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Tracking the post-Ubaid ceramic transition as an indicator of social  
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# BETWEEN AN END AND A NEW BEGINNING

## *Tracking the post-Ubaid ceramic transition as an indicator of social change*

J. S. BALDI

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**Abstract.** *New research in previously unexplored or poorly documented areas of Greater Mesopotamia has made it possible to define better the chronology and distinctive material aspects of the Ubaid cultural phenomenon. In particular, the end of the Middle Chalcolithic period has been investigated in well-stratified contexts comparable with the best-known archaeological record from the Mosul-Tepe Gawra region or the Syrian steppe despite the regionally changing nature of the Ubaid cultural sphere. This article aims to present a very elemental characterisation to make this transition better recognisable during fieldwork activities. From this perspective, my paper discusses some recent ceramic data and radiocarbon dates from northern Mesopotamia (from the sites of Logardan and Boskin, in the Zagros Piedmont) and southern Mesopotamia (from the site of Tell 'Uwaili). This approach does not intend to underestimate the complexity and diversification of economic, social, and cultural dynamics developed in different remote areas within the Ubaid sphere. On the contrary, the analysis of ceramic evolution (not only in its most superficial and visible aspects but also according to technical characteristics) aims to verify whether, towards the end of the Obeid phase, the Mesopotamian cultural world still had its own internal coherence, or whether the post-Obeid transition marked a general cultural fragmentation along divergent lines of development in the different regions.*

**Résumé.** *Les recherches récentes menées dans des régions jusqu'alors inexplorées ou insuffisamment documentées de Grande Mésopotamie ont permis de mieux définir, tant sur le plan chronologique que matériel, les aspects distinctifs du phénomène culturel de l'Obeid. En particulier, la fin du Chalcolithique Moyen a été étudiée dans des contextes bien stratifiés qui peuvent être comparés avec des aires mieux connues comme la région de Mossoul-Tepe Gawra et la steppe syrienne, en dépit de la nature multiforme de la sphère culturelle de l'Obeid. Le but de cet article est une caractérisation de base de cette transition, afin de la rendre mieux reconnaissable lors des activités de terrain. Il présente dans ce but des données céramiques récentes et des datations au radiocarbone provenant à la fois de Mésopotamie du Nord (sites de Logardan et Boskin, dans le piémont du Zagros) et de Mésopotamie du Sud (site de Tell 'Uwaili). Cette approche n'entend pas sous-estimer la complexité et la diversification des dynamiques économiques, sociales et culturelles qui se sont certainement développées de manière différente dans des zones fort éloignées les unes des autres. Au contraire, l'analyse de l'évolution céramique (non seulement par ses aspects les plus superficiels et visibles mais aussi en fonction des caractéristiques techniques), vise à vérifier si, vers la fin de la phase Obeid, le monde culturel mésopotamien avait encore sa propre cohérence interne, ou si la transition post-Obeid a marqué une fragmentation culturelle générale suivant des lignes de développement divergentes dans les différentes régions.*

**Keywords.** *Late Ubaid, post-Ubaid, ceramic chronology, Zagros Piedmont, Syrian Jazeera, southern Mesopotamia, social change*  
**Mots-clés.** *Obeid récent, post-Obeid, chronologie céramique, piémont du Zagros, Djézireh syrienne, Mésopotamie du Sud, changement social*

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## INTRODUCTION: DECONSTRUCTING THE END OF A PERIOD

Trying to discern signs of historical and social evolution in ceramic change is an approach that is now so old as to be ingrained in archaeological practice (Roux 2019a). This research strategy (sometimes illusory and sometimes compelling) can rest on a few different investigative methodologies, which determine the quality and reliability of its results (Whittaker et al. 1998). However, all these analytical procedures share the risk of implicitly adopting a culturalist perspective, inappropriately associating chrono-typological variations dealing with time and cultural change depending on people (Roberts and Vander Linden 2011). The mixing of these two scopes is intrinsic to the very notion of chrono-cultural phasing (Petrie 2011; Petrie et al. 2018), whose chief aim is to outline the evolution of people's social organisation over time. Besides, the blending between ceramic chronology and social change becomes particularly slippery in essentialist and culturalist terms when applied to the Ubaid entity.

Originally used to designate a black-on-buff painted pottery style, this toponym of a southern Iraqi site has quickly become an eponym for a “culture”, a people, and a period (Carter and Philip 2010b). Moreover, from its first subdivision into phases (first based on eponymous sites such as Eridu, Hajji Muhammad, and Ubaid and then in stages called Ubaid 1-4; Oates 1960), the same term has delineated both the chrono-ceramic steps and the underlying society. Therefore, even for the most recent research, the commendable intention of separating chronological and social considerations is (at least partly) doomed to failure on the terminological plan. Indeed, when approaching the Ubaid entity, the same label “Ubaid” is used to define the chronological phases and culturally connote human communities (table 1). Nevertheless, since “pots are not people” (Kramer 1977), establishing ceramic chronological indicators for a period does not mean assuming that the examined pottery was the material expression of a specific people or social group. Therefore, this paper focuses on the end of the “Middle Chalcolithic” using this chronological terminology rather than speaking of the Late and Final “Ubaid period” (table 1) to discuss chrono-cultural



Fig. 1 – Late Middle Chalcolithic and Late Chalcolithic 1 sites map (after Vallet et al. 2020: 33).

phasing while avoiding (or at least limiting) any undue confusion between what concerns time and what concerns society. Here, the term “Ubaid” is reserved as much as possible to designate the wide West Asian 6th and 5th millennia BCE sphere of cultural interactions. Indeed, a focus on the differences between distinct regions and communities (fig. 1) is the purpose of an analysis bridging ceramic data and social evolution. There is now a broad consensus on this perspective, following the demonstration that the Ubaid cultural sphere was a multifaceted composition. In this, we find different closely connected interwoven territorial entities to the point of being coated by a (sometimes relatively thin) veneer of ceramic homogeneity (Adams and Wright 1989; Stein and Özbal 2007; Stein 2010b; Baldi 2016b). Hence, although the Ubaid research history and terminology are not favourable for discerning between pots and people, the societies in the background of the Ubaid assemblages are definitely to be understood as plural and differentiated groups.

Recent data from previously unexplored or poorly documented areas of Greater Mesopotamia enhance the focus on the regional differentiation of the Ubaid *oikumene* (Baldi and

Zingarello 2021). They improve the chronology definition and distinctive ceramic features in a relatively basic, but not simplistic, way. Indeed, recently excavated assemblages can be helpful to stress ceramic continuities and discontinuities between Middle and Late Chalcolithic, stressing the complex and diversified economic and socio-cultural dynamics having developed in distinct areas within the declining Ubaid sphere. Once adopted for different regions, this attitude highlights what persists and is new within ceramic horizons. It offers a panorama of various local peculiarities enabling a multi-regional comparative perspective. It is a matter of trying to recognise what changes in different areas at the end of a period and then assessing whether these changes suggest entirely divergent evolutions or whether, despite their composite background, post-Ubaid societies seem to follow comparable (although far from linear) evolutionary trajectories.

## METHODOLOGY. DISTANT SITES AND A DYNAMIC CHART FOR DETERMINING PHASES

The assemblages chosen for this purpose come from regions far away from each other and sites with highly differentiated features.

Tell Feres al-Sharqi is a small rural site close to Tell Brak in the Syrian Jazeera steppe (Hassake province) extensively excavated between 2006 and 2010.<sup>1</sup> The levels straddling the late Middle Chalcolithic and the early part of the Late Chalcolithic sequence (i.e. 10B-10.6, fig. 2.1) include a large ceramic workshop, a large communal edifice, another craft area and a series of barns and storage buildings (Baldi 2016a; Baldi and Vallet 2018).<sup>2</sup> Dargrdal and Boskin are little mounds in the northern Zagros Piedmont, where two step-trenches were dug in 2017 by the MAFGS (the survey expedition to the Governorate of Sulaymaniyah) to substantiate on a stratigraphic basis the validity of the dates attributed in that region to the surface sherds.<sup>3</sup> The contexts excavated at Dargrdal seem to be domestic, whereas, for the period concerned, the test-trench of Boskin has yielded portions of workspaces (probably

**Table 1** – *Paralleling several chronological grids and terminologies (J. S. Baldi). Absolute dates are those accepted since the Santa Fe chronology (Rothman 2001), which do not correspond to the most recent data (fig. 7). The terminology adopted here is purely chronological, devoid of any cultural reference to the Ubaid (right-hand column). The question marks in correspondence with the Ubaid 5 in the “southern Mesopotamia” column indicate the traditional uncertainty about the limits and duration of the Ubaid 5 in relation to the Northern chronology. Southern Ubaid 5 and Northern LC1 seemingly constitute the same chronological phase (see the non-cultural-related chronological terminology column and table 2).*

Absolute dates currently accepted	Northern Mesopotamia (Santa Fe chronology)	Southern Mesopotamia	Non-cultural-related chronological terminology
5300 BCE	Northern Ubaid	Ubaid 3	Middle Chalcolithic
4800 BCE	Late Ubaid	Ubaid 4 ↑ ?	Late Middle Chalcolithic
4500 BCE	LC1	Ubaid 5 ? ↓ ?	(northern or southern) Late Chalcolithic 1
4200 BCE	LC2	Early Uruk	(northern or southern) Late Chalcolithic 2
3900-3850 BCE			

1. The assemblage considered here consists of 187,902 fragments, of which 58,104 are diagnostic.
2. J.-D. Forest directed the expedition until the last campaign. After his death, responsibility for the documentation was passed to R. Vallet.
3. The assemblage considered here amounts to 6,813 fragments, of which 2,817 are diagnostic at Dargrdal, and 17,532 fragments, of which 5,076 are diagnostic at Boskin.



granaries), a mudbrick terrace with diversified architectures and cist graves (fig. 2.2-3; Baldi 2018; Giraud et al. 2019).<sup>4</sup> Girdi Qala North and Logardan, located in the Chamchamal area near the Qara Dagh mountain range in Iraqi Kurdistan, are multi-period sites investigated by an ongoing expedition since 2015 (fig. 2.4-5).<sup>5</sup> At Logardan, level 6 of trench C consists of a large pottery floor and a massive retaining wall supporting a sector of the settlement. At Girdi Qala North, some traces of an occupation dating from the period at the turn between Middle and Late Chalcolithic has been identified in the basal level of trench D (Vallet et al. 2019; Baldi and Zingarello 2021).<sup>6</sup> Tell ‘Uwaili<sup>7</sup> is a large prehistoric site close to Larsa in southern Iraq (Dhi Qar province) explored during the 1970s and 1980s by a French expedition. Fieldwork activities were resumed in 2019 in a new large excavation area (fig. 2.6).<sup>8</sup> In several soundings, disparate Middle-Late Chalcolithic contexts have been excavated, revealing domestic architectures, large (probably communal) buildings, craft areas, mudbrick platforms, and granaries (Lebeau 1983; Calvet 1991; Vallet et al. 2020).<sup>9</sup> These sites have yielded well-stratified material evidence and radiocarbon dates for the late Middle and Late Chalcolithic periods. Although the pottery collected at these sites is highly variable, each has provided a quantitatively significant assemblage. Moreover, their geographical location makes it possible to compare fairly well-known areas, such as the Syrian Jazeera, with much less documented regions where intense fieldwork research is currently carried on, such as southern Iraq and Iraqi Kurdistan. For their combined characteristic, I chose these particular sites to carry out a tentative re-analysis of the phase between the end of the Ubaid and the beginning of what came after. Indeed, to ensure the reliability of a supra-regional study, abundant, partially, or as yet unpublished material was needed from coeval

phases from distant sites located in areas with different environmental attributes, with functionally disparate levels of occupation,<sup>10</sup> excavated in various ways (extensively or in relatively narrow trenches). Likewise, the assemblages presented here make it possible to base the analysis on a high degree of stratigraphic precision and a homogeneous approach from the quantification and selection of diagnostic shapes. These are crucial criteria for the methodology adopted.

First of all, local ceramic typologies were established at each site and tested by applying the “envelope method” (Orton 1987), namely by superimposing the sherds profiles at the same scale to observe, within each type, the degree of similarity of the different specimens in terms of morpho-dimensional variability. Then, using a statistical-combinatory chart, I defined an inter-regional synchronisation that synthetically combines and compares stratigraphies and assemblages of the sites considered. Since this approach is based on typological (i.e., morpho-stylistic) seriations, it implies a certain degree of discretion that cannot be eliminated from the process of defining the “types” within a given assemblage (Hill and Evans 1972; Perlès 1988; Gilboa et al. 2004; Adams and Adams 2007). However, this way of identifying the repertoire of forms and decorations is not methodologically biased by its arbitrariness: in fact, much of the catalogue (figs. 3, 4) consists of types on which, over time, a certain consensus has emerged in the analysis of Middle and Late Chalcolithic ceramics (Oates 1960; Henrickson 1986; Sørenhagen 1986; Abu Jayyab 2012; Baldi and Abu Jayyab 2012; Volpi 2020).<sup>11</sup> On the other hand, the combinatory chart adopted in this paper is basically

4. The MAFGS (*Mission Archéologique Française du Gouvernorat de Sulaymānīyah*) is directed by J. Giraud.

5. The assemblage analysed here amounts to 2,610 fragments, of which 801 are diagnostic at Girdi Qala North, and 14,571 fragments, of which 3,402 are diagnostic at Logardan.

6. Directed by R. Vallet until 2019, the F.Ar.M.Qa.D. (French Archaeological Mission in the Qara Dagh) is currently run by J. S. Baldi.

