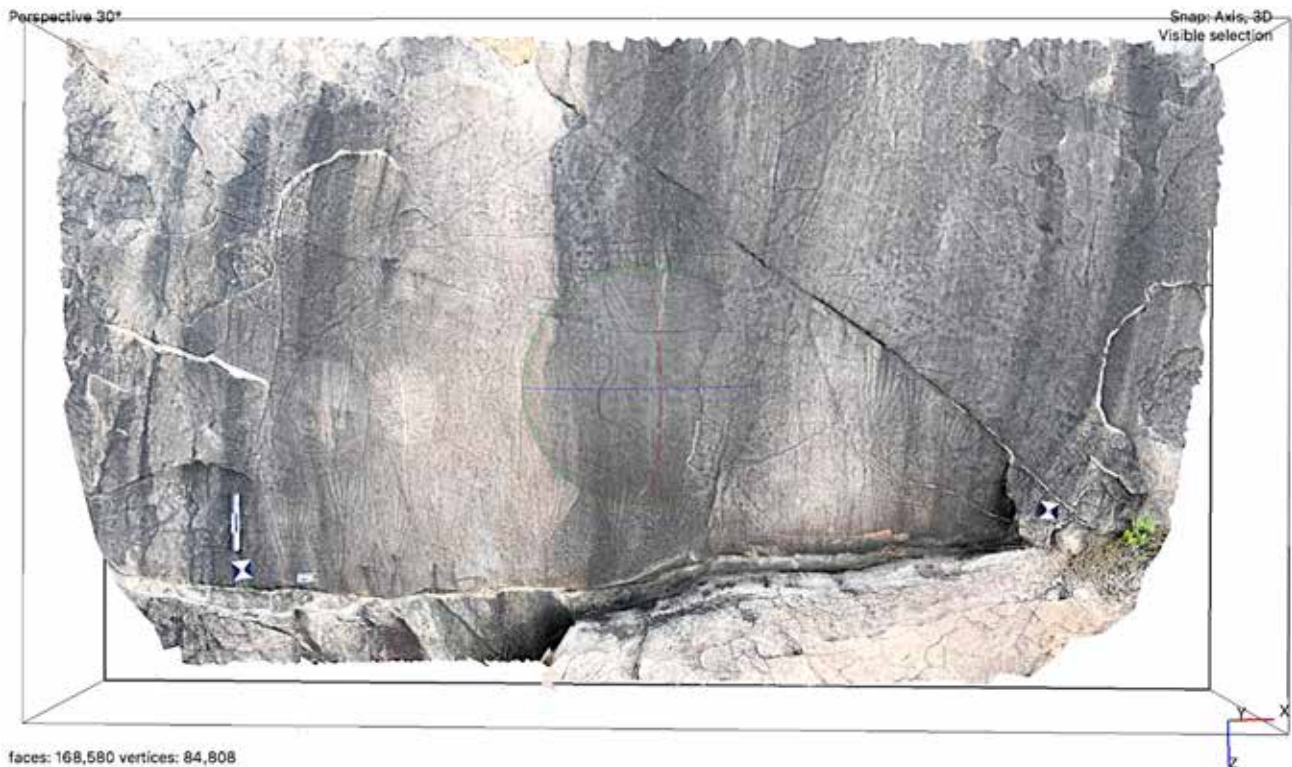


Figure 4. The 3D model of the Jiangjunya petroglyphs main panel.

realistic textures and colours.

### Results

Once we built the 3D models for the petroglyphs and the massif body (Figs 4, 5), we used the 'ruler' within the software to measure the actual dimensions of the petroglyph panels.

Subsequently, we assigned values to the control points upon the models to build a 3D coordinate system. The orthophotos built through this process are highly accurate, with no visible error in the pictorial perspective (Fig. 6).

Regarding drawings, we mainly use Photoshop for the task because the lines of the petroglyphs are highly varied and curvaceous. Compared with earlier scholars' drawings on the same subject (e.g. Zhang 2017), our digital drawings showed that some of the details on the petroglyph surface had already become blurred and illegible during the time between our research and Zhang's survey (Fig. 7). It is also worth noting that the most eroded or damaged petroglyphs are those located around the cracks on the rock surface, which shows that the depletion of the Jinping phosphate mine has caused severe damage to the petroglyphs. To make matters worse, the cracks will further increase the rate of weathering.

### Conclusion

The practice introduced has proved the convenience, feasibility and accuracy of multi-view

3D modelling, which we think is highly compatible with the digital reconstruction of large immovable cultural heritage sites. 3D modelling would also exhibit previously invisible or inaccessible attributes of the petroglyph panels, such as blurred lines or contours while allowing scholars to conduct quantitative studies on the digital data.

The application and end-result of 3D modelling should also never be confined within one particular

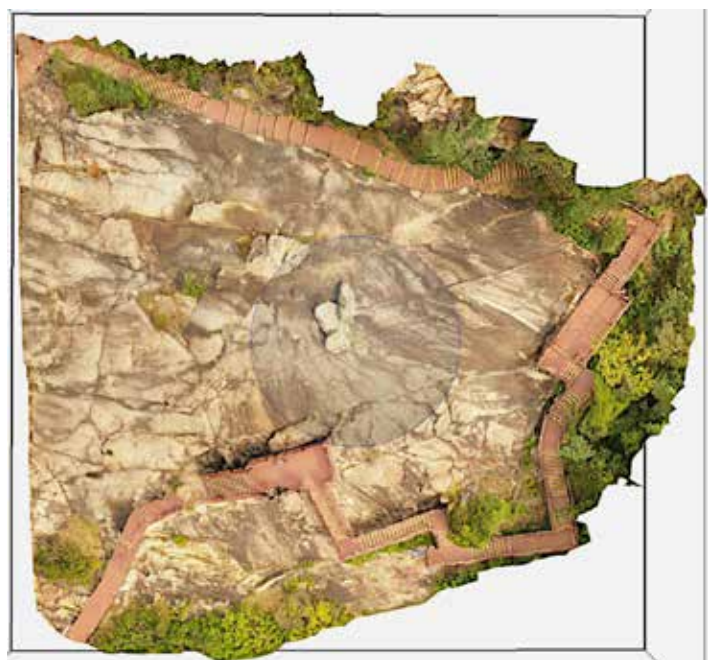


Figure 5. The 3D model of the Jiangjunya rock massif.



Figure 6. Details of the orthophoto of the main petroglyph panel.



