

Environment, Culture
and Subsistence
of Humans in the
Caucasus between
40,000 and 10,000
Years Ago

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By

Liubov V. Golovanova
and Vladimir B. Doronichev

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FOREWORD

This book is essentially the first synthesis of research undertaken so far on the Upper Palaeolithic archaeology of the Caucasus. It is based on the original materials we obtained over the course of almost 30 years of excavating and researching the Upper Palaeolithic layers dating from ca. 40/39 to 11 ka ago at Mezmaiskaya Cave and other sites in the northwestern Caucasus. We have collected and present in this book all the currently available data about the Upper Palaeolithic in the Caucasus, including findings from our own extensive fieldwork in various archaeological sites, archival records and museum collections, and also studies published by other researchers.

Much of the information reported in this book is unavailable in English and not even published in detail in Russian. The book provides a number of new statements and conclusions about the Upper Palaeolithic peopling of the Caucasus and prehistoric cultural adaptations to extreme natural environments in the broader context of a detailed multi-proxy palaeoenvironmental study. We and other researchers have developed many of these ideas over the last ten years.

Both the scope and contents of this book should make it of great value to both professional experts and students of archaeology and interdisciplinary Quaternary studies, as well as for all members of the public interested in the modern peopling of Eurasia. We hope this book will be serve as the main reference title for future investigations of the Upper Palaeolithic in the Caucasus.

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INTRODUCTION

The Caucasus is a vast mountain area located between the Black and Caspian Seas. The Caucasus contains two major mountain provinces—the Greater Caucasus and the Lesser Caucasus—separated by the Rioni-Kura depression. The Greater Caucasus Mountains (or Greater Caucasus), approximately 1100 km in length and about 180 km at maximum width, with elevations of over 4000 m above sea level (asl), occupy a central position within the Caucasus and divide it into two parts—the Northern Caucasus, or Ciscaucasia, and the Southern Caucasus, or Transcaucasia. The highest European volcanic mountain peaks—Elbrus (5642 m asl) and Kazbek (5034 m asl), along with 13 other mountain peaks that are higher than Mt Blanc (4810 m asl) in the Alps—are located in the Greater Caucasus. The Greater Caucasus is further divided into three parts: western (from the Anapa-Novorossiysk area on the Black Sea coast to Mt Elbrus), central (between Mt Elbrus and Mt Kazbek) and eastern (from Mt Kazbek to the Absheron peninsula on the Caspian coast). The Northern Caucasus abuts the Russian plain at the southernmost edge of Eastern Europe, while the Southern Caucasus is the most northern part of West Asia, spreading southward into the Near Eastern highlands and the Zagros Mountains (Gvozdetskiy, 1963; Milanovskiy, 1968; Nesmeyanov, 1999).

The southernmost part of the Southern Caucasus, located south of the large Rioni-Kura depression, also known as the Lesser Caucasus, consists of a series of mountain ridges separated by inter-peak depressions, the South Georgian or Javakhetian highland, and the huge Armenian volcanic highland. The Armenian highland, with elevations generally between 1300 and 2300 m asl but also some major peaks (Mt Aragats: 4090 m; Mt Ararat: 5165 m) is the most elevated part of the Near Eastern highlands. Sevan Lake, the largest lake in the Caucasus, covering an area of 1416 km², is also located in the Armenian highland.

Nowadays, most of the Southern Caucasus has a dry continental climate and a forest-less landscape. This is especially characteristic of the Armenian volcanic highland, which is covered mostly by arid steppe environments, with average annual precipitation below 570 mm and considerable temperature variation between low-mountain (an average of 24–26°C in the summer and 1°C in the winter) and high-mountain (average 1°C in the summer and -13°C in the winter) areas. Deciduous forests

dominated by beech and oak remain locally on the northern slopes of mountains and river canyons up to elevations of around 1900–2000 m asl, while shrubs and open vegetation dominate the southern slopes. Alpine and sub-alpine open grass vegetation embraces mountains and plateaus located higher than 2000–2200 m asl. Semi-desert and desert landscapes with extremely xerophilous vegetation adapted to saline soils occur in some areas at elevations of 900–1400 m asl.

