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How old is old looking? The Dampier petroglyphs in review

Ken MULVANEY

Abstract

In public forum, the age of the Dampier Archipelago petroglyphs of the Pilbara region of northwest Australia is cited as in the order of 25-30,000 years. Clark (1978), based on the presence of a mineral coating (desert varnish), believed that a component of the rock art must be older than 17,000 BP. Others, including Lorblanchet (1983, 1992), assessing the weathered appearance and degree of patination, certainly regard the petroglyphs as having a Pleistocene antiquity. In this paper, the pattern of weathering is assessed in relation to the lithology (gabbro and granophyre) on which these petroglyphs are produced, and motif subject and stylistic range exhibited. Based on associated data, including archaeological information, climatic and environmental factors, and ethnographic parallels, the Dampier petroglyphs are placed into a temporal sequence that likely spans the late Pleistocene and Holocene.

The Dampier Archipelago lies on Western Australia's Pilbara coast, extending over an area of 1,456km^2 (c. 300km^2 actual landmass) into the Indian Ocean (Fig. 1). These islands are the easternmost of a chain of islands that extend from Exmouth Gulf, 335km to the west southwest. They are the only islands which comprise intrusive igneous rock (gabbro and granophyre) and basalt lava (Donaldson 2011), providing exceptional, weathered surfaces on which the petroglyphs are preserved. The progression of weathered rind (erosion rate) is among the lowest measured anywhere in the world. This, in part, explains the abundance of the rock art, more importantly it allows for the likelihood of preserved ancient rock art. During the Pleistocene this area was a series of high rugged hills set within a vast plain. It was following the Last Glacial Maximum (LGM) and the associated rise in sea level that these higher landforms became the islands of the Dampier Archipelago some 9-6,000 years ago (Fig. 2).

No systematic and complete survey has been conducted of the Dampier Archipelago petroglyphs. However, investigations to date show this area to be one of the richest concentrations of petroglyphs in the world (Bednarik 2007; Mulvaney 2010; Veth *et al.* 1993; Vinnicombe 2002). Not only in shear number (500,000 to 1,000,000 individual petroglyphs), but in the range of subjects, forms and techniques displayed. This diversity covers the spectrum of motifs which may be broadly grouped as Geometric (shape-like), Anthropomorphic (human-like), Zoomorphic (animal-like) and Spooromorphic (track-like), comprising many hundreds of distinct motif types within teach of the overarching divisions (Mulvaney 2010).

