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Short communication

Preliminary site report of a stone jar burial in the Lao People's Democratic Republic

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ABSTRACT

For nearly a century, questions have remained as to the purpose and age of the Plain of Jars in the Lao People's Democratic Republic. Scholars have generally argued that these megaliths served a mortuary function, either as symbolic monuments or receptacles for the dead. However, due to a paucity of mortuary evidence associated with the jars, it has been difficult to conclusively argue either way. Aside from small amounts of cremated human bone fragments found within a limited number of jars, to date no substantive human burials have been found inside a stone jar across this vast megalithic landscape. Additionally, the stone jars are thought to date to the Southeast Asian Iron Age, between ca. 500 BCE-500 CE, with ritual activity continuing into the 13th century CE. This paper provides the first substantial evidence that the jars were used to contain the deceased for either primary or secondary burials during the 9th to 12th century CE.

1. Introduction

The Plain of Jars comprises over 120 megalithic jar sites distributed throughout the mountains and lower foothills of the central plain of the Xiang Khouang Plateau in the Lao People's Democratic Republic (Laos). These sites include boulders, carved disks, and most notably stone jars that range from one to three meters tall, weighing on average from 6 to 30 t (Colani, 1935; O'Reilly et al., 2018). Some of the larger sites have more than 300 stone jars, predominately carved from sandstone but occasionally conglomerate, granite or breccia (Skopal et al., 2023). They are part of a larger cultural phenomenon extending throughout northern Laos, reaching an area of ca. 8000 km^2 (Fig. 1) (Van Den Bergh and Luangaphay, 2008; Skopal et al., 2020; Skopal et al., 2023).

The chronology of these stone jars remains uncertain. The phenomenon is frequently associated with the Southeast Asian Iron Age, between ca. 500 BCE-500 CE, (Colani, 1935; Shewan et al., 2021). Recent analyses (radiocarbon and Optically Stimulated Luminescence) suggest placement of the jars may have commenced as early as the late 2nd millennium BCE, with ritual activity continuing into the 13th century CE (Shewan et al., 2021).

An additional challenge has been understanding the exact function of stone jars. Early interpretations suggested the jars were storage containers for provisions (Raquez, 1902), however scholars such as Colani (1935), Sayavongkhamdy and Bellwood (2000), Nitta (1996), Genovese (2015), and O'Rielly and Shewan (O'Reilly et al., 2019a) have since argued that they served a mortuary function, either as symbolic mortuary monuments or receptacles for the dead. This interpretation is primarily due to the presence of secondary pit burials, secondary ceramic burials and primary burials surrounding the jars at Site 1, which date between 9-13th century CE (Colani, 1935; Nitta, 1996; O'Reilly et al., 2019b). Two sites contain evidence to suggest they were vessels for the deceased: Site 1, where Colani (1935) identified small amounts of