The Colchis lowland, located in the southwestern part of the Greater Caucasus (the Imeretian region of west Georgia) has a humid subtropical climate, with mild winters and hot summers. Facing strong westerly winds and associated with a distinct area of meson climate, this area receives abnormally high precipitation of 1300–1500 mm annually, mostly in autumn and winter. Swamp forests, consisting of alder combined with aquatic and paludal plants, cover large areas in the Colchis lowland (Kvavadze and Rukhadze, 1989). The Colchis lowland and abutting forested areas of the Imeretian highland constitute a forest refugium where multiple tertiary forest relics and endemic species, including a relic Pitsunda pine and numerous Mediterranean species, as well as forest-associated biological communities, survived unfavourable climates during the Pleistocene glaciations (Kikvidze and Ohsawa, 2001; Denk et al., 2001; Milne and Abbott, 2002; Tarkhnishvili et al., 2012).

In the Northern Caucasus, at the base of the foothills, near today's sea level, is an open steppe with galleries of deciduous forests along its rivers. The largest continuous dense forest landscape in West Asia covers the entire western part of the Greater Caucasus and the eastern Black Sea coast in the Southern Caucasus (Tarkhnishvili et al., 2012: fig. 1). Mixed broad-leaved forests with oak, hornbeam, oriental beech, and chestnut varieties occupy the foothills (below 700 m asl) in the northwestern Greater Caucasus and along the Black Sea littoral zone in the southwestern Greater Caucasus. The low-mountain and middle-mountain zones (700–2000 m asl) are predominantly covered by deciduous beech forests gradually transforming into mixed fir and beech forests, and dark coniferous fir- and spruce-dominated forests higher in the mountains (at elevations of 1200–1900 m asl). The subalpine zone (2000–2400 m asl) represents a mosaic combination of sub-alpine meadows and open crook-stem beech and birch forests, gradually transforming into bunch-grass alpine meadows that prevail at elevations above 2500 m asl.

The evolution of environments and landscapes in the Caucasus during the Late Pleistocene was strongly influenced by volcanic and tectonic events, and by glaciations in the Greater and Lesser Caucasus (e.g., Milanovskiy, 1968; Dumitrashko, 1982; Nesmeyanov, 1999; Ollivier et al.,

2010; Tielidze, 2016, 2017). During the glacial periods corresponding to global phases of climate cooling, the Greater Caucasus appear to have represented a practically impenetrable mountainous and glacial barrier to human contact between the Northern and Southern Caucasus. The phases of climate warming resulted in the disappearance or significant reduction of the vast mountain glaciers and significant degradation of glacial and periglacial landscapes. This provoked the movement of human groups into the high mountains and resumption of cultural contacts between the Upper Palaeolithic populations of the Northern and Southern Caucasus.

In this book, we provide a comprehensive synthesis of the currently available—and especially the most recent—data on the Upper Palaeolithic occupation of the Caucasus. Based on this information, we have established a chronological framework and defined the changing environmental background to the Upper Palaeolithic occupation of this region. We show the dynamics of cultural changes in Upper Palaeolithic industries and developments in the subsistence strategies of modern humans (raw material procurement, the hunting of large animals, settlement systems, and other factors) across the entire duration of the Upper Palaeolithic, from approximately 40,000 to 10,000 years ago, in the Caucasus. The information gathered here highlights how the current archaeological record has reshaped our understanding of Upper Palaeolithic human adaptations to mountain environments, illustrating the scale and dynamics of the occupation of the Caucasus in this period, as well as the peculiarities of development in this region in comparison to other regions of West Eurasia.

