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Title: Gledswood Shelter 1: Initial radiocarbon dates from a Pleistocene aged rockshelter site in northwest Queensland

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Introduction

Like elsewhere in Australia, the archaeology of northwest Queensland has focused on the antiquity of occupation and the continuity of that occupation through the Last Glacial Maximum (LGM), in an attempt to better understand the adaptive capabilities and strategies of early humans. Veth (1989, 1993) has hypothesised that the northwest Queensland savannah, as an important ‘corridor’ for the colonisation of Australia (e.g. Bird *et al.* 2005; Horton 1981), should contain ‘early’ sites; and furthermore that with the climatic deterioration associated with the LGM, such sites should fit one of two patterns: (1) they will be abandoned and display a cultural hiatus; or, (2) if located in resource-rich zones within catchments (‘local refuges’), they will continue to be utilised, though subsistence strategies will be modified to rely more heavily on locally available resources. The northwest Queensland sites of Colless Creek at Lawn Hill (Hiscock 1984, 1988), and GRE8 near Riversleigh (Slack 2007:218-251; Slack *et al.* 2004), both fit the second pattern, i.e. persistent occupation through the LGM with altered strategies to cope with increased aridity. However, outside these local refugia, sites pre-dating the LGM have not yet been located in the northwest Queensland savannah. For example, Mickey Springs 34 (Porcupine Gorge) provides evidence for human occupation from c.10,000 BP (Morwood 1990, 1992, 2002) and Cuckadoo Shelter in the Selwyn Ranges (Davidson *et al.* 1993) provides a near basal date of 15,270 ± 210 BP; Veth (1989:87) argued that such sites reflect the post-LGM expansion of groups from refuges. The evidence available to date raises the question as to whether the wider northwest Queensland savannah corridor was indeed occupied in the pre-LGM period, when rainfall levels were higher and there was greater availability of surface water and food resources (cf. Hiscock and Wallis 2005).

In 2002, a research programme was initiated in collaboration with the Woolgar Valley Aboriginal Corporation to investigate the long-term chronology and nature of regional occupation of the northwest savannah corridor, beyond local refugia. Subsequent surveys identified more than 100 sites among the sandstone escarpments in the foothills of the Gregory Ranges (Wallis *et al.* 2004). However, owing to the specific site formation processes operating locally, few of these have accumulated sedimentary sequences suited to addressing questions

of longterm chronology. The recently excavated Gledswood Shelter 1 (hereafter GS1) is an exception to this generalisation and this paper presents the initial results of radiocarbon determinations from this site.

The Study Site and Environs

GS1 is a small, south-facing overhang in a sandstone range situated a few kilometres north of the Norman River in northwest Queensland (Figure 1). The area lies within the semiarid tropics, characterised by a short, hot, wet season and a long cool, dry season. While surface water is abundant during the wet season, it becomes extremely scarce during the dry, when people must access subterranean streams. The surrounding vegetation is primarily open woodland and grassland, and even today the region is generally regarded as rugged and difficult to traverse. Like almost all overhangs in the vicinity, GS1 contains an array of stenciled art (predominantly hand stencils) and occasional pecked geometric motifs. Description and analysis of the extensive art in this and other shelters in the region shows some technical similarities to that of the Central Queensland Highlands (cf. Morwood 2002), though the range and proportions of specific motifs of the two areas are clearly quite different, and the GS1 region is more aligned with the Northern Queensland Highland Rock Art Province (Wade 2009). During a preliminary visit to GS1 in 2005, charcoal, a portable grinding slab and flaked stone artefacts were observed on the shelter floor, and it was apparent that the site contained a considerable depth of sedimentary deposit. Ground-penetrating radar and magnetometer surveys were subsequently undertaken to reveal subsurface information about the distribution of stratigraphic units and concentrations of magnetic minerals, and to better understand the bedrock topography across the site (Conyers 2009). Three 1m² squares (D1, D0, C0) were excavated in 2006, with Square C0 still producing stone artefacts at a depth of 180cm below surface, without bedrock having been reached. A second field season in 2008 expanded the excavation in order to reach bedrock and during this season a further three 1m² squares were excavated (C1, B1, B0), bringing the total area excavated to 6m² (Figure 1).

