## 1.0 Introduction:

The national territory of the Union of the Republic of Myanmar ('Myanmar') constitutes the sub-Himalayan corridor for terrestrial human interactions from Initial Human Colonisation to the present-day. As such, the Myanmar chronological sequence is of critical importance for understanding the interconnectedness of East and South Asian developments, as well as those in the rest of Mainland and Island Southeast Asia ('MSEA' & 'ISEA')(e.g. Bellwood 2005). In 2018 we published the first radiometric sequence for late prehistoric Myanmar, based on the 2014-16 seasons of the Franco-Myanma team of the *Mission Archéologique Française au Myanmar* ('MAFM') at the Late Neolithic and Early-Mid Bronze Age sites of the Oakaie/Nyaung'gan complex on the eastern bank of the Chindwin River in north-central Myanmar's Sagaing Division (Figure 1, Pryce *et al.* 2018a). With this paper, we consolidate and expand the central-northern Myanmar chronology with 94 new $^{14}$C dates spanning the Neolithic to Bagan periods, early 3rd millennium BC to early 2nd millennium AD. The samples dated come from five locations (eight trenches, of which three exclusively settlement, and the remainder mixed funerary and settlement remains) excavated by the MAFM during the 2017-20 seasons at Halin (Figure 2), the iconic and nominally Pyu culture (ca 1st to 9th c. AD) site complex on the western flanks of the Irrawaddy.

Covering an area of ca. 540 hectares, Halin is the smallest of the three Pyu city-states that received WHC/UNESCO-listed status in 2014 (Myint Aung 1970, see also https://whc.unesco.org/en/list/1444/). Sriksetra, the largest (1857 ha) and southernmost city-state, is located 8 km east of the Irrawaddy near Pyay (Figure 1). Long famous for its monumental brick architecture, concentric hydraulic and defence systems, and rich and heavily Indianised material culture (e.g. Stargardt 1990), recent excavations have revealed extensive domestic contexts and provided more radiometric dating for the Iron Age phase immediately preceding the Pyu (Stargardt 2016). Beikthano is the next largest site (ca. 850 ha) and is located 130 km NNE of Sriksetra, at the confluence of the Sadon and Yanpe tributaries of the Irrawaddy, which runs its closest 29 km to the WSW (Figure 1). Beikthano was also studied extensively during the 20th century (Stargardt 2016) and the limited radiocarbon dates suggest a full 1st millennium AD Pyu occupation (Hudson 2012). Finally, Halin, a further 277 km NNE from Beikthano, is the smallest of the Pyu city-states[1] but is notable for having extensive evidence for Neolithic, Bronze Age and Iron Age occupation (see SM1 for former excavations). Halin was thus a natural target for the MAFM team, offering the chance to investigate, in reverse chronological order: the full duration of the Pyu civilisation, the transition to and development of that state, the socio-political and socio-economic evolutions of the Iron and Bronze Ages, and possibly the origins of agriculture at the dawn of the Myanmar Neolithic.

Halin is located on Upper Miocene – Pliocene sedimentary rocks of the Irrawaddy Formation (Soe Thura Tun *et al.* 2014), at the northern boundary of Myanmar's 'arid, steppe, hot' (BSh) with the 'tropical, savannah' (Aw) Köppen–Geiger climate classification zones. As with most of Myanmar's known major sites, including Bagan, it probably rose on the economic back of irrigated agriculture. Halin's soils are loamy with occasional bands of clay, with a base of sand, clay and white calcareous gravel and boulders. Halin is not immediately adjacent to a natural water course. The Mu River runs north-south ca. 26 km to the west and the Irrawaddy similarly oriented ca. 15 km to the east. Halin also shares with Sriksetra the particularity of being situated at a hot spring, so often figuring as special places in cultures around the world. In Halin these springs are a major source for common salt due to its efflorescence in the local soils. Establishing the antiquity of salt production and its relation to

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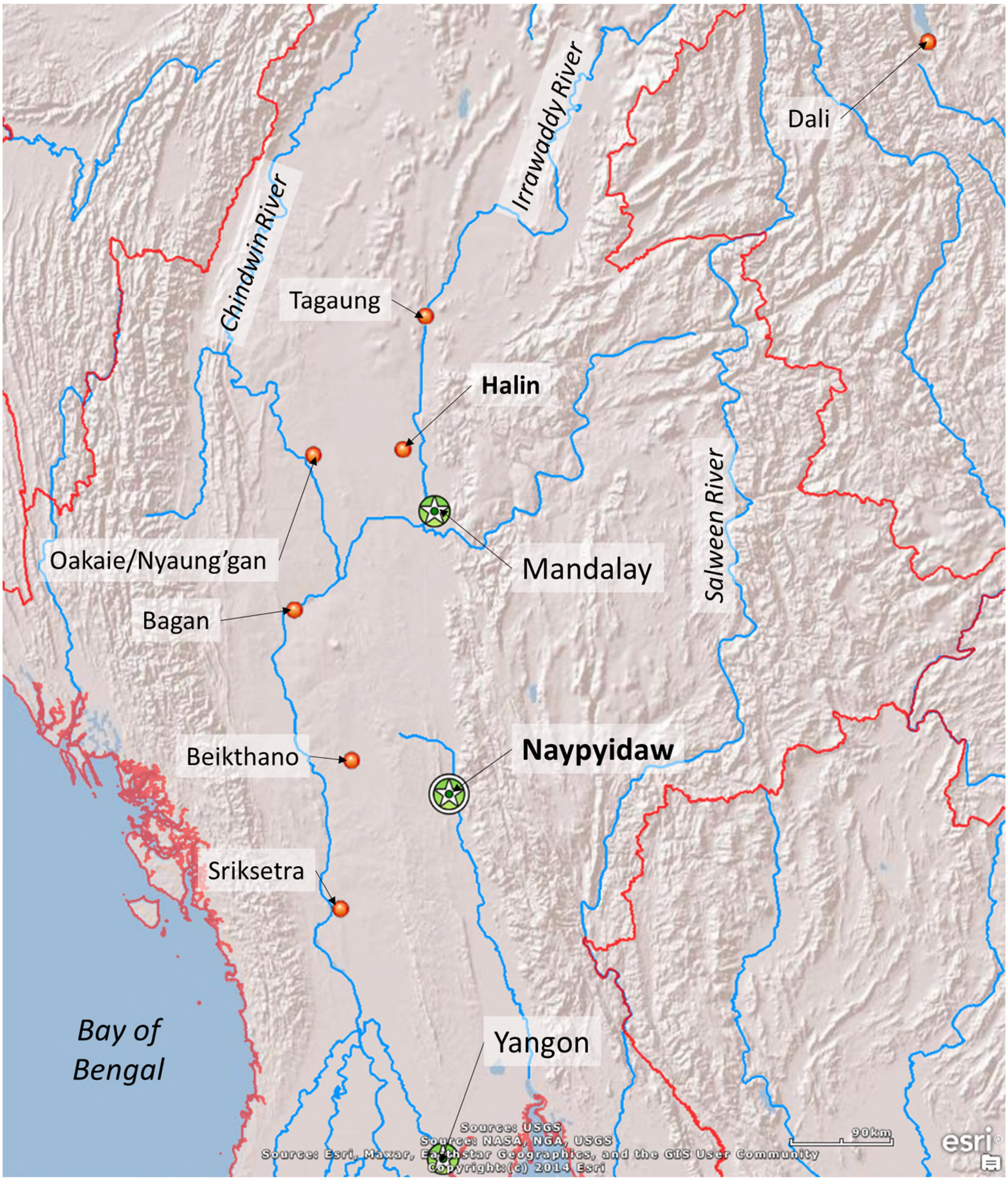
[1] Tagaung is also known to have been a Pyu site, a further 115 km NNE from Halin, and is the subject of several origin chronicles/myths (Hudson 2012; Stargardt 2016).

food preservation and Halin’s location, away from a major axis of communication, is a major task for the MAFM.