Figure 7. Comparison of the details of the 'human faces' panel. Red lines refer to now illegible lines or patterns which were nevertheless shown in earlier scholars' drawings. Yellow lines refer to cracks.

institution, used only for its archaeological survey and research. The promotion of 3D archaeological models and how to expand their public access beyond our discipline is still a worthwhile topic for discussion. Digital databases for rock art materials, including 3D models, can no doubt establish a relatively secure information-sharing system, providing data support to archaeological research, cultural heritage management

and the virtual displays of digital museums. In the future, we hope to develop a multi-media interaction platform for the public display of Jiangjunya rock arts, even launching an on-line virtual tour of the site through virtual reality techniques. Such works have the prospect of breaking geographical limits, allowing for public access to relatively remote rock art sites while promoting public awareness of their preservation through virtual engagements.

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## *Cross-verification between micro-erosion analysis and archaeological inference: a case study of a dated stone menhir at Khonakhai, Xinjiang, northwest China*

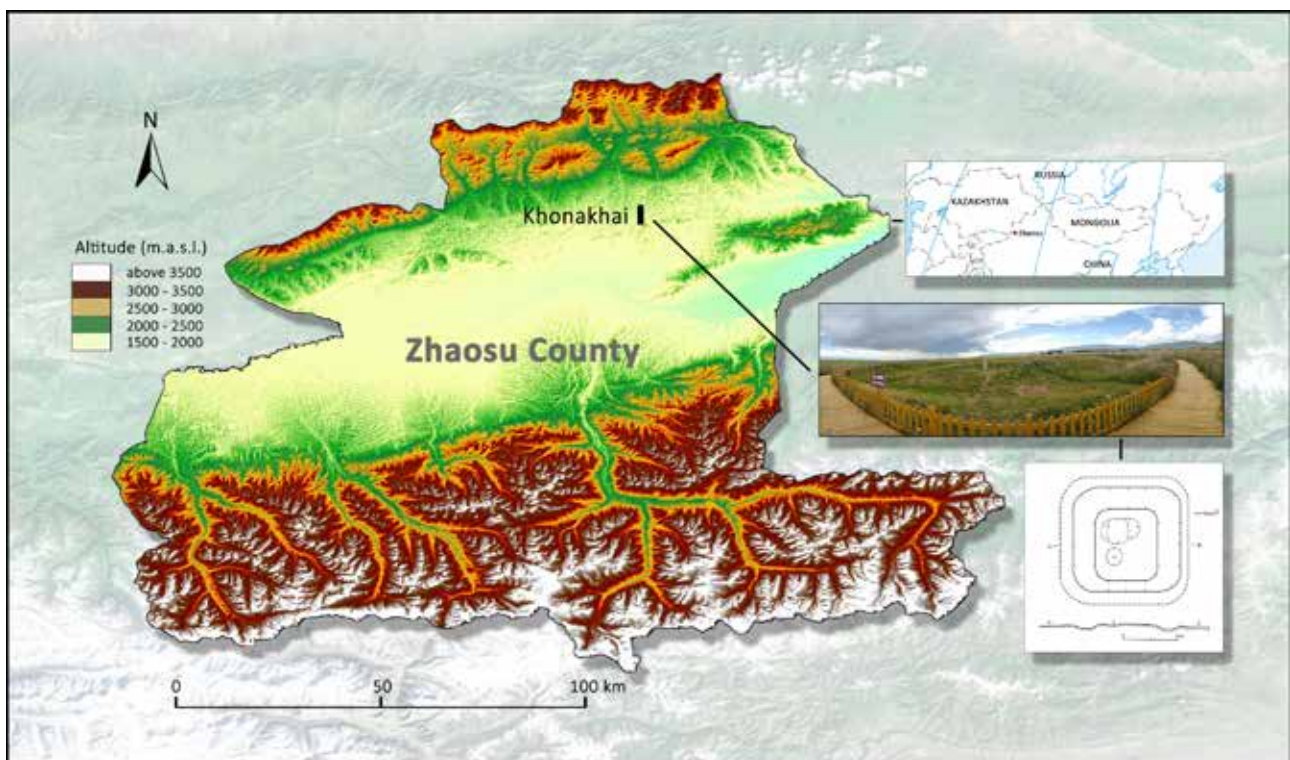
By CHAO GE, JIN ANNI and SHALUNHUA

Microerosion analysis, known as a specialised dating method for petroglyphs based on field microscopy, was proposed by Robert G. Bednarik in the 1980s and has been applied to a lot of rock art-related scientific activities in various countries around the world (Bednarik 1992, 1993, 1995, 2001, 2002, 2005, 2009; Bednarik and Khan 2005; Jin et al. 2016, 2023; Tang et al. 2017, 2018; Santos Junior et al. 2018; Kumar et al. 2019; Jin and Chao 2019, 2020, 2021, 2023). Its effectiveness and accuracy highly depended on local calibration curves secured from dated inscriptions, which can hardly be found in many cases. The contradiction between the theoretical precondition and reality hindered the method's broader utilisation for decades until the Universal Calibration Curve (UCC) was introduced (Beaumont and Bednarik 2015; Bednarik 2019), making dating feasible even without local calibration data. However, the advent of the UCC also brought a long-term task of its verification and adjustment to the analysts. In 2019, its effectiveness was preliminarily proven in the cupule sites and standing

stones research at Lianyungang City, east China (Jin and Chao 2020). Three years later, another verification was conducted at Zhangzhou City, southeast China (Jin and Chao 2023). This paper reports a recent case in Zhaosu, Xinjiang, northwest China, about an attempt to cross-check between the UCC and a dated engraved standing stone.

The Ili (Ghulja) Valley lies in central Asia's heartland, linking Kazakhstan's Zhetysay Basin (also known as 'the Seven Rivers Area') with several branches of the Tianshan Mountains in northwest China. Its unique topography approximating a semi-closed triangle opening towards the west has ensured access for the periodic visits of the wet and warm airflow from the northern Atlantic Ocean, giving the valley the mildest climate and most liveable environment around the entire Xinjiang Region. Therefore, numerous ancient ethnic groups such as the Sakas, Yuechis, Xiongnu, Usuns, Hans<sup>1</sup> and Türks scrambled to dominate the

1 Han is the main ethnic group in China, representing 91% of the country's population (the remaining 9% comprises 55 minority ethnic groups). Its appellation originated from the Han Dynasties (the 2nd century BCE – the 3rd century CE). The Han people describe themselves as the descendants of the legendary sovereigns in the remote ages, i.e. Huang Di and Yan Di (the Yellow Emperor and the Fire Emperor, who are believed to have been two tribal chiefs of 5000–6000 years ago living in the middle reaches of the Yellow River). However, the growth of the Han group from Neolithic river tribes to over a billion of the population was, in fact, a continuous process of absorbing neighbouring ancient peoples like the Hu, Di,



**Figure 1.** (Left and upper right) Location of the Khonakhai menhir; (middle right) the cemetery, seen from the east; (lower right) the plan and section of the cemetery, drawn by Chao Ge based on an illustration extracted from Ōtsuka 1995.