LIST OF ABBREVIATIONS

- AH—archaeological horizon
- AMH—anatomically modern human
- AMS—accelerator mass spectrometry
- AP—arboreal pollen
- CTE—core trimming element
- EPP—Epipalaeolithic
- EUP—Early Upper Palaeolithic
- LGM—Last Glacial Maximum
- LMP—Late Middle Palaeolithic
- LUP—Late Upper Palaeolithic
- MIS—Marine Isotope Stage
- MNI— minimum number of individuals
- MP—Middle Palaeolithic
- NISP—number of individual specimens
- UP—Upper Palaeolithic

CHAPTER ONE

UPPER PALAEOLITHIC RESEARCH IN THE CAUCASUS: OLD VIEWS AND MODERN CHANGES

In the Caucasus, the first Upper Palaeolithic finds were reported in the 1860–1880s, from several caves located in western Georgia, in the foothills of the southwestern Caucasus, but the first archaeological excavations were only performed in this area in the 1910s (Liubin, 1989). These excavations were carried out by R. Schmidt and L. Kozlowskiy at Sakajia cave and by S. Krukowskiy at two other cave sites in 1914 and at Gvardjilas klde, Khergulis klde and Taro klde caves in 1916 ("klde" means "rock" in Georgian). However, systematic research into the Upper Palaeolithic period in the Caucasus only began during the Soviet era, in the 1920s and 1930s, and has continued to the present day.

In the Caucasian region, the overwhelming majority of the known Upper Palaeolithic sites are in caves and rockshelters located in deep river canyons along the foothills (250–1000 m asl) on both the southwestern and northwestern slopes of the Greater Caucasus—the geographical area known as the western Caucasus (Fig. 1-1). Many of the Upper Palaeolithic sites in this region have a stratigraphic sequence that includes Late Middle Palaeolithic (LMP) and/or early Holocene (defined as Mesolithic or Neolithic) layers (see Appendixes A and B). Only a few Upper Palaeolithic sites have been found so far in the north-central Caucasus (Sosruko, Alebastrovyy Zavod, Badynoko, and Psytuaje rockshelters) and in the Lesser Caucasus (Aghitu-3 and Kmla-2 caves, Kalavan-1 open-air site, and Hatsut-1 locality in Armenia). Virtually no Upper Palaeolithic sites (except Khunzakh locality in Dagestan) are known from either the northern or southern slopes of the eastern Greater Caucasus or the south-central Caucasus. It seems that the geographical spread of known Upper Palaeolithic sites can be explained not only by the high intensity of research in the western Caucasus, but also by the less favourable conditions for

human survival and preservation of Palaeolithic sites in the higher and more mountainous eastern half of the Caucasus in that era.