Source: USGS
Source: NASA, NGA, USGS
Source: Esri, Maxar, Earthstar Geographics, and the GIS User Community
Copyright:(c) 2014 Esri

*Figure 1: North-central Myanmar, showing the capital and major cities and rivers, plus principal sites mentioned in the text.*

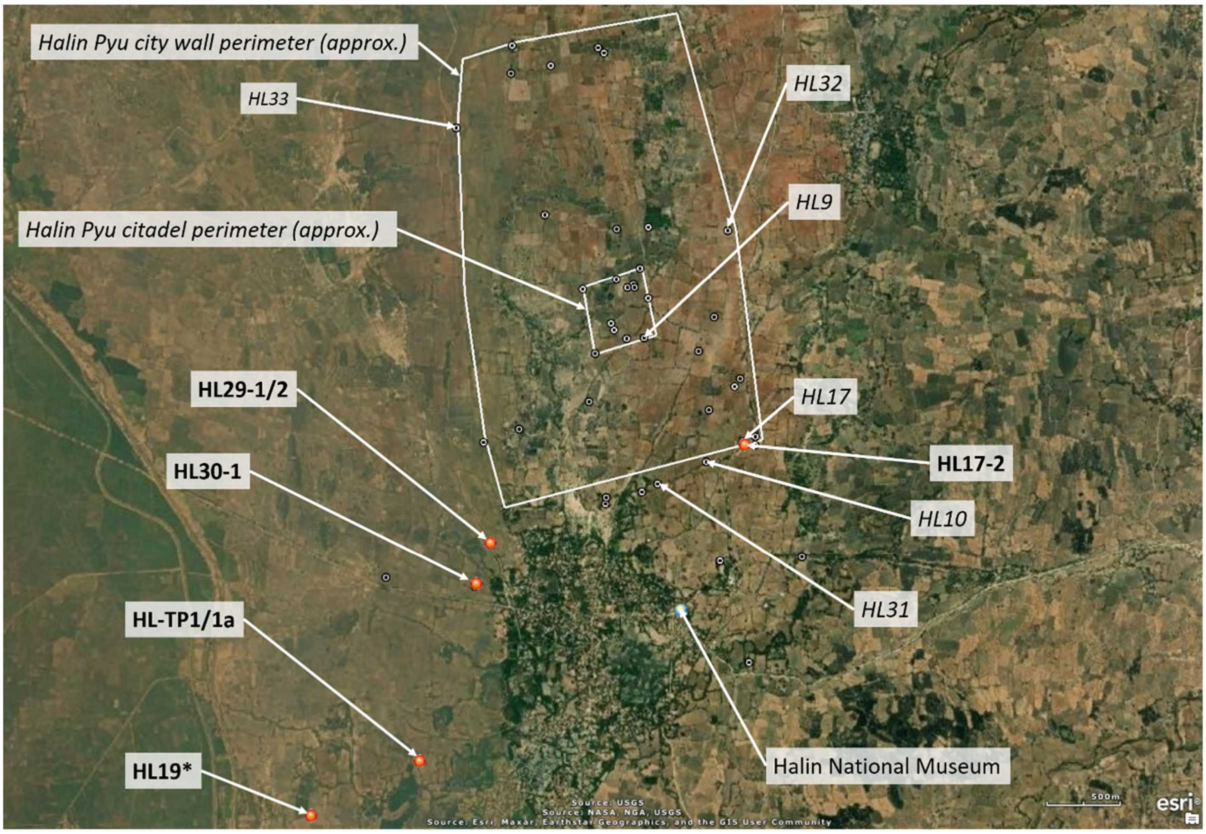


*Figure 2: Satellite image showing Halin, with the city and citadel perimeters in white, as well as locations excavated by MoRAC (black dots, those with $^{14}$C dates labelled in italics) and MAFM (red dots with bold labels). Scale bottom right is 500 m.*

## 2.0 MAFM excavations

The MAFM's aims at Halin were wide, to provide the fullest possible reconstruction of life and industry, environment and economy, and death and health for a large site complex with substantial time-depth. As such, many specialist studies are ongoing as student or professional research projects, but even if their complete data were available, they would be scarcely usable without a reliable chronological framework. Prior to our work at Halin, there were twelve radiocarbon dates, three of which were obtained in the 1960s with large error margins. These were typically single determinations per site, for an archaeological landscape that covers 25 km² at a bare minimum, with a date range spanning a potentially precocious early/mid 3rd millennium BC Neolithic (HL19*) to the early 2nd millennium AD Bagan period (HL19). We do not claim to have perfected Halin's chronology but in multiplying the available dates tenfold we certainly believe the resolution to be there, when combined with stratigraphic (especially funerary) and material culture (especially pottery) data, for fruitful intra and inter-site interpretation and extrapolation to adjacent regions.

### Digging and dating approaches

Our excavations were executed on the basis of 4 x 4 m squares, the multiplication of which depended upon the anticipated depth of the deposit and the time available. Prehistoric archaeology in MSEA tends to be funerary focused, and since its inception in 2001, the MAFM has employed the *anthropologie de terrain* approach to understanding cemeteries (e.g. Duday *et al.* 1990). This 'field anthropology', wherein a firm understanding of human anatomy and decomposition processes allows for a fine-grained reconstruction of the original burial, can identify whether individuals were buried 'as is', wrapped in a shroud or enclosed in a coffin, which in addition to grave good analysis can be used to detect similarities and differences in burial practices in fine detail, which might relate to use by different populations or sub-populations (ethnicities, migrants, ranking etc), or critical to the current paper's chronological focus, prolonged use (intra-site sub-phasing) . All MAFM-excavated individuals were carefully exposed and recorded in situ and have, since 2015 when the lifting of skeletons was first permitted nationally, been subjected to thorough cleaning and multi-factor metric recording by the team anthropologists in the field laboratory, for comparison with standard and regionally-focused databases to establish sex, pathology and age of death (cf. Pradier *et al.* 2019). Further laboratory analyses (diet, mobility, aDNA etc) were carried out on exported skeletal samples and all grave goods were studied according to the *chaîne opératoire technique* by team specialists, and will be published separately.