**Figure 2.** The studied menhir; (a) its direct dating by the authors; (b, c) the excavation in 2009 (d, extracted from Zhao 2016: 65), showing the underground part; the inscription (e, extracted from Xinjiang Uygur Autonomous Region Bureau of Cultural Heritage 2011: 132).

area for centuries and left uncountable remains, e.g. fortresses, beacon towers, mounded tombs, rock art, standing stones. Standing stones, or menhirs, are usually large manufactured upright stones with or without petroglyphs on their surfaces. They are widely distributed across Europe, Africa and Asia, but most numerous in western Europe and central Asia. In central Asia, most of them have been witnessed along the Altay and Tianshan Mountains, consisting of two major types: the 'bal-bals'<sup>2</sup> and 'dear stones'. In most cases, the former are anthropomorphous stelae, while the latter can be described as stone tablets bearing large deer-like petroglyphs.

Yi and Qiang; hence in this sense, the Han is probably not an ethnic group based on genetic ties, but more likely a cultural group built upon the consensus of Confucianism-based social order and the Chinese language.

2 The earliest use of the word 'bal-bal' can be traced back to several stone inscriptions of the Second Türkic Khanate (682–745) written in Türkic Runic, such as the Ongin inscription, Orkhon inscription, Kül Tegin inscription and Bilge Qaghan inscription. 'Bal-bal' often appears in the company of 'alpärm' or 'alpärin', indicating the stone or statue was set up for warriors (Wang and Qi 1995: 24–25). In addition, another similar term for this is 'baba'. It is possibly a Russian-Turkish word that means 'stone father' or 'stone peasant woman' (*kamennaya baba*) (Horvath 1989: 99; Hayashi 2005: 24).

During the 3rd National Cultural Heritage Survey of China (2007–2011), fifty-four *bal-bals* were discovered in the Ili Valley (Xinjiang Uygur Autonomous Region Bureau of Cultural Heritage 2011: 2). Among them the one at the Khonakhai cemetery (see Fig. 1), Zhaosu (Mongol Küriye) County has frequently attracted scientific attention since it was first reported in 1953 (Cultural Heritage Survey Team of Northwestern Cultural Bureau 1953; Wang 1956; Zhang 1990; Yoshida 1991, 1997; Ōtsuka 1995; Wang and Qi 1995: 145; Wang 1997; Ōsawa 1999; Lin 2005; Zhao 2016). Research mainly focused on deciphering the twenty lines of the Sogdian inscription found on its lower part and conjecturing who was buried beneath. Some identified lines of the inscription are quoted with translation as below (Zhao 2016: 66, translated by Chao Ge from Zhao Haiyan's Chinese translation):

Line 5: *s' r p' w' ... t rty 26 sr δ p' ys' r*  
Translation: *towards then ... twenty-six years later*

Line 6: *mwx' n' x' y' n npyšn β γy' ... p'y' nry x'y'n'*  
Translation: *Muqan Qaghan's grandson the sacred ... Niri Qaghan*

Line 7: *... sr dw mz' yxx' γ'nβ'y*  
Translation: *... to be the Great Qaghan*

Based on the above, scholars have temporarily

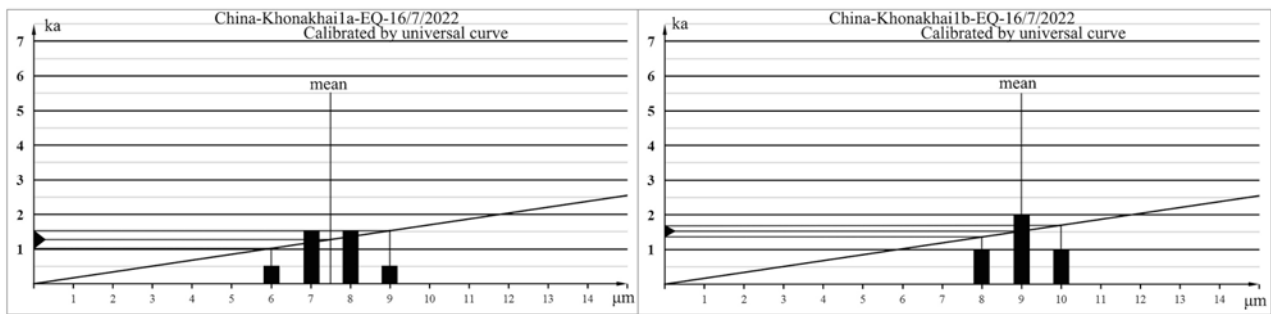


Figure 3. Microerosion age estimates secured from the two observed micro-wanes of quartz on the Khonakhai menhir.

agreed that the inscription involves two Türkic sovereigns living in the 6th–7th century CE, i.e. Muqan Qaghan and his grandson, Niri Qaghan. Moreover, some researchers assumed that both the menhir and the tomb behind belong to Niri Qaghan<sup>3</sup> (Yoshida 1991, 1997; Wang 1997; Ōsawa 1999; Lin 2005; Zhao 2016). However, a final and universal consensus about this has not been achieved.

In July 2022, the authors visited the menhir mentioned above during an expedition surveying petroglyphs and standing stones in the Ili Valley. The *bal-bal* stands in front of a stone circle tomb of 13 × 10 m, surrounded by a trench shaped like a rounded rectangle (see Fig. 1: lower right, diameter: 40 m; depth: 1 m; width: 8 m). It was made of pinkish granite (rich in K-feldspar) and engraved into a warrior-like statue of 1.8 m tall in the so-called ‘ancient Türkic style’<sup>4</sup> with the right hand in front of the chest holding a triangular cup and the left hand grasping the handle of a dagger tied on the belt (Fig. 2a). The inscription was engraved on the ‘lower hem’ of the ‘robe’ but was covered up by earth and grass in recent decades. In 2009, a mini-excavation conducted by the archaeologists of Xinjiang Autonomous Region Museum revealed the underground part about half-a-metre deep (Fig. 2d) and the original hardened ground beneath mixed with lime, thus high-definition photographic recording of the inscription was available (Fig. 2e). The soil dug out was soon backfilled after the excavation, which left the inscription hidden in the ground again since then. Traces of exfoliation events can be seen at the anthropomorphous stela’s ‘chin’ and ‘chest’. Some tiny micro-wanes of 2–3 µm wide were observed, in-

<sup>3</sup> As a descendant of the royal family of the eastern Türkic Khanate founded by Bumin Qaghan, Niri inherited the crown from his uncle, Apa Qaghan, in 587 CE (his father, Angsu Tegin and Apa were Muqan Qaghan’s heirs, and Muqan’s farther was Bumin) and probably succeeded the supreme title of the Great Qaghan of the western Türkic Khanate in 599 CE (Bao 2021). Niri possibly died in the war against the Tölös and left the Khanate to his son, Nikül Chula Qaghan. Zhu (2008) suggested that the outbreak of this final war should be no earlier than 600 CE.