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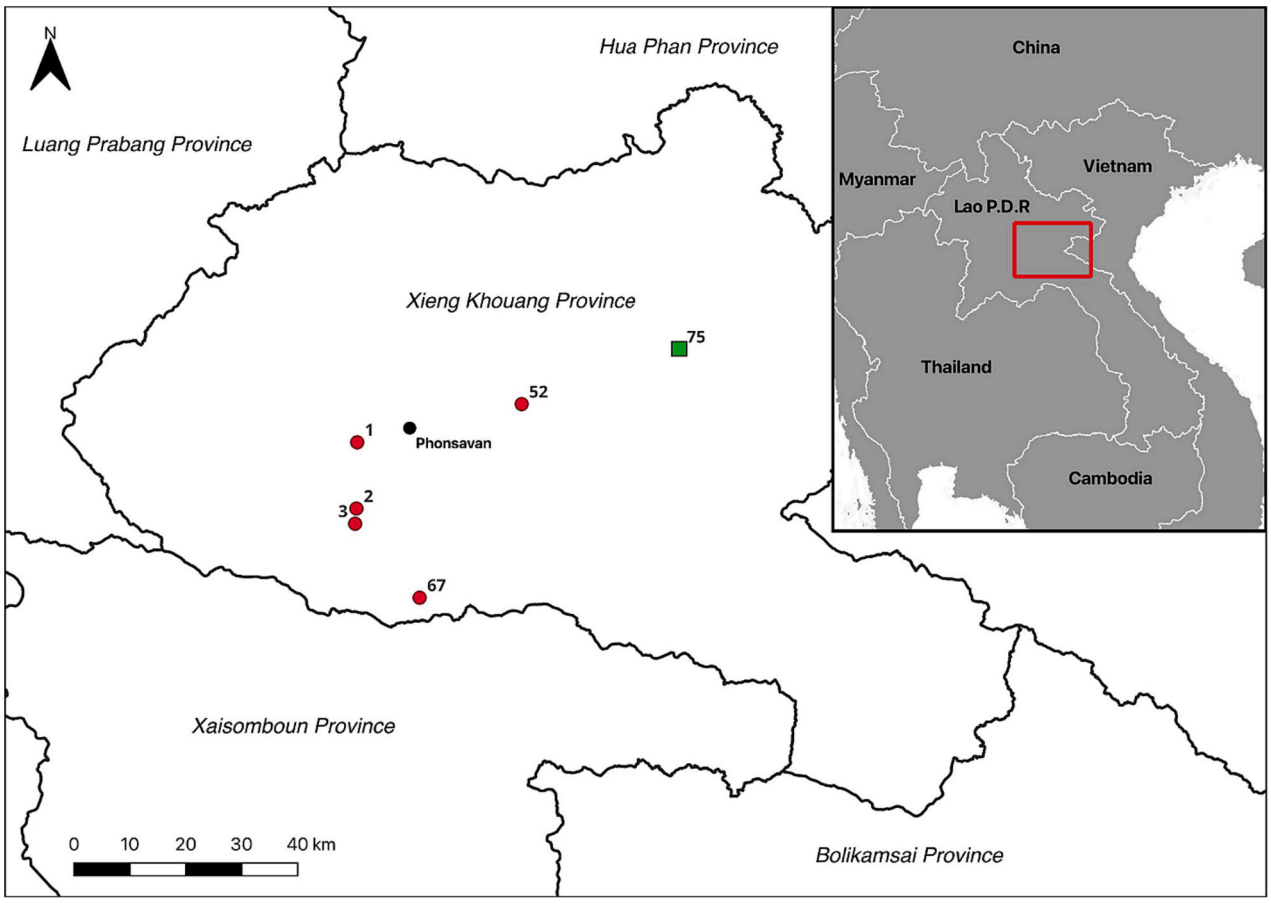

Fig. 1. Map of Plain of Jars sites 1, 2, 3, 52, 67 and 75 in Laos.

Fig. 2. Site 75 excavated jar.

burnt human bone fragments and teeth inside multiple jars; and Site 67, where excavations within and around a buried stone jar found material culture and fragmented cremated bone dated to the Iron Age and the historic period (post-1000 CE) (O'Reilly et al., 2022a). To date, no substantive human burials have been found inside a stone jar. These theories are, however, limited by the lack of research outside of the main