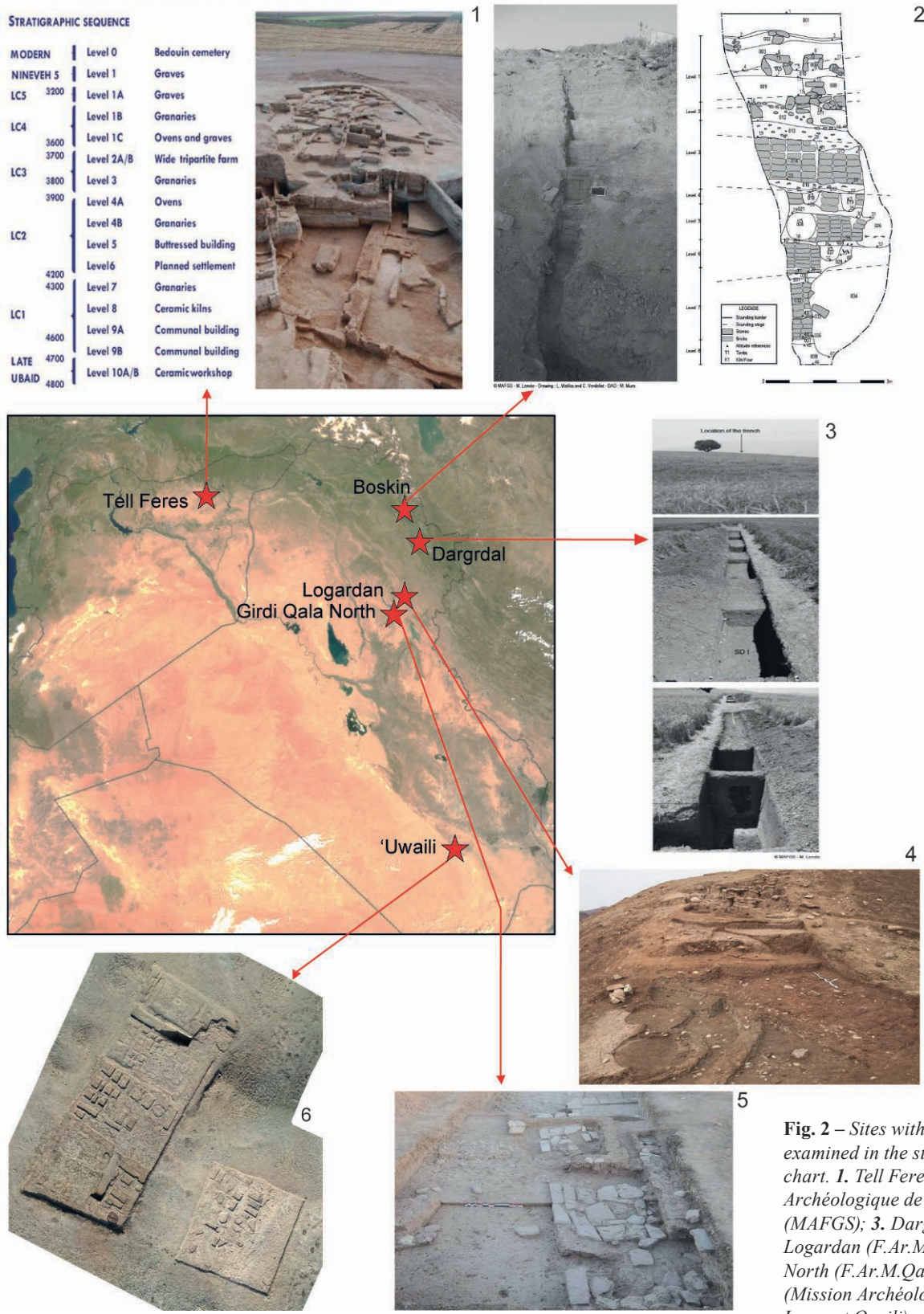
7. In this case, this transliteration from Arabic was preferred (as opposed to the “Oueili” version used in older publications on this site near Larsa) because it is the writing used in preliminary reports since the resumption of excavations (see Vallet et al. 2020).

8. The assemblage analysed here consists of 13,455 fragments, of which 6,732 are diagnostic sherds collected in the last campaigns at ‘Uwaili. But the typological analysis also considers previously published samples excavated in the 1970s and 1980s. At that time, sherd selection exclusively used morpho-stylistic and typological criteria, and no precise information is currently available on their quantity.

9. The French expedition at Larsa and ‘Uwaili is currently directed by R. Vallet.

10. The nature of the excavated areas at each of the sites examined here was an essential factor in the choice of assemblages to be analysed. If all the investigated contexts had been functionally homogeneous, this would certainly have ensured the comparison of ceramic forms associated with practices of the same type. However, it would also have risked excluding from the analysis vessels associated with different activities (since working areas are not rich in storage jars, or vice versa, in warehouses, there are not many fine ceramic vessels). On the other hand, if functionally specific contexts had represented each site, the risk would have been to compare not only sites that were distant from each other but also heterogeneous ceramic shapes, whose presence or absence in the various sites would have been largely due to specific activities performed in specific contexts. For this reason, a variety of contexts characterise as much as possible the selected sites (especially Tell Feres, ‘Uwaili, and Boskin, with dwellings, barns, pits, workshops, and open spaces) as well as a comprehensive repertoire in which all the main functional categories of ceramic vessels (for storage, presentation and consumption of food) were represented.

11. In some cases (such as for the Red-Grey ware or the Coba bowls; fig. 4.19, 4.26), the ceramic “types” do not correspond to specific forms, but rather to a wide range of shapes sharing aesthetic or functional features that have often been emphasised in ceramic analyses on this period (Akkermans 1988a, 1988b, 1988c; Baldi and Abu Jayyab 2012).



**Fig. 2** – Sites with stratified assemblages examined in the statistical-combinatory chart. 1. Tell Feres al-Sharqi (Mission Archéologique de Tell Feres); 2. Boskin (MAFGS); 3. Dargrdal (MAFGS); 4. Logardan (F.Ar.M.Qa.D.); 5. Girdi Qala North (F.Ar.M.Qa.D.); 6. Tell 'Uwaili (Mission Archéologique Française à Larsa et Oueili).

a type-context association table indicating the presence or absence of each specific pottery type in the examined levels of the selected sites. This specific kind of seriation table is mainly employed by Italian studies on European prehistory (Peroni 1998: 14-27). Except for some very recent studies (Vacca 2020; Zingarello 2020), it is rare in west Asian ceramic analyses, but for the Ubaid pottery, the same criterion of highlighting the association between a series of recurring types and different archaeological contexts was already in use for single-site studies (Safar et al. 1981: 148, fig. 72; Vertesalji 1984: 36, table 1). In this paper, I intend to achieve a cross-occurrence seriation based on a few critical principles by applying the method to several sites from different areas.

- The archaeological contexts are indicated on the vertical axis according to their stratigraphic order at each site, from the earliest (top) to the most recent (bottom).<sup>12</sup> The functioning of the table assumes that a context regarded as earlier in the stratigraphic sequence of each sector must never appear below a context ascribed to a later phase and vice versa. It is thus possible to identify chronologically significant groups of contexts and stratigraphic associations (table 2).
- The morpho-stylistic types are indicated on the horizontal axis, ordered from left to right, from the earliest to the most recent.<sup>13</sup> But in this case, the typological seriation does not lead to a permanent arrangement. Indeed, this type of chart is not a static tool, which simply illustrates the presence or absence of different shapes. This table's dynamic nature consists of the fact that the final order of types on the horizontal axis results from several manipulations. This way, the types occurring only

in the first stratigraphic phase are grouped at the top left at the beginning, the later ones at the bottom right of the table, and so on, with the types distinctive of the intermediate phases grouped in the middle, according to an oblique graphical layout from top left to bottom right. The types shared by all contexts (which represent the less chronologically distinctive shapes) have moved to the columns on the far right of the diagram (table 2).

This procedure generates clusters of type-context associations, each including a given number of types occurring exclusively in the contexts of a certain period and never in others.<sup>14</sup> Each cluster indicates an archaeological phase whose internal chrono-cultural coherence is documented by the presence of *characteristic* and *exclusive* ceramic types constituting groups of significant associations.<sup>15</sup> Along with the clusters defining individual archaeological phases, some groups of associations (represented by yellow blocks in table 2) include a certain number of types occurring in two (or more) distinct and contiguous archaeological phases.<sup>16</sup> We can define these groups gathering ceramic varieties as “long-duration types” not univocally attributable to a single phase.

Table 2 summarises the chronostratigraphic and ceramic data of several contexts from Tell Feres, Dargrdal, Boskin, Logardan, Girdi Qala North, and Tell ‘Uwaili between the late Middle Chalcolithic (namely Gawra XIV-XIII) and the early LC2 (Gawra XIA-B and XI).

12. In cases where the stratigraphic order and ceramic assemblages do not give decisive indications for the sorting of the various sites and contexts, they are arranged higher or lower on the vertical axis on the basis of radiocarbon dating.

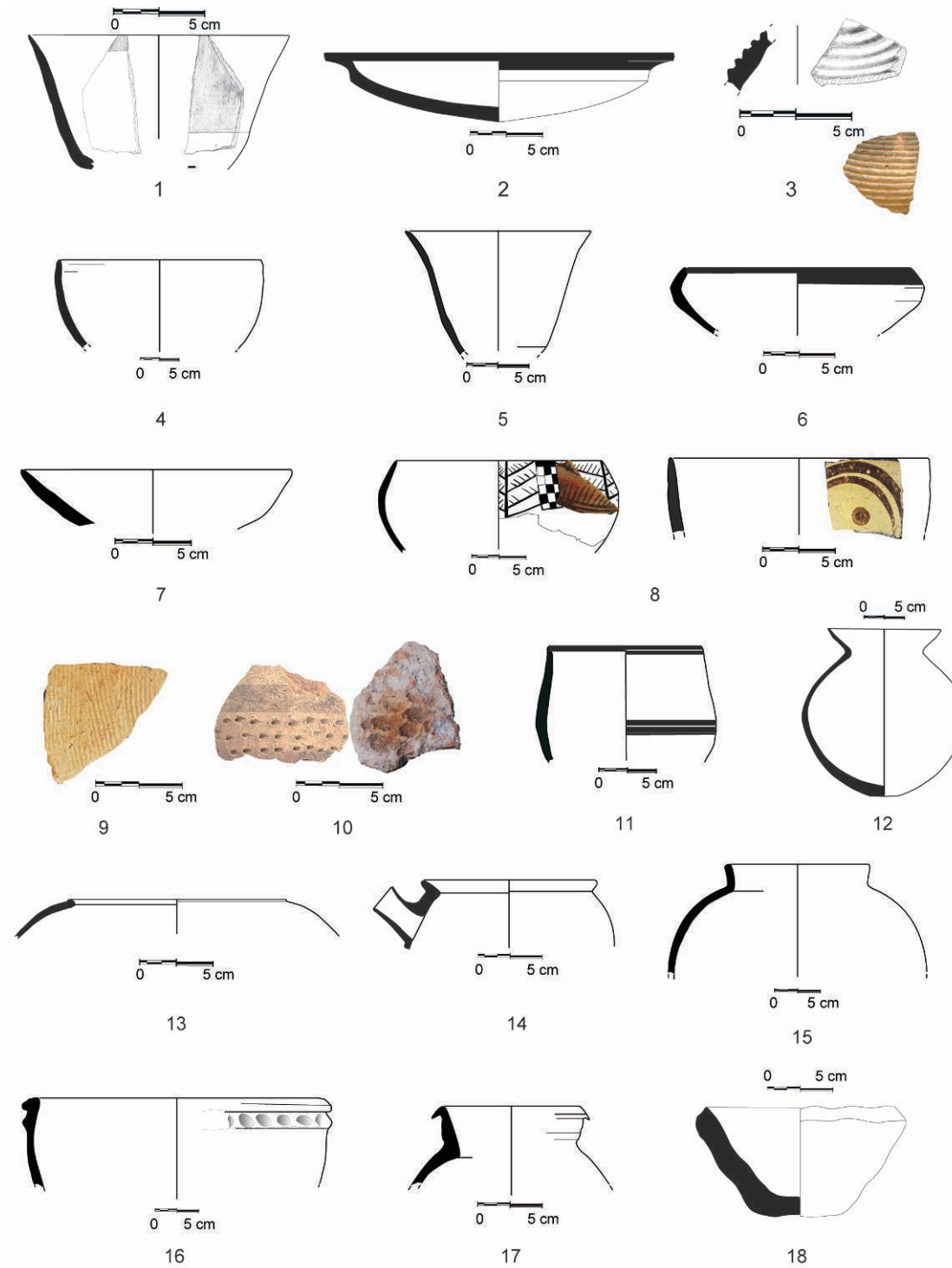
13. As stressed above (note 12), radiocarbon dates are essential. However, in cases where the order of the contexts on the vertical axis is in doubt, the dominant criteria are generally stratigraphic and ceramic. For instance, in table 2, the site of Dargrdal is placed in that position because it includes phase I types but not types typical of phases II and III (only types which, although present until phase III, are documented from phase I). The same can be said of the position of Boskin level 2, which yielded phase II and III types without any typical phase I or III types. Thus, it is preceded by contexts with a greater number of types documented in earlier phases, and followed by contexts with distinctive or more widely represented types in later phases. As pointed out below, although this table appears in its final version, it is the result of a dynamic elaboration, with frequent changes of position for both the contexts on the vertical axis and the types on the horizontal axis.

14. It is important to emphasise that it is not a matter of associations between certain forms and contexts of a specific nature, namely associations dictated by functional reasons. These are chrono-stratigraphic associations between forms that, whatever their function, appear in contexts of a certain phase and not in earlier or later ones.

