Chapter 10

The rock art soundscapes of the Karakol valley (Republic of Altai, Russia): An archaeoacoustic study of a unique landscape

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Abstract

This article explores the presence of shamanism in the Karakol valley, analysing its historical timeline from prehistoric to modern times. Scholarly opinions vary, suggesting origins from the Neolithic to the modern era, with clearer depictions emerging in the 18th and 19th centuries. Acoustic tests conducted in four areas associated with shamanic practices revealed inconclusive results due to their location in an open-air environment. However, accounts of intense auditory experiences during shamanic rituals suggest that, even if acoustics may be used in some occasions, there are other alternative means of emotional control. It is argued that the lack of significant acoustic effects in the tested sites does not rule out the possibility of shamanic rituals. The discussion also delves into the representation of shamans in rock art and the interpretation of results from acoustic tests, considering factors like reverberation and sound clarity. This study highlights the complex interplay between shamanism, sensory experiences and ritualistic practices in ancient societies.

Keywords: archaeoacoustics, Altai, Siberia, shamans, reverberation, sound clarity

Introduction

In August 2019 the Artsoundscapes project carried out a fieldwork campaign in Russian Altai. Acoustic tests were conducted in four zones: the Lower Chuya valley, Urkosh, Karakol and the middle sector of the Katun river close to the rural locality of Kuyus (Fig. 10.1). The results obtained in the two first zones indicated that the acoustic conditions of the rock art sites were appropriate for storytelling and singing, intangible cultural practices well attested in the area by the ethnographic sources.

More importantly for the chronology of the rock art, the excavations undertaken at some of these sites point to the possible existence of these practices in earlier periods, given the presence of campfires around which singing and storytelling took place in recent times. Evidence of sacrifices performed close to decorated walls indicate that these locations had a special meaning for those who spent some time around them (Díaz-Andreu *et al.* 2023a; 2023b). Like these two already published areas, the third area where acoustic tests were performed during our fieldwork, the Karakol valley, is placed along the Chuysky (Chuiskii) Tract – a road that crosses from north to south/southeast of today's Republic of Altai and was most likely used already in prehistory (Fig. 10.1). Yet, despite this similarity, there were key differences with the previously analysed areas.

The Karakol valley contrasts with the two previous areas analysed because of its unique character (Plets 2013, 247–263). In Karakol, the number of prehistoric sites is smaller, and none of them shows a high concentration of motifs. Moreover, many rocks in Karakol display fine engravings dated to the Turkic[1] and the historic periods. Especially among the latter, there are many representations of shamans, a term that comes from the Evenk of northern Siberia but has been used to designate a form of religious sensibility and practice found around the world, although not a single, unified religion (Vitebsky 2001, 10–11). One of the key features of this type of religion is trance, shamans's ability "to leave the body and travel to other parts of the cosmos, particularly to an upper world in the sky and a lower world underground" (Vitebsky

Fig. 10.1: Map of Russia and countries to its south with the Altai Republic marked. The four areas where acoustic tests were undertaken in August 2019 are shown in the inset to the bottom right. 1: Lower Chuya area; 2: Urkosh area; 3: Karakol valley; 4: Kuyus. The line transversally crossing the Republic of Altai represents the Chuysky Track. Author's own elaboration.

2001, 10). The high number of shamans' motifs in the Karakol valley is significant and marks the singular nature of the region, which is still considered sacred by today's local populations (Plets *et al.* 2011, 377). This article will explore whether the distinctive character of the Karakol area is reflected in the different acoustics of its rock art landscapes. A review of the evidence of shamanism, especially in relation to rock art in Siberia throughout the different historic periods is undertaken, paying particular attention to the Karakol valley. This is followed by a brief description of the rock art sites where archaeoacoustic tests were performed and an explanation of the results obtained. All this will be the basis for discussing the nature of shamanistic rock art soundscapes of the study area.

Shamanism and rock art in Siberia

Did the rock art of Altai have a shamanic character? This question will first be answered by looking at the evidence in the prehistoric and historic periods, not only in rock art but also in other types of sites. We will then look at the possible confirmation found in Siberia to narrow the angle and focus on Altai.

Shamanism in the prehistory of Altai?

History of research

Scholars have discussed evidence of shamanism in rock art since the end of the 19th century. Znamenski mentions that in 1892, Russian ethnographer Grigory N. Potanin (1835–1920) presented a "Report on shamanic drums and the sign of the cross on them" at a session of the Russian Imperial Geographical Society. In it, he linked the cross motifs found in the rock art of a site he called Kaibazhi with the same sign painted in Siberian frame drums (also called tambourines in the literature) (in Znamenski 2003, 97–98). Also, in the first third of the 20th century the painter Grigory I. Choros-Gurkin (1870–1937) recorded some images of shamanic tambourines in the Karakol valley, in the hill of Bichikty-Bom (see below). For his part, many decades later Soviet archaeologist Alexei P. Okladinikov (1949 in Hoppál 2007, 44) insisted in the connection between rock art and shamanism. He suggested a date for the appearance of shamanism in the Bronze Age and identified some figures as shamans (see, for example, Figs 10.2a and 10.2b). Moreover, Hungarian ethnographer Vilmos Diószegi, who visited with Okladinov some panels next to the Bolshaya Khada community, found the representation of a drum on a large cliff with many rock art motifs, a drum that his colleague considered to be from the Bronze Age (Diószegi 1968, 192–195) (Fig. 10.2c). Later additions to the number of representations of shamans and shamans' drums, together with the earliest findings already mentioned, can be found in later publications (see, for example, Devlet 2001; Rozwadowski 2001; Devlet and Devlet 2002; Rozwadowski and Kosko 2002) (Fig. 10.2).

The abundance of recent publications that mention shamanism in the context of Siberian rock art can be connected to the high-profile debates taking place from

the mid-1980s. These started in South Africa (Lewis-Williams 1986; 1987) and then extended to other parts of the world such as the European Palaeolithic (Lewis-Williams and Dowson 1988) and Neolithic rock art (Lewis-Williams and Dowson 1993). There were voices, however, against the consideration of shamanism as a global prehistoric religion (Bahn and Vertut 1997; de Beaune 1998; Lorblanchet *et al.* 2006; Bahn 2010, 67–135) and nuancing its presence, something that we can see in scholars working in Central Asia such as Henri-Paul Francfort (Francfort *et al.* 2001; see also below). However, most scholars working on Siberian rock art remained oblivious to the debates and continued with the long-established tradition of relating rock art and shamanism. The only sign of some influence of the complaints expressed by the small group of authors against shamanism can be seen in the use of the term "proto-shamans", a term that appeared in the literature in the year 2000 in relation to the motifs dated to the prehistoric period (for example Devlet and Devlet 2000, 371; Rozwadowski 2017; 2019; 2021). Nowadays, three decades after the proposal of shamanism as an all-embracing theory, scholarly debate has moved on. Since the 2010s, rock art researchers' attention has turned to animism and ontology (Janik 2010; Willerslev 2013; Díaz-Andreu *et al.* 2023a) and, although shamanism is still mentioned, there is a higher awareness of the very high diversity of ritual practices that can take place beneath this umbrella term.

Shamanic evidence in rock art?

What elements did scholars use to identify shamanism in the rock art motifs in Siberia? In 2001, regarding the oldest motifs, Russian rock art specialist Ekaterina Devlet commented on shamanic flights (Fig. 10.2e), drums and drumsticks (Fig. 10.2f), bows as an object that could have had the same function as a drum (Devlet 2001, 49), and particular head-gear "often decorated with horns or antlers, and with bird feathers or other ornithomorphic features" (Devlet 2001, 50) (Fig. 10.2g). Regarding the key presence of drums, there seems to be some disagreement, for Andrzej Rozwadowski has noted that, at least in Southern Siberia and Central Asia, it is challenging to find unequivocal representations of drums in rock art that could be older than the 1st millennium BCE (Rozwadowski 2009, 316). He mentions that some researchers only date the appearance of shamanism to that millennium (Bokovenko 2006) and this leads him to date Figure 10.2g not in the Bronze Age but in the Iron Age Scythian period. Rozwadowski is not the only one reluctant to talk about shamanism in the Bronze Age. American specialist in the rock art of Mongolian Altai, Esther Jacobson-Tepfer, has also criticised this early date, and a similar opinion has been expressed by French specialist, Henri-Paul Francfort. According to him it is only from the second half of the 1st millennium BCE there are more abundant representation of characters with drums and other paraphernalia with similarities to the shamans of the historical period (Francfort 2006, 173).

Focusing on the Altaian area, no representations of shamanic drums have been found in the prehistoric rock art motifs. However, there are other elements usually