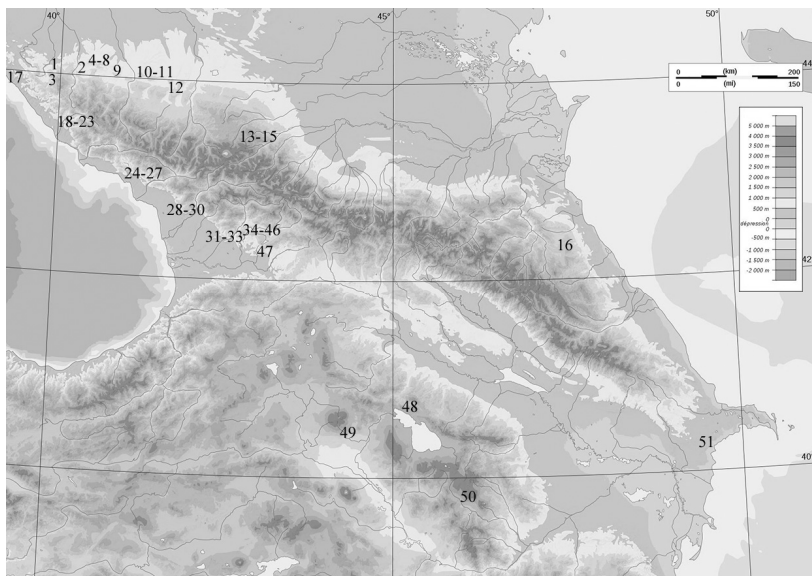


Figure 1-1. Map showing distribution of the Upper Palaeolithic sites in the Caucasus. Northern Caucasus: 1. Korotkaya cave; 2. Kamennomostskaya cave; 3. Mezmaiskaya cave; 4–8. Dvoinaya and Kasojskaya caves, Gubs 1, Gubs 5 (Chygai), and Gubs 7 (Satanai) rockshelters, and other cave sites in the Gubs River gorge; 9. Besleneevskaya open-air site; 10–11. Baranakha 4 open-air site, Baranakha 1 locality, and other small localities on the Baranakha plateau; 12. Yavora open-air site; 13–15. Sosruko, Badynoko, and Alebastrovyy Zavod rockshelters; 16. Khunzakh locality. Southern Caucasus: 17. Shyrokiy Mis open-air site; 18–23. Akhshtyrskaya, Navalishenskaya, Khostinskaya-1, Akhtsu, and Atsinskaya caves, and Nijnyaya Plastunka locality; 24–27. Apiancha (Kep-Bogaz) and Svanta Savane (Amtkelskaya) caves, Kholodny Grot rockshelter, and Sabelasuri open-air site; 28–30. Kvachara and Okumi-1 caves, and Djampala rockshelter; 31–33. Sakajia (formerly Virchow's), Chakhati, and Sagvardjile caves; 34–46. Gvardjilas klde, Dzudzuana, Bondi, Khergulis klde, Kotias klde, Satsurbli, Tagon klde, Taro klde, Undo, Samertskhle klde, and Sareki klde caves, and Ortvale klde and Mgvimevi-1 rockshelters (for detailed localization of the sites see also Fig. 1-2); 47. Devis Khvreli Cave; 48. Kalavan-1 open-air site; 49. Kmlo-2 (Apnagyugh-8) rockshelter; 50. Aghitu-3 cave; 51. Gobustan area.

The Upper Palaeolithic sites in the Caucasus vary from wide and shallow caves (e.g., Mezmaiskaya, Satsurblia, and Gvardjilas klde caves) to narrow and deep, corridor- or gallery-like caves (e.g., Ahshtyrskaya, Navalishenskaya, Devis Hvreli, Samertshle klde, Dzudzuana, and Bondi caves), and from vast, sometimes multi-chambered grottoes and rockshelters (Ortvale klde and Aghitu-3) to small grottoes and rockshelters (e.g., Okumi-1, Sagvardjile, Svantasavane, Togon klde, Apiancha, Djampala, Chakhati, Kasojkaya, and Samgle klde caves). The overwhelming majority of Upper Palaeolithic sites in the Caucasus are located at a height range of 250–1000 m asl. There are only a few sites located at elevations above 1000 m asl, although two cave sites (Mezmaiskaya in the northwestern Caucasus and Aghitu-3 in the Lesser Caucasus) have yielded deep sequences of Upper Palaeolithic deposits containing rich evidence of human occupation. Open-air sites from this period are not abundant in the Caucasus, but are known in various landscape zones, from the low foothills (Yavora) to the middle mountains at elevations of 1500 m asl and more (Baranakha-1, Baranakha-4, and Kalavan-1).