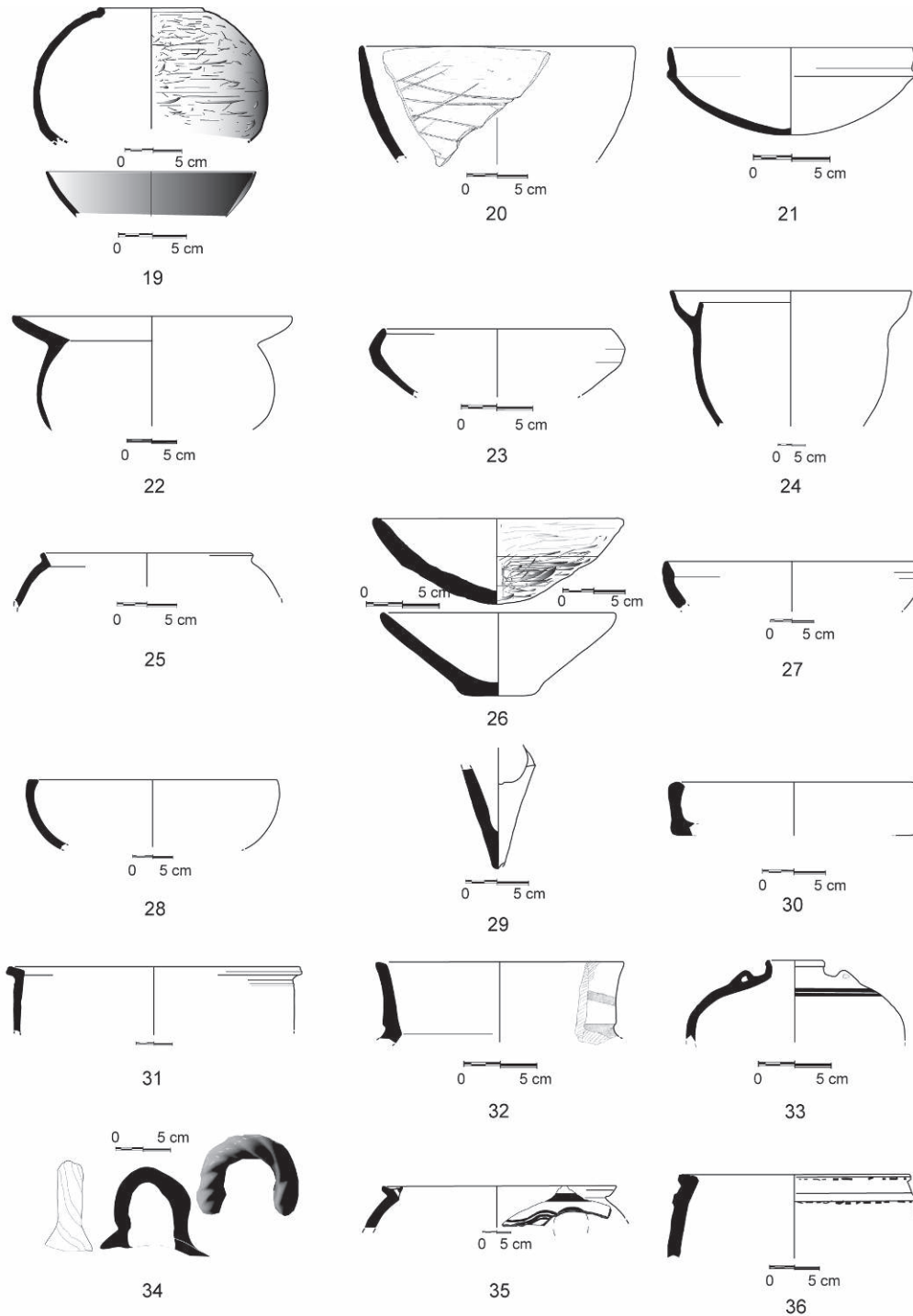
15. In this sense, an archaeological phase is defined by a series of contexts in which several types are *characteristic* and *exclusive*; and these types occur in relatively constant and regular associations. They are also mutually exclusive with other groups of types, which, in their turn, are characteristic and exclusive of other series of contexts, namely of other phases (see Vacca 2020: 184).

16. Indeed, these groups of associations do not represent mere ceramic phases, but proper archaeological phases because of their chrono-stratigraphic coherence.





**Fig. 3** – Late Middle Chalcolithic (Ubaid 4), LCI-Ubaid 5 and early LC2 morpho-stylistic typology: types 1-18, ordered according to the chart (J. S. Baldi). **1.** Rounded bottom and sinuous walls goblets; **2.** Everted ribbed rim bowls; **3.** Corrugated ware; **4.** Deep bowls; **5.** Thin-walled carinated goblets; **6.** In-turned rim bowls (painted rim); **7.** Thinned-rim shallow bowls; **8.** Locally specific painted decorations; **9.** So-called “Dalma Ware” Comb-decorated pottery; **10.** So-called “Dalma Ware” Impressed-incised-rusticated ware; **11.** Middle body carinated bowls; **12.** Flange-rim jars (small rim); **13.** Beaded rim holemouth jars; **14.** Pots with cannon spouts; **15.** Short neck flaring rim jars; **16.** Large deep bowls with shaped rim; **17.** Dropping lip jars; **18.** Proto-bevelled-rim bowls.



**Fig. 4** – Late Middle Chalcolithic (Ubaid 4), LCI-Ubaid 5 and early LC2 morpho-stylistic typology: types 19-36, ordered according to the chart (J. S. Baldi). **19.** Red/grey burnished beaded-rim bowls and holemouths; **20.** Internally incised bowls; **21.** Fine carinated bowls; **22.** Flange-rim jars (large rim); **23.** In-turned rim bowls (plain rim); **24.** Double-rim jars (large rims); **25.** Inward bevelled rim holemouth jars; **26.** Coba bowls and associated types; **27.** Inward bevelled rim bowls; **28.** Flattened rim bowls; **29.** Pointed bases; **30.** Irregular profile shallow trays; **31.** Square-edge urns; **32.** Flaring-rim jars; **33.** Pierced lugs jars; **34.** Twisted handles; **35.** Double-rim jars (little rims); **36.** Ribbed, flattened-rim large urns.



## SERiations, STRATIGRAPHIES AND ABSOLUTE DATES: A COMPARATIVE DYNAMIC ANALYSIS

### LOOKING FOR THE END OF THE MIDDLE CHALCOLITHIC: IS THERE SUCH A THING AS THE LC1?

In table 2, a large number of dark yellow columns to the right of the chart clearly indicate the very significant ceramic continuity during the whole period, with types attested throughout the centuries between the late Middle Chalcolithic and the early LC2. Although this evidence is entirely correct, it also depends on the fact that this table does not consider the quantitative frequency of the considered types.<sup>17</sup> As a result, Coba bowls and associated types (fig. 4.26), which are rare at the end of the Middle Chalcolithic as well as at the beginning of the LC2 and extremely widespread during the LC1 (Baldi 2012a, 2012c),<sup>18</sup> end up not being regarded as characteristic and distinctive forms for the definition of the LC1 phase. Likewise, inward bevelled-rim bowls (fig. 4.27), which are ubiquitous during the LC2 but sometimes appear even earlier (as in Norşuntepe or Hamoukar “southern extension”; Hauptmann 1976: pl. 49.1-2, 1979: pl. 42.3, 1982: pl. 37.5; Abu Jayyab 2012: fig. 2.3-5) cannot be considered a typical shape of the LC2.<sup>19</sup> A similar consideration also applies to very conservative forms, such as flaring-rim jars and pierced lugs jars (fig. 4.32-33), whose slight morphological evolution over the long term and throughout the Mesopotamian alluvium (until the end of the Late Uruk in the South; Baldi 2016a, 2016b: 123) can only be appreciated by taking into account the quantitative variations of each micro-type of rim or handle. However, the absence of a quantitative analytical criterion

17. Apparently, this seems to be a major weak point, but in reality it is a pragmatic feature of this methodology. Indeed, considering the frequency of the various types, possibly using battleship curves or precise counting in the chart (Wright 1981), would allow a more detailed definition of the assemblages by showing the quantity of the residual types in each level. But for a table that must combine data from several sites, and include also information from old excavations (among the sites considered here, this is the case of Tell ‘Uwaili), often indications of type frequency are non-existent.

18. If not explicitly stated, the considerations on the quantitative evolution of the various types do not apply only to the sites considered in table 2 but are valid for the entire Ubaid cultural sphere.

19. Inward bevelled-rim bowls are, in fact, also very common towards the end of the LC2 and the beginning of the LC3 (as in Hacinebi A, Hammam et-Turkman VB, Helawa, or in Transcaucasia at Böyük Kesik and Leilatepe, Akkermans 1988a: fig. 9.140, 1988c: pl. 104.74; Pearce 2000: fig. 2g; Akhundov 2007: fig. 13.7-13.10; Peyronel and Vacca 2020).

does not distort the result of the chart.<sup>20</sup> Instead, it should be considered an element to balance the qualitative outcomes according to the typology’s degree of accuracy (the two aspects influencing each other).

Even considering these caveats, two clusters of late Middle Chalcolithic and early LC2 contexts (in light and dark grey, respectively, in table 2) appear distinctively due to the types exclusive to these phases. Concerning the late Middle Chalcolithic, which appears as “phase I” at the top left of the chart, it is characterised by (fig. 3.1-3) rounded bottom and sinuous walls goblets (Jasim 1985: fig. 115.c), everted ribbed-rim bowls (Safar et al. 1981: fig. 75.4-9, fig. 76.1, fig. 77.4, 77.6-7, also known as *assiettes à marli* in the french archaeological literature; Lebeau 1983: 81, pl. III, V.1) and corrugated ware (Tobler 1950: pl. CXXXVIII.300, 302; Arzt 2001: fig. 3-57.290). However, one should see these types as distinctive of this phase compared to the other stages of the period under consideration, which does not imply that they are uniquely characteristic of the late Middle Chalcolithic-Ubaid 4 phase (Oates 1960) typology. In other words, they are distinctive of the cluster of contexts appearing at the chart’s beginning (namely at the beginning of the period under consideration). It does not mean that the same shapes are not attested before.<sup>21</sup>

At the other extremity of the sequence discussed here, the beginning of the LC2 is characterised by fine carinated bowls, flange (large)-rim jars (Abu Jayyab 2012: figs. 6.8, 13.6, 13.8), in-turned (plain) rim bowls (Numoto 1987: fig. 14.4, 14.7), and double (large) rim jars (fig. 4.21-24). This cluster of contexts from Tell Feres, Tell ‘Uwaili, and Boskin appears in table 2 as

20. Other changes, such as those concerning technical aspects, are also not taken into account by this chart. This does not mean that they are secondary issues (as specified in the following paragraphs). For instance, as far as north Mesopotamian fabrics are concerned, a widespread increase in pastes with vegetal inclusions starts in the Late Ubaid, becomes more pronounced during the LC1, and then leads to a very large presence of so-called Chaff-Faced Wares from the LC2 onwards. However, apart from the fact that the chart is based on criteria of morpho-stylistic typology, it would be very hazardous to base evolutionary considerations on fabrics. A generalised and long-lasting evolution towards Chaff-Faced Wares is a matter of fact. But it would be much more aleatory (if not impossible) to establish the pace and details of this evolution as a result of comparisons between different and distant sites. Fabrics were prepared on the basis of culturally different recipes and local availability or absence of specific raw materials.

21. On the contrary, these types are well documented during the phase that Oates (1960) refers to as “Ubaid 3” (see for instance at Tell al-‘Abr, Hammade and Yamazaki 2006). Although it is beyond the scope of this paper, this collateral result of the cross-occurrence seriation highlights the very blurred boundaries between Ubaid 3 and 4, and the consequent need to redefine the internal chronology of the Middle Chalcolithic (see Volpi, this volume).



“phase III”. For the same reasons as the ones mentioned for the initial section of the chart, it contains some shapes documented for later periods.<sup>22</sup> Moreover, in-turned rim bowls with plain rims represent a case where the combination of quantitative and qualitative data in the chart should be critically scrutinised. Indeed, on the one hand, this shape is a plain variant of an analogous and very common type with a painted rim (fig. 3.6) documented at the analysed sites and throughout the Ubaid sphere between the end of the Middle Chalcolithic and the LC1 (table 2).<sup>23</sup> On the other hand, specimens with an undecorated rim are rare everywhere at the beginning of the LC2.<sup>24</sup> Therefore, it would probably be more correct to consider types 6 and 23 as variants of a single type, which simply becomes less frequent and generally non-painted at the beginning of the LC2.

Despite these considerations, phase III constitutes a clearly recognisable chrono-cultural stage from a ceramic point of view. This means that the initial stage of LC2 marks a clear break with Ubaid traditions. It also suggests that the period appearing here as “phase III” is quite distinguishable from the rest of LC2.<sup>25</sup> The distinct discontinuity from previous phases is indicated above all by the beginning of phase III coinciding with the disappearance of many long-duration types (yellow column in table 2 indicated as phase I-II), which were widespread throughout Greater Mesopotamia since the Middle Chalcolithic. Here is the confirmation of an aspect that has already been underlined in a few cases for the early LC2 in northern Mesopotamia, namely its character as a highly

idiosyncratic moment, clearly distinct from the late Ubaid and the late LC2 (Gut 1995; Baldi and Abu Jayyab 2012; Baldi 2016b). In this respect, finding Tell ‘Uwaili among the sites where phase III (levels B-A in trench X36; Calvet 1991) is unambiguously recognisable is an interesting situation. It suggests that the distinctive character of phase III marks the beginning of the LC2 in northern Mesopotamia and also connotes the Early Uruk of southern Mesopotamia.