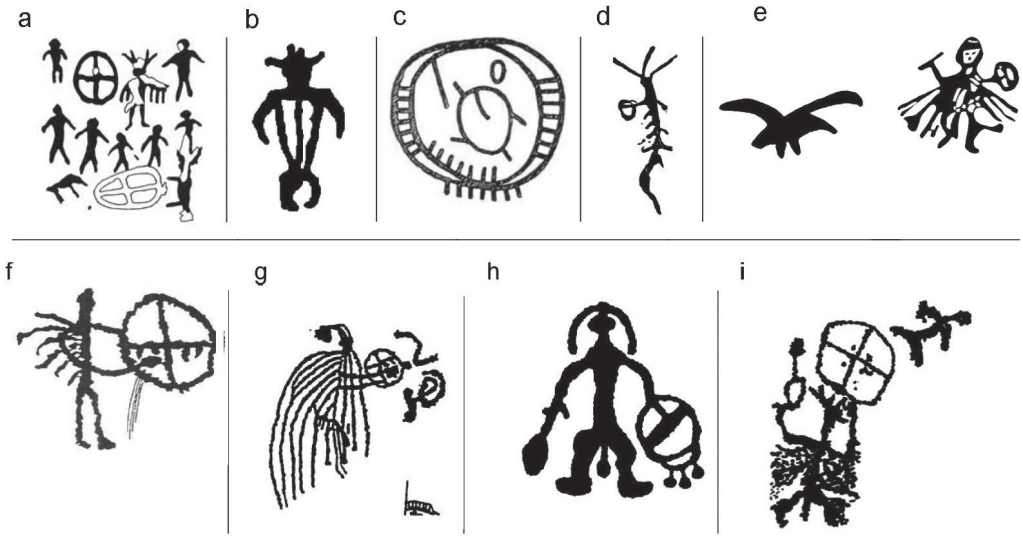

Fig. 10.2: Motifs likely represent shamans and/or frame drums. a: Scene with a motif possibly representing a shaman recorded by A.P. Okladinov in 1949. Mokhsogollokh-Haja, middle Lena. Source: (Devlet and Devlet 2005: figure 237, Hoppál 2007: figure 13); b: Shaman carved near a tambourine on the rocks above the Bolshekadinsky rapids on the Oka River, above Bratsk (Irkutsk Oblast) (Source: Okladnikov 1964, 74); c: Shaman's drum from Krasnoiarsk first published by Diószegi (1960, 108–109) (Source: Diószegi 1968, fig. p. 196; Hoppál 2007, fig. 27); d: Lake Maloye, Middle Yenisei River (Source: Devlet 2001, fig. 7.2); e: Representation of the shamanic flight at the Niukzha rock art site in the Olekma River basin (Amur Oblast) (Source: Devlet 2001, fig. 7.4); f: Oglakhty, Middle Yenisei river (Khakasia) (Source: Devlet 2001, fig. 3.5.1; Devlet and Devlet 2005, fig. 241.1); g: Oglakhty (Khakasia) (Source: Devlet 2001, fig. 3.5.2; Devlet and Devlet 2005, fig. 242.1); h: Motif found in a cleff of the rock in the Minusinsk Basin. The site is near Ilinskaya Village, Krasnoyarsk County (Source: Rozwadowski 2009, fig. 1); i: Middle Yenisei (Khakasia) (Source: Devlet and Devlet 2005: fig. 241.3). Author's own elaboration.

associated with shamans that Devlet sees as evidence of shamanism before the Iron Age of Altai. As she puts it, talking about motifs such as Figure 10.3a:

> frontal images of male and female figures wearing long, fringed coats with bands hanging down from the hands, arms, and sometimes from the sides, chest and hem... Most of these figures are shown with raised hands, suggesting that they are "praying", perhaps appealing to celestial realms or supernatural powers; others are shown with extended hands, as if they are flying... Female images are usually shown with more complicated clothing, including a more prominent skirt-like element. Fringes may be depicted on both sides of the torso, as well as at the sides, breast and hem of the clothing. The evident differences between the male and female representations in the rock art may be connected with the co-existence of male and female shamans and persons involved in shamanic activity. (Devlet 2001, 45)

Delvet also offers alternative explanations for some of these figures, as illustrated in the case of the motif in Figure 10.3b, that she does not interpret as a shaman but

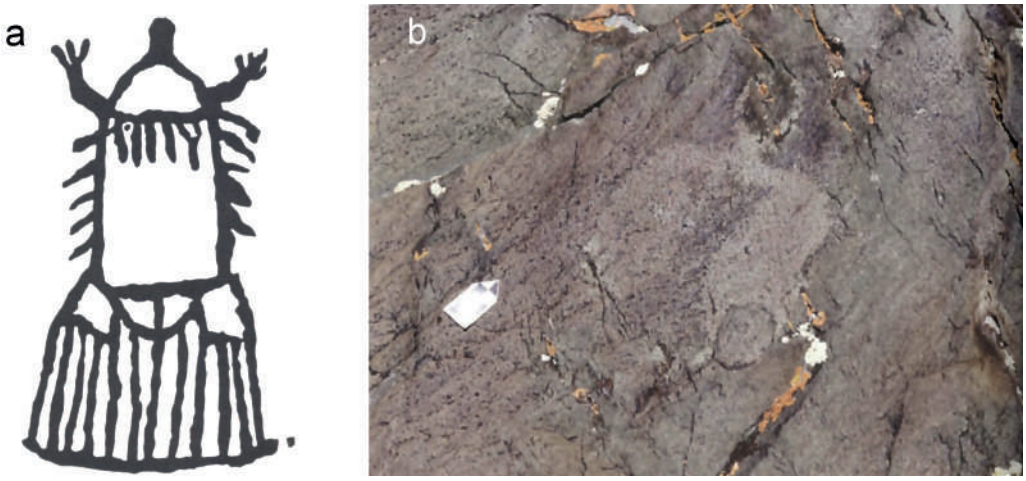

Fig. 10.3: a: Female frontal motif with bands hanging down from the sides and chest. Kalbak Tash I (Source: Kubarev and Jacobson 1996, fig. 194); b: Spirit Figure with moth wings and horns. Tsagaan Salaa III, Bayan Olgiy aimag, Mongolia (Photo: Gary Tepfer. Source: Jacobson-Tepfer 2015, fig. 3.18). Author's own elaboration.

a "spirit Figure with moth wings and horns" from the Early Bronze Age (Jacobson-Tepfer 2015, 102).

It could be said that, at least in a great deal, the difference in opinion of these different authors seems to be related to geography: the more to the south, the more reluctant scholars are to see shamanism in the prehistoric period, at least before the Iron Age. Yet, as we will see, in the case of Altai, there are some scholars who still insist on talking about shamanism in the Bronze Age (see below).

Evidence of shamanism beyond rock art

What about other evidence that can tell us about early shamanism in Altai? Two sites are relevant in this respect: the Tourist-2 archaeological site and the prehistoric burial area excavated in the village of Karakol. The first of them, the Early to Middle Bronze Age cemetery at the Tourist-2 site, is located north of the Karakol valley in Novosibirsk. In it, a series of theriomorphic and ornithomorphic figures with parallels to the so-called Karakol culture (see below) were found. They were interpreted as a reflection of the cult of the ancestors and early forms of shamanism (Basova *et al.* 2019) (Fig. 10.4).

A key site for those who are in favour of the existence of shamanism from the Neolithic in the Altai area is the burial found in the village of Karakol. This archaeological site has become the representative site of the Karakol culture, considered by some to be a regional variation of the hunting-dependent Okunev culture of the Minusinsk basin, located about 450 km to the northeast, and traditionally dated to the Early Bronze Age or earlier (Jacobson-Tepfer 2015, 40, 82). Yet, despite certain similarities between both (Kubarev 1988), there are also many differences

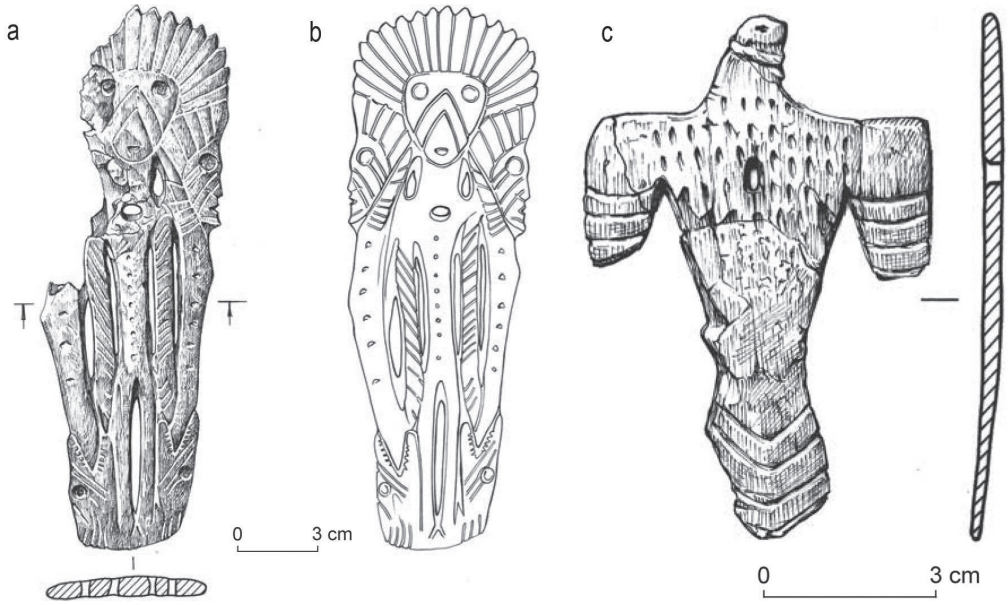

Fig. 10.4: Figurines found in the Early to Middle Bronze Age cemetery at the Tourist-2 site. a and b: Belt buckles with anthropomorphic representations; c: Image of a bird. Source: based on Basova et al. 2019, figs 2 and 6. Author's own elaboration.

regarding ritual, and, according to Jacobson-Tepfer, there is a lack of diagnostic material culture (Jacobson-Tepfer 2015, 81n).

The Karakol burial was excavated in 1985–1986 by Vladimir Kubarev (1946–2011) (Kubarev 1988). The site was found while landscaping a plot of land in the village to make a schoolyard next to a community building (Jacobson-Tepfer 2015, 82) (Fig. 10.5). Five burials were identified; some, unfortunately, had already been disturbed by the bulldozers. They were small, rectangular cists delimited by stone slabs. Interestingly, many of them seemed to be reused, a practice characteristic of the northeastern Okunev and eastern Isakovo[2] burials (Jacobson-Tepfer 2015, 82), and in general in other parts of Asia (Miklashevich 2003a, 30). Kubarev dated the burials to the middle of the second half of the 2nd millennium (Kubarev 1988). In contrast, other scholars have proposed an earlier date, the first half of the 2nd millennium (Jacobson-Tepfer 2015, 81n; Molodin 2006, 281).

The inner walls of the rectangular cists were covered with engraved, pecked and painted motifs. For the latter, red, white and black colours were used and the motifs seemingly formed scenes involving anthropomorphic creatures and animals, including moose, ibexes, birds and dogs. Moose and caprids seemingly belonged to an earlier phase. The stone slabs where these figures had been executed were later turned clockwise and reused for the Karakol burials (Jacobson-Tepfer 2015, 89). The figures of a later period include some composite motifs part human and part animal with similarities with other figures found in a vast territory that includes Southern

Fig. 10.5: a: View of the village. Karakol. Altai Republic. The arrow indicates the site of archaeological excavations (Kubarev 2009, fig. 2); b: Burial 2 of Kurgan 2 (Kubarev 2009, fig. 30); c: Reproduction of the painted motifs found on the south wall of burial 2 in the kurgan 2, south wall, Karakol. Two frontal figures with large, feathered heads and long, tail-like hands are accompanied by frontal figures with vertical horns and clawlike hands (Kubarev 2009, fig. 32); d: Documentation made of the motifs in c. Drawing: L.-M. Kara, after Kubarev 1988 (Jacobson-Tepfer 2015, fig. 3.3). Author's own elaboration.

