

INTERACTION BETWEEN THE TOALEAN AND AUSTRONESIAN CULTURES IN THE MALLAWA AREA, MAROS DISTRICT, SOUTH SULAWESI

Hasanuddin¹, Bernadeta AKW¹, Andi Muhammad Syaiful¹, Lutfi Yondri²,
Iwan Sumantri³, Muhammad Nur³, Supriadi³, Rustan⁴, Isbahuddin⁵, Khairun Al Ansyary⁵, Khaidir
Sirajuddin⁵

¹South Sulawesi Archaeology Office, Makassar, Indonesia

²West Java Archaeology Office, Bandung, Indonesia

³Hasanuddin University, Makassar, Indonesia

⁴South Sulawesi Archaeology Office for Cultural Preservation, Makassar, Indonesia

⁵Hasanuddin University alumni, Makassar, Indonesia

Corresponding author: Hasanuddin, Email: udin.balar@gmail.com, hasanuddin1962@kemdikbud.go.id

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ABSTRACT

The Mallawa area lies 92 km northeast of Makassar city and 62 km east of Maros township, in South Sulawesi, Indonesia. Previous research points to an indigenous population named the Toalean and here we demonstrate its presence in the Mallawa area by around 6500–7000 BP, before the immigration of Neolithic Austronesians at around 3580 BP. Distinctive Toalean artefacts are geometric microliths, blades and Maros points, while distinctive Austronesian artefacts are red-slipped pottery and polished stone artefacts (especially axes and adzes). The purpose of this research is to examine archaeological evidence for contact between the first Austronesians and the Toaleans who already occupied Mallawa. The research method involved survey and excavation. The survey finding was documentation of 11 closed sites (caves) and two open sites. Excavation, undertaken in Liang Uttange 1, indicates Toalean occupation by 7000 cal. BP, followed by the arrival of Austronesian speakers in the Mallawa area who then underwent interaction and adaptation. Their interaction with Toaleans is shown by finds such as earthenware, adzes and distinctive types of shell ornaments (Neolithic Austronesian culture) associated with geometric microliths and Maros points (Toalean culture). This start of this interaction is dated to between circa 3500 and 3200 cal. BP at Liang Uttange 1.

ABSTRAK

Kawasan Mallawa terletak 92 km sebelah timur laut Kota Makassar atau 62 km sebelah timur Kabupaten Maros, Sulawesi Selatan. Selama ini, penelitian terdahulu menunjukkan adanya populasi asli yang disebut Toalean dengan identitas budayanya jelas, menghuni wilayah Mallawa sekitar 6500–7000 BP sebelum imigran Neolitik Austronesia awal menghuni wilayah ini sekitar 3580 BP. Penanda artefak untuk Toalean adalah mikrolit geometris, bilah, dan lancipan Maros, sedangkan penanda artefak Austronesia adalah tembikar slip merah, dan artefak batu diupam (terutama kapak dan beling). Tujuan penelitian ini adalah mengkaji bukti-bukti arkeologi mengenai kontak atau persentuhan budaya Austronesia Awal dengan Toalean yang pernah menghuni Mallawa. Metode penelitian yang digunakan adalah survei dan ekskavasi. Hasil survei telah ditemukan 11 situs gua (liang) dan ceruk serta dua situs terbuka. Ekskavasi dilakukan di Liang Uttange 1. Hasil penelitian menunjukkan bahwa kedatangan Penutur Austronesia di wilayah Mallawa yang sudah dihuni sekitar 7000 BP oleh populasi lokal (Toalean), telah terjadi proses adaptasi dan interaksi. Kontak dan interaksi budaya antara Austronesia dengan Toalean ditunjukkan oleh temuan-temuan seperti gerabah, beliung dan perhiasan dari kerang (budaya Austronesia) berasosiasi dengan artefak batu mikrolit geometris dan

lancipan Maros (budaya Toala). Interaksi kedua budaya tersebut diperlihatkan pada lapisan tanah pertama dan kedua di kotak ekskavasi Liang Uttange 1 dengan pertanggalan antara 3500 dan 3200 BP.

INTRODUCTION

The area of Mallawa lies 92 km northeast of Makassar city and 62 km east of Maros township (to the north of Makassar) in South Sulawesi province, Indonesia. The topography of Mallawa is pronouncedly uneven and includes several ranges. In its geographical position, Mallawa continues the Maros karsts, which contain abundant evidence of prehistoric occupation, notably in the caves. The time depth of this prehistoric occupation in Maros can be seen in the caves (*liang*), such as Liang Lompoa, Barugayya 1, Barugayya 2, Jing, Timpuseng, Jarie and Sampeang, with their rock paintings dated to the Late Pleistocene (Aubert *et al.* 2014), and Liang Bulu Betue and Liang Burung 2 with their traces of Late Pleistocene habitation (Brumm *et al.* 2017, 2018). Several types of stone in these Maros karsts resemble the raw material used for making the stone artifacts found at Mallawa (Fadhlan *et al.* 2012). The geology of the Mallawa area is influenced by the Mallawa Formation, which consists of sedimentary rock derived from coal, clay and sandstone from the Lower Eocene, and underlies the Balangbaru Formation dating to the Miocene (Mahmud 2008).

It is known that blades and geometric microliths are signs of the Toalean culture, and many have been found in Maros dating from about 8000 years ago. Suryatman *et al.* (2019) demonstrate the antiquity of Maros points at Liang Jarie by 8000 cal. BP, and their production sequence from blade and flake preforms. On the other hand, in Sulawesi, red-slipped pottery and polished adzes are key indicators of the presence of Austronesian-speaking populations. Survey and excavation at Bulu Bakung, an open site in the Mallawa area, has encountered rectangular ground stone axes, chisels, carnelian beads, and decorated and red-slipped pottery (Mahmud 2008:126–127; Hasanuddin 2017a), associated with habitation by Austronesian-

speaking communities. Investigations by Simanjuntak (2008) at Bulu Bakung resulted in C14 dates of 3580±130 BP (P36-06, 4400–3400 cal. BP) and 2710±170 BP (P36-06, 3450–2140 cal. BP) from carbon samples obtained from excavating the Bulu Bakung summit. Investigations by Budianto Hakim *et al.* (2009:45–52) produced a date of 2281±46 BP (Wk-20380, 2350–2130 cal. BP) from a carbon sample obtained from excavation at the foot of the slope at Bulu Bakung (95% calibrated ranges using the Intcal13 calibration curve; Bulbeck 2018).

Aside from the open sites, archaeological surveys in the Mallawa area have encountered caves and rock shelters with indications of human occupation in the form of stone artifacts (flakes, blades, denticulated points including Maros points with their hollowed base, and microliths), animal bones and pottery. Stone blades, Maros points and microliths were frequently found in the Mallawa cave sites, associated at Liang Panninge with a radiocarbon determination (Beta-446748, PNG01) of 6885–6950 cal. BP (Duli *et al.* 2015; Hasanuddin 2017b). Faunal remains found in association with the stone artifacts in Liang Panninge and other Mallawa cave excavations show that the inhabitants hunted animals such as suids and the endemic Anoa water-buffalo (Hasanuddin 2017b).

In summary, investigations undertaken so far into the prehistory of the Mallawa region demonstrate occupation dating from the middle Holocene with a pre-Neolithic (Toalean) cultural character, followed by a Neolithic phase.