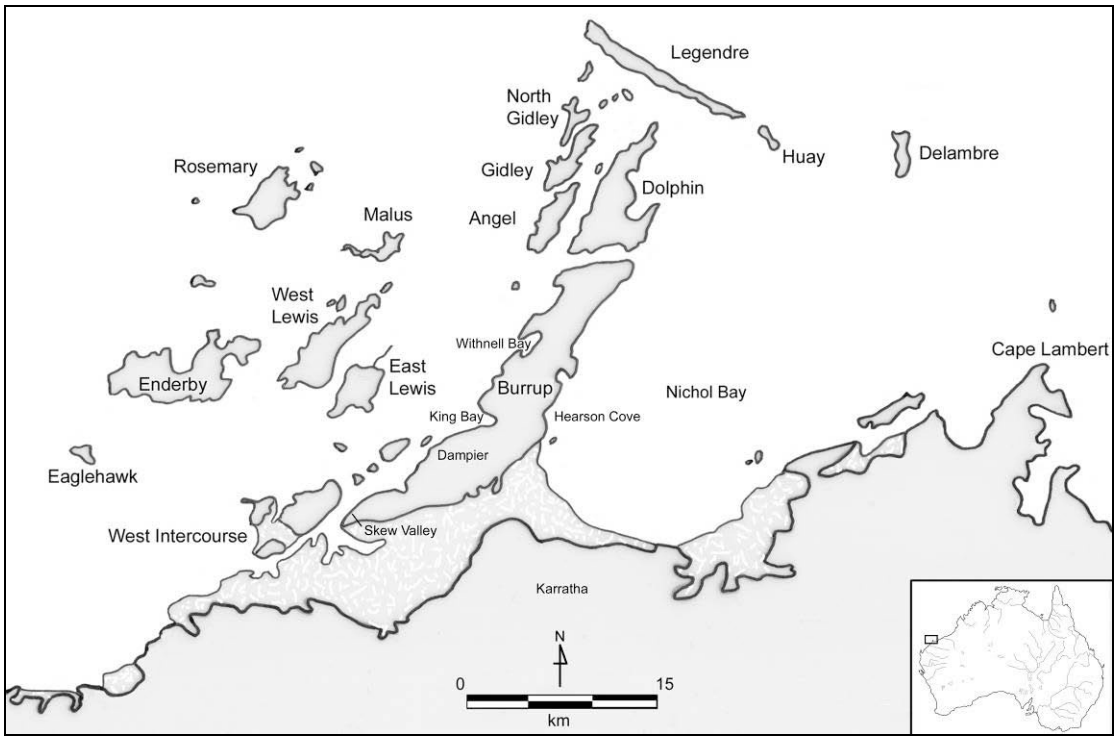

Fig. 1. Map of the Dampier Archipelago, Western Australia, showing location of places mentioned in the text.

Fig. 2. View of part of the Dampier Archipelago, looking southward along Flying Foam Passage with Dolphin Island at left, Angel Island to right and Burrup in background.

The Pilbara is a region of Australia rich in petroglyphs, with distinct local variation displayed (Fig. 3). One of the earliest documented references about Australian Aboriginal rock art relates to Depuch Island, just 90km east of the Dampier Archipelago (Stokes 1846; Wickham 1843). Further eastward, around Port Hedland, are the petroglyph sites on limestone outcrops (McCarthy 1962). Others of the better known sites occur along the Fortescue River and Yule River (McNickle 1984; Wright 1968). There are also the painted rockshelter sites of the Hamersley Range (Walsh

1988). Lesser known sites are scattered throughout the Abydos Plain, the Chichester Range and Hamersley Range. This is an area covering some 182,000km^2 of diverse topography and surface expression of geology, the pattern of rock art, to an extent, reflecting this. However, the Dampier Archipelago is a location where the specific combination of petrology and ecology presents a unique circumstance for the development and preservation of its rock art.