Khakassia, where the burial site of Tas-Khazaa has been excavated (Savinov 2019) and the area of the Tuba river in Krasnoyarsk, where the site of Shalabolin is found (Jacobson-Tepfer 2015, 37). The most important of these figures, in Jacobon-Tepfer's view (2015, 90), were front-facing, and displayed haloes formed with horns or feathers (Fig. 10.6). Other figures were running and were also adorned with either a feathered headgear or a peculiar looped structure emerging from their heads (Fig. 10.5c and 10.5d). Jacobson-Tepfer sees parallels between the feathered heads of the Karakol burials and those from Shalabolin in the Krasnoyarsk Krai (2015). Writing about the motifs the excavator wondered:

> Who are the main characters depicted on the Karakol plates? Are they shamans? Good or evil ghosts? And may be even Gods? Everything is posible. (Kubarev 2009, 81)

Historic period

Regarding the Turkic period, there does not seem to be much in terms of evidence of representations of tambourines in the area of Altai. Erkinova and Kubarev believe that the engravings that have been dated to that period are, in fact, of the historic

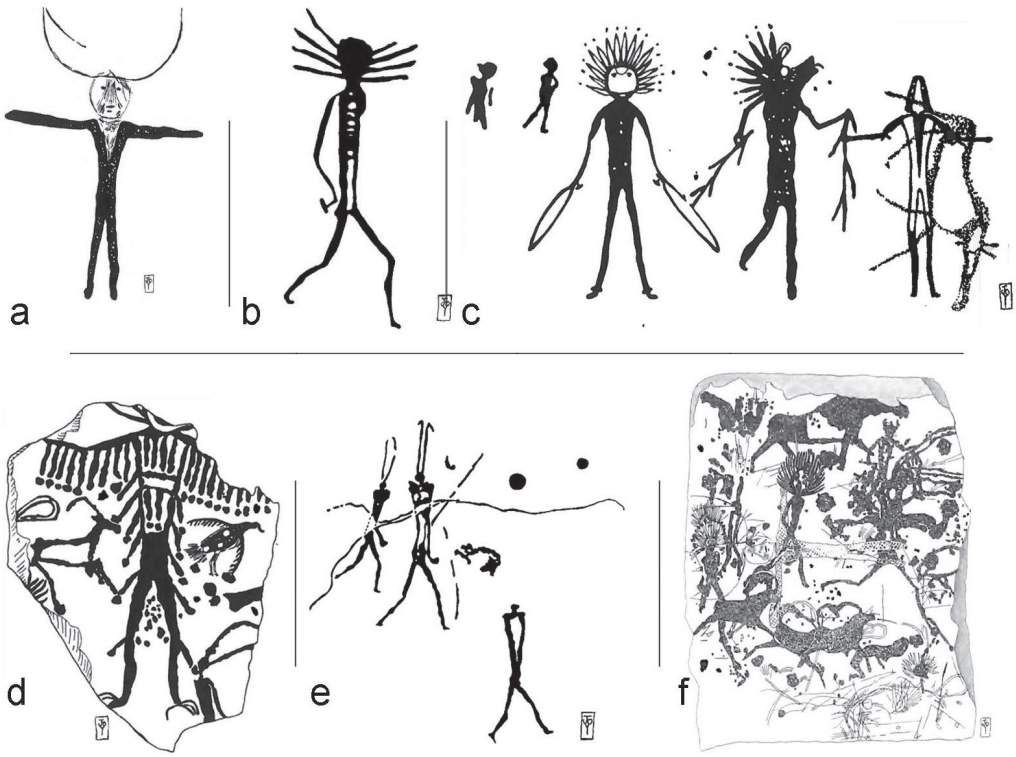

Fig. 10.6: Engraved and painted motifs in the upper layer of a slab forming the west wall in burial 2 of kurgan 2, west wall. Karakol. Drawing: L.-M. Kara, after Kubarev 1988 (Jacobson-Tepfer 2015, fig. 3.2); Running anthropomorph with peculiar headdress made on a cover slab of kurgan 2. The motif was pecked, engraved and scrapped. Drawing: L.-M. Kara, after Kubarev 1988 (Jacobson-Tepfer 2015, fig. 3.4); c: Painted and pecked motifs with feathered headdresses. The one at the centre has a bear-like head. Burial 5, on a slab from the south wall. Drawing: L.-M. Kara, after Kubarev 1988 (Jacobson-Tepfer 2015, fig. 3.5); d: Motif of bird-man pecked and scraped on a slab from burial 2, kurgan 1 (Jacobson-Tepfer locates this burial 2 in kurgan 1 (Jacobson-Tepfer 2015, 86) and kurgan 2 (Jacobson-Tepfer 2015, 85) (Jacobson-Tepfer 2015, fig. 3.6); e: Three pecked and engraved motifs, two of them with tall headdresses and all executed with pecking and engraving techniques. Slab 6, burial 5 (Jacobson-Tepfer 2015, 87, fig. 3.8); f. Superpositions in slab 3 of burial 2, Kurgan 2 (Jacobson-Tepfer 2015, 87, fig. 3.7). Author's own elaboration.

period (Erkinova and Kubarev 2004, 91). Indeed, there is plenty of evidence of shamanism in the Modern period: the same items mentioned for the prehistoric period – drums, drumsticks, particular head-gears and cloth decorations – are found in the much finer rock engravings dated in the last few centuries, probably with a chronology from the 18th century onwards, Interestingly, a series of representations found in other types of objects such as tobacco containers also show the places where shamans performed. These were mainly in enclosed spaces but occasionally also in the open-air (Fig. 10.7).

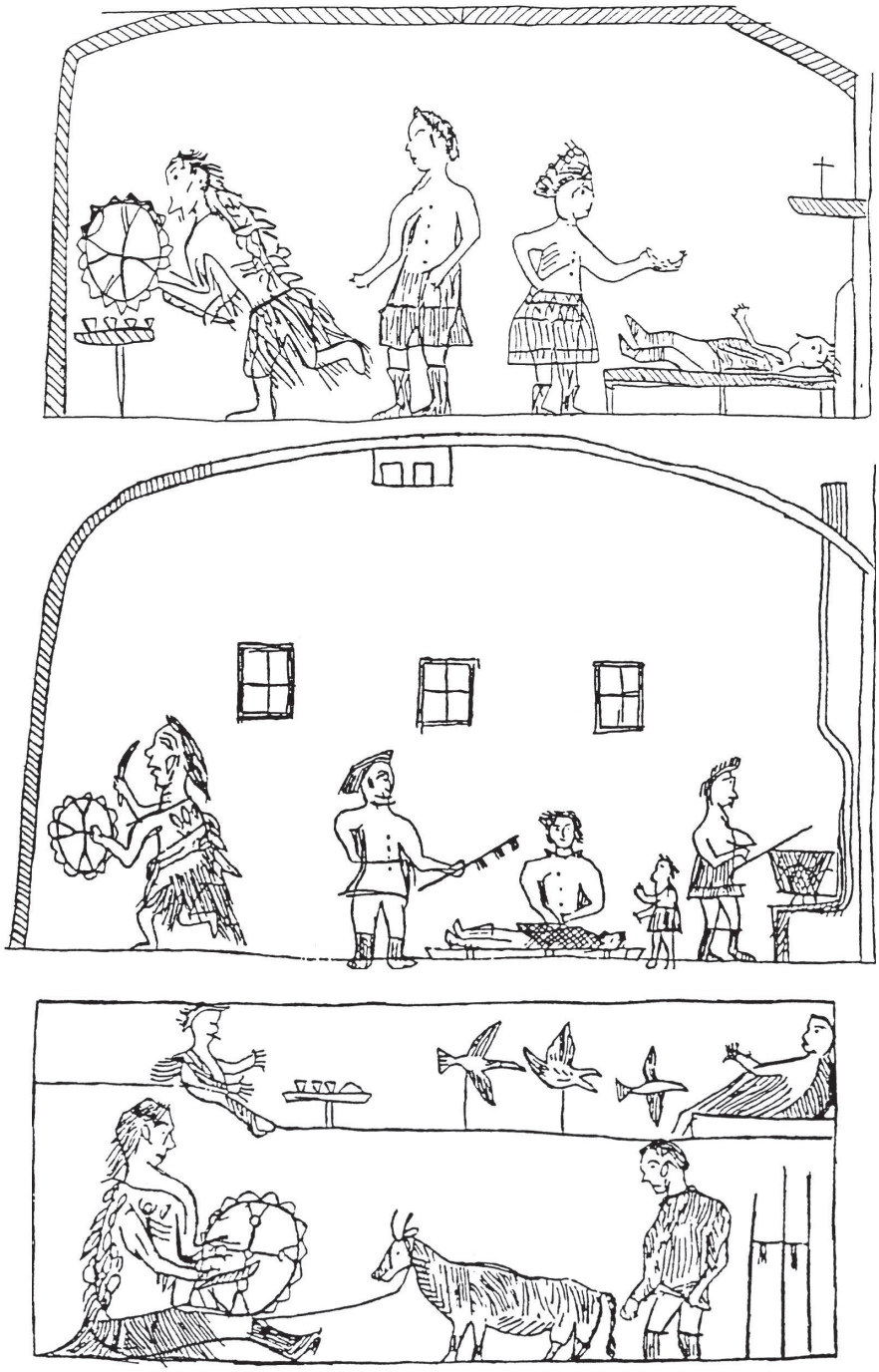

Fig. 10.7: Decoration of Yakut tobacco containers made from birch bark showing shamanic séances (Devlet 2001, fig. 3.9).

