Quaternary Science Reviews 191 (2018) 204–228

Contents lists available at ScienceDirect

Quaternary Science Reviews

journal homepage: www.elsevier.com/locate/quascirev

Carpenters Gap 1: A 47,000 year old record of indigenous adaption and innovation

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ARTICLE INFO

Article history:
Received 1 November 2017
Received in revised form
1 May 2018
Accepted 14 May 2018

Keywords:
Pleistocene
Sahul
Colonization
Kimberley
Bayesian modelling
LGM refugia

ABSTRACT

Here we present the first detailed analysis of the archaeological finds from Carpenters Gap 1 rockshelter, one of the oldest radiocarbon dated sites in Australia and one of the few sites in the Sahul region to preserve both plant and animal remains down to the lowest Pleistocene aged deposits. Occupation at the site began between 51,000 and 45,000 cal BP and continued into the Last Glacial Maximum, and throughout the Holocene. While CG1 has featured in several studies, the full complement of 100 radiocarbon dates is presented here for the first time in stratigraphic context, and a Bayesian model is used to evaluate the age sequence. We present analyses of the stone artefact and faunal assemblages from Square A2, the oldest and deepest square excavated. These data depict a remarkable record of adaptation in technology, mobility, and diet breadth spanning 47,000 years. We discuss the dating and settlement record from CG1 and other northern Australian sites within the context of the new dates for occupation of Madjedbebe in Arnhem Land at 65,000 years (±5700), and implications for colonisation and dispersal within Sahul.

1. Introduction

The site of Carpenters Gap 1 (CG1) located in the Napier Range within the Devonian reef system of the southern Kimberley, Western Australia (Figs. 1 and 2), has long been known as one of the earliest radiocarbon dated occupation sites on the Sahul continent (O'Connor, 1995). The age of the excavated deposits and exceptional preservation of organic remains makes the site significant; providing one of the richest archaeological records of early settlement of inland environments in Sahul. CG1 has already provided critical data to our understanding of the technology and artistic traditions which accompanied the first Australians, such as early evidence of edge-ground axe production (Hiscock et al., 2016), the earliest known bone personal ornament (Langley et al., 2016), and pigment use earlier than 40,000 cal BP (O'Connor and Fankhauser, 2001:299). Other studies from this site have produced a long anthracological, macrobotanical and phytolith record (Frawley and O'Connor, 2010; McConnell and O'Connor, 1997, 1999; Wallis, 2001). These studies of CG1 have added to our knowledge of Pleistocene life, yet the stone artefacts and fauna have not been previously published in any analytical detail. Here we present the first detailed analyses of the stone artefacts and fauna from Square A2, the oldest and deepest square in CG1, in chronostratigraphic context. We also present all available radiocarbon dates for the first time, plotted within stratigraphic sections. This information is used to construct a Bayesian chronology. Together with a growing number of Australian sites, such as Riwi, Boodie Cave, Madjedbebe (formally known as Malakunanja II), Nawarla Gabarnmang, Nauwalabila, Warratyi, Devils Lair, and Mungo (Fig. 1); CG1 provides critical archaeological evidence for the economic and social lives of the first Australians.

Until recently, the colonisation of Sahul was thought to have occurred at around 50,000 cal BP, with a consistent pattern of dates for the earliest occupation levels of sites such as Riwi (Wood et al., 2016), Devils Lair (David et al., 2011; Turney et al., 2001), Nawarla Gabarnmang (David et al., 2011), Nauwalabila (Bird et al., 2002; Roberts et al., 1994), Vilkuav (Summerhayes et al., 2010), and

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https://doi.org/10.1016/j.quascirev.2018.05.016

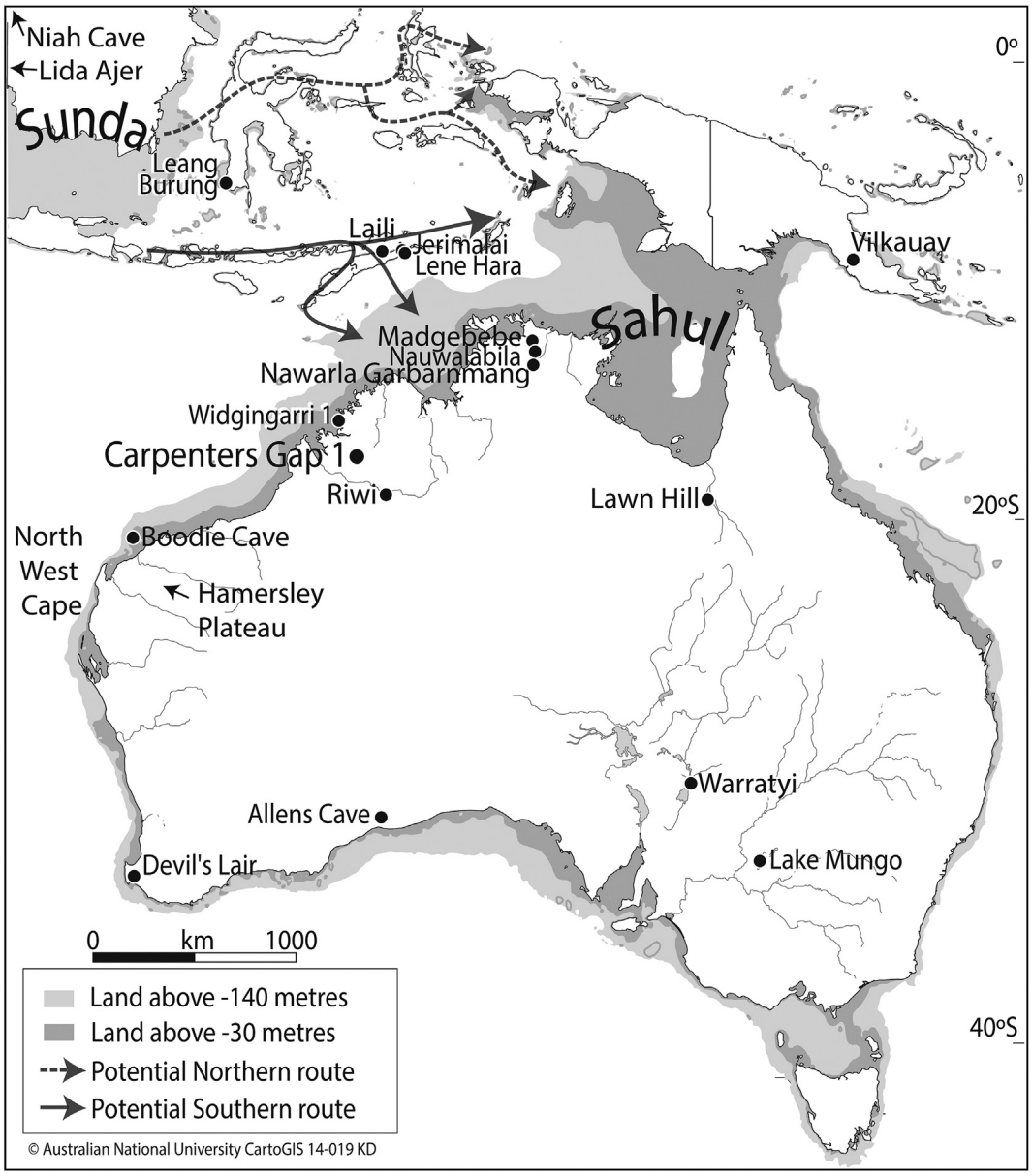

Fig. 1. Sunda and Sahul illustrating Pleistocene sites mentioned in text and possible migration routes.

Boodie Cave (Veth et al., 2017:23) ranging between about 50,000 and 44,000 BP. A detailed review of the dates can be found in Wood et al. (2016). Recent results from Madjedbebe has revealed a dense band of cultural material, coincident with first occupation of this site, occurring between '65.0+/− (3.7, 5.7) and 52.7+/− (2.4, 4.3) kyr' (Clarkson, 2006:309). The absence of dates of comparable antiquity in the islands to the north of Australia, from where colonisation should logically have proceeded, appeared to present a challenge to such an early colonisation of Sahul. However, shortly after the publication of the Madjedbebe dates, Westaway et al. (2017:2) reported ages of '68 ± 5 kyr (mean ± 1σ, age range 73–63 kyr)' for a human fossil at Lida Ajer, Sumatra Island, Indonesia. This new data for the age of Sahul colonisation also reveals that the first Australians co-occupied northern Australia with megafauna species for at least 20,000 years before the latter's extinction (Saltré et al., 2016; Van der Kaars et al., 2017).

At the time of initial colonisation of northern Sahul at ~65,000 years ago, climatic conditions were favourable for human habitation. In the inland savannah regions, rivers witnessed a peak in fluvial activity and the inland lakes of both northern and southern Australia, which are dry today, experienced lake full conditions (Johnson et al., 2016:3–4; Saltré et al., 2016:3). This evidence is taken to indicate a generally more humid climate with temperatures perhaps comparable to those of the Holocene (Van der Kaars et al., 2006:888). This is corroborated by the phytolith record derived from the bulk sediment samples recovered from CG1, which indicates that at the time of first occupation vegetation communities were similar to those seen in the vicinity of the site today with 'a high diversity of grass species and at least medium level rainfall' (Wallis, 2001:111).

Following this early period, drier and cooler conditions prevailed across the continent although with marked regional variability. Cooler conditions throughout Late MIS3 (35,000–32,000 BP) in northern Australia most likely resulted in decreased evaporation (Reeves et al., 2013). This period witnessed a peak in fluvial activity both in the north (Nanson et al., 2008; Veth et al., 2009) and