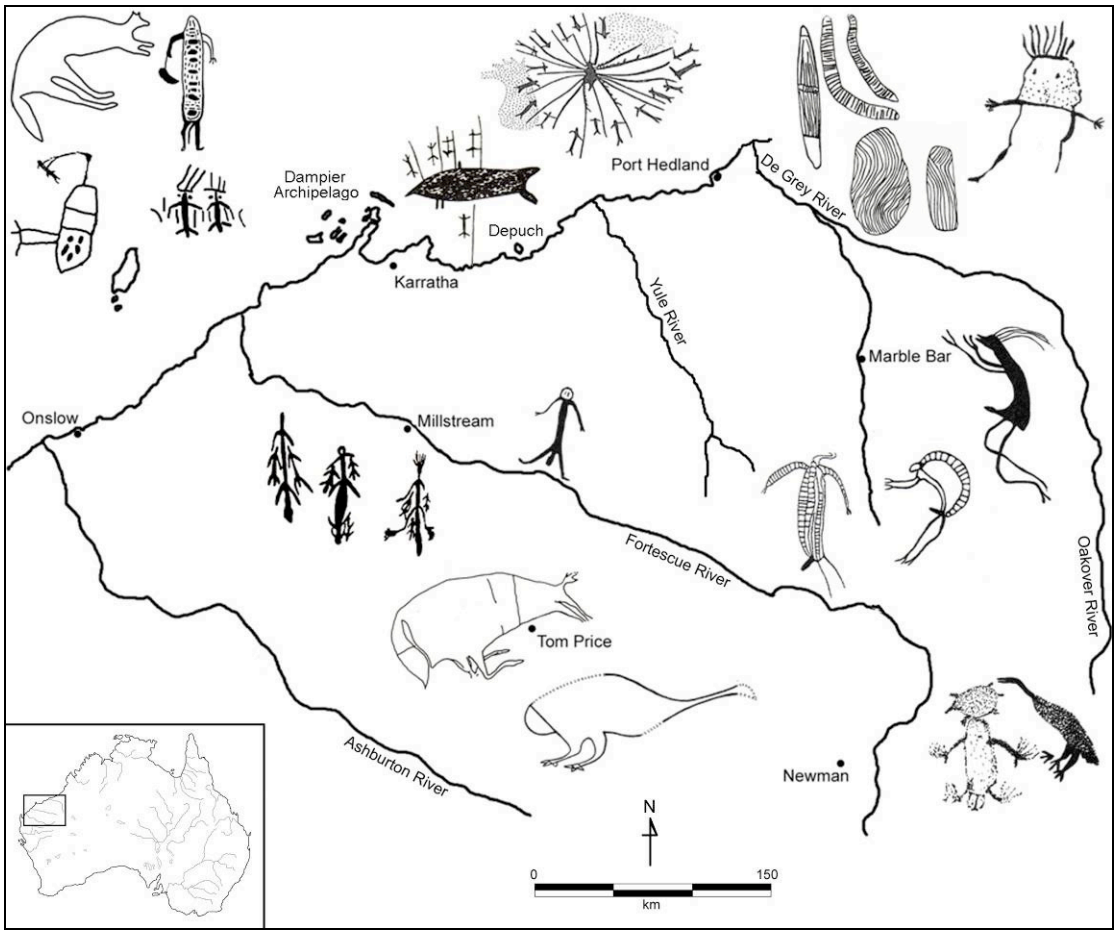

Fig. 3. Map of the Pilbara region, Western Australia, showing the location and motif styles of the major rock art traditions of the region.

Archaeological investigations of shell middens provide evidence of occupation throughout the last 9,000 years. This pattern is reflective of the post-glacial marine transgression, the formation of the archipelago and the availability of marine resources. There is one date, c. 21,500 BP, from a shell fragment retrieved from a rocky slope containing petroglyphs, which suggests a greater antiquity for human presence in the area. Evidence from other parts of the Pilbara indicates that people were in the region at least 35,000 years ago (Brown 1987; Law *et al.* 2010; Slack *et al.* 2009). Just how this may relate to the production of the Damper petroglyphs, their antiquity and temporal patterning is examined through relationship of superimposition and physical condition of the petroglyphs, keyed to specific events and lines of evidence.

Attempts to date the petroglyphs have not proved successful, especially so in reference to the Dampier rock art (e.g. Dragovich 2000). The very nature of the petroglyphs, how they are constructed and their open, exposed situation, preclude

many of the conditions necessary for direct dating. Clarke (1978) had theorised about possible ages relating to the development of a mineral rock coating he identified as “desert vanish”. The conditions for its formation being hyper-aridity, a situation Clarke (1978) postulated as relating to the LGM (c. 22-17,000 BP). However, without reliable dating of organic carbon trapped within or under this mineral coating, the relative age of petroglyphs remains unresolved. In an analysis of some 3,400 petroglyphs in the area south of Withnell Bay (see Fig. 1), I attempted to address this question of Pleistocene age for rock varnish formation (Mulvaney 1982). Rock varnish was present within a small percentage of the petroglyphs (12% n=408), while many more truncated the varnish (34% n=1156). Comparison of motif subjects correlated with many of the macropod, elaborate non-figurative and certain of the anthropomorphic (human-like figures) motifs covered with the rock varnish, while marine subjects and simple human forms cut through the coating. Despite being unable to obtain an age determination for the rock varnish formation, nor to estimate approximately when it may have formed, the subject dichotomy observed in the Withnell Bay sample does provide a strong indicator that some of the rock art predates the formation of the Dampier Archipelago around 7000 BP.

Without options of direct dating the Dampier petroglyphs, what remains is relative association of temporal indicators to provide some insight. During the 13m^2 Skew Valley midden excavation (see Fig. 1) four petroglyphs and a fifth rock, “bearing a groove only” were exposed (Lorblanchet 1992: 41). The associated shell layers burying the petroglyphs provide a minimum age as between 2700 and 4000 BP. One of these panels depicts a group of side profile stick figures, another of a curvilinear design, the other two of human stick figures of different design (Lorblanchet 1992). None of these are diagnostic of any specific artistic tradition or style, providing little but a minimum age for rock art on the Burrup.

