



Some Implications of Pleistocene Figurative Rock Art in Indonesia and Australia

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Abstract

Until recent years, most western scholars had overlooked the existence of rock art in Indonesia or viewed it as being of limited antiquity and of largely regional-interest only. In 2014, however, an Indonesian-Australian team announced the results of a program of Uranium-series (U-series) dating of rock art in Maros-Pangkep, Sulawesi, including a surprisingly early antiquity of at least 39.9 ka for a hand stencil and 35.4 ka for a figurative animal painting. U-series dating more recently has yielded minimum ages for figurative animal painting of 40 ka in Kalimantan and 45.5 ka in Maros-Pangkep, with the latter presently constituting the world's oldest dated example of representational art. Indonesia's previously little-known rock art has been propelled to the global stage. Here, we examine how scholars are grappling with the implications of 'ice age art' in Indonesia and its integration, for the first time, into models of early human artistic culture in other parts of the world. In particular, we discuss the seemingly close stylistic parallels between Late Pleistocene figura-

tive animal art in Indonesia and early representational depictions of animals in the Arnhem Land and Kimberley regions of northern Australia. We consider scenarios that could explain these similarities, including the idea that a single figurative rock art style spread into Australia from Wallacea during the early movements of our species in the region.

Keywords

Sulawesi · Indonesia · Rock art · Late Pleistocene · Figurative art · Animal painting · Wallacea

3.1 Introduction

The presence of rock art in Indonesia was first reported by a western observer in 1678 (Tan 2014), long before the celebrated discovery of the animal images at Altamira in 1878 that would culminate in the scientific recognition of the existence of Palaeolithic rock art (Bahn and Vertut 1997). Despite this long pedigree, until recently relatively little systematic field research had been undertaken by western researchers into the nature and distribution of rock art in Indonesia and wider Southeast Asia, collectively described just a decade ago as 'one of the least understood regions of the world in terms of its rock art heritage' (Taçon and Tan 2012, 207). Most work in Indonesia and other Southeast Asian countries (e.g., Thailand) had been done by local scholars and was published in domestic, non-English language journals that are not easily accessible to western scholars (Tan 2014). It is therefore not surprising that, until recently, most global rock art syntheses published by western scholars have failed to include more than a fleeting reference to the rock art of Indonesia and Southeast Asia.

In 2014, however, a team of Indonesian-Australian scientists reported Late Pleistocene ages for rock art in limestone caves and shelters in the tower karst region of Maros-

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Pangkep, South Sulawesi (Fig. 3.1). Using Uranium-series disequilibrium (U-series) analysis of associated calcite deposits (coralloid speleothems — ‘cave popcorn’), Aubert et al. (2014) inferred a minimum age of 39.9 ka for a hand stencil in the limestone cave of Leang Timpuseng. These researchers also showed that a figurative painting of a pig on the same panel was created at least 35.4 ka. This 2014 paper was followed by another U-series rock art dating study focused on the limestone karst area of Sangkulirang-Mangkalihat in East Kalimantan, Borneo (Fig. 3.1). Here, Aubert et al. (2018) obtained a minimum age of 40 ka for a figurative painting of an indeterminate animal. These studies were followed by two U-series rock art dating papers reporting: (1) a large naturalistic painting of a suid at Leang Tedongge (Maros-Pangkep) with a minimum age of 45.5 ka (Brumm et al. 2021a); and (2) a multifigured hunting scene created at least 43.9 ka at Leang Bulu’ Sipong 4 in the same karst area (Aubert et al. 2019).

These U-series dating breakthroughs in Sulawesi and Kalimantan have considerably raised the international profile of rock art in Southeast Asia. Subsequently, the rock art of Indonesia is, for the first time, undergoing a process of academic ‘globalization’ in the sense that authorities are beginning to consider the role that this formerly poorly understood corpus of parietal imagery may have had in the development of ancient artistic cultures in other parts of the world. For example, some scholars have posited that the Pleistocene rock art of Indonesia is strikingly similar to that of Upper Palaeolithic Europe. According to Derek Hodgson, ‘the [figurative animal] depictions of the Sulawesi[sic] artists display a number of similarities with those from Europe [and] the observable differences seem marginal’ (Hodgson and Watson 2015, 784). This same neuroscientist and rock art authority has also argued that the Pleistocene animal art of Sulawesi and Europe is markedly similar in that it is characterised



Fig. 3.1 Map of Island Southeast Asia and northern Australia. Dated Late Pleistocene rock art is reported from the limestone karst regions of Sangkulirang-Mangkalihat in northeastern Kalimantan (Indonesian Borneo) — at the very eastern extent of the Sunda landmass — and the Maros-Pangkep district in the south of Sulawesi — the largest island in Wallacea, the biogeographically-distinct zone of oceanic islands situated between Sunda and Sahul. Similar rock art has also been found in

the Bone karsts to the east of Maros-Pangkep, as well as in the northern Australian rock art provinces of Arnhem Land and the Kimberley. It has been proposed that modern human seafarers followed the so-called ‘northern route’ (indicated by grey dotted lines) from Borneo to West Papua during the initial colonisation of Sahul. Base map prepared by M. Kottermair and A. Jalandoni

by animal outline depictions shown in profile (side) view, and that these portrayals of animals also tend to exaggerate body proportions (Hodgson and Watson 2015, 778; see also Hodgson and Pettitt 2018 for broadly similar comments). The Upper Palaeolithic cave art of western Europe has long served as a yardstick of ancient human artistic endeavour (Bahn and Vertut 1997). It is therefore inevitable, perhaps, that some authorities will contemplate how the very old Indonesian rock art ‘measures up’ to this record. Leaving aside the fact that the vast majority of Upper Palaeolithic rock art in Europe is undated (Clottes 2016), and that about 80% of the known artworks can all be attributed stylistically to the Magdalenian period (von Petzinger and Nowell 2011) — i.e. tens of thousands of years after the dated animal art in Indonesia — there is little to be gained by directly comparing the Pleistocene rock art traditions found in such widely separated parts of the world. Portraying animals as outline depictions shown in side profile is a ubiquitous feature of visual cultures worldwide (Halverson 1992; Taçon et al. 2010). As Meyering et al. (2021, 3) point out, ‘this particular profile view “grammar” for depicting animals can be seen as a pan-global phenomenon’. Others have argued that apparent parallels in the early animal art of Late Pleistocene Sulawesi and Europe are best explained by the shared concerns of small-scale societies engaged in a hunting and gathering lifestyle, by commonalities in human-animal relations among foragers, and other convergences (Taçon et al. 2010, 2014).

