Human occupation along the foothills of Northwestern Zagros during the Late Pleistocene and the Holocene in the Rania and Peshdar plains First results of the French archaeological mission in the Governorate of Soulaimaniah (Iraqi Kurdistan)

Jessica Giraud, J. Baldi, Stéphanie Bonilauri, Marjan Mashkour, M. Lemée, Fiona Pichon, Mathilde Mura, M.A. Pot, F. Biglari, M. Jamialahmadi, et al.

Human occupation along the foothills of Northwestern Zagros during the Late Pleistocene and the Holocene in the Rania and Peshdar plains

First results of the French archaeological mission in the Governorate of Soulaimaniah (Iraqi Kurdistan)

J. Giraud, J. Baldi, S. Bonilauri, M. Mashkour, M. Lemée, F. Pichon, M. Mura, M.-A. Pot, F. Biglari, M. Jamialahmadi, A. Ameen, K. Raeuf, S. Saber, R. Sofy, J. Jameel and K. Rasheed

with the collaboration of C. Caze, R. al-Debs, C. Douché, A. Havé, A. Louchet, C. Verdellet and L. Walika

Abstract. *Since 2012, the French archaeological mission in the Governorate of Soulaimaniah has been exploring the Rania and Peshdar plains in order to understand the evolution of settlement patterns in Northern Mesopotamia from the Palaeolithic to the present day. Newly acquired data from surveys combined with excavations at six prehistoric sites provide the first picture of human settlement patterns in this region from the Palaeolithic to the Chalcolithic. The development of these patterns reveals the presence of a local system that was deeply rooted in the wider Mesopotamian context but was also subject to influence from the Iranian Plateau.*

Résumé. *Depuis 2012, la mission archéologique française du Gouvernorat de Soulaimaniah explore les deux plaines de Peshdar et de Rania afin de comprendre l'évolution des systèmes d'habitat en Mésopotamie septentrionale dans la longue durée, du Paléolithique à aujourd'hui. Les données nouvellement acquises lors des prospections, ainsi que les informations issues de sondages effectués sur six sites préhistoriques permettent d'esquisser une première image des modèles d'implantation humaine dans la région, du Paléolithique jusqu'au Chalcolithique. L'évolution des modèles de peuplement montre une dynamique locale ancrée dans le système mésopotamien, mais influencée également par le plateau iranien.*

Keywords. *Mesopotamia, Palaeolithic, Neolithic, Chalcolithic, settlement patterns, evolution, Sarsyan, Halawezha/Bijian, Boskin, Dargrdal, Mewe Cave*

Mots-clés. *Mésopotamie, Paléolithique, Néolithique, Chalcolithique, peuplement, évolution, Sarsyan, Halawezha/Bijian, Boskin, Dargrdal, Mewe Cave*

 Manuscript received on 7 March 2019, accepted on 8 September 2019

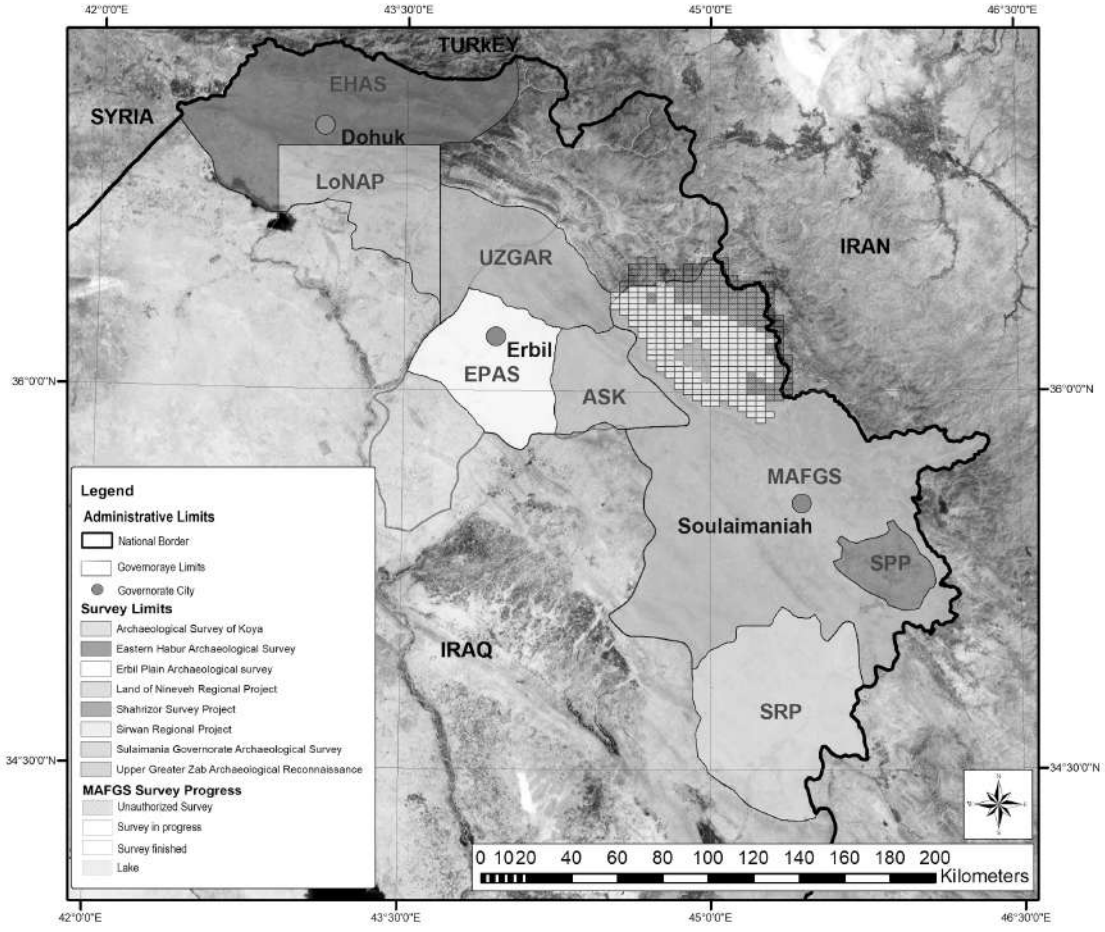

Fig. 1 – *Situation of the survey mission in Iraqi Kudistan (map J. Giraud).*

The south-western foothills of the Zagros range, in Iraqi Kurdistan, have long been largely unexplored because it has been impossible for archaeologists to carry out fieldwork research in this area for more than half a century. The first excavations carried out in the 1960s and 1970s revealed the crucial importance of the region for the prehistoric periods. Many important sites, such as Shanidar (Solecki 1963), Jarmo (Braidwood *et al*. 1983) and Shemshara (Mortensen 1970) were discovered and excavated.

Although for several decades this territory has been considered a peripheral area, it is, undoubtedly, a region that is fundamental for the understanding of the first Mesopotamian cultures. In fact, this area spawned the emergence, development and spread of major cultural entities, from the Neanderthal hunter-gatherers to the first complex societies characterised by the very large villages of the Late Chalcolithic period.

The reopening of this region to archaeologists in 2011 has made it possible to resume research in this vast and little-known territory. Currently, there are more than 60 archaeological missions working in Iraqi Kurdistan. The surveys and excavations have produced a great deal of new data that provide a larger picture of these first prehistoric societies (fig. 1).

Since 2012, the French archaeological mission in the Governorate of Soulaimaniah (MAFGS) has identified more than 366 archaeological sites in the provinces of Rania, Peshdar and Dukan (fig. 2), among which a third have been dated to the prehistoric period. The distribution of these prehistoric settlements, combined with rescue excavations carried out on six sites, is providing us with a first picture of the early cultures that developed along the south-western flanks of the Zagros. Local cultural entities, characterised by features already identified in other areas of Northern and Southern Mesopotamia, were established in a wide territory of foothills beyond the Mesopotamian steppes but retained close connections with the steppes and with the Iranian Plateau.

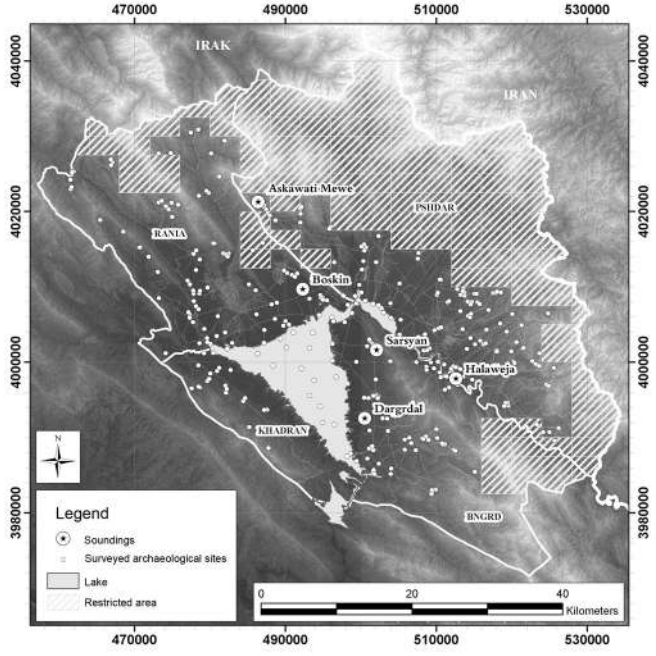

Fig. 2 – *Location of the 366 archaeological sites discovered and the six excavated sites (map M. Mura).*

THE FRENCH ARCHAEOLOGICAL MISSION IN THE GOVERNORATE OF SOULAIMANIAH: GOALS AND METHODS

The history of archaeological research in Northern Iraq dates back to the 19th century, during which the first archaeological discoveries were made by travellers and diplomats. However, it was during the 1940s that the Iraqi Directorate of Antiquities and Heritage conducted more extensive and systematic investigations to document and date archaeological sites throughout Iraq (Directorate General of Antiquities 1970). Later, in the 1950s and 1960s, the construction of large dams led to salvage surveys and rescue excavations to document the majority of archaeological sites that would be flooded (Husaini 1962; Abu al-Soof 1964, 1970). From 1960 to 2011, archaeological research was conducted in a piecemeal fashion because the geopolitical situation prevented work from being carried out regularly. It is for this reason that the *Atlas of archaeological sites* in Iraq from the 1940s still provides the basis for our resumption of extensive survey work.

Since the reopening of the Kurdistan autonomous region (Iraqi Kurdistan), the country has experienced strong economic development, but in a somewhat anarchic way. The urban, agricultural and economic expansion thus endangers the rich archaeological heritage of the area. To prevent its destruction, the Iraqi Directorate of Antiquities and Heritage needed accurate and complete archaeological maps. It has, therefore, set up teams in charge of new surveys, thus dividing Iraqi Kurdistan between international survey missions,[1] all of which are based on the same field methodology: the Shahrizor Survey Project (SSP; Altaweel *et al.* 2012, Mühl and Fassbinder 2016; Mühl *et al.* 2018); the Erbil Plain Archaeological Survey (EPAS; Ur *et al.* 2013);[2] the Land of Nineveh Archaeological Project (LoNAP; Morandi Bonacossi and Iamoni 2015, Gavagnin *et al.* 2016); the Upper Greater Zab Archaeological Reconnaissance (UZGAR; Koliński 2017), the Eastern Habur Archaeological Survey (EHAS; Pfälzner and Sconzo 2015); and the Sirwan Regional Project (SRP; Casana and Glatz 2017; fig. 1). It is, therefore, possible to combine all the archaeological maps to obtain a global map of Iraqi Kurdistan. This will provide a perfectly adapted tool for the protection of this heritage dating back thousands of years as well as a very useful decision-making aid for a considered development of the country, without forgetting the possibility of a complete overhaul of the history of Upper Mesopotamia.

GOALS OF THE PROJECT

The MAFGS survey concentrates on the Governorate of Soulaimaniah, the eastern governorate of Iraqi Kurdistan. The survey project has two main objectives. The first is to implement a clear and exhaustive archaeological map that will be an essential instrument for the protection of the heritage of this region. The lack of knowledge with regard to ancient sites and their locations was, indeed, endangering the sites because the area is undergoing rapid economic development.

The second objective is aimed at understanding the settlement patterns in the south-western foothills of the Zagros from the lower Palaeolithic to the present day, and to reconstruct the

1. From the north-west to the south-east: the Eastern Habur Archaeological Survey (EHAS), dir. P. Pfälzner (Tübingen University); the Land of Nineveh Archaeological Project (LoNAP), dir. D. Morandi Bonacossi (Udine University); the Boston University Soran Survey (BUSS), dir. M. Danti (Boston University); the Upper Greater Zab Archaeological Reconnaissance (UZGAR), dir. R. Kolinski (Polanz University); the Erbil Plain Archaeological Survey (EPAS), dir. J. Ur (Harvard University); the Archaeological Survey in Koya (ASK), dir. C. Papi (Innsbruck University); the Sirwan Regional Project (SRP), dir. C. Gladz and J. Casana (Glascow and Arkansas Universities); and the Shahrizor Survey Project (SSP), dir. S. Mühl (Munich University).
2. Ur J., Babaker N., Palermo R., Soroush M. and Ramadan S., The Erbil Plain Archaeological Survey: Preliminary results, 2012-2018. *Iraq*, forthcoming.

territorial organisation specific to each culture. By defining the evolution of settlement patterns over time with detailed surveys and well-targeted excavations, it is now possible to provide a preliminary description of the development of human presence in this region. Obviously, the development of these cultural spaces depended upon economic, social, political and religious factors, whose specific characteristics and overall extent are yet to be defined locally, as well as their relations with other cultural entities.

REMOTE SENSING AND FIELD SURVEY METHODS

The archaeological surveys have been the primary source of data for the MAFGS project. The survey of the Governorate of Soulaimaniah required a broad approach; thus, it combines the study of the archaeological sites themselves with landscape analysis in order to create the datasets allowing us to address major regional-scale questions about Mesopotamian history, as did previous research in the south (Adams 1981).

The MAFGS survey methods are mainly based on the methods of British landscape archaeology established by T.J. Wilkinson (1982, 1989, 2003; Wilkinson and Tucker 1995) in Syrian and Iraqi Jazirah, in which the study of the sites (intra-sites) and the "off-site" landscapes (inter-sites) are combined for a general understanding of the territory. The intra-site study is based on a statistical analysis of a reasoned collection of material in order to understand the site's internal organisation. The inter-site study is based on photography and satellite imagery to establish structures, roads and canals, which allow us to understand how sites are structured between them, forming a territory (Altaweel *et al.* 2012; Ur *et al.* 2013; Morandi Bonacossi and Iamoni 2015; Altaweel and Marsh 2016; Mühl and Fassbinder 2016; Gavagnin *et al.* 2016; Giraud 2016, 2018; Mühl and Fassbinder 2016; Iamoni 2018; Mühl *et al.* 2018; Ur 2018).

The MAFGS method combines the study of archives, old maps and published research with using satellite images from GIS. Systematic interviews with the inhabitants encountered in the villages were also carried out. The remote sensing of recent (QuickBird, GeoEye) and old (CORONA) satellite images enabled the sites or other archaeological features (canals, paths, roads) to be systematically located and digitalised in the GIS.

Archaeological features are recognisable on images by the particular signature (Philip 2002; Ur 2010: 43-46), of their anthropogenic soils (differences of colour in the image). This way, we reach a 75% positive correlation between the possible sites visible on the images and the field assessment. However, interviewing the locals was indispensable to identify other sites where the images were unexploitable, such as in mountains or hilly landscapes.

Each identified archaeological site was then divided into sub-areas according to their dimensions and morphology, with careful surface collection carried out in each area. At the qualitative level, sampling is a compromise between rapidity, effectiveness and accuracy. On a quantitative level, meticulous and broad collection enables maximal recording of the potential of the sites. All the sherds were described, photographed and sorted to analyse precisely the diagnostic elements: rims, bases, handles and decoration. So far, 11,344 diagnostic sherds have been collected as a typological reference for the chronological framework. All the sherds have been recorded, drawn and photographed, but only two-thirds have yet been dated.

The use of this methodology has allowed us to multiply by five the number of sites known for the Rania and Peshdar plains.

EXCAVATIONS

Test trenches at six sites were excavated in order to define a local lithic and ceramic chrono-typology. These new stratified typologies (in progress) will help us to refine the dating of the local sites. Furthermore, they allow us to understand the development of human occupation from the Palaeolithic to the Late Chalcolithic in the region.

These sites (fig. 2) were chosen according to their potential for establishing chrono-stratigraphy, and because of their small size. The last-but-not-least criterion was the risks threatening sites. More than half of the excavated sites were largely looted (Cave Mewe, no. 268), or threatened by urbanisation (Boskin, no. 60) or intensive agriculture (Halawezha/Bijian, no. 187 and Dargrdal, no. 266). The last site was chosen for its chronological importance and its stratigraphic sequence, unique in this regional context (Sarsyan, no. 77).

THE RANIA AND PESHDAR PLAINS: NOW AND IN THE PAST

The MAFGS survey began in the north-eastern part of the Governorate of Soulaimaniah, around Lake Dukan. Administratively, this area belongs to the districts of Rania and Peshdar and the sub-districts of Bingird and Khadran in the Dukan district. Geographically, this is a coherent spatial unit that will allow a global reflection on the evolution of its occupation.

THE RANIA AND PESHDAR PLAINS: GEOGRAPHY, HYDROLOGY, CLIMATE AND BIOGEOGRAPHY

This area forms a coherent unit for spatial analysis. It is a closed system with well-defined inputs: two plains, the Rania Plain and the Peshdar Plain[3] surrounded by high mountains. The Rania Plain is separated from the Peshdar Plain to the north-east by a long ridge oriented north-west/south-east known as the Maqooq Mount. The Lesser Zab river flows along this ridge and enters the Rania Plain through a gorge. The Lesser Zab, which used to run in the Rania Plain, now feeds Dukan Lake. These two plains are linked together by the gorge mentioned above. However, they are one and the same unit and could be considered to be an enclosed space. This enclosed area is open to the outside via a series of valleys and passes, allowing people to move inside Iraqi Kurdish territory through narrow valleys such as the Samakuli, Khalakan and Balissan. In the north, they are linked to Iran by high valleys such as the Issawo, and mountain passes, including those of the Mount Qandil.

The hydrographic network of the region is mainly organised around the Lesser Zab. The river runs along the Peshdar Plain before flowing into Dukan Lake, via the gorge. In the Peshdar area, it receives contributions from several tributaries located at intervals from the mountains to the Iranian and Iraqi borders. These rivers literally divide the plain into vast north-south-facing terraces before joining the Lesser Zab that digs its bed from east to west. In the Rania Plain, the tributaries come from the east and west and currently flow directly into the lake. These last wadis wander in wide beds at the bottom of the valleys leading to the Governorate of Erbil.

The study area is located in the large semi-arid climatic zone (Walter and Lieth 1960) but the presence of mountainous massifs induces higher humidity with cold and wet winters and hot and dry summers. Data from Dukan's weather station show that the mountainous location of the region gives it high thermal contrasts during the year and high rainfall (743.8 mm per year), mainly during the winter and spring seasons (Karim *et al.* 2014). However, as summers are particularly warm, the vegetation is quickly under water stress, but the evapotranspiration effect is compensated for by numerous rivers and springs, leading to the practice of dry farming (Walliser 2010). Moreover, given climatic and geological conditions, soils are particularly well developed, with a large organic matter content and a low salinity rate (Muhaimeed *et al.* 2014).

In terms of vegetation and land use, the landscape is completely anthropic nowadays. The mountain areas are covered by a relictual forest vegetation dominated by oak (*Quercus brantii, Q. aegilops, Q. infectoria* and *Q. libani*), pistachio (*Pistacia atlantica* and *P. khinjuk*) and almond trees. Due to anthropisation, the density of the vegetation type decreases from the highest part to the foothills (Ghazanfar and McDaniel 2016). The lower slopes often support the cultivation of fruit and vegetables. Mountain and foothill areas are also the domain of semi-sedentary pastoralism[4] . Groups of sheep and goats are present and seasonal migration of livestock takes place.

The plains are occupied by crop fields, mainly wheat and barley, surrounded by weeds such as *Malva* sp., *Centaurea* sp., *Phalaris* sp., *Avena* sp., *Hordeum spontaneum*, *Hordeum murinum*, *Trigonella* sp., *Papaver rhoeas*, *Heliotropium* sp., *Sinapis* sp. and *Convolvulus* sp.[5]

PALAEOENVIRONMENTAL PROXIES IN THE LONG TERM

The region's palaeoenvironment is very little known. We will very quickly outline here a broad and more local paleoclimatic history.

Regional climate evidence comes mainly via lake core analysis (pollen, sediment, chemicals and diatoms) from Iran (Van Zeist and Woldring 1978; Stevens *et al.* 2001), from Lake Zeribar and Lake Mirabad and from Lake Van and Lake Nar in Turkey (Roberts *et al.* 2001; Wicke *et al.* 2003; Dean *et al.* 2015). The records have a low temporal resolution (Marsh *et al.* 2018). Very recently, two speleothem analyses were carried out in Iraqi Kurdistan. The Geijkar Cave stalagmites (Piramagron mountains) cover the period 430 BC-350 AD and that from 930 AD (Flohr *et al.* 2017). Too recent for our study, the positive results show drought peaks in an already rather hot and dry context. Some stalagmites from Shalaii Cave provide palaeoclimate proxies from 8500 BC to the present time (Marsh *et al.* 2018; Altaweel *et al.* 2019). These preliminary

3. We named these plains according to the administrative boundaries of the region. To the north, the Peshdar Plain overlaps completely with the Peshdar district. In the south, the Rania Plain is located in one district (Rania) and two sub-districts (Bingird and Khadran), so we have chosen the name of the district for reasons of convenience.