METHODS

The Mallawa region includes both caves and open sites (Figure 1). Three open sites with characteristics of Neolithic Austronesian occupation were investigated in 2018, as well as 13 cave sites with material culture characteristics of Austronesian and/or pre-Neolithic/Austronesian (Toalean) occupation. Of the 13 known cave sites, one, Liang Uttange 1, was selected for excavation because of surface indications of Austronesian occupation such as finds of adzes and pottery. This excavation was undertaken with the aim of elucidating the age and nature of

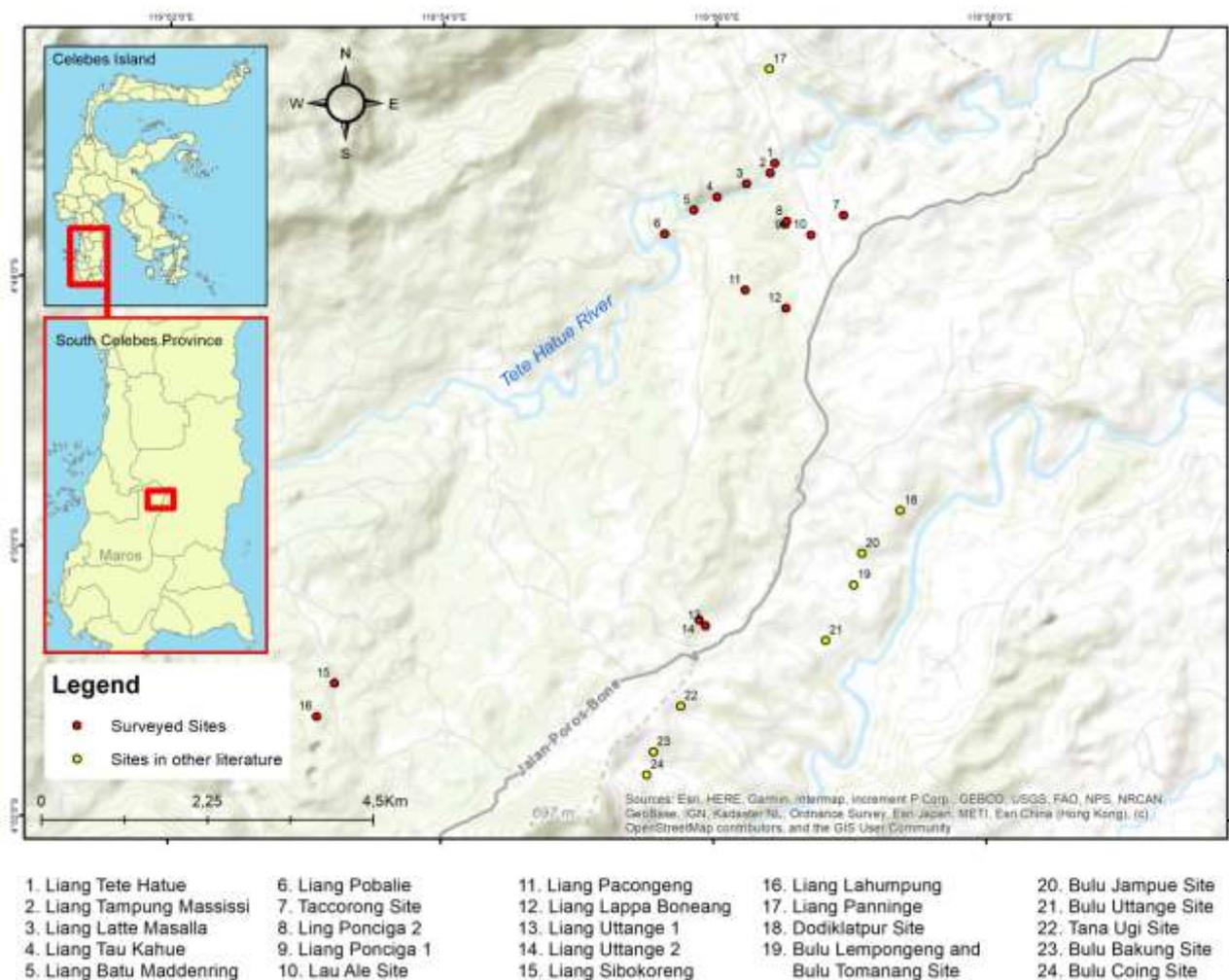


Figure 1: Distribution of closed and open sites in Mallawa, including those from the 2018 survey. Source: The authors.

the finds that can depict the interaction between the Neolithic and pre-Neolithic (Toalean) cultures.

The data on material culture in this research include adzes, axes, flakes, production waste, denticulated points including Maros points, pottery, and traces of burnt organics (charcoal). Maros points and backed blades are here regarded as a robust indicator of occupation by Toalean communities. Various forms of analysis were undertaken such as technological, typological, contextual, and dating analysis, as well as use-wear analysis on the stone and bone artifacts. Dating was undertaken to learn the period of occupation and nature of the artifacts in each cultural phase. Four of the charcoal samples ob-

tained from the excavation squares in Liang Uttange 1 were sent to the Beta Analytic Laboratory in Miami, Florida, USA for Accelerator Mass Spectrometry (AMS) dating. In addition to the radiocarbon age determinations, Beta Analytic (2020) provided 95.4% probabilities of the calendar years using the SHCal13 (southern hemisphere) calibration curve, corrected for isotopic fractionation using the samples' $\delta^{13}\text{C}$ value. Finds from the same cultural layer are deemed to pertain to the same phase.

LIANG UTTANGE 1 SURVEY AND EXCAVATION DATA

Liang Uttange 1 lies at an elevation of 314 meters above sea-level in Palacari Ward,

Mattampapole Village, Mallawa District, Maros Regency, with geographic coordinates 4° 50' 34.50" S 119° 55' 55.70" E. The cave can be accessed by taking a four-wheel drive track off the main road for 304 meters and then walking 45 meters in an easterly direction. The Liang Uttange I cave site is on the west face of a hill, and lies not far from teak, pecan nut and cacao plantations.

Liang Uttange 1 has three entrances that respectively face to the east, southeast and north (Figure 2). The east entrance is 5.2 meters wide and 2.5 meters high. The southeast entrance is 8.5 meters wide and 8.6 meters high. The north entrance is 8.5 meters wide and 8.6 meters high (Figure 3). The depth of the cave is 21.5 meters and its width is 24.6 meters, with a ceiling between 2 and 5.3 meters high.