<sup>4</sup> Some researchers believe that the menhirs of this type were widely made in central Eurasia during the 6th – 8th century CE (Sher 1966; Kubarev 1984; Ermolenko 2003). Meanwhile, Wang and Qi (1995) nominated them as ‘the Qiaoxia type’ based on local data in China.

dicating that the events probably happened in recent centuries. What is more worth mentioning is that two micro-wanes on granular quartz were successfully located in the engraved grooves through microscopy (Fig. 2b, c): one at the ‘hair accessory’ (or crown?) on the ‘left forehead’, 80 µm long, yielding the widths of 8, 8, 9, 8, 7, 7, 6, 7 = 60 / 8 = 7.5 µm; another at the upper margin of the ‘left ear’, 70 µm long, yielding the widths of 10, 9, 8, 8, 9, 9, 10, 9 = 72 / 8 = 9 µm.

Considering that the connection between the menhir and Niri Qaghan is still an assumption, there would be two ways to deal with the above data of micro-wanes: estimating ages calibrated by the UCC or securing new calibration coefficients based on the assumed year of Niri’s death (600 CE = 1422 years BP).

(a) If we estimate directly with the calibration of the UCC:

The average annual precipitation in Zhaosu is 471 mm (Wang 2020) which is equal to 5.9 µm/ka on the UCC. After calibration, the first micro-wane provides an age estimation of E1270 + 260 / - 250 years BP (‘BP’ here refers to ‘before 2022’), and the second produces a result of E1530 + 160 / - 170 years BP (Fig. 3). The age variation range (the median of which is 1400 BP = 622 CE) roughly matches the period of the Türkic Khanates’ reign in the area.

(b) If we secure calibration coefficients on the premise of Niri’s death in 600 CE:

The first micro-wane gives a coefficient of 5.3 µm/ka, and the second offers 6.3 µm/ka, whose average is 5.8 µm/ka, extremely approximating the value of the UCC (5.9 µm/ka).

Different approaches lead to the same end: we will meet (b) if we choose (a), and *vice versa* if we make the opposite choice, i.e. on the one hand, the Türkic origin of the menhir and its connection with Niri Qaghan can be probably confirmed if we use the UCC as calibration; on the other hand, the effectiveness of the UCC will be proven if we accept that this human-figured stela was made around 600 CE. Therefore, the archaeologists’ age estimation based on a partly deciphered inscription mentioned above has been verified through the utilisation of a direct dating method (in fact, it should be perceived as a ‘blind test’), and methodologically, what sounds more encouraging for the analysts is that the UCC has been proven

applicable in the Ili Valley, a 'crossroads' of central Asia. This reported case shows the great potential of microerosion analysis in other scientific fields besides rock art research.

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## AURANET

AURANET, the Web presence of IFRAO and AURA, is the largest rock art resource on the Internet. It is upgraded and expanded progressively and includes downloadable rock art books. Please visit the pages and bookmark them on your computer.

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## RAR REVIEW

*The Cosmos revealed: precontact Mississippian rock art at Painted Bluff, Alabama*, by JAN SIMEK, ERINE E. DUNSMORE, JOHANNES LOUBSER and SIERRA M. BOW. 2021. University of Alabama Press, 216 pages, 113 colour figures, 13 black and white images, 4 maps, 8 tables, 6 pages of References Cited, and an index. Cloth bound ISBN 978-0-8173-2085-0; e-book ISBN 978-0-8173-9342-7.

A gorgeously illustrated text focusing on one rock art site in northern Alabama, this publication includes photographs by Alan Cressler and artwork by Johannes Loubser. It is dedicated to L. Bart Henson, the first archaeologist to document the rock images at Painted Bluff, and a major figure in rock art scholarship in the American Southeast. A foreword by LaDonna Brown, director of research and cultural interpretation for the Department of Culture and the Humanities for the Chickasaw Nation in Ada, Oklahoma, sets the context of the site in contemporary indigenous thought and testifies to the authors' stated intentions to consult with native communities, of which 18 are listed in the acknowledgements of gratitude for their contributions (p. xi). The authors' main goal is to present the imagery of Painted Bluff in its entirety for both professionals and the public with detailed descriptions. Their second goal is to place the art in several contexts: historical, geographical and cultural, as well as discussing the current management of this site on the National Register for Historic Places (pp. 19, 26).

Clearly intended for the interested public, I found the technical details, the methodological discussions, illustrations and data tables easy to understand. Even the titles of the chapters clearly conveyed their subjects. After a brief recap of various stories about how people arrived in this part of the world, blending non-native theory and native beliefs, Chapter 1 summarised the earliest European sources and the history of archaeology at the site. Chapter 2 discusses the geographical context and the archaeology performed by the authors from 2004–2015 (p. 30). Chapter 3 goes into depth about the methodology for recording the rock art, cataloguing 137 images in total (p. 20). Chapter 4 provides the promised detailed descriptions of the images, considering each in isolation. Chapter 5 illustrates the 'stratigraphic' composition of the images on three different levels of the high limestone bluff,

drawing on structuralism and place theory. Chapter 6 details the chemical analysis of various paintings, emphasising the use of non-destructive methods. Chapter 7 relates how the Tennessee Valley Authority (TVA) has held stewardship over the site since 1933 and continues to manage public interaction as well as professional research (p. 24). Chapter 8 describes Johannes Loubser's leadership of volunteer teams to remove any graffiti over 50 years old, particularly recent spray paint, as well as mitigate the use of the bluff by the rock-climbing community. Chapter 9 gathers up the various threads of evidence and research, providing general interpretations from the non-native viewpoint.

Chapter 9 speaks in particular to the natural and spiritual contexts of the rock art. General interpretations link the geographical and structural contexts of the rock art to their iconography. The geographical context is particularly important to the hypotheses regarding the notion that this site may have been a pilgrimage site (p. 200). A massive limestone exposure on the northern bank of the Tennessee River, Painted Bluff stands over 300 metres high with much of its face easily in view by river travellers (p. 175). While the site is located behind Wheeler Dam, it is at the headwaters of the lake. Thus the river is still in its original channel, leaving the relationship between the water and the bluff unchanged (p. 31). This relationship and accessibility fulfill the definition of an essentially 'public' site in the meaning of the term as used by scholars of place theory (Chippindale and Nash 2004; Tilley 1994). Given the local topography, Painted Bluff would have been isolated in a world of water during major flooding events (p. 175). Drawing on the evidence from chemical analyses as well as surface collections, most of the imagery is tentatively dated between 800 BCE and CE 1500 or — in the language of the professional archaeologist — the Middle Woodland to the Late Mississippian period (pp. 42, 188).