4. Thevenin M. and Giraud J. (2019), Pratiques pastorales au Kurdistan irakien : enquêtes ethnographiques dans la région de Rania. *Les Carnets de l'Ifpo*. Online: http://ifpo.hypotheses.org/9068.

5. Douché C. and Mashkour M. (2018), Dargrdal vegetation. *In*: Giraud J., Mura M., Pot M.-A., Mashkhour M., Bonilauri S., Lemée M., Jamialahmadi M., Amin A., Raouf K., Havé A., Pichon F. and Douché C., *Soulaimaniah Governorate Archaeological Survey*: 49-50. Unpublished report on the 2018 Spring mission, Soulaimaniah Directorate of Antiquities.

data are particularly promising. They are consistent with known regional data but provide a more local and, therefore, accurate view of Holocene climate fluctuations.

In the Quaternary, the Pleistocene is marked by a series of glacial and interglacial phases. During the glaciations, temperatures drop and aridity increases. These periods are interrupted by interglacial periods, characterised by an increase in temperature and precipitation and involving significant river activity and the formation of terraces. The vegetation cover in the uplands and plains would probably have been steppes (Blanchet *et al*. 1997; Altaweel *et al*. 2012: 5-6).

The Holocene, around 10,000 BP, after a final series of interstadial fluctuations of the Last Glacial Maximum (21,000-15,000 BP), the Tardiglacial (15,000-11,000 BP) and the Younger Dryas (12,800-11,700 BP), manifest themselves in a new climate regime throughout the Near East characterised by dry summers and wet winters (Blanchet *et al.* 1997). The vegetation becomes shrubby, with oaks and pistachio trees, and also herbaceous vegetation with wild cereals. Shalaii's speleothems, lake cores and other environmental proxies from Southern and Northern Iraq (Marsh *et al.* 2018; Altaweel *et al.* 2019) show local climatic variations within the Holocene. The Early Holocene (9700-4000 BC) was characterised by wetter conditions with increased rainfall (Altaweel *et al.* 2019: 15-16) and the rivers incised the Pleistocene and Early Holocene terraces (Altaweel *et al*. 2012: 6). The end of the mid-Holocene (3000 BC) witnessed the shift to drier conditions and the climate remained stable for the rest of the Holocene until today; however, there are always drier or wetter phases (Altaweel *et al*. 2019: 16).

FORMATION OF THE RANIA AND PESHDAR PLAINS

In 2013 and 2014, the MAFGS began the geomorphological study of the two plains)[6] and it became possible to formulate an initial hypothesis about to their establishment. At the same time, several geomorphological studies were being carried out in the region. A small, very local study was done by a Japanese team working on Qalat Saïd Ahmadan (Tsuneki *et al*. 2015: 6-7), and other larger studies were being carried out at the Qalat-i Dinka site (Altaweel and Marsh 2016; Eckmeier *et al*. 2016. These are concerned with its environment, but also with the formation of the Bora Plain where some important archaeological sites are located like Qalat-i Dinka and Bijian. They provide local data but corroborate the pattern identified by the preliminary MAFGS missions.

The region is mainly included in the folded sedimentary zone of the Zagros (Jassim and Goff 2006). This relief was created when the Paleo-Tehys and Neo-Tehys oceans closed as the Arabian and Eurasian plates collided during the Upper Miocene and Lower Pliocene. Thus, the folded landforms surrounding these plains are reliefs inherited from the differential erosion of Miocene and Pliocene sedimentary folds. The limestone, which is mainly from the Cretaceous period, has a karst structure. Many limestone pavements are visible, which explains the presence of caves. The southern landforms surrounding the Rania Plain consist of inverted landforms, anticline valleys and syncline ridges.

The region, which has been geographically considered as two large plains, appears to be actually one plain formed in depressions filled by alluvial cones, river terraces and slope deposits, that is, colluvium formed from the Pleistocene to the Holocene.

Morphogenesis of the Rania Plain

The morphogenesis of the area to the east of the Rania Plain has been subjected to climatic pulsations that have modified the nature of sediment inputs, mainly from large dejection cones. During calm phases, the plain was covered with clay, whereas during agitated phases, pebbles (of varying sizes) spread over a huge area. The plain does not seem to have an identifiable terrace or, perhaps, it has been "smoothed' by the influence of dejection cones or the significant impact that humans have had on it.

The situation to the north of the Rania Plain (Bingird sub-district) appears to be affected by the presence of the large calcareous Maqooq Mount, which crosses the study area. Indeed, massive sediment inflows, in the form of large blocks resulting from the erosion of the summit cornice were deposited at the foot of the slope, forming a glacis connected to the plain. In the north-east of the plain, what appears to be the legacy of a Villafranchian[7] climate crisis was found. This would have affected this area, creating a significant destabilisation of the biogeographic balance. The cycles of morphogenesis in the

6. Caze C. (2014), *Évolution paléo-environnementale quaternaire de plaines alluviales en milieu montagnard semi-aride : le cas de deux dépressions topographiques de la moyenne vallée du Zab inférieur (Zagros occidental, Kurdistan irakien*. Unpublished Master thesis, Université Paris 4. See also Louchet A. and Caze C. (2014), Geomorphology studies *In*: Giraud J. *et al*., *Soulaimaniah Governorate Archaeological Survey*: 4-6. Unpublished report on the 2014 Spring mission, Soulaimaniah Directorate of Antiquities.

7. Which includes the Plaisancian, the Gelasian and the Calabrian. Villafranchien covers the end of the Tertiary (Final Pliocene) and the beginning of the Quaternary (Initial Pleistocene).

Rania Plain can, indeed, be explained by a climatic phenomenon: the Villafranchian crisis. The Villafranchian is the stratigraphic division between the end of the Tertiary and the beginning of the Quaternary, between -5.2 and -1.2/-.09 Ma. It is characterised by the beginning of climatic oscillations that gave rise to the typical Quaternary glaciations. It is a phase of slope destabilisation and soil removal (rhexistasis) that occurs after a period of biostasis (near stability, in which the absence of erosion results from the presence of sustainable vegetation cover).

This assumption is particularly valid for the eastern sector where conglomeratic deposits are based on clays with a clear limit. A period of biostasis materialised by the deposition of a clay level would have been disrupted and the clay covered by a massive spreading of pebbles (testimony to soil erosion and slope instability). We can identify the following successive phases:

1. the clay deposition during a phase of biostasis and hot episodes (Late Tertiary), on which a hydrographic network is built;
2. still, in the biostasis phase, the hydrographic network cuts the clay level;
3. the rhexistasis phase in Villafranchien, with a spreading of stones that completely covers the clay level;
4. the current situation, in which the environment is said to be in "relative biostasis" after a succession of different cold phases (Quaternary glaciations).

Morphogenesis of the Peshdar Plain

In the depression of the Peshdar Plain, different stages seem to have created levels of clearly identifiable terraces. Three main levels, shaped between 500,000 BP and 15,000 BP, have resulted from climatic pulsations that have generated significant sediment inputs. A Holocene terrace currently in formation seems to be emerging as the next low level. The data from the Bora Plain (Altaweel and Marsh 2016: 23-24) to the east of the Peshdar Plain help us to understand the stages of terrace shaping in the Peshdar Plain. The Bora Plain is a small alluvial plain lying on a tectonic zone where, "the main geological units consist mainly of Cretaceous period limestone with some conglomerates and sandstones especially in the foothill areas closest to the plain, and with Quaternary period alluvium deposited along the channel of the Lesser Zab. The Bora channels originating from the Zagros Mountains were likely originally carved out by the meandering of the Lesser Zab, with deposition of alluvium from both the Zab and the feeder channels originating from the Zagros Mountains" (Altaweel and Marsh 2016).

Prospects for further work

Although the shaping of the surface formations of these two plains has resulted in different landforms and compositions, the main force in action in both cases is the climate. However, further and more refined studies are still needed for an even more complete understanding of the functioning of sediment inputs from these depressions. The implementation of drilling or coring would allow us to learn more about stratigraphy and confirm or modify our assumptions.

Finally, although the paleoenvironmental evolution of the study area is mainly related to climate action, we are entitled to ask ourselves what influence the tectonic component may have in this region, given that the Zagros massif is relatively young and that its over-reaction is still active today.

ARCHAEOLOGICAL DATA ACQUIRED BY THE MAFGS: 2012-2016

The MAFGS project located and studied 366 sites throughout the region. For the moment, only two-thirds of them have been dated. Of these 244 dated sites, a small number have been occupied from the Palaeolithic to the Late Chalcolithic and 6 of them were excavated (fig. 2-3).

PALAEOLITHIC PERIODS

The material recovered by the surveys reveals the extreme richness of the lithic assemblages. Fieldwork has recovered 75 of these. Although chrono-cultural determination is often made difficult by the lack of local chrono-stratigraphic contexts and distinctive typo-technical elements, typo-technological analyses of some lithic assemblages provide some chrono-cultural attributions: Middle Palaeolithic and Epipalaeolithic, with many assemblages dating to the first period. Sixteen sites could be dated to the Middle Palaeolithic (fig. 3-4).

Palaeolithic settlements

The Palaeolithic lithic material was mainly located in lower and hilly zones and was discovered in or close to caves, rock shelters and several open-air sites in the lower and mid-mountain zones. There are no open-air sites located in the plains, which could partly be explained by the formation of terraces from the Pliocene to the Holocene.

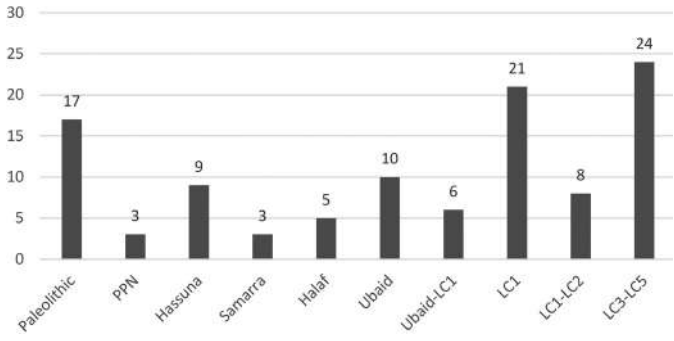

Fig. 3 – *Diagram showing the number of relatively dated settlement per period (CAD J. Giraud).*

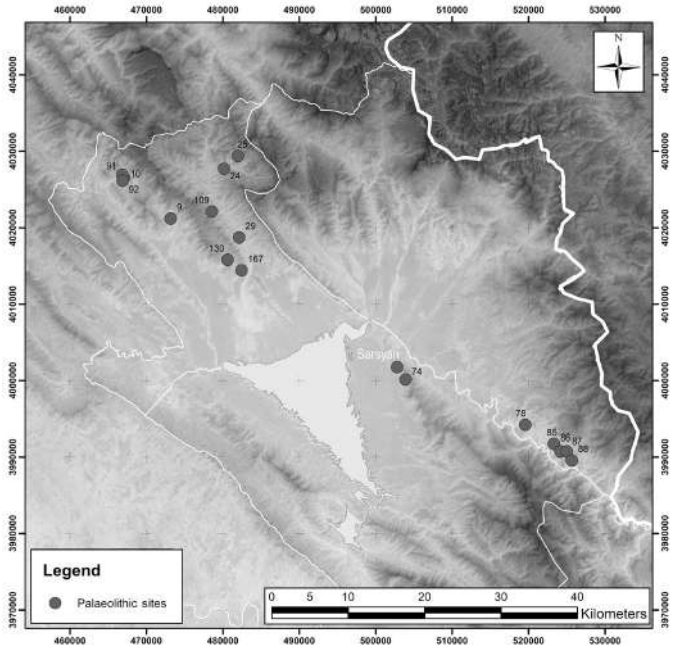

Fig. 4 – *Location of Palaeolithic sites (map J. Giraud).*

The lithic assemblages typical of the Lower Palaeolithic have not yet been identified. Upper Palaeolithic assemblages with Aurignacian/Baradostian sequences, broadly present in the Zagros region (Olszewski and Dibble 1994; Otte and Kozłowski 2007; Otte *et al*. 2007; Bordes and Shidrang 2009; Shidrang *et al*. 2016; Shidrang 2018), are so far absent. However, with regard to the Middle Palaeolithic, the assemblages are relatively well represented.

We discovered several Middle Palaeolithic sites in the open-air locations of Ser Girdy (no. 78), Grtk Qala (no. 85), Hassana Rash Qalat (no. 87) and Geremka (no. 88), located in a valley southeast of the city of Qalat Dizah (Peshdar district) and characterised by the presence of Levallois reduction and products, including some points made in limestone. The others sites are in the mountains, either in caves or in rock shelters, as in the Besara Valley (no. 10, 91-92), the Dolmaran Valley (no. 130, 167), the Marbab Valley (no. 24-25) and inside Maqooq Mount (Sarsyan, no. 74, 77).

The most significant assemblage belongs to the rock shelter site (Sarsyan, no. 77). Its lithic assemblage presents clear affinities with the Zagros Mousterian industries (Dibble 1993; Olszewski and Dibble 1993; Lindly 2005; Jaubert *et al*. 2006; Biglari 2007; Bazgir *et al*. 2014).

Sarsyan: a complete stratigraphy from the Middle Palaeolithic

The Sarsyan rock shelter (fig. 5),[8] located in the limestone formations of Maqooq Mount, is a deep rock shelter (14.5 m long, 10 m high and 11.5 m wide) whose orientation is north-south, with the entrance facing south. A trench 12.80 m long and 1 m wide was excavated to the bottom of the rock shelter, down to the hardened layers that overlie the bedrock. Through the trench, six different layers have been identified. The five first layers—stratigraphical units (SU) 1-5—are disturbed and a few centimetres deep. The next layer—SU 6—corresponds to an undisturbed, very compact beige layer, richer in gravels and with artefacts in a flat position. This could suggest that it corresponds to the earliest preserved layer. SU 1-5 were all excavated through the trench. SU 6 was only excavated through a small pit of 50 cm depth, on the southern extremity of the trench, where it was better preserved (fig. 5). The bedrock has not been reached yet.

The different layers and deposits that were identified produced more than a thousand finds, mainly lithics and bones, throughout the trench. Archaeological remains from SU 1-5 mainly come from the underlying layer, SU 6, along with mixed material, such as historical and modern pottery, from more recent periods. The lithic artefacts of these layers as well as the one found on the surface present the same typo-technological traits as the underlying layer, SU 6 (see table 1).

A first consideration of the lithic remains (still under study) found in all the layers was aimed at assessing the typo-technological traits of the lithic industry. As the quantity of material is large, the procedure focused on significant technical

8. Bonilauri S., Lemée M., Jamialhmadi M. and Mura M. (2018), Excavation at Sarsyan 2018. *In*: Giraud J. *et al*., *Soulaimaniah Governorate Archaeological Survey*: 57-74. Unpublished report on the 2018 Spring mission, Soulaimaniah Directorate of Antiquities.

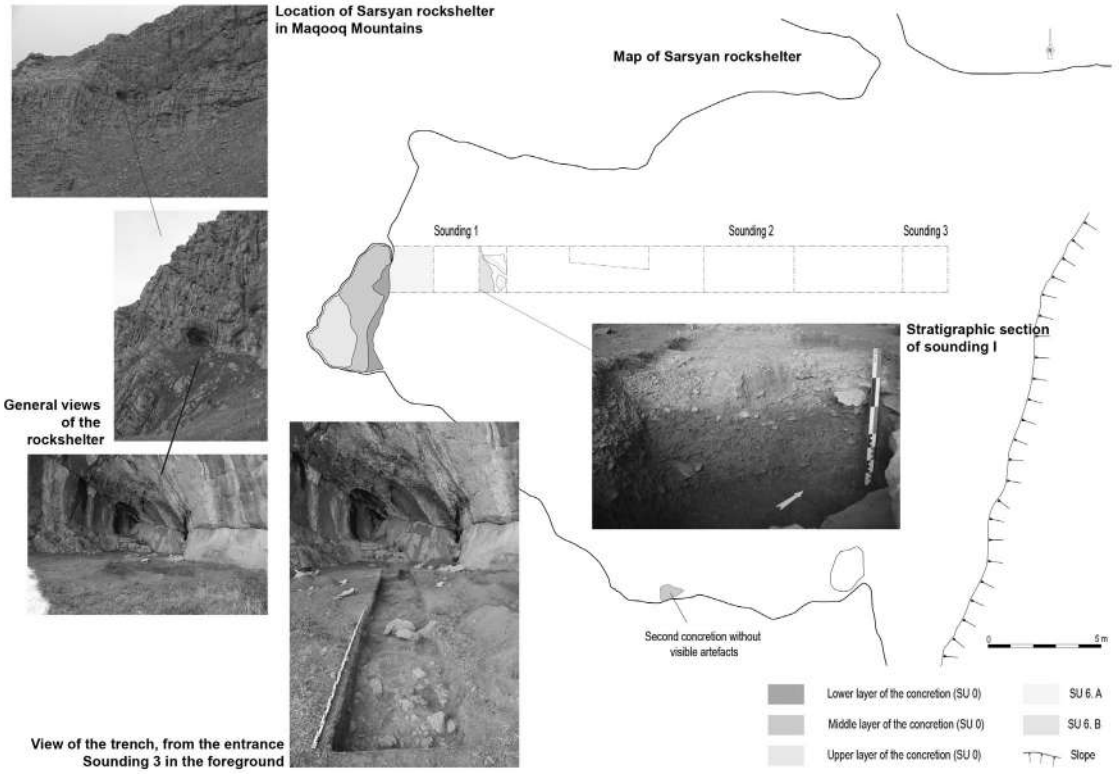

Fig. 5 – *The rockshelter Sarsyan (CAD M. Lemée): general views of the site, plan of the rockshelter and stratigraphic session of the trench test.*

Tabl. 1 – *Technological composition of the Sarsyan lithic industry based on a sample of 148 pieces ((S. Bonilauri).*

Products	Surface	SU1 to SU5	SU6	Summ
Levallois cores			9	**9**
Discoidal cores	1	2		**3**
Other cores		1	8	**9**
Levallois flakes	10	17	10	**37**
Levallois points / flakes with convergent edges	7	17	11	**35**
Diverse flakes	9	25	26	**60**
Bifacial pieces			2	**2**
Blades	1	4	1	**6**
Bladelets	1	4	7	**12**
Bladelet cores	1	1	3	**5**
Sum	**30**	**71**	**77**	**178**

elements. Waste, chips, debris, most damaged fragments and undetermined pieces were not included in the analysis. The result of the lithic sorting carried out here was 178 pieces (table 1). The lithic industry is composed of numerous chert and limestone artefacts and the raw material was locally available in the form of different sized blocks. The state of preservation is relatively good, indicating minor post-depositional disturbance. The production results from two main debitage: Levallois for the main intended artefacts; and non-Levallois. There is also discoïdal and lamellar in small quantities (table 1). The lithic industry consists of two major categories: convergent, including Levallois points; and triangular and wide/elongated flakes. Convergent artefacts, mainly Levallois, are well represented and range from 26 mm to 56 mm long (table 1; fig. 6). Their contours are variable (elongated with small, wide-based points, symmetric and asymmetric pieces) and their profiles are straight or curved. These convergent pieces are unretouched or retouched on at least one lateral edge. For the most part, the assemblage also includes Levallois and non-Levallois flakes, wide and more or less elongated (table 1; fig. 6). Some of them are retouched. The lithic industry also contains some unretouched blades and bladelets. In the case of the unidirectional bladelets, the cores were formed by a bladelet reduction strategy. Mousterian points, retouched points and typo-scrapers (including side scrapers, double scrapers and convergent scrapers) dominate the typological group. A smaller number of retouched pieces

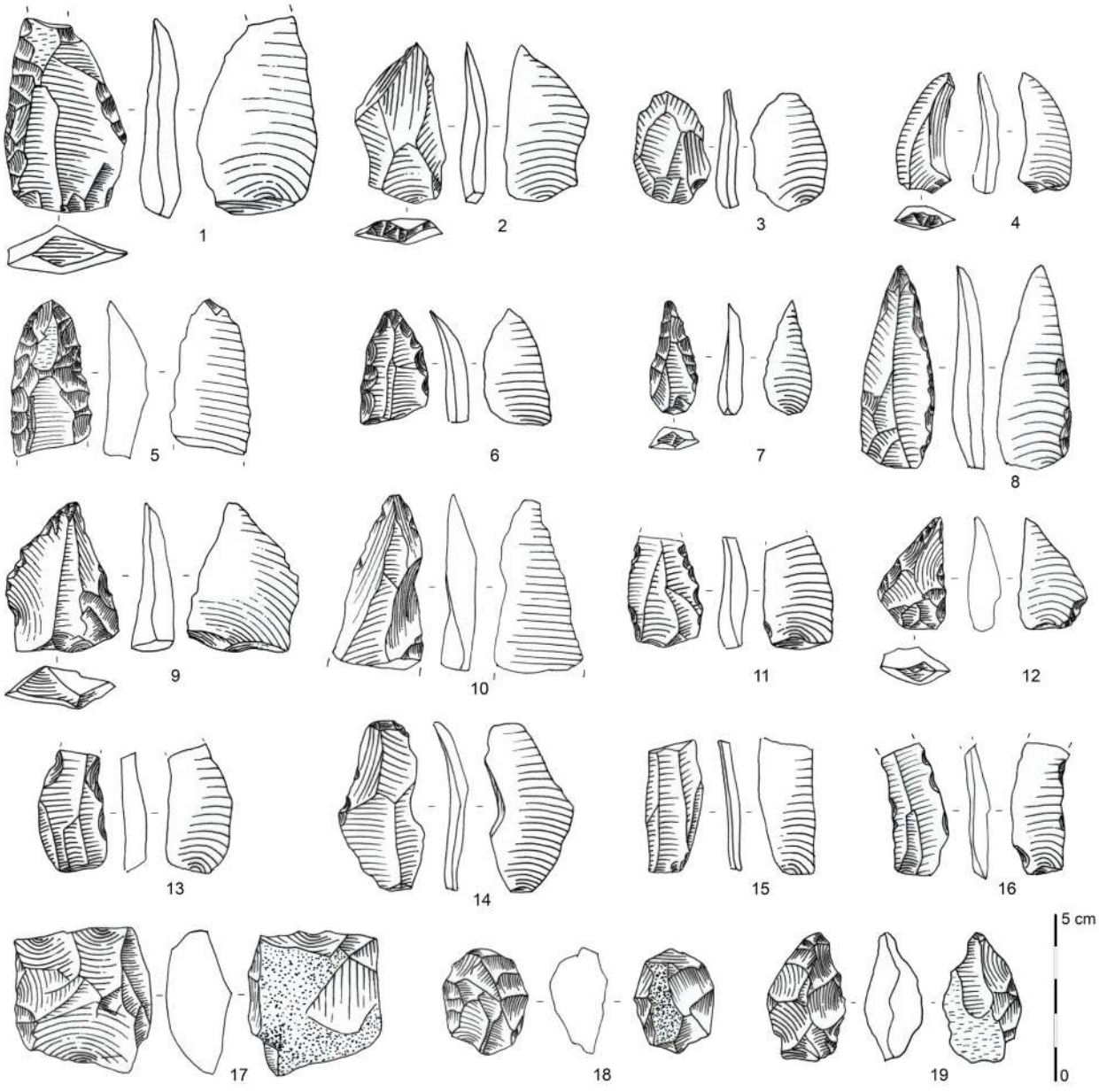

Fig. 6 – *Examples of the lithic assemblage of Sarsyan site (CAD S. Bonilauri, M. Jamialahmadi, K. Aziz):* ***1.*** *retouched Levallois flake (side scraper);* ***2-3.*** *Levallois flakes;* ***4.*** *Levallois point;* ***5-7.*** *Mousterian points;* ***8-9.*** *retouched points;* ***10-11.*** *fractured points;* ***12.*** déjeté *convergent flake;* ***13-16.*** *elongated flakes;* ***17-18.*** *Levallois cores;* ***19.*** *biface.*

and notches are present, along with one dihedral burin. The presence of some Upper Palaeolithic elements (bladelet reduction strategy, dihedral burin) may be intentional or, more likely, they are from the dismantled upper layer.