On the other hand, some scholars have noted what appear (to us) to be much more compelling resemblances between the Pleistocene animal art of Indonesia and certain early northern Australian rock art styles featuring naturalistic depictions in the famously art-rich regions of Arnhem Land and the Kimberley (Aubert et al. 2014; Finch et al. 2021; Taçon et al. 2014; Taçon and Webb 2017). It has long been assumed that ‘Art was almost certainly part of the cultural repertoire of the first Australians’ (Balme et al. 2009, 64). Cultural convergence may have been a factor here (Taçon et al. 2014), but the notion of direct transmission of an early rock art style via modern human migration from Sulawesi to northern Australia is at least theoretically plausible, given that seafaring hunter-gatherers had to pass through Wallacea, and probably Sulawesi (Kealy et al. 2018), to reach northernmost Sahul by 50 ka (Allen and O’Connell 2020), and possibly up to 65 ka (Clarkson et al. 2017). Here, therefore, we discuss the nature of the apparent similarities between the early animal art styles of southern Sulawesi (presently the oldest known in the region) and those of Arnhem Land and the Kimberley, and consider what they could mean.

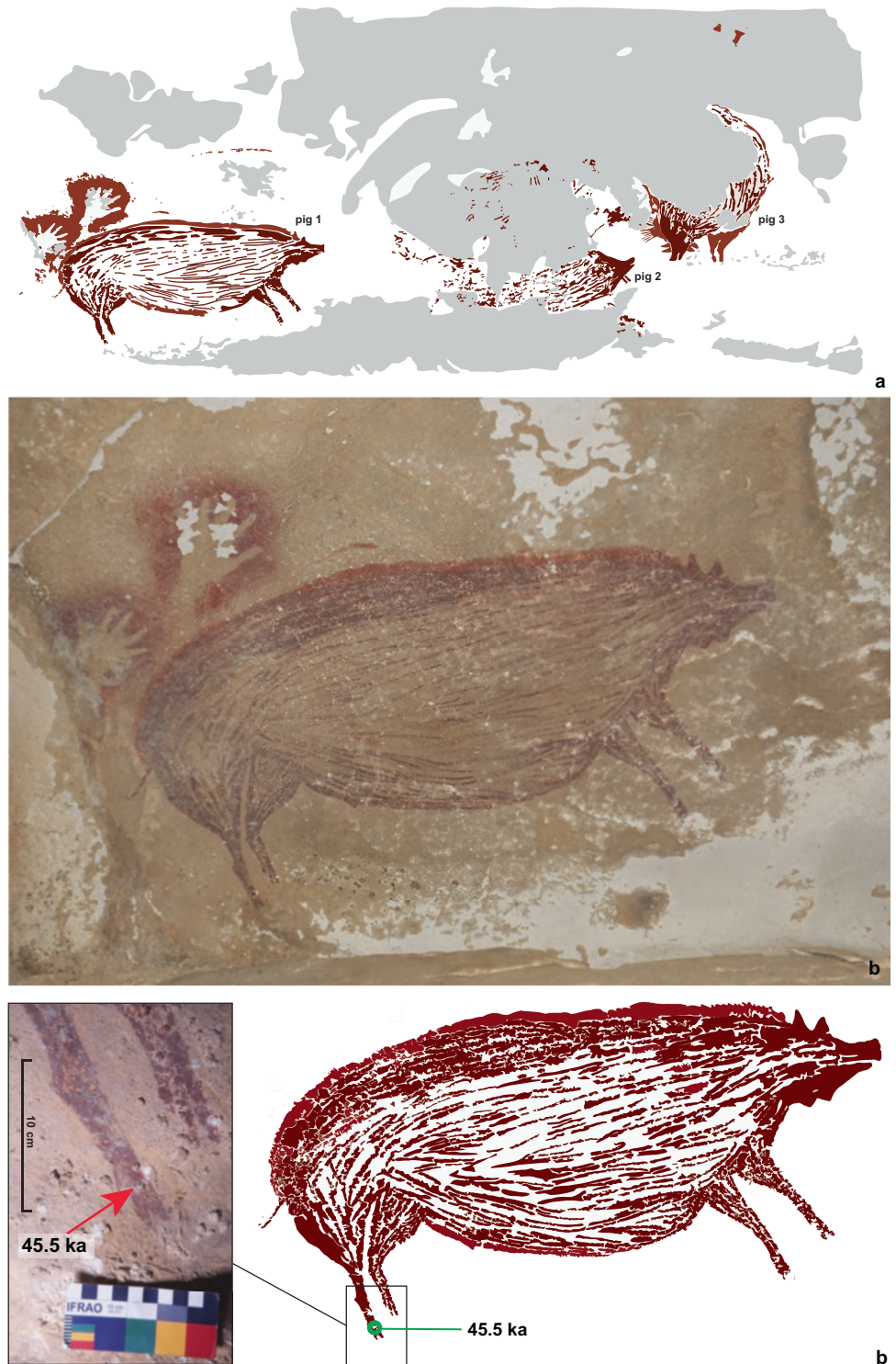
3.2 Current Rock Art Dating Evidence from Indonesia

3.2.1 Sulawesi

To our knowledge, the Maros-Pangkep rock art was first described in the published literature by van Heekeren (1952). It has been intensively studied over recent decades, largely by Indonesian university students and cultural heritage professionals (e.g., see Eriawati 2003; Permana 2015a; Saiful and Burhan 2017; but see also Brumm et al. 2021b). At the time of writing, about 600 individual rock art sites are presently documented in the region. In terms of published data, U-series dates are now available on 26 coralloid samples associated with 20 rock art motifs (13 hand stencils, seven figurative motifs) from ten sites (Aubert et al. 2014, 2019; Brumm et al. 2021a). All motifs yielded minimum Late Pleistocene ages. The earliest minimum U-series age obtained (45.5 ka) is for a suid motif at Leang Tedongnge (Brumm et al. 2021a). This dated suid (pig 1) is interpreted as a Sulawesi warty pig (*Sus celebensis*). It is positioned on a panel with at least two other warty pigs that are facing one another (Fig. 3.2). One (pig 3) seems to be leaping, while the other (pig 2) is in a more passive pose. We interpret this artwork as a composed scene portraying an episode of social interaction between a group of warty pigs. Similarly, the dated panel at Leang Bulu’ Sipong 4 comprises a multifigured composition that features small therianthropomorphic figures confronting anoa (*Bubalus* sp.) and warty pigs (Aubert et al. 2019) (Fig. 3.3). The small figures display a mix of human and animal characters: one appears to be depicted with a beak, while another has a tail. Several of these enigmatic beings seem to be holding long thin objects which may represent spears or ropes, that connect with the running animals (Aubert et al. 2019). The composition of this dated panel at Leang Bulu’ Sipong 4 is suggestive to us of a mythical hunting narrative.