Two distinct stratigraphical layers were identified within the shell midden, the upper dated from approximately 5100 to 2300 BP, the lower from 7800 to 7200 BP (Lorblanchet & Jones 1979: 466). The lower layer comprises gastropods *(Terebralia sp.)* and a low density stone artefact component of flakes and small number of scrapers. *Anadara*, a bivalve, dominates the upper layer and there is the appearance of quartz rather than reliance on the local granophyre, with backed artefacts. This transference pattern in shellfish species dominance is repeated across the archipelago, indicating a change around 5000 BP, which may also relate to a shift in petroglyph production. However, change in rock art production does not necessarily indicate the emergence or arrival of a replacement people, but it can be indicative of cultural adjustments.

Occurrence of superimposition and the condition of weathering of motifs provide the most opportune means of identifying temporal patterns. The circumstance of where one motif overlies another provides a mechanism to investigate temporal relationships. The petroglyphs occur on the rock surfaces of the block structured weathered slopes (Fig. 4); they are not confined to single bedrock exposures or rockshelters. A factor of this open, extensive occurrence of suitable canvases for rock art placement is that a relatively small percentage (c. 5%) of superimposed petroglyphs arises. Fortunately the unprecedented extent of petroglyph production ensured that 557 pairing of motifs as under and over were sampled for analysis. Utilising superimposition in combination with a measure of weathering condition (contrast-state), establishes a basis of constructing a temporal sequence. However, as Keyser (2001: 124) cautions, “only when a number of stylistically distinct motifs

are consistently superimposed in the same order at a series of different sites can a generalized chronology for a region's rock art be developed".

Fig. 4. View along one of the valleys at the northern end of the Burrup, showing the general position of petroglyphs.

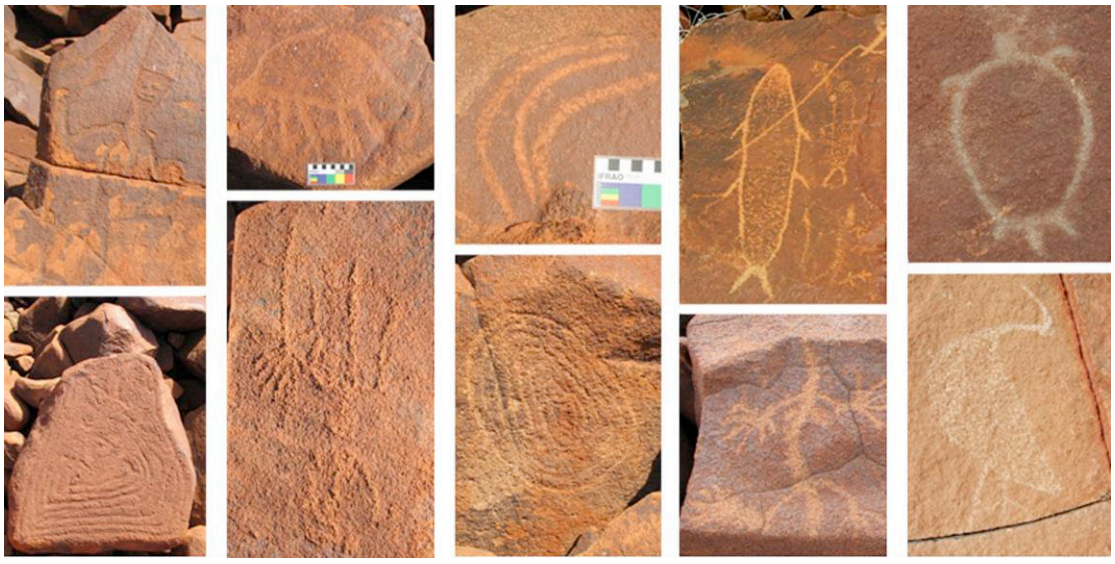

Fig. 5. Examples of the contrast-state conditions, with oldest, more weathered at left to most recently produced petroglyphs at right.