In terms of settlements, heavy vegetation and monsoonal erosion/deposition are often cited for the difficulty of MSEA site detection and excavation, respectively. However, judicious mattocking combined with attentive trowelling of monsoon-washed grey soils can and does reveal features to allow excavation by context, postholes, hearths, middens etc (e.g. Oxenham *et al.* 2011; Pryce *et al.* 2018a). When layers could not be followed in plan, arbitrary spits of 100 mm were removed until features were again revealed and context numbers harmonised to provide a full recording. See SM2 for descriptions of MAFM excavations.

Regional cemeteries generally do not furnish macro-charcoal, identifiable in the field during excavation. Neither does our skeletal material conserve sufficient collagen to allow for direct dating, and apatite dating of human teeth and bone has not given us satisfactory results (Pryce *et al.* 2013, 2018a and tested again at HL29-1 in 2017). We are, therefore, largely constrained to cross-dating the charcoal-bearing settlement sites with the charcoal-deficient cemeteries using pottery studies. So far this has proven effective and, crucially, allows us to build regional techno-typological chronologies for sites that have not had any successful radiometric dating (e.g. Favereau *et al.* 2018). Other materials, like copper-base metals (Pryce *et al.* 2018b) and glass (Dussubieux & Pryce 2016) may offer insights on phase attribution, but pottery analysis remains the mainstay for chronology construction.

Routine recovery of organic material was carried out by washover bucket flotation, collecting light fractions with 0.25 mm mesh. Minimum sampling of large contexts, identifiable features or arbitrary spits, was 40 kg, whereas postholes, grave fill, grave good pottery contents and the abdominal volume of individuals were 100% floated. Dried samples were exported to the UCL Institute of Archaeology for sorting of seeds and micro-charcoal, with eventual identification for the former. This paper concentrates on the dating benefits of flotation, with detailed archaeobotanical results forthcoming.

## Phasing and ceramic techno-typology

Critical to our dating efforts, the Halin ceramics were analysed using the French technological approach (Roux 2019). In practice, this amounts to identifying the traces and features on surfaces and sections formed when the ceramic paste was manipulated during vessel manufacture. Every excavated sherd was studied in the field with the naked eye, a x10 magnifying glass and a x10-200 binocular microscope, and classified traceologically. These ways of making ceramics can be interpreted, for spatially and/or chronologically contiguous populations, in terms of communities of practice. Finally, the ceramic forms and decorations were taken into account to assess whether the same forms mean the same community (traces and forms the same) or stylistic transfer (traces are different but forms are the same). A publication devoted to Halin pottery is forthcoming, as some of the assemblages were not fully studied prior to February 2021, but we provide a basic description in SM3. In summary, there appear to be some marked technological continuities throughout the pottery assemblage, which suggests a certain stability of the local population. The pottery of different periods can be usefully compared across different sites within Halin (Figure 4), and without; namely the Oakaie/Nyaung'gan area for Neolithic and Bronze Age material, the Samon Valley for Iron Age material, Sriksetra and Beikthano for Pyu period material, and Bagan for material of that period.

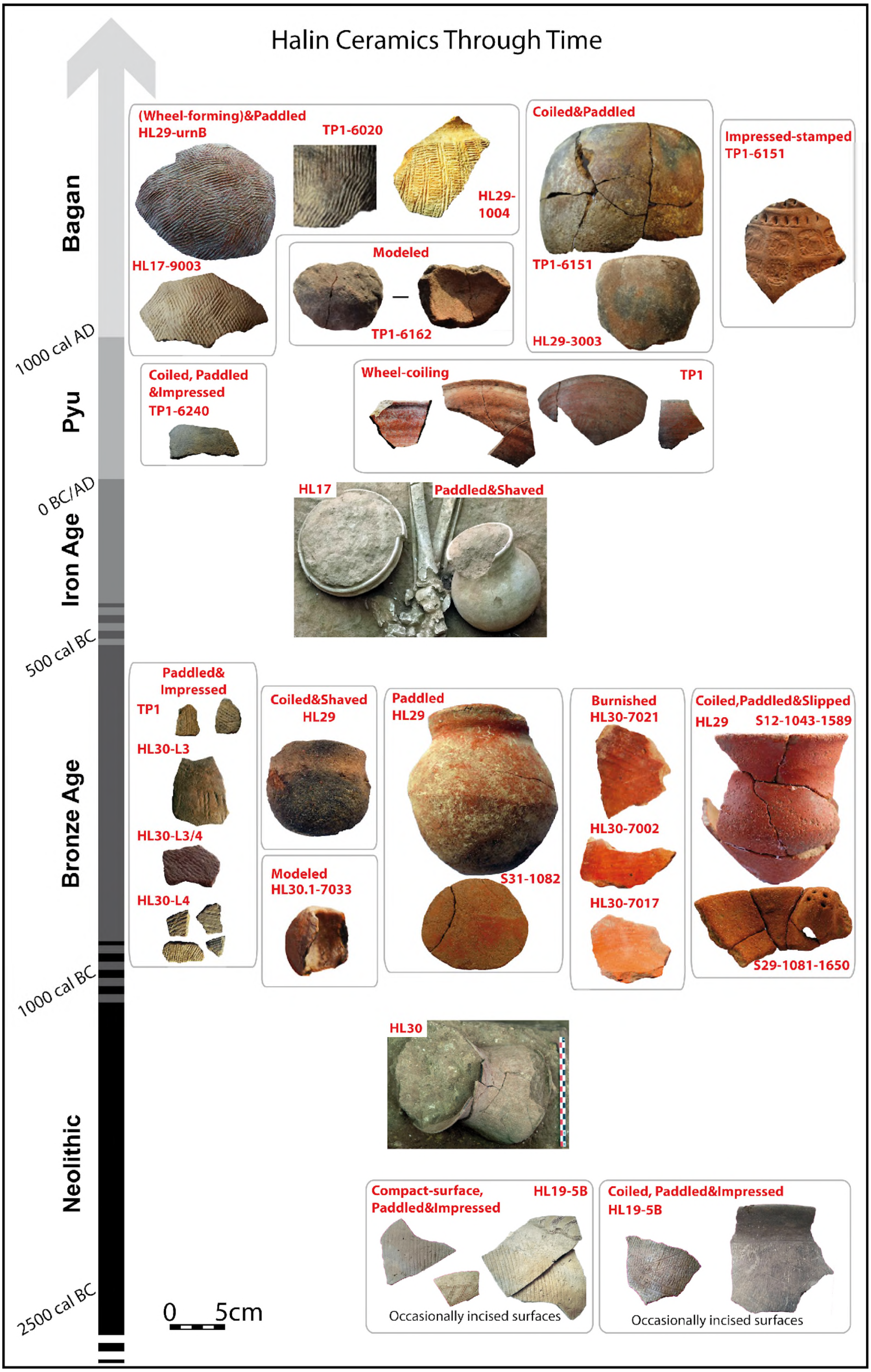

Halin Ceramics Through Time
Bagan
1000 cal AD
Pyu
0 BC/AD
Iron Age
500 cal BC
Bronze Age
1000 cal BC
Neolithic
2500 cal BC
(Wheel-forming)&Paddled
HL29-urnB
TP1-6020
HL29-1004
HL17-9003
Modeled
TP1-6162
Coiled&Paddled
TP1-6151
HL29-3003
Impressed-stamped
TP1-6151
Coiled, Paddled &Impressed
TP1-6240
Wheel-coiling
TP1
HL17
Paddled&Shaved
Paddled& Impressed
TP1
HL30-L3
HL30-L3/4
HL30-L4
Coiled&Shaved
HL29
Modeled
HL30.1-7033
Paddled
HL29
S31-1082
Burnished
HL30-7021
HL30-7002
HL30-7017
Coiled,Paddled&Slipped
HL29
S12-1043-1589
S29-1081-1650
HL30
Compact-surface, Paddled&Impressed
HL19-5B
Occasionally incised surfaces
Coiled, Paddled&Impressed
HL19-5B
Occasionally incised surfaces
0 5cm