The youngest minimum age (17.4 ka) inferred for Maros-Pangkep rock art is for a distinctive style of hand stencil art (Aubert et al. 2014). First described by van Heekeren (1952), these comprise ‘normal’ anatomical hand stencils where the finger shape has been intentionally modified to produce claw-like digits (Oktaviana et al. 2016). This particular style of stencilling art appears to be unique to Sulawesi. At one Maros cave, Gua Jing, Aubert et al. (2014, 225) also obtained minimum and maximum ages for a ‘normal’ hand stencil created on an actively forming coralloid speleothem, demonstrating that this particular artwork was created at some point between 22.9 and 27.2 ka. Coupled with evidence from Leang Timpuseng and Leang Tedongnge, these bracketing U-series ages suggest that ‘normal’ hand stencil art was pro-

Fig. 3.2 Dated Late Pleistocene suid painting from Leang Tedongnge (Maros-Pangkep). The dated motif (pig 1) is part of a rock panel (a) featuring at least two other pigs (denoted pigs 2–3); (b), photograph of pig 1. A coralloid speleothem sample collected from pig 1 yielded a minimum Uranium-series age of 45.5 ka, as reported in Brumm et al. (2021a)



duced in the Maros-Pangkep karst area over a period of at least 12,700 years, while parietal art in general was produced over a period of at least 18,300 years.

Of particular note is the early focus in the Sulawesi rock art on composed scenes as we would define them in the con-

text of modern western visual culture; that is, clear figurative depictions of sets of figures in spatial proximity to each other and from which one can infer actions taking place among the figures (Davidson 2021; Davidson and Nowell 2021a, 2021b; see also Azéma and Rivère 2012). As noted,

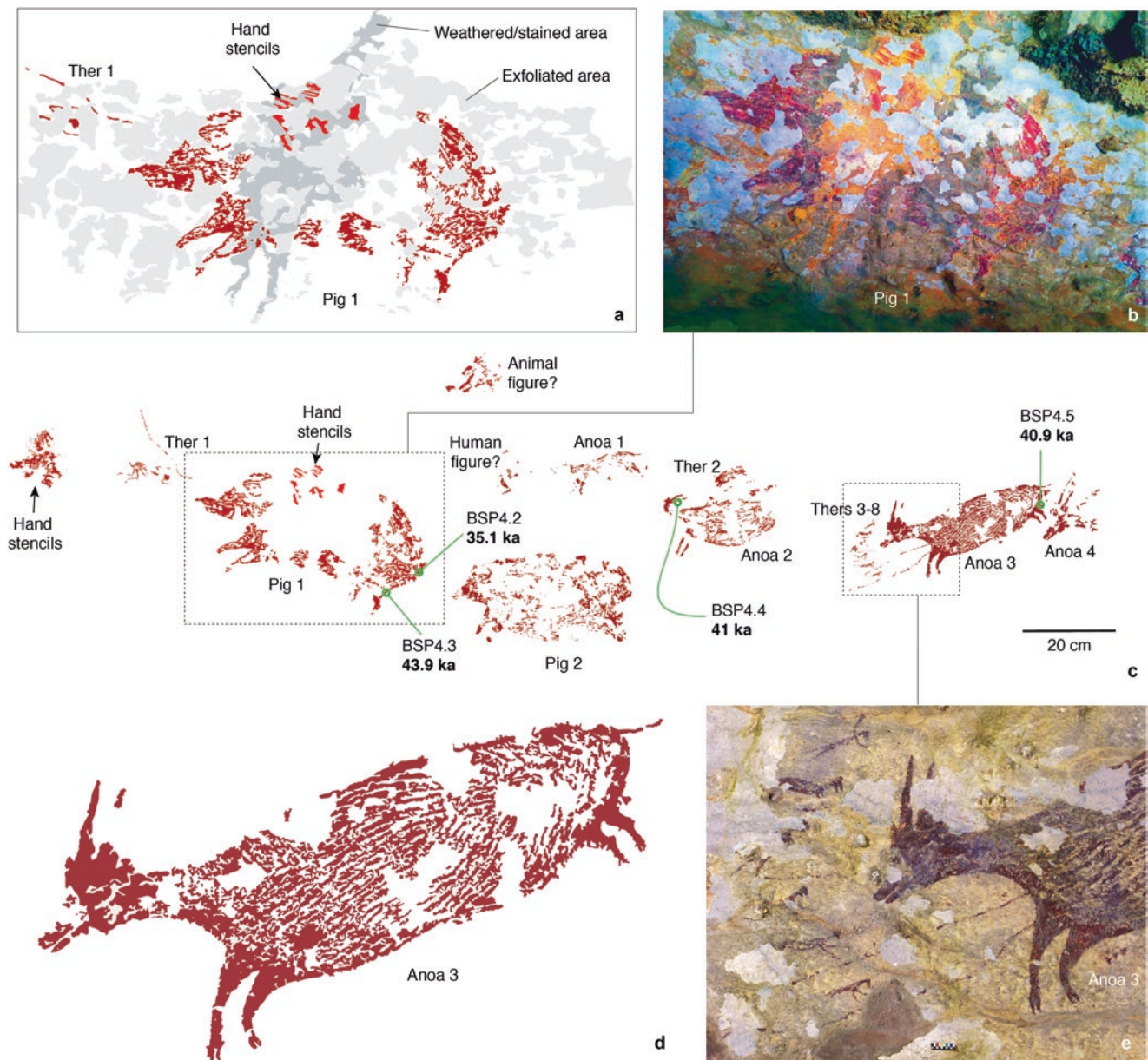


Fig. 3.3 Dated Late Pleistocene animal paintings from Leang Bulu' Sipong 4 (Maros-Pangkep). A total of four minimum Uranium-series ages was obtained for three animal figures (denoted Pig 1 (a–b, c), Anoa 2 (c), and Anoa 3 (c, d–e)) on this multifigured rock art panel interpreted as a single narrative composition — a hunting scene (Aubert et al. 2019). The photograph of the animal motif (a) has been enhanced

using the Decorrelation Stretch (*DStretch*) computer program. The small anthropomorphic 'hunters' (a, c, e) seem to have been intentionally depicted as composite beings with both human and animal characteristics, and hence they are interpreted as therianthropes (denoted Thers 1-8) (Aubert et al. 2019)

in Maros-Pangkep the oldest dated naturalistic animal motifs are in rock art panels at Leang Timpuseng and Leang Bulu' Sipong 4 that we construe to be narrative representations (scenes) (Figs. 3.2 and 3.3). We also draw reference to the ground line painted below the dated suid figure at Leang Timpuseng (Aubert et al. 2014). The latter is a simple horizontal red line atop which the suid seems to be standing; no

other aspect of the physical environment of this animal is shown (e.g., grass, trees, hills). For Davidson and Nowell (2021b, 328), the ground line painted below the suid at Leang Timpuseng 'may be the makings of a scene'. Undated animal figures produced in the same style are also portrayed on ground lines at Gua Uhallie, a rock art site in Bone (Permana 2015b).