The same cannot be said of a possible “phase II”, which would unequivocally define the LC1. Indeed, table 2 shows that a typically and exclusively LC1 ceramic repertoire does not seem to exist. The only form exclusively attested for this stage in a wide range of contemporary contexts at Tell ‘Uwaili, Tell Feres al-Sharqi, Boskin, and Girdi Qala North is a bowl with a mid-point carination (fig. 3.11). This shape, often characterised by horizontal painted bands across the carination and the rim, may have a ring base or a rounded bottom and appears with different decorations and a slightly thinned everted rim in northern and southern Mesopotamia (at least) since the middle (Ubaid 3 and 4) stages of the Middle Chalcolithic (as at Tell al-‘Abr, Tell ‘Uwaili or Tello; Genouillac 1934: pl. 30.2.a; Lebeau 1983: pl. VII.4-9; Hammade and Yamazaki 2006 : pl. 6.2.1, 6.3.9). In other words, here again, it would be probably more correct to consider the bowls with mid-point carination as a variant, unquestionably characteristic of the initial Late Chalcolithic but belonging to an older type, widespread long before that time. This is an indication of the highly elusive nature of the LC1. Considering the number of sites analysed here, it would be hazardous and even improper to define a ceramic phase solely on the base of a single type that seemingly appears neither before nor after. The fuzzy character of the initial Late Chalcolithic does not seem to be the effect of a methodological bias, possibly due to the restricted quantity of assemblages taken into account. Instead, it appears to be a general feature of the centuries labelled LC1 (Rothman 2001). This is no surprise since there is a strongly recognisable Ubaid material culture (with mullers, small clay boats and figurines; Stein 2010a, 2010b; at least) until the end of the Middle Chalcolithic, just as later, there was a material culture typical of the beginning of the LC2 (with stamp seals and spectacle idols; Rothman 2002). In contrast, there are no artefacts exclusively associated with the LC1. And if it were the other way around, there would be no

22. In particular, double-rim jars are attested until the end of the LC2, as at Tepe Gawra, where they continue until level IX (Rothman 2002: fig. 14.1448, 1475). A variant of fine carinated bowls, with a thinned and flared rim above the carination, is largely documented until the early part of the LC3, as at Tell Feres or at Helawa in the Erbil plain (Baldi and Abu Jayyab 2012; Baldi 2016a; Peyronel and Vacca 2020).

23. See for instance at Tepe Gawra, Hammam et-Turkman or Nineveh (Tobler 1950: pl. CXXXII.236, CXXVII.167, CXXVII.169, CXXIV.126, CXXIV.129; Rothman 2002: pl. 8:801, 822; Akkermans 1988c: pl. 101.47; Gut 1995: pl. 54-55.811-812).

24. At Tell Feres, the early LC2 plain specimens of in-turned rim bowls are 18, while those painted in earlier phases are 621; at Boskin the early LC2 plain specimens are 5 compared to 58 painted in earlier phases; while at Tell ‘Uwaili (considering only the assemblage excavated since 2019, the only one for which we have quantitative data) the ratio between plain and painted specimens is 2 to 70.

25. The difference between the first and second parts of LC2 lies beyond the scope of this article and, therefore, is not documented in table 2. However, it is worth noting that among the four distinctive forms of the Early LC2 (phase III), at least two are not documented in the late LC2. In particular, the fine carinated bowls (fig. 4.21), from the late LC2 onwards (Abu Jayyab 2012: fig. 11.5), have a much more developed and flared rim, while the plain in-turned rim bowls (fig. 4.23) disappear altogether from the late LC2 onwards.

need to search within the ceramic assemblages for the existence of the LC1 as an autonomous phase.<sup>26</sup>

Nevertheless, pointing out the problematic and vague definition of the LC1 on a ceramic basis is not the same as stating that LC1 ceramics are particularly difficult to recognise. Table 2 clearly shows that the long-duration types attested since the late Middle Chalcolithic (Ubaid 4) disappeared at the end of the Ubaid 5-LC1. In contrast, the long-duration types documented in the early LC2 appear at the beginning of the cluster of contexts belonging to the Ubaid 5-LC1 stage. In the case where ceramic types belonging to these two long-duration blocks (the ones attested since the Ubaid 4-late Middle Chalcolithic and the ones documented until the Early LC2) are found together in the same well-stratified context, the chronological attribution of the context can only be the Ubaid 5-LC1. This is indeed the case in the contexts of Tell ‘Uwaili, Boskin, Tell Feres, and Girdi Qala North, where specimens of thin-walled carinated goblets or thinned-rim shallow bowls (Safar and Lloyd 1948: pl. III.6C; figs. 3.5, 7; Hammade and Yamazaki 2006: pl. 6.43, both long-duration types of the phases I-II) were identified along with flange (small) rim jars or pots with cannon spouts (Rothman 2002: pl. 6.240; Roaf 1989: fig. 12. F11; fig. 3.12, 3.14, both long-duration types of the phases II-III). These are not contingent circumstances relating only to the sites analysed here but associations of types that can also be observed elsewhere in contexts dating from the LC1 (such as at Tepe Gawra XII for flange rim jars and thin-walled goblets, Rothman 2002: pl. 6.235, 6.271). However, this LC1 ceramic definition remains loose because it is delineated not by distinctive features but by types appearing before and not continuing. Ultimately, it is not very satisfactory.

#### AN ALTERNATIVE STRATEGY: TRYING TO DEFINE THE LC1 THROUGH A CERAMIC PROCESS

Although this is not adequate in terms of typological definition, matching the chronological boundaries of the elusive LC1 phase with the appearance and disappearance of a large number of long-duration ceramic types (table 2) is profoundly significant from a cultural point of view. It does not invalidate the clear-cut ceramic continuity between the late Middle Chalcolithic and later periods. On the other hand, it offers a

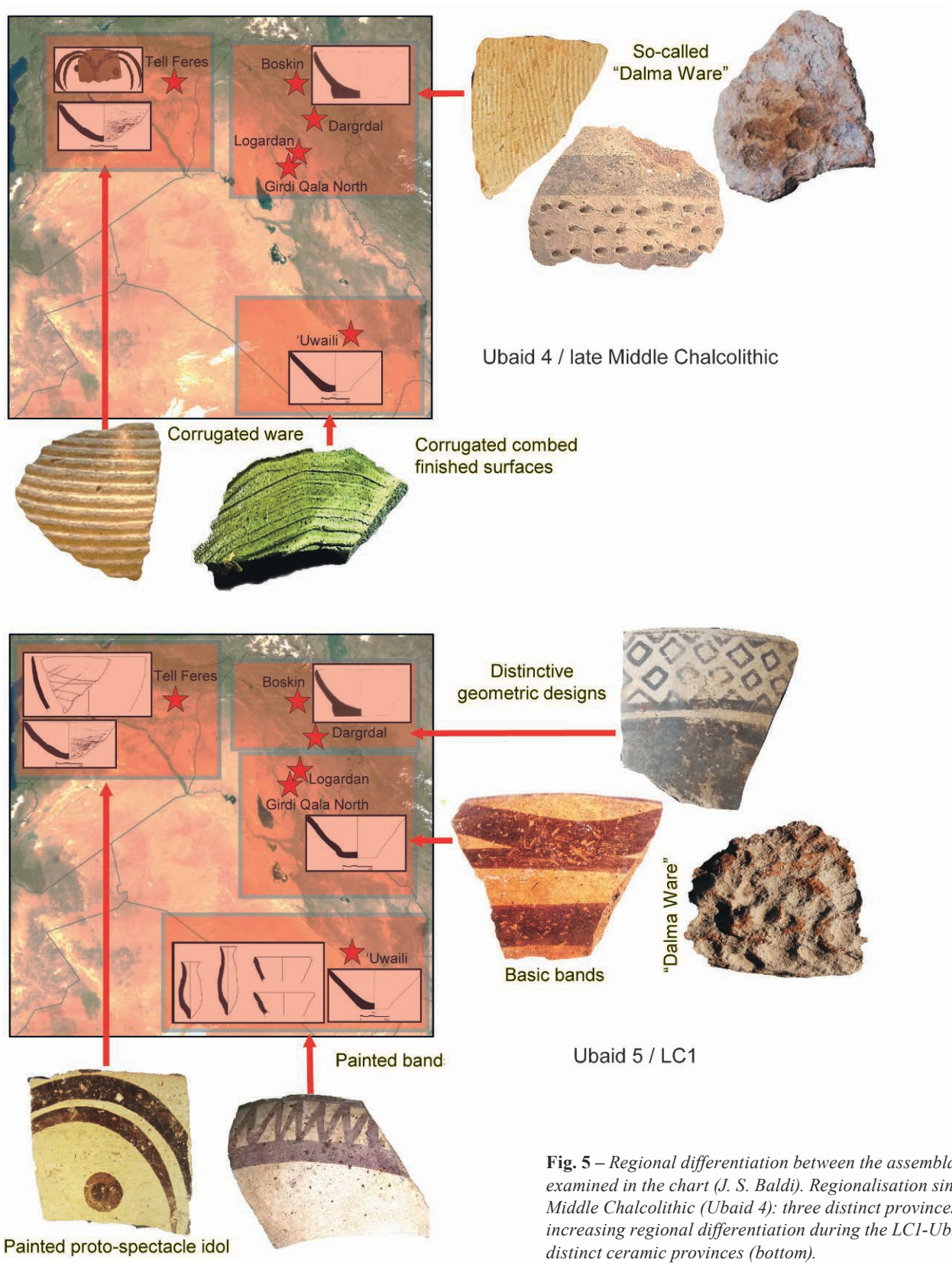
schematic picture of the LC1 as a time undeniably characterised by a profound socio-economic change. Although not clearly distinguishable from specific ceramic shapes, the LC1 begins and ends with relevant discontinuities in ceramic practices. Many plain or decorated types, with closed or open shapes intended for storage or consumption practices, evolved abruptly, vanishing or emerging as tools of everyday habits in all of Greater Mesopotamia. These social changes arise from deep dynamics (at least partly) schematised in table 2. The analysed sites are represented by contexts that, from a functional point of view, are not limited to a specific field; they cover various activities (housing and storage areas, as well as workshops and communal buildings). Therefore, empty boxes in table 2, without any “X” to mark the presence of a given type in a specific context, are not indicative of missing information but of increasing regionalism instead. The number of sample sites analysed here is sufficient to offer a general overview of this trend, yet it is insufficient to describe it comprehensively. But the geographical distribution of these settlements in different areas avoids the risk of making mistakes in generalising processes that might have been restricted to specific territories.

The regionalisation of the assemblages is a tendency inscribed in the very nature of the Ubaid cultural sphere. Nevertheless, as early as the Ubaid 4/late Middle Chalcolithic, one can detect an evident differentiation between at least three ceramic macro-provinces: the South, the North-East and the North-West (fig. 5, top). Some ceramic productions have wavy or incised surfaces in all three of these districts, but they are very different. Although attested in other northern areas,<sup>27</sup> the so-called “corrugated ware” (fig. 3.3) is mainly concentrated in the Syrian Jazzeera and the Upper Euphrates (Arzt 2001: fig. 3-57.290; Baldi 2012b: fig. 6.4). The version documented in Tell ‘Uwaili, Uruk and the whole South is not really corrugated; it has much shallower folds and deeply combed wavy or horizontal patterns on the external surface (Boehmer 1972: pl. 57, 643; Lebeau 1983: pl. XIV).

On the other hand, Boskin, Logardan, Girdi Qala North, Dargrdal, the Hamrin Basin and the whole northern trans-Tigridian region display a variant of “Dalma Ware” (Abedi et al. 2014a; Abedi et al. 2014b; Abedi et al. 2015; Alden et al. 2021) with lightly combed and with very close incisions (fig. 3.9; Jasim 1985: fig. 214g). Moreover, since the end of the Middle Chalcolithic in these three macro-areas, the appearance of the so-called “Coba bowls” (or Wide flower pots or

26. A further indication of this, both in terms of ceramics and other material evidence, is that recent and ongoing surveys in northern Mesopotamia refer to the beginning of the Late Chalcolithic as the “LC1-2 phase” (Baldi 2018; Sconzo 2019).

27. See for instance in the Gawra-Nineveh district (Tobler 1950: pl. CXXXVIII.300, CXXXVIII.302; Gut 1995: pl. 50.754-759).



**Fig. 5** – Regional differentiation between the assemblages examined in the chart (J. S. Baldi). Regionalisation since the late Middle Chalcolithic (Ubaid 4): three distinct provinces (top), then increasing regional differentiation during the LC1-Ubaid 5: four distinct ceramic provinces (bottom).



associated types; fig. 4.26) is documented by (still relatively rare) specimens already presenting different morphologies (Baldi 2012a, 2012c; Kennedy 2012, 2019). These regional differences do not stem from the existence of ceramic types exclusively associated with one territory and absent from the other. Even though Dalma Ware seems to be absent from Tell ‘Uwaili and in the South, this broad ceramic category is by no means restricted to the northern Zagros and Upper Tigris. It is also widely present in the Hamrin at least as early Ubaid 3,<sup>28</sup> and appears sporadically in Tell Feres and the Syrian Jazeera. Likewise, the so-called “corrugated ware” is documented not only in the north-western macro-province but also by some (rare) specimens with less-pronounced corrugations from the Zagros and the Hamrin (Jasim 1985: fig. 214b-c). However, there is a significant tendency for the Ubaid 4 sphere to become more and more diversified according to local specificities. In other words, in this case, table 2 does not work as a mere presence/absence indicator. The information that one can draw from it (i.e. certain types being attested in more than one area) requires balancing against the quantitative data available. For instance, it shows that “corrugated ware” is not typical of the North-East, just as types associated with “Dalma Ware” are rare in the North-West and Syrian Jazeera.<sup>29</sup> However, even from a purely typological point of view, it is significant that the version of “corrugated ware” attested at Tell ‘Uwaili and the South is not documented anywhere else (fig. 5, top). Likewise, a clear distinction is attested, starting from this period, between semi-globular Coba bowls in the North-West and those with a flattened base appearing instead in the North-East. Here is the beginning of a noticeable trend towards regional differentiation.