The Sarsyan site provides a Mousterian lithic assemblage characterised by many Mousterian points and many typo-scrapers comparable with the Zagros Mousterian industries (Solecki and Solecki 1974, 1993; Dibble 1984, 1993; Dibble and Holdaway 1990; Biglari 2001; Jaubert *et al.* 2009; Beshkani 2018).

The Zagros Mousterian industry is globally characterised by small retouched artefacts dominated by scrapers, including convergents, side and double scrapers, Mousterian points and elongated Levallois flaking.

The Sarsyan rock shelter has proved to be an important Middle Palaeolithic site in this regional context. Indeed, this site represents the only Middle Palaeolithic sequence preserved (at least 50 cm deep) for the surveyed area. Obviously, we now need to excavate extensively to fully understand the distribution of the Middle Palaeolithic artefacts throughout the cave.

EARLY NEOLITHIC

For the pre-Neolithic period, only three Pre-Pottery Neolithic (PPN) sites are represented: Qalat Saïd Ahmadan (Tsuneki *et al.* 2015, 2016), Shemshara (Mortensen 1970; Matthews *et al.* 2016) and Halawezha/Bijian[9] (fig. 3).

Distribution of Early Neolithic sites

Evidence of Early Neolithic sites (fig. 7) in the Rania and Peshdar plains is difficult to identify on the basis of surface collections. With the MAFGS method used, only one site, Halawezha/Bijian, was probably identified as a PPN site. The other two sites, Qalat Saïd Ahmadan (Tsuneki *et al.* 2015, 2016) and Shemshara (Mortensen 1970; Matthews *et al.* 2016), were dated from this period following the excavation of their oldest levels.

Concerning Shemshara, Mortensen's excavations, as early as 1970, have established levels of occupation dating to the Neolithic, more precisely to the Hassuna period (Mortensen 1970). The resumption of excavation of these earliest levels (Matthews *et al.* 2016) clearly indicates a PPN occupation, with a radiocarbon sample of *ca*. 7300-7200 BC (Matthews *et al.* 2016) lying on the last layer of occupation excavated in trenches 1 and 2. The lithic assemblage is mainly composed of tools and flakes in obsidian and chert, specifically, several Cayönü tools and some sickle blades and diagonal-ended bladelets in both materials (Matthews *et al.* 2016).

Similarly, at Qalat Saïd Ahmadan, the last levels before the natural substrate, SU 5 and 6 of trench B, are dated from 7600-7300 BC (radiocarbon date). The lithic of these layers is far richer and more varied than the other upper layer. There is a great variety of flint and obsidian tools including sickle elements, scrapers, serrated blades and points.

During the surveys carried out by the MAFGS, only Halawezha/Bijian (fig. 8) was spotted in fortuitous circumstances. This can be explained in different ways. First, the method used by the MAFGS does not lend itself well to the search for this type of site, which is too intangible with thin and highly fragmented lithic material. In addition, CORONA imagery does not give a clear view of this type of site. Furthermore, the history of the morphogenesis of the plain has barely stabilised: the alluvial terraces of the Early Holocene are still being set up. Finally, in the case of reoccupied sites, PPN levels can be buried below metres of more recently occupied layers, as at Qalat Saïd Ahmadan and Shemshara.

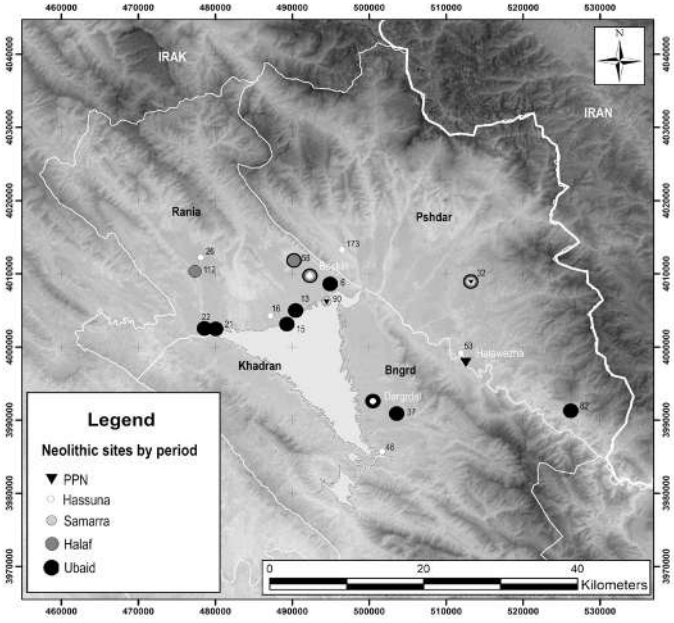

Fig. 7 – *Location of Neolithic sites (map J. Giraud).*

Nevertheless, 75 lithic assemblages have been collected in the region. Half of this material is still under study and we can very well imagine that other sites from this period exist. On the surface, Halawezha/Bijian showed an abundance of ground stone tools, some features of lithic industry and an absence of pottery, suggesting to us an Early Neolithic occupation in the Bora Plain (Peshdar Plain) on this open-air site. Its location is on one of the middle terraces bordering the Lesser Zab, which indicates a very old occupation of this small plain (Altaweel and Marsh 2016).

Halawezha/Bijian site: evidence for Early Neolithic

In order to understand the soil composition of the Halawezha/Bijian open-air site[10] and the degree of preservation/destruction,

9. Mashkour M., Lemée M., Mura M. and Pichon F. (2018), Halawezha/Bijian, site nº 187. *In*: Giraud J. *et al.*, *Soulaimaniah Governorate Archaeological Survey*: 6-15. Unpublished report on the 2018 Spring mission, Soulaimaniah Directorate of Antiquities.

10. See note 9.

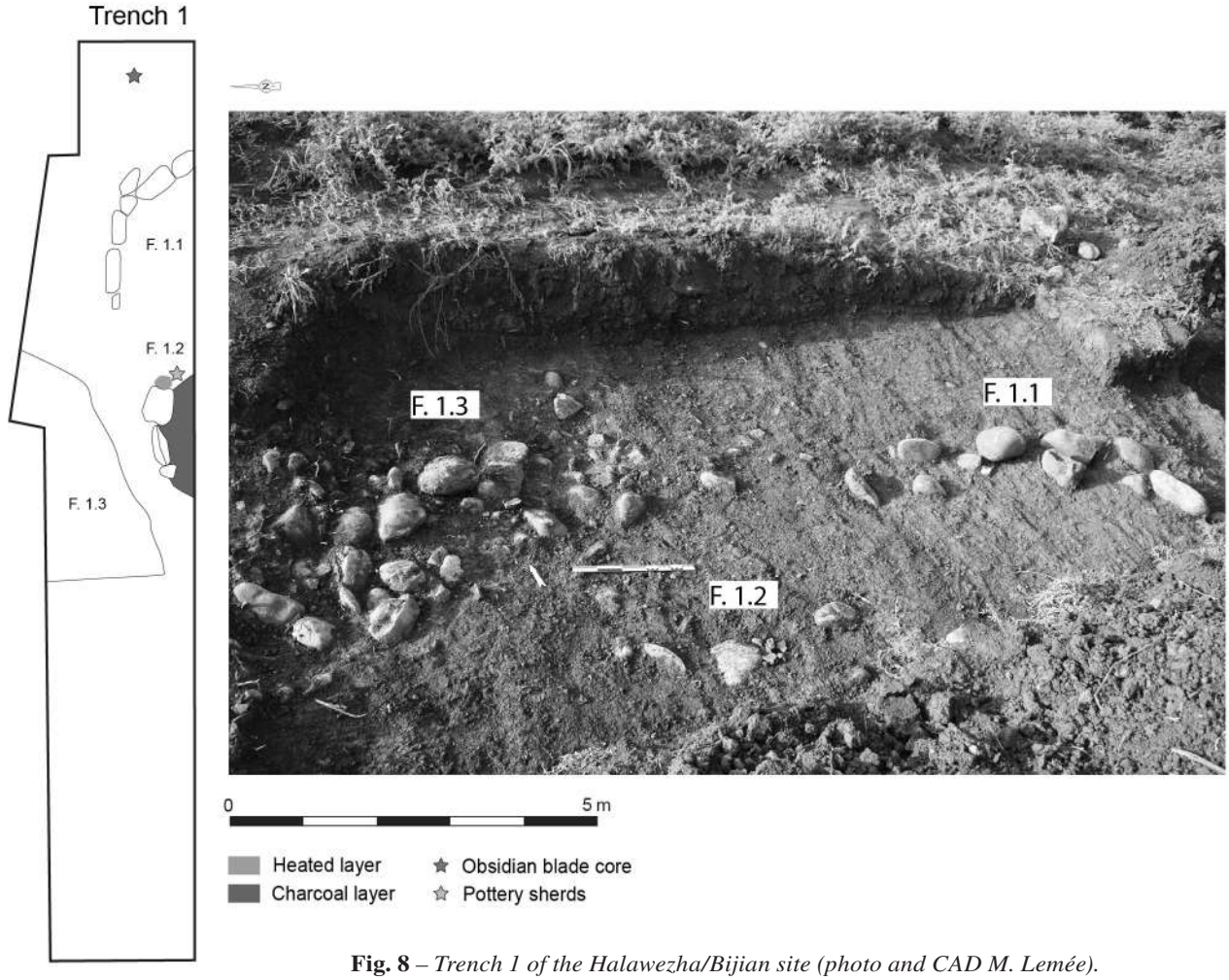

Fig. 8 – *Trench 1 of the Halawezha/Bijian site (photo and CAD M. Lemée).*

we opened a deep geomorphological trench. Beneath the topsoil, the soil consisted of a thick layer of brown, compact and homogeneous clay at least 1.3 m deep (depth of the trench), identified as a colluvium level. The archaeological features, found only in trench 1, lie at the surface of this layer and are dated to the Neolithic. This suggests that very early archaeological features could have been preserved under this colluvium layer.

In trench 1, a semi-circular structure 2 m wide (fig. 8), consisting of large river pebbles around 0.2 m to 0.3 m in size, extended beyond the trench. Very close and to the west, a small hearth along with a few non-diagnostic sherds was identified. A flat layer of similar pebbles was interpreted as an area of circulation or a floor (courtyard?) directly related to the other features. Very close to these features, in the eastern extremity of the trench, an obsidian blade core (fig. 9.13) was discovered in the clay but was not associated with any archaeological feature.

The chipped stone industry[11] (fig. 9) recovered during the surface sampling (2015) and the excavation campaign (trench 1) presents a lamello-laminar technology, with a production of blades and bladelets in both obsidian and various types of chert, and elongated or wide flakes in chert. The majority of the material is fragmented, causing the morpho-technological analysis to be somewhat difficult. A double-platform chert core flaked surface does not demonstrate bipolar knapping (fig. 9.1) and the removal negatives observed on the chert products are unipolar. The chert blades and bladelets are very regular and thin, with a generally trapezoidal cross-section and, when preserved, a punctiform or plain butt (fig. 9.2-12). There are no

11. Pichon F. (2018), Chipped stone industry: Preliminary remarks. *In*: Giraud J. *et al.*, *Soulaimaniah Governorate Archaeological Survey*: 12-14. *Unpublished* report on the 2018 Spring mission, Soulaimaniah Directorate of Antiquities.

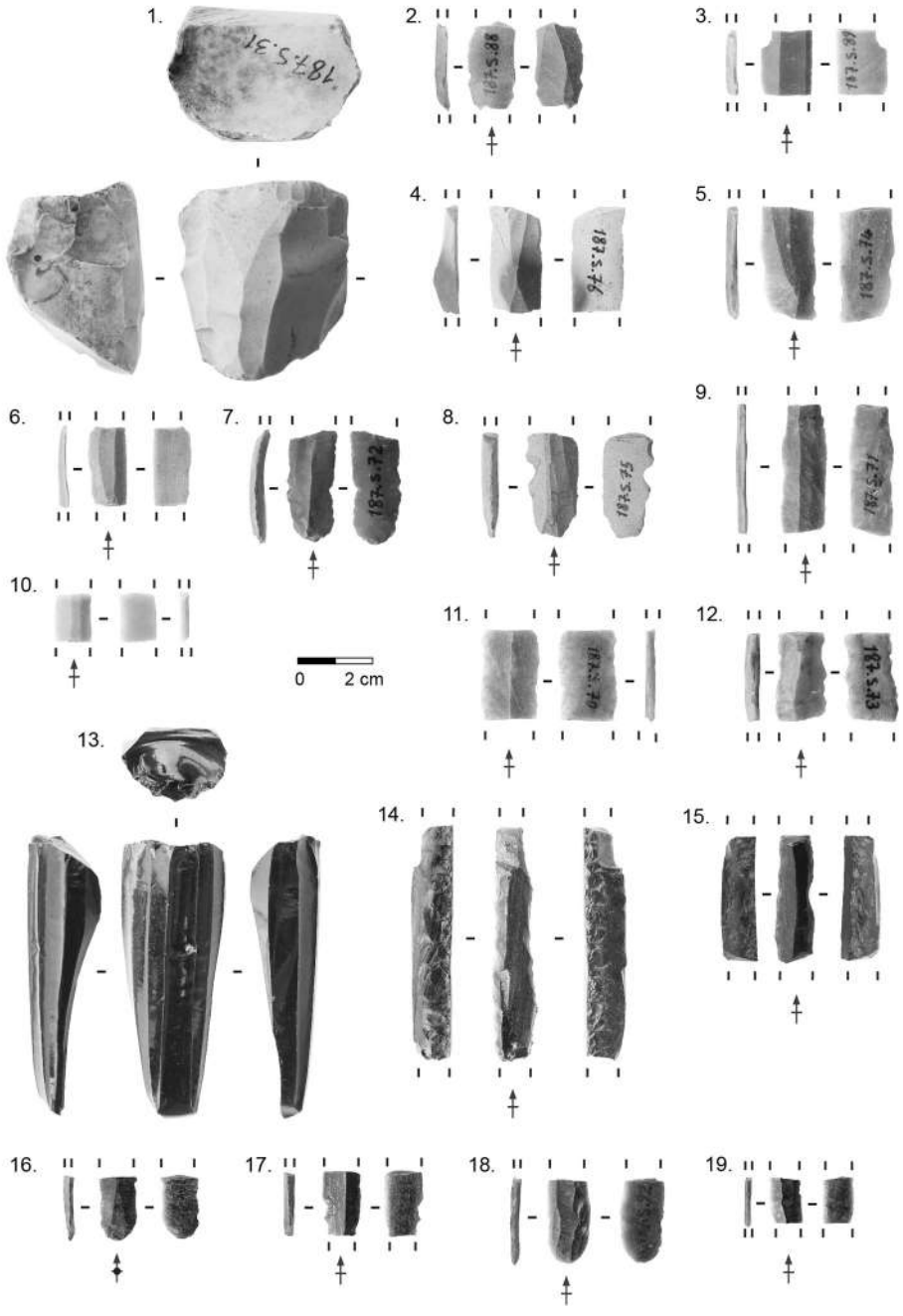

Fig. 9 – *Lithic from Halawezha (CAD F. Pichon):* ***1.*** *double-platform chert core;* ***2-12.*** *chert blades and bladelets;* ***13.*** *single-platform conical obsidian core;* ***14-15.*** *bilateral retouched obsidian blades;* ***16*** *and* ***18-19.*** *obsidian bladelets;* ***17.*** *Cayönu tool.*

formal tools among the chert assemblage, with the exception of some notched and retouched blades/bladelets.

One broken single-platform conical core in obsidian was found in the excavated area (fig. 9.13). The regularity of the removal negatives in the flaked surface, associated with the curved profile of their distal end, is typical of core reduction technology by pressure for blade production. Also found were several thin, regular fragments of obsidian bladelets, two thick obsidian blades (close to 1 cm) with an abrupt and direct retouch on both edges resulting in a tubular cross-section (drills or

Cayönü tool fragments) and one fragment of a Cayönü tool with linear striations on both the dorsal and the ventral face that were interpreted as use-wear traces from the shaping and polishing of stone objects (Anderson 1994; fig. 9.17). As Upper Palaeolithic material was present as well, this must be taken into consideration and the whole collection better defined.

THE POTTERY NEOLITHIC: 7th-5th MILLENNIUM BC

For the period from the 7th to the 5th millennium BC, 27 sites provided material. More precisely, 9 were occupied in the Hassuna period, 3 in the Samarra period, 4 in the Halaf period and 10 in the Ubaid period (fig. 3).

Distribution and typology of sites: Hassuna to Ubaid period

With regard to the 7th and early 6th millennia (fig. 7), the pottery style of the Pottery Neolithic, or "Early Chalcolithic", characterised by the so-called Hassuna and Samarra "cultures", has been identified in the MAFGS region based on a small quantity of combed and painted sherds from a number of sites: Quruja (no. 16), Tle Tell (no. 26), Qalat Saïd Ahmadan (no. 32; Tsuneki *et al.* 2015, 2016), Du Grdan (no. 48), Dinka (no. 53), Boskin (no. 60), Shemshara (no. 90; Mortensen 1970, Matthews *et al.* 2016), Dari Zewe (no. 173) and Dargrdal (no. 266). Despite the limited amount of collected samples, the region appears to have been characterised by reciprocal influences between the different traditions, especially with regard to the painted wares. There are clear parallels with Hakemi Use and Yarim Tepe (Merpert and Munchaev 1993; Tekin 2005).

During the Late Pottery Neolithic, Halaf pottery is also in little evidence at four sites: Qalat Saïd Ahmadan (no. 32), Girdy Dema (no. 58), Boskin (no. 60) and Xwchaw Poke Saru (no. 112). Its morpho-stylistic typology is close to the collections from Nineveh, Sabi Abyad, Tell Hassan, Tell Halaf and Yarim Tepe III (Von Oppenheim 1943; Fiorina 1987; Merpert and Munchaev 1993; Gut 1995; Nieuwenhuyse 2007), even if the Early Halaf (or Hassuna III) influence is conspicuously absent from the surveyed area (as with the SSP so far; Mühl and Nieuwenhuyse 2016; Nieuwenhuyse 2018: 49).