3.2.2 Kalimantan

Sangkulirang-Mangkalihat is a 4200 km² limestone karst area located in a remote part of northeastern Borneo. Rock art was first identified there in 1994 (Fage et al. 2010; Setiawan 2015). Some 52 sites have now been documented. Aubert et al. (2018) dated 15 calcium carbonate samples associated with 13 parietal motifs at six cave sites. The earliest minimum age is from Lubang Jeriji Saléh (previously known as Gua Saleh cave, dated by Plagnes et al. 2003). Here, Aubert et al. (2018) obtained a U-series age of 40 ka for a calcium carbonate deposit overlying a large reddish-orange-coloured painting of a quadruped, interpreted as a still-extant wild Bornean banteng (*Bos javanicus lowi*; Fage et al. 2010). A minimum U-series age of 37.2 ka was also obtained for two hand stencils produced in the same reddish-orange hue (Aubert et al. 2018).

In addition to these dating results, Aubert et al. (2018) provided a chronological age for a distinct rock art style previously inferred on the basis of stylistic analysis and studies of superimpositioning to be younger than the reddish-orange-coloured naturalistic animals and hand stencils (Fage et al. 2010). This style is characterised by dark purple (mulberry) hand stencils, some with elaborate decorative elements in the interior portions of the stencils — including vine-like motifs interconnecting individual hand stencils — as well as small human figures elegantly portrayed in the same mulberry hue. These human figures (termed ‘Datu Saman’ figures; Aubert et al. 2018) are often depicted with large headdresses; some are represented holding material culture objects, including possible spearthrowers, and in some panels these figures are shown in narrative compositions hunting animals (typically deer). Based on minimum and maximum age estimates, Aubert et al. (2018) infer that the mulberry-hued hand stencils appear in the rock art sequence around 20 ka. A Datu Saman figure yielded a minimum age of 13.6 ka. This U-series dating study provides evidence for a stylistic change in the local Kalimantan rock art sequence during the Terminal Pleistocene.

3.2.3 Figurative Animal Art in Maros-Pangkep

The dated assemblage of Late Pleistocene figurative animal art from Maros-Pangkep now comprises seven individual motifs with U-series ages: (1) a warty pig from Leang Tedongnge, with a minimum age of 45.5 ka; (2) a warty pig (minimum age 43.9 ka) and two anoas (minimum ages of 41 ka and 40.9 ka, respectively) from Leang Bulu’ Sipong 4; (3) an indeterminate, suid-like animal from Leang Barugayya 2 (minimum age 35.7 ka) (Aubert et al. 2014); (4) a suid (possibly a female warty pig) from Leang Timpuseng (minimum age 35.4 ka); and (5) a warty pig from Leang Balangajia

1 (minimum age 32 ka) (Brumm et al. 2021a) (Fig. 3.4). Here we discuss only the six identifiable motifs with minimum U-series ages.

The dated figures all consist of monochrome paintings executed using various shades of red to mulberry pigment. In one case, at Leang Tedongnge, two distinct shades of colour were used to produce a single suid motif, likely reflecting a later repainting or retouching episode (Brumm et al. 2021a). So far as we are able to discern, the paint was applied directly to the rock surface using broad, free-flowing brush strokes. The paintings are usually large to life-sized (or bigger), although the anoa motifs at Leang Bulu’ Sipong 4 are relatively small (e.g., Anoa 2 measures 74 × 29 cm). In all cases, the animals are represented as pictorial outlines and the figures are portrayed in side (profile) view, making use of ‘twisted perspective’ (Leroi-Gourhan 1968, 108–9) to depict horns, facial warts, and other paired anatomical features of the animals not visible in strict profile (Meyering et al. 2021).

The exterior outlines of the animal figures are generally depicted in what we regard as an anatomically realistic manner. The suid and anoa motifs typically all exhibit fully formed musculature in the limbs. Overall body proportions are more or less accurately represented, although in the case of the Leang Timpuseng suid the limbs lack clearly defined muscles, being straighter or stick-like (Aubert et al. 2014). There are few stylised elements in the sense of features that do not conform to physiological fidelity. Intuitively, however, the animals’ bodies seem to be too rotund and/or elongated in form, and, in the case of Anoa 3 from Leang Bulu’ Sipong 4, the legs are shorter than found in nature (Fig. 3.3d). In most cases the artists portrayed the animals’ feet (specifically, cloven hooves of suids and anoas) with realistic anatomical detail (e.g., Fig. 3.2b). Certain secondary sexual characteristics, such as head crests, were also represented with sufficient anatomical detail for these motifs to be recognised as depictions of adult male warty pigs (see also Brumm et al. 2021b).

One area in which the outlines fall short of naturalism or anatomical reality is in the omission of certain salient physical features. For instance, genitalia appear not to have been depicted in any of the animal outlines. Moreover, while in three out of six cases the mouths of the animals are portrayed in an open position (as though slightly agape) – the mouth is only clearly defined on three figures – only in one case (the Leang Bulu’ Sipong 4 suid) were teeth explicitly depicted. In this particular instance, it seems noteworthy that the prominent upper or lower canines (‘tusks’) of warty pigs are not evident in the artworks; only the maxillary and mandibular molars and premolars were portrayed, and these seem to take the form of sharp carnivore-like teeth. This unusual anatomical detail, rather than a physiological inaccuracy, was perhaps intended to represent the unworn ridges and cusps of a young suid’s cheek teeth — thus potentially functioning as a marker of the individual’s relative age.