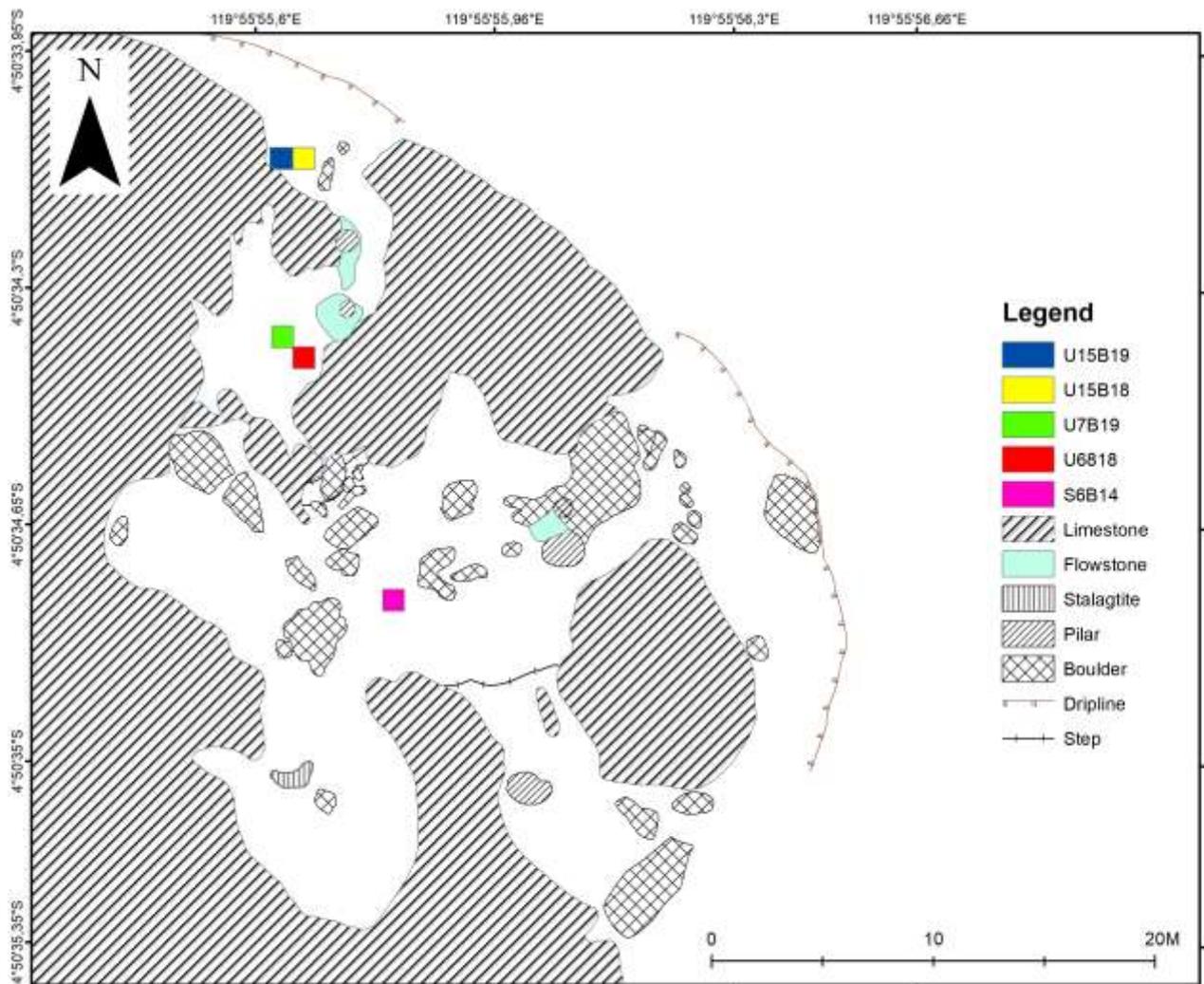


Figure 2: Site plan of Liang Uttange 1. U equals North, B equals West and S equals South. Source: The authors.

Surface finds from Liang Uttange 1 include stone cores and flakes distributed across the eastern part. Other finds from inside the cave include flakes, pottery, microfauna remains and the eroded traces of cave paintings (Figure 4),

along with the remains of adzes found in the west part.

Excavation of the cave during the 2018 season involved opening five 1 m by 1 m squares (Figure 2). Owing to time and budgetary restraints, the excavation technique was to remove

spits at 10-cm intervals. These restraints also prevented excavation from reaching either the deepest deposits or bedrock. Complete excavation and reporting of the results are planned for the future, depending on funding opportunities. As a preliminary output, the excavation results from two of the squares, labeled U6 B18 and U15 B18, are reported on here. These excavation squares respectively sampled the interior and exterior of the cave at locations where the surface is flat and has surface finds of potshards, denticulated points and adzes (Figures 5 to 14; Tables 1 to 5).



Figure 3: Northern entrance of Liang Uttange 1 (source: Balai Arkeologi Sulawesi Selatan 2018).



Figure 4: Red pigment hand stencils at Liang Uttange 1 (source: Balai Arkeologi Sulawesi Selatan 2018).

In the U6 B18 square (Figure 5), layer 1 consisted of coarse sand colored dark yellowish brown. It extended to a maximum depth of 45 cm below datum in the west wall (spit 3). Layer 2 consisted of brown, coarse sand that extended across spits 2 and 3 in the north and east walls but spits 3 to 5 in the west wall. Across most of the square, layer 2 was underlain by layer 3, between spits 4 and 6, which consisted of a coarse sand colored dark brown. However, in the southwest section of the square, there was a stratigraphic anomaly involving a deposit of mixed layer 2 and layer 3 sediment. Finally, the deepest excavated layer, layer 4, consisted of sandy silt colored dark yellowish brown. This was the dominant deposit in spits 6 to 8.

Due to the undulating nature of the layers in the U6 B18 square, and the presence of a charcoal-containing deposit mixed between layers 2 and 3 in spits 3 to 5 (Figure 5), the AMS dates do not distinguish between layers 2 and 3, which accordingly are both dated to the fourth millennium BP. Only the underlying layer 4 can be dated to earlier than the fourth millennium BP (Table 5).

The equivalents of layers 1 and 2 in the U6 B18 square can also be discerned in the U15 B18 square (Figure 6): respectively, layer 1 consisting of coarse sand colored dark yellowish brown, and layer 2 consisting of coarse sand colored brown. Underlying layer 2 is a sandy silt colored yellow, labeled layer 3, but which corresponds to layer 4 in the U6 B18 square. The available charcoal sample from spit 4 relates to the junction of layers 2 and 3 in this square (Figure 6). Its calibrated date in the seventh millennium BP (Table 5) therefore applies to either the late accumulation of sandy silt or to the early accumulation of coarse sand at Liang Uttange 1.

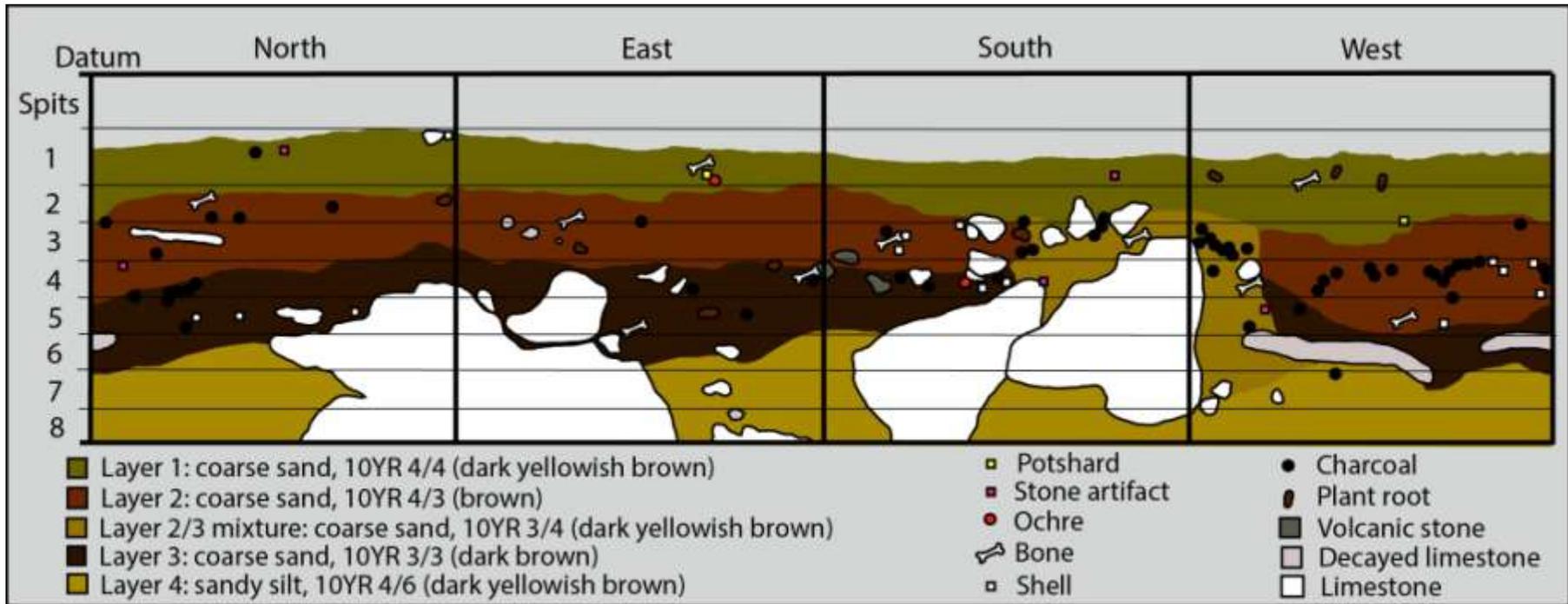


Figure 5: Stratigraphy of the U6 B18 square, Liang Uttange 1 (source: Balai Arkeologi Sulawesi Selatan 2018).