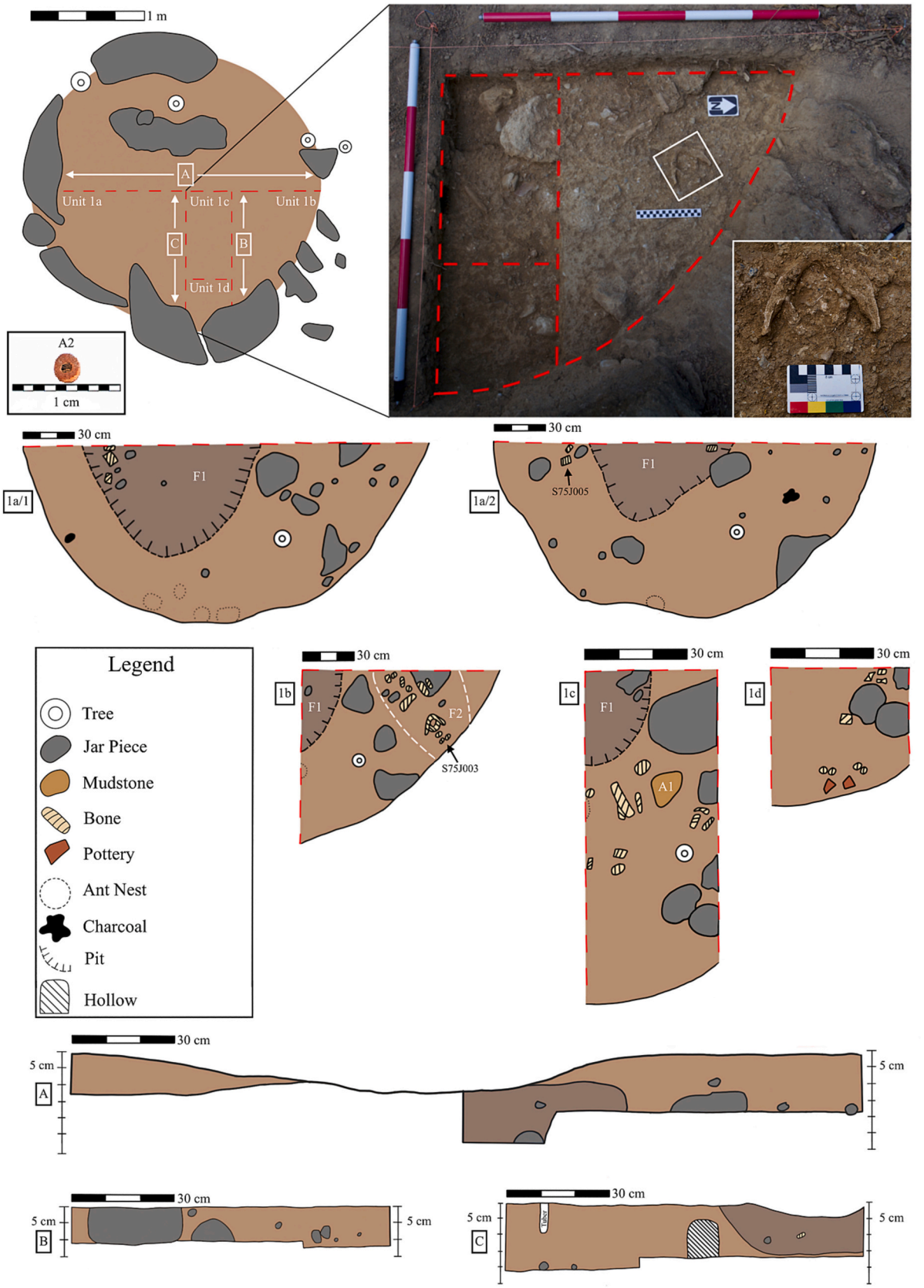

Fig. 3. Spit Maps and Stratigraphy for Unit 1 at Site 75, Plain of Jars (unit/spit).

Sample	Unit/ Spit	Sample ID	^{14}C age	Cal AD (95.4% probability)	Yield (mg)	Yield (wt %)	%C	%N	δ^{13}C % (VPDB)	δ^{15}N % (AIR)	C:N
Human Premolar	1d/5 (sieve)	S75J002	966± 21	1025-1157	6.7	19.9	36.9	13.8	-18.7	9.1	3.1
Human Molar	1b/3a	S75J003	964± 19	1036-1158	2.2	9.1	40.8	14.8	-17.6	10.3	3.2
Human Femur Diaphysis	1a/2	S75J005	962± 20	1027-1157	3.0	20.0	39.7	14.7	-17.7	10.6	3.2