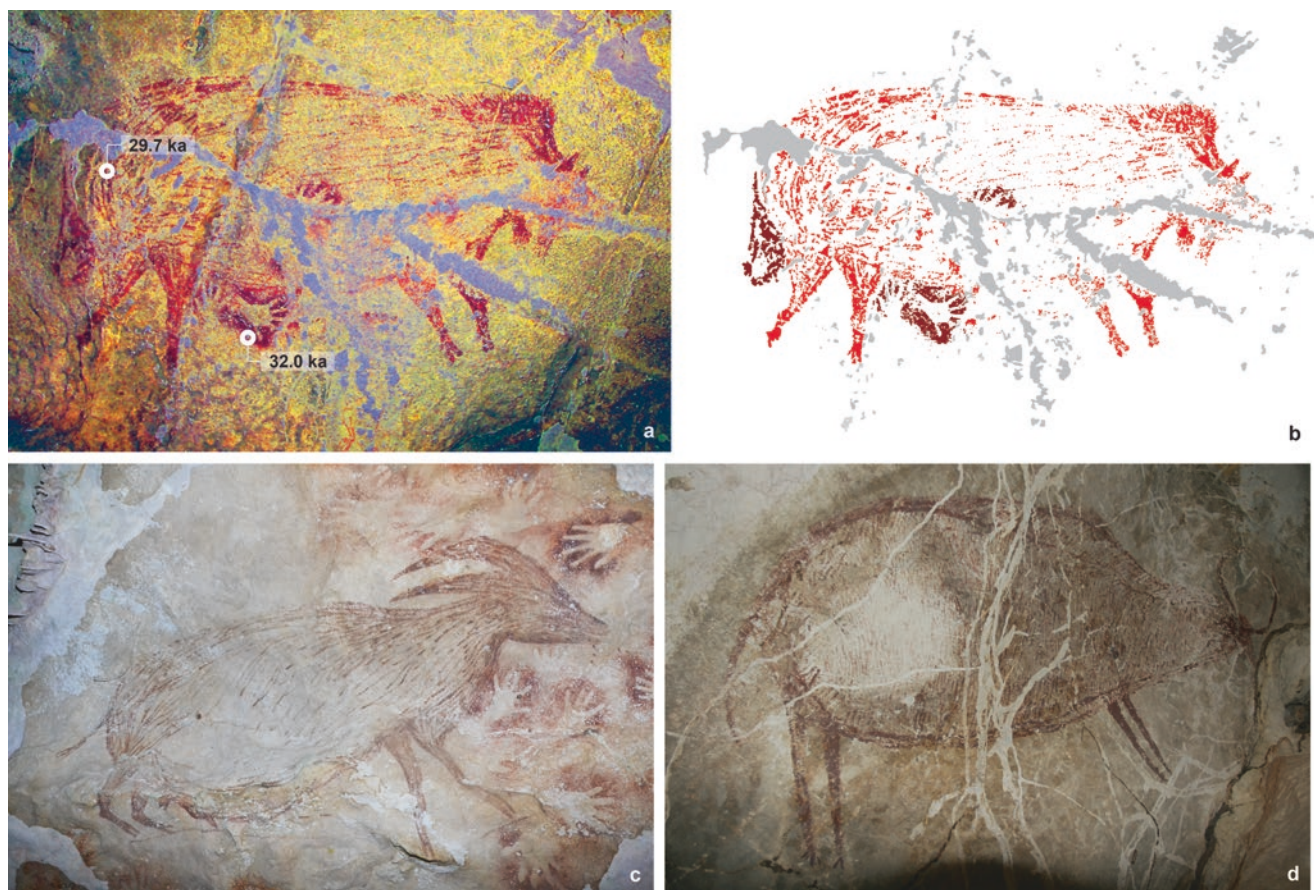


Fig. 3.4 Early rock art depictions of animals from Sulawesi and Kalimantan. **a–b**, Pig motif from Leang Balangajia 1, Maros-Pangkep. The photograph (**a**) has been enhanced using the Decorrelation Stretch (*DStretch*) computer program; a digital tracing of the motif is provided in panel **b**. This suid motif has a minimum age of at least 32 ka based

on U-series dating of an overlying hand stencil (**a**) (Brumm et al. 2021a); **c**, undated painting of an anoa from a cave site in the Bone karsts, South Sulawesi; **d**, undated painting of a bovid (banteng) from Liang Apil Banteng in the Sangkulirang-Mangkalihat karsts, Kalimantan (credit: Pindi Setiawan)

The most notable departure from naturalism, and one of the key stylistic characteristics of this art, relates to the method used to infill the animal outlines. In all of the cases we have documented thus far the interior of the animal outline lacks discernible anatomical detail such as eyes, coat markings, muscle tone, and so on. Instead, the outline depictions were infilled with what at first appears to be a stochastic pattern of painted strokes or lines. Partial block infill using solid colour was also employed, principally for the extremities (lower limbs and head). This infill pattern does not seem to be a stylistic convention (e.g., a kind of hatching style) for representing coat hair or pelage (see Hodgson and Watson 2015, 778). It also does not seem to be a homogeneous, undifferentiated mass of markings used to fill up the outline in the manner of a decorative pattern ‘swatch’. In the case of the Leang Tedongnge warty pig (Fig. 3.2), for example, the orientation of the infill pattern conforms to the outlines of different body parts. The infill strokes on the side and shoulders are oriented in a different direction to those on the ‘hams’, and the infill pattern on the rear leg on the far side of

the suid (the side furthest away from the viewer) is denser than on the opposing rear leg, conveying a sense of depth and volume. Hence, despite the irregular appearance of the strokes and lines comprising the infill pattern, the overall effect gives an impression of the three-dimensional form of the animals. This stylistic characteristic is widely documented in the Maros-Pangkep rock art and may potentially constitute a subtle form of shading.

Here, we propose an umbrella term to describe this distinctive manner of depicting animals in Late Pleistocene Maros-Pangkep: the *Naturalistic animal with stroke-infill* style (hereafter NASI). We should note that very similar animal art is documented at as-yet undated cave sites in the Bone karst region 30 km to the east of Maros-Pangkep (Aubert et al. 2014; Brumm et al. 2021b; Permana 2015b) (Fig. 3.4c). Broadly similar rock paintings of animals are also known from Sangkulirang-Mangkalihat (Aubert et al. 2018; Fage et al. 2010) (Fig. 3.4d). The figurative animal art in Sangkulirang-Mangkalihat is presently less well understood than the figurative animal art in Sulawesi, but based

on our intuitive impression of the Kalimantan paintings we have observed we are inclined to include these artworks within the NASI style *sensu lato*. In the discussion that follows, however, we restrict our comments to the dated distribution of the NASI style located in the Maros-Pangkep and Bone karsts. In these areas of southwestern Sulawesi, NASI animal figures that are dated or attributed based on stylistic grounds to the Pleistocene (N = 85) are dominated by wild suids (89%) and anoas (11%). So far, there are no clear NASI depictions of other endemic mammalian fauna, such as bear cuscuses, civets, macaques, tarsiers, and rodents, or birds and fish. If the surviving motifs we have documented are anything to go by, it seems there was a pronounced focus on just one animal taxon, with nine out of ten identifiable animal images representing suids. We should note that Sulawesi is host to two sympatric suid genera: *Babyrousa* and *Sus* (*S. celebensis*) (Musser 1987). Only the latter is evident among the large corpus of suid paintings in Maros-Pangkep. If the babirusa is represented, the images are all of females (which lack the ornate tusks of males) or immature males.