To establish a sequential relative chronology, it is not sufficient to merely recognise that the motif underneath must predate the overlying one; it is how much earlier was its production that needs to be ascertained. Passage of time is marked by the degree of re-weathering of the motif, thus a five state measure of weathering

condition, based on the contrast between the motif surface and adjacent (unmodified) rock surface was recorded. The principle is that the longer the time-span from producing a petroglyph, the closer its surface colour will be to that of the adjacent, non-engraved rock surface, thus of low or no contrast. More recently produced petroglyphs will be of high contrast (Fig. 5). To rule out other factors which might determine contrast-state, trends of location, aspect, dip, technique and depth of petroglyphs were analysed from a 5,650 motif sample from 17 locations across the archipelago (Mulvaney 2010). This analysis confirms that the gauge of contrast, a measure of weathering, is a factor that correlates with time related processes, rather than with underlying rock condition, location or inclination. The only other constant is that motifs on gabbro have a tendency to lower contrast-state more than comparable motifs on granophyre.

In addition to a general sequence marked by contrast-states and superimposition, the occurrence of thylacine (Tasmanian tiger) motifs in the Dampier rock art (see Mulvaney 2009) allows some anchoring of the chronology. Depictions of thylacines are also recorded from the Kimberley and Arnhem Land. In these two areas they appear in the earlier art phase (e.g. Murray & Chaloupka 1984), while dingoes only appear in the later period rock art. Indications are the thylacine became extinct on mainland Australia around 3500 BP (e.g. Partridge 1967), which provides a minimum age for at least some of the art. With sea-level rise following the LGM, the Dampier Archipelago formed some 7,000 years ago; so, it is likely that the majority of marine subject images post date this occurrence. The data (see Mulvaney 2010) suggests a general trend from terrestrial lower-contrast to marine higher-contrast in the faunal depictions. There is also change in the way of graphic representation of both geometric and anthropomorphic motifs, from complex and intricate design elements to general, uncomplicated graphic arrangements. Consistency in the pattern of the data supports the contention that the rock art reflects the local environment and, at the least, there are petroglyphs that are older, produced prior to the formation of the islands, yet others that are newer, produced once the marine environment became established.

Investigation of specific motif types demonstrated that a number of graphic elements appeared in the Dampier Archipelago rock art assemblage at different times. Some of these were relatively short lived (e.g. complex geometric design), while others were produced over extended periods (e.g. concentric circle). Broader archaeological and paleoclimatological data for the region suggests a number of significant events and changes, providing a logical framework for comprehending the temporal sequence in the rock art. Conditions prior to, during and following the LGM, shifts in the stone tool and dietary evidence are some of these. The pattern of superimposition and changing motif repertoire indicates that one of these shifts in artistic expression is tied to changes in the dry land/marine regimes of the archipelago.

Five major rock art phases (artistic traditions) are indicated by the evidence. The earlier phases, based on absence of marine subjects and their weathered states, are probably Pleistocene in age and the oldest may well date prior to the LGM (i.e. >22,000 BP). Phase one comprises complex geometric design, “Archaic Face” and disarticulated blob-head figure motifs (Fig. 6-8). This is followed by a significant change in structure, subject and situation of the petroglyphs. The Phase two suite of rock art is characterised by outline, pecked and abraded motifs, especially key subsistence species like emu and kangaroo, which are large and placed in

prominent, highly visible locations (Fig. 9). An increase in the range of subjects, forms and situation of motifs characterises Phase three.

Fig. 6. Three examples of complex geometric designs, relating to the earlier identified petroglyph tradition, located at the one site on the Burrup, right hand motif includes a face-like arrangement.