Linking the structural context to cultural iconography, Simek and his co-authors suggest 'that Painted Bluff is a single composition of images on a very large scale ... We believe the rock art and its disposition at Painted Bluff indicates that the cliff face comprised a single, massive rock art composition depicting [the Mississippian period three-tiered] model, or map, of the cosmos.' (p. 197). While many of the images are smears of paint or simple circles,

there are enough examples of rayed circles, circles with interior crosses, and bird/anthropomorph forms to support the comparison. The authors demonstrate how the iconography of birds, bird/anthropomorphs and 'flying' anthropomorphs symbolise the upper world in the three-tiered cosmogram of Mississippian culture, while the fish or serpents — including horned serpents — refer to the lower world (p. 197, 200). The authors conclude that Painted Bluff fits within a larger geographic and cultural context focused on the rim of the Cumberland Plateau. Many sites have been recorded where open air sites with red-painted pictograms portraying upper world imagery are often paired with caves and lower-world imagery in black paint, just as is found at Painted Bluff (p. 200).

In my opinion, the authors achieve their main goal to fully illustrate and discuss the images of Painted Bluff in terms accessible to both professional scholars and the interested public. They also achieve their second goal to place the art into historical, geographical and cultural contexts (pp. 19, 26). Their discussion of the larger body of Mississippian period imagery assumes a great deal of familiarity on the part of the reader, which includes few illustrations for comparison. Consultation with over 18 indigenous communities no doubt supports this broad collaboration, but more work remains to be done, as few 21st century voices were heard in the final analysis of the site. Overall, *The Cosmos revealed* represents a collaborative effort to understand, share and preserve this monumental site for future visitors.

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*Rock art of the Qsur and 'Amour Mountains, Algeria: a cognitive approach*, by AHMED ACHRATI. 2023. Cambridge Scholars Publishing, Newcastle upon Tyne, U.K.; 412 pages, well-illustrated with colour and monochrome images, extensive bibliographies, hardcover, ISBN 978-1-5275-9213-1.

Although this book deals specifically with Algerian rock art, it does so generically, with the cognitive approach that has been evident in much previous work

by this author. Professor Achraati is well known for applying his encyclopaedic knowledge of the discipline and his uniquely innovative thinking to explore the limits of interpreting rock art. The volume begins with several short introductory chapters in Part I, essentially creating a framework for the book. These begin with the role of the Maghreb region in the appearance of anatomically modern humans. Of most relevance are the numerous hominin remains from the Middle Pleistocene of the western Moroccan site Jebel Irhoud, found with a Middle Stone Age lithic inventory. Other Maghreb regions have also yielded relevant sites, such as Dar es-Sultan 2 and Témara. An important technological tradition in much of northern Africa was the Aterian, first appearing before the Last Interglacial and continuing to the final Pleistocene. It occurs from the Mediterranean coast, across the width of Africa, and south to Chad and Niger, and is widely followed by the Capsian with the advent of the Holocene.

Chapter 2 briefly considers the palaeoenvironments of the Maghreb and then enumerates the main cultural periods applied in Africa. A telling detail is the late introduction of the Later Stone Age across northern Africa, twenty millennia after the Upper Palaeolithic arose in Eurasia and emphasising that these traditions were apparently not imported from sub-Saharan Africa. Chapter 3 deals with the Neolithic of the Maghreb, specifically of the Capsian, Saharan and Mediterranean traditions, with the rise of pastoralism and agriculture, leading to the region's Bronze Age traditions. It is commendable that the author frequently provides space for conflicting interpretations of the empirical evidence.

After these preliminaries, it is at the beginning of Part II that the primary substance of this book's subject comes to the fore, with the chapter on body and embodiment in rock art. Here, Achraati launches his first challenges of the reader's preconceptions, e.g. in his discussion of salience, his proposition that rock art has distinctive gustatory aspects and his repeated espousal of sensory substitution. Concerning the last-mentioned topic, he reminds the reader that haptic and tactile sensations can be substituted for visual information and that 'spatial perception is multimodal'. Loss of a sensory ability can prompt the exaptation of another. 'Nowhere do drawings and paintings exhibit a somaesthetic character as deep as in rock art', he states; 'its aesthetic articulation [is] partly a kinaesthetic perception and haptic response to visual experience' (p. 89). The author also sees rock art as a 'moving art'. He refers not only to the moment of an action captured in rock art but also to the movements creating rock art and the fact that most objects depicted are perceived as animate.

Chapter 5 addresses the nexus between mirror neurons, empathy and rock art. The author begins by discussing salience and the experience of observing an intentional impact on the environment, for example, through the motor skills honed in the production of

stone tools. He notes that early insights into deliberate mark-making origins have supported more recent neurological discoveries. The detection of mirror neurons in the 1990s, in particular, is considered in much detail, and they are involved in imitation, which in turn is implicated in rock art production: 'both drawing and imitation rely on the perception of the organizational structure of observed behavior of the target agent or object'. However, as Achrati recognises, 'whereas imitation reproduces movement, rock art representation freezes it' (p. 118). Another issue he addresses is that, in most cases, we can reasonably assume that the rock artist did not abstract the image from the live model but externalised mental templates from his or her memory repertoire.

The author's next innovative step is to focus on the connection between empathy and rock art. In this, he refers to the empathy a viewer of art might experience when beholding details in an image, such as a finger probing a bodily wound or the infliction of injury. He cites the work of Caravaggio, Goya, Michelangelo, Pollock and Fontana but provides no examples of rock art. Nor is it likely that there are such examples in rock art, where most meanings are imposed by rock art interpreters who lack the relevant cultural insights and where most anthropomorphs lack the relevant details. Empathy for non-conspecifics is discussed next, and here we would argue that the practices of ethnographically known societies to express empathy with animals they hunt (e.g. by 'apologising' to the quarry just killed) might provide evidence for such empathetic regret. However, can it be reliably and credibly detected in rock art? The Chapter then continues with a discussion of the various perspectives of zoomorphic petroglyphs: profile view, dorsal, frontal and rear views. Its summary offers this interesting proposition (p. 137):

The zoomorphic bias in rock art may be a human attempt at resolving an aesthetic/moral ambiguity arising from the fact that animals are, at once, a source of food and an object of awe and empathy. That is, rock art can be thought of as an artistic tribute to the animal, and a sublimation of human sensibilities, which stands as the equivalent of the mythical restitution referred to in the ethnographic literature on hunting magic. As an aesthetic behavior, therefore, rock art may be a precursor to moral and religious development.

Achrati then rounds off his hypothesis with the observation that it might be supported by the absence of cannibalistic scenes in rock art and the absence / near-absence of rock art in societies known to have practised cannibalism. However, there are presumed head-hunting depictions in rock art, and cannibalistic societies have indeed produced extensive rock art, some of which might be interpreted as recording such themes. South America, Mexico, the Caribbean and New Guinea provide examples — and there is no more empathy evident than in the various practices known of human sacrifice.