3.3 Early Figurative Animal Art in Northern Australia

Some of the world's densest concentrations of rock art are found in the Arnhem Land region of the Northern Territory, the 'Top End' of Australia, and in the Kimberley area of Western Australia 700 km to the west (Morwood 2002; Jones et al. 2020; Veth et al. 2018). In both regions style phases focused on large naturalistic animal depictions with NASI-like infill are among the earliest known in the chronological

sequence of painted art. In Arnhem Land, Chaloupka (1977, 1993) categorised this style as the *Large naturalistic figures complex*. Taçon et al. (2020, 218) propose that *Large Naturalistic Style* (LNS) is a more fitting descriptive label, while Jones et al. (2020) use the term 'early large naturalistic fauna' (see also Gunn et al. 2018) (Fig. 3.5). In the Kimberley, early large naturalistic fauna depictions are grouped into the *Irregular Infill Animal Phase* (IIAP) style (Walsh 1991, 1994; Welch 1993; Finch et al. 2021).

Large naturalistic paintings of animals (typically macropods) are widely agreed by some specialists to be an early feature of the painted figurative rock art sequences in both Arnhem Land and the Kimberley. Detailed analysis of these animal motifs is challenging, however. This is owing to the advanced state of weathering of the few surviving older motifs (Finch et al. 2021), and dense overpainting obscuring the art (Chaloupka 1993, 94; Walsh 1994, 35). Consequently, there is some debate among Australian rock art authorities about whether these particular styles of figurative animal art have been accurately characterised in the past.

3.3.1 Early NASI-Like Animal Art in Arnhem Land

The LNS is currently the most comprehensively documented of the large naturalistic animal painting styles of northern Australia. Jones et al. (2020) undertook a detailed analysis of 163 early macropod motifs from 88 sites in western Arnhem Land, focusing on stylistic distinctions and design attributes. These authors argue that a distinctly early phase of animal art is characterised by large monochrome red paintings of macropods. Animal figures comprise anatomically realistic out-



Fig. 3.5 Rock paintings of macropods in the Large Naturalistic Style of Jawoyn Country in eastern Arnhem Land. Image credits: Robert 'Ben' Gunn

line depictions in side profile, including stylised but nevertheless relatively accurate renderings of the overall body forms of macropods (well-defined musculature in the legs and forelimbs, and so on). Typical infill patterns lack clear anatomical detail, instead consisting most usually of lined infill, but also partial and block infill (sometimes combined with lined infill in a single figure), and other types. Jones et al.'s (2020) paper does not explicitly characterise what is meant by the lined infill pattern, described by Chaloupka (1993, 94) as 'contour lines', while Chippindale and Taçon (1993, 38) refer to the same pattern observed on LNS figures as 'stroke-infill manner'. However, illustrations of lined infill pattern motifs are markedly similar to the NASI style, consisting of roughly parallel strokes or lines that tend to follow the outline of the body and limbs, and sometimes solid blocks of color infilling the extremities (heads and ears, limbs).

Jones et al.'s (2020) analysis suggests that partial and lined infill methods span multiple styles of figurative rock art from the Pleistocene through to the middle Holocene (including Dynamic and Maliwawa Figures; Taçon et al. 2020), and thus were potentially used to depict fauna and other subject matter for tens of thousands of years (Jones et al. 2020). It is therefore difficult to maintain the view that the particular manner of infill depiction that characterises many large naturalistic animal figures belongs to a single, continuous artistic style or tradition, as prior interpretations of the LNS had assumed (Chaloupka 1977, 1993).

Nevertheless, Jones et al. (2020, 249) propose a style sequence for LNS infill patterns: 'It is likely then that Lined Infill was used as an infill manner alone in earlier macropods (as demonstrated in the superimpositions) and then continued to be used with the introduction of other infill types such as Partial Infill and Early X-ray'. Thus, large NASI-like outline profile depictions of animals with NASI-like lined infill patterns may be the earliest examples of figurative animal art in Arnhem Land. The other infill types were possibly developed in Arnhem Land or were introduced later, rather than all infill types appearing as a single package or repertoire of choices available to early artists for depicting animals.

The age depth of the LNS remains poorly understood. It has long been assumed to be of great antiquity (Chaloupka 1993), and to precede the well-known terminal Pleistocene Dynamic figure style (May et al. 2017). In their new chronology for Arnhem Land rock art, Taçon et al. (2020, 218) consider 'Large Naturalistic Animals (including various extinct animals); hand stencils' to date to 18,000–15,000 BP and to constitute the second phase in the sequence, while the third phase (15,000–13,000) is 'Large Naturalistic Animals (including some extinct animals); hand stencils'. However, as there are no absolute dates available for LNS figures, the antiquity of this particular rock art style is presently unknown.

3.3.2 Early NASI-Like Animal Art in the Kimberley

The IIAP style is less well described in the published literature. It is characterised by large naturalistic depictions of fauna (Walsh 1991, 1994), principally aquatic species (fish and turtles), but including a wide array of animals, especially macropods, but also birds, flying foxes, echidna, possums, and goannas (Finch et al. 2021; Veth et al. 2018). Despite the descriptive name assigned to this art style, a quarter of IIAP images documented by one team portray yams and other plants rather than animals (Veth et al. 2018). Typical IIAP motifs comprise monochrome red outline paintings of animals depicted in side profile (Walsh 1994). The broad, free-flowing brushstrokes (suggestive of fine brushes capable of holding relatively large amounts of pigment) forming the pictorial outlines convey various anatomical details such as overall body form and musculature of limbs in a stylised but generally realistic manner (Walsh 1994, 36). Anatomical detail (e.g., eyes) is usually lacking in the interior sections of the motifs. Instead, outlined animals are infilled with variations of painted lines, dots, or dashes that, while forming an irregular pattern, tend to be oriented in a manner than conforms to the shapes of body outlines and appendages. Walsh (1994, 36) interpreted these infill patterns as a 'paint conservation option' rather than as a purely decorative element.

The IIAP has recently been the focus of a comprehensive rock art dating program based on radiocarbon-dating of micro-charcoal contained within ancient mudwasp nests associated with IIAP motifs (Finch et al. 2021). This research yielded 27 radiocarbon dates on 16 IIAP rock art motifs. Notably, most of the radiocarbon age estimates obtained are *minimum* ages, as the mudwasp nests had mostly formed over the art. The dating team interpret the results to suggest that the IIAP proliferated between 17 and 13 ka (17.2 and 13.1 calibrated thousand years before present) (Finch et al. 2021). The age of one motif (an IIAP style depiction of a kangaroo) was also securely bracketed to between 17.5 and 17.1 ka based on dating mudwasp materials above and below the painting (Finch et al. 2021). The dating team add the cautionary note that much older mudwasp nests associated with IIAP motifs are unlikely to have survived: 'Many more dates from this period are required before the full chronological extent of the paintings still visible today can be determined' (Finch et al. 2021, 317). Veth et al. (2018, 32) propose that the oldest minimum age for animal art in Maros-Pangkep (at that time 35.7 ka; Aubert et al. 2014) can be used as a valid anchor point for dating the first appearance of the IIAP in the Kimberley region, noting that: 'Early exemplars [of the IIAP] may be as old as similar figures from island SE Asia dated to 36 ka BP'.