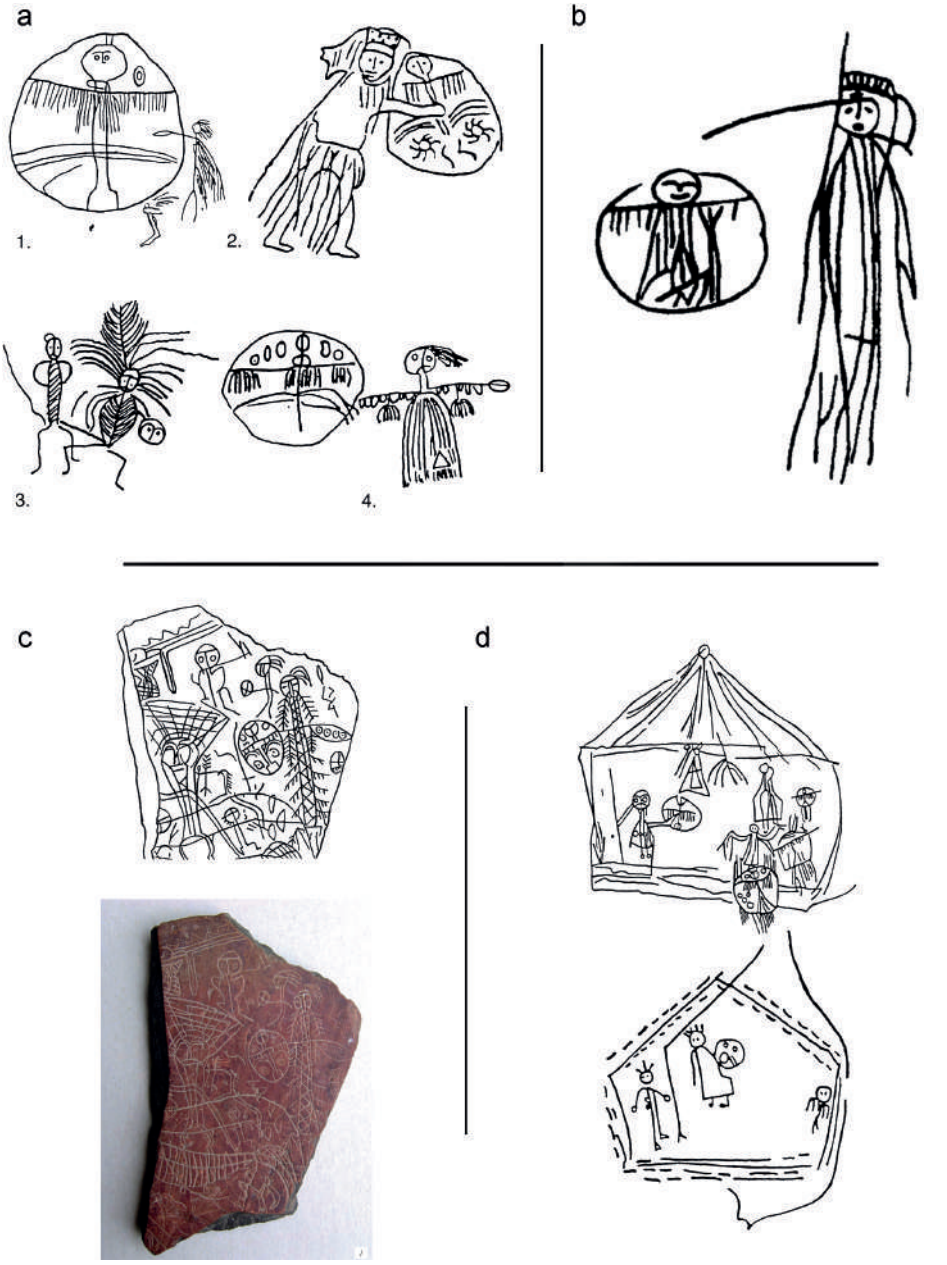

Fig. 10.8: Historic motifs of shamans from the Altai region. a: 1. Karakol; 2. Altai; 3–4. Shalkoby. (Devlet 2001, fig. 3.2); b: Late modern engraving from Karakol published by Kubarev with no data of provenance; c: bottom: engraving on a piece of sandstone tile now in the school museum, Karakol (Devlet and Devlet 2002, fig. 6.4); top: Documentation of the tile (Kubarev 2009, fig. 157). c: Karakol. (Kubarev 2009, fig. 157); d: shamanizing in a yurt. Rock art panels from the historical period, Shalkoby, Altai (Devlet 2001, fig. 3.10). Author's own elaboration.

In the last few years, rock art specialists have started asking local shamans about the meaning of rock art. Thus, Jean Clottes recently described how a modern Tuvan shaman identified cross rock paintings with the cross represented in his drum, which symbolised the cardinal points (Clottes 2016, 80), seemingly confirming what Potanin had said more than a century earlier (see above).

In contrast with the earliest rock art, all authors agree on the connection between historic engraved drum motifs and shamanism (Fig. 10.8). On a piece of sandstone tile in display in the school museum of the village of Karakol there is even a representation of a scene of shamanising in a yurt (Fig. 10.8d).

Sites tested in the Karakol valley

As mentioned in the introduction, in August 2019 the Artsoundscapes project undertook research on the acoustics of rock art landscapes in Russian Altai, including in the valley of Karakol. The archaeoacoustic studies of rock art sites have followed a great variety of methodologies over time, evolving from simple observational methods (Glory 1964; Reznikoff 1987), to quantitative approaches based on principles and techniques from the field of acoustic engineering (Dauvois and Boutillon 1990; Fazenda *et al.* 2017). The method used for the Artsoundscapes project is built on the analysis of a full set of Impulse Responses (also referred to as IRs) gathered at each site (Díaz-Andreu *et al.* 2023a; 2023b). The methodology employed to register and analyse the IRs follows the recommendations outlined in the ISO 3382-1 (2009). However, certain adaptations in the measurement protocol are needed in each case to account for the particularities of rock art sites such as those with which we worked in Altai because of their location in open natural sites. For a more detailed discussion on the applicability of the standard in rock art sites, see Alvarez-Morales *et al.* (2023).

The archaeoacoustic campaign in Karakol included several sites of the lower section of the Karakol valley (Russian Каракол) river valley, before the junction with the river Ursul (Russian Урсул) next to the rural locality of Kurota (Russian Курота) (selo) in the Ongudai District. In this area, we identified four rock art sites (Fig. 10.9) where we performed 15 acoustic measurements, although a series of technical constraints meant that only nine can be considered valid (Table 10.1).

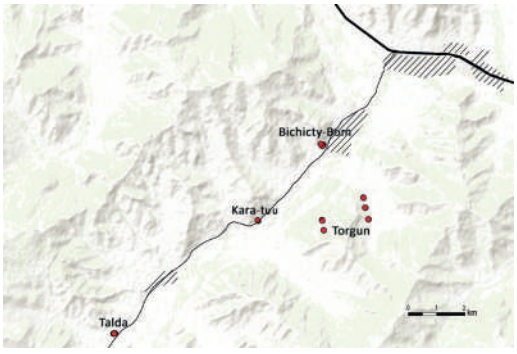

Fig. 10.9: Map of the lower section of the Karakol valley with the rock art sites of Kara-Tuu, Torgun, Bichicty Bom and Talda. Red dots indicate test points. The slashed lines indicate modern settlements. The lines indicate roads, the thicker one being the Chuysky (Chuiskii) Tract. Karakol is the village at the crossroads. Author's own elaboration.

The methodology followed involved a Multiple Input-Multiple Output (MIMO) approach, involving the use of a custom-built dodecahedral sound

Table 10.1: Number of acoustic measurements per site.

Date	*Site name*	*Number of acoustic measurements*	*Valid acoustic measurements*
19/8/2019	Kara-Tuu	2	0
19–20/8/2019	Torgun	5	4
21/8/2019	Bichicty-Bom	5	2
21/8/2019	Talda	3	3

source (a MIMO loudspeaker with a configurable directivity (www.adrianofarina.it/MIMO/). A 3rd-order Ambisonics microphone (Zylia ZM-1) was also employed. The IRs are obtained by post-processing the audio recordings with the MIMO Matlab script (the latest version of the MIMO script is available at github.com/xorgol/MIMO_Matlab). The acoustic data gathered has been archived to be used to generate auralisations, so that the acoustics of the tested sites can be experienced even by those unable to visit it (Benítez-Aragón *et al.* 2024).

Kara-Tuu

This site is located between the rural locality of Bichikty-Boom (Бичикту-Боом) and Boochi (БооЧи) in the Ongudai District. The rock art panel is next to the routeway through the Karakol valley. It has a high quantity of carvings dated to the Neolithic, Bronze Age and Scythian periods (Fig. 10.10). Interestingly all, or at least the great majority, of animal motifs, are looking towards the northeast, i.e. towards today's village of Karakol, where the burial was excavated. This site is, as yet, unpublished.

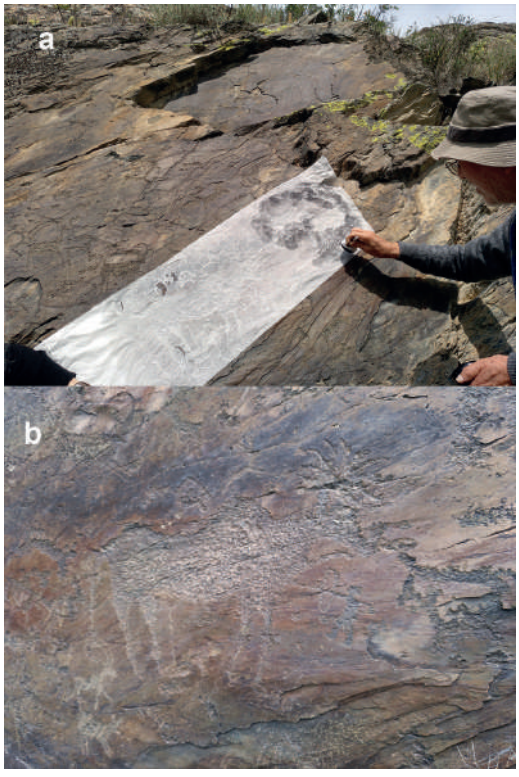

Fig. 10.10: Kara-Tuu panel. a: Japanese rock art avocational archaeologist documenting the panel; b: details of the Kara-Tuu panel. Photographs: M. Díaz-Andreu.