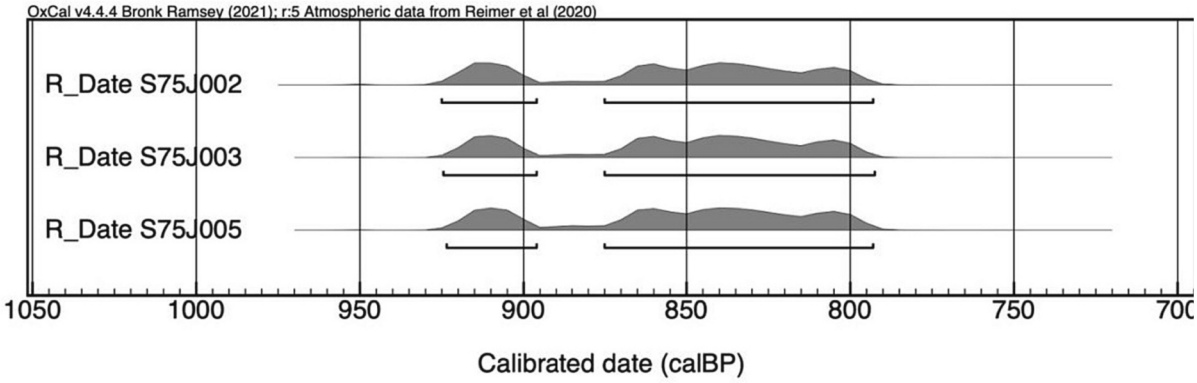

Fig. 4. Radiocarbon results for samples in Unit 1 at Site 75, Plain of Jars.

sites 1, 2, 3 and 52, which are predominately located around the Xiang Khouang Plateau (Colani, 1935; O'Reilly et al., 2019b; O'Reilly et al., 2022b; O'Reilly et al., 2023). Further, it is plausible that the purpose of these jars evolved over time.

This paper presents new evidence of mortuary activity from a test excavation inside one of the seven jars at Site 75, ca. 70 km northeast of Phonsavan. This is the most northeasterly jar site excavated to date. It was selected after reports that locals had discovered human remains inside the jar. The jar was damaged with its walls broken into large fragments, most likely caused by explosives (locally known as bombies) dropped during the Secret War from 1964 to 1973 (Fig. 2) (Van Den Bergh and Luangaphay, 2008).

2. Methods

The authors established a 2x1m trench (Unit 1) running north-east at 30° across the centre of the jar (Fig. 3). Due to time limits and available personnel, only a partial excavation of the jar was conducted, with the intention of a following field season. Excavation was undertaken using arbitrary 10 cm spits unless a stratigraphic layer was encountered. Features uncovered in each spit were labelled sequentially, and human remains were excavated using brushes and wooden implements. The excavated sediment was floated, using bucket flotation, to allow for archaeological plant macrofossils to be recovered and analysed. The light residue or 'flot' was captured in a 200 μm flot bag, and the heavy residue was wet-sieved through a 2 mm screen. After the excavation of Spits 1 and 2 of Unit 1, the unit was subdivided into four sub-units: Unit 1a, 1b, 1c and 1d, to gain greater spatial resolution across the jar (Fig. 3). Three samples - two human teeth and one human bone - were radiocarbon dated by the Australian National University (Fallon et al., 2010; Wood et al., 2023). Collagen was purified using ultrafiltration and the dates were calibrated against IntCal20 in OxCal v.4.4 (Ramsey, 2009; Reimer et al., 2020).

3. Results

The excavation reached a depth of 40 cm in Unit 1d, with all units comprising only one stratigraphic layer. Due to the limited excavation, it is difficult to determine if the context remains in situ. There is evidence of some disturbance in the centre of the jar, labelled Feature 1 (Fig. 3). This is the likely point of intrusion by locals, measuring 50 by 40 cm in size, with an excavated depth of 30 cm. Two bombie fragments were uncovered in Spit 1, Unit 1d, which suggests additional disturbance of the jar deposit.

Fragmented human remains were found across the five subunits, ranging in size from 0.5 to 4 cm in length. Preliminary analysis suggests that these fragments represents mature bones, femur diaphysis, a well preserved mandible with occluded M_3s, cranial fragments and four permanent teeth. At this stage of the investigation none of the fragments yielded evidence of burning. Most of the bones have been found commingled in Feature 2, which is characterised by more compact sediment intermixed with small stones and pebbles (Fig. 3). This feature does suggest some evidence of stratigraphic integrity within the jar and highlights the potential continuation of the context. Human remains have been directly radiocarbon dated, including a molar, a premolar and a femur diaphysis giving dates in the range of c. 900 CE–1200 CE (see Fig. 4 for details). Further skeletal analysis and publication to follow once excavations conclude.