Some samples from Boskin (no. 60) and Ibrahim Katshal (no. 13) belong to the transitional Halaf-Ubaid period (attested at Tell Zeidan, Tepe Gawra XX-XVII, Tell Begun, Logardan[12]; fig. 17; Tobler 1950: pl. LXVIII-LXX, Stein 2011, Nieuwenhuyse *et al.* 2016: 127). In particular, Late Halaf and transitional Halaf-Ubaid sherds are sometimes polychrome painted as at other sites in the Zagros Piedmont (Begun, Marani, Logardan; Nieuwenhuyse *et al.* 2016: fig. 24-25; Wengrow *et al.* 2016: fig. 18).[13] As recently emphasised in relation to the Shahrizor Plain and the Qara Dagh area (Nieuwenhuyse *et al.* 2016: 127; Nieuwenhuyse 2018: 50-51)[14], the Halaf-Ubaid transition was an early and slow phenomenon, implying the microvariability of the assemblages and reciprocal influences. For instance, the so-called Halaf "cream" bowls—carinated and sometimes painted red—become bell-shaped or bowls with an inturned rim, often characterised by black-painted decoration on a buff surface, according to the development of this type analysed at Tell Masaikh in Syria and Domuztepe in Southern Anatolia (Robert *et al.* 2008; Campbell and Fletcher 2010: fig. 5.3a-d).

For the Ubaid period, we distinguish nine sites: Malan Girdy (no. 6), Ibrahim Katshal (no. 13), Aliyawa (no. 20), Blil (no. 21), Saxima (no. 22) Qalat Saïd Ahmadan (no. 32), Pirota Sour (no. 37), Boskin (no. 60) and Dargrdal (no. 266).

The Ubaid ceramics fall outside of the Pottery Neolithic proper and represent rather a Middle Chalcolithic marker. They have a quite ordinary look, with varying shapes: hemispherical; bowls with an inturned rim; middle-sized jars with beaded or flaring rims. Even if black-on-buff painted decorations belong to a widely shared Ubaid repertoire, in the Zagros Piedmont some decorations (chequered motifs, or lozenges decorated by a central point) are very much indebted to previous Halaf traditions. At the same time, as already observed in the Shahrizor Plain and at Logardan (Altaweel *et al.* 2012; Baldi 2016), Ubaid pottery from the Rania and Peshdar plains is much more closely related to sites in Central Mesopotamia and in the Hamrin Valley (Jasim 1985) than to the Zammar and Mosul regions in the north (Tobler 1950; Gavagnin *et al.* 2016).

We distinguished two types of shape for sites belonging to this part of the Pottery Neolithic period. The first type is represented by mounds with extensive surfaces (1-3 ha) having a gentle slope and low elevation (about 5 m), located in the plain near a wadi or canal. On the CORONA images their signatures are dark, indicating a more humid and organic subsoil (remains of architecture with a light material structure or mud-brick), whereas whitish signatures indicate a dry subsoil and more densely built structures (probably stone architecture).

12. Baldi J.S., Evolution as a way of intertwining: regional approach and new data on the Halaf-Ubaid Transition in Northern Mesopotamia. *In*: *Proceedings of the Broadening Horizons 5 conference (BH5), Udine, June 2017*, WEST & EAST Suppl., forthcoming.
13. See note 12.
14. See note 12.

These characteristics correspond to a number of sites: Ibrahim Katshal (no. 13), Saxima (no. 22), Dari Zewe (no. 173), Du Grdan 2 (no. 48), Dargrdal (no. 266) and Xwchaw Poke Saru (no. 112). They do not particularly correspond to a specific period within this Neolithic period. These are small villages that were occupied for a shorter period than other types of site.

Concerning the second type, the sites correspond to small tells with a high mound associated with a lower town. These tells are attributed to the Chalcolithic, but at their bases we found earlier layers of Pottery Neolithic, such as at Boskin (no. 60), Qalat Saïd Ahmadan (no. 32), Tle Tell (no. 26), Shemshara (no. 90), Malan Girdy (no. 6), Pirota Sour (no. 37), Quruja (no. 16), Dinka (no. 53) and Blil (no. 21).

DARGRDAL: EVIDENCE FOR HASSUNA AND UBAID III

The Dargrdal corresponds to type 1 (fig. 10). It is a small hill measuring 3 ha.

The trench excavated at Dargrdal is 37.3 m long and 1 m wide.[15] Six smaller exploratory trenches (SD) were dug along the main trench (fig. 10). SD I, 0.9 m deep, revealed the highest concentration of archaeological remains and levels, the frequency and nature of which, as well as the nature of the structures, indicate domestic activities. The frequency of anthropogenic remains decreases in SD VI and V. This suggests that the richest anthropogenic levels are in the centre of the hill, around SD I, and could extend over its western and southern slopes.

However, human occupation is obvious in the entire trench, because pottery sherds were found in each of the smaller trenches.

As the bedrock was not reached, the description of the SU begins at the top and extends to the deepest level reached.

Between 0.2 m (at the top of the hill) and 0.7 m (at the bottom) under the topsoil, a dark orange-brown soft clay sediment containing carbonate nodules was uncovered (SU 2, SD I-II and V-VI; SU 16, SD III-IV). There are many indications of bioturbation here, and this may have concealed some archaeological features. Only one hearth has been identified in this level (FP 13 in SD I). The presence of terracotta nodules in the fill could indicate the existence of a cover.

In SD III and IV, only SU 19 (under SU 16), in which many rolled sherds and fractured lithics were found, indicates the occupation of the area. The compactness of this area, as well as the rolled appearance, high fragmentation and quantity of the sherds, suggest that it is a level of human circulation, such as a courtyard, rather than a level of debris. In any case, no domestic or artisanal activities appear to have taken place in this part of the trench. The pottery sherds belong exclusively to the Ubaid III period. SU 20-21 and 35 consist of very compact brown sediment in which no archaeological material or features were found.

In SD I, below the carbonaceous level SU 2, and cut off by FP 13, a second oven was discovered (FP 14) in SU 4, which was composed of yellow-brown loose clay sediment. This level is rich in pottery fragments and includes numerous snail shells. Beneath SU 4, SU 24, a yellowish clay sediment containing many inclusions of carbonate nodules, is more compact. Several noteworthy artefacts were found in this level: a stone mortar, pottery, flint fragments, fauna and terracotta fragments. The presence of a posthole (PH 22) and a small pit (SU 25) indicate that this is another stratigraphic layer, although the difference compared with SU 4 is slight. In these two layers, SU 4 and 24, the pottery fragments consist of heterogeneous material dated to the Hassuna and Ubaid III periods (fig. 11). In conjunction with the mixed material, this indicates a gap in occupation that is difficult to detect in the stratigraphy.

SU 26, beneath SU 24, consists of loose, yellow-brown clay sediment containing frequent inclusions of carbonate nodules. Some sherds were found in low concentration but are not associated with any archaeological feature. However, they all belong to the Hassuna period (fig. 11). SU 26 is about 0.2 m thick and covers SU 29, in which no material or archaeological structures were found. The excavation stopped at this level.

To conclude, the Dargrdal site was occupied at least from the Neolithic, during the Hassuna period. Following this, Ubaid III people settled in the same place. The mixture of the pottery material in SU 24 and SU 4 in SD I can be explained by the erosion of the earlier Hassuna site, which occurred during the Ubaid occupation. However, it is possible that in another part of the hill, especially at its base, intermediate levels between Hassuna and Ubaid III exist that are covered by colluvium levels. Indeed, it is not certain that SU 20-21 and 35 in SD III-IV and SU 29 in SD I are equivalent because Hassuna levels or the natural soil in SD III-IV were not reached. On the top of the hill, intermediate levels between Hassuna and Ubaid III could have been eroded. In any case, this gap in chronology needs to be explained.

15. Lemée M., Mura M., Pichon F. and Mashkour M. (2018), Test trench at Dargrdal, site nº 266. *In*: Giraud J. *et al*., *Soulaimaniah Governorate Archaeological Survey*: 14-34. Unpublished report on the 2018 Spring mission, Directorate of Antiquities of Soulaimaniah.

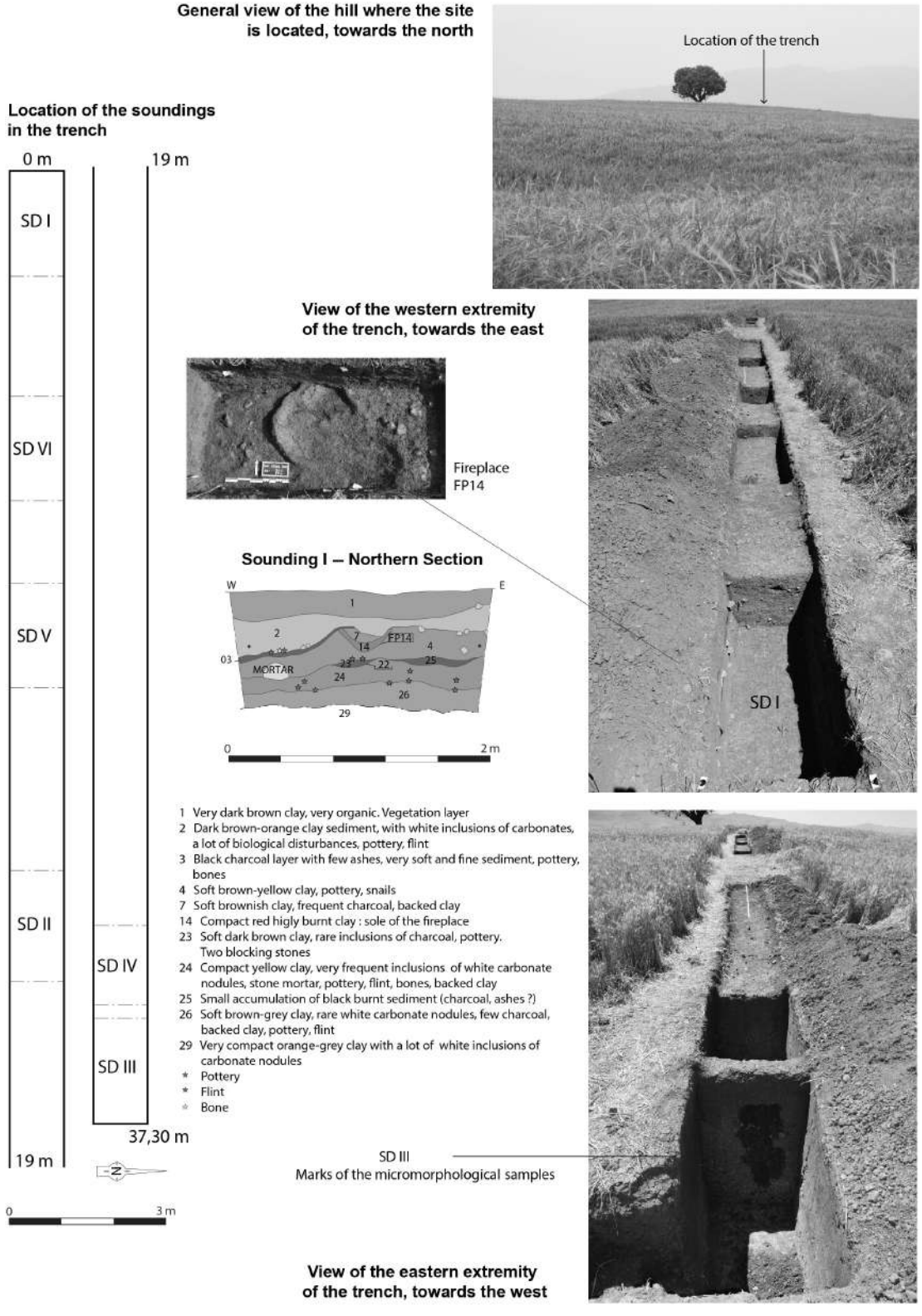

Fig. 10 – *Dargrdal excavations (CAD M. Lemée, M. Mura).*

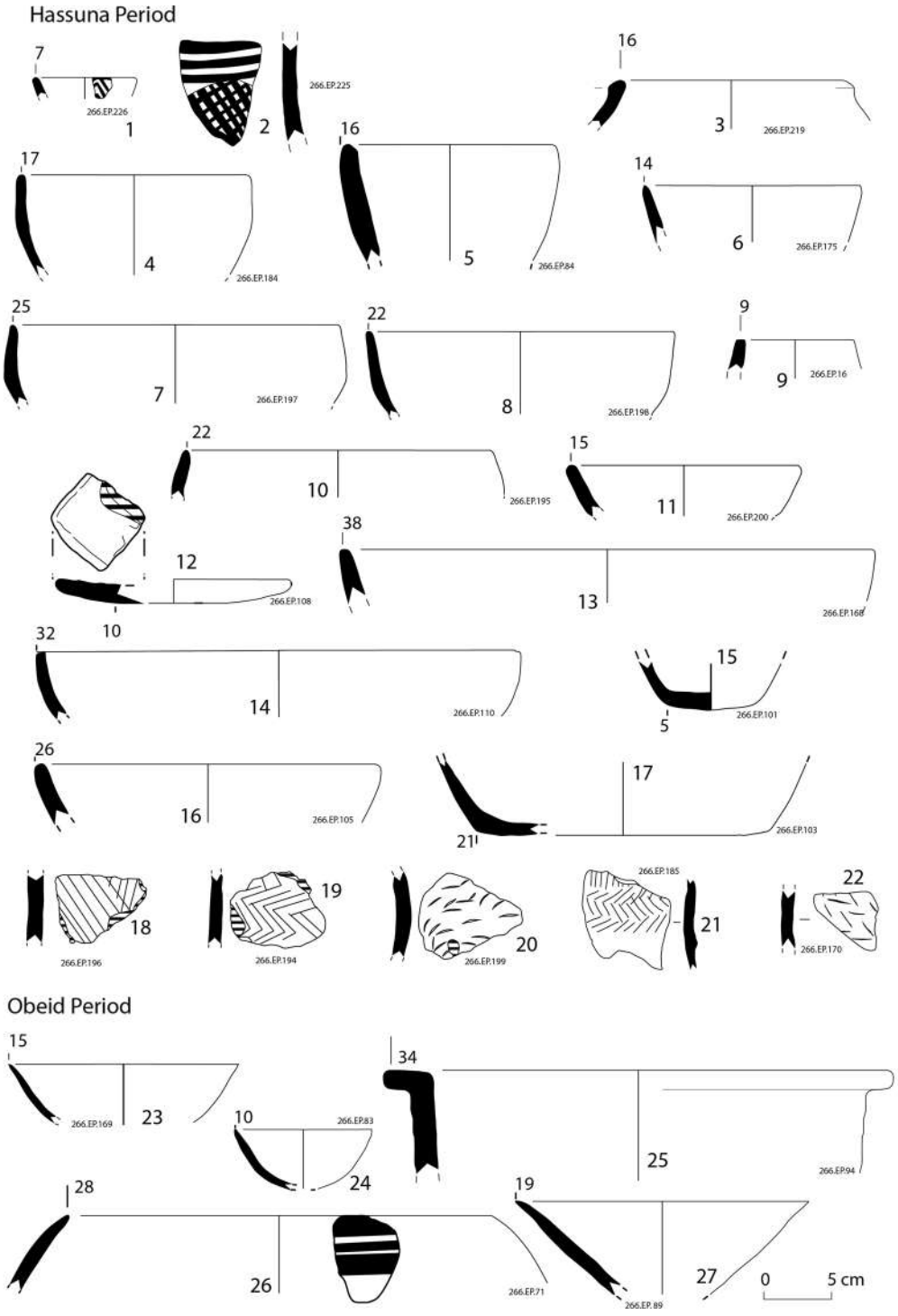

Fig. 11 – *Pottery samples from Dargrdal (CAD J.S. Baldi, A. Amin, A. Havé, M.-A. Pot, M. Mura):* ***1-2.*** *Samarra-Hassuna standard painted;* ***3-17.*** *Hassuna plain pottery;* ***18-22.*** *Hassuna standard incised;* ***23-27****. Late Ubaid-LC1.*

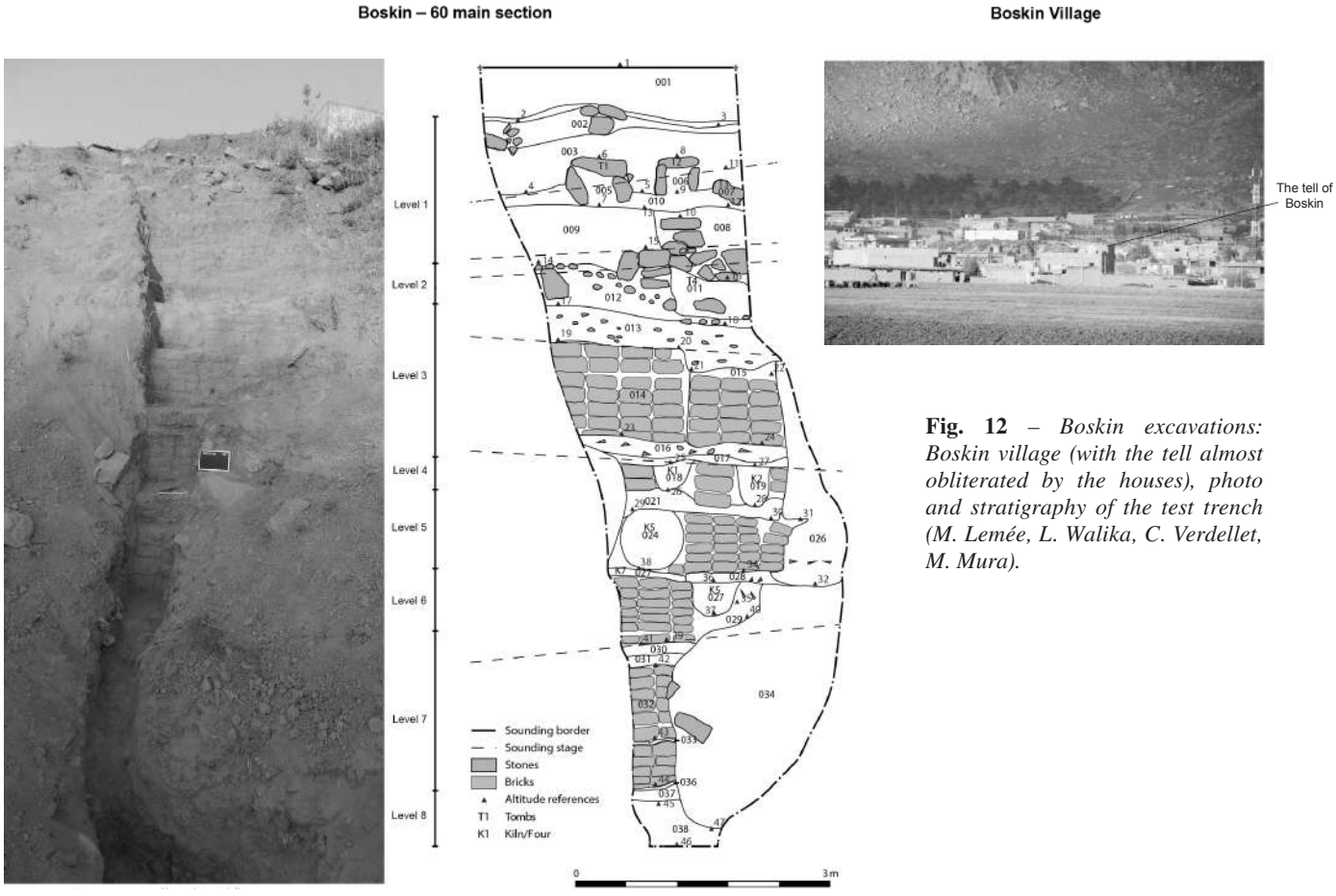

Fig. 12 – *Boskin excavations: Boskin village (with the tell almost obliterated by the houses), photo and stratigraphy of the test trench (M. Lemée, L. Walika, C. Verdellet, M. Mura).*

TEST TRENCH AT BOSKIN: A COMPLETE STRATIGRAPHY FROM THE HASSUNA PERIOD TO THE LATE CHALCOLITHIC 2

Boskin belongs to the second type (fig. 12-13) of Neolithic sites. At this tell there was a possibility of revealing a complete stratigraphy from the Hassuna period to Late Chalcolithic 2[16].

The site is badly damaged; the remains of the mound measure 80 m long, 140 m wide and 10 m high. A 3 m x 10 m test trench was opened on the eastern side of the hill, but the width of the trench was progressively adapted to the topography of the slope for a total surface area of about 70 m², excavated on eight levels (fig. 12).

Level 8 consists of an extremely hard clay bed (SU 38) covered by a layer of sandy alluvial soil (SU 37) 20-35 cm thick. Both layers are completely sterile and represent the non-archaeological base of the site. The first traces of human presence were recognised in a thin burnt layer (SU 36), disturbed by a large and deep surface pit (SU 34) cut on the slope of the tell through levels 6-7 and the upper deposit of level 8.

Level 7 displays clear traces of the first major development of the site with extensive architectural works. A huge mudbrick terrace wall (SU 32) was covered by a floor 4 cm thick paved with Hassuna sherds (SU 33).

In level 6, above some burnt ashy layers that mark the separation from the previous stage, it has been possible to identify the first of a series of workshops for the firing of pottery. A large circular potter's kiln (SU 27-K7), located in the southern sector of the trench, was determined to have been a two-storey updraught structure whose lower part, the firing chamber was conserved and visible in section. The

16. Baldi J., Verdellet C., Al-Debs R. and Asaad J.J. (2017), Preliminary report on the archaeological investigations 2017 at Boskin, site n° 60. *In*: Giraud J. *et al.*, *Soulaimaniah Governorate Archaeological Survey*: 46-57. Unpublished report on the 2017 season, Soulaimaniah Directorate of Antiquities.