Torgun

At about 2 km to the south of the village of Bichikty-Boom, on the right bank of the Karakol river, there is a series of carved rocks on a hill locally called Torgun. The site has been divided into two main areas: Torgun I on the northeast slope, opening into a wide valley known as the Ustyu-Ayra tract, and Torgun II on the northwest side of the mountain. The site was discovered in the 1980s by Prof Anatoly I. Martynov's students, who were sent to search for rock

art sites while working in the area. A more systematic investigation was undertaken a few years later by one of the discoverers, Elena Miklashevich, who also, together with Leonid Bove, searched for further petroglyphs between Torgun and Karakol no other petroglyphs without success (Miklashevich and Bove 2010, 233).

In Torgun I, 10 decorated rocks were published in 2003, although the existence of more was mentioned. Of the published ones, only two in the extreme ends of the area are clearly visible (Miklashevich, pers. comm. 18/08/2019). In the case of Torgun I-1 the darker colour of the rock marked it in the landscape.

Torgun I, site 1

Torgun I was published in 2003 by Elena Miklashevich (2003b). Rock art site Torgun I-1 was dated to the Turkic period (Fig. 10.11). It was poorly preserved. She explained that

> The images are made with the thinnest carved lines, with a careful study of details ... Judging by the surviving fragments, hunting scenes were depicted here - deer, rams and other ungulates racing in a gallop ... One of the animals (a horse?) is shown pierced by an arrow. There are also figures of archers, indistinct and fragmentary images, and disorderly carved lines. (Miklashevich 2003b, 84)

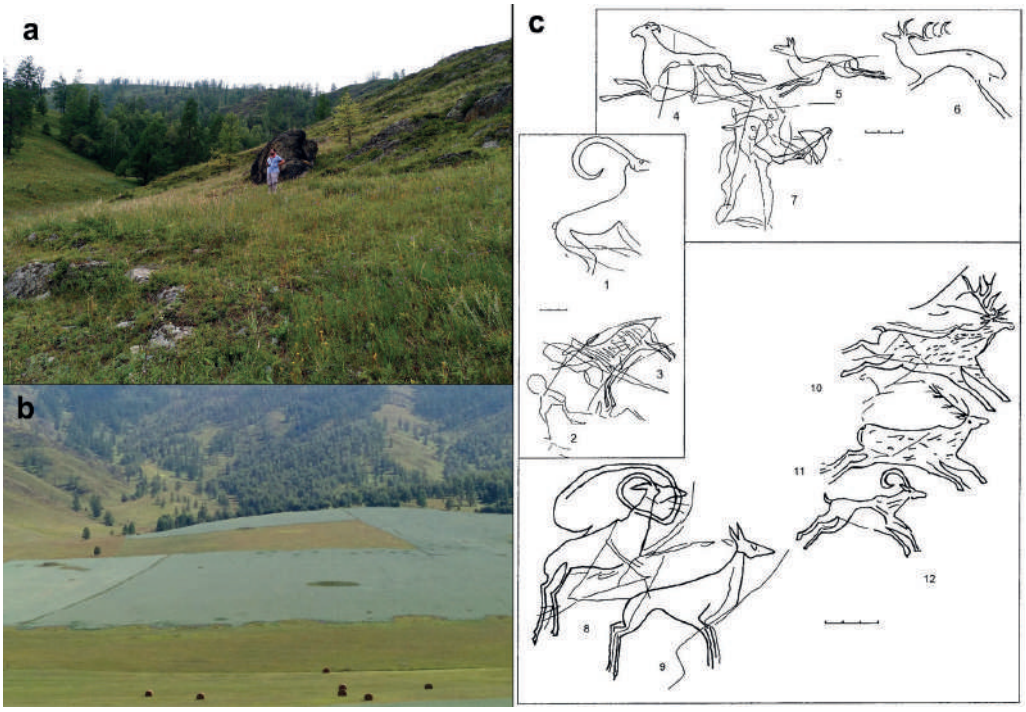

Fig. 10.11: Torgun I-1. a: View of Torgun I-1. b: View from Torgun towards the Ustyu-Ayra valley. Photographs: M. Díaz-Andreu. c: Motifs documented in Torgun I-1 (After Miklashevich 2003b, fig. 6).

Fig. 10.12: Torgun I-8. 1: Panel with multi-temporal images at the Torgun-I site. In the lower left part detail of the engraved sun-headed motif; 2: remains of engraved and polished drawings of the Karakol culture (sun-headed figure and elk), found on the panel between the engraved images of the Scythian period I (Miklashevich and Bove 2010, fig. 1).

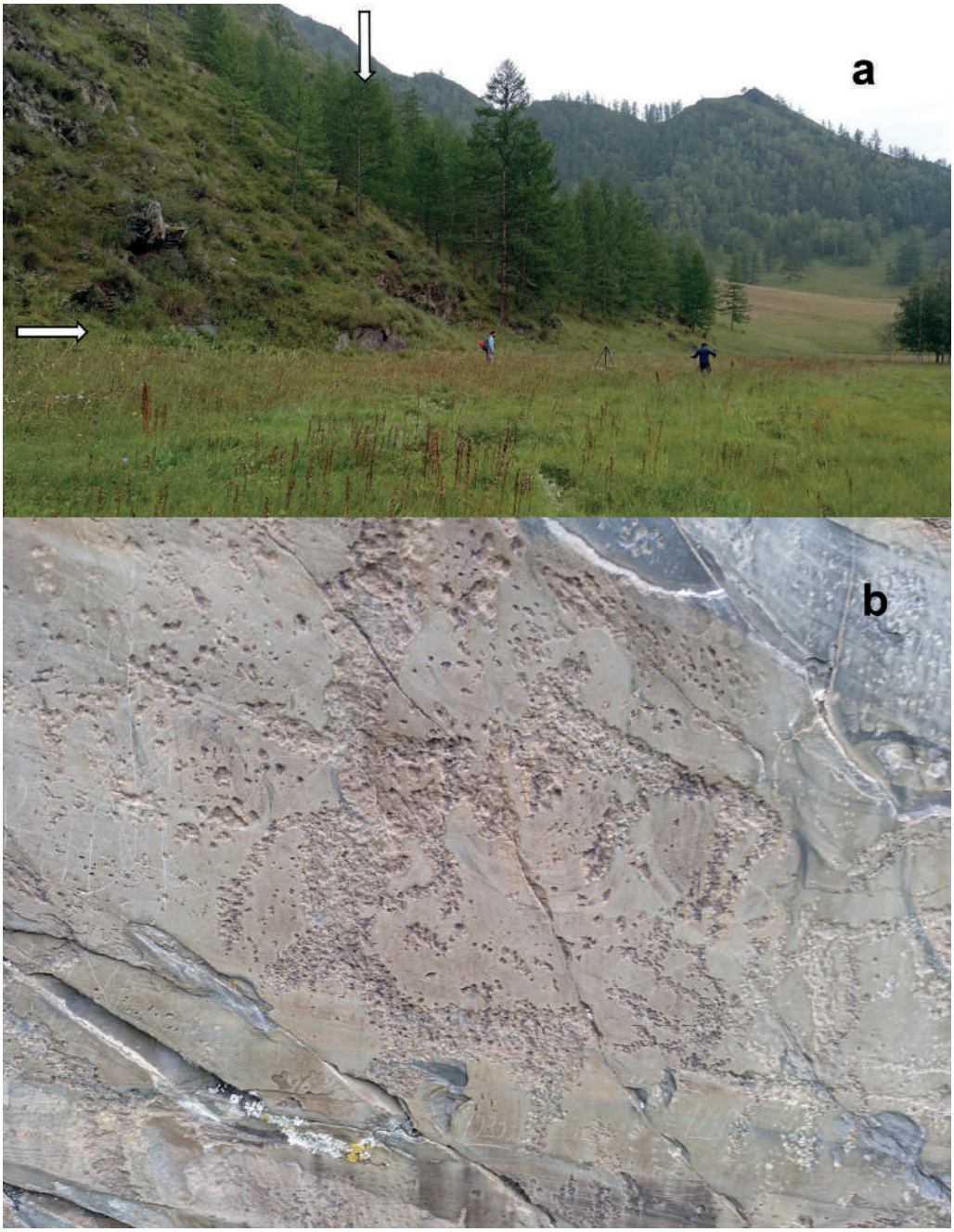

Fig. 10.13: Torgun II-3. a: General view of site; b: panel. Photographs: M. Díaz-Andreu.