While detailed analysis of raw materials will be reported elsewhere (Skopal et al., 2023 in prep.), a broad overview can be presented here. Artefacts include four small earthenware pottery sherds, a glass bead (A2), a quartz crystal and a flat piece of mudstone (A1). The earthenware sherds were examined under low-powered magnification. All four sherds feature a plain, black/brown slip on both surfaces. Their fabric is composed of medium sand-sized mineral temper (Wentworth, 1922) from a sedimentary lithic source (likely sandstone) but petrographic examination would be required to confirm this beyond doubt. The

colour range exhibited across the sherd fabrics (including orange-red, red-brown, or black-brown) indicates use of varied clay sources. However, colour is uniform through the section of each sample, suggesting that the sherds were fired at low temperatures and under oxidised atmospheric conditions allowing for complete combustion. This is consistent with the use of an open firing technique such as a pit kiln or bonfire (Santacreu, 2014: 106) and may explain the considerable erosion of the sherds. Preliminary analysis suggests that the glass bead (Fig. 3, A2) is typical of the Indo Pacific tradition (Dussubieux and Walder, 2022). It is an orange colour, measuring ca. 2 mm in diameter. Within Unit 1c was a flat piece of smooth mudstone (A1) ca. 12 by 5 by 1 cm in size (Fig. 3). Finally, a small quartz piece measuring ca. 60 by 50 mm was uncovered in Unit 1c, which is similar to those found associated with the burials at Site 1 (O'Reilly et al., 2022a).

4. Conclusions

Preliminary excavations at Site 75 have revealed the first substantive evidence for uncremated human remains inside the Lao stone jars. The disturbances make it difficult to confidently assess the nature of the deposit and to associate the accompanying cultural material with the human remains. However, it is plausible that the concentration of bones contained within Feature 2, and examples (Colani, 1935; O'Reilly et al., 2019a) of earthenware products and glass beads found within burials at Site 1, could suggest that these commingled human remains represent a burial. The absence of cremated human remains suggests that the jars may have been used for a more complex mortuary practice than previously identified.

This paper provides further insight into chronology of stone jars and associated human remains. Initial results suggest that the stone jar at Site 75 was used for mortuary purposes during the 9th to 12th century CE. The dates align with mortuary activity surrounding the jars at Site 1 and buried jars at Site 67. They are, however, contrary to the suggested Iron Age dates for standing jars (Shewan et al., 2021). Further research is required to determine if the jar was potentially repurposed for burials at a later date or was carved during the 9-12th century CE with the intention as a repository for burials.

CRediT authorship contribution statement

Nicholas Skopal: Writing – original draft, Methodology, Investigation, Conceptualization. **Souliya Bounxaythip:** Writing – original draft, Methodology, Conceptualization. **Charlie Cooper:** Investigation, Writing – original draft. **Baptiste Pradier:** Formal analysis, Investigation, Writing – review & editing. **Tracey Pilgrim:** Writing – original draft, Formal analysis. **Tahlia Stewart:** Writing – original draft, Formal analysis. **Anna Florin:** Investigation, Writing – review & editing. **Tate Devantier-Thomas:** Investigation, Writing – review & editing. **Daniel Baker:** Investigation, Visualization. **Sophie Philip:** Investigation, Writing – original draft, Writing – review & editing.

Declaration of competing interest

None.