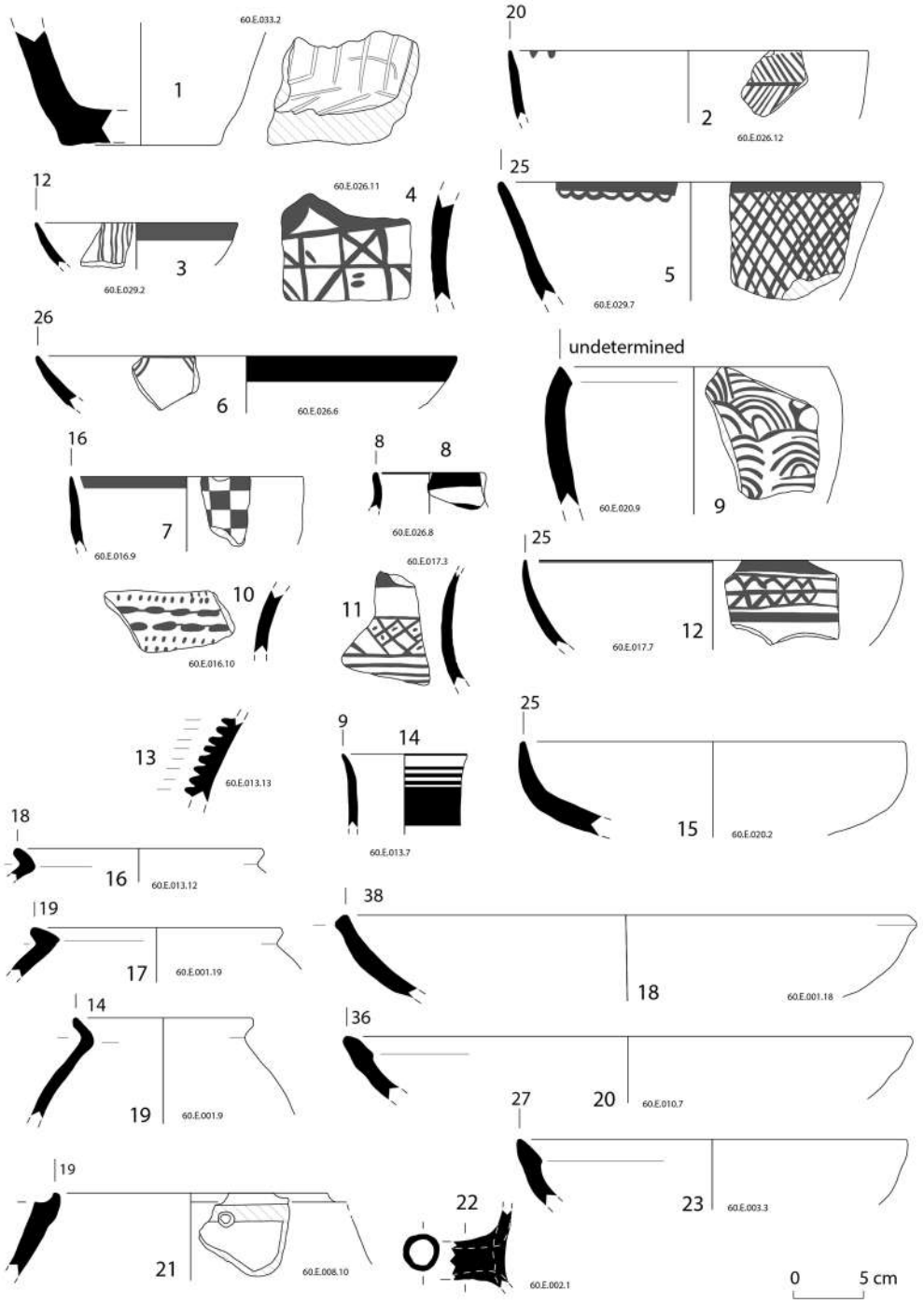

Fig. 13 – *Pottery samples from Boskin (CAD J.S. Baldi, M.-A. Pot, L. Walika):* ***1.*** *Hassuna husking tray;* ***2.*** *Haussuna geometric painted;* ***3-12.*** *Halaf painted wares;* ***13-15.*** *Ubaid 3-4;* ***16-23.*** *Late Chalcolithic 2.*

surrounding work area consisted of a floor with Halaf sherds, pieces of slag and some potter's tools such as obsidian blades, bone polishers and spherical pebbles.

In level 5, the firing chambers of the kilns (SU 22-K3, SU 23-K4, SU 24-K5 and SU 26-K6) were not cut through earlier layers of fill, but rather built up within a huge mudbrick platform (SU 25), which was probably used both as a work bench and as a space for drying vessels.

Level 4 is represented by two later kilns (SU 18-K1 and SU 19-K2), cut through the destruction layer (SU 021, containing sherds, ashes and crushed mudbrick) of the firing chamber of the level 5 kilns. The surrounding workshop area was occupied by a mudbrick platform (SU 20).

Level 3 marks a reorganisation of the site. Built in mudbrick upon a burnt layer (SU 17), two well-preserved walls are part of one coherent Ubaid architectural complex.

In level 2, after an abandonment of this sector of the site, the entire area was levelled and reorganised. The main structure of this new architectural phase is a huge stone terrace wall (SU 012), lying on a pebble floor 8 cm thick.

In level 1, the first constructions built upon the stone retaining wall of level 2 were erased by some later Late Chalcolithic 2 cist graves. Four burials of this type (05-T1, 06-T2, 07-T3 and 011-T4) have been identified in level 1. Except for one structure (T4), which is north-south oriented and contains stones taken from the terrace wall (SU 12), the other cist graves were lined with stones and roughly oriented east-west.

In accordance with the stratigraphy, four distinct pottery phases (fig. 13) have been identified:

– Levels 8-7 (Hassuna–Samarra traditions);
– Levels 6-4 (Halaf and Early Ubaid);
– Levels 3 (Ubaid III phase);
– Levels 2-1 (Late Chalcolithic 2).

THE CHALCOLITHIC

With regard to the Chalcolithic, the number of occupied sites is higher and 59 sites have been recorded (fig. 14): 6 from the Halaf-Ubaid transition-Late Chalcolithic 1, 21 for the Late Chalcolithic 1, 8 for the Late Chalcolithic 1-2 transition and 24 for the Late Chalcolithic 3-4 transitions.

Distribution of Chalcolithic sites

The late and post-Ubaid phase is particularly interesting because, until recently, the Late Chalcolithic ceramic typology of Northeast Mesopotamia during the Late Chalcolithic 1

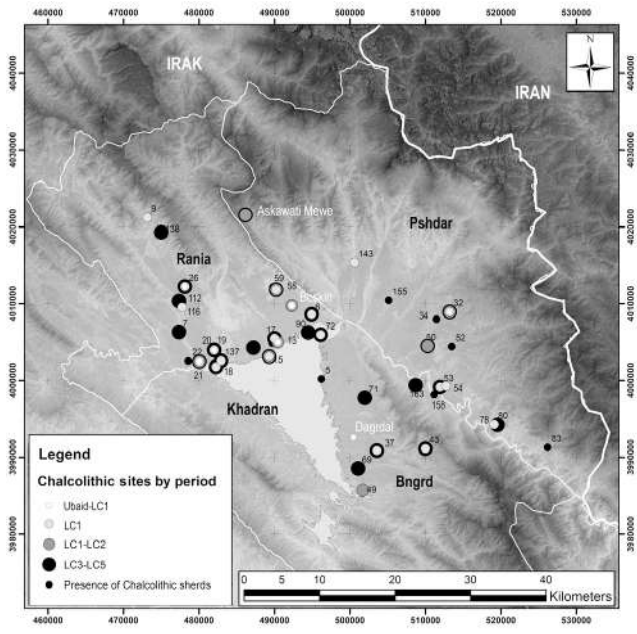

Fig. 14 – *Location of Chalcolithic sites (map J. Giraud).*

(4600-4200 BC) was identified with the assemblages from the Mosul region and the Syrian Jazirah, at Yarim Tepe III, Gawra, Hamoukar and Tell Arpachiyah (Abu Jayyab 2012). The dramatic simplification of the decorative motifs, as well as the fewer and fewer quantities of painted pottery, reveal the decline of Ubaid traditions. The pottery was fired in poorly oxidised conditions and became increasingly homogeneous, with serially produced Coba bowls, the first samples of potters' marks and chaff-faced wares (Baldi and Abu Jayyab 2012). In this phase, it is possible for the first time to detect a tendency towards the regionalisation of pottery in Northern Mesopotamia (Baldi 2016: fig. 1). At al-Hawa, Hamoukar and in the Khabur basin, this process depended upon the reorganisation of a system of villages that were fairly homogeneous in size and devoid of spatial hierarchies into a more territorially ranked model, with some areas coming under the influence of major centres (Wilkinson and Tucker 1995; Ur 2010). In the Rania Plain, the regionalisation process can be recognised because of some peculiarities in the pottery: there is no trace of sprigware or painted animal motifs (*i.e.* birds or scorpions). Moreover, the only type of Coba bowl is the V-shaped wide flower pot, although at Gawra, another rounded type has also been attested (Baldi 2012). All these aspects are also shared by the Shahrizor area at Tell Begun and Gurga Chiya (Nieuwenhuyse *et al.* 2016: fig. 26.11; Wengrow *et al.* 2016: fig. 12.26-27). In this sense, the Late Chalcolithic 1 continues the late prehistoric

close connection between the Hamrin region, the Halabja region and the Rania Plain.

The Late Chalcolithic 2 (4200-3800 BC) is characterised by the so-called "Gawra material culture" throughout Northern Mesopotamia. The various meso-regions tend to merge into two macro-regions (Baldi 2016: fig. 2-3). The Khabur basin, the Upper Tigris and Northern Iraq belong to one single area. The assemblage around Lake Dukan provides evidence for this Northeast Mesopotamian koine, as seen at Gawra XIA-XI, Brak CH13, Gawra A from the Nineveh period, Khirbet Hatara, Musharifa, Begun and Gurga Chiya (Numoto 1987; Oates 1987; Gut 1995; Fiorina 2001; Rothman 2002; Nieuwenhuyse *et al.* 2016; Wengrow *et al.* 2016). Chaff-faced materials have become ubiquitous, as have some common types of artefact (jars with interior-angled rims and bowls with inwardly turned bevelled rims) whose presence continues at the beginning of the Late Chalcolithic 3.

Compared with the slow increase in population and number of sites between the 7th and the early 5th millennium, the beginning of the Late Chalcolithic, around the middle of the 5th millennium BC, represents a major transition. The landscape was much more densely populated, with an important number of new settlements (*e.g.* Waranga Saru, no. 15; Sofian Kawlan, no. 43; Dinka, no. 53). Nevertheless, virtually all the Ubaid sites continued to be occupied, and settlements appear to have been more and more clustered in the plains. The sites had become characterised by a tell with a citadel and a lower town.

Later, during the Late Chalcolithic 3-4 (3800-3300 BC), the tendency of the pottery traditions to merge reached its peak, and in all of Northern Mesopotamia there appears to have been a single widespread tradition of pottery (Baldi 2016: 127). The Rania and Peshdar plains and the Bngrd district reflect this trend. However, as observed by the LoNAP survey (Gavagnin *et al.* 2016) and by the French mission at Qara Dagh (Vallet *et al.* 2017: 79), carinated casseroles and hammerhead bowls—the main Late Chalcolithic 3-4 hallmarks in Northern Syria[17]—are virtually absent east of the Tigris. Besides local materials used in chaff-faced ware, some mineral-tempered types of artefact (bevelled-rim bowls and some jars with irregular criss-cross incisions) from Southern Mesopotamia, indicate the first interactions with people from Southern Uruk.[18] Likewise, the so-called "grey ware", typical of the Nineveh North Uruk phase A (Late Chalcolithic 2-3) is recorded at Blil (no. 21), Kolaga (no. 18) and Waranga Saru (no. 15). This contradicts the general acceptance (Abu al-Soof 1969; Gut 1995) that the Tigris River was the extreme eastern limit for grey ware.

The end of the Chalcolithic is represented by the Late Chalcolithic 5, characterised by the peak of the Uruk colonial presence in Northwestern Mesopotamia and by the decline of the local pottery traditions (Helwing 2002, 2005; Oates 2002). The materials used to make ceramics demonstrate this very clearly. Chaff-faced wares represent a minority of the assemblage and many local shapes were made with mineral-tempered materials from Southern Mesopotamia. In addition to artefacts from Southern Uruk in evidence since the Late Chalcolithic 3-4 (pierced lugs, bevelled-rim bowls, inverted-rim jars with incised shoulders; Gut 1995: pl. 59-68), some Late Uruk ceramic features (such as drooping spouts and reserved slip decoration) are typical of this phase (Sürenhagen 1978: pl. 12.76, 17, 102).

Connections with Southern Uruk became widespread,[19] probably because of the mountain passes that led towards Northern Iran, with sherds of pottery from here even identified at several small sites such as Salki (no. 19), Pirota Sour Bingird (no. 37), Sofian Kawlan (no. 43) and Mwrad Rasu (no. 72). However, in the Rania and Peshdar plains, there is no trace of entirely Uruk colonies or major centres.[20] Later, typical Late Chalcolithic 5 pottery is quite rare. This could be due to a different organisation of the Southern Uruk presence, perhaps more concentrated in distant enclaves (Nineveh), rather than characterised by frequent contacts with small villages as occurred during the Late Chalcolithic 3-4 phase. This could reflect a generalised evolution of north-south relationships in Iraqi Kurdistan, as documented in the Qara Dag and Shahrizor areas (Kani Shaie, Logardan, Girdi Qala, Gurga Chiya). Since the Late Chalcolithic 3, Uruk enclaves in Southern Mesopotamia within indigenous sites are frequent. Following this, during the Late Chalcolithic 4, in the Rania and Peshdar plains, this tendency continues, even without the foundation of Uruk colonies.[21] Later, east of the Tigris River,

17. See, for example, at Zeytinli Bahçe or Hacinebi phase B (Pearce 2000: fig. 5a-e, 6c; Balossi Restelli 2006: fig. 9, 11-12).

18. See, in this sense, the stratified data from Kani Shaie, Girdi Qala, Logardan and Gurga Chiya (Tomé *et al.* 2006; Wengrow *et al.* 2016; Vallet *et al.* 2017) for the increasing interactions with Southern Uruk.

19. A noteworthy example in this sense is represented by the large quantity of Uruk bevelled-rim bowls discarded in the pits of a local Late Chalcolithic site, Bab-w-Kur (Boaz Bruun, Skudbøl and Colantoni 2016).

20. In this sense, the Uruk settlement of Araban (see Eidem *et al.* in this volume), not surveyed by the MAFGS, represents a major exception.

21. Entirely Uruk settlements in Southern Mesopotamian are documented in the Late Chalcolithic 4 at Gurga Chiya and Girdi Qala North Mound (Wengrow *et al.* 2016; Vallet *et al.* 2017).

the end of the Uruk period is characterised everywhere by a clear change in the Uruk network, with very large areas completely devoid of any trace of material culture from Southern Mesopotamia and a noticeable absence of settlements dating back to the last quarter of the 4th millennium BC.

Overall, Late Chalcolithic 1-5 pottery indicates different trends of regionalisation between the end of a cultural koine (Ubaid) and the end of another broad cultural community (Uruk; Stein and Özbal 2007). If the Ubaid phase marks the beginning of a clustered pattern for settlements in the plain, the Uruk phase in Southern Mesopotamia appears to have had a limited regional impact. The large number of Late Chalcolithic 1-2 sites contrasts with their decrease during the Late Chalcolithic 3-5, as well as with the scarcity of material from Uruk in Southern Mesopotamia. As recently suggested for the area around Halabja (Altaweel et al. 2012: 24), the southern colonial presence in the Zagros Piedmont shows a rather dispersed settlement pattern in this area, probably crossed by roads to Iran (Tomé *et al*. 2016: 431), but not occupied by important southern colonies.

MEWE CAVE EXCAVATIONS

The cave, situated in a narrow mountain valley in the Peshdar Plain, is elongated, oriented east-west and measures 43 m long by 38 m wide. It has an overall height of approximately 5 m (Mashkour *et al*. 2017). It is divided by a huge central stalactite merged with the rock upheaval in the centre of the cave. This has produced two rooms, one in the front and one in the rear, joined by a corridor 1-2 m wide. Room 1, near the entrance, is sub-rectangular and measures 9 m x 5 m. Room 2 is elongated and measures 26 m x 3 m x 8 m (fig. 15). Three large stalactites are visible in this part.

The looting of the cave was extensive, so we used the holes created by the looting to make clear sections in order to understand the stratigraphic layers of the cave. The sedimentation is homogenous in all parts of the cave. Considering the existing slope in the cave, we shall begin the description from the rear of the cave, moving towards the entrance.

Room 2 has a stratigraphy of 2 m comprising, from the substratum to the top:

– A natural sedimentation of between 5 cm and 20 cm, containing no artefacts, that lies over the bedrock (SU 23, SD IV; SU 39, SD II; fig. 15);
– This sedimentation is covered by a red clay layer of approximately 20 cm that contains many sherds (SU 22, SD IV; SU 34, SD II);
– This lay, in turn, is covered by a dark brown layer of approximately 20 cm, (SU 21, SD IV; SU 29, SD II). In some places, it is pierced by pits (SU 24-25, SD IV; SU 34-35, SD II). These pits have produced a relatively important number of artefacts: fragments of storage jars attributed to the Bronze Age or the Late Chalcolithic; animal bones (sheep/goat, *Ovis aries/Capra hircus*); rodents (*Muridae*); and molluscs (*Hellicidae – Eobania vermiculata*; SU 24, SD IV);
– Finally, there is a series of heated, ashy, chalky layers in approximately one metre of deposit, forming several similar sequences. These are most probably related to the cleansing of the cave by burning when it was used as a sheepfold up to recent times.

Room 1 contains a maximum of 60 cm of sedimentation:

– A brownish-grey ashy layer approximately 20 cm deep containing very few artefacts (SU 5-7, SD I), above the rock in the northern part of the investigated area;
– A stratified ashy sedimentation (SU 4, SD I), covering the previous component and the bedrock in the southern part of the investigated area. In this part, the sediment is trapped in the rock crevices. It contained pottery sherds, five lithic artefacts (flakes, core fragment and blade) and a Chalcolithic/Neolithic ground stone made of an exogenous sandstone;
– A sequence similar to the fourth stratigraphic sequence described above for investigated area 2, in the room 2;
– Finally, a thick layer of contemporary dung (between 10 and 25 cm) covering the whole.

Most of the pottery fragments consist of storage pottery that belongs to the Late Chalcolithic/Uruk phase and to the Bronze Age, with a few pieces belonging to Late Antiquity. It should also be noted that a Byzantine coin was found in room 1. This indicates the cave continued to be sporadically occupied in the latter part of Late Antiquity.

Concerning the Chalcolithic period, the Mewe ceramic materials (fig. 16) indicate that over a relatively restricted period, at the beginning of the 4th millennium BC, the cave was occupied by culturally different human groups. They used the second room as a storage area.

– People from Northern Mesopotamia, using local Late Chalcolithic 2 ceramics.
– Uruk people from Southern Mesopotamia, using Early Uruk vessels.