Only about a dozen Caucasian Upper Palaeolithic sites have been studied using modern research methods (see Chapters Two and Three). In the Northern Caucasus, the deepest sequence of Upper Palaeolithic layers was excavated in Mezmaiskaya cave, in the northwestern Caucasus. Additional evidence has been recovered from recent excavations at several other sites in this region: Korotkaya and Dvoinaya caves, Sosruko, Badynoko and Chygay rockshelters, Baranakha-4 and Besleneevskaya open-air sites. In the Southern Caucasus, our knowledge of Upper Palaeolithic chronology, environment, culture, and subsistence stems mostly from recent excavations at Dzudzuana cave. Additional evidence has been gleaned from recent excavations in Ortvale Klde rockshelter, and Kotias Klde, Bondi and Satsurblia caves in west Georgia. In the Lesser Caucasus, the earliest evidence of Early Upper Palaeolithic (EUP) occupation was found at Aghitu-3 cave in Armenia, and Epipalaeolithic occupation has been documented in the Kalavan-1 open-air site in Armenia. Modern research on all these Caucasian sites has provided new perspectives on the origins and timing of the Upper Palaeolithic occupation of the Caucasus, and our understanding of how anatomically modern human (AMH) groups changed their behaviours and technologies in response to major climatic oscillations during this period, between approximately 40,000 and 10,000 years ago.

Table 1-1. Old periodization and characterization of the Upper Palaeolithic industry in the Caucasus.

Zamyatnin, 1957	Kozlowsky, 1972	Tushabramishvili and Vekua, 1982
Not identified	Not identified	Group IV (Mesolithic): Chakhati I, Kvachara, Kholodniy Grot B, Zurtaketi, Edzani, Yashtkhva, Djampala
Group 3: Gvardjilas klde*-type site: tools made mostly on bladelets; many backed and truncated bladelets; predominance of rounded and short forms among end-scrapers and angle burins on bladelets among burins; few geometrics (triangles and segments), microgravette and Vachons points; rare pièces écaillées, core scrapers (rabot), carinated scrapers, and polyhedral burins.	Group V (>10 ka): Gvardjilas klde 2-type site, Sagvardjile I-II, Djruchula UP layer Group IV (~17–15/10.3 ka): Sakajia upper level-type site, Sagvardjile III, Chakhati II Last Glacial Maximum (~21-17 ka)	Group III: Gvardjilas klde*-type site, Samgle klde, Sagvardjile III, Kholodniy Grot C, Apiancha
Group 2: Sakajia-type site: tools made mostly on blades and bladelets; variable burins and end-scrapers on blades, and backed bladelets and microbladelets; rare backed and truncated bladelets and backed and double truncated bladelets (rectangles); rare pièces écaillées, core scrapers, carinated scrapers, and polyhedral burins. Devis-Khvreli, Bnele klde	Group III (~24–21 ka): Sakajia middle level-type site, Gvardjilas klde, Chakhati III, Sagvardjile IV, Kholodniy Grot D, Akhshtyrskaya 2, Atsinskaya 5, Devis-Khvreli, Mgvimevi Group II (~26–24 ka): Samertske klde, layer 6 Sakajia, lower level	Group II: Sakajia-type site, Devis-Khvreli, Bnele klde, Mgvimevi-I, Dzudzuana I–IV, Sagvardjile IV, Samertske klde, Sareki klde
Group 1: Khergulis klde*-type site: polyhedral and angle burins, core scrapers (rabot), carinated and nosed scrapers; rare backed bladelets, some similar to Gravette points. Taro klde	Group I (~34–31 ka): Sagvardjile, layer V*-type site, Kamennomostskaya*	Group I: Khergulis klde*-type site, Sagvardjile V*, Okumi-I, Svantaviana*, Togon klde, Dzudzuana V–VII

* denotes assemblages that comprise Upper Palaeolithic artefacts mechanically mixed with Mousterian or post-Palaeolithic artefacts, and hence are not diagnostic for cultural comparisons; see text for details. Chronology of Kozlowsky's stages after Liubin (1989).

A number of hypotheses have previously been proposed regarding the place of the Caucasian Upper Palaeolithic within the wider West Eurasian context. Since the 1930s, these discussions have been largely influenced by research from Upper Palaeolithic sites located in western Georgia (Fig. 1-2). Zamyatnin (1935, 1957) has offered the first unilinear, three-phased periodization and characterization of the Upper Palaeolithic in the

Caucasus, based on the typological study of lithic artefacts from excavations in western Georgia between 1914 and 1918 and then in the 1920s and 1930s (Table 1-1).