Chapter 6 considers the connection between play, pleasure and rock art. Importantly, Achrati emphasises the significant contribution of children to Pleistocene rock art and the definition of human modernity as a neoteny. More substantial is the following chapter on dream-flying and avian metaphors. Here the author considers a great diversity of topics, including aviforms in rock art, onomatopoeia, various potential avian metaphors, and of course, the well-known avian allusions perceived in San paintings. A brief discussion of bird-inspired funerary symbols leads to an interesting discussion of flying dreams and how they might have influenced beliefs and rock art.

The second half of the book, Part III, is dedicated to the cognitive analysis of the petroglyphs of the Qsur and 'Amour mountains. There is no mention of their location, except that they are in Algeria, nor is there any other empirical information about the sites. An extensive search of Google Earth and several atlases yielded no definitive matches. Chapter 8 begins immediately with the interpretation of rock art motifs which dominates the rest of the book. The first example is a 6 m long image of a 'scorpion', a complex composition not anatomically resembling that animal. For instance, it lacks both legs and pincers, among the most prominent parts of the genus. The continuous-line execution over numerous distinct segments is repeated in other motifs in more simplified forms. One, at another site, is defined as an 'insect'. Another is apparently superimposed over a significantly smaller 'elephant' nearby image, and Achrati finds this 'strange' (p. 227). Nevertheless, another such figure, apparently resembling a caterpillar, was defined as a turtle's shell or entrails by Henri Lhote in 1970.

We suggest that there is no good reason why these figures should have the meanings attributed to them; they more likely depict an abstract concept familiar to a participant in the culture in question but entirely unresolvable to the modern beholder who exists in a totally different cognitive environment. Dissonance is also evident in a following rock art motif, which resembles the torso and arms of a probably female person, but the author identifies as an 'angry face'. Much of this subjectivity applies to the remainder of the book. Chapter 9 attempts to present how various techniques were used to 'suggest kinesthetic depth and empathy' in the petroglyphs. These propositions derive from the subjective determinations of 'hiding elephants', 'anxious hesitation', or 'aurochs caught in a torrential flow'. One factor complicating the assessment of the accompanying photographs is that many appear to show chalked-in or otherwise marked grooves, so we are looking at interpretation-influenced recordings.

This volume is exceptionally well referenced throughout, not only at the end of each chapter but also these lists are combined and presented at the end of the book for easy finding. There is also an index. The volume has been produced as a hardcover and is as handsome as we have become accustomed to from

Cambridge Scholars Publishing. It is recommended reading for anyone interested in innovative ways of thinking about rock art.

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## RECENT ROCK ART JOURNAL

*Boletín APAR*. Newsletter of the Peruvian Rock Art Association (APAR). Edited by GORI-TUMI ECHEVARRÍA LÓPEZ.

Volume 8, Number 27 (2022):

TIWARY, S. K. and G.-T. ECHEVARRÍA-LÓPEZ: Vishnu Shridhar Wakankar, padre de la investigación rupestre india / Vishnu Shridhar Wakankar: father of Indian rock art research. URBIZAGÁSTEGUI-ALVARADO, R.: Arte rupestre peruano: análisis textométrico / Peruvian rock art: textometric analysis.

ECHEVARRÍA-LÓPEZ, G.-T.: Una revisión de los aspectos teórico-metodológicos de la investigación rupestre. El caso de las quilcas de La Galgada, Perú / A review of the theoretical-methodological aspects of rock art research. The case of the quilcas of La Galgada, Peru.

CHAUHAN, P. R.: General observations on the rock art of Satpura Tiger Reserve, Madhya Pradesh / Observaciones generales sobre las quilcas de la Reserva Satpura Tiger, Madhya Pradesh.

ZHANG J.: Austronesian culture of Wanshan in Taiwan: an ethno-rock art research / La cultura Austronesia de Wanshan en Taiwan: una investigación etno-rupestre.

KUMAR SINGH, S.: Distributional of rock art sites in Sonbhadra District, Uttar Pradesh, India / Distribución de sitios con quilcas en Sonbhadra District, Uttar Pradesh, India.

SAURABH S., A. SARKAR AND D. SHARMA: Tracing the symbols: an ethno-rock art study of the north-eastern Chhotanagpur plateau with special reference to Jamui Region, India / Trazando los símbolos: un estudio etno-rupestre del noreste de los llanos de Chhotanagpur, con especial referencia a la región de Jamui, India.

ARJUN, R.: Rock bruising along the dyke-swarms, a gallery of site history in Advibhavi-Rampura, south India / Golpes en los enjambres de roca, una galería de historia local en Advibhavi-Rampura, sur de India.

POOJARI, R. A.: Exploration and documentation of rock art sites in the Vindhyan Hills of Madhya Pradesh (central India) and implications for their conservation / Exploración y documentación de

sitios con quilcas en las colinas de Vindhyan de Madhya Pradesh (India central) y sus implicancias para su conservación.

## RECENT BOOKS OF INTEREST

*Arte rupestre paleolítico en la Cueva de Maltravieso (Cáceres, España). Vol. I: Estudios*, edited by HIPÓLITO COLLADO GIRALDO and JOSÉ JULIO GARCÍA ARRANZ. 2022. Interreg (Spain and Portugal) and First Art, Cáceres; 207 pages, profusely illustrated in colour and monochrome, bibliography, hardcover, ISBN 978-84-9852-719-3.

*Arte rupestre paleolítico en la Cueva de Maltravieso (Cáceres, España). Vol. II: Catálogo*, edited by HIPÓLITO COLLADO GIRALDO and JOSÉ JULIO GARCÍA ARRANZ. 2022. Interreg (Spain and Portugal) and First Art, Cáceres; 229 pages, profusely illustrated in colour and monochrome, bibliography, hardcover, ISBN 978-84-9852-720-9.