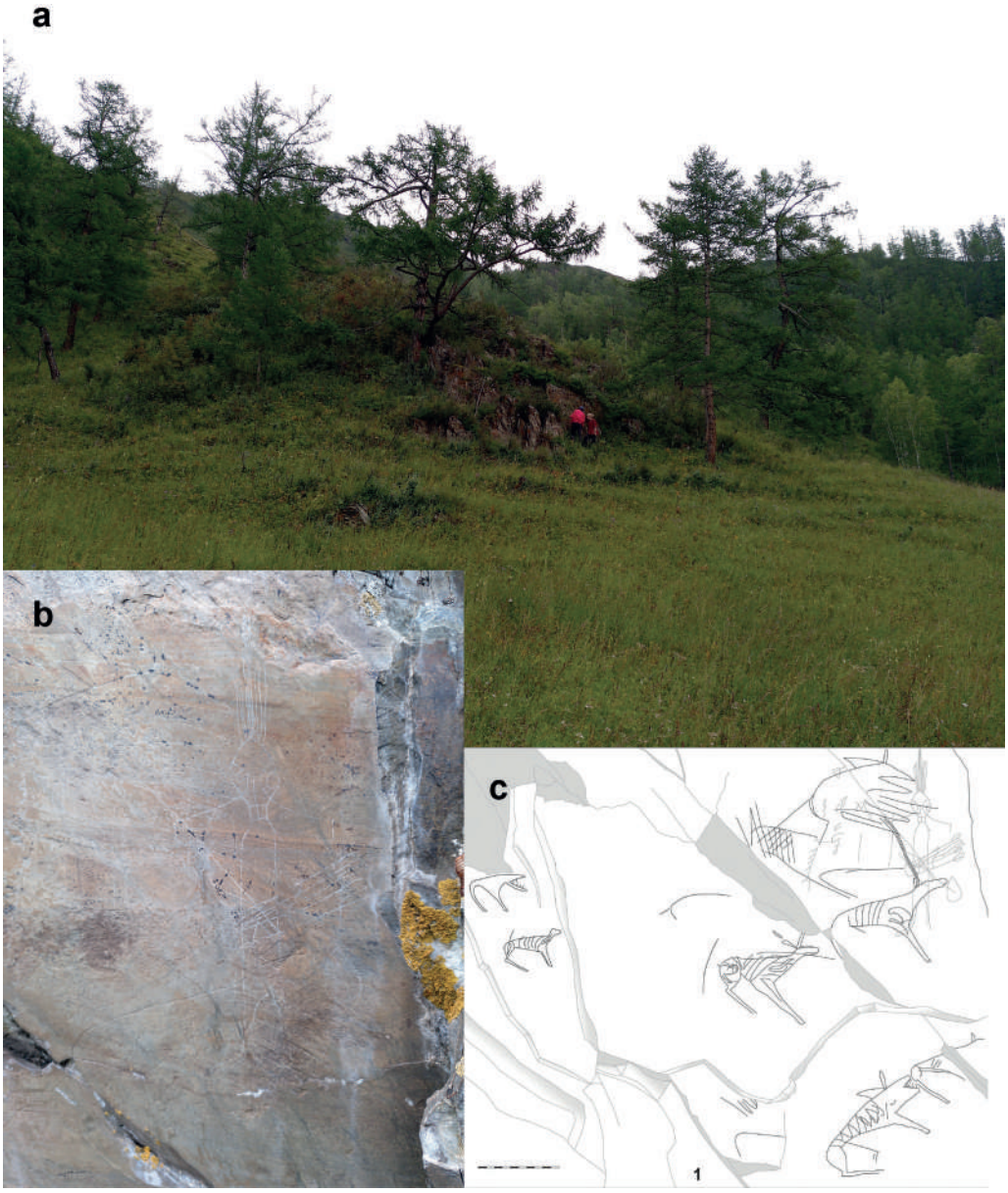

Fig. 10.14: Torgun II-4. a: General view of the site; b: motif, perhaps of a shaman. Photographs: M. Díaz-Andreu; c: motifs of Scythian style (Miklashevich and Bove 2010, fig. 2.1).

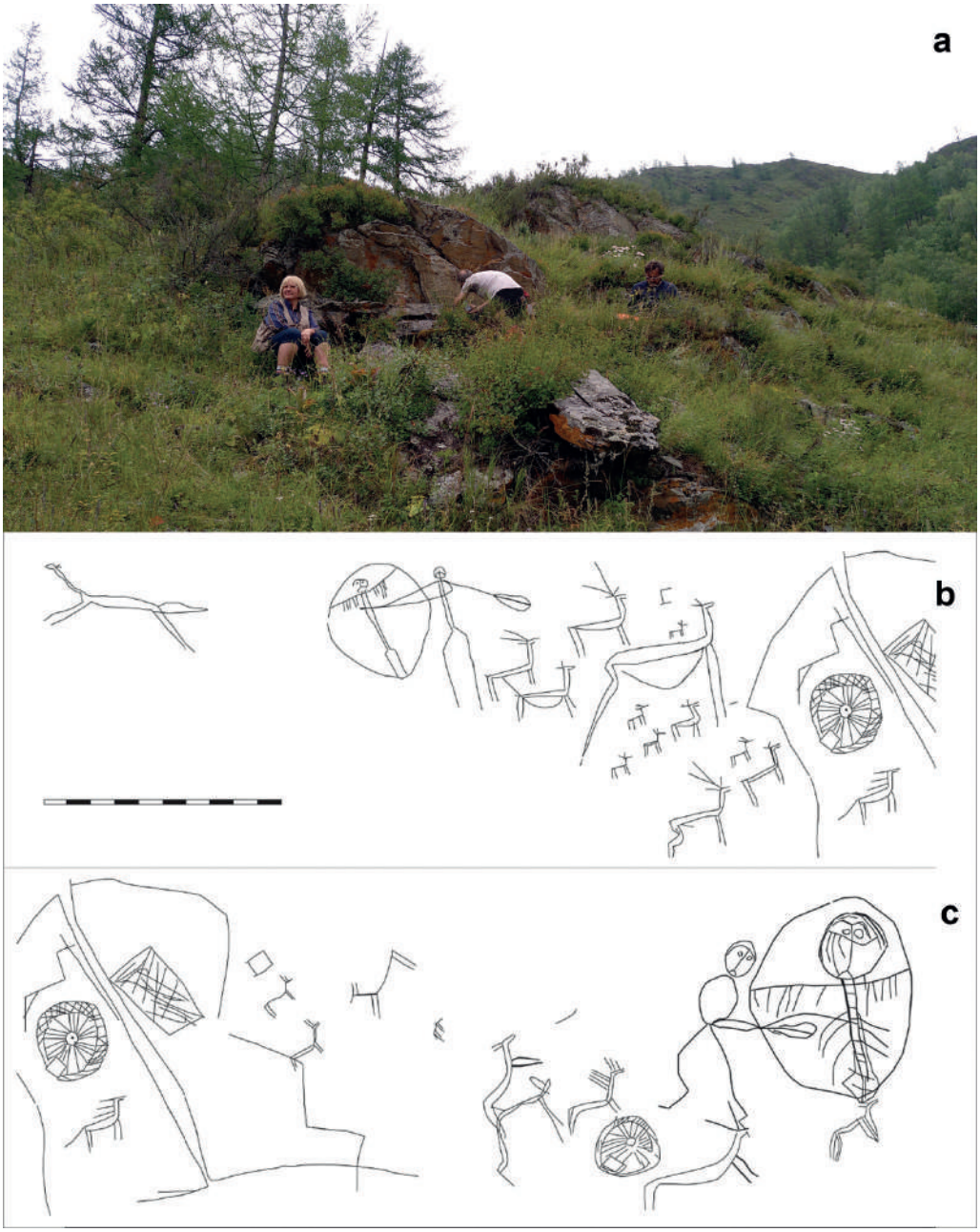

Fig. 10.15: Torgun II-5. a: General view of the site; b and c: Motifs representing shamans and other motifs. b represents the left side of the panel, and c the right side (Based on Miklashevich and Bove 2010, figs 2-2a and 2-2b).

And she added:

> Obviously, this stone was considered sacred and revered by the local population until recently. In front of it there is a very comfortable horizontal platform, well trampled down. The slope below the stone is quite gentle and is also very convenient for performing rituals. (Miklashevich 2003b, 84–85).

Torgun I, site 8

First recorded by Miklashevich and Bove in 2003 as rock number 8, a proper description, together with a new recording, was published in 2010. They identified engravings and carvings of the Bronze Age Karakol culture, including an engraved sun-headed figure and an elk using the technique of engraving and polishing ("scraped"). There are also deers and goats of the Scythian period (Miklashevich and Bove 2010, 229–231) (Fig. 10.12).

Torgun II, site 3

Elena Miklashevich dates the earliest rock art in this area II in the Late Bronze Age, although the published recordings have a chronology of the Scythian, Turkic and contemporary periods. Because of the freshness of the engravings of the motifs of shamans with tambourines, she considers them recent. The decorated rocks in Torgun II have not been identified with numbers and therefore we are providing our own numbering. Technical constraints will make us focus on sites 3 to 5.

Visited on 18 and 21 August, site 3 was located in an outcrop at the foot of the hill. It consisted of a panel with Bronze Age pecked carvings of goats, other quadrupeds and a few anthropomorphs (Fig. 10.13).

Torgun II, site 4

Located in the hill slope, site 4 had a series of carvings of Scythian style with predators and ungulates recorded by Miklashevich and Bove (2010, fig. 2.1) together with a figure of what seems to be an anthropomorph, perhaps a shaman (Fig. 10.14).

Torgun II, site 5

Located in an area nearby site 4, this site has a historic engraving of a shaman (Miklashevich and Bove 2010) (Fig. 10.15).

Bichikty-Bom

The hill of Bichikty-Bom (also spelled as Bichiktu-Bom and Bitchiktu Boom in the literature) is located next to the village of the same name on the left bank of the Karakol River, a tributary of the Ursul. The site's name, translated as "rock with scribbles", indicates that its existence was well known to the local population. In the many rocky outcrops of slate rock of this mountain, there is an abundance of flat panels that may reach large dimensions (3–4 m). Many panels have been inscribed with engravings, as many as 800 (Erkinova and Kubarev 2004, 88). Their study has a long history starting in the early 20th century, when artist Grigory I. Choros-Gurkin recorded some of them, a task that he continued during the Altai ethnographic

expedition of the Society for the Study of Siberia and its Productive Forces [Общества изучения Сибири и е производительных сил] in 1930 (Seregin and Matrenin 2015, 96). Some of these recordings were later published by Erkinova and Kubarev in 2004. Other scholars continued mentioning them from the 1950s, but a more thorough study was only conducted in the 1980s by Anatoliĭ I. Martynov, and this resulted in a series of articles by him and others (Martynov 1985, 88; 1993; 1995; Martynov *et al.* 2006). In the lower parts of the hill the motifs are small, from 5 to 15–20 cm, and most of them depict deers. There are also several hunting scenes. The medieval engravings depict battle, domestic, erotic and cult-religious scenes. The dating ranges from the Bronze Age to the Scythian time for the oldest, but most of the motifs are later, from Turkic to later medieval and contemporary (Erkinova and Kubarev 2004, 88). Regarding the depictions of drums or tambourines, as mentioned above, Erkinova and Kubarev are unsure on whether they may go back to the Turkish period or should be dated in a recent period, before the time when Choros-Gurkin copied them (Erkinova and Kubarev 2004, 91).