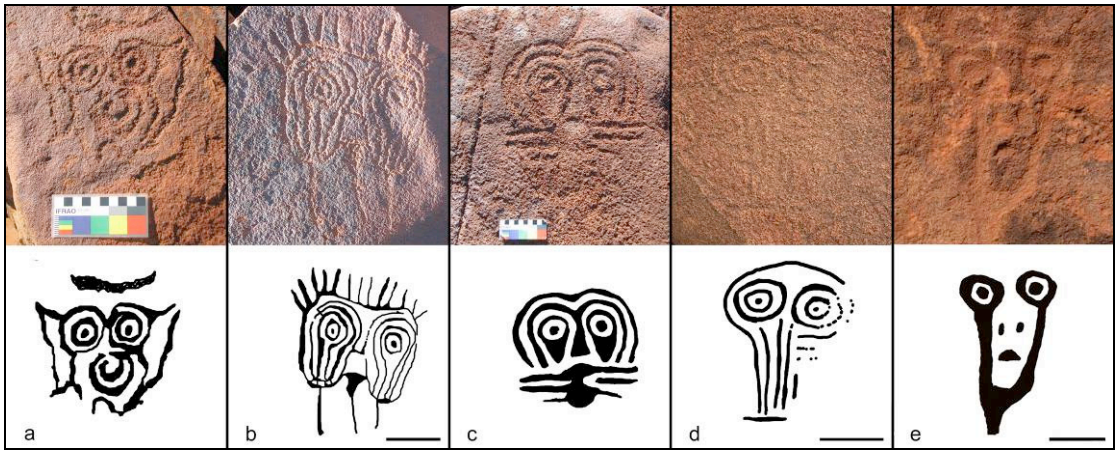

Fig. 7. Selection of "Archaic Face" motifs, relating to the earlier identified petroglyph tradition: **a-b.** from Rosemary Island; **c-d.** from north end of Burrup; **e.** from a site near King Bay.

Fig. 8. Examples of the so called "Climbing men" motif, relating to the earlier identified petroglyph tradition, located at three sites (Climbing Man, Deep Gorge, Happy Valley) 14km apart, showing the extreme weathered conditions of these ancient motifs.

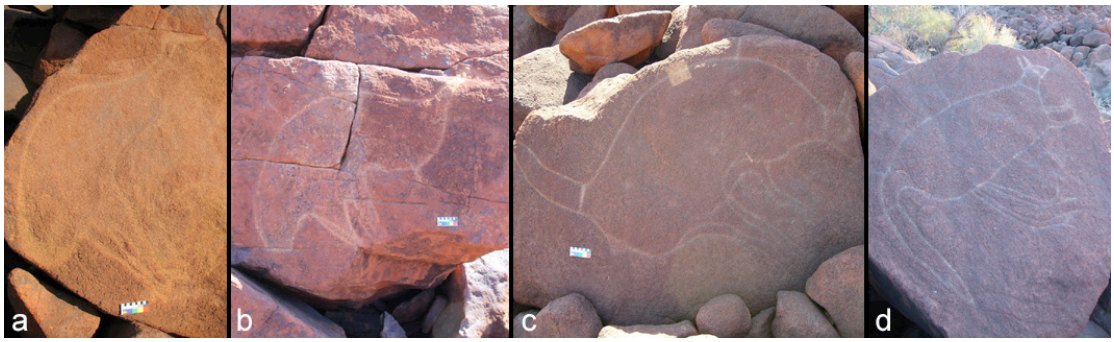

Fig. 9. Selection of large emu and macropod motifs, characteristic of the second phase or artistic tradition of the Dampier petroglyphs.