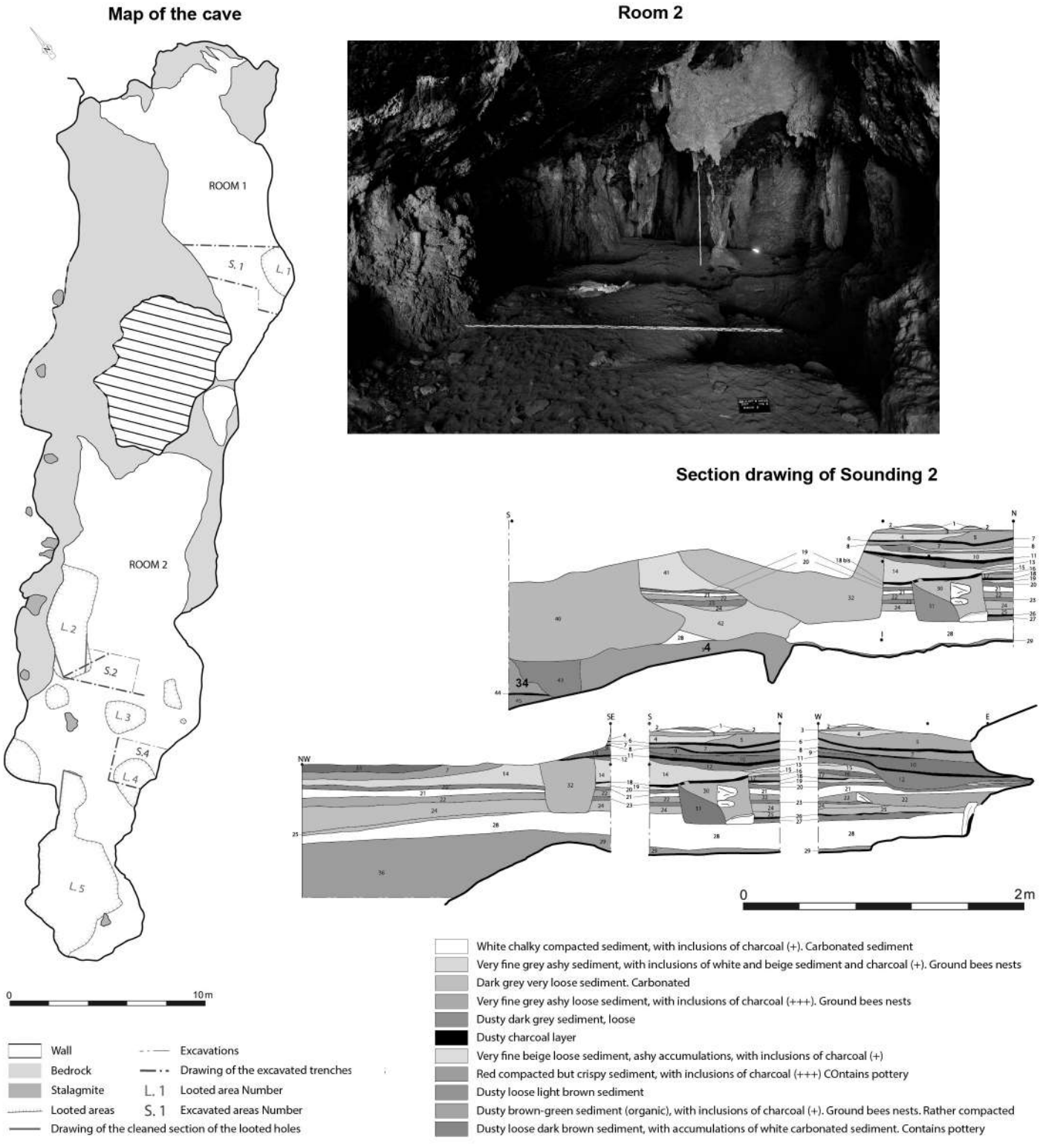

Fig. 15 – *Mewe Cave excavation (CAD M. Mura, R. Sofy, M. Lemée).*

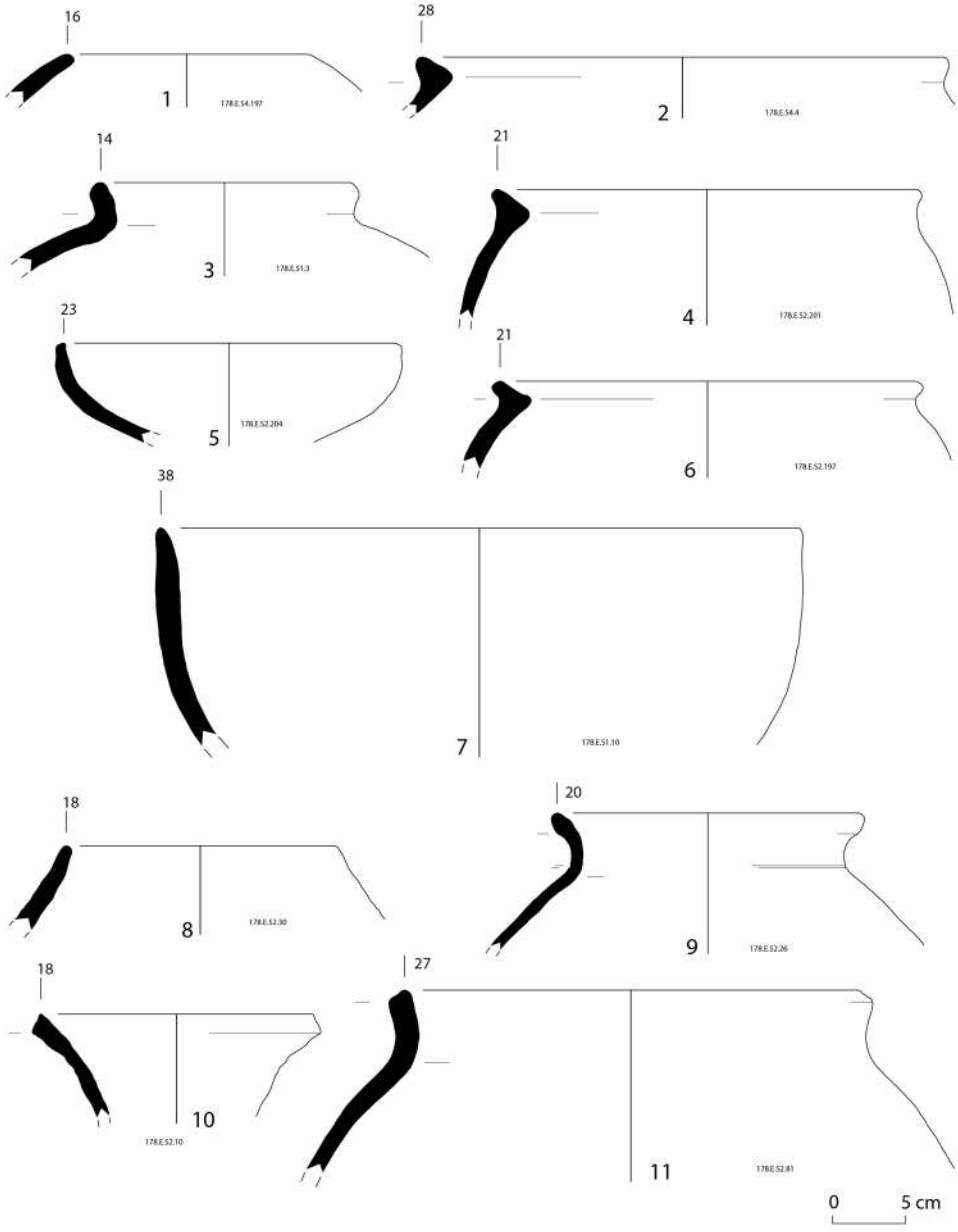

Fig. 16 – *Pottery samples from Mewe Cave (CAD J.S. Baldi, M.-A. Pot, L. Walika):* ***1-7.*** *indigenous Late Chalcolithic 2 ceramics;* ***8-11.*** *southern Early Uruk ceramics.*

THE MAFGS REGION AND ITS CONNECTION WITH NEIGHBOURING AREAS FROM MIDDLE PALAEOLITHIC TO LATE CHALCOLITHIC

The first analyses of the data collected allow us to begin to highlight the evolution of the occupation of the Rania and Peshdar plains. Subsequently, further analyses (dating, spatial analyses) will make it possible to establish broader territorial organisational models, enabling a more precise understanding of the history of occupation in the Southern Zagros and in Upper Mesopotamia over the long term.

For the prehistoric periods, the figure 3 shows the trends in the evolution of occupation in the Rania and Peshdar plains. We are only talking about trends here because we are

in the preliminary stages of our analyses. To go further, we will have to finish dating 4600 sherds collected last season and find a way to weight the "black hole" that is Dokan Lake. Indeed, since the lake flooded a large part of the Rania Plain, we have a spatial hole in the data. The "lake data" are mainly bibliographic information and, possibly, obsolete surveys from the 1940s and 1960s focusing on the most prominent and well-known sites. No systematic survey was undertaken during this period. Future analyses will, therefore, have to take this issue into account and find a way to weight the effect of the lake for the analysis of a territorial organisation.

The primary interpretation of the diagram shows us an initial history of the evolution of the occupation of the two plains in the prehistoric periods. The region has been occupied since the Middle Palaeolithic with certainty. Following this, a few groups of farmers settled in small habitats (PPN) located in the plains and near the Lesser Zab or its large tributaries. The Hassuna-Samarra settlements, which are more numerous, occupy the agricultural plain and the tributaries. Later, these larger sites were often reoccupied during the Halaf period. During the Ubaid period, some Halaf sites were reoccupied but new sites also appeared in the plains and close to the watercourses. Some of these sites were reoccupied in the Late Chalcolithic 1-2 and up to the Late Chalcolithic 5. Indeed, the Late Chalcolithic 1-2 phase represents a peak in the occupation of the surveyed areas, whereas the very beginning of the next period (Late Chalcolithic 3) coincides with a decrease in the number of recorded villages. This stage of territorial reorganisation is documented both by the settlement pattern and by excavations in the whole of Northern Mesopotamia.[22] Nevertheless, even if it is difficult to recognise the distinctive traits of ceramics in and the material culture of the Late Chalcolithic 3 and the Late Chalcolithic 4-5,[23] the middle and the second half of the 4th millennium correspond to a new peak in terms of human presence. During this last period, we observe an increase in the number of new sites. From the Ubaid to the Late Chalcolithic 5, sites are nucleated and consist of tells with lower cities. Almost all these sites would then be reoccupied in the Early Bronze Age.

22. Concerning the decrease in number and the change in location of the villages see, for example, Wilkinson and Tucker 1995 in Northern Jazirah. Significant excavated settlements, such as Tepe Gawra (Rothman 2002) and Hamoukar (Baldi and Abu Jayyab 2012), were abandoned between the end of the Late Chalcolithic 2 and the beginning of the Late Chalcolithic 3.

23. As already observed for the whole of Iraqi Kurdistan by other surveys (Gavagnin *et al.* 2016). In any case, a clear ceramic indicator for this phase is represented by sherds from the Middle and Late Uruk periods in Southern Mesopotamia.

It is interesting to note that in the Rania and Peshdar plains we have the same trends as in the neighbouring regions: the Zarho Plain (Pfälzner and Sconzo 2015), the Nineveh Plain (Morandi Bonacossi and Iamoni 2015), the Erbil Plain (Ur *et al.* 2013; Koliński 2017)[24], the Sharizor Plain (Altaweel *et al.* 2012) and the Sirwan Plain (Casana and Glatz 2017). There are a few sites in the Early Neolithic, a slightly greater number of sites in the Pottery Neolithic and then a first explosion of the number of sites in the Ubaid period, continuing during the Chalcolithic, especially in the Late Chalcolithic 1-2. Later, during the Late Chalcolithic 3-5, the significant number of local sites with traces of some kind of Uruk presence in Southern Mesopotamian, which is more important than in other areas of Iraqi Kurdistan,[25] could suggest that the Zagros Piedmont played a fundamental role in the Uruk expansion towards the Iranian Plateau. However, despite this general trend of occupation, we have different cultural traits for each region: Nineveh, which takes on features from the Syrian Jazirah cultural assemblage; Erbil from the Southern Mesopotamian culture; and Soulaimaniah from Northern Iran. These influences also seem to persist across different periods.

In the following discussion, we will review chronologically the relationships that the local cultures of the Rania and Peshdar plains maintained with both close and distant neighbouring regions.

PALAEOLITHIC PERIODS

At the crossroads between Africa, Europe and East Asia, the Zagros and all of the Near East (Southwest Asia) is a fundamental region for understanding the development of human society. The Near East was a region of passage and occupation for biologically distinct populations, Homo sapiens (anatomically modern humans) and Neanderthal, who concurrently or successively shared the same technical knowledge. For geopolitical reasons, the investigations conducted in the Zagros have, so far, mainly focused on the Iranian Zagros, and very little is known of the Palaeolithic of Iraqi Kurdistan. Indeed, for the early prehistoric periods, most of the sites and chrono-cultural sequences are concentrated on the Iranian side of the Zagros. They consist of several caves and rock shelters and are mainly attributable to the Middle and Upper Palaeolithic (Hole and Flannery 1967;

24. See also the reference in note 2.

25. See, for example Sconzo, in this volume.

Solecki and Solecki 1974; Olszewski and Dibble 1993, 1994; Biglari 2007; Jaubert *et al*. 2009; Bazgir *et al*. 2014; Shidrang *et al*. 2016), dated from MIS3 (Becerra-Valdivia *et al*. 2017). In this context, the first results of the MAFGS are particularly interesting with regard to the types of lithic assemblages discovered and their Palaeolithic chrono-cultural attribution. The survey data, although fragmentary, and the stratified data from Sarsyan[26], offer significant elements for the understanding of human occupation in the Northwest Zagros during the Late Pleistocene. Indeed, these discoveries in a previously unexplored zone constitute a significant element in the understanding of Palaeolithic techno-complexes and settlement patterns. Concerning the patterns of territorial occupation, the Rania and Peshdar plains appear to have been occupied differently by the Palaeolithic populations, with sites found both on the piedmont and in the lower mountain zones, in rock shelters/caves or in the open air. Open-air sites, however, are less common, which could be explained in part by the deposition of Holocene terraces on Pleistocene terraces and, thus, on potential open-air sites. With regard to the typo-technological traits of the lithic assemblages discovered and their chrono-cultural attribution, they provide evidence for ancient settlement in lower mountain areas beginning at least in the Middle Palaeolithic and, more specifically, starting with the Late Mousterian in one case. The Sarsyan site has produced a late Mousterian lithic assemblage comparable to the Zagros Mousterian industries, an entity that is well defined on the basis of sites such as Shanidar, Bisitun, Warwasi and Mar Tarik and attributed to the Late Middle Palaeolithic (Solecki and Solecki 1974, 1993; Dibble 1984, 1993; Dibble and Holdaway 1990; Bilgari 2001; Jaubert *et al*. 2009; Beshkani 2018). Aside from its specific features, this site, which is located between Shanidar to the north-west and the Iranian sites of the Kermanshah region and the Mousterian techno-complexes in the Khorramabad Valley to the south-east, is indicative of a degree of regional technological stability for this period. In addition, some lithic industries from sites no. 85 and 87-88 also show some affinities with the Middle Palaeolithic industries of the Near East. These assemblages are characterised by convergent products (Levallois points) and flakes (Levallois and non-Levallois) made in limestone and that are wider and longer than the ones from the Sarsyan site. Despite the lack of chrono-stratigraphic context, they raise the question of the settlement of this region during the Middle Palaeolithic and the relationships between this mountainous zone and the western steppe plains.

As already mentioned, if we have unmistakable evidence from the Sarsyan site of an ancient occupation of the region at least since the Late Middle Palaeolithic, there is no evidence yet of Upper Palaeolithic occupation, although such sequences are widely represented throughout the Zagros (Hole and Flannery 1967; Smith 1986; Olszewski 1993a, 1993b; Olszewski and Dibble 1994, 2006; Otte and Kozłowski, 2004, 2007; Jaubert *et al*. 2006; Bordes and Shidrang 2009; Shidrang *et al*. 2016; Shidrang 2018).

EARLY NEOLITHIC PERIODS

The data relating to Early Neolithic development in the Central Zagros and the hilly flanks in Eastern Iraq when hunter-gatherers became villager-farmers is yet poorly understood despite ongoing survey projects and recent excavations. In Iraqi Kurdistan, only six sites can be identified, if we include Jarmo (Braidwood and Howe 1960). Four were found recently during surveys: Halawezha/Bijian[27] in the Bora Plain in the Peshdar district, SRP 10 in the Sirwan Valley and SSP 6 in the Sharizor Plain (Altaweel *et al*. 2012: 21; Casana and Glatz 2017: 8). The other two were found through excavations: Shemshara and Qalat Saïd Ahmadan (Tsuneki *et al*. 2015, 2016; Matthews *et al*. 2016).

There are several explanations for the low number of sites identified for this period. First, there is the morphogenesis of the Northern Iraqi plain.[28] At the beginning of the Holocene the terraces were stabilising and the Early Neolithic sites may have been buried by alluvium or colluvium. Second, we need to consider the site morphology, the type of material associated with it and the survey methods. Indeed, the occupations either correspond to small mounds (Halawezha/Bijian, Jarmo, Bestantsur) that we can hardly locate on CORONA imagery or on the ground, or they consist of a deep layer on sites occupied by a number of periods (SRP 10, Qalat Saïd Ahmadan, Shemshara) that are difficult to locate because of their very fragmented lithic material. Third, these small sites may have been destroyed by intensive agriculture in the plains, as in the case of Halawezha/Bijian. It is also possible that the socio-

26. Bonilauri S., Lemée M., Jamialhmadi M. and Mura M. (2018), Excavation at Sarsyan 2018. *In*: Giraud J. *et al*., *Soulaimaniah Governorate Archaeological Survey*: 57-74. Unpublished report on the 2018 Spring mission, Soulaimaniah Directorate of Antiquities.

27. See notes 9 and 11.

28. We generalise to the whole of Iraqi Kurdistan in view of similar data obtained for the Sharizor, Rania and Peshdar plains.

economic organisation of societies living in the Early Neolithic may be difficult to identify archaeologically, the sites probably being occupied seasonally, then abandoned or occupied in more sustainable ways (Tsuneki *et al.* 2015: 28).

Nevertheless, the sites are preferably located in Pleistocene and Early Holocene terraces bordering rivers or tributaries. This settlement patterns corresponds to the typical organisation of Early Neolithic settlements in the Middle Euphrates area in the Syrian steppes (Geyer and Besançon 1997), in the Northern Levant (Geyer *et al.* 2019: 106) and in Iranian fertile plains such as the Sheikh-Abad and Jani (Matthews *et al.* 2013). A more intensive survey of these terraces should be carried out to uncover any unidentified archaeological sites from this period.

In terms of lithic industry, the assemblages at each site seem to belong to the same group. The general traits of the assemblages evoke the M'lefaatian chipped stone tradition, as defined by Kozłowski (1999) and are present in the region at some Neolithic sites, such as M'lefaat, Shemshara (Matthews *et al.* 2016) and Bestantsur (Matthews *et al.* 2016, 2018). Cayönü tools are one of the most important diagnostic aids found in some Neolithic sites in Southeast Anatolia, Upper Mesopotamia and the Central Zagros (Nishiaki and Darabi 2018) and are dated to the later 8th and 7th millennia (calibrated BC; Matthews *et al.* 2016, 2018). Finally, the provenance analysis of chert pieces and imported obsidian pieces could be promising for the understanding of the Early Neolithic community and its long-distance network for obtaining raw materials.

7th-5th MILLENNIUM BC

In the following period (7th-5th millennium BC), when pottery appeared in Mesopotamia, the Neolithic villages thrived. Understanding the boundaries and interactions between the cultures of Hassuna, Samarra and, later, Halaf and Ubaid, is complex because of the scarcity of data for this area.

The so-called Hassuna-Samarra "cultures" constitute an interesting topic. Dargrdal has produced a much larger Hassuna assemblage than Boskin, where the lowest levels were reached on a narrow surface.[29] However, both sites are characterised by the same features: husking trays incised on the interior side (fig. 13.1), a small quantity of painted sherds with linear geometric motifs (fig. 11.1-2 and 13.2), plain neckless jars and hemispherical bowls with flat bases in coarse, plant-tempered materials (fig. 11.3-17) and "standard Hassuna" incised specimens with triangular or crescent decorations (fig. 11.18-22).[30]

The Halaf-Ubaid transition is not the only interesting macro-interaction between "cultures". Some early Ubaid sherds clearly show a mixed Samarra-Ubaid pattern, as in the Hamrin region at Tell Abada level III (Jasim 1985: pl. ii, fig. 108-112). Choga Mami transitional painted motifs, recognised for the first time at Choga Mami by J. Oates (1969, 1972) as a Samarra-Ubaid transitional style, appear to characterise an early spread of the Ubaid culture in the Zagros Piedmont between the Halabja and Rania plains (Altaweel *et al.* 2012: fig. 10.9).[31]

In the mid and late 6th millennium BC, the pottery landscape consists essentially of the Ubaid III repertoire and presents close parallels with Central Mesopotamia; the morpho-stylistic typology is, therefore, closer to Tell Abada I (Jasim 1985) than to Tepe Gawra XVI-XIII (Tobler 1950). Indeed, this trend continues a cultural tendency already observed, beginning with the first appearance of the Ubaid traditions, when Halaf-Ubaid transitional assemblages from the Zagros Piedmont in Northeast Mesopotamian were characterised by decorative patterns very similar to the central Mesopotamian Choga Mami transitional style (see above).

Finally, with regard to the Hassuna and Samarra "cultures", their co-existence at several sites such as Boskin and Dargrdal is not surprising. Indeed, Samarra decorated pottery was considered earlier to have been a "luxury component" of Hassuna assemblages (Leslie 1952). After the excavations at Choga Mami (Oates 1969, 1972), it has been examined as a culture in itself, with many samples assumed to be imported products appearing outside the supposed Samarra "heartland", for example, at Shemshara (Mortensen 1970: 119). However, the hybridisations observed at Boskin and Dargrdal also imply contacts with Early Halaf and Ubaid traditions, some samples displaying hybrid traits both with clay bodies and stylistic decoration. Although hybrid traits combining Samarra and Early Ubaid have been recorded in Central Iraq and the Halabja area for the so-called "Choga Mami transitional style", they were previously unknown in Northern Mesopotamia and do not represent simply a clue for a phenomenon of cultural contact between co-existing entities, but are evidence for local technical continuity, given that Samarra, Halaf and Ubaid

29. See notes 15-16.

30. For parallels, see Tell Hassuna (Lloyd and Safar 1945: fig. 7-15); Shemshara (Mortensen 1970); Akemi Use (Tekin 2005: fig. 4b-d, 6a-b).

31. This same kind of transregional and transcultural interaction must also be emphasised for the polychrome painted Late Halaf landscape (Nieuwenhuyse 2018: 53 and fig. 7).

pottery continued to be fabricated with the same clay bodies over a long period. Moreover, hybridisations observed at Boskin and Dargrdal raise questions concerning the relationships and chronology of the Samarra, Halaf and Ubaid "cultures", which may have had simultaneous relationships with local traditions of the Zagros area (such as the so-called "Dalma ware"; Henrickson 1986).