*Figure 3: Preliminary techno-stylistic pottery sequence for Halin, showing examples of major technical groups and their context.*

## Bayesian modelling of radiocarbon dates

To interpret our corpus of radiocarbon determinations we applied a Bayesian statistical approach, using OxCal 4.4 (Ramsey, 2009a) software and the INTCAL20 calibration curve (Reimer *et al.*, 2020). The basis of the method is the integration of prior information, in the case of Halin principally via the excavated stratigraphic/cultural sequences, along with the radiocarbon likelihoods, or calibrated ages. We built a series of models reflecting the stratigraphic sequence in the various excavated areas that contained significant numbers of determinations and confident stratigraphic information (these include areas HLTP1, HL29, HL30, HL19 and HL17). Several excavated areas have very few radiocarbon dates and were therefore left to one side. We applied boundaries to account for the transition between one phase and another, and double boundaries which reflect an unknown span of the time elapsing between those various phases, for example in the form of a sterile layer. We applied an outlier detection approach to explore the extent to which different likelihoods produced results at odds with their stratigraphic position (Ramsey, 2009b). We used a modified Charcoal outlier model termed Charcoal Plus (after Dee and Bronk Ramsey, 2014) as well as a General outlier model, with the prior probability function set at 0.05. In some instances, for example when modelling dates of tooth enamel, we increased the outlier probability to 0.4. In the Charcoal Plus models the outlier probability was automatically set to 1.00 to reflect the possibility that all charcoal determinations contain a non-systematic inbuilt age bias (Dee and Bronk Ramsey, 2014). Outliers of significance were downweighted in the model as a function of the extent of the posterior probabilities. Each excavation-based Bayesian model built is described in SM4 along with the model codes and results (Figures 4-8).

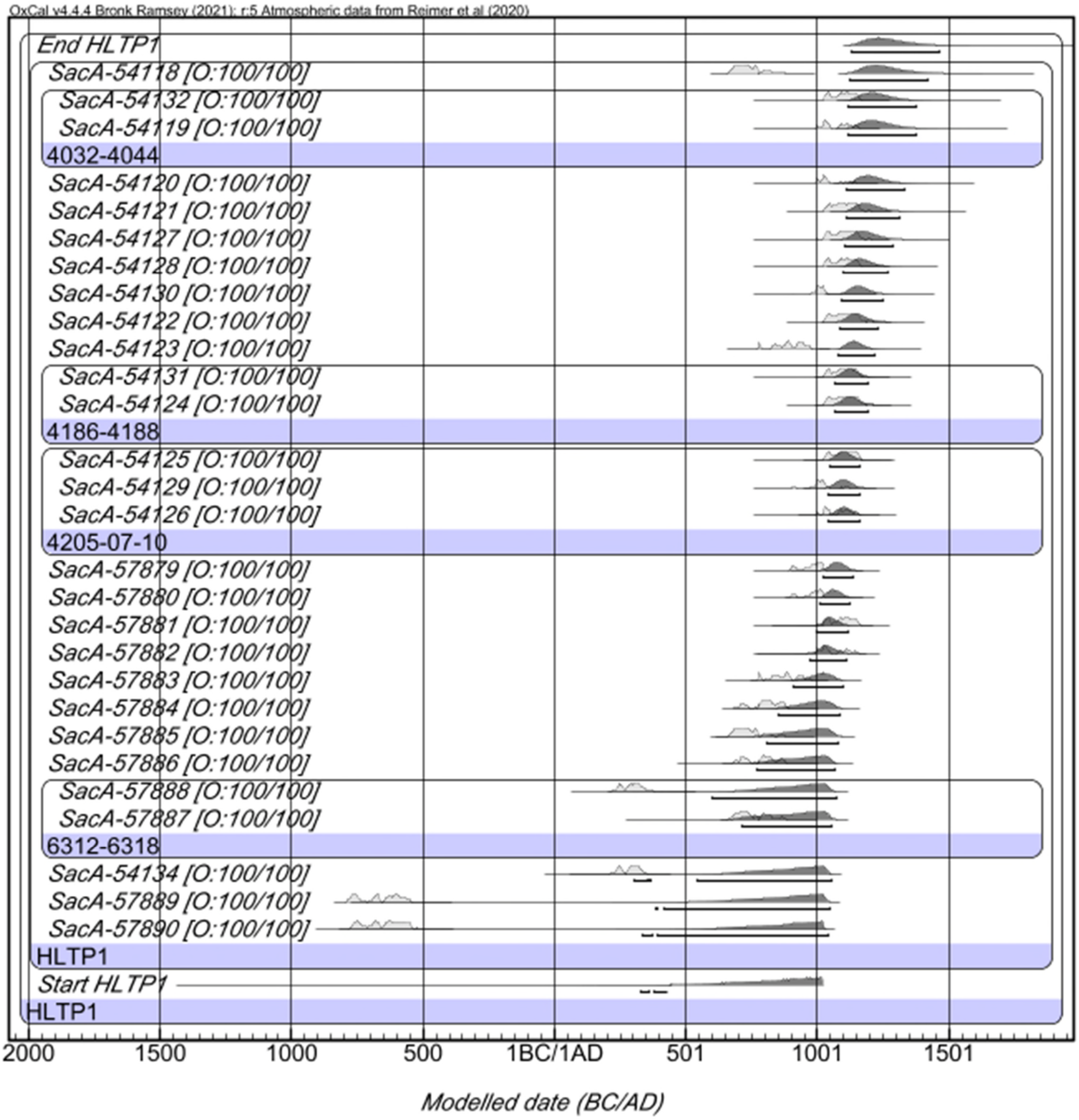


*Figure 4: Bayesian model for area HLTP1. Modelled data post MCMC is shown in dark outline, lighter shades indicate the radiocarbon likelihoods or single calibrated age ranges. Outlier values are shown in the form (Outlier [posterior]; Outlier [prior]).*