Methods

Excavation in all squares proceeded using 5cm arbitrary spits unless a stratigraphic change was apparent. The use of shallower spits than this was not considered appropriate given the nature of the deposit; contemporary footsteps cause depressions up to 5cm deep, and sleeping hollows created by macropods have made the surface even more uneven. Presumably such conditions have existed throughout the history of site use and have led to a continuous mixing zone of 5–10cm depth at the contemporary ground surface, a proposition supported during excavation by the lack of detailed stratigraphy or sharp boundaries between sedimentary units. Excavation continued until bedrock was reached, except in Square B0 where two large slabs of roof-fall prevented excavation beyond c.100cm below surface. Where possible, *in situ* charcoal samples were collected during excavation and, following the completion of excavation, further charcoal samples were recovered directly from the exposed stratigraphic sections. Descriptions of sediment colours were obtained through reference to a Munsell Soil Colour Chart and pH values were determined through a colorimetric test. Bulk sediment samples were collected for subsequent laboratory analysis including Loss on Ignition (LOI), magnetic susceptibility, x-ray diffraction, phosphorous percentage, particle size analysis and granulometry, along with oriented samples for micromorphological analysis, and samples for OSL dating. The volume and weight of all excavated deposit was recorded and the deposit then passed through 7mm and 3mm nested sieves. Most 7mm sieve residues were preliminarily sorted in the field; most

3mm sieve residues were bagged in the field and returned to the laboratory for sorting and analysis.

Figure 1 Site plan and shelter profile, Gledswood Shelter 1, north Queensland.

Initial Results

Maximum depth to bedrock was reached in Squares C0, C1 and B1 at approximately 275cm below surface (Figure 2). Eleven stratigraphic units were recorded, including three major zones of roof fall. Abundant stone artefacts were recovered throughout the deposit to a depth of approximately 240cm below surface in Squares C0, C1 and B1. More than 13,000 artefacts were recovered from the 2006 excavations alone. Although detailed analysis of the stone assemblage remains to be undertaken, initial examination reveals that the assemblage represents a largely expedient technology dominated by unretouched flakes manufactured from locally available milky quartz and quartzite, with occasional occurrences of higher quality chert and volcanics. In addition to flaked stone, numerous ochre fragments were recovered from the 3mm sieve fractions in some squares. Although these have not yet been quantified, a range of pigment colours are represented and their analysis will be particularly interesting given arguments suggesting painted rock art in north Queensland commences in the mid-Holocene (Morwood 1984, 2002). The high pH levels throughout the deposit resulted in extremely poor organic preservation, with only a few highly fragmentary small bones and seeds being recovered from the uppermost spits, though abundant charcoal was found from the surface through to c.100cm below the surface, below which it decreased rapidly.

Thirteen charcoal samples were submitted for radiocarbon dating, documenting a pre-LGM, and late Pleistocene/Holocene cultural sequence (Table 1). Radiocarbon determinations were

calibrated to calendrical ages using OxCal (v4.1) (Bronk Ramsey 2009), using the SHCal04 atmospheric curve to calibrate Holocene radiocarbon dates (<11,000 BP) (McCormac *et al.* 2004). Owing to limitations in southern hemispheric ¹⁴C adjustments beyond this age, the 13,185 ± 75 BP determination was calibrated using the IntCal04 curve (Reimer *et al.* 2004). Given the uncertainty for calibrating ¹⁴C ages older than 26 kyr BP (van der Plicht *et al.* 2004), the 28,419 ± 320 BP date has not been calibrated and is presented as a conventional radiocarbon determination only.