Besides, in accordance with the assemblages from Boskin, Begun, Marani and Logardan, it is clear that all these "cultures" maintained very close relations with the Hamrin region during the entire Late Neolithic. In particular, Halaf and Early Ubaid material from Boskin (fig. 13.3-12) presents painted motifs that are widely found in the Hamrin basin,[32] thus confirming the very early emergence of Ubaid culture in the Zagros Piedmont, as well as its close relation with the Ubaid in Southern Mesopotamia until the last quarter of the 6th millennium BC.[33] Later, during Ubaid III, Late Ubaid and Late Chalcolithic 1, stratified materials from Boskin and Dargrdal (fig. 11.23-27 and 13.13-15) confirm the generalised regionalisation of the pottery landscape in the whole of Mesopotamia, including closer relations with the north (Baldi 2016: fig. 1; Abu Jayyab 2012 for parallels between Dargrdal and Hamoukar in Northern Syria). There are two types of site. The small mounds were occupied only in the Hassuna-Samarra and Halaf periods. Some sites were occupied continuously and over a longer time, and have formed tells. These latter sites were, therefore, occupied from the Hassuna to the Late Chalcolithic 5.

Finally, between the 7th and early 6th millennia, the sites are quite scattered and they are slow to increase in number (fig. 7, lower). This appears to indicate a gradual but continuous demographic growth in association with the proliferation of small sites. With regard to their shape, the sites belong to the first type. Concerning the Late Pottery Neolithic and the Halaf-Ubaid period, the increase in number and size of the sites should be interpreted as a process of slow but radical change in the economy and subsistence strategies, with less and less mobile populations and, therefore, more visible evidence in the archaeological record.

LATE CHALCOLITHIC

In accordance with this tendency towards regionalisation, from the beginning of the 4th millennium, during the Late Chalcolithic 2, some kind of relationship is evident between the Rania and Peshdar plains and sites in Northern Iran such as Pisdeli, Yanik and Geoy Tepe in the Lake Urmia region, which is about 120 km distant via the mountain passes (Dyson and Young 1960). However, besides some locally specific micro-features[34], during the Late Chalcolithic 2, local assemblages from Boskin and Mewe are virtually identical to the collections recorded in the Syrian Jazirah, in the Sinjar, in Southern Anatolia and at Nineveh and Tepe Gawra—neckless jars with inverted rims, double-rimmed jars, cannon spouts, globular holemouths and bowls with inwardly turned bevelled rims (fig. 13.16-23, 16.1-7; Gut 1995; Rothman 2002: pl. 9.723, 9.795; Abu Jayyab 2012). Indeed, the most surprising characteristic of the assemblage from Mewe is the presence, besides local Late Chalcolithic 2 pottery, of Early Uruk sherds from Southern Mesopotamia (fig. 16.8-11). Although very early (dated to about three centuries earlier than expected)[35], an Uruk expansion east of the Tigris River and in the Zagros Piedmont starting at the very beginning of the 4th millennium BC is now attested at several sites[36] and well recorded by stratified materials at Logardan (Vallet *et al.* 2017; Vallet *et al.* in this volume). Early Uruk material also comes from surveys by the MAFGS at sites such as Pyrota Sour (no. 37). Thus, a southern Uruk presence at Mewe does not appear surprising for any chronological reason but, rather, because of the nature of the site itself. Mewe is a cave that was occupied at the beginning of the 4th millennium (probably on a seasonal basis) both by local Northern Mesopotamians and Uruk people from Southern

32. For example, at Tell Abada III-II, during the Early Ubaid and the Halaf-Ubaid transition (see the motifs in fig. 13.7, 13.9; Jasim 1985: fig. 202.d, 220.a) and at Tell Songor B (see motif in fig. 13.12; Jasim 1985: fig. 252.4).

33. Baldi J.S., Evolution as a way of intertwining: regional approach and new data on the Halaf-Ubaid Transition in Northern Mesopotamia. *In*: *Proceedings of the Broadening Horizons 5 conference (BH5), Udine, June 2017*, WEST & EAST Suppl., forthcoming.

34. See note 12.

35. Before recent investigations in the Zagros Piedmont, Early Uruk occupations were only known from Susa Acropole III and Southern Mesopotamian sites such as Eridu and Uruk (Eanna XII-IX). Therefore, until recent years, the beginning of the Uruk expansion in Northern Mesopotamia was dated to the local Early Late Chalcolithic 3 rather than to the Late Chalcolithic 2 (contemporary to the Early Uruk in Southern Mesopotamia). For a recent review of Early Uruk materials see Wright 2014.

36. Proto-bevelled-rim bowls and bevelled-rim jars (see fig. 16.10-11) were found in local Late Chalcolithic 2 contexts at Kani Shaie (Renette, pers. com.) and Girdi Shamlu. About this last site, see D'Anna M.B. and Mühl S., *Un air de famille*. Preliminary notes on the Late Chalcolithic period in the Shahrizor Plain (Slemani, Kurdistan). *In*: Baldi J.S., Iamoni M., Peyronel L. and Sconzo P. (eds.), *Proceedings of the 11th ICAANE, 5th April 2018*. Munich: Brepols (Subartu series), forthcoming.

Mesopotamia. The assemblages of both (fig. 16), characterised by a large predominance of medium-sized storage jars and by a restricted quantity of bowls, appear to suggest that local and foreign occupants used the cave for similar purposes. It is possible that at the beginning of the 4th millennium, the similarities between local and northern Iranian assemblages represent a confirmation of the role played by the mountain passes. Mewe is not the only cave occupied by people from Southern Mesopotamia during the Early Uruk phase[37], and the existence of these seasonal occupations indicates the importance of the mountain roads that led to Iran.

For the Chalcolithic, and the Ubaid and Uruk periods, Boskin, Dargrdal and Mewe Cave thus provide a small encyclopaedia of the pottery of Late Prehistory in the Rania and Peshdar plains. The techno-stylistic interweaving between different traditions, as well as the co-existence of culturally distinct traditions on small sites, suggest the importance, from very ancient times, of communication routes crossing the mountains towards Iran. In the same way, the existence of a "corridor of the Zagros" running along the piedmont is evident, so that pottery features so far considered typical of Central Mesopotamia (such as the Choga Mami mixture of Samarra and Ubaid) were, in fact, widespread even in areas such as the Rania Plain, which is located several hundred kilometres to the north.

The large majority of Late Chalcolithic settlements are located in the plain and close to small streams. It is still too early to suggest a precise reconstruction of land management, but despite the absence of a clear territorial hierarchy, throughout the Chalcolithic there is a clear trend towards a decrease in the homogeneity of the sites, both in terms of their size and distribution. The progressive formation of clusters of villages between the end of the 5th millennium and the beginning of the 4th millennium indicates an increase in population and, presumably, in the complexity of the management of common resources. Later, even if in the Rania and Peshdar plains several local sites show traces of a southern Uruk presence, the decrease in the number of settlements is a phenomenon that has yet to be explained. In any case, this tendency affects the entire area east of the Tigris, as also demonstrated by the results of the LoNAP mission (see Morandi *et al.* in this volume). It would be tempting to interpret this apparent depopulation as a discontinuous evolution of social complexity. In fact, after a trend towards the creation of rural agglomerations between the Ubaid period and the Late Chalcolithic 2, it could be that the population tended to concentrate mainly in large proto-urban centres and in nearby villages, with few settlements to control in the more distant countryside.

In the future, research in the Zagros Piedmont will attempt to answer questions about the prehistory of Iraqi Kurdistan as a tale of emerging social complexity in a region that was a main cultural crossroads.

37. Kunji Cave, on the Iranian side of the Zagros (in Luristan), has also yielded Early Uruk sherds from Southern Mesopotamia (Wright *et al.* 1975).

ACKNOWLEDGEMENTS

We warmly thank first of all the Directorate of Antiquities of Iraqi Kurdistan, its former director, Mala Awat (Z. Abubaker), and its current director, K. Ali, who have provided us with the authorisation to carry out all our field missions.

In particular, we would like to thank the Soulaimaniah Antiquities Department and its director, K. Rasheed, who has always been highly supportive, for resolving all administrative, logistical and political problems. We also wish to thank his team, in particular our colleagues and friends who worked with us during eight campaigns as well as during the preparation of this article: A. Ameen, K. Aziz and S. Saber.

We would also like to thank the newly created Directorate of Antiquities of Raparin and its director B. Baiz for his local diplomatic assistance.

We thank all the Kurdish archaeologists and scientists who have worked with us, including R. Sofy, J. Jameel, Z. Baiz, I. Mohammed of Nurridin and Ali of Qala Dizah, and all the drivers working at the Directorate of Antiquities who assisted us far more as guides than as drivers: Kak Aziz, Kak Abdulrahman, Kak Salekh, Kak Moussa and Kak Bahzaid.

Without the support of the Ministry of Foreign Affairs and the Commission for Excavations, these archaeological activities could not have taken place. We would like to acknowledge the former director of the Commission for Excavations, J.-F. Jarrige, and the present director, N. Grimal, for the confidence they have placed in a young team of researchers without permanent jobs. We would like to thank IFPO for its unfailing support for this project, in particular, M. Griesheimer and F. Alpi.

Finally, we thank the French Embassy and the French Consulate in Erbil, without which we would never have been able to maintain the mission during times of crisis. In particular, we would like to thank D. Gauer, F. Tissot, A. Guépratte, D. Mas, O. Chatelais, R. Oudjani, T. D'Anna, T. Vergon and J.-N. Baléo.

We also wish to acknowledge the institutions and research teams that have supported us financially and administratively: the CNRS through UMR 7041 (VEPMO and AnTeT research groups), the ANR "L'altérité culturelle du continent asiatique", the Museum national d'Histoire naturelle, CNRS research units through UMR 7209 (AASPE) and UMR 7194 (HNHP). We are also grateful to the doctoral school ED112 at the University of Paris 1 Panthéon-Sorbonne. Finally, we must not forget INRAP, which allowed us to have two PAS contracts for M. Lemée to join us.

The mission would not have survived without all the researchers, doctoral students and students who were with us in the field: E. Fouache, E. Boeda, J.-J. Herr, R. Palermo, M. Ahmed, D. Arhan, Z. Hashemi, C. Caze, L. Arbez, C. Douché, I. Mesfin and C. Padovani.

Jessica Giraud
French Archaeological Mission
of the Governorate of Soulaimaniah
UMR 7041 ArScAn, team VEPMO
21 allée de l'Université, 92000 Nanterre– France
giraud.jessica@gmail.com

Johnny S. Baldi
CNRS, UMR 5133 Archéorient
Maison de l'Orient et de la Méditerranée
7 rue Raulin, 69000 Lyon – France
jsb.arch@gmail.com

Stéphanie Bonilauri
UMR 7194 Histoire naturelle de l'Homme préhistorique
Musée de l'Homme – Palais de Chaillot
17 place du Trocadéro, 75016 Paris – France
stephanie.bonilauri@mnhn.fr

Marjan Mashkour
UMR 7209 Archéozoologie, Archéobotanique
Muséum national d'Histoire naturelle
55 rue Buffon 75005 Paris – France
mashkour@mnhn.fr

Marion Lemée
Inrap Grand-Ouest
Centre archéologique de Cesson-Sévigné
37 rue du Bignon, 355100 Cesson Sévigné – France
marion.lemee@inrap.fr

Fiona Pichon
Fyssen Foundation, Institución Milá y Fontanals
Carrer de les Egipcíaques, 15, 08001 Barcelona – Spain
fiona.pichon@gmail.com

Mathilde Mura
Marie-Aliette Pot
UMR 7041 ArScAn, team VEPMO
21 allée de l'Université, 92000 Nanterre – France
mathildemura@gmail.com
mariealiette.pot@free.fr
have.amaury@hotmail.fr

Mana Jamialahmadi
UMR 7041 ArScan, team AnTET
21 allée de l'Université, 92000 Nanterre – France
mana.jami@gmail.com

Fereidoun Biglari
Palaeolithic Department, National Museum of Iran
Siyeh Tir St. Emam Ave. 1136917111, Tehran – Iran
fbiglari@gmail.com

Kamal Rasheed
Amanj Ameen
Kamal Raeuf
Saber Saber
Sulaimaniyah Directorate of Antiquities
Salem Street, 46001 Slemani, Iraqi Kurdistan – Iraq
Kamal_zewe@yahoo.com
amanj.archeo@gmail.com
kamal.ra.az.ar.84@gmail.com
jwtyara@yahoo.com

Rafeeq Sofy
Jamal Jameel
Kurdistan Antiquities Directorate
44001 Erbil, Iraqi Kurdistan– Iraq
rafeeq.sofy@arc.krg.org
jamaljameel197@gmail.com

BIBLIOGRAPHY

Abu al-Soof B.

1964 Uruk pottery from the Dokan and Shahrazur district and the distribution of Ninevite V pottery as revealed by field survey work in Iraq. *Sume*r 20: 37-45.

1969 Excavations at Tell Qalinj Agha (Erbil). Summer, 1968. *Sumer* 25: 3-42.

1970 Mounds in the Rania Plain and excavations at Tell Bazmusian (1956). *Sumer* 26: 3-31, 65-104.

Abu Jayyab K.

2012 A ceramic chronology from Tell Hamoukar's southern extension. *In*: Marro C. (ed.), *After the Ubaid. Interpreting change from the Caucasus to Mesopotamia at the dawn of urban civilization (4500-3500 BC). Papers from "The Post-Ubaid Horizon in the Fertile Crescent and Beyond", international workshop held at Fosseuse, 29th June-1st July 2009*: 87-127. Istanbul: Institut français d'Études anatoliennes (Varia Anatolica 27).

Adams R.M.

1981 *Heartland of cities. Surveys of ancient settlement and land use on the central floodplain of the Euphrates*. Chicago: University of Chicago.

Altaweel M. and Marsh A.

2016 Landscape and geoarchaeology of the Bora Plain. *In:* Radner K., Kreppner F.J. and Squitieri A. (eds.), *Exploring the Neo-Assyrian frontier with Western Iran: The 2015 season at Gird-i Bazar and Qalat-i Dinka*: 23-28. Gladbeck: PeWe Verlag (Peshdar Plain Project Publications 1).

Altaweel M., Marsh A., Jotheri J., Hritz C., Fleitmann D., Rost S., Lintner S.F., Gibson M., Bosomworth M., Jacobson M., Garzanti E., Limonta M. and Radeff G.

2019 New insights on the role of environmental dynamics shaping Southern Mesopotamia: From the pre-Ubaid to the early Islamic Period. *Iraq* 81: 1-24.

Altaweel M., Marsh A., Mühl S., Nieuwenhuyse O.P., Radner K., Rasheed K. and Saber S.A.

2012 New investigations in the environment, history, and archaeology of the Iraqi Hilly flanks: Shahrizor survey project 2009-2011. *Iraq* 74: 1-35.

Anderson P.C.

1994 Reflections on the significance of two PPN typological classes in the light of experimentation and microwear analysis: Flint "sickles" and obsidian "Cayönü tools". *In:* Gebel H.G. and Kozłowski S.K. (eds.), *Neolithic chipped stone industries of the Fertile Crescent. Proceedings of the first workshop on PPN chipped lithic industries, Berlin, 29th March-2nd April 1993*: 61-82. Berlin: ex Oriente (SENEPSE 1).

Baldi J.S.

2012 Coba bowls production, use and discard: A view from Tell Feres al-Sharqi. *In*: Matthews R. and Curtis J. (eds.), *Proceedings of the 7th ICAANE, London,12th-16th April 2010. Vol. 1: Mega-cities and mega-sites. The archaeology of consumption and disposal, landscape, transport and communication*: 355-368. Wiesbaden: Harrassowitz Verlag.

2016 Regionalized patterns and paths to "complexity": Reflections about ceramic provinces and organizational modalities in the 6th-4th millennia Northern Mesopotamia. *In*: Iamoni M. (ed.), *Trajectories of complexity. Socio-economic dynamics in Upper Mesopotamia in the Neolithic and Chalcolithic periods*: 117-138. Wiesbaden: Harrassowitz Verlag (Studia Chaburensia 6).

Baldi J.S. and Abu Jayyab K.

2012 A comparison of the ceramic assemblages from Tell Feres al-Sharqi and Hamoukar. *In*: Marro C. (ed.), *After the Ubaid. Interpreting change from the Caucasus to Mesopotamia at the dawn of urban civilization (4500-3500 BC). Papers from "The Post-Ubaid Horizon in the Fertile Crescent and Beyond", international workshop held at Fosseuse, 29th June-1st July 2009*: 163-180. Istanbul: Institut français d'Études anatoliennes (Varia Anatolica 27).

Balossi Restelli F.

2006 The local Late Chalcolithic (LC3) occupation at Zeytinli Bahçe (Birecik, Şanli-Urfa): The ceramic production. *Anatolian Studies* 56: 17-46.

Bazgir B., Otte M., Tumung L., Ollé A., Deo S.G., Joglekar P., Lóper-García J.M., Picin A., Davoudi D. and Van der Made J.

2014 Test excavations and initial results at the Middle and Upper Paleolithic sites of Gilvaran, Kaldar, Ghamari caves and Gar Arjene Rockshelter, Khorramabad Valley, western Iran. *Comptes Rendus Palevol* 13,6: 511-525.

Becerra-Valdivia L., Douka K., Comeskey D., Bazgir B., Conard N.J., Marean C.W., Ollé A., Otte M., Tumung L., Zeidi M. and Higham T.F.G

2017 Chronometric investigations of the Middle to Upper Paleolithic transition in the Zagros Mountains using AMS radiocarbon dating and Bayesian age modelling. *Journal of Human Evolution* 109: 57-69.

Beshkani A.

2018 *Analyse techno-fonctionnelle des industries lithiques moustériennes des sites du Zagros : les grottes de Bisitun, Shanidar et abri Warwasi*. Unpublished PhD thesis. University of Paris Nanterre.

Biglari F.

2001 Recent finds of the Palaeolithic period from Bisotun, Central Western Zagros Mountains. *Iranian Journal of Archaeology and History* 28: 50-60.

2007 Approvisionnement et utilisation des matières premières au Paléolithique moyen dans la plaine de Kermanshah (Iran) : le cas de la Grotte Do-Ashkaft. *In*: Moncel M.-H., Moigne A.-M., Arzarello M. and Peretto C. (eds.), *Aires d'approvisionnement en matières premières et aires d'approvisionnement en ressources alimentaires. Approche intégrée des comportement*: 227-239. Oxford: Archaeopress (BAR Int. Ser. 1725).

Braidwood R.J. and Howe B.

1960 *Prehistoric investigations in Iraqi Kurdistan*, Chicago: University of Chicago (Studies in Ancient Oriental Civilization 31).

Blanchet G., Sanlaville P. and Traboulsi M.

1997 Le Moyen-Orient de 20 000 ans BP à 6 000 ans BP. Essai de reconstitution paléoclimatique. *Paléorient* 23,2: 187-196.

Braidwood L.S., Braidwood R.J., Howe B., Reed C.A. and Watson P.J.

1983 *Prehistoric archaeology along the Zagros flanks*. Chicago: University of Chicago (Oriental Institute Publications 105).

Boaz Bruun, Skuldbøl T. and Colantoni C.

2016 Early urbanism on the margins of Upper Mesopotamia – Complex settlement patterns and urban transformations on the Rania Plain in northeastern Iraq. *In*: Iamoni M. (ed.), *Trajectories of complexity. Socio-economic dynamics in Upper Mesopotamia in the Neolithic and Chalcolithic periods*: 1-26. Wiesbaden: Harrassowitz (Studia Chaburensia 6).

Bordes J.-G. and Shidrang S.

2009 La séquence Baradostienne de Yafteh (Khorramabad, Lorestaan, Iran). *In*: Otte M., Biglari F. and Jaubert J. (eds.). *Iran Palaeolithic*: 85-100. Oxford: Archaeopress (BAR Int. Ser. 1968).

Campbell S. and Fletcher A.

2010 Questioning the Halaf-Ubaid transition. *In*: Carter R.A. and Philip G. (eds.), *Beyond the Ubaid. Transformation and integration in the Late Prehistoric societies of the Middle East*: 69-83. Chicago: University of Chicago (Studies in Ancient Oriental Civilization 63).

Casana J. and Glatz C.

2017 The land behind the land behind Baghdad: Archaeological landscapes of the Upper Diyala (Sirwan) River valley. *Iraq* 79: 47-69.

Dean J.R., Jones M.D., Leng M.J., Noble S.R., Metcalfe S.E., Sloane H.J., Sahy D., Eastwood W.J. and Roberts C.N.

2015 Eastern Mediterranean hydroclimate over the late glacial and Holocene, reconstructed from the sediments of Nar lake, central Turkey, using stable isotopes and carbonate mineralogy. *Quaternary Science Reviews* 124: 162-174.

Dibble H.L.

1984 The Mousterian industry from Bisitun Cave (Iran). *Paléorient* 10,2: 23-34.

1993 Le Paléolithique moyen récent du Zagros. *Bulletin de la Société préhistorique française* 90,4: 307-312.

Dibble H. and Holdaway S.

1990 Le Paléolithique moyen de l'abri sous roche de Warwasi et ses relations avec le Moustérien du Zagros et du Levant. *L'Anthropologie* 94,4: 619-642.

Directorate General of Antiquities

1970 *Archaeological sites in Iraq*. Baghdad: State Board of Antiquities and Heritage.

Dyson R.H. and Young T.C.

1960 The Solduz Valley, Iran: Pisdeli Tepe. *Antiquity* 34,133: 19-28.

Eckmeier E., Tolbas H. and Weidenhiller M.

2016 Soils and sediments in the Dinka settlement complex and the surrounding Bora Plain as indicators for landscape and site formation process. *In*: Radner K., Kreppner F.J. and Squitieri A. (eds.), *The Dinka settlement complex 2017: The final season at Gird-i Bazar and first work in the Lower Town*: 107-119. Gladbeck: Pewe Verlag (Peshdar Plain Project Publications).