This trend is much broader in the LC1 (fig. 5, bottom). Starting from this phase, the South stands out from the other regional assemblages, with proto-bevelled-rim bowls (fig. 3.18; Wright 2014: 119), elongated bottles, and vertical twisted handles (fig. 4.34; Lebeau 1983: pl. XXIII) and other proto-Uruk shapes. Tell Feres yielded almost all the shapes documented in this period (table 2), confirming that towards the middle of the 5th millennium BCE the Khabur Basin, probably due to the growing role of Tell Brak as a major supra-regional

centre, became a connection area gathering different cultural influences from the South, the East, and the West.<sup>30</sup> However, the Khabur also shows locally specific traditions, such as red or grey burnished ware and internally incised bowls (fig. 4.19-20; Baldi and Abu Jayyab 2012: fig. 3).<sup>31</sup> Finally, in the Zagros, there is a distinction between more eastern sites close to the mountain range (as Boskin) and those in foothill areas (as Girdi Qala North). This region still shares some local features already observed in the Ubaid 4/late Middle Chalcolithic, such as the combed and rusticated Dalma Ware. However, there are divisions about other attributes, such as the ribbed flattened-rim large urns (fig. 4.36; Roaf 1989: figs. 5.J6, 6.K7, 6.K17, 6.L6) or painted decorations, which are very specific in the mountain area and much more generic in the Piedmont (fig. 5, bottom). As far as painted decorations are concerned, the LC1 develops and completes a trend towards the appearance of strongly regionalised motifs already observable in the Ubaid 4/late Middle Chalcolithic. Indeed, whereas painted decorations became increasingly rare and plain throughout the Ubaid sphere, some local traditions appear to be increasingly distinguishable. These trends are not in contrast since locally specific traditions are not characterised by very complex decorations but rather by a specific and strongly recognisable structure and design. It is the case of the so-called “Sprig Ware”, with a motif of stylised black painted branches on a reddish paste. Although there are occurrences of this category (fig. 3.8, left) in the Syrian Jazeera (at Tell Feres as well as at Hamoukar; Baldi and Abu Jayyab 2012: fig. 2; Baldi 2012b: fig. 7.4) and even some rare specimens at Boskin in the northern Zagros, it is rather typical of the Zammar region on the Upper Tigris (Ball 1997; Rothman 2002: pl. 7.311, 7.324, 7.320, 7.322; Ball 2003: 54). Likewise, although attested up to the Upper Tigris at Kenan Tepe (Parker et al. 2006: fig. 16.A), the “proto-spectacle idol” motif (fig. 3.8, right) is highly typical of the Khabur Basin (Oates 1987: fig. 2; Arzt 2001: figs. 3-25.117, 3-48.242-245; Baldi 2012b: fig. 7.4). At the same

28. See, for instance, at Tell Abada, levels II-I (Jasim 1985: figs. 211-215).

29. At Tell Feres, 819 specimens of “corrugated ware” are documented. In contrast, it is absent from Boskin, Dargrdal and Logardan (table 2), and it is rare in other north-eastern contexts such as the Hamrin Valley (Jasim 1985). Also in contrast, Tell Feres (by far the most extensive assemblage analysed here) has only seven samples of combed “Dalma Ware” in this phase (in level 9b; table 2), while Logardan, Boskin and Dargrdal have yielded 32, 85 and 20, respectively.

30. Indeed, Tell Feres does not only present forms of southern tradition (such as the large deep bowls with shaped rims; fig. 3.16). It also has combed decorations which have their origin, as discussed below, in the Zagros and in northern Iran (fig. 3.9). Above all, the most numerous containers during this phase show how Tell Feres and the Syrian Jazeera incorporated both eastern and western influences. Coba bowls (fig. 4.26) are documented with the rounded bottom shape of south Anatolian and western origin and the V-shaped flat base profile of eastern origin (Baldi 2012b, 2012c).

31. In any case, even these more local Khabur traditions show strong connections with the surrounding areas. In particular, red-grey ware is widely documented in the Upper Tigris and internally incised bowls are attested as far west as the Balikh valley (Akkermans 1988b: pl. 91.258; Stein 2010a; Abu Jayyab 2019).



time, Tell ‘Uwaili and the South are witnesses to an increasing prevalence of plain painted triangle motifs, mainly concentrated on the shoulders of the vessels (Boehmer 1972: pl. 45.30; Lebeau 1983: pl. XX.3), which from Ubaid 5 onwards, begin to evolve into the triangular incised decorations typical of the Uruk repertoire (Calvet 1991: pl. XIII.130-131, pl. XII.125-126). Thus, it is evident that during the LC1, several Ubaid ceramic traditions became fragmented and evolved in different ways according to the regions.

The regionalised splitting trend seems to reverse at the beginning of the LC2-Early Uruk phase, when Tell Feres and the North-West share many features with the Upper Tigris/Gawra area, as also does the Zagros Piedmont. On the other hand, the South maintains a distinctly different assemblage. Still, an increasing connection between the Zagros and the South is documented by the early appearance of some proto-Uruk shapes in the north-eastern Trans-Tigridian region. It means that all of early LC2 northern Mesopotamia is beginning to look like one substantial ceramic province sharing the Gawra XI assemblage (Tobler 1950; Rothman 2002). Of course, within this macro-area, there are distinctions, but these consist essentially of local versions of the same types. For instance, in the Gawra region and the Upper Tigris, the so-called “cannon spouts” (fig. 3.14) are fairly developed and have a slightly flared “trumpet-like” end (Rothman 2002: pl. XII.1453), while in Boskin and throughout the northern Zagros the spouts are rather broad and short (Baldi 2018).

Similarly, as far as double-rim jars are concerned, Tell Feres, the Syrian Jazeera, and the Tepe Gawra area present a type with a highly developed outer rim (fig. 4.24; Baldi and Abu Jayyab 2012: fig. 4), while Boskin and the entire Trans-Tigridian region maintain a version with two small edges, very similar to the type attested since the Middle Chalcolithic (fig. 4.35). However, these are minor idiosyncrasies within a very coherent area from a ceramic point of view. Indeed, what is most interesting is not so much the existence of these subtle typological divergences within the North but rather that the versions attested at Boskin and in the northern Zagros illustrate a clear connection with contemporary Early Uruk South Mesopotamian assemblages. It is no accident that short cannon spouts and double-rim jars with tiny rims are attested in layer A of Calvet’s trench at Tell ‘Uwaili (Calvet 1991: pl. III.25, III.30, III.32). The form that best expresses the existence (or rather the persistence; Baldi 2018; Baldi and Zingarello 2021) in the early LC2-Early Uruk of a “Trans-Tigridian corridor” between the South and the North-East is the proto-bevelled-rim bowl (fig. 3.18). These containers, typical of the Early Uruk phase at Tell ‘Uwaili and throughout

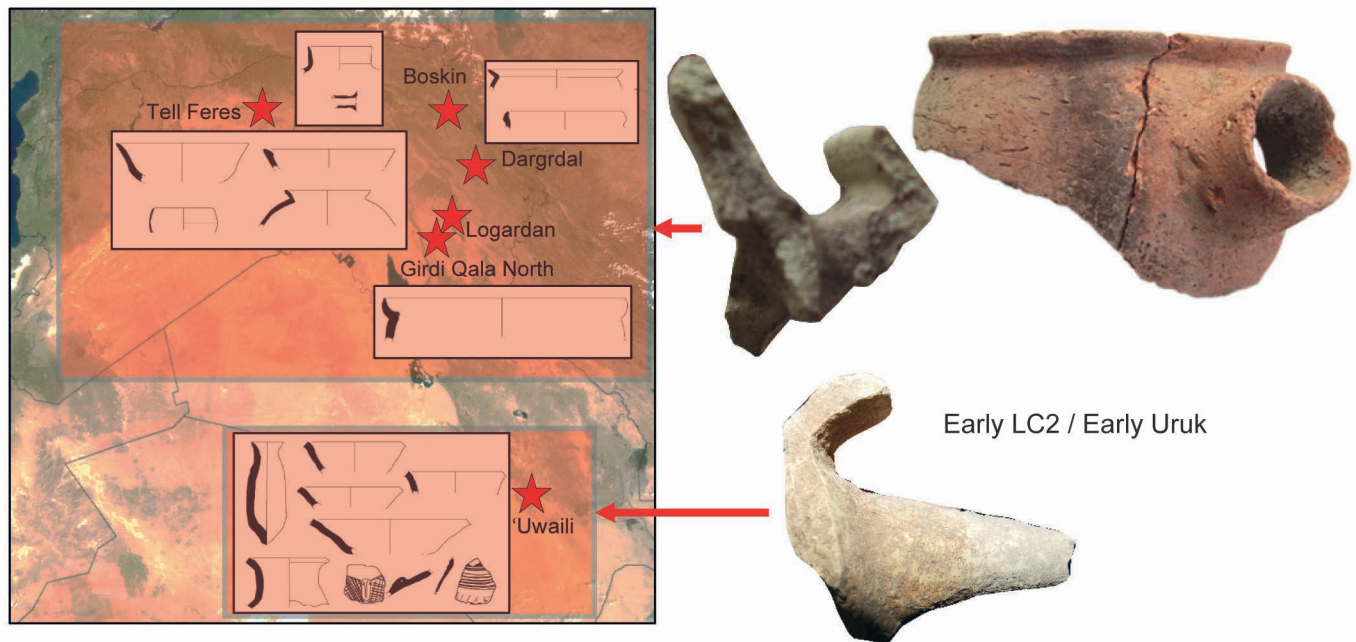
the South (Dyson 1966: 320; Calvet 1991: pl. I.5-7; Alizadeh 2014: 30; Wright 2014: 119), occur since the Early LC2 in Boskin and other sites of the northern Zagros Piedmont (Giraud et al. 2019; Baldi and Zingarello 2021).<sup>32</sup>

Consequently, in looking at table 2, by shifting one’s attention from the presence or absence of the various types within the different contexts to the more general diachronic picture, regionalisation appears as a significant ceramic process, with an increasing trend from the late Middle Chalcolithic onwards, up to an inverse tendency from the early LC2. Adopting this perspective, the LC1 represents the peak of the differentiation process of the local assemblages considered in the chart and the rest of the Ubaid cultural sphere. Although adding an essential attribute to the description of LC1 as a phase in its own right, this remark does not provide a satisfactory definition. In fact, on the one hand, we observe a growing emergence of increasingly regionalised local features from well before the final part of the Middle Chalcolithic. The regional differentiation of the ceramic repertoires probably dates back at least to the Ubaid 3 (around the middle of the Middle Chalcolithic) and must be considered an intrinsic consequence of the spread of the Ubaid entity over much of the Fertile Crescent (Stein and Özbal 2007; Baldi 2020a). On the other hand, it is also true that a trend towards greater integration between distant areas (especially between the North-East and the South) is beginning to be perceptible during the LC1, even in the framework of a highly fragmented ceramic landscape. So even from this point of view, the LC1 does not appear to be a schematically and distinctly definable phase.

## PUTTING DATES AROUND AN ELUSIVE CULTURAL OBJECT

Given the difficulty of determining a series of ceramic shapes or processes distinctly and exclusively associated with the LC1, it is pretty clear that attempting to establish its chronology in this way ends up being a thoroughly slippery exercise. It is essentially a matter of demarcating an area whose content is not recognisable with boundary indicators.

32. In Kani Shaie, some proto-bevelled-rim bowls come from levels attributed to the late LC1 and early LC2 (based on ceramic and radiocarbon dates; Renette et al. 2021). Starting from the very beginning of the 4th millennium BCE (in the late LC2 of northern Mesopotamia), Logardan yielded several proto-bevelled-rim bowls as part of an extensive ceramic and material-cultural evidence of an Early Uruk South-Mesopotamian presence (Baldi and Zingarello 2021).



**Fig. 6** – Decreasing regional differentiation during the early LC2 phase: two distinct provinces (J. S. Baldi).

The Late Chalcolithic subdivision established at Santa Fe, with an LC1 phase between 4500 and 4200 BCE, is still valid and widely used. However, it is based on a somewhat limited number of radiocarbon samples and has some problematic aspects, which have become increasingly controversial in recent years. The recent high chronology offers an example for the LC1 phase at Surezha in the Erbil Plain (with the LC1 starting around 5000-4800 BCE; Stein 2018: table 2; Stein and Fischer 2020). However, more in general, recent excavations in the Trans-Tigridian region of Iraqi Kurdistan have begun to reveal unprecedented synchronisations between assemblages from distant regions. Well-stratified contexts show associations between ceramic traditions that were not considered contemporary according to the Santa Fe chronology (Alden et al. 2021; Renette et al. 2021). Although the LC1 can be ambiguous as an object of study, it is worth combining the two approaches used so far, namely attempting to delimit this phase chronologically, based on the presence or absence of assured ceramic types and established evolutionary trends. Some recent radiocarbon dates from Tell 'Uwaili (Huot et al. 1981; Hritz et al. 2012: table 1), Tell Feres (Baldi and Vallet 2018), and Girdi Qala North (Vallet 2018: 168) may help to reassess the time frame of the LC1 (fig. 7). All absolute dates

in the left margin of fig. 7 are known<sup>33</sup> but had never been discussed in the general framework of the limits of the LC1 and Ubaid 5 in various areas of Greater Mesopotamia. They contradicted somewhat generalised convictions and were considered slightly too high and insufficiently accurate. The simple evidence that from a chronological point of view, the two labels of LC1 and Ubaid 5 indicate the same time frame (fig. 7) allows the removal of a certain ambiguity persisting in the Santa Fe scheme. (Rothman 2001: table I.1). This is entirely consistent with recent ceramic data coming from the excavation of the Ubaid 5/LC1 levels at the TB7 mound of Tūlūl al-Baqarat (Bruno 2020: table 1; Lippolis 2020: 187-204), as well as with the pottery assemblage from level 1 in the new trench of Tell 'Uwaili (Vallet et al. 2020). In this sense, it appears that we should consider Ubaid 5 and LC1 as two tags indicating the same chrono-stratigraphic sequence characterised by a strong regionalisation tendency typical of this period in northern and southern Mesopotamia.