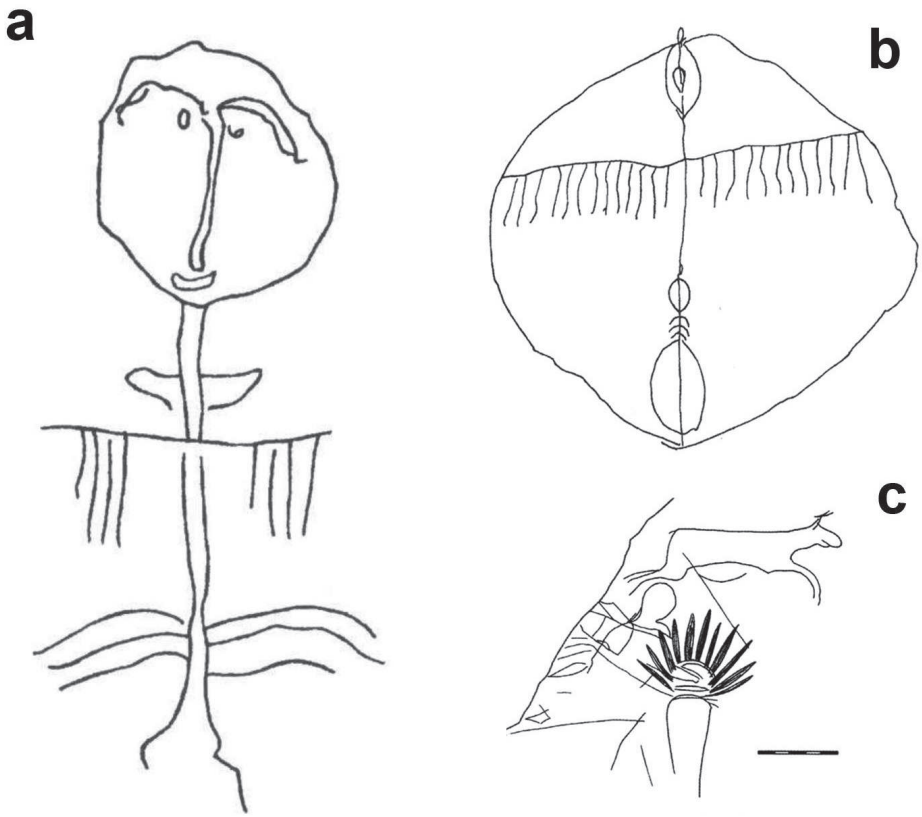

Fig. 10.16: Engraved motifs recorded in Bichikty-Bom: a: the image of the drum spirit proper in the form of an anthropomorphic figure (Erkinova and Kubarev 2004, fig. 4.2). b: drum (Erkinova and Kubarev 2004, fig. 1.2); c: anthropomorphic motifs (after Miklashevich and Bove 2009, fig. 1.3). Not to scale.

Fig. 10.17: Talda Hill. Left: View of Talda Hill from afar; Right: Engraved motif of a drum. Photographs: M. Díaz-Andreu.

Talda

This small hill located south of the rural locality of Boochi (Russian: Боочи) in the Ongudaysky District has many panels with fine-line rock art engravings and carved figures. The great majority of them are dated to the historic period. There is no publication on this site.

Results of the acoustic tests

Several tests involving different source and receiver positions were conducted on the sites to account for their spatial features (Table 10.1). To accomplish a fair comparison

Fig. 10.18: Acoustic measurements undertaken in the Torgun area I, site 5. Photo: © Artsoundscapes project.

between tests here, we present a similar disposition between sound receiver (listener) and sound emitter (sound emitter) regarding spatial configuration, in which the first is in the area where the rock art is, while the latter is placed at 10 m in front of the receiver location. Figure 10.18 shows an example of this arrangement in the field.

This hypothesis was tested in the four locations, and therefore, a selection of the captured IRs is discussed in this work. Table 10.2 details which are the IRs selected. For the analysis of the IRs, EASERA 1.2 and ARTA 1.9.4 software tools have been utilised. In our discussion about the results we will highlight reverberation, echoes and sound (speech and music) clarity. Regarding the first, given the open field characteristics of the studied rock art areas in Karakol, it is not meaningful to discuss reverberation (Mo and Wang 2012; Rindel 2023). Actually, the early decay curves derived from the measured IRs do not exhibit sufficient linearity for an accurate estimation of the reverberation parameters ($r^2 < 0.96$). These results follow the line of those found in the Lower Chuya and the Urkosh valley rock art areas (Díaz-Andreu *et al.* 2023a; 2023b).

As it could not be otherwise, the absence of reverberation and late reflections result in very high values of the speech definition and musical clarity parameters (D_m close to 1 and C_{80m} well above 20 dB), which is within what it would be expected in an open-air environment. Besides, in our acoustic analysis, the centre time is used to assess sound clarity, since this energy parameter does not initially distinguish between late and early reflections. The results included in Table 10.2 not only highlight the expected sound clarity perceived in the sites ($T_{Sm} < 5$ ms), but also lead us to dismiss the presence of echoes. The echo criterion introduced by Dietsch and Kraak (1986) additionally assesses whether a listener might detect a disturbing echo considering both speech and music, but in this respect the acoustic data gathered in Karakol provides negative results. Finally, the values of the sound strength parameter (G_m approximately 0 dB relative to the free field at the same distance) lead us to dismiss the idea of any reflections from the landscape being sufficiently potent to increase the perceived sound level (loudness) in the sites.

It is essential to mention that the suffix "m" in Table 10.2 refers to the spectral average value or mid-frequency value of the results obtained for each parameter, calculated as the average between the values obtained at the 500 Hz and 1000 Hz frequency bands. In this case, the mid-frequency value is considered sufficiently representative when evaluating the acoustic characteristics of the sites, as no significant variation in the spectral behaviour of

Table 10.2: Acoustic parameters obtained in the Karakol area. Mid values are averaged at 500 Hz and 1 kHz frequency bands as defined in the ISO 3382-1 (2009). The parameters obtained in Kara-Tuu and Torgun I-1 had technical problems and are not taken into consideration in the analysis.

Test point	T_{Sm}	G_m
	[s]	*[dB]*
Talda T1	4,16	0.25
Talda T2	3,71	0.30
Talda T3	3,06	0.10
Kara-Too T1	6,31	–
Bichiktu-Bom T3	2,42	0.10
Bichiktu-Bom T4	2,63	0.15
Torgun I-1 T1	26,19	–
Torgun I-5 T1	2,77	0.15
Torgun II-2_3 T1	4,46	0.25
Torgun II-4_5 T1	3,05	0.10

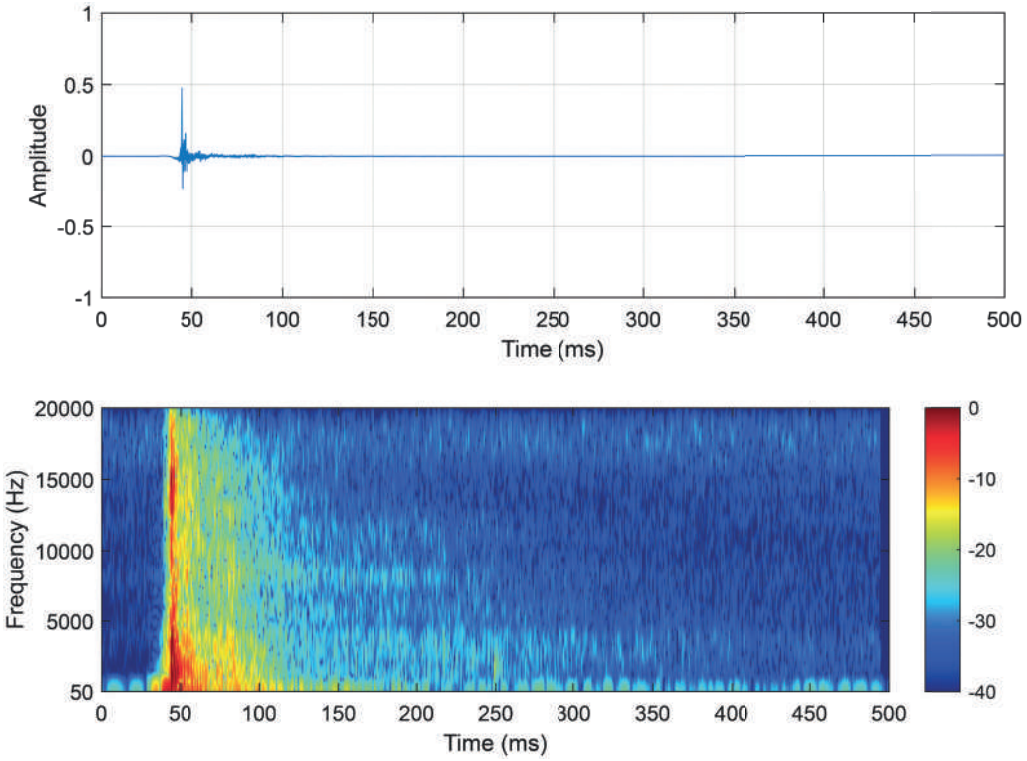

Fig. 10.19: Waveform and spectrogram of the impulse response measured in the acoustic test in site 5 in Torgun I. Authors' elaboration.

the parameters is observed. For example, the spectrogram in Figure 10.19 demonstrates the lack of enhancements or any notable variations in specific frequencies.

Discussion

The area of Karakol is considered to be sacred by today's Altaians. Indeed, in contrast to the other two areas where we performed acoustic tests and have already been published, the Lower Chuya (Díaz-Andreu *et al.* 2023a) and the Urkosh areas (Díaz-Andreu *et al.* 2023b), where no motifs representing shamans have been identified, the rock art of Karakol has a high number of them. These are finely engraved, and most scholars date them to the modern period, as mentioned in the sites' description. Archaeologists, however, disagree on how far back shamanism goes as a religious practice. As explained in our discussion on shamanism above, Devlet argues in favour of the Neolithic, whereas others such as Rozwadowski, Jacobson-Tepfer and Francfort move this date forward to the 1st millennium BCE during the Scythian Iron Age. The Neolithic burial site discovered in Karakol village, with its very peculiar figures decorating the cists, can have alternative interpretations but indeed seem

to indicate that this area may already have been special at that time. The Tourist-2 site, a later cemetery dated in the Early to Middle Bronze Age found in Novosibirsk, shows that beliefs in magical creatures may have existed, given the theriomorphic and ornithomorphic figures found in it, perhaps reflecting an early form of shamanism. Yet, as mentioned above, most of the rock art motifs representing shamans seem to be chronologically placed in the last few centuries. Given their numbers, our initial question at the start of this article was whether there were distinct acoustics in the rock art sites of the Karakol valley. However, the result of our acoustic tests indicate that this was not the case. Reverberation was not significant, there were no echoes, and the clarity of music and speech were normal in an open-air environment. Let's analyse now whether we should have expected a different set of results.