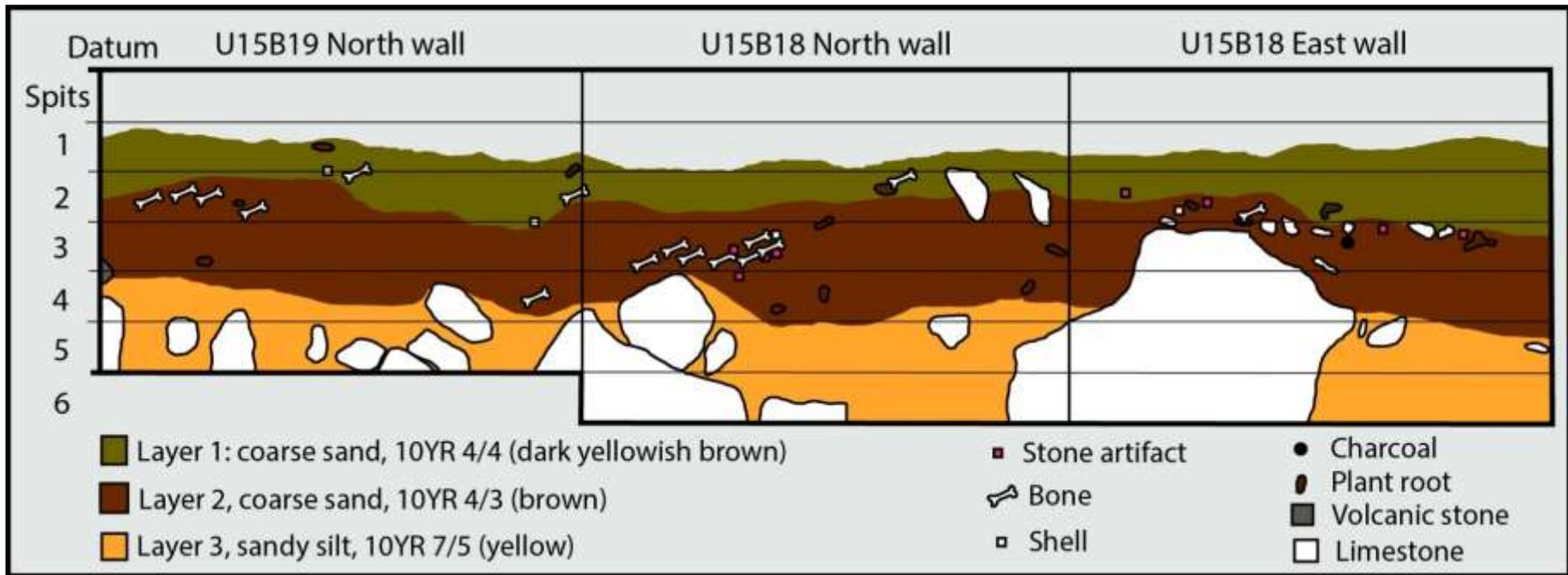


Figure 6: Stratigraphy related to the U15 B18 square, Liang Uttange 1 (source: Balai Arkeologi Sulawesi Selatan 2018).



Figure 7: Spit 4 (50–60 cm) in the U6 B18 square (source: Balai Arkeologi Sulawesi Selatan 2018).



Figure 10: Spit 5 (60–70 cm) in the U6 B18 square (source: Balai Arkeologi Sulawesi Selatan 2018).



Figure 8: Spit 4 (40–50 cm) in the U15 B18 square (source Balai Arkeologi Sulawesi Selatan).



Figure 11: Spit 6 (70–80 cm) in the U6 B18 square. (source: Balai Arkeologi Sulawesi Selatan 2018).



Figure 9: Maros point from Spit 4 of the U15 B18 square (source: Balai Arkeologi Sulawesi Selatan).



Figure 12: Liang Uttange 1 Spit 8 (90–100 cm) of the U6 B18 square (source: Balai Arkeologi Sulawesi Selatan 2018).



Figure 13: Examples of stone artifacts recovered from layer 2 of Liang Uttange 1 that mark the mid-Holocene Toalean signature. Far left, geometric microliths (square U15 B18, spit 2); center, Maros point (square U15 B18, spit 4); right of center, flake (square U15 B18, spit 4); and far right, blade (square U15 B18, spit 4). (Source: Balai Arkeologi Sulawesi Selatan, 2018.)

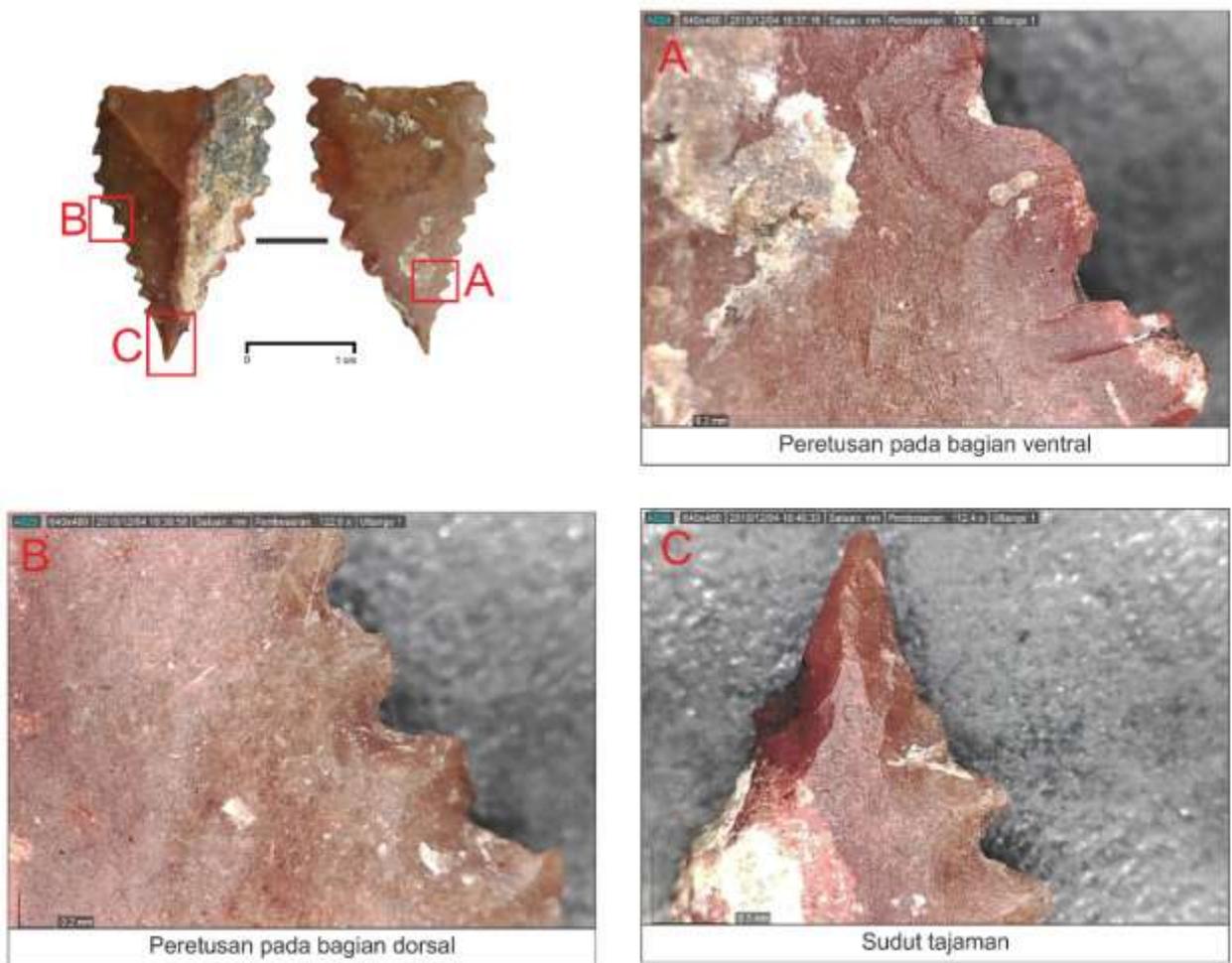


Figure 14: Notches created by retouch along the ventral and dorsal faces of the Maros point illustrated in Figure 13. A: ventral retouch; B: dorsal retouch; C: retouch at the point. (Source: Balai Arkeologi Sulawesi Selatan, 2018.)

Table 1: Types and weights of finds from the U6 B18 square, Liang Uttange 1.