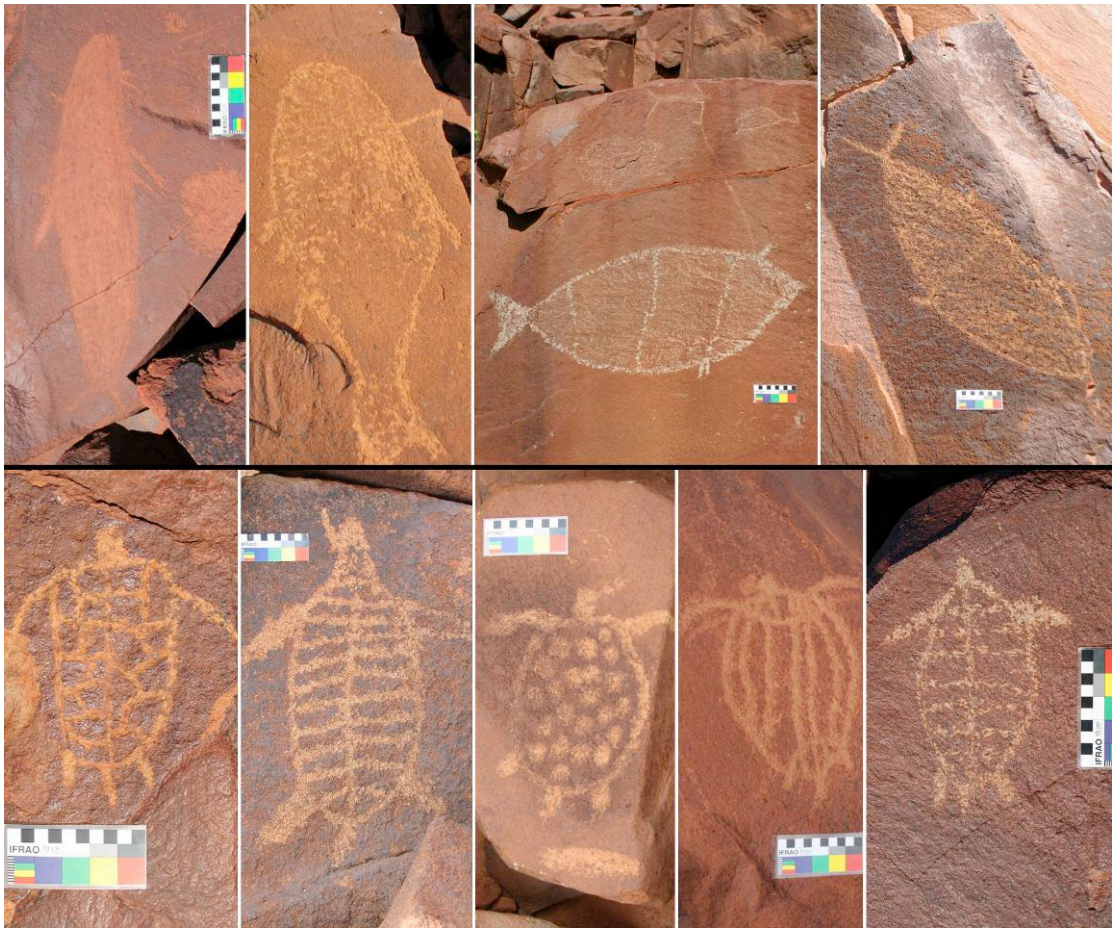

Fig. 10. Examples of the range in fish and turtle motifs, identified with the later, marine associated artistic traditions of the Dampier petroglyphs, showing the relatively unweathered, high contrast-state of the motifs.

The subsequent rock art traditions are directly associated with the formation of the Dampier Archipelago during the Holocene (c. 8000 BP). These petroglyphs of the marine associated rock art phases are of higher contrast-state, less weathered than motifs of the earlier artistic traditions. The proximity of marine resources is reflected in the petroglyphs and other archaeological evidence. In addition to the depictions of marine fauna (primarily fish and turtle; Fig. 10), human figures, in group scenes and dynamic representations, are displayed in association with graphic elements such as boomerang, dance wands and headdress (for contemporary Aboriginal cultural

sensibilities these motifs are not depicted in this article). These material culture items have parallels with contemporary and ethnohistorical records of ceremonial performance. Such petroglyphs suggest an antiquity of at least several thousand years for such cultural practices.

Weathering state provides an indication of the relative antiquity of the Dampier Archipelago petroglyphs. It is established that the weathering rates of the gabbro and granophyre, at approximately 0.2mm per 1,000 years, are amongst the lowest rates measured throughout the world (Pillans *et al.* 2008). However, just how old the old looking petroglyphs are is less certain. Based on detailed analysis of a sample of the rock art (Mulvaney 2010), it is suggested that the Dampier Archipelago petroglyphs span more than 20,000 years of production, only ending with the disruption brought about by the coming of European settlement in the region in the 1860s. The old looking rock art could be more than 25,000 years old, and may yet prove to be as old as the presence of humanity in the region.

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