<sup>33</sup>. Dates from levels 8, 7 (LC1) and 6 (early LC2) of Tell Feres were however considered aberrant (Vallet 2014), before a recent stratigraphic revision of the samples used. This reanalysis is part of ongoing work and also affects the Ubaid 5 levels identified in 2019 in the new trench at Tell 'Uwaili (Vallet et al. 2020).

Site	Trench/Sector / Sounding	Level/ Phase	Suggested Date	Phase I	Phase II	Phase III	Phases III
5345-4856 BCE	Tail 'Uwalli	Upper (1976-1981)	Ubaid 4	x	x	x	x
				x	x	x	x
4881-4636 BCE	Tail Feres	Lower	Late Ubaid / Early Ubaid 4	x	x	x	x
				x	x	x	x
4890-4884 BCE	Tail Feres	Lower	9B	x	x	x	x
				x	x	x	x
4700-4342 BCE	Tail 'Uwalli	Upper (1976-1981)	Ubaid 5	x	x	x	x
				x	x	x	x
4702-4552 BCE	Tail Feres	Lower	9A	x	x	x	x
				x	x	x	x
4458-4338 BCE	Girdi Qala North	D	Under 6B	x	x	x	x
				x	x	x	x
4371-4239 BCE	Tail Feres	Middle	Late LC1	x	x	x	x
				x	x	x	x
4104-4071 BCE	Tail Feres	Middle	6	x	x	x	x
				x	x	x	x

Site	Trench/Sector / Sounding	Level/ Phase	Suggested Date	Phase I	Phase II	Phase III	Phases III
5345-4856 BCE	Tail 'Uwalli	Upper (1976-1981)	Ubaid 4	x	x	x	x
				x	x	x	x
4881-4636 BCE	Tail Feres	Lower	Late Ubaid / Early Ubaid 4	x	x	x	x
				x	x	x	x
4890-4884 BCE	Tail Feres	Lower	9B	x	x	x	x
				x	x	x	x
4700-4342 BCE	Tail 'Uwalli	Upper (1976-1981)	Ubaid 5	x	x	x	x
				x	x	x	x
4702-4552 BCE	Tail Feres	Lower	9A	x	x	x	x
				x	x	x	x
4458-4338 BCE	Girdi Qala North	D	Under 6B	x	x	x	x
				x	x	x	x
4371-4239 BCE	Tail Feres	Middle	Late LC1	x	x	x	x
				x	x	x	x
4104-4071 BCE	Tail Feres	Middle	6	x	x	x	x
				x	x	x	x


Feature	5345-4856 BCE	4881-4636 BCE	4890-4884 BCE	4700-4342 BCE	4702-4552 BCE	4458-4338 BCE	4371-4239 BCE	4104-4071 BCE
Rounded bottoms and sinuous walls goblets	x	x	x	x	x	x	x	x
Everted ribbed rim bowls	x	x	x	x	x	x	x	x
Corrugated ware	x	x	x	x	x	x	x	x
Deep bowls	x	x	x	x	x	x	x	x
Thin-walled carinated goblets	x	x	x	x	x	x	x	x
In-turned rim bowls (painted rim)	x	x	x	x	x	x	x	x
Thinned-rim shallow bowls	x	x	x	x	x	x	x	x
Locally specific painted decorations	x	x	x	x	x	x	x	x
Comb-decorated pottery	x	x	x	x	x	x	x	x
Impressed-incised-rusticated ware	x	x	x	x	x	x	x	x
Middle body carinated bowls	x	x	x	x	x	x	x	x
Flange-rim jars (small rim)	x	x	x	x	x	x	x	x
Beaded rim holemouth jars	x	x	x	x	x	x	x	x
Pots with cannon spouts	x	x	x	x	x	x	x	x
Short neck flaring rim jars	x	x	x	x	x	x	x	x
Large deep bowls with shaped rim	x	x	x	x	x	x	x	x
Dropping lip jars	x	x	x	x	x	x	x	x
Proto-bevelled-rim bowls	x	x	x	x	x	x	x	x
Red/grey burnished beaded-rim bowls and holemouths	x	x	x	x	x	x	x	x
Internally incised bowls	x	x	x	x	x	x	x	x
Fine carinated bowls	x	x	x	x	x	x	x	x
Flange-rim jars (large rim)	x	x	x	x	x	x	x	x
In-turned rim bowls (plain rim)	x	x	x	x	x	x	x	x
Double-rim jars (large rims)	x	x	x	x	x	x	x	x
Inward bevelled rim holemouth jars	x	x	x	x	x	x	x	x
Coba bowls and associated types	x	x	x	x	x	x	x	x
Inward bevelled rim bowls	x	x	x	x	x	x	x	x
Flattened rim bowls	x	x	x	x	x	x	x	x
Pointed bases	x	x	x	x	x	x	x	x
Irregular profile shallow trays	x	x	x	x	x	x	x	x
Square-edge urns	x	x	x	x	x	x	x	x
Flaring-rim jars	x	x	x	x	x	x	x	x
Pierced lugs jars	x	x	x	x	x	x	x	x
Twisted handles	x	x	x	x	x	x	x	x
Double-rim jars (little rims)	x	x	x	x	x	x	x	x
Ribbed, flattened-rim large urns	x	x	x	x	x	x	x	x

Feature	LC1
Peak of the regionalisation process	x

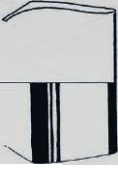
  

Disappearance of




Decrease in number of painted pottery (from about 20% to about 2-9%)

Appearance of



Peak of



**Fig. 7 – Radiocarbon dates and chronological framework of the LC1 phase of the sites analysed in table 2 (J. S. Baldi; for the radiocarbon dates on the left margin, see Huot et al., 1981; Hritz et al. 2012: table 1; Baldi and Vallet 2018; Vallet 2018: 168. The chronological picture derived from the dates of these sites is entirely consistent with recent radiocarbon data from other sites, Vignola et al. 2019).**

Taking into account the first criterion used to try to define the LC1, namely a purely typological principle, this phase can be delimited using three main markers:

1. the disappearance of typical Middle Chalcolithic shapes like the everted ribbed-rim bowls (so-called *assiettes à marli*; fig. 3.2);
2. the occurrence, throughout Mesopotamia, of the sub-type of bowls with mid-point carination (fig. 3.11) with a characteristic painted band straddling the carination;
3. the appearance of typical early LC2 shapes such as fine carinated bowls (fig. 4.21).

Not surprisingly, the portion of the cross-seriation table 2 (in orange in fig. 7) bounded by these indicators corresponds to the area in which some major ceramic processes occurred. Indeed, suppose one adopts this second criterion. In that case, some evolutionary phenomena are clearly typical of this period regarding the sites analysed here and the rest of the Ubaid sphere. In addition to the assemblages' peak of regionalisation tendency, a trend towards simplification and a decrease in the number of painted traditions is evident everywhere. Painted motifs are not only simplified, but their quantitative drop is dramatic. Considering all the contexts examined for Tell 'Uwaili, Boskin, Tell Feres, and Girdi Qala North, the general frequency of painted decoration falls from 20-22% to between 9 (at Tell Feres) and 2% (at Boskin).<sup>34</sup> In the archaeological literature, these types of counts are rarely reported and are generally determined using very uneven selection criteria; however, the percentages observed at other sites are entirely consistent. At Tell al-'Abr phase IV2 (late Ubaid 4-early LC1), painted ceramics represent 20% of the total (Hammade and Yamazaki 2006: 88). Their quantitative decline is evident, for instance, at Tell Afis levels 18-18a (LC1-LC2 phases combined), where the percentage of painted decoration is 5-6% (Mazzoni 1998: 12); the same is documented at Tell Mashnaqa (Thuesen 2000) and Tell Ziyada levels 14-18 (Arzt 2001: 133). However, it is mainly in Hammam et-Turkman that one observes the decrease in percentage from phase IV onwards: from 17.6% in the Ubaid level IVA to 2.4% in the LC1 level IVD (Akkermans 1988b: 198), down to between 1.5% and 1.1% during the LC1-LC2 phase of levels VA-B (Akkermans 1988c: 301). This is a development shared by all of Greater Mesopotamia. In the South, the decline of painted decorations is evident in levels 17a-12b of the Eanna's "Tiefschnitt" in Uruk, contemporary

34. The percentages are based on the single count of all sherds, but the proportions calculated on the basis of the EVR count limited to ceramic individuals (Orton 1993) are quite similar.

with the late Ubaid and LC1 of northern Mesopotamia (Finkbeiner 2001).<sup>35</sup>

Another process reaching its peak during this same period is the serial production of bowls (especially of the Coba and associated types; fig. 4.26). Although this phenomenon has been studied in more detail in northern Mesopotamia (Baldi 2012a, 2012b, 2012c; Kennedy 2012, 2019), it is by no means a peculiarity confined exclusively to this area. Obviously, in the South, the utilitarian functions and production dynamics associated with extensive bowl production did not begin until the spread of Uruk bevelled-rim bowls at the outset of the Middle Uruk (Eanna VIII). It is also clear that however misleading their name may be, the so-called proto-bevelled-rim bowls have never been found in large numbers in any context and are not a precursor to a large-scale production phenomenon (Baldi and Zingarello 2021).

On the one hand, during this phase, some north Mesopotamian Coba-like bowls occur in corresponding layers of southern sites (like in Ubaid 5 strata at Tell 'Uwaili, or in Eridu VII; Lloyd and Safar 1948: pl. III, type 6C; Lebeau 1983: 1.1). On the other hand, the emergence of a "serial production" system does not mean "mass production". Neither does it necessarily lead to the manufacture and use of large quantities of a specific container (Baldi 2012b, 2012c). Instead, "serial production" is a change in production methods that implies manufacturing a specific type of vessel in batches. This is an organisational transformation in work that does not automatically entail quantitative increases in the volume of finished products but instead results in repetitive gestures that one can measure on a morphometric basis (Roux 2003; Baldi and Roux 2016). This process is also found in southern Mesopotamia during the Ubaid 5, although it does not concern a bowl but rather a specific type of thin-walled goblet with a small ring-shaped base (Calvet 1991: pl. X.100-101, X.103-104). The emergence of the serial production of specific ceramic vessels in southern Mesopotamia has never been systematically investigated<sup>36</sup> and is beyond the scope of this article.

Nevertheless, these goblets' quantitative and morphometric characteristics suggest that they were part of a cultural

35. In southern Iran, at Susa, after levels 27-23 (end of the Susa I phase), a probable hiatus prevents us from following step by step the same kind of evolution in the painted decorations (Canal 1978). But between Late Susiana 1 and 2, sites such as Geser and the surrounding areas show the same process as the one observed in northern Mesopotamia (Alizadeh 2014).

36. This apparent lack of interest is due both to an inappropriate overlapping of the concepts of "serial" and "mass" production and to the fascination that the later Bevelled-rim-bowls have always exercised in south Mesopotamian archaeology (Helwing 2014).



dynamic comparable to the one expressed by *Coba* bowls in the North. Indeed, not only are these vessels massively attested in Ubaid 5 contexts, but a relatively low coefficient of standardisation also characterises them. Although they were produced repetitively, they were not fashioned continuously and not by a very restricted number of craftspeople (Roux 2003). I.e. they were manufactured in batches and by several crafts workers for specific occasions when a particular type of substance was consumed in a specific way at special banquets or gatherings. In short, these are the same attributes and purpose as the various (semi-globular or V-shaped) types of *Coba* bowls in northern Mesopotamia (Baldi 2012).

On the other hand, these are goblets and not bowls; therefore, they were associated with a practice implying different arrangements, methods and substances compared to the North. This fact does nothing but confirm a typical feature of the LC1-Ubaid 5, namely the formal regional differentiation of the ceramics due to locally different but contemporaneous and structurally linked practices. In this sense, serial production (albeit of different shapes) seems to be a distinctive feature of the LC1 in the North and the Ubaid 5 in the South.

If LC1-Ubaid 5 is taken as the period in which these ceramic forms and phenomena are all documented simultaneously, the available radiocarbon dates for the analysed sites indicate a time range of ca. 4700-4250 BCE (fig. 7). This does not disagree with the Santa Fe chronology. Nevertheless, it still establishes an earlier time frame, as confirmed by recent and stratigraphically reliable dates from sites other than those analysed here, such as Tell Zeidan.<sup>37</sup> For the time being, the area where this period is least documented is undoubtedly the South. But in northern Mesopotamia, other clues tend to confirm this time range.

In particular, the spread and evolution of the so-called “Dalma Ware” recently emerged as a critical issue for the 5th millennium BCE levels at several sites under excavation in the Trans-Tigridian region. It is not an attempt to clarify doubts about the LC1 by having recourse to another fuzzy scientific object like the Dalma Ware. On the contrary, building on past analyses about the distribution of different west Iranian and Zagros-based productions (Henrickson 1986: 91-93, 116-121), some scholars have recently defined on a reliable stratigraphical basis the various ceramic traditions that are generically and collectively referred to as “Dalma” (Abedi et al. 2014a, 2014b, 2015; Balmaki 2017; Bahranipoor 2021). This situation has allowed for concrete chronological progress. Until recently (Henrickson 1986: 121-122), the chronology of

Dalma Ware was vaguely considered to lie between the Neolithic Hajji Firuz phase (contemporary with Hassuna and Samarra traditions) and the Middle Chalcolithic Pisdeli phase (with clear affinities to Ubaid and LC1 pottery).