Spit	Type of find	Weight (g)
1	Potshards (5)	4.62
	Charcoal	0.80
	Bone (112)	71.99
	Teeth	22.38
	Mollusk shell	23.32
	Ocher (3)	4.66
	Stone artifacts (17)	107.06
2	Potshards (5)	5.64
	Charcoal	6.38
	Bone (55)	21.93
	Teeth (1)	1.02
	Mollusk shell	11.28
	Stone artifacts (16)	50.58
3	Potshards (3)	10.12
	Charcoal	9.80
	Bone (85)	60.14
	Teeth (6)	14.50
	Mollusk shell	27.42
	Ocher (7)	11.52
	Stone artifacts (36)	190.3
4	Potshards (4)	2.10
	Charcoal	12.00
	Bone (114)	99.35
	Teeth (11)	7.80
	Mollusk shell	24.26
	Ocher (4)	4.00
5	Stone artifacts (37)	119.53
	Charcoal	5.72
	Bone (62)	137.21
	Teeth (11)	80.02
	Mollusk shell	29.32
6	Ocher (8)	10.42
	Stone artifacts (21)	1025.99
	Charcoal	2.86
	Bone (62)	74.54
	Teeth (6)	6.18
7	Mollusk shell	38.78
	Ocher (3)	28.12
	Stone artifacts (12)	3567.26
	Bone (35)	43.9
	Teeth (1)	0.52
8	Mollusk shell	9.34
	Ocher (2)	3.26
	Calcium straws	56.92
	Stone artifacts (9)	1873.36
	Charcoal	7.76
8	Bone (10)	13.85
	Mollusk shell	0.90
	Stone artifacts (5)	986.75

Table 2: Types and quantities of diagnostic finds from the U6 B18 square, Liang Uttange 1.

Spit	Type of find	Count (specimens)
1	Maros points	1
	Backed microliths	–
	Other blades	–
	Other flaked stone artifacts	16
	Bone points	–
2	Maros points	–
	Backed microliths	2
	Other blades	–
	Other flaked stone artifacts	14
3	Bone points	1
	Maros points	–
	Backed microliths	3
	Other blades	8
4	Other flaked stone artifacts	25
	Bone points	–
	Maros points	–
	Backed microliths	3
5	Other blades	2
	Other flaked stone artifacts	32
	Bone points	1
	Maros points	1
6	Backed microliths	–
	Other blades	–
	Other flaked stone artifacts	18
	Bone points	–
7	Maros points	–
	Backed microliths	1
	Other blades	–
	Other flaked stone artifacts	11
8	Bone points	–
	Maros points	–
	Backed microliths	–
	Other blades	–
8	Other flaked stone artifacts	9
	Bone points	–
	Maros points	–
8	Backed microliths	–
	Other blades	–
	Other flaked stone artifacts	5
8	Bone points	–

Table 3: Types and weights of finds from the U15 B18 square, Liang Uttange 1.

Spit	Type of find	Weight (g)
1	Potshards (3)	3.84
	Kemiri nut husk (29)	15.12
	Charcoal	3.96
	Bone (60)	55.8
	Mollusk shell	3.32
	Ocher (1)	0.28
	Stone artifacts (57)	122.16
2	Potshards (1)	0.76
	Kemiri nut husk (21)	8.34
	Charcoal	3.34
	Bone (306)	233.86
	Mollusk shell	29.90
	Ocher (3)	2.76
	Stone artifacts (143)	643.88
3	Potshards (3)	25.4
	Fruit rind (1)	0.16
	Charcoal	2.92
	Bone (954)	528.8
	Mollusk shell	102.80
	Ocher (22)	29.92
	Stone artifacts (267)	442.35
4	Charcoal	4.50
	Bone (132)	82.34
	Mollusk shell	30.70
	Ocher (3)	6.88
	Stone artifacts (79)	333.87
5	Burnt fruit rind (1)	0.10
	Charcoal	0.24
	Bone (24)	17.88
	Mollusk shell	10.06
	Ocher (4)	2.84
	Stone artifacts (32)	57.33
6	Bone (10)	5.72
	Mollusk shell	3.66
	Ocher (1)	1.06
	Stone artifacts (11)	12.38

Table 4: Types and quantities of diagnostic finds from the U15 B18 square, Liang Uttange 1.

Spit	Type of find	Count (specimens)
1	Maros points	2
	Backed microliths	–
	Other blades	3
	Other flaked stone artifacts	52
	Bone points	–
2	Maros points	4
	Backed microliths	3
	Other blades	3
	Other flaked stone artifacts	134
	Bone points	–
3	Maros points	26
	Backed microliths	–
	Other blades	10
	Other flaked stone artifacts	231
4	Bone points	13
	Maros points	4
	Backed microliths	–
	Other blades	2
	Other flaked stone artifacts	73
5	Bone points	2
	Maros points	2
	Backed microliths	–
	Other blades	2
	Other flaked stone artifacts	28
6	Bone points	–
	Maros points	–
	Backed microliths	–
	Other blades	1
	Other flaked stone artifacts	10
	Bone points	–

Table 5: AMS dates on dispersed charcoal from Liang Uttange 1, Mallawa, Maros.

Square	Spit	Layer	Depth below datum (cm)	Dated material	Weight (g)	Laboratory code	Date	Cal BP*
U6 B18	4	2/3	50–60	Charcoal	12.00	Beta-509045	3060 ± 30 BP	3274–3105
U6 B18	5	2/3	60–70	Charcoal	5.72	Beta-509046	3330 ± 30 BP	3609–3445
U6 B18	6	4	70–80	Charcoal	2.86	Beta-509047	5240 ± 30 BP	6013–5898
U15 B18	4	2/3 (=3/4)	40–50	Charcoal	4.50	Beta-509048	6260 ± 30 BP	7134–7006

* 95% confidence interval, calibrated using the SHCal13 calibration curve (Beta Analytic 2020).

DISCUSSION

Toalean culture in Mallawa

Stone artifacts such as blades and geometric microliths are characteristic Toalean stone artefacts, and many have been recovered from excavations in the caves and rockshelters of Maros (on the northern border of Makassar) dating from around 8000 years ago. The Toalean can be assessed as a developed cultural expression related to the indigenous hunter-gatherer population that occupied the southwestern arm of the island of Sulawesi. True, according to Bellwood (2013:116), denticulated points (also known as Maros points) are the signature of the advanced phase of the Toalean phase, generally associated with pottery, which indicates interaction with, and influence from, pottery-using Austronesian populations on the Toalean typology. However, research at Liang Panninge in Mallawa, Maros has clarified the stratigraphic position of Maros points with their discovery in association with a human burial dated to 7000 BP (Duli *et al.* 2015). Accordingly, the Mallawa data overrule Bellwood's interpretation and instead we suggest that Maros points should also be included as part of the autochthonous Toalean signature.

Previous investigations in Mallawa have already reported open and closed (cave or rockshelter) Toalean sites (Duli *et al.* 2015; Hasanuddin 2017b). Artifacts such as stone flakes and blades including Toalean examples are distributed comprehensively along Mallawa's ranges. Survey results document stone flakes and blades including Maros points found behind Bulu Uttange (Hasanuddin 2017a). The research of Duli *et al.* (2015) also demonstrated the existence of cultural layers at the Liang Panninge site that contained both Maros points and microliths. The lowest Maros points at Liang Panninge were dated to around 7000 BP, and a layer with microliths more recently than 7000 BP (Duli *et al.* 2015). It is now clear that Maros points as well as microliths are a guide to the Toalean culture in the elevated landscape of Mallawa, just as in the lowlands of South Sulawesi as documented in the coastal

karsts of the Maros and Pangkep (to the immediate north of Maros).

The geometric microliths whose production is the technological foundation of the Toalean, and which the Toaleans curated as multipurpose tools, have close parallels in the stone artifact industries of Australia. It is possible that this simply reflects independent developments in the two regions. On the other hand, Indonesia is the only place in Southeast Asia with this particular tool type otherwise found in Australia. An explanation for this shared tool type is the possibility of cultural diffusion between the two regions, that is, Indonesia and Australia (Bellwood 2013:116–117).