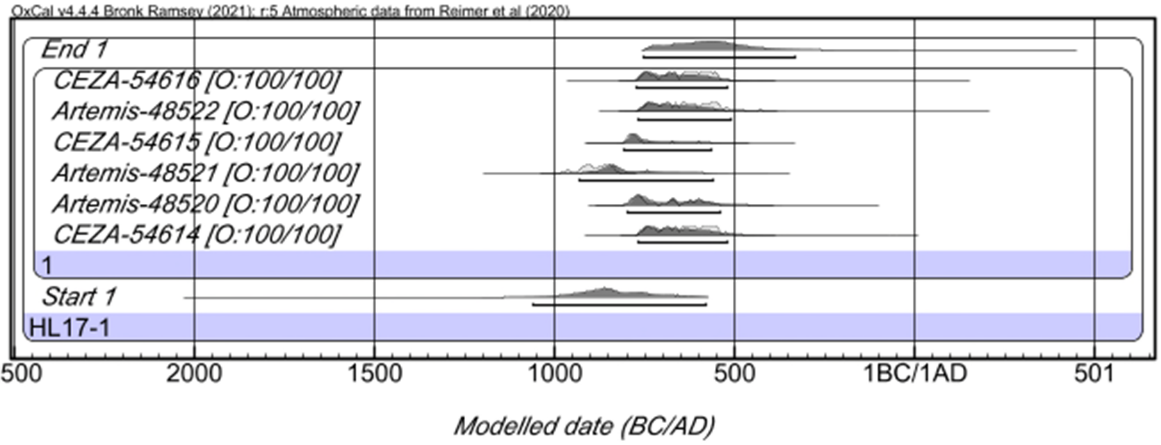


*Figure 5: Bayesian model for location HL17.*

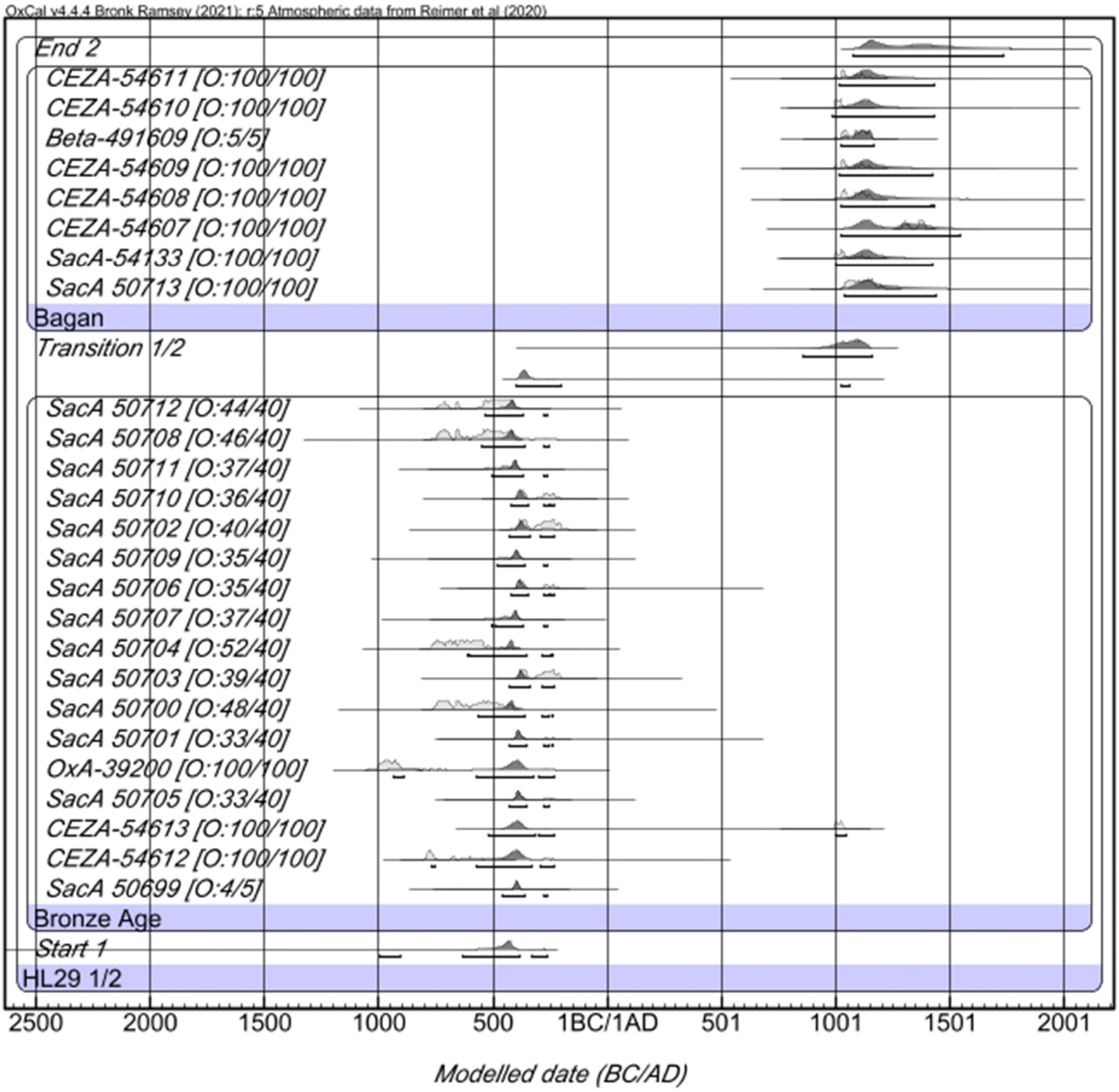


*Figure 6: Bayesian model for area HL29 1/2.*

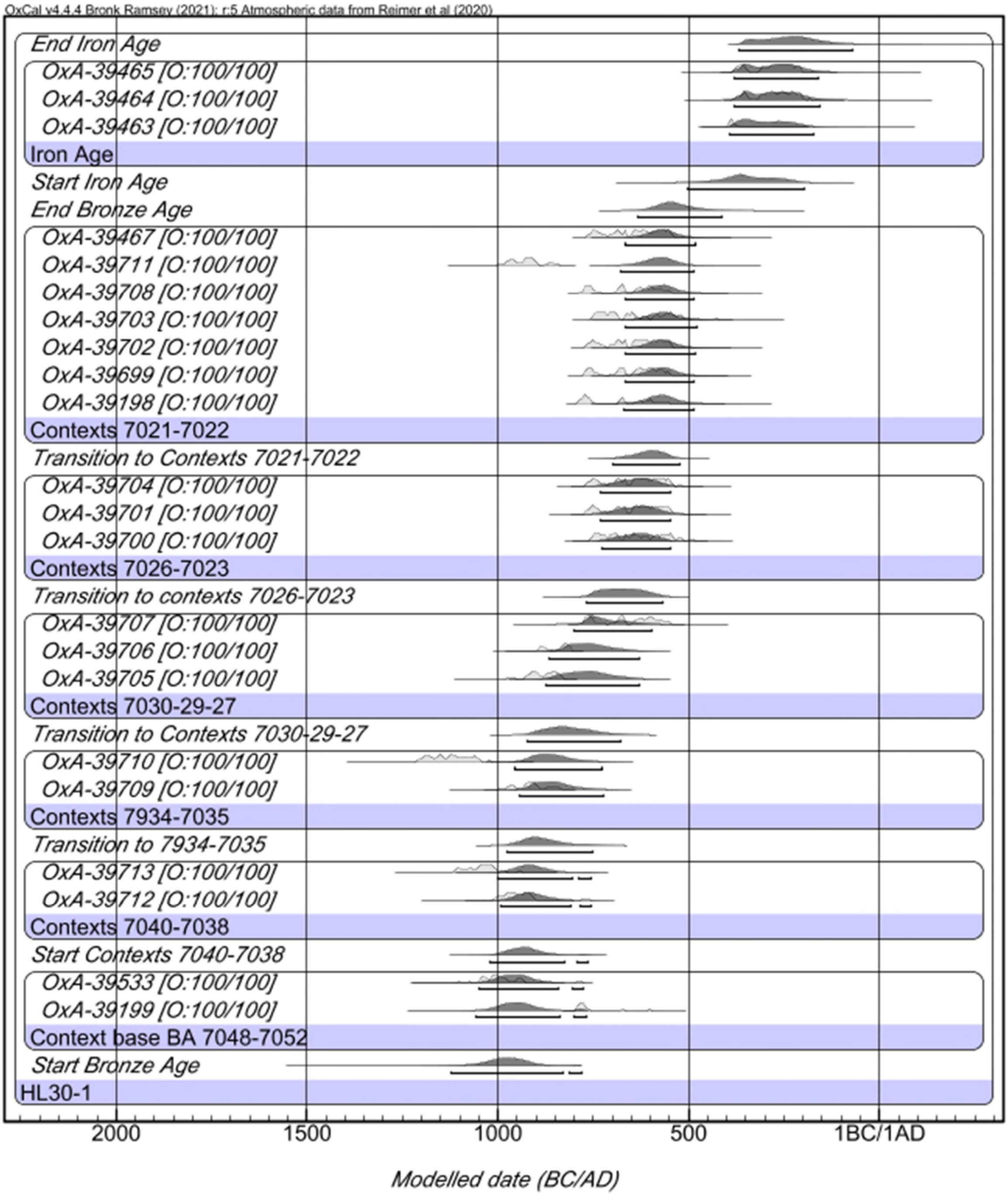


*Figure 7: Bayesian model for area HL30-1.*

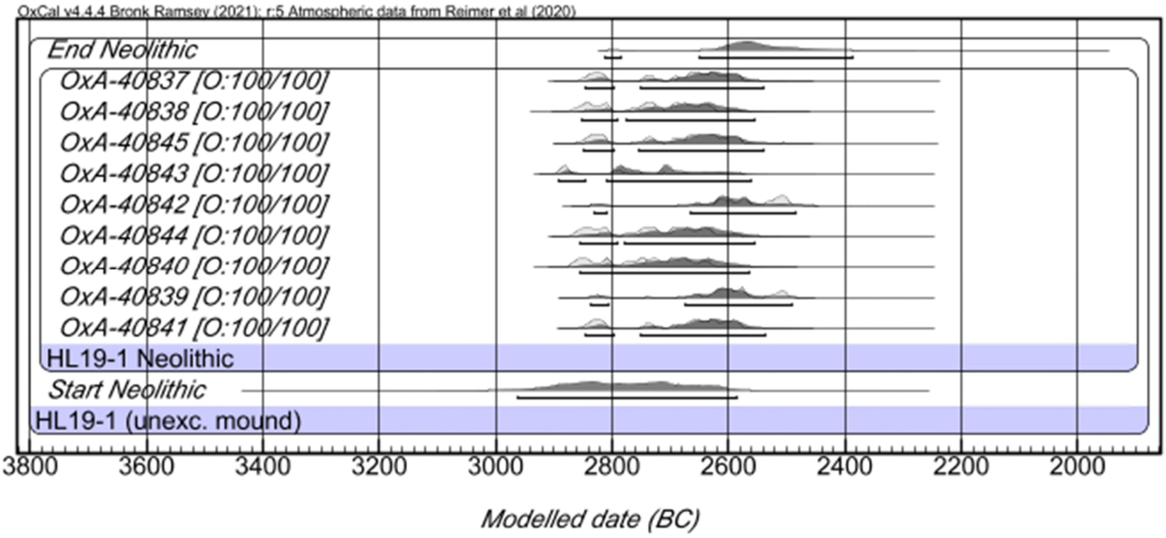


*Figure 8: Model for the HL19-1 excavation.*

To consider all of the radiocarbon results together, we built a KDE_Model in OxCal 4.4 (Figure 9). This enables us to visualise the sum of the calibrated distributions (Ramsey, 2017; Higham et al., 2020). The kernel function (usually gaussian), with an associated bandwidth, is used to define the region over which a single observation contributes to the estimated frequency function. We also summarised the results of the individual site-based Bayesian models by selecting several key boundary priors from the most important models created at the site (Figure 10). This largely complements the KDE_Model results, providing a reliable chronology for the Halin site and wider region for the first time.