## RECENT PAPERS OF INTEREST

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## The following articles will appear in forthcoming issues of *RAR*:

'Categorising catfish, jewfish and eel motifs in Laura (Quinkan) rock art, Cape York Peninsula, Australia', by Noelene Cole, Christine Musgrave, Roseanne George, Lynley Wallis, and the Laura Indigenous Land and Sea Rangers

'Stretching the surrogate: an initial test combining DStretch image enhancement with photogrammetry modelling at Bunjil's Shelter and Gulgurn Many, Australia', by T. J. Keep, R. G. Gunn and J. Goodes

'Rock painting within southern Peru in the context of physicochemical analysis of pigments', by Józef Szykalski, Beata Miazga and Jakub Wanot

'Wurranderra's symbols: an exploration and contextualisation of the Thurk (Kingston-on-Murray) Petroglyph Site on the Murray River, South Australia', by Amy Roberts, Marc Fairhead, Craig Westell, Ian Moffat, Jarrad Kowlessar and the River Murray and Mallee Aboriginal Corporation

'A purported Pleistocene sand sculpture from South Africa', by Charles W. Helm, Andrew S. Carr, Hayley C. Cawthra, Paul D. Cowley, Jan C. De Vynck, Pieter-Jan Gräbe, Renee Rust, Willo Stear and Alan K. Whitfield

'The Marmie: a distinctive motif in the early rock art of Greater Gariwerd, Australia', by R. G. Gunn, J. R. Goodes, M. Hanson, L. C. Douglas and D. Griffin



## ORIENTATION

### *Preminghana petroglyphs returned in Tasmania*

By PETER C. SIMS

Smoke filled the air outside the two Tasmanian museums recently at a ceremony attended by representatives from the Tasmanian Aboriginal Centre and the Tasmanian Aboriginal Land Council. This event was to celebrate or perhaps lament the official handing back of Preminghana petroglyphs from far north-west Tasmania. After years of negotiations, the Tasmanian Minister for Aboriginal Affairs finally gave the official nod for the Tasmanian Museum and Art Gallery in Hobart and the Queen Victoria Museum and Art Gallery in Launceston to formally return the petroglyphs that each held from this site back to the Aboriginal community.

This Aboriginal smoking ceremony was held on 23 November outside the two institutions, the event being the lead story on the ABC TV news bulletin that same day (ABC 2022). However, it failed to gain any mention in either the local Launceston or the Burnie newspapers; only the Hobart *Mercury* ran the story on page 11 the following day (Kempton 2022). The *Mercury* story by Helen Kempton, leading with 'Two ancient Tasmanian Aboriginal petroglyphs stolen 60 years ago are on their way home to far North West Tasmania', indicated two quite separate events involving these two Tasmanian museums.

From their discovery by schoolmaster Arch Meston and his report in 1932 (Meston 1932), it was not until 1950 that permission was granted by the then-private landowner to excavate and record the extensive aeolianite sandstone sites at Preminghana, formerly known as Mt Cameron West (Luckman 1950). It was also agreed that as one engraved slab, then in three pieces that had recently fallen from the eroding cliff face, would soon be lost through erosion by the exposed sand-blasting winds, and it could be taken from the site. This fragmented petroglyph was to be protected from the elements and formed the central public display at the Queen Victoria Museum for many years. Incidentally, it was this display that sparked my interest in Aboriginal rock art and my long association with that institution.

The other separate event occurred ten years later in 1962, when the Tasmanian Museum and Art

Gallery, a State Government enterprise, undertook the removal of one of the petroglyphs by sawing off sections that, when reassembled, formed a display in that institution. Had it not been for the intervention by the Australian Institute of Aboriginal Studies, more petroglyphs would have been removed from this site (Mulvaney and Jones 1968). Prompted by this act, described as vandalism (Mulvaney 2011: 116), the Institute, led by its Principal Fred McCarthy, with photographer Bob Edwards undertook an excavation and recording of the site in 1969 (McCarthy 1969). This brief report on this extensive study indicated that McCarthy would publish a monograph. However, this did not eventuate.

In the review of my monograph on Preminghana (Sims 2020), Robert G. Bednarik indicated that this account was one example representative of the systematic neglect cultural heritage has always experienced in Australia (Bednarik 2021). Since 1995 when the Preminghana site was handed back to the Tasmanian Aboriginal community, it has been managed by the Aboriginal Land Council Tasmania (ALCT). After constant lobbying for several years by the Aboriginal community for the return of these petroglyphs from the two Tasmanian institutions, that request has now been finally granted.

According to the *Mercury* article, the plan is for the two petroglyphs to be returned to Country, and according to the ALCT Chairman Michael Mansell, 'They will be placed back and just as in the past, would be periodically covered and uncovered with sand driven winds'. However, the local Circular Head Aboriginal Corporation had been excluded from these decisions and protested against the petroglyphs' burial, being concerned about erosion, claiming 'They should be on display for all to see' (Kempton 2022).

These two petroglyphs from Preminghana were finally returned to Country on 26 November, attended by a gathering on the beach in the shadow of Mount Cameron West, near Marrawah. This event was reported in the Burnie *Advocate* newspaper headlined '*luwamakuna lumi, milaythina palawa*' which translates as 'the petroglyphs are home on Aboriginal land'. The story in the print version omitted the photo of the group on the beach, but this was included in the electronic version only (Flint 2022).

This event was a significant step in the history of Aboriginal rock art in Tasmania, and it will now be

interesting to see if 'stolen' petroglyphs from other Tasmanian sites will also eventually be returned to Country. Like in other Australian states, Tasmanian rock art also has a history of research, neglect and mismanagement. This latest event is not the last chapter in the record of Aboriginal rock art in Tasmania.

**Peter C. Sims OAM**

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makers, the indigenous people; together with other rock art sites worldwide, they have formed the memory of all humankind's past. As far as we know, such vandalism happened in many countries, but contrary to our expectations, this time, it happened in Australia. On this 'highly civilised' continent, people have preserved the world's richest rock art resource and fostered the most advanced rock art science. It is not only a violation of the consensus that our former generation has made under the framework of UNESCO, e.g., in the *Venice Charter 1964*, the *Recommendation Concerning the Preservation of Property Endangered by Public and Private Works 1968*, the *Convention on the Means of Prohibiting and Preventing the Illicit Import, Export and Transfer of Ownership of Cultural Property 1970*, the *Burra Charter 1999* (ironically, it was adopted by the Australian Committee of ICOMOS in 1979 at Burra, South Australia) and the *Declaration Concerning the Intentional Destruction of Cultural Heritage 2003*, but more importantly an irreversible loss of humanity. We believe that most of our international colleagues share the same feeling about this tragedy. The international academic community must condemn this unforgiven savagery, and the event also needs to be reported to UNESCO and ICOMOS.

We are writing to you because we want you to know that you are not alone, and what you have contributed to our discipline and the indigenous people is righteous and selfless. The courage to 'blow the whistle' in darkness is priceless, especially when others choose to 'keep silent'. You will always have our support.

Best regards,  
Anni and Ge  
(Dr Jin Anni and Prof. Chao Ge, China)

RAR 40-1432

## Letter to the Editor

Dear Robert,

We are sorry to hear about the IFRAO Congress's cancellation and the unfairness imposed on you. We cannot imagine how many difficulties and dangers you have encountered during your actions to protect rock art sites against 'Goliath', i.e., the political-industrial complex. We are deeply grateful for all the personal sacrifices you've made to safeguard the academic purity of the discipline. Please accept our most sincere respect.