3.4 Discussion

Archaeologists and rock art scholars have long recognised that the earliest human occupation levels exposed by excavation in Arnhem Land and other parts of northern Australia contain evidence for ochre processing, implying that pigment use was part of the ‘cultural baggage’ brought to Sahul by the first colonists (Flood 1996, 5; see also Balme et al. 2009). As noted, based on a spate of recent rock art dating breakthroughs it is now evident there is figurative animal art in Wallacea that dates to at least 45.5 ka and is similar in formal style to the earliest surviving figurative animal art in northern Australia. What does this mean? Here, we wish to discuss a few scenarios that could possibly account for the similarities between the NASI art of Pleistocene Sulawesi and the earliest figurative rock art depictions of animals in Arnhem Land and the Kimberley. These are purely theoretical scenarios based on a handful of dates from a vast region; we offer them here as a basis for further thought and debate.

To begin with, it now seems plausible to suggest (see, e.g., Aubert et al. 2014; Taçon et al. 2014) that the apparently large and well-organised groups of people that colonised Sahul (Bird et al. 2019) brought along with them the NASI art style as part of their ‘colonising repertoire’. It is possible to imagine a scenario in which the NASI style of figurative animal art depiction originated in Sunda (northeastern Kalimantan) and spread across the Wallace Line with the initial eastward movement of modern human colonists to Sulawesi, from there dispersing with the seagoing colonisers across the so-called ‘northern route’ to a Sahul previously uninhabited by people, making landfall either in West Papua or the Aru Islands (Kealy et al. 2018; Norman et al. 2017) (Fig. 3.1). The NASI then moved with the exploratory journeys of colonists in a southwesterly direction along the coastal fringes of the now-submerged Sahul shelf, reaching Arnhem Land by at least 65 ka — giving rise to the LNS, which endured until the terminal Pleistocene — and then spreading further west to the Kimberley, where it persisted through the terminal Pleistocene as the IIAP until around 13 ka based on recent dating data (Finch et al. 2021). It should be noted that the earliest excavated archaeological evidence in the Kimberley region is dated at ~50 ka (Veth et al. 2019). Hence, if the NASI reached Arnhem Land and the Kimberley at essentially the same time then presumably there was an earlier phase of human occupation in the Kimberley (going back some 15 millennia) for which there is currently no indication in the stratigraphic record. Alternatively, the NASI reached Arnhem Land earlier than it did the Kimberley.

There is at least one problem we can foresee, however, with the notion that the modern human colonisers of Sahul brought with them the NASI art style as part of the colonis-

ing repertoire. In both Arnhem Land and the Kimberley there appear to be indications of various forms of rock art production that pre-date the earliest known figurative animal art, the LNS and the IIAP respectively. In Arnhem Land, this evidence includes early Panaramitee-like rock engravings that seem to have been produced at a period of time prior to the emergence of the LNS (Chaloupka 1993). In more recently formulated schemes, it is contended that the pre-LNS rock art production is characterised by various forms of hand stencils and animal stencils, along with object and hand prints (Taçon et al. 2020, 218). In the Kimberley, rock ‘art’ characterised by pecked cupules is believed by some to precede the emergence of the earliest figurative art (IIAP animal and plant motifs) (Walsh 1994, 33; Veth et al. 2018). At least in Arnhem Land, the possible existence of what may be older forms of non-figurative image-making is clearly inconsistent with the notion that the NASI rock art style was introduced to Sahul during the initial peopling of the continent from Wallacea.

Therefore, an alternative theoretical scenario is that the NASI tradition originated in Sunda (e.g., Kalimantan) *after* the initial spread of modern humans from Sunda to Sahul at least 65 ka. Thus, the original NASI art style moved across the Wallace Line to Sulawesi as part of a second wave of dispersal by modern humans in the region. From Sulawesi, modern human colonists then took this artistic culture with them to Sahul, most parsimoniously using the northern route through the rest of Wallacea (that is, island-hopping eastward from Sulawesi to the western tip of New Guinea [Bradshaw et al. 2021]). This secondary migration might have taken place by at least 45.5 ka, based on the oldest minimum age for NASI art. However, if we take the oldest known occupation dates from the ‘last stop’ on the route (Kimberley) as the temporal baseline, then we can push the upper limit back to 50 ka. In any case, the implication here is that the NASI art was originally introduced by a later movement of Wallaceans into a part of Australia that had already been under human habitation for some 15,000 years. Such a scenario would explain the apparent existence of local rock art pre-dating the LNS imagery. Recent genetic evidence can be interpreted to support this scenario; for example, ancient DNA extracted from the skeletal remains (dated to ~7.2 ka) of a middle Holocene ‘Toalean’ hunter-gatherer from Leang Panninge in easternmost Maros suggests that a secondary wave of Late Pleistocene modern humans of mainland Asian origin entered Wallacea at some stage after the initial settlement of the region by the ancestors of present-day Aboriginal Australian and Melanesian groups (Carlhoff et al. 2021).

Both of these scenarios face some additional problems. First, if we assume that the LNS and the IIAP both derived from the NASI, and that both of these regional variants of the latter persisted in northern Australia until the terminal

Pleistocene period (~13–12 ka), then we must also explain how a particular rock art style could have persisted in Arnhem Land and the Kimberley without apparent change for many tens of thousands of years. Even under a scenario in which a secondary wave of human migration to Sahul introduced the NASI style to Arnhem Land, we are still talking about a period of around 38,000 years without stylistic change. It is an astonishing 53,000 years if we assume that the NASI style arrived 65 ka. Does it strain credulity to suggest that artists depicted animals in essentially the same way over such long periods of time? In Upper Palaeolithic Europe, ‘silhouette’ art — a particular manner of depicting animals used extensively in (generally pre-Magdalenian) parietal and portable art — is believed to have persisted more or less unchanged for over 20,000 years (Pigeaud 2007). If 20,000 years without stylistic change is intellectually palatable in the context of European cave art can we also digest the concept of a much longer lasting phase of apparent artistic ‘stasis’ among the Late Pleistocene inhabitants of Sahul? If so, the NASI style is starting to look like a single intercontinental rock art tradition that was spread across an area of millions of square kilometres and which endured for a truly vast period of time.