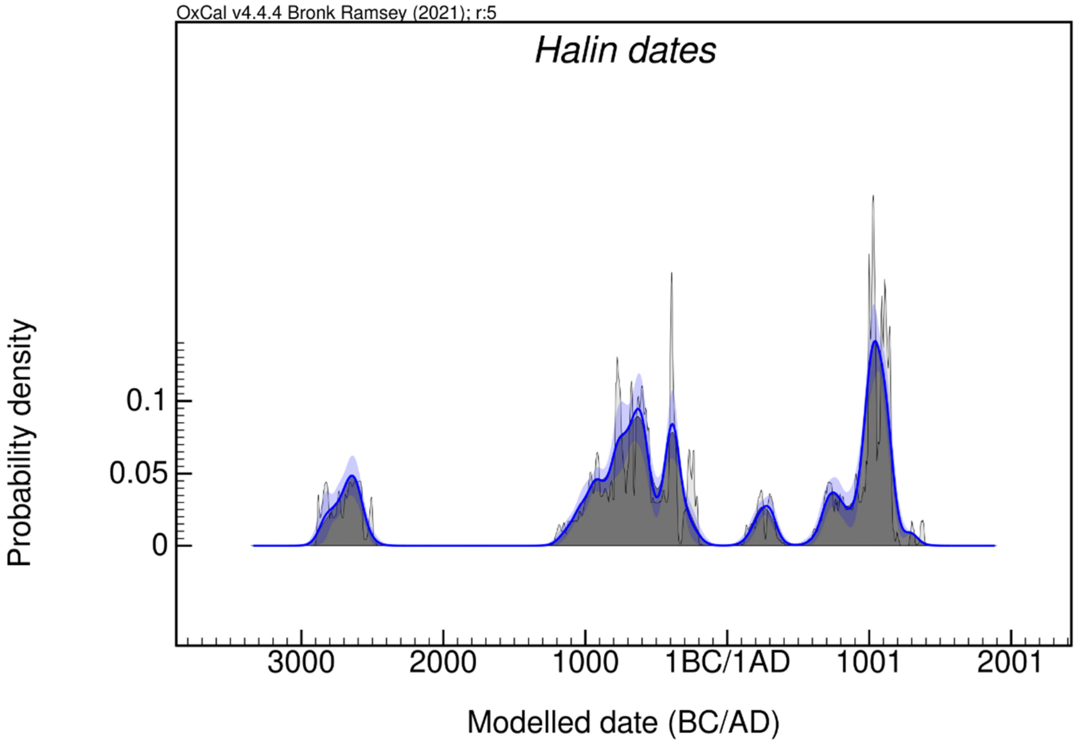


*Figure 9: KDE_Model for the Halin determinations (n = 104).*

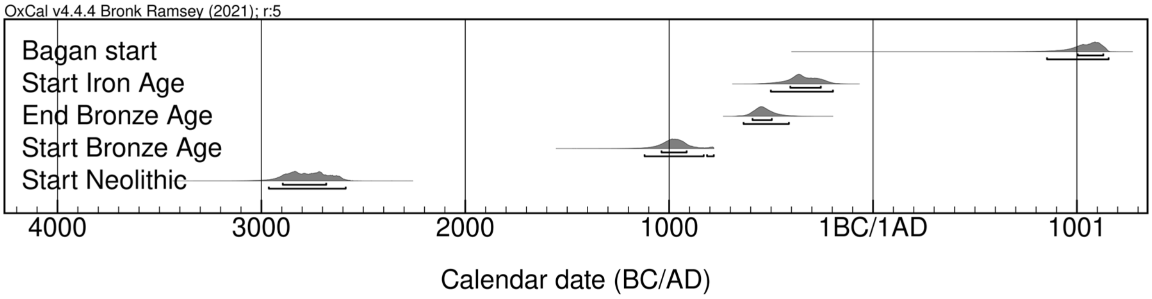


*Figure 10: Priors from some of the key boundaries for the models built at Halin (see SM). The boundaries come from, respectively from the bottom, HL19-1, HL-30-1 (start and end BA, start IA) and HL29 1-2.*

## Halin synthesis and regional comparanda

Halin thus has a proven chronology spanning up to 45 centuries, but how is the evidence distributed spatially and what can it tell us about the site complex over time? In reverse chronological order, the presence of Bagan phases at nominally Pyu Halin is not surprising. HL19 is a long-known Bagan temple and there is no reason for an abandonment of Halin at the end of the Pyu period. However, the scale of the Bagan phase at HL-TP1 is unexpected, in both the thick industrial/settlement deposits and the presence of major earthworks three kilometres from the city. The duration of Bagan period activity at HL-TP1 appears to be in the order of two or three centuries, which is not inconsiderable, but this produced 4 m of domestic deposits composed of dozens of strata with interspersed hearths and probable salt production remains. This is likely indicative of an intense occupation. Furthermore, why did this settlement and industry take place on a 3 m constructed earthwork? Was the earthwork built deliberately for this or was it part of some general change in the focus of occupation at Halin? Such activity implies the whole area to the south-west of Halin's UNESCO-designated property zone needs evaluating in more detail, which is also suggested by the dense Bagan shell midden and cremation burials at HL29-1. Halin's Bagan period radiocarbon sequence is consistent with historical records and the few determinations available at Bagan (Hudson 2012).

Despite not targeting Pyu phases, it is surprising just how few such deposits the MAFM encountered at Halin. The only definite exposure is at HL-TP1, with 1.5 m of deposits spanning the 1st millennium AD, suggesting a much lower intensity occupation than that seen in the subsequent Bagan phase, or possibly a greater concentration within the city walls, where our only exposure was at HL17-1/2. The MAFM dates are consistent with historical records and radiocarbon dates from other Pyu sites (Hudson 2012; Stargardt 2016).

The MAFM's coverage of the Halin Iron Age consists of the cemetery phase at HL30-1, which produced four dates spanning the mid-late 1st millennium BC, and our excavation at HL17-2, which exposed what appears to be mid-1st millennium BC burials just next to the Pyu gatehouse. More data are required, especially from settlement sites, but there is no untoward gap in Halin's Iron Age phasing, which is consistent with the limited dates available from the Samon Valley cemeteries (Pautreau *et al.* 2010a) and other Iron Age deposits in central Myanmar at Taungthaman (Stargardt 1990: 16), Sriksetra (Stargardt 2016) and Kan Gyi Gon (Pryce *et al.* 2013). Indeed, HL17-2 and Kan Gyi Gon suggest there may even be a tendency to a regionally early Iron Age transition in central and north-central Myanmar, perhaps 6th c. BC rather than the typically stated 4th c. BC for MSEA. At HL17-2, the presence of iron/steel but the absence of glass, the latter also a typical MSEA IA type marker, may hint at a slight delay between ferrous and vitreous technologies reaching Southeast Asia from their, widely presumed, proximal source in India (Biggs *et al.* 2013; Dussubieux & Pryce 2016). That Myanmar's Iron Age may be slightly earlier than that for the rest of MSEA need not be surprising, given the relative proximity of

South Asia but requires verification, for example why is there no Iron Age occupation in the Oakaie/Nyaung'gan area (Pryce *et al.* 2018a).

The Bronze Age period at Halin is comfortably accounted for by cemetery layers at HL29-1, settlement and burial contexts at HL30-1, and settlement at basal TP1, spanning the late 2nd and first half of the 1st millennium BC; all of which demonstrate shared ceramic traditions. So far uniquely at Halin, HL30-1 also captures the Neolithic transition, which we place during the 11th c. BC. All these dates are comparable to the Bronze Age phasing established at Oakaie/Nyaung'gan (Pryce *et al.* 2018a), and with Laos (Cadet *et al.* 2019), Thailand (Higham *et al.* 2015, 2020), Vietnam (Pryce *et al.* 2021) and Yunnan (Yao *et al.* 2020; Higham 2021). This tight chronological patterning indicates that north-central Myanmar was tightly integrated within broader regional interaction networks of the late 2nd millennium BC; as exemplified by early metal exchange networks (Pryce *et al*. 2022).