Discussion and Conclusion

GS1 is the first rockshelter outside a well-watered local refuge in the savannah corridor of northwest Queensland to produce evidence for human occupation in the pre-LGM period, thus fitting with the transformation model presented by Hiscock and Wallis (2005) and the biogeographic model of Veth (1989, 1993). Despite its comparatively small size, the presence of stone artefacts, ochre and charcoal at the GS1 site are testimony to its repeated use throughout at least the last 28,400 years. It is not yet clear whether it was continuously occupied or abandoned through the height of the LGM before being reoccupied; certainly there is a considerable depth of deposit containing abundant stone artefacts between the c.13,200 and c.28,400 BP dates though the local catchment cannot be considered to possess the general environmental criteria to be considered a local refuge, and thus we would expect it to be abandoned. As O'Connor *et al.* (1999) have noted, many rockshelter sites in northern Australia experienced a temporal hiatus during the LGM without any obvious break in stratigraphy. On this basis, additional AMS and OSL dating is being undertaken to assess this issue at GS1, as well as to assess the importance of the slight inversion during the Holocene phase of occupation (Wk-19347). Some results from detailed analyses of the sediments from Square C0 are available (Keys 2009; Keys *et al.* 2008); when combined with similar analyses from the other squares this will further contribute to our understanding of the site occupation history and formation processes. Phytolith analysis and charcoal species identification projects are scheduled to be undertaken in the near future to provide further complementary information on local vegetation, and detailed analysis of the extensive stone artefact assemblage is underway. When all analyses have been completed, the results from the GS1 investigations promise to provide important data to allow us to test competing models relating to cultural change, subsistence and land-use through the late Pleistocene in the savannah corridor of northwest Queensland, as well as providing a valuable palaeoenvironmental record for a region which hitherto lacks any such local data.

Figure 2 Stratigraphic sections for Squares C0 and D0, Gledswood Shelter 1, north Queensland.

Table 1 Radiocarbon age determinations from Gledswood Shelter 1, northwest Queensland.

Square	XU	Depth (cm)	Lab. No.	$\delta^{13}C\text{‰}$	^{14}C Age (years BP)	Calibrated Age BP (2 σ probability)
C0	3	10	Wk-19346	-24.8 $\pm$ 0.2	619 $\pm$ 47	651(585)519
C0	5	22	ANU-2625	-28.0 $\pm$ 2.3	1530 $\pm$ 35	1485(1391)1297
C0	6	27	ANU-2626	-28.0 $\pm$ 1.9	1600 $\pm$ 35	1525(1439)1353
C0	9	42	ANU-2627	-28.2 $\pm$ 2.7	3100 $\pm$ 40	3368(3254)3081
C0	10	46	ANU-2629	-26.1 $\pm$ 2.9	3525 $\pm$ 40	3865(3748)3631
C0	10	46	Wk-19347	-24.8 $\pm$ 0.2	5233 $\pm$ 67	6179(5962)5746
C0	13	61	ANU-2630	-26.1 $\pm$ 2.9	3765 $\pm$ 40	4223(4065)3907
C0	16(2)	80	Wk-19348	-25.7 $\pm$ 0.2	3566 $\pm$ 51	3958(3799)3640
C0	16(2)	80	ANU-2631	-25.8 $\pm$ 3.1	4260 $\pm$ 45	4855(4717)4579
C0	19(2)	103	Wk-19349	-22.3 $\pm$ 0.2	8581 $\pm$ 40	9550(9508)9465
C0	22(1)	125	ANU-2633	-26.2 $\pm$ 2.4	9310 $\pm$ 50	10,570(10,417)10,264
C0	24(2)	139	Wk-19350	-25.0 $\pm$ 0.2	13,185 $\pm$ 75	16,006(15,626)15,247
B1	East Section	195	Wk-24199	-24.1 $\pm$ 0.2	28,419 $\pm$ 320	—

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