Nevertheless, it is now conclusively established that the Dalma traditions are all much later than Neolithic and Early Chalcolithic, without any chronological overlap even for late Halaf-related traditions such as the so-called “J Ware” (Sharp and Kaercher 2018). The various traditions grouped under the label of “Dalma Ware” are instead Middle Chalcolithic in date, with still relatively abundant evidence of incised and rusticated sherds (fig. 3.10) in Trans-Tigridian contexts characterised by Ubaid 4 painted ceramics (with absolute dates around 4800 BCE; Stein and Alizadeh 2014: table 2), and then rapidly declining at the same time as the decrease of painted decorations during the LC1 (Renette and Mohammadi Ghasriani 2020; Alden et al. 2021). On the other hand, Dalma productions are never associated with the painted black-on-buff decorations of the Zagros, which, despite their aesthetic affinity with Ubaid traditions, are later in date and belong instead to the early LC2 phase (Renette and Mohammadi Ghasriani 2020). In the light of this chrono-stratigraphic framework, Dalma Ware is no longer just an indicator of the trend towards regionalisation of ceramic traditions but also a reliable temporal benchmark of the late Middle Chalcolithic and LC1.<sup>38</sup>

The sum of the Dalma findings and associated dates seems to reinforce a temporal range between 4700 and 4250 BCE for the LC1. Even if this chronological framework is somewhat older than the one commonly accepted until lately, it is not per se something upsetting. Indeed, it is mainly its high limit that ends up being brought earlier. In contrast, the low limit remains almost unchanged, with no particular impact on the chronology of the LC2 and later stages. What does seem to be new instead is the duration of the LC1. A period of about four and a half centuries is a very long time, comparable to the duration of the LC2, which, however, now appears as a phase

38. Productions belonging to the Dalma tradition play this role not only in the North-East, where they are most abundant and best attested, but also in contexts where they appear sporadically, such as Tell Feres, where only nine fragments of “comb-decorated” Dalma (fig. 3.9) are documented during all the LC1 (concentrated in level 8, radiocarbon dated between 4585 and 4343 BCE; table 2). The same can be said of contexts in central-eastern Mesopotamia, such as the Hamrin, where specimens of different Dalma traditions (combed, rusticated, incised, and painted) are attested in level II and most notably level I (Jasim 1985: fig. 211-215). Therefore, the latter seems to date to the late Middle Chalcolithic. This date is also confirmed by the numerous specimens which, although still painted, show the classic horizontal bands simplified decorations of this phase (Jasim 1985: fig. 226).

37. See Fischer, this volume.

composed of two distinct and distinguishable moments—an early stage and a late one (table 2; Baldi 2016b; Renette et al. 2021). Instead, the LC1 appears as an extended period, quite difficult to define in cultural and ceramic terms. Consequently, it does not seem at all acceptable to reduce the characteristics of the LC1 to a mere “transitional” phase, nor to use this expression in the generic sense that is all too often adopted in the archaeological literature.<sup>39</sup> The ceramic evolutionary processes evoked here must clearly correspond to profound social and organisational dynamics which, over such an extended period, have profoundly impacted the structure of the different societies of the Ubaid sphere. However, to have (even a vague) perception of what these dynamics might have been, it is necessary to go beyond a purely typological analysis of the ceramic material.

## HIGHLANDS AND LOWLANDS INHABITANTS AT THE UBAID TWILIGHT

### SUB-ASSEMBLAGES, TECHNIQUES, AND HINTS ON THE END OF THE UBAID SPHERE

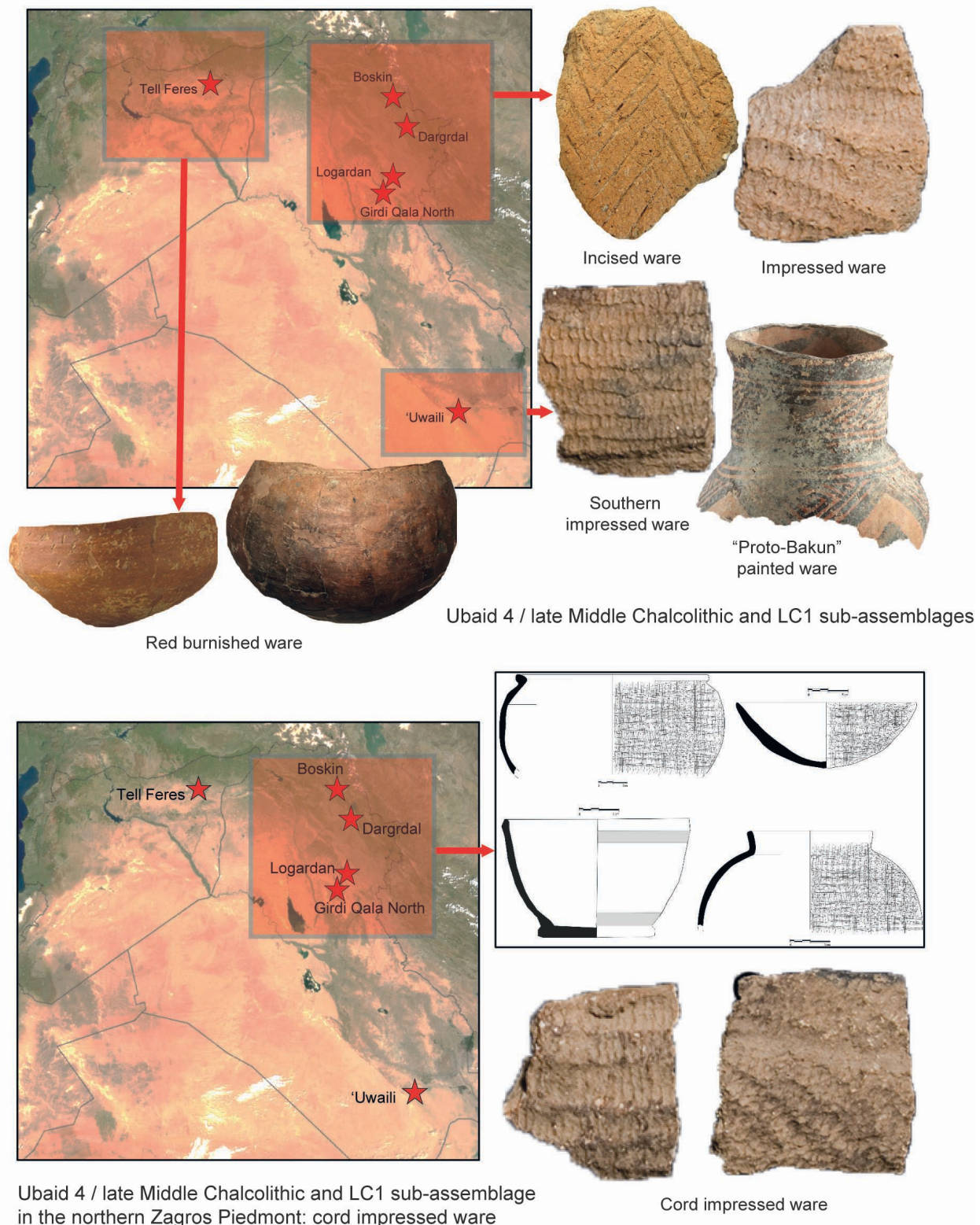
On the one hand, phenomena common to the entire Ubaid sphere characterise the LC1, such as the substantial simplification and decrease in the number of painted decorations; on the other hand, the assemblages tend to differ according to the process of regionalisation. In most cases, however, the process involves an escalating development, which starts with adopting distinct versions of the same ceramic types in different macro-areas. Initially, this implied quite limited differences between ceramic macro-provinces sharing the large majority of a relatively homogeneous repertoire. This is not to say that the process of local differentiation arose from any kind of “essential” and common Ubaid: discrepancies between spheres of interaction have always existed and were rooted in the diffusion patterns of the Ubaid material culture (Baldi 2020a). However, compared to the homogenising tendencies of Ubaid 3 (Abu Jayyab and Gibbons, this volume), the Late Ubaid marked the beginning of a centrifugal trend destined to culminate in the LC1 and then begin to reabsorb. Within each macro-region, the most apparent element diverging from the ordinary Ubaid traditional base were just a few restricted groups of pottery

categories and shapes, clearly distinguishable from the rest of the assemblage.

It is the case of the so-called “red/grey ware” (fig. 4.19), documented in LC1-2 sites between the Upper Tigris and the Syrian Jazeera (attested at Tell Feres among the sites analysed here; fig. 8, above) and represented by slightly burnished shallow bowls and hole-mouth jars fired in a reduced atmosphere (Tobler 1950: fig. 298; Rothman 2002: pl. 8.775, 15.1807; Baldi and Abu Jayyab 2012: 166, fig. 1). In southern Mesopotamia, the same can be said for some open shapes with a brown wrinkled surface decorated with rope or finger-impressed decoration, and small jars with black-painted decorations on reddish fabrics and thick reserved triangle or cross “proto-Bakun”-like motifs (fig. 8, top; von Haller 1932: Taf. 17.D.k, ad; Taf. 18.A.h; Alizadeh 2014: fig. 53D). Eventually, another recognisable, very specific pottery group falls within the variegated set of loosely defined “Dalma Ware” in the Trans-Tigridian region (namely the north-eastern macro-area location of Logardan, Girdi Qala North, Dargrdal, and Boskin; fig. 8). This category consists of a restricted range of shapes—a short-necked jar, a shallow bowl, a hole-mouth pot and a deeper bowl with a flat base (fig. 8, bottom)—with a distinctive appearance, often described as “combed” (Giraud et al. 2019: pl. I.19, II.24). This term is not strictly correct since the bowl is sometimes painted (with just a line or a band) or slightly combed under the rim, while the other shapes are instead cord-impressed. This is a functionally coherent group, with a cooking pot, a jar for holding medium amounts of liquids, a coarse bowl and a more polished eating bowl. Its chronology is entirely consistent with all other “Dalma” productions: these types appear in the Hamrin and the northern Zagros during the Middle Chalcolithic (around the end of the Ubaid 3; Jasim 1985: figs. 132b, 133b, 133k, 212b, 213d, 213f, 235d). They become a little more frequent in the late Ubaid 4 and the LC1 (Alden et al. 2021: fig. 2.SR-6156a, 2.SR-6194d), and then they disappear.

Recently, to indicate these kinds of well-circumscribed ceramic categories, Abu Jayyab (2019, 2022) has coined in a very conclusive way the notion of “sub-assemblages”, referring in particular to the specific set of red/grey ceramics attested between the Syrian Jazeera and the Upper Tigris. This attitude is not limited to the apparent observation of the differences characterising the “sub-assemblages” and making them recognisable; instead, it aims to understand the reasons for these differences, in particular by analysing them from the point of view of ceramic techniques. The analysis implies a study transcending the morphological and functional aspects of the vessels (namely issues concerning distribution and use

39. For a critique of the use of the notion of “transition” in a way that is often so vague as to be inconsistent, see Frangipane (2012) and Iamoni (2014).



**Fig. 8 – Top:** Ubaid 4/late Middle Chalcolithic and LC1 sub-assemblages according to different macro ceramic provinces. **Bottom:** Ubaid 4/late Middle Chalcolithic and LC1 sub-assemblage in the northern Zagros Piedmont: cord impressed ware (J. S. Baldi).



by users/customers) to incorporate craft attributes and dynamics, depending on the producers (Roux 2019a). This research perspective on “sub-assemblages” is particularly fruitful for broadening the information potential of the LC1 ceramic horizon and explaining its internal variability. The “sub-assemblages” of southern Mesopotamia are still poorly documented due to the small number of sites excavated for this phase, while the red/grey ware of the northwest has already been extensively studied (Abu Jayyab 2019, 2022). It is, therefore, appropriate to apply this approach to the LC1 sub-assemblage recognisable in the north-eastern ceramic macro-province.

The four Dalma-related cord-impressed containers documented in the Trans-Tigridian region (fig. 8, bottom) share distinctive features that clearly differentiate them from the rest of the Ubaid 4 and LC1 local assemblage.<sup>40</sup> The aim here is to offer a summary reconstruction of the operational sequence of these ceramics’ manufacture to show their similarities and differences compared to the rest of the contemporary pottery horizon.<sup>41</sup> Because “pots are not people” (Kramer 1977), whereas technical traditions are (specifically traditional *chaînes opératoires*; Baldi 2012b, 2012c, 2012d, 2012e, 2016a, 2020a, 2020b; Roux 2019a, 2019b; Gosselain 2002, 2018), they constitute the peculiar “ways of doing” and the specific technical signatures of distinct groups of producers (Stark 1998b; Livingstone-Smith 2007; Patton 2008; Stark et al. 2008). Therefore, recognising the different *chaînes opératoires* documented within an assemblage means identifying the technical identities of the craft communities of learning and practice underlying the technical traditions (Wenger 1998; Iserlis 2009; Wendrich 2012). This recognition allows a more profound and much more articulated anthropological approach whereby *chaînes opératoires* used

as material indicators make it possible to reconstruct the interactions between the groups of manufacturers (Roux and Courty 2005, 2007; Roux 2010; Baldi 2013). Consequently, schematic documentation of the *chaînes opératoires* can reveal relationships of distinction or integration between different producer communities (Baldi 2020a). Concerning ceramic pastes, in the Trans-Tigridian region, as in all the Ubaid sphere, chaff-tempered fabrics increasingly characterise the vast majority of late Middle Chalcolithic and LC1 pottery. It is a long-lasting process massively affecting the whole of northern Mesopotamia and ending in the emergence, from the LC2 throughout the 4th millennium BCE, of the vast so-called “Chaff-Faced Ware” cultural area (Marro 2010). Likewise, as far as the shaping method is concerned, the large bulk of vessels belonging to late and post-Ubaid traditions is manufactured by superimposing small coils with joints oriented inwards (Baldi 2012b, 2012e, 2013; fig. 9, left). Compared to these technical attributes of the majority of the repertoire, the Dalma-related sub-assemblage is remarkable for its non-calcareous mineral-tempered pastes with metamorphic inclusions and a paddle anvil shaping method (fig. 9, right). The absence of limestone in the fine mass of the ceramic matrix is quite unusual for the Mesopotamian alluvium, especially for the north and the north-eastern macro-province, where pottery often has pastes with significant quantities of calcareous inclusions (Baldi 2016a; Abu Jayyab 2019). Even stranger is the stage of the *chaîne opératoire* corresponding to the forming technique, since the “paddle and anvil” is a very peculiar method, halfway between hammering and moulding technique (Rye 1981; Martineau 2005), which has no parallel in Mesopotamia. The same observation goes for the very uncommon surface treatment, given that cord-impressed decorations require very specific preparation and tools (fig. 9, right). Instead, they are documented in the Late Neolithic Levant, in a chrono-geographical area unrelated to 5th-millennium Mesopotamia (Nieuwenhuys et al. 2012). Thus, the technical differences between the vast majority of local pottery and the sub-assemblage represented by Dalma-related cord-impressed ceramics do not concern a specific stage of the *chaîne opératoire*, but the entire production process. On the anthropological level, when differences involve the whole of two operational sequences, the distinction cannot be attributed to the gradual evolution of mutual distinction or some innovation affecting a particular step of manufacture. In the case of documented discrepancies at all steps of two *chaînes opératoires*, the only possibility is that the distinction depends on a demic factor, namely that the *chaînes opératoires* in question belong to different social groups and peoples with distinct

40. In the sites of the north-eastern macro-province analysed here, where this sub-assemblage is attested (namely Logardan, Girdi Qala North, Dargrdal, and Boskin; fig. 8, below), 846 sherds of Dalma-related cord-impressed pottery are documented out of a total of 41,526 sherds for all contexts of this period from the 4 sites (table 2).