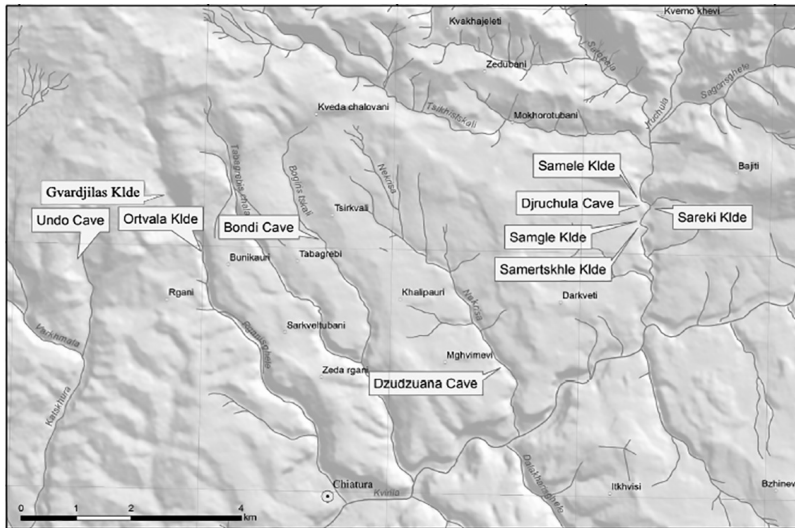


Figure 1-2. Map showing the distribution of the main Upper Palaeolithic sites in the Imeretian region of west Georgia, listed under numbers 34–46 in Fig. 1-1. Modified from (Tushabramishvili et al., 2012b: figs 3, 4)

Zamyatnin described the Caucasian Upper Palaeolithic as generally "Aurignacoid" or "Aurignacian-like" in character and drew broad analogies with the Upper Palaeolithic of the Greater Mediterranean, from North Africa across to Syria and the Levant. He believed that Aurignacian features were seen "primarily in the core-like tool forms and the character of burins", namely the significant numbers of polyhedral burins, core scrapers and carinated scrapers in many sites (1957: 455).

However, Zamyatnin, and later other Soviet researchers, never assigned the Upper Palaeolithic industry of the Caucasus to a variant of the Aurignacian tradition in Europe, but rather underlined the specific character of the Upper Palaeolithic in this region and emphasized its broad analogies with the Upper Palaeolithic in West Asia. For example, Formozov (1959) argued for more geographically limited affinities between the Upper Palaeolithic in the Caucasus within the Upper Palaeolithic of West Asia, particularly with Syria, Palestine, and Iraq. He

also noted that a few northwestern Caucasus Upper Palaeolithic sites known at that time conformed with Zamyatnin's three-phased model (Formozov, 1965). Bader (1966) pointed to particular similarities between the Upper Palaeolithic of the Caucasus and the Baradostian and Zarzian industries in the Zagros Mountains, Iran.

J. Kozłowski (see Kozłowski, 1970; 1972) did not accept the presumed unilinear three-phased chronological sequence, and he was the first to attempt to correlate climatic data with the litho-stratigraphic data available from the Caucasian sites, as the basis for a chronological subdivision of the Caucasian Upper Palaeolithic. He subdivided the Upper Palaeolithic assemblages known in the Caucasus, particularly in west Georgia, into five chrono-stratigraphical groups (Table 1-1).

Kozłowski proposed dating the earliest assemblage, from Layer V at Sagvardjile cave, to 34–31 ka ago, on the basis of long-range comparisons with the Baradostian assemblages from Shanidar cave (Iran), and placed the Sagvardjile V assemblage at the base of this sequence. Later analyses, however, have demonstrated that presence of both prevailing (up to 63%) typical Middle Palaeolithic and typical Upper Palaeolithic artefacts in Sagvardjile V, as well as in the assemblage from Layer II at Chakhati cave—which Berdzenishvili (1964 a, b) assigned (together with Sagvardjile V) to the earliest "transitional phase" from the Middle to Upper Palaeolithic in this region—is a result of the admixture of artefacts from different layers (Meshveliani, 1986; Liubin, 1989).