Current research has further documented the distribution of Toalean culture sites at Mallawa (Figure 1) and at the same time added information germane to cultural contact with the Austronesian newcomers who, according to Bellwood's (2000) hypothesis, arrived in Sulawesi 3500 years ago. A significant quantity of stone artifacts including flakes, blades and cores were found on the surface of Liang Ponciga II. The presence of cores indicates that stone reduction for the production of Toalean artifacts occurred at this site. At the open site of Lao Ale, a source of chert was found, along with various stone artifacts including blades (Figure 15), which were preforms for the production of Maros points and backed microliths according to the technological analysis of Suryatman *et al.* (2019).

Another suggestion of Toalean occupation comes from the stone artifacts such as flakes, blades and cores found as surface concentrations on the open hilltop site of Taccorong (Figure 1). These same classes of stone artifacts were also found on the surface of Liang Lappa Boneang, along with numerous skeletal fragments from small animals. The scores of Maros points and microliths excavated at Liang Uttange 1 (Tables 2 and 4) also demonstrate the presence of a Toalean population, not to mention the flakes and blades also found at Liang Uttange 2. Moreover, the discovery of hand stencils at Liang Uttange 1 (Figure 4) and 2 are the first ever documentation of hand stencils in the Mallawa region.



Figure 15: Stone blade found during survey of the open Lao Ale site (source Balai Arkeologi Sulawesi Selatan, 2018).

Other sites in Mallawa (Figure 1) that also reflect the Toalean culture include Liang Latte Massallae, where stone artifacts including a small number of blades were found (Figure 16), and Liang Sibokoreng, a shaded rockshelter where thousands of stone artifacts (including Maros points, blades, cores and grindstones) point to intensive Toalean habitation (Balai Arkeologi Sulawesi Selatan 2018).



Figure 16: Stone flake and blade found during survey of the Liang Latte Masallae site (source Balai Arkeologi Sulawesi Selatan, 2018).

Data on the presence of more than ten Toalean sites in Mallawa is consistent with the chronological data on the establishment of the Toalean here by 7000 BP (Beta-446748, PNG01, noted above; Duli *et al.* 2015), although there may have been a still earlier hunter-gatherer occupation as suggested by the documentation of hand stencils at Liang Uttange 1.

Austronesian culture in Mallawa

The origins and dispersal of Austronesian speakers constitute a major research issue. Today there are over 350 million Austronesians who speak 1200 languages extending from Taiwan and Micronesia in the north to New Zealand in the south, and from Madagascar in the west to Easter Island in the east (Tanudirjo 2008:33). Historical linguistic research by Blust (1984–1985) identified Taiwan as the Austronesian homeland, a theory elaborated by Bellwood based on archaeological data. Taiwan and coastal south China constituted the original homeland where the proto-Austronesian language and culture underwent formation. According to the archaeological record, this region reveals signs of agriculture, adzes and pottery dating to 7000 years ago (Bellwood 2000:97–98).

The region of South and West Sulawesi is a strategic location for Austronesian studies, because of its central position within the islands of Indonesia. Sulawesi lay along the prominent migration route in the context of the “Out of Taiwan” theory, particularly for the north to south migration, rather than the east to west movement (Simanjuntak 2015; Simanjuntak and Widiyanto 2012).

The footprint of Austronesian culture in Mallawa has already been detected through previous research such as Simanjuntak (2008), Hakim *et al.* (2009) and Hasanuddin (2017a). Until now the earliest signs of Austronesian culture in Mallawa are known from the Bulu Bakung site with dates of 3580±130 BP and 2710±170 BP (Simanjuntak 2008:233). As with the early signs of Austronesian culture elsewhere in Sulawesi (Simanjuntak 2008), finds of red-slipped pottery and polished adzes are thought to signal the presence of Austronesian populations in Mallawa.

Forty-six pottery body shards were found at Liang Ponciga II. The open site of Taccorong produced 13 fragments of adze blanks along with 21 potshards, which are clearly an indication of Austronesian culture (Figure 17). Fragments of pottery and several stone adzes were also found at Liang Lappa Boneang, along with a flaked stone core.

At the Liang Uttange I site, which was excavated intensively and studied, pottery was found on the surface along with flaked stone artifacts, an adze and a core (Figure 18). However, the excavated deposit itself predominantly reflects Toalean habitation. This is shown by the much larger number of stone artifacts compared with potshards even in the upper spits, including Maros points and backed blades (Tables 1 to 4). Unfortunately, there are no radiocarbon dates from the upper spits to indicate how long Toalean occupation lasted here after 3000 calBP, but light, post-Toalean use of the site is indicated by its surface finds as well as the recovery of kemiri nut husks from spits 1 and 2 of the U15 B18 square.



Figure 17: Adze fragment found during survey of the open Taccorong site (source: Balai Arkeologi Sulawesi Selatan, 2018).



Figure 18: Adze found during survey of Liang Uttange I with close-ups clearly showing the striations resulting from grinding (teknik penggosokan) during manufacture (source Balai Arkeologi Sulawesi Selatan, 2018).

At the Liang Uttange II site, which has been eroded by water, pottery with geometric motifs and plain pottery was found along with human teeth. At the Liang Latte Massallae site, red-slipped pottery and adzes of various materials were found along with mollusk shell. Liang Tampung Massissi produced a concentration of potshards, while 16 potshards were the only find at the Liang Lahumpung rockshelter. Liang Sibokoreng, another rockshelter site, also produced polished stone and pottery.

Toalean and Austronesian cultural contact at Mallawa

Evidence for Toalean and Austronesian cultural contact is seen in several cave sites that contain various frequencies of Toalean and Austronesian cultural elements. Before communicating the finds from relevant sites that point to cultural contact at Mallawa, we undertake a pilot analysis of the hypothesis of Toalean and Austronesian cultural elements. The strongest attribute of Toalean culture is a technology of flaked blades including the possibility of blade technology (Figure 19). This blade technology was the basis for producing standardized tool types such as arrowheads and microliths (Suryatman *et al.* 2019).



Figure 19: Blade found at Liang Uttange 1 during the excavation of the U15 B18 square, spit 3 (30–40 cm, layer 2) (source Balai Arkeologi Sulawesi Selatan, 2018).

On the other hand, clear guides to the Austronesian population include pottery and polished adzes and axes. At Liang Uttange 1 (U6

B18 square), spits 1–4 include a total of 17 potshards, as far down as layer 2 which possibly dates back to around 3000 BP, directly overlying layer 3 which probably dates to more than 3000 BP. The dominance of stone blades and the presence of Maros points and backed microliths, even in layers 1 and 2, confirm that Liang Uttange was the possession of a Toalean population.

Excavated finds from Liang Uttange 1 show that there was a change in the stone tools, bone and shell from a technological perspective. During the Austronesians' contact with the local inhabitants, their technological innovations resulted in the development of new forms such as a shell ornament (Figure 20) and a possible bone whistle (Figure 21). The closest parallel to the shell ornament, of which the authors are aware, are two modified *Conus* sp. spires from Golo Cave, Gebe Island, Northern Moluccas, which probably date to the Neolithic (Szabó 2019:128, 134). The bone whistle may be a fragment of the nose flutes played amongst dispersed Austronesian groups in places as far apart as Sabah (Howells 1973:unnumbered plate), Taiwan, the Philippines, Fiji, Hawaii and New Zealand (Wikipedia 2019).

Also, while there are finds of serrated arrowheads or Maros points with features of the Toalean culture as shown by their technological features from a time before knowledge of the process of polishing, there is also an excavated Maros point that shows changes in the technological aspect away from the use of stone. The form and technology of Maros points underwent a new effect implemented through grinding (Figure 22) as generally found with stone artifacts from later times. Flaked and ground *Tridacna* shell adzes and fragments dated to between the early and middle Holocene were excavated by Nur (2018:271) at Gua Tenggera in Southeast Sulawesi, but none have yet been reported from South Sulawesi. Thus, this shaping innovation probably reflects contact with Austronesian speakers, even if the item is a recycled Austronesian artifact. Moreover, the stratigraphy of the excavated square shows an association of pottery, microliths and Maros points in the same sedimentary layer.