Undoubtedly, those rock art sites belong to their

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## The second issue of Journal of Rock Art published

The *Journal of Rock Art* (岩画学报), Volume 2, Number 1, has published the following articles in May 2023. *JORA* is *RAR*'s Chinese language sister journal and is Open Access.

1. A PRELIMINARY STUDY ON BAYANG PETROGLYPH C IN YUNYANG, CHONGQING by Jiujiang Bai, Liyuan Yang
2. EXPERIMENTAL STUDY ON DATA COLLECTION TECHNIQUES FOR ROCK ART IN HUASHAN, ZUOJIANG, GUANGXI by Qingping Yang, Yihan Zhang, Qiuyan Jiao
3. THE WHOLE-IMAGE ANALYSIS AND RESEARCH OF ROCK ART DISEASE IMAGE OF HUASHAN MOUNTAIN, NINGMING COUNTY by Pengcheng Hu
4. THE CLASSIFICATION AND DISTRIBUTION OF HUMAN-FACE PETROGLYPHS IN THE AMUR RIVER BASIN AND THEIR ASSOCIATION WITH CHINA AND NORTH AMERICA by Lifeng Zhu
5. THE CULTURAL CHARACTERISTICS AND RELEVANT STUDIES ON DAXINGANLING ROCK ARTS by Hongyan Zhuang
6. A STUDY OF THE TYPES OF RESIDENTIAL ARCHITECTURE-LIKE IMAGES IN CHINESE ROCK PAINTINGS AND THEIR EVOLUTION by An Sui, Yongsheng Tong
7. ROCK ART, REGIONALITY AND ETHNOGRAPHY: VARIATION IN SOUTHERN AFRICAN ROCK ART by Ghilraen Laue, translated by Xia Luo, Bo Xiao
8. STRANGER THAN FICTION: DISTINGUISHING BETWEEN ANTHROPOGENIC AND NON-ANTHROPOGENIC ROCK MARKINGS by Robert G. Bednarik, translated by Jing Che, Bo Xiao

The articles can be downloaded at  
<https://jora.org.my/archives/>

### A preliminary study on Bayang petroglyph C in Yunyang, Chongqing

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'Bayang Petroglyph C' is one of many ancient petroglyphs in Bayang Gorge, Yunyang Section, Chongqing, Yangtze River. The petroglyph consists of 45 motif types, including rib boats, stags, human heads, wizards, vertical eyes, hoof prints, owl birds, giant fish tails/ladders, sacred trees and pavilion-shaped buildings. Its production methods include grinding, line carving, chiseling, reduction, etc. Generally speaking, the rock art was created multiple times between the Xia Dynasty and the early Shang Dynasty, showing the scene of the deceased soul ascending to heaven under the protection of the ancestor gods, divine beasts, and divine birds during the ancient ritual of offering and

sending souls, and looking forward to resurrection. 'Bayang Petroglyph C' is unique in southwest petroglyphs, and its symbols are related to archaeological cultures such as Erlitou and Sanxingdui, which has important research value.

### Experimental study on data collection techniques for rock art in Huashan, Zuojiang, Guangxi

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Zuojiang Huashan rock art in Guangxi is a most important part of the world cultural heritage, Zuojiang Huashan Rock Art Cultural Landscape. It faces a series of conservation challenges, and it is significant to completely record this rock art painted on the cliff and the information of their surrounding cultural relics in a technically feasible and economically viable way. The experiment took Longzhou Chenxiangjiao rock art, Chaochuantou rock art, Mianjiang Huashan rock art and Ningming Huashan rock art as research objects, used oblique photography technique, object photogrammetry technique, panoramic technique and hyperspectral technique to conduct experimental research on data acquisition of the above rock art on the basis of different environments and parameters, and obtained a large amount of experimental data. The comparative analysis shows that the object photogrammetry is the most suitable data acquisition technique for Zuojiang Huashan rock art at present.

### The whole-image analysis and research of rock art disease images of Huashan Mountain, Ningming County

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The Huashan rock arts in Ningming county were painted by the Luo Yue people, the ancestor of the Zhuang people between the 5th century BCE and the 2nd century CE. They have endured more than 2000 years of historical changes due to geological and natural environmental factors. These diseases including rock cracking, stalactite covering, flaking, and fading, caused some of the rock arts to be mutilated, blurred and diffused and seriously compromised the integrity of the images, which brought significant challenges to the research process. In this study, we primarily discuss the two techniques of 'inpainting' and 'mending old painting' in the restoration of paintings and calligraphy. We also develop a 'full image' of the damaged rock art images from an artistic point of view, with the goal of restoring the original appearance of rock art images as much as possible.

**The classification and distribution of human-face petroglyphs in the Amur River Basin and their association with China and North America**

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The human-faces petroglyph in Asia, America and the Pacific is a unique type of rock art in the world, so it is a Pacific rim cultural phenomenon. The similarity factors of human-faces petroglyphs from Amur River at Russia to Xiliaohe River, Yinshan Mountain, Zhuozishan Mountain, Helan Mountain of China, and to northwest coast of North America is obvious. Also, the petroglyphs in the above sites have many unique features of their own. Some main types of Asia were reproduced in North America, which points a fact that the cultural exchange and communication has affected the rock art creation.

**The cultural characteristics and relevant studies on Daxinganling rock art**

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The Daxinganling, situated in northeastern China, is the watershed between the Inner Mongolia Plateau and the Northeast Plain. In the northern region of the Daxinganling, numerous red-painted rock art sites have been discovered since the turn of the 21st century. Through more than a decade of investigation on the rock arts of the Daxinganling, it has been determined that these rock arts exhibit distinctive regional cultural characteristics. On the basis of multiple field investigations and the exhaustive use of archaeological and anthropological data, a systematic analysis has been

conducted to synthesise the cultural characteristics of the Daxinganling rock art in this paper. The discussion also includes rock art's cultural functions and systematic attribution. The rock art in the Daxinganling should be a component of the northern woodland hunting cultural system, it was determined.

**A study of the types of residential architecture-like images in Chinese rock paintings and their evolution**

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Rock art in northern and southern China are rich in matrices, and architectural motifs are numerous and rich in type in Chinese rock art. This paper combs through the architectural imagery in Chinese rock art, classifying and organising the existing iconographic material from Chinese rock art, distinguishing, and categorising the different architectural styles within them. To explore the differences in the way people lived in different regions of China in ancient times, it examines in detail the characteristics and causes of the architecture in the rock art images of residential buildings in China, as well as their evolutionary patterns. It reflects the original creativity and aesthetic orientation of the ancient ancestors, and better reflects the differences in the lifestyles and environmental characteristics of the ancient ancestors and the reasons for these differences, providing a partial reference for the study of traditional architecture and habitat.

The remaining articles in this issue of *JORA* are translated versions of *RAR* papers in recent issues.

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