By far the most striking results of our dating programme concern the Neolithic deposits. HL30-1's layer 4 cemetery, though limited in exposure and lacking direct dating, is comparable in ceramic and funerary practice terms with the late 2nd millennium BC Late Neolithic phases at Oakaie and Nyaung'gan (Favereau *et al.* 2018; Pryce *et al.* 2018a; Pradier *et al.* 2019). HL19* is a different matter, with a total of 12 radiocarbon dates starting 2896—2683 cal BC (68% prob.) and ending by 2612—2510 cal BP (68.3% prob.), making it among the earliest Neolithic contexts in Mainland Southeast Asia. Recent fieldwork in Vietnam and Thailand has identified earlier dates of this arrival of immigrant rice and millet farmers. The third occupation phase of Cái Bèo on Cát Bà island in Hạ Long Bay incorporated typical Neolithic incised pottery and rice phytoliths, dated to ca. 2500 BC (Wang *et al.* 2022a), At Bai Ben, a late Hạ Long culture site on Cat Ba island, grinding stones of the 3rd millennium BC included millet starch (Wang *et al.* 2022b). The Bàu Tró phase of Thạch Lạc in central Vietnam, dated to ca. 2480-2000 BC and, as per HL19*, not yet fully evidenced by archaeobotanical and zooarchaeological studies, is also provisionally Neolithic (Piper *et al.* 2022). Therefore, the equally early dates for the Halin Neolithic thus corroborate and confirm the regional 'Two-layer' model, which describes the movement of rice and millet-farming populations, ultimately from the Yangtze and Yellow rivers, from the southern Chinese provinces of Yunnan and Guangxi into northern Vietnam and Thailand in the mid-3rd millennium BC[2]. The Two-layer model has been challenged in the ISEA and Pacific arena as conflating genetics, language and material culture (e.g. Lipson *et al.* 2014; Denham 2018; Larena *et al.* 2021; Alam *et al.* 2021) but for MSEA the alternative model is that of the indigenous development of agriculture. This alternative was indeed prevalent during the 1960s and 1970s, when claims of 7th and 5th millennium BC Neolithic contexts at Spirit Cave and Non Nok Tha, respectively, in northern Thailand (Gorman 1970; Solheim 1972), and even late Pleistocene Neolithic phases at Padah-Lin cave in eastern Myanmar (Aung Thaw 1971), led to speculation that MSEA had been a centre of plant domestication. However, MSEA research over the last thirty years strongly supports the Two-Layer model in the fields of material culture, linguistics, bioarchaeology, archaeobotany and aDNA studies (Rispoli 2007; Higham *et al.* 2011; Oxenham *et al.* 2011; Piper *et al.* 2017; Lipson *et al.* 2018; McColl *et al.* 2018; e.g. Guedes *et al.* 2020; Higham 2021); though there is of course much room for refinement and chrono-spatial variations. Thus we place the Halin sequence in a broader Southeast Asian context, seeing a continuum with those sites that have Neolithic phases commencing ca. 2300 BC, like An Son in southern Vietnam (Bellwood *et al.* 2011); the MP1 phase at Khok Phanom Di and the initial occupation of Nong Nor in northeast Thailand (Higham & Higham 2022). These regional nuances, we suggest, are due to different waves of migrants from different areas, speaking different languages, at approximately the same time. Austroasiatic is the dominant reconstructed language family for Neolithic central MSEA, with Kra Dai in northern Vietnam, potentially derived from the Yangtze river

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[2] No significant South Asian interaction is posited or evidenced at this time. Laos has no proven Neolithic sites.

basin, and Tibeto-Burman hypothesised in western MSEA from the Yellow River basin (Bellwood 2021; Guo *et al.* 2022). Therefore, we suggest HL19*'s evidence should be viewed in light of the geographical dislocation between north-central Myanmar and early Neolithic sites in Thailand and central-southern Vietnam, and their relative proximities to Chinese source cultures.

Halin lies ca. 1000 geodesic kilometres from northern Vietnam and northeast Thailand but less than 250 km from the Chinese border. Furthermore, these 1000 km are perpendicular to most of the mountain ranges and rivers, whereas Yunnan can be accessed via several river valleys (e.g. the Nanting) leading towards Dali and then Kunming and the rest of Yunnan lies downstream on the Red River (Figure 1). Subject to verification, it seems conceivable that Halin's Neolithic reflects a direct and relatively short extension of Yunnan's own Neolithicisation, circa 4800–3900 cal BP for rice cultivation (e.g. Li *et al.* 2016; Dal Martello *et al.* 2018; Dal Martello 2022). This phenomenon could also represent a more westerly Tibeto-Burman migration, as suggested by the very limited aDNA data available for Myanmar, which indicate Tibeto-Burman individuals in the Oakaie area ca. 3000 BP (Lipson *et al.* 2018). HL19*'s current dating is consistent with the only other radiometrically-dated suspected Neolithic deposits in Myanmar, three determinations from Ywa Gon Gyi, south of Mandalay (Pautreau *et al.* 2010b). The combined data presented here do indicate, we argue, that Myanmar experienced Neolithic interactions with East Asia that differ from those of the rest of MSEA, seemingly dominated by the migration of Austroasiatic speaking populations into Vietnam and Thailand. This potential for variation in Mainland Southeast Asian cultural transmission pathways and chronologies is also indicated for the Bronze Age transition, with metal provenance research showing the likelihood of direct contact with Yunnan as well as possibly indirectly with Thailand and Laos in the late 2nd millennium BC (Pryce 2018; Pryce *et al.* 2018b, 2021, 2022)**.**

## Conclusion

With this paper we have improved tenfold the radiometric chronology for Halin, which by virtue of the site's size, status and historical sequence, represents an archaeological advance at the national and regional scale. We confirm evidence for an early-mid 3rd millennium BC, potentially Neolithic, phase, which is comparable to the wider MSEA and perfectly in line with what might be expected given the proximity to Yunnan. The ca. 1100 BC Bronze Age transition is fully compatible with other Myanma data as well as those from Yunnan, Vietnam and Thailand, and is likewise directly supported with archaeometallurgical data. Halin's Iron Age phase, ca. 6th c. BC has the potential to be marginally earlier than the MSEA standard, 4th c. BC, which could be explained by relative proximity to South Asia, the likely source for ferrous and vitreous technologies, the latter possibly being transmitted with a slight delay. Our dates capture the full 1st millennium AD of Pyu occupation at Halin, as well as evidencing clear continuity into the 2nd millennium AD Bagan phase, which might be expressed until the present-day on the basis of ceramic traditions. Nevertheless, we acknowledge several lacunae, needing to improve our resolution of Pyu and Iron Age subphasing, as well as to capture the late 3rd and early-mid 2nd millennium BC Neolithic. Furthermore, the timing and mechanism of Myanmar's transition from the Mesolithic/Hoabinhian/Late Anyathian to the Neolithic has not been broached as we have not yet identified a suitable site. Given what we know of other such Southeast Asian sites, Halin's location lacks the cave locations normally presenting such evidence (e.g. Forestier *et al.* 2021). It goes without saying that Myanmar has much to yield of its past and will continue to be a major focus of Southeast Asian archaeological research once circumstances allow.

## Acknowledgements

The *Mission Archéologique Française au Myanmar* was a bilateral scientific cooperation project between the *Centre National de la Recherche Scientifique* and the Department of Archaeology and National Museum and Library of the Myanmar Ministry of Religious Affairs and Culture, which was active between 2001 and 2020. The fieldwork for the present study was financed by the Archaeological Consultative Commission of the French Ministry for Europe and Foreign Affairs for the 2017-2020 project cycle, with additional funds being contributed by the individual projects of a number of team members. We offer our gratitude to U Kyaw Oo Lwin, Director-General of the Department of Archaeology for his support of the Franco-Myanma team, in the provision of permits and also the participation of his personnel during the quadrennial 2017-2020. In particular, we thank U Than Hitke, U Tun Tun Aye, Daw Tin Tin Win, Daw Aye Aye Mar, Daw Cherry Thin, Daw Han Myo Kyi Aung, Daw Khin Thidar Lin, and finally Daw Kalayar Myat Myat Htwe of the Department of Archaeology, University of Yangon (Myanmar Ministry of Education).

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