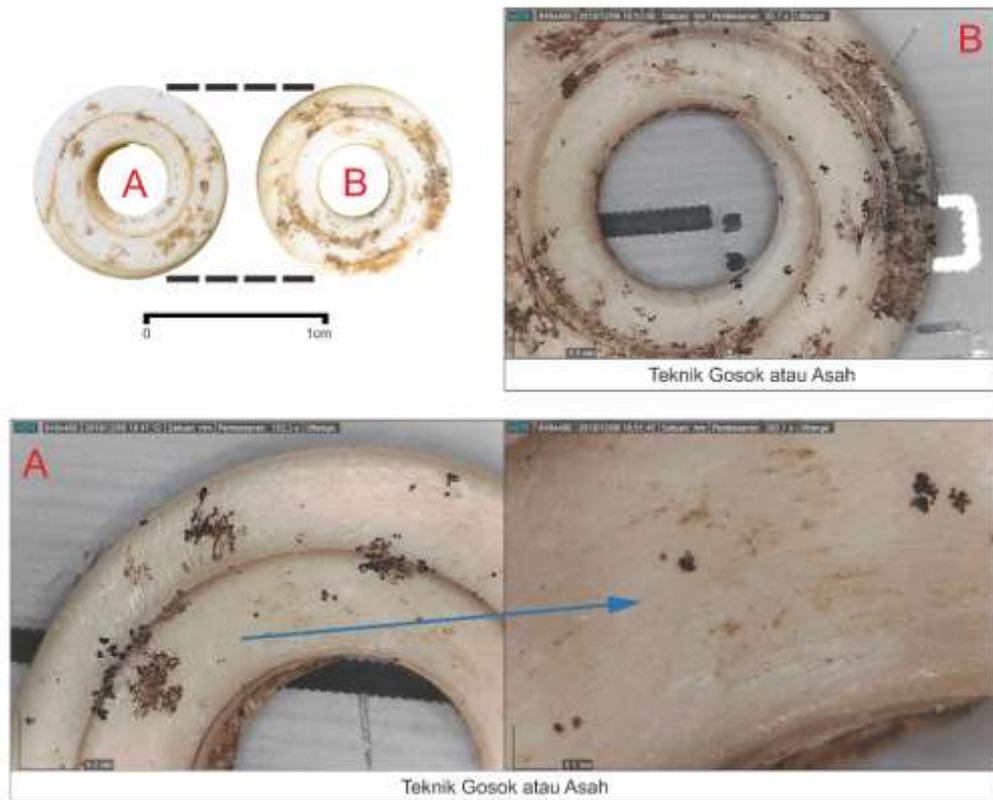


Figure 20: Polished (teknik gosok atau asah) shell ornament from Liang Uttange, U6 B18 square, spit 4, layer 2, dated to ca. 3000 BP (source Balai Arkeologi Sulawesi Selatan, 2018).

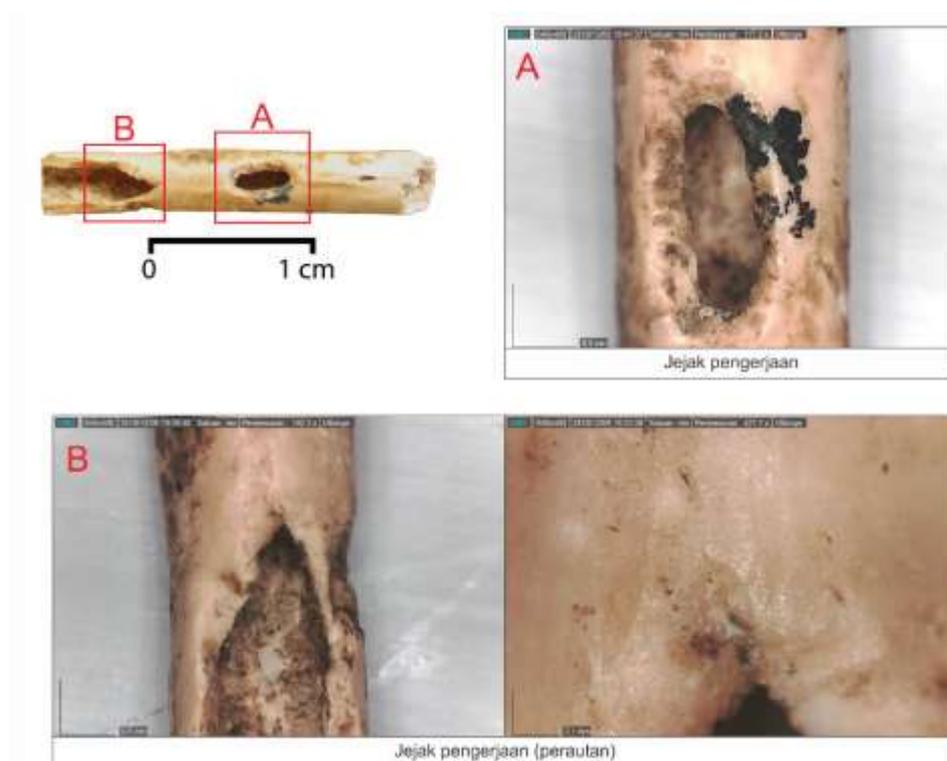


Figure 21: Bone artifact from Liang Uttange, U6 B18 square, spit 4, layer 2 with two symmetrically positioned holes, producing a possible whistle, dating to ca. 3000 BP. (source Balai Arkeologi Sulawesi Selatan, 2018).

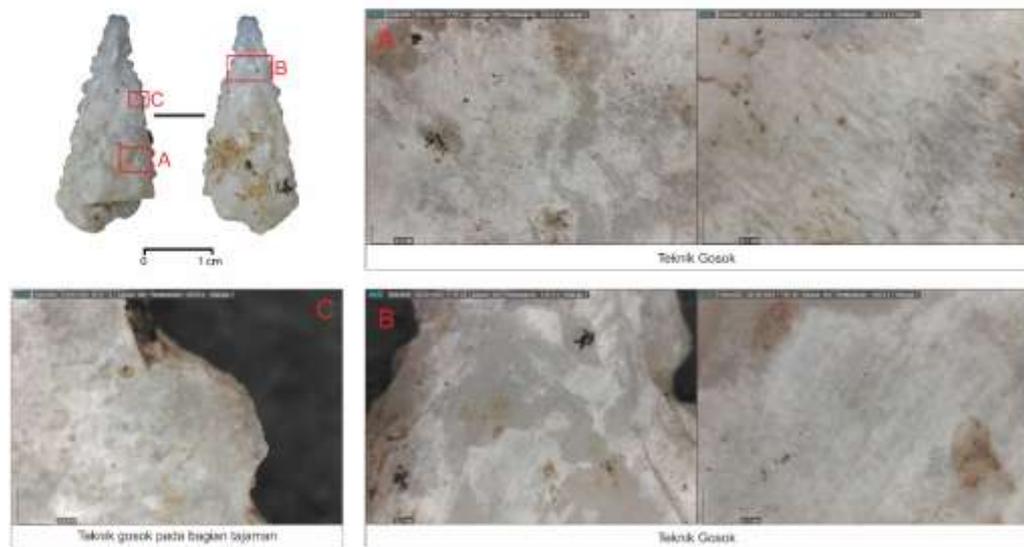


Figure 22: Ground artifact from shell, which imitates a Maros point (top left), and close-ups of its ground (gosok) surfaces. C: Grinding along the edge (teknik gosok pada bagian tajam). From Liang Uttange, U6 B18 square, spit 2, layer 1. This find was associated with microliths (Table 2), and is evidence of Austronesian and Toalean cultural contact at Mallowa. (Source: Balai Arkeologi Sulawesi Selatan, 2018.)