Second, if the NASI art style was brought by modern humans during their movements along the northern route from Sunda to Sahul then the apparent absence of NASI-like rock art in the limestone karst-rich islands between Sulawesi and New Guinea, and in New Guinea itself, is difficult to explain.¹ So far, the only rock art of this style identified in island Southeast Asia is in northeastern Kalimantan and southwestern Sulawesi. The archaeological record of the northern route is poorly known. However, rock art has been identified on some of the northern route islands east of Sulawesi, including Seram and Buru (Arifin and Delanghe 2004). It is also known from the portion of the Sahul landmass where the northern route ‘ends’ — that is, where seafarers following this route would have made initial landfall in Sahul. This includes Misool, part of the emergent Sahul landmass, where some 50 rock art sites are documented in the extensive karstic landscape (Oktaviana 2015), and coastal and highland areas of western New Guinea (Arifin and Delanghe 2004). Aru, also part of Sahul, is another region with limestone karst where we might reasonably expect to see evidence for the production of figurative animal art related to that of the NASI style. To our knowledge, none of the roughly 213 rock art sites uncovered in these places contain early large naturalistic paintings of animals that are any-

thing like those found in Kalimantan, Sulawesi, Arnhem Land, and the Kimberley.² Hand stencil art has been recorded in Buru, Seram, and Misool, and also in mainland West Papua (Arifin 2015; Arifin and Delanghe 2004). Some figurative depictions of fish and other marine fauna are also evident in Misool and elsewhere along the northern route (Oktaviana 2015). These images could also be very old, but the figurative animal art in these places does not offer any compelling similarities to the NASI art style. Perhaps this simply reflects the almost total lack of large non-flying land mammals in the depauperate fauna of these small Wallacean islands. But if so, why was the NASI style of depicting animals not transferred to the fish and other marine creatures commonly portrayed by these artists, or to the terrestrial mammalian fauna such as marsupials and giant rats?

It is evident that the absence of NASI-like art between Sulawesi and Australia presents a conundrum for the idea of a pan-NASI art province associated with the early movements of humans between Kalimantan and the Kimberley. As noted, these areas generally remain under-studied by field archaeologists, so perhaps the NASI rock art is there but simply has not yet been discovered. Or perhaps it has not survived or was not created in the rock art sites uncovered thus far. Another possibility is that during the initial human journeys from Sulawesi to Sahul artists created outline depictions of animals with NASI-like patterns of infill using media (e.g., bark paintings) that have not survived in the record. Alternatively, we could consider the prospect of *direct* long-distance sea-voyaging from Sulawesi to Arnhem Land (or the Kimberley). Or, given that the maximum age of the animal art in northern Australia is as yet unclear we could also surmise, as van Heekeren (1972, 125) surmised, that the dispersal of early rock art between Sahul and Wallacea could have been in the *other* direction; that is, the art originated in Australia and from there spread to Sulawesi.

Given these conceptual dilemmas, another possible scenario is that the NASI rock art style of Late Pleistocene Sunda (Kalimantan) and Wallacea (Sulawesi) is totally unconnected to the LNS of Arnhem Land and the IAP of the Kimberley, with similar styles of animal depiction simply arising independently at different points in time and space owing to convergence. Is it possible there is a neuroscientific explanation to be found here, with the NASI art style reflecting some universal way of depicting animals? Perhaps this could account for the very widespread focus on depicting animals in outline profile view (‘silhouette art’). But in our

¹The apparent absence of NASI-like art in the Victoria River rock art province between Arnhem Land the Kimberley is more readily explained. It has long been hypothesised that the Pleistocene rock art provinces of these regions were essentially both local variants of a single, spatially continuous art province, with the zone of rock art sites that once connected them located on the now-submerged continental shelf (Lewis 1997).

²At this point, we could suggest a later wave of human migration to Sahul followed a variation of the southern route; albeit beginning in Sulawesi, and thereafter involving the movements of people through the Lesser Sunda islands and then direct to northern Australia. There is even less compelling evidence, however, for early NASI-like rock art in Flores, Timor, Alor, and other Wallacean islands in this group — in fact, there is none.

opinion the distinctive patterns of stroke or lined infill evident in the NASI art seem more like the convention of a specific visual culture that was anchored in time and space, rather than some by-product of how the modern mind works (but cf. Hodgson and Watson 2015). Indeed, if the NASI art style simply reflects a commonality in modern human cognitive architecture then why do we not see analogous forms of infill in Upper Palaeolithic Europe?

Finally, therefore, we should entertain the notion that the NASI art style arose in Sunda and spread across Wallacea to Sahul following either the ‘long’ (65 ka) or ‘short’ (at least 45.5–50 ka) chronology scenarios outlined above, but thereafter underwent a process of stylistic change over time and space as the people who brought it persisted and adapted to their new country in these regions. In northern Australia, styles of animal depiction similar to NASI (LNS and IIAP) were not artistic traditions that persisted essentially unchanged over tens of thousands of years; rather, they changed subtly over time — indicating more realistically that any tradition of depicting animals does not remain static. This is consistent with Jones et al.’s (2020) reappraisal of the LNS, which confirmed that some elements of this artistic convention may be very old and persisted over a long period. Under this scenario, the LNS was not a static art period but was far more stylistically variable than hitherto supposed.

3.5 Conclusion

The discovery of Late Pleistocene rock art in Sulawesi and Kalimantan has elevated the status of the previously little-known rock art of Indonesia in global debates about the origin and spread of the earliest traditions of figurative cave painting. In this process of rock art ‘globalization’, some scholars have argued that the early Indonesian art is similar in terms of formal style to some early art in northern Australia, implying that there may have been some form of direct historical connection between them. We have argued that there are, indeed, similarities that are worthy of note between the NASI art style and the early large naturalistic animal paintings in the Arnhem Land and Kimberley regions of northern Australia (Aubert et al. 2014; Finch et al. 2021; Taçon et al. 2014). We have considered a number of scenarios that could account for these close similarities in art styles. One possibility that is at least theoretically plausible — based on the available dating evidence — is that the NASI art style was introduced to northern Australia during the initial peopling of Sahul or (more likely) during a later dispersal of Wallaceans to an already-inhabited Australia. Whether the former or the latter would depend largely on the validity of the current view that a distinct stylistic phase characterised by engravings or stencil- and print-focused rock art pre-dates the earliest figurative animal paintings (LNS) in Arnhem

Land, which requires further dating work to resolve. We are also still left with the problem of how to account for the apparent absence of NASI art in the regions that are relatively well-explored (although still poorly known compared with the Australian sites) between Sulawesi and Arnhem Land. For example, why is this animal art ‘missing’ from the northern route islands east of Sulawesi and the Indonesian portion of New Guinea? Why is it not found in still-emergent portions of coastal northern Sahul through which the early colonists likely passed (e.g., Aru)? We clearly need many more rock art dates and a great deal more archaeological research if we are to begin to make sense of the early movements of modern humans and artistic cultures in this region.

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