Tempo and reverberation

Key acoustical aspects of shamanism practices generally involve acoustic stimulation, often of a repetitive sound (Oohashi *et al.* 2002; Aparicio-Terrés *et al.* forthcoming). The rhythm created by the recurrence of short, quick sounds may be produced with drums, rattles, clapping with clappers or with the hands, or stamping feet while dancing. As our neuroacoustical research in the ERC Artsoundscapes project has found, rhythmic sounds at particular tempos produce entrainment that may lead to altered states of consciousness (Aparicio-Terrés *et al.* in prep). Is entrainment enhanced by reverberation? There is no research on this, but it would not be surprising if it were. In practice, however, it is not at all essential for shamanic seances. As the ethnographic literature shows, these may occur indoors (as in Alaska, see Salius Guma 2014) and outdoors (for example, in the Kalahari desert, see Marshall 1969). As seen in Figures 10.7 and 10.8d, both settings were present in Altai in recent history, the period to which it is most likely that the engravings are dated. The fact that outdoor rituals were organised seems to indicate that reverberation was not a key factor leading to altered states of consciousness, the central practice in shamanism. Reverberation may be helpful to enhance sound, and to boost a sense of community within the group as we have argued elsewhere (Santos da Rosa *et al.* 2023), but is not essential to induce an altered state of consciousness or trance, and as examples around the world show, it is not essential for shamanic seances.

A different issue is whether the place where the fine engravings have been located ratifies that shamanic seances occurred precisely there. So far, there is nothing that can confirm or disprove this. There are no ethnographic accounts of the possible ceremonies that may have taken place in places such as Bichikty-Bom or, indeed, any of the other places. The only comment in the literature comes from the area of Torgun I, site 1, where, as explained earlier in the article, the trampling of the front area adjacent to the panel and its general location close to a flat surface terrain made Elena Miklashevich argue that the local population had venerated the stone until recently (Miklashevich 2003b, 84–85; see above).

Yet, her comments were very general, for she did not mention any particular type of religion or ritual practice.

Echoes

Echoe is an acoustic effect that the literature has often linked with shamanism in many parts of the world (for example, Arsenault and Zawadzka 2014; Boyd and Busby 2022). Yet, in our acoustic tests in the area of Karakol no evidence of them was found. A detailed reading of the publications on the connection between echoes and shamanism, however, makes clear that their presence is usually related to beliefs in spirits living within the rocks and, as Levin and Süzükei (2006) mention for Tuva, with the world (the rocks, trees, and so on) being alive, but not to their importance to induce trance. Thus, echoes are considered a particular acoustic cue, but their presence is not essential for shamanistic practices involving an altered state of consciousness. They are not necessarily associated with the shaman figure, although they belong to the shamanic worldview.

Speech and music clarity

Regarding speech and music clarity, the results found in Karakol are similar to those in the lower Chuya and the Urkosh area, where we discussed the benefits of these acoustic parameters for the intangible practices of singing and storytelling, which, the ethnographic sources indicate, were key for the relationship between people and spirits in Siberia (Díaz-Andreu *et al.* 2023a; 2023b). These practices were most likely taking place in Karakol throughout the different periods in which rock art was produced, also in the modern period when the shaman motifs were most probably produced.

Regarding speech, there are some indications that, at least in contemporary ritual uses of rock engravings and petroglyphs that may or not be connected with old traditions, it may be a relevant aspect. In a brief article by Isabel Célestin-Lhopiteau published in 2009, she recounts her experience with a Buryat shaman. During Célestin-Lhopiteau's research on shamanism and medicine, a shaman brought her to a 2 × 1 m wall with petroglyphs near Lake Baikal showing anthropomorphic figures and animals. The shaman touched all the animals and humans or spirits and explained that:

> For us, shamans, this rock painting is like an icon for other religions. Here we have a hunting scene, in particular that of the reindeer, here is the adult reindeer with her baby, here are the dogs or wolves; we can only think that they are wolves, as we think that these are men, but it is possible that they are gods. There it is certain that we see the shaman carrying out a rite near a fire. There is a small altar. There above are the spirits (...) Our aim is to preserve all that, we have already made an impression of this rock engraving against vandalism or theft (Célestin-Lhopiteau 2009, 28).

After this explanation he performed a ritual, touching the engravings and performing diverse gestures towards the floor, the sky, his heart, and speaking to the spirit of the steppe. Apparently, once out of trance, the shaman explained that this ritual

had allowed him to contact his ancestors, those who made the engravings, and also with the animals, the spirits and the elements. He also stated that he would make rituals with rock art carvings when someone in the village had a problem. This ritual reconnected through trance and by touching and talking to the engravings linking him with the shamans of the past (Célestin-Lhopiteau 2009, 29).

The association between music and shamanism is well documented (Pentikäinen 1998, 12; Walker 2003). In shamanism, music is a medium to communicate with other sentient beings, and as a way for the shaman to access the spirit world (Walker 2003, 42). In Khakassia, Caroline Pegg describes a shamanic ritual celebrated in her honour, with drumming and singing, which took place in a sacred archaeological site that the shaman considered important in terms of her ancestry. In the site, there were two anthropomorphic standing stones that were thought to be remains of ancient European populations (Pegg 2006, 29). The multisensory experience seems to have been very strong for the scholar, and she describes increasingly feeling an intense aural effect (Pegg 2006, 32). Yet, there is no indication of any awareness from her part of the author experiencing any especial acoustic effects related to the landscape.

As a result of our discussion, we could argue that even if the type of landscapes in which representations of shamans have been found are not special in terms of their acoustics, this does not mean that sound and music were not important for the local shamans represented in the engravings. As the ethnographic sources tell us, there are other factors that create the atmosphere in which shamans undertake the more important practice of shamanism, and these include repetitive sounds produced by music and dancing, as well as ingestion of psychotropic drugs, isolation, intense pain, or sensory deprivation (an absence of light, sound and physical stimulation) (Clottes and Lewis-Williams 1998, 14).

Conclusions

The diversity of acoustic phenomena in rock art sites around the world is large: there are places where the presence of echoes seems to favour the choice of shelters to be decorated in reverberant landscapes (Díaz-Andreu and García Benito 2012; Díaz-Andreu *et al.* 2019); in others, augmented audibility indicates a strong possibility of being behind their selection (Mattioli and Díaz-Andreu 2017); other rock art places used as aggregation sites have fine qualities for the transmission of word and music, something that would have facilitated communication and the enhancement of a feeling of community (Santos da Rosa *et al.* 2023). Yet, in contrast with these rock art landscapes that illustrate a direct connection between acoustics and rock art, there are others where such a relationship is less clear. Among the latter, we find the rock art landscapes of Altai, where we have argued elsewhere that, although they are not particularly special from an acoustic point of view, the acoustic conditions of the area may have been beneficial for specific intangible practices such as singing and storytelling (Díaz-Andreu *et al.* 2023a; 2023b). This is

indeed the case of the rock art sites discussed in this work, located in the Karakol valley, despite the area being unique because of the presence in it of many motifs representing shamans.

The discussion in this article has revolved around the existence of shamanism in the Karakol valley, starting with an examination of its chronology, if it can be considered prehistoric, and if so, from when, or only historic. As explained, scholars' proposals range from the Neolithic, to the more possible Iron Age for a sort of proto-shamanism, to the Turkic and, especially, modern period. Despite this ample chronology, the clearest representations of shamans are most likely dated to the modern period, probably in the 18th and 19th centuries. A description of the four areas acoustically tested has also emphasised the representations of shamans in them. The results of the acoustic tests have been discussed in terms of the values obtained for reverberation, echoes and sound (speech and music) clarity. The lack of any acoustic values that we can ponder remarkable has partly been related to the open-air environment of the rock boulders where the rock art was produced. Yet, this does not mean we can rule out the performance in their vicinity of shamanic rituals. In the literature, there are several accounts of people being guests or participants in them who report a strong experience and, in the case of researcher Caroline Pegg, an increasingly intense aural effect (see above).

Can motifs with any sort of links to shamanism be considered an indication of séances being held at the rock art sites where they have been carved or engraved? We cannot answer this question solely based on the rock art motifs, and nothing in the ethnohistoric sources hints at this. Nevertheless, even if this were the case, the absence of special acoustic effects found in our case study might be attributed to the small space in which ritual practices were performed and the small number of people participating in these séances. Cambridge ethnomusicologist Carole Pegg describes a ritual organised for her in Khaakassia, also located in the Sayan-Altai Mountain region of central southern Siberia, in 2002. The ritual took place at the entrance of a sacred valley marked by two prehistoric standing stones and involved much drumming and multi-sensory experience including not only sound but also sights, tastes and smells. She explains that, "as a result, a change in personhood occurred for all involved" (Pegg 2006, 27).[3] In this and in other occasions we would contend that the ritual specialist, the shamans and shamanesses, find it easier to control participants' feelings and emotions through other means than acoustics. In more complex societies, however, acoustics are, to a large extent, needed to produce emotion (López-Mochales *et al.* 2022). It is then, with the appearance of complex, state societies, that acoustic effects, such as high reverberation, appear as a key element in closed religious spaces – usually purposedly built buildings – all over the world, with specific religions fostering particular soundscapes (Zhang *et al.* 2024). Before this, we argue, acoustics may be a factor chosen by societies to enhance community and religious feelings, but it should not necessarily be expected at every rock art site – or any other type of site – linked to ritualistic practices.

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Notes

1 The Turkic period is dated to the 6th–8th centuries CE (Jacobson-Tepfer 2008, 208).
2 The Isakovo culture is found in Mongolia and dated to the Neolithic, c. 4000 BCE.
3 Jean Clottes states that "The traditional shamans of southern Siberia consider some rock art sites as 'places of power' and on occasion hold ceremonies there (as I have personally witnessed)" (Clottes 2011, 142).

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