41. From a methodological point of view, the schematic reconstruction of the manufacturing sequence presented here rests on an analysis of all these assemblages according to the *chaîne opératoire* approach (Roux 2019; Baldi 2012e, 2013, 2016a, 2020a, 2020b). Basically, through autoptic and magnifying glass observations and microscopic analysis of the composition and the macro- and micro-traces of processing and fabrication, the aim was to reconstruct the sequence of distinctive gestures and operations characterizing each step of the manufacturing method. These include selecting and preparing the fabrics, fashioning, surface treatment, decoration, and firing of the vessels. This summarized approach concerned all the assemblages in question, not only the Dalma Ware samples.





Fig. 9 – *Chaîne opératoire* of the cord-impressed ware compared to the most common operational sequence within the post-Ubaid horizon in the northern Zagros Piedmont (J. S. Baldi).

knowledge networks (Stark 1998; Roux and Courty 2005; Stark et al. 2008; Wendrich 2012; Roux 2019a; Baldi 2020).

This scenario is entirely coherent with observations made for the cord-impressed vessels of the north-eastern macro-province between late Middle Chalcolithic and LC1. After consideration of all their technical and morpho-functional characteristics, this sub-assemblage consists of a recurring set of easily transportable containers, technically alien to the Mesopotamian Ubaid milieu and widespread near mountain passes. It is very tempting to associate these vessels with the mobility of specific groups possibly characterised by close connections to the Iranian Zagros and engaged in transhumance or interactions with the highlands. Indeed, this interpretation is becoming widely accepted for cord-impressed pottery and all the so-called Dalma ceramics. These traditions are increasingly considered as a marker of mountain communities and pastoralist groups seasonally moving on quite

limited distances and acting as intermediaries in the distribution of obsidian and ceramics materials on a wide area across the Zagros (Henrickson 1986: 118-120; Abedi et al. 2015: 332; Alden et al. 2021: 22).<sup>42</sup>

Although applied to a different area, the scenario that seems to emerge from the analysis of the Dalma-related cord-impressed sub-assemblage parallels the recently reconstructed dynamics underlying the spread of the red/grey ware

42. This scenario does not necessarily imply the (far from proven) emergence of specialised forms of pastoralism and long-distance transhumance between the Zagros and Tigris plains of the 5th millennium BCE. Based on recent excavations (Abedi et al. 2014a, 2014b, 2015; Balmaki 2017), the area characterised by the Dalma Ware should not be seen as formed by groups regularly crossing the Zagros, but rather as centred on scattered, stable villages inhabited by closely interconnected mountain communities. The mobility, albeit over relatively limited distances, of some of these communities' components often ensured indirect but extremely effective interconnections between the trans-Tigridian plains, the Urmia area and the Lower Caucasus. (Marro 2010; Renette, this volume).

sub-assembly in the north and northwest Mesopotamian macro-area. By mapping migration routes, seasonal pastures, obsidian sources, and the circulation of obsidian and red/grey wares, Abu Jayyab (2019, 2022) has convincingly demonstrated that the *chaîne opératoire* of the latter and its spatial distribution were associated with pastoral groups whose presence had structurally interconnected south-eastern Anatolia, the Khabur Basin and the Hamoukar area in the late 5th millennium BCE. For the moment, conclusions of this nature would be premature concerning the sub-assembly that stands out from the majority of southern Mesopotamia's ceramic horizon during Ubaid 5 (fig. 8, top). The quantity of materials associated with this southern sub-assembly is still too limited, without mentioning that, within the South, some variability may have existed between the areas of the Lower Euphrates valley and the Lower Tigris. However, at least on a chronological and typological basis, there is a clear relationship between the rare attestations of rope/finger-impressed or black-on-red painted ceramics in southern Mesopotamia and typical productions of the late 5th millennium BCE between Zagros, central Iran and south-western Iran (Henrickson 1986: 121-122; Renette and Mohammadi Ghasriani 2020: 113-115). Despite the rarity of rope/finger-impressed or black-on-red painted ceramics,<sup>43</sup> some of the macro-traces seem to suggest that they were also shaped using a “paddle and anvil” technique. Even if this were not confirmed by further analysis in the future,<sup>44</sup> the southern sub-assembly was manufactured using a hammering technique. This method has nothing to do with the shaping methods using layered small coils, generally documented in this phase in South Mesopotamia as in the North and the rest of the Ubaid cultural sphere (Vallet et al. 2020). On the one hand, it is impossible not to notice the differentiation of this decorated sub-assembly from south Mesopotamian Ubaid 5 and the proto-Uruk horizon. On the other hand, it is equally impossible not to observe that this peculiarity could constitute a sort of bridge to the so-called “Ubaid-related-related” painted traditions of the late 5th millennium Iranian world, as suggested by intertwined

painted geometric motifs leaving room for reserved crosses or triangles (Weeks et al. 2010: fig. 16.4.TNP1316, 16.5.TNP1006).

More generally, data suggest a somewhat unusual pattern, especially if one considers that one of the few certainties about the LC1-Ubaid 5 phase is that it corresponds to the end of the Ubaid traditions throughout Mesopotamia. It seems that this end was anything but a period of cultural decline and retreat, but rather a time of increasing supra-regional relations.

## TO CONCLUDE: END OF A STILL-EXPANDING WORLD

The definition of a chrono-cultural sequence necessarily implies a risky and sometimes ambiguous reflection straddling two epistemological fields: one concerning time and the other concerning people. Determining discrete significant steps in the cultural, economic and organisational evolution affecting human communities over time requires at least the possibility of recognising these stages according to clearly detectable (in this case, ceramic) markers. Since the Ubaid sphere, under a veneer of apparent uniformity, has always gathered different societies under one roof, the only way to observe its developments (especially its final ones) is to have a broader look at assemblages from different sites, contexts, and geographical areas. It is a matter of answering two questions: on the one hand, verifying whether, at the end of the Ubaid world, the Greater Mesopotamian ceramic panorama still had (and if so, to what degree) any kind of internal coherence. On the other hand, the objective is to ascertain whether, from a chronological point of view, the end of the Middle Chalcolithic coincides with the break-up of the Ubaid sphere and the growing cultural differentiation between the macro-areas and communities that composed it.

Chronologically, table 2 somewhat confirms the traditionally accepted range for the LC1 (table 1), albeit by widening it and tracing its start back to around 4700 BCE. The sites used as a documentary base are not numerous, but their record is reliable because it is recent, from disparate regions, well stratified and dated. Concerning chronology and sequences, this opens a new research perspective. A period such as the LC1, which now all recent radiocarbon dates tend to last about 450 years, can no longer be considered a homogeneous block. From this point of view, it is increasingly necessary to use uninterrupted and diversified stratigraphic sequences to be able to start investigating the stages of this long era and

43. If we make abstraction from the old excavations, about which we have no quantitative information, the Ubaid 5 levels of Tell ‘Uwaili have yielded only 18 fragments of this sub-assembly from 2019 to date.

44. Whether or not the “paddle and anvil” technique was used does not change much in terms of the differences between the sub-assembly in question and the rest of the local southern pottery. Nevertheless, this remains an important issue in need of clarification. Suppose that paddle and anvil were indeed used, the technical coherence of the sub-assemblies across the Zagros from North to South would raise the question of the (probably high) degree of integration or even homogeneity of the mountain communities across this vast area.

correlating them radiometrically.<sup>45</sup> Especially since chronologically speaking, the cross-occurrence seriation chart (table 2; fig. 7) stresses and summarises one essential fact: the LC1 is no longer Middle Chalcolithic.

Although this may seem a truism, it is probably worth pointing it out because, at the same time, on a ceramic level (and based on the rest of the material culture), the LC1 still seems to be Ubaid. There is no range of distinctive shapes or diagnostic artefacts different from previous Ubaid phases characterising the LC1. A peak of regionalisation, substantial simplification and a decrease in painted decorations are typical ceramic processes of this period. Instead, they show a weakening of the Ubaid sphere's uniform patina, its polarisation and break-up; however, they do not signify the end. In other words, the LC1 is a very effective chronological framework but not a particularly meaningful notion for describing a cultural break. Rather than an apparent homogenisation of the Ubaid horizon, LC1 marks the emergence of a form of union (or rather simultaneity) in differences.

The growing trend towards regionalisation is a highly complex phenomenon. It does not mark a genuine centripetal turn, with each macro-region setting out on its path with independent rhythms and trajectories. This process does not seem to be due to the collapse of the supra-regional mobility and connectivity horizon of the Ubaid but rather to its transformation. The result is an increasingly marked difference in the formal ceramic features adopted in each region, but with an evolutionary pace remaining largely shared, synchronised, and oriented towards the same results as concerns all the main evolutionary phenomena. Starting from a broadly common basis, the intensification of increasingly regional interactions, with exchanges less and less open to other horizons, led to a growing emphasis on distinctive local features, with increasingly idiosyncratic shapes and decorations at a regional level. However, entirely new shapes appear in no area, whose difference from the common Ubaid premises might indicate some completely new culinary, storage, or consumption tradition. In other words, social practices remained broadly the same in different areas; they evolved locally by developing ergonomic and functional solutions that made the objects involved in these practices different on a regional basis. The regionalisation process seems to have been a tendency to perform locally structurally similar social practices in different ways and through different ceramic tools. The increasingly evidenced contemporaneity between LC1 in the North and Ubaid 5 in the

South shows how distinct assemblages were, in reality, evolving at the same pace.

An example is how, as painted decorations became increasingly rare everywhere, this common structural evolution led to the emergence of highly locally recognisable motifs on a formal level. The same observation concerns the appearance of increasingly extensive and frequent feasting or redistribution practices associated with the emergence of the serial production of relatively standardised batches of specific vessels. Such social, economic, and food consumption practices emerged simultaneously throughout Greater Mesopotamia. Everywhere regarding these new needs, serial manufacturing methods were adopted as a response in terms of production. However, the formal outcomes of this process, whether for the so-called *Coba bowls* or other vessels, differed in each macro-region.

Alongside this structural unity articulated in formal distinctions, there was also another differentiation pattern between distinct areas. In this case, it was not just a matter of local decorations or shapes but of distinctive groups of ceramics aesthetically and technically unrelated to the rest of the indigenous post-Ubaid landscape and without parallels in other regions. These discrete and highly recognisable sub-assemblages seem associated everywhere with the intensification of exchanges and interactions between the Ubaid sphere and mobile groups. In the Zagros Piedmont, the Syrian Jazeera, and the Upper Tigris (where these sub-assemblages are proven to be produced by allogenic populations), and also probably in southern Mesopotamia, an intensified pattern of interaction with mobile groups seems to have been a strong social and economic driver during the LC1-Ubaid 5 period, probably to the point of impacting even inland areas of the Alluvium. Indeed, the end of the Ubaid world in no way resembles a phase of decadence and cultural retreat. On the contrary, it appears as a moment of vigorous territorial expansion of the late Ubaid traditions. Apart from the strengthening of links with the highland peoples, the available data do not yet allow for an easy understanding of the mechanisms of this expansionary trend. What is certain is that the Ubaid sphere's lasting propensity to contaminate even distant areas, like the Gulf, Iran, and the Levant (Kirkbride 1969; Stein 2010; Baldi 2020), was still particularly vibrant in the middle centuries of the 5th millennium BCE. In the Levant, whether in the north (level XVI of Mersin Yumuktepe; Garstang 1953; Palumbi and Caneva 2019) or the south (Gabrieli 2016), the LC1 coincides with a moment of considerable interactions between local cultural entities and the Ubaid sphere. The same occurs in the southern Caucasus, where from the LC1 onwards,

45. See Fischer, this volume.



relations with northern Mesopotamia become increasingly closer (Chataigner 2010; Marro 2010). On the Iranian side, the drastic decrease of Ubaid painted motifs in Mesopotamia coincides with the emergence of ceramic pictorial styles spreading in parallel with the LC1 until the end of the 5th millennium BCE at least (Goff 1963; Renette and Mohammadi Ghasrian 2020).

Therefore, perhaps the elusive and hardly definable nature of the LC1 is due precisely to the fact that the end of the Middle Chalcolithic seemingly does not coincide with the end of the Ubaid. Above all, although the end of the Ubaid world has certainly implied a territorial limitation of mobility and exchanges during the LC1, it did not imply a genuine crisis or a process of economic and cultural dissolution. Instead, the end of the Ubaid world resembles a crisis of growth, with a generalised and structural increase in the degree of organisational complexity and the beginning, in the various sectors of Greater Mesopotamia, of formally distinct proto-urban systems.

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