A significant achievement of Kozłowski's approach was that he recognized the importance of the Last Glacial Maximum (LGM) as the main climatic and chronological marking period in the Upper Palaeolithic sequence of the Caucasus. He also concluded that industries involving various backed tools and geometric microliths prevailed in the the Caucasus during the Late Glacial (Tardiglacial) period after the LGM (Kozłowski, 1972).

Zamyatnin (1957) reached an important conclusion, which was supported by later research (e.g., Berdzenishvili, 1964b; Tushabramishvili and Vekua, 1982; Tushabramishvili, 1981, 1984; Bader, 1984; Liubin, 1989), regarding the recognition of cultural continuity from the earlier to later stages of the Upper Palaeolithic, and on to the Mesolithic in the Caucasus. For this reason, some researchers (Berdzenishvili, 1964b; Tushabramishvili, 1981) have proposed defining the early Mesolithic stage in west Georgia as the "Epipalaeolithic". Bader and Tsereteli (1989: 93) underlined the early appearance of geometric microliths in the Upper Palaeolithic of this region. They also noted cultural continuity from the Upper Palaeolithic to the Mesolithic and the conventionality of the lower

border of the Mesolithic in the Caucasus.

Until the 1980s, and following Zamyatnin's initial unilinear model (1935; 1957), which was based only on typological criteria and emerged before the use of radiometric dates, most researchers treated the Upper Palaeolithic in the western Caucasus as a uniform cultural entity that developed into the cultural phenomenon named the "Imeretian culture" by Grigoriev (1977). Researchers identified either five (with addition of the earliest "transitional phase" from the Mousterian to the Upper Palaeolithic and the latest "Mesolithic phase"; Berdzenishvili, 1964a) or four (with addition of only the "Mesolithic phase"; Tushabramishvili, 1981) stages in the development of this culture (Table 1-1).

Bader (1984), and later Liubin (1989), proposed that most parts of the Greater Caucasus and the Lesser Caucasus highlands were not inhabited during the period of harsh climatic conditions corresponding to the LGM, due to the glacial environments and cold climate. Also, Liubin (1989; Lioubine, 1992) has offered a hypothesis that the Colchis lowland and the abutting forested foothill areas of the southwestern Caucasus—from the Imeretian highland in western Georgia in the east, to Abkhazia and the Sochi district of Russia in the west—would have benefited from a milder climate during this period and thus served as the main refuge region (called the "Colchis refugium") for the survival of the region's Upper Palaeolithic humans during the LGM. He also assumed that the continuity of the Upper Palaeolithic occupation in the Colchis region, where about 90% of all Upper Palaeolithic sites known in the Caucasus are concentrated, contributed to the techno-typological homogeneity of the lithic assemblages and the development of the regional Upper Palaeolithic cultural entity known as the Imeretian culture.

Amirkhanov (1986) emphasized the mixed Aurignacian–Perigordian character of the Caucasus' Upper Palaeolithic, referring to the combination of features typical of both the European Aurignacian and Gravettian (defined as Upper Perigordian at that time). He also noted the rarity of bone tools as a distinguishing feature of the Upper Palaeolithic in this region, compared to the Upper Palaeolithic industries of Europe.

Amirkhanov (1994) also used the LGM as the main chronological division of the Caucasian Upper Palaeolithic sequence. Based on the climate-stratigraphic data, the few radiocarbon estimates available then, and the peculiarities of the lithic assemblages, he divided the Upper Palaeolithic assemblages of the Caucasus into two major chronological groups separated by the LGM. He concluded that there was a cultural discontinuity between the earlier and later groups. Amirkhanov was also the first to propose that the Imeretian culture label should be applied

mainly to the Upper Palaeolithic assemblages postdating the LGM.