Adaptive strategy

The preceding analysis shows that both Toalean and Austronesian sites were spread across Mallowa. The number and distribution of Austronesian cultural sites show how suitable the Mallowa region was for these people. This karst topography alongside open fields made Mallowa an ideal location with its natural freshwater springs and fertile soils, good sources of fine-grained raw material for manufacturing lithics, and abundant clay for pottery production (Fadhlan *et al.* 2012), along with a virtual Eden of small, medium-sized and large mammals.

The majority of the Toalean sites in Mallowa lie a long way from the coast (~30–40 km), and this is a reason to distinguish the Toalean culture of the hinterland from the main expression of the Toalean, which is found near the west coast of South Sulawesi. The concept of distinguishing between the coastal and the hinterland Toalean may become an issue for continued research in the imminent future.

Analysis of the faunal remains at the Toalean culture sites in the Mallowa region points to influences on the diet from their hinterland environment. The excavations at Liang Uttange 1 recovered a lot of remains from large animals such as suids and Anoa and small mammals

such as cuscus, palm civets, bats and rats (Table 6). These data demonstrate adaptation of the local Toalean population to its hinterland environment. The hypothesis that Maros points functioned as arrowheads needed to hunt animals of the hinterland forest has strong prospects for confirmation in the upcoming future.

The recovered bone artifacts took the form of points, either rubbed on one face or both faces. The bone used for them came from wild animals including suids. The technology involved shaping to produce a sharp end. The middle part was rubbed to tidy the form into the desired shape. Moreover, some of these points were sharpened through polishing (Figure 23). The majority of the Liang Uttange 1 bone points (Tables 3 and 4) were recovered from square U15 B18 spits 3 (associated with pottery) and 4 (not associated with pottery, dated to ~7000 years ago). Bone points are well-represented in pre-Neolithic, Holocene assemblages in Sulawesi including Toalean assemblages (South Sulawesi) and non-Toalean assemblages in eastern Sulawesi, but any polishing of these tools is associated only with use wear (Aplin *et al.* 2016; Nur 2018). Therefore, the polishing recorded as a finishing technique for a Liang Uttange 1 bone point from layer 2 may reflect Austronesian influence.

Table 6: Summary of faunal identifications from Liang Uttange 1

Taxon	Elements	Identified as used for making points	Other cultural modifications
Anoa	Teeth, cranial and postcranial bones	No	Not noted
Suids	Teeth, cranial and postcranial bones	Yes	Burning
Cuscus	Teeth, cranial and postcranial bones	No	Burning
Palm civet	Teeth, cranial bones	No	Not noted
Snake	Cranial and postcranial bones	No	Not noted
Bat	Teeth, cranial and postcranial bones	No	Not noted
Rat	Teeth, cranial and postcranial bones	No	Burning

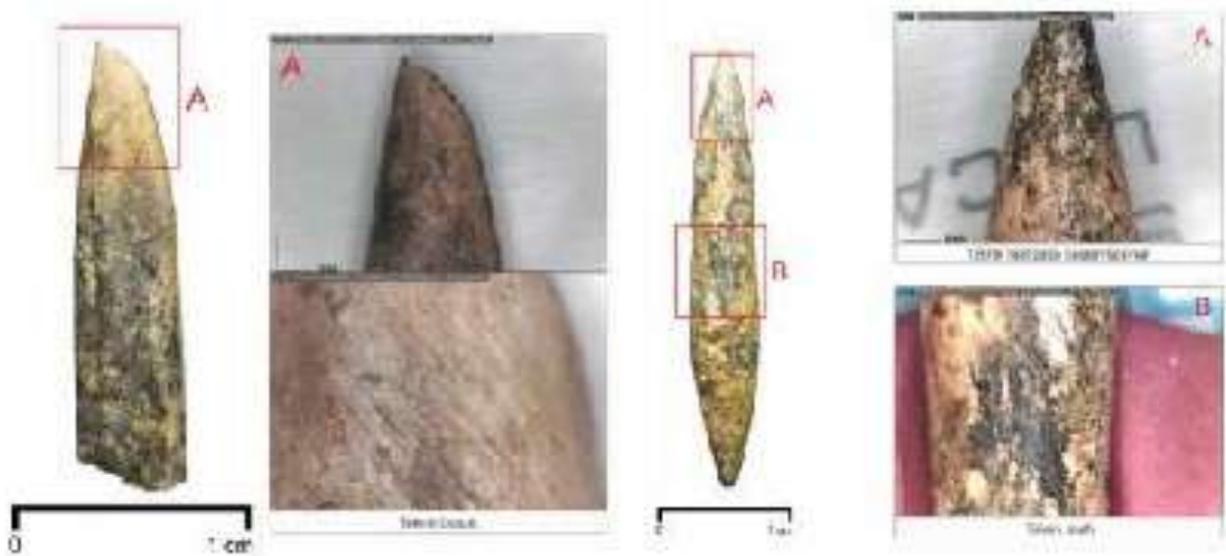


Figure 23: Two of the bone points that show sharpening through rubbing; a technological adaptation at Mallawa. A, left: Unipoint with ground point (teknik gores). A, right: Sharpened tip of bipoint (teknik raut pada bagian tajaman). B, right: middle part of bipoint with polished surface (teknik asah). From Liang Uttange, U6 B18 square, layers 1 (spit 2) and 2 (spit 4). (Source: Balai Arkeologi Sulawesi Selatan, 2018.)

Zooarchaeological analysis of the finds from the excavated square at Liang Uttange 1 clearly shows hunting activities and behavior to soften food through cooking, from the evidence of charcoal in each stratigraphic layer. Some of the bones of the hinterland forest animals show burning, which supports the hypothesis of intensive occupation of the Mallawa region. Mallawa could serve as a case study for testing the hypothesis of Bellwood (2000), for the Southeast Asian region, which is based on the perspective of a pattern of adaptation by the indigenous inhabitants with the Austronesian newcomers, as a

result of the contact between these populations resulting from their living in close proximity.

CONCLUSION

Archaeological survey of Mallawa District, Maros Regency, resulted in the discovery of 16 cave and open sites in the karsts of Mallawa District. The survey results include finds that are interrelated with strong indications of contact between the Austronesian culture and the local Toalean culture. The various artifacts recovered from surface survey include pottery and artifacts of stone, bone and shell.

The finds resulting from the excavation of Liang Uttange 1 possess technological features and artifact types that provide certainty to the research question dealing with interaction between the Toalean and Austronesian cultures. The overall research results point to:

- Establishment of local Toalean occupation by 6260±30 BP.
- Identifications of the faunal remains point to a dietary pattern that was an adaptation to the hinterland environment at an elevation of 314 meters above sea-level. At Liang Uttange 1, which was systematically excavated, lots of skeletal remains were recovered both from large animals such as suids and Anoa and small animals such as cuscus, bats and rats. Softening the food through cooking is suggested by the evidence of charcoal in each stratigraphic layer to the depth of the bottom spit in the U6 B18 square.
- Arrival of Austronesian culture in the Mallawa region and contact with the Toalean culture. Contact and interaction between these two cultures is reflected in the first and second layers at Liang Uttange 1 after approximately 3000 BP. This contact is shown by finds such as pottery, adzes and shell ornaments (Austronesian culture) associated with geometric microliths, blades and Maros points (Toalean culture).
- The contribution of this research is to present data on the multicultural society that arose in the Mallawa region as the immediate outcome of the migration of Austronesian people and their culture and the cultural changes following contact with the local Toalean culture. The cultural changes that can be seen include the use of a ground shell artifact to make a Maros point, along with polished adzes and particular examples of bone artifacts.

Future research

- In view of the great cultural potential of the Mallawa region, recognize it as a research focus for applying multi-year in-

vestigations of its archaeology, history, natural history and related disciplines.

- Going forward, there are two main aspects of research that need to be continued: **First**, clarify the contacts between the Austronesian and Toalean cultures through extension of regional survey and the excavation of closed and open sites; **Second**, see the acculturation impact that emerged through the process of this cultural contact.
- The Mallawa region is expected to become a center of archaeological studies with particular importance for the local establishment of Austronesian people and culture. Moreover, the heritage of this establishment could be developed by the local government as a tourist destination in future days.

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