Fiorina P.

1987 Tell Hassan: les couches Halafiennes et Obéidiennes et les relations entre les deux cultures. *In*: Huot J.-L. (ed.), *Préhistoire de la Mésopotamie*: 243-255. Paris : CNRS Éditions.

2001 Khirbet Hatara. La ceramica del livello 1. *Mesopotamia* 36I: 1-47.

Flohr P., Fleitmann D., Zorita E., Sadekov A., Cheng H., Bosomworth M., Edwards L., Matthews W. and Matthews R.

2017 Late Holocene droughts in the Fertile Crescent recorded in a speleothem from northern Iraq. *Geophysical Research Letters* 44,3: 1528-1536.

Gavagnin K., Iamoni M. and Palermo R.

2016 The land of Nineveh Archaeological Project: The ceramic repertoire from the Early Pottery Neolithic to the Sasanian period. *BASOR* 375: 119-169.

Geyer B., Braemer F., Davtian G. and Philip G.

2019 A geo-archaeological approach to the study of hydro-agricultural systems in the arid areas of Western Syria. *Journal of Arid Environments* 163: 99-113.

Geyer B. and Besançon J.

1997 Environnement et occupation du sol dans la vallée de l'Euphrate syrien durant le Néolithique et le Chalcolithique. *Paléorient* 22,2: 5-15.

Ghazanfar S.A. and McDaniel T.

2016 Floras of the Middle East: A quantitative analysis and biogeography of the flora of Iraq. *Edinburgh Journal of Botany* 73,1: 1-24.

Giraud J.

2016 Surface survey of the Dinka settlement complex, 2013-2015. *In*: Radner K., Kreppner F.J. and Squitieri A. (eds.), *The Dinka settlement complex 2017: The final season at Gird-i Bazar and first work in the Lower Town*: 29-35. Gladbeck: Pewe Verlag (Peshdar Plain Project Publications).

2018 Nouveaux horizon archéologiques pour le Kurdistan irakien. *Archéologia* 570: 62-67.

Gut R.

1995 *Das prähistorische Ninive: Zur relativen Chronologie der frühen Perioden Nordmesopotamiens*. Mainz: Philipp von Zabern (Baghdader Forschungen 19).

Helwing B.

2002 *Hassek Höyük II. Die Spätchalkolithische Keramik*. Tübingen: Wasmuth (Istanbuler Forschungen 45).

2005 The Late Chalcolithic period in the Northern Zagros. A reappraisal of the current status of research. *In*: Azarnoush M. (ed.), *Proceedings of the international symposium on Iranian archaeology: Northwestern region*: 11-23. Teheran: Iranian Center for Archaeological Research.

Henrickson E.F.

1986 Ceramic evidence for cultural interactions between Chalcolithic Mesopotamia and Western Iran. *In*: Kingery W.D (ed.), *Ceramics and civilization. Vol. 2: Technology and style*: 87-133. Columbus: American Ceramic Society.

Hole F. and Flannery K.V

1967 The prehistory of Southwestern Iran: A preliminary report. *Proceedings of the Prehistoric Society* 33: 147-206.

Husaini M.

1962 The excavations at Tel Bakr Awa. *Sumer* 18:141-164.

Iamoni M.

2018 A vital resource in prehistory: Water and settlement during the Pottery Neolithic and Chalcolithic periods. A preliminary analysis of the Eastern Upper Tigris basin area. *In*: Kühne H. (ed.), *Water for Assyria*: 7-24. Harrassowitz: Wiesbaden (Studia Chaburensia 7).

Jasim S.A.

1985 *The Ubaid period in Iraq. Recent excavations in the Hamrin region*. Oxford: BAR Publishing (BAR Int. Ser. 267).

Jassim S.J. and Goff J.C.

2006 *Geology of Iraq*. Praha: Dolin.

Jaubert J., Biglari F., Bordes J.-G., Bruxelles L., Mourre V., Shidrang S., Naderi R. and Alipour S.

2006 New research on Palaeolithic of Iran: Preliminary report of 2004 Iranian-French joint mission. *Archaeological Reports* 4: 17-26.

Jaubert J., Biglari F., Mourre V., Bruxelles L., Bordes J.G., Shidrang S., Naderi R., Mashkour M., Maureille B., Mallye J.-B., Quinif Y., Rendu W. and Laroulandie V.

2009 The Middle Palaeolithic occupation of Mar Tarik, a new Zagros Mousterian site in Bisotun Massif (Kermanshah, Iran). *In*: Otte M., Biglari F. and Jaubert J. (eds.). *Iran Palaeolithic*: 7-27. Oxford: Archaeopress (BAR Int. Ser. 1968).

Karim K.H., Sissakian V. K., Al-Ansari N. and Knutsson S.

2014 Effect of the sun radiation on the asymmetry of valleys in Iraqi Zagros Mountain belt (Kurdistan region). *Journal of Earth Sciences and Geotechnical Engineering* 4,2: 23-32.

Koliński R.

2017 Settlement history of Iraqi Kurdistan: An assessment halfway into the project. *Polish Archaeology in the Mediterranean* 26,1: 579-590.

Kozłowski S.K.

1999 *The Eastern wing of the Fertile Crescent. Late prehistory of Greater Mesopotamian lithic industries*. Oxford: BAR Publishing (BAR Int. Ser. 760).

Leslie C.

1952 Style, tradition and change: An analysis of painted pottery from North Iraq. *Journal of Near Eastern Studies* 11: 57-66.

Lindly J.M.
2005 *The Zagros Mousterian: A regional perspective*. Tempe: Arizona State University (Anthropological research papers 56).

Lloyd S. and Safar F.
1945 Tell Hassuna: Excavations by the Iraq Government Directorate General of Antiquities in 1943 and 1944. *Journal of Near Eastern Studies* 4,4: 255-289.

Marsh A., Fleitmann D. Ali D., Altaweel M., Wengrow D. and Carter R.
2018 Mid- to late-Holocene archaeology, environment and climate in the northeast Kurdistan region of Iraq, *The Holocene* 28,6: 955-967.

Matthews R., Matthews W., Raheem K.R. and Aziz K.R.
2016 Current investigations into the Early Neolithic of the Zagros foothills of Iraqi Kurdistan. *In*: Kopanias K. and MacGinnis J. (eds.), *The Archaeology of the Kurdistan region of Iraq and adjacent regions:* 219-228. Oxford: Archaeopress.

Matthews R., Mohammadifar Y., Matthews W. and Motarjem A.
2013 Investigating the Neolithisation of Society in the Central Zagros of Western Iran. *In*: Matthews R. and Neshli H.F. (eds.), *The Neolithisation of Iran. The formation of new societies*: 14-34. Oxford and Oakville: Oxbow Books (BANEA 3).

Matthews R., Richardson A. and Maeda O.
2018 'Behind all those stones': Activity and society in the Pre-Pottery Neolithic of the Eastern Fertile Crescent. *In*: Horejs B., Schwall C., Müller V., Luciani M., Ritter M., Giudetti M., Salisbury R.B., Höflmayer F. and Bürge T. (eds.), *Proceedings of the 10th ICAANE, 25th-29th* April 2016, Vienna. Vol. 2: 377-390. Wiesbaden: Harrassowitz Verlag.

Merpert N. and Munchaev R.M.
1993 Yarim Tepe I, Yarim Tepe II and Yarim Tepe III. *In*: Yoffee N. and Clark J. (eds.), *Early stages in the evolution of Mesopotamian civilization: Soviet excavations in Northern Iraq*: 73-114, 206-228 and 225-240. Tucson: University of Arizona Press.

Morandi Bonacossi D. and Iamoni M.
2015 Landscape and settlement in the eastern upper Iraqi Tigris and Navkur plains: The land of Nineveh Archaeological Project, seasons 2012-2013. *Iraq* 77: 9-39.

Mortensen P.
1970 *Tell Shimshara: The Hassuna period*. Copenhagen: Munksgaard (Historisk-Filosofiske Skrifter 5.2).

Muhaimeed A.M., Saloom A.J., Saliem K.A., Alani K.A. and Muklef W.M.
2014 Classification and distribution of Iraqi soils. *International Journal of Agriculture Innovations and Research* 2,6: 997-1002.

Mühl S. and Fassbinder J.
2016 Magnetic investigations in the Shahrizor Plain: Revealing the unseen in survey prospections. *In*: Kopanias K. and Ginnis J. (eds.), *The archaeology of the Kurdistan region of Iraq and the adjacent area*: 241-248. Oxford: Archaeopress.

Mühl S. and Nieuwenhuyse O.P.
2016 Halaf and Ubaid period settlement: A view from the Central Zagros Piedmont. *Studia Chaburensia* 6: 27-56.

Mühl S., Rösch M., Muhammed D.A., Kadereit A. and Aziz B.Q.
2018 Irrigation in the Shahrizor Plain. The potential of archaeological and geoarchaeological archives to reconstruct ancient water management. *In*: Kühne H. (ed.), *Water for Assyria*: 117-136. Harrassowitz: Wiesbaden (Studia Chaburensia 7).

Nieuwenhuyse O.P.
2007 *Plain and painted pottery. The rise of Late Neolithic ceramic styles on the Syrian and Northern Mesopotamian plains*. Unpublished PhD thesis. University of Leiden.
2018 In the Shahrizor. Reassessing the Halaf ceramic traditions of Iraqi Kurdistan. *In*: Gómez Bach A., Becker J. and Molist M. (eds.), *II workshop on Late Neolithic ceramics in Ancient Mesopotamia: Pottery in context*: 45-57. Barcelona: Museu d'Arqueologia de Catalunya (Monografies del MAC 1).

Nieuwenhuyse O.P., Odaka T., Kaneda A., Mühl S., Rasheed K. and Altaweel M.
2016 Revisiting Tell Begum: A prehistoric site in the Shahrizor Plain, Iraqi Kurdistan. *Iraq* 78: 103-135.

Nishiaki Y. and Darabi H.
2018 The earliest Neolithic lithic industries of the Central Zagros: New evidence from East Chia Sabz, Western Iran. *Archaeological Research in Asia* 16: 46-57.

Numoto H.
1987 Tell Musharifa. *In*: Fujii H. (ed.), Working report on the first season of Japanese archaeological excavation in Saddam Dam salvage project. *In*: *Researches on the antiquities of Saddam Dam basin salvage and other researches*: 49-54. Baghdad: State Organisation of Antiquities and Heritage.

Oates J.
1969 Choga Mami, 1967-68: A preliminary report. *Iraq* 31,2: 115-152.
1972 A radiocarbon date from Choga Mami. *Iraq* 34,1: 49-53.
1987 A note on the 'Ubaid and Mitanni pottery from Tell Brak. *Iraq* 49: 193-198.
2002 Tell Brak: The 4th millennium sequence and its implications. *In*: Postgate J.N. (ed.), *Artefacts of complexity: Tracking the Uruk in the Near East*: 111-122. Warminster: British Institute for the Study of Iraq (Iraq Archaeological Reports 5).

Olszewski D.I.
1993a The Late Baradostian occupation at Warwasi Rockshelter, Iran. *In*: Olszewski D.I. and Dibble H.L. (eds.), *The Palaeolithic prehistory of the Zagros-Taurus*: 187-206. Philadelphia: University of Pennsylvania (University Museum Monograph 83).
1993b The Zarzian occupation at Warwasi Rockshelter, Iran. *In*: Olszewski D.I. and Dibble H.L. (eds.), *The Paleolithic prehistory of the Zagros-Taurus*: 207-236. Philadelphia: University of Pennsylvania Press (University Museum Monograph 83).

Olszewski D.I. and Dibble H.L.
1993 *The Paleolithic prehistory of the Zagros-Taurus*. Philadelphia: University of Pennsylvania Press (University Museum Monograph 83).
1994 The Zagros Aurignacian. *Current Anthropology* 35,1: 68-75.
2006 To be or not to be Aurignacian: The Zagros Upper Palaeolithic. *In*: Bar-Yosef O. and Zilhão J. (eds.), *Towards a definition of the Aurignacian. Proceedings of the symposium held in Lisbon, 25th-30rd June 2002:* 355-373. Lisbon: Instituto Português de Arqueologia (Trabahos de Arqueologia 45).

Otte M. and Kozłowski J.K.
2004 La place du Baradostien dans l'origine du Paléolithique supérieur d'Eurasie. *L'Anthropologie* 108,3-4: 395-406.

2007 *L'Aurignacien du Zagros*. Liège: Université de Liège (ERAUL 118).

Otte M., Biglari F., Flas D., Hashemi N., Mashkour M., Mohaseb A., Naderi R., Radu L., Shidrang S. and Zwyns N.

2007 New research on the Aurignacian in the Zagros region: Test excavation at Yafteh Cave, Lorestan, Iran. *Antiquity* 81,311: 82-96.

Pfälzner and Sconzo P.

2015 First results of the eastern Ḫabur Archaeological Survey in the Dohuk region of Iarqi Kurdistan. The season of 2013. *Zeitschrift für Orient-Archäeologie* 8: 90-122.

Pearce J.

2000 The Late Chalcolithic sequence at Hacinebi Tepe, Turkey. *In*: Marro C. and Hauptmann H. (eds.), *Chronologies des pays du Caucase et de l'Euphrate aux IV^e^-III^e^* millénaires: 115-144. Paris: Éditions de Boccard (Varia Anatolica 11).

Philip G., Dononghue D., Beck A. and Galiatsatos N.

2002 CORONA satellite photography: An archaeological application from the Middle East. *Antiquity* 76,291: 109-118.

Robert B., Blanc C., Chapoulie R. and Masetti-Rouault M.-G.

2008 Characterizing the Halaf-Ubaid transitional period by studying ceramic from Tell Masaïkh, Syria. Archaeological data and archeometric investigations. *In*: Kühne H., Czichon R.M. and Kreppner F.J. (eds.), *Proceedings of the 4^th^ ICAANE. Vol. 2: Social and cultural transformation: The Archaeology of transitional periods and Dark Ages. Excavations reports*: 225-234. Wiesbaden: Harrassowitz Verlag.

Roberts N, Reed J.M., Leng M.J., Kuzucuoğlu C., Fontugne M., Bertaux J., Woldring H., Bottema S., Black S., Hunt E. and Karabiyikoğlu M.

2001 The tempo of Holocene climatic change in the eastern Mediterranean region: New high-resolution crater-lake sediment data from central Turkey. *The Holocene* 11,6: 721-736.

Rothman M.S.

2002 *Tepe Gawra: The evolution of a small prehistoric center in Northern Iraq*. Philadelphia: University of Pennsylvania (Museum Monograph 112).

Shidrang S.

2018 The Middle to Upper Palaeolithic transition in the Zagros: The appearance and evolution of the Baradostian. *In*: Nishiaki Y. and Akazawa T. (eds.), *The Middle and Upper Palaeolithic archaeology of the Levant and beyond*: 133-156. New York: Springer.

Shidrang S., Biglari F., Bordes J.G. and Jaubert J.

2016 Continuity and change in the Late Pleistocene lithic industries of the central Zagros: A typo-technological analysis of lithic assemblages from Ghar-e Khar Cave, Bisotun, Iran. *Archaeology, Ethnology and Anthropology of Eurasia* 44,1: 27-38.

Smith P.E.L.

1986 *Palaeolithic archaeology in Iran*. Philadelphia: University of Pennsylvania (American Institute of Iranian Studies 1).

Solecki R.S

1963 Prehistory in Shanidar Valley, Northern Iraq. *Science* 139,3551: 179-193.

Solecki R.L. and Solecki R.S.

1974 Shanidar Cave. *Science* 184,4140: 937.

1993 The pointed tools from the Mousterian occupations of Shanidar Cave, Northern Iraq. *In*: Olszewski D.I. and Dibble H.L. (eds.), *The Palaeolithic prehistory of the Zagros-Taurus*: 119-146. Philadelphia: University of Pennsylvania (University Museum Monograph 83).

Stein G.J.

2011 Tell Zeidan. *Annual report of the Oriental Institute 2010-2011*: 122-139.

Stein G.J. and Özbal R.

2007 A tale of two *Oikumenai*: Variation in the expansionary dynamics of 'Ubaid and Uruk Mesopotamia. *In:* Stone E.C. (ed.), *Settlement and society: Essays dedicated to Robert McCormick Adams:* 329-342. Los Angeles-Chicago: Cotsen Institute of Archaeology, University of Chicago.

Stevens L.R., Wright H.E. and Ito E.

2001 Proposed changes in seasonality of climate during the Lateglacial and Holocene at Lake Zeribar, Iran. *The Holocene* 11,6: 747-755.

Sürenhagen D.

1978 *Keramik-produktion in Ḫabūba Kabira-Süd: Untersuchungen zur Keramikprodukten innerhalb der spät-urukzeitlichen Siedlung Ḫabūba Kabira-Süd in Nordsyrien*. Berlin: Hessling.

Tekin H.

2005 Hakemi use: A new discovery regarding the northern distribution of Hassunan/Samarran pottery in the Near East. *Antiquity* Project Gallery 79,303. Online: http://www.antiquity.ac.uk/projgall/tekin303/.

Tobler A.

1950 *Excavations at Tepe Gawra. Vol. 2*. Philadelphia: University of Pennsylvania (Museum Monographs).

Tomé A., Cabral R. and Renette S.

2016 The Kani Shaie Archaeological Project. *In*: Kopanias K. and Ginnis J. (eds.), *The archaeology of the Kurdistan region of Iraq and the adjacent area*: 427-434. Oxford: Archaeopress.

Tsuneki A., Rasheem K., Saber A.S., Nishiyama S., Anma R., Ismail B.B., Hasegawa A., Tatsumi Y., Miyauchi Y., Jammo S., Makino M. and Kudo Y.

2015 Excavations at Qalat Said Ahmadan, Slemani, Iraq-Kurdistan: First interim report (2014 season). *Al-Rāfidān* 36: 1-63.

Tsuneki A., Rasheem K., Saber A.S., Nishiyama S., Watanabe N., Greenfield T., Ismail B.B., Tatsumi Y. and Minami M.

2016 Excavations at Qalat Said Ahmadan, Qaladizah, Iraq-Kurdistan: Second interim report (2015 season)". *Al-Rāfidān* 37: 89-142.

Ur J.

2010 *Urbanism and cultural landscapes in Northeastern Syria. The Tell Hamoukar survey 1999-2001*. Chicago: University of Chicago (Oriental Institute Publication 137).

2018 Water for Arbail and Nimrud. *In*: Kühne H. (ed.), *Water for Assyria*: 57-75. Harrassowitz: Wiesbaden (Studia Chaburensia 7).

Ur J., de Jong L., Giraud J., Osborne J.F. and MacGinnis J.

2013 Ancient cities and landscapes in the Kurdistan region of Iraq: The Erbil Plain Archaeological Survey 2012 Season, *Iraq* 75: 89-117.

Vallet R., Baldi J.S., Naccaro H., Rasheed K., Saber S.A. and Hamarasheed S.J.

2017 New evidence on Uruk expansion in the Central Mesopotamian Zagros Piedmont. *Paléorient* 43,1: 61-87.

van Zeist W. and Woldring H.

1978 A postglacial pollen diagram from Lake Van in East Anatolia. *Review of Palaeobotany and Palynology* 26,1-4: 249-276.

von Oppenheim M. (ed.)

1943 *Tell Halaf I. Die Prähistorische Funde*. Berlin: De Gruyter.

Walliser Y.

2010 L'agriculture du Kurdistan irakien Entre destruction et reconstruction. Études rurales 186: 133-148.

Walter H. and Lieth H.

960 *Climadiagram atlas of the world*. Jena: Gustav Fisher Verlag.

Wengrow D., Carter R., Brereton G., Shepperson M., Hamarashi S.J., Saber S.A., Bevan A., Fuller D., Himmelman H., Sosnowska H. and Gonzalez Carretero L.

2016 Gurga Chiya and Tepe Marani: New excavations in the Shahrizor Plain, Iraqi Kurdistan. *Iraq* 78: 253-284.

Wicke L., Lemcke G. and Sturm M.

2003 Evidence of the Lateglacial and Holocene climatic change and human impact in eastern Anatolia: High-resolution pollen, charcoal, isotopic and geochemical records from the laminated sediments of Lake Van, Turkey. *The Holocene* 13,5:665-675.

Wilkinson T.J.

1982 The definition of ancient manured zones by means of extensive sherd-sampling techniques. *Journal of Field Archaeology* 9,3: 323-333.

1989 Extensive sherd scatters and land use intensity: Some recent results. *Journal of field Archaeology* 16,1: 31-46.

2003 *Archaeological landscapes of the Near East*. Tucson: University of Arizona.

Wilkinson T.J. and Tucker D.J.

1995 *Settlement development in the North Jazira, Iraq. A study of the archaeological landscape*. Warminster: Aris and Phillips (Iraq Archaeological Reports 3).

Wright H.T.

2014 Early Uruk ceramic assemblages: Cultural relations in Greater Mesopotamia during the late fifth and early fourth millennia BC. *In*: McMahon A. and Crawford H. (eds.), *Preludes to urbanism. The Late Chalcolithic of Mesopotamia. In honour of Joan Oates*: 109-125. Cambridge: University of Cambridge (McDonald Institute Monographs).

Wright H.T., Neely J.A., Johnson G.A. and Speth J.

1975 Early fourth millennium developments in Southwestern Iran. *Iran* 13,1: 129-147.