The chronology and reliability of the Caucasian Upper Palaeolithic record have been issues of debate; stratigraphic inconsistencies and a shortage of chronological data have affected our understanding of the timing and cultural peculiarities of Upper Palaeolithic development in this region. Until the 1990s, most researchers believed that the earliest phase of the Upper Palaeolithic sequence in the Caucasus was characterized by the presence of Mousterian tools, together with the appearance of distinct Upper Palaeolithic tools such as end-scrapers, burins, and retouched blades. These assemblages were thought to represent a cultural transition from LMP to EUP, with ancestral LMP Neanderthal groups evolving into the EUP modern humans, reminiscent of the coexistence phenomenon seen at that time in Western Europe.

In the 1980s-90s, Meshveliani (1986), Liubin (1989), and Amirkhanov (1994) revised the Upper Palaeolithic materials from old excavations, which provided the basis for a unilinear periodization, and concluded that there was admixture of Mousterian, Upper Palaeolithic, Mesolithic, and sometimes later artefacts in many contexts. Among others, the most striking example of mechanical admixture is the Sagvardjile V assemblage, in which more than 60% of artefacts are typical Levalloiso-Mousterian blanks and tools (in Sagvardjile V, 95 of 202 retouched tools are Mousterian points). In Khergulis klde cave, Mousterian flakes and cores were abundant among the 800 total lithics found, including 80 cores, as well as about half of the 20-or-so retouched tools were Mousterian points and side-scrapers. Also, in Gvardjilas klde cave, the Upper Palaeolithic assemblage represents a mixture of at least two different assemblages recovered from different stratigraphical layers (Liubin, 1989). However, even later, some new researchers (Adler, 2002) suggested that the mosaic of Mousterian and Upper Palaeolithic traits in some Caucasian sites reflects a late survival of LMP Neanderthals in the region, with EUP cultural influences entering from surrounding areas.

Since the end of the 1990s to the present, some researchers (Kozlowski, 1998; Cohen and Stepanchuk, 1999; Nioradze and Otte, 2000; Schelinsky, 2007; Otte and Kozlowski, 2007; Demidenko and Noiret, 2012) have been suggesting that a group of Upper Palaeolithic assemblages in the Caucasus represents a variant of the Aurignacian. Initially, Kozlowski (1998) suggested a bilinear development of Upper Palaeolithic cultures in west Georgia and the entire western Caucasus, and linked Caucasian Upper Palaeolithic industry to the Early Ahmarian and Aurignacian industries of West Asia. Nioradze and Otte (2000) subdivided the Georgian Upper Palaeolithic sequence into three

chronological stages, from early to late: "Aurignacoid", "with straight backed points", and "with geometric microliths". These stages do not correspond at all to the contents and definitions of the chronological groups defined within Zamyatnin's (1935; 1957) three-phased model.

Beginning in the mid-1990s, radiometric data began to emerge, changing our understanding of the character and chronology of the Upper Palaeolithic in the Caucasus. The first robust series of radiocarbon dates for the Upper Palaeolithic context of the region were obtained in the 1990s in Georgia (Nioradze and Otte, 2000).

Over the last 20 years, modern excavation techniques, including sediment water screening, and expanded series of radiocarbon dates from several recently excavated sites—Mezmaiskaya cave (northwestern Caucasus, Russia), Dzudzuana cave, Satsurbliya cave, and Ortvale klde rockshelter (southwestern Caucasus, west Georgia), and some others—have revolutionized perceptions of the Upper Palaeolithic in the Caucasus, with important implications for our understanding of the development and spread of humans in this period in the entire West Eurasia (Meshveliani et al., 2004; Bar-Yosef et al., 2006, 2011; Golovanova et al., 2006, 2010a, b; 2014; Golovanova and