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References

Colani, M., 1935. Ḿ egalithes du Haut-Laos (Hua Pan, Tran Ninh). É cole Française d'Extrême-Orient. XXXV, Paris.
Dussubieux, L., Walder, H., 2022. The Elemental Analysis of Glass Beads: Technology. Leuven University Press, Chronology and Exchange.
Fallon, S., Fifield, L., Chappell, J., 2010. The next chapter in radiocarbon dating at the Australian National University: status report on the single stage AMS. Nuclear Instruments and Methods in Physics Research Section B: Beam Interactions with Materials and Atoms 268 (7–8), 898–901.
Genovese, R., 2015. The Plain of Jars of North Laos: beyond Madeleine Colani. Doctoral dissertation, SOAS, University of London.
Nitta, E., 1996. Comparative study on the jar burial traditions in Vietnam, Thailand and Laos. Historic. Sci. Rep. 43, 1–19.
O'Reilly, D., Shewan, L., Van Den Bergh, J., Luangaphay, S., Luangkhoth, T., 2018. Megalithic jar sites of Laos: a comprehensive overview and new discoveries. J. Indo-Pacific Archaeol. 42, 1–31.
O'Reilly, D., Shewan, L., Domett, K., Halcrow, S., Luangkhoth, T., 2019a. Excavating among the megaliths: recent research at the 'plain of jars' site 1 in Laos. Antiquity 93 (370), 970–989.
O'Reilly, D., Shewan, L., Khamphouvong, M., Butphachit, A., 2019b. Research at megalithic jar site 52 and the discovery of new jar sites in Xieng Khouang Province, Laos. Asian Archaeol. 3 (1–2), 21–33.
O'Reilly, D., Shewan, L., Khamphouvong, M., Butphachit, A., Luangkoth, T., Skopal, N., Bounxayhip, S., 2022a. Ban Pha Tai: the excavation and dating of a buried megalithic jar in Xieng Khouang, Lao PDR. Archaeol. Res. Asia 29, 100336. https://doi.org/10.1016/j.ara.2021.100336.
O'Reilly, D., Shewan, L., Luangkhoth, T., Butphachit, A., Khamphouvong, M., 2022b. Further excavations among the megaliths: research at plain of jars site 2 in Laos. J. Indo-Pacific Prehistory Associat. 46 (1), 1–16.
O'Reilly, D., Shewan, L., Luangkoth, T., Domett, K., Halcrow, S., Khamphouvong, M., Butphachit, A., Sayavongkhamdy, T., Natasha Heap, N., 2023. Secondary burial practice at megalithic jar site 1. Plain Jars Laos Asian Archaeol. 7 (1), 105–117.
Ramsey, C.B., 2009. Bayesian analysis of radiocarbon dates. Radiocarbon 51 (1), 337–360.
Raquez, A., 1902. Pages laotiennes: le haut-Laos, le moyen-Laos, le bas-Laos. Schneider.
Reimer, P., Austin, W., Bard, E., Bayliss, A., Blackwell, P., Ramsey, C., Butzin, M., Cheng, H., Edwards, R., Friedrich, M., Grootes, P., 2020. The IntCal20 northern hemisphere radiocarbon age calibration curve (0–55 cal kBP). Radiocarbon 62 (4), 725–757.
Santacreu, A., 2014. Materiality, Techniques and Society in Pottery Production: The Technological Study of Archaeological Ceramics through Paste Analysis. De Greuter Open, Warsaw/Berlin.
Sayavongkhamdy, T., Bellwood, P., 2000. Later prehistoric cultures of island and mainland Southeast Asia. Recent archaeological research in Laos. Bull. Indo-Pacific Prehistory Associat. 19, 101–110.
Shewan, L., O'Reilly, D., Armstrong, R., Toms, P., Webb, J., Beavan, N., Luangkhoth, T., Wood, J., Halcrow, S., Domett, K., Van Den Bergh, J., Chang, N., 2021. Dating the megalithic culture of Laos: radiocarbon, optically stimulated luminescence and U/Pb zircon results. PLoS One 16, 3.
Skopal, N., Bounxaythip, S., Shewan, L., O'Reilly, D., Luangkhoth, T., Van Den Bergh, J., 2020. Jars of the jungle: a report on newly discovered and documented megalithic jar sites in Lao People's Democratic Republic. Asian. Archaeology 3, 9–19. https://doi.org/10.1007/s41826-020-00030-6.
Skopal, N., Bounxaythip, S., O'Reilly, D., Shewan, L., Luangkhoth, T., Van Den Bergh, J., 2023. A field work report on newly discovered and documented megalithic jar sites in the Lao People's Democratic Republic. Asian Archaeol. 7 (2), 221–233. https://doi.org/10.1007/s41826-023-00071-7.
Van Den Bergh, J., Luangaphay, S., 2008. Plain of Jars Archaeological Landscape: Heritage Management Plan. Unpublished report submitted by Safeguarding Plain of Jars project for review to the National Heritage Department of the Ministry of Information, Culture and Tourism.
Wentworth, C.K., 1922. A scale of grade and class terms for clastic sediments. J. Geol. 30 (5), 377–392.
Wood, R., Esmay, R., Usher, E., Fallon, S., 2023. Sample preparation methods used at the Australian National University Radiocarbon Facility. Radiocarbon 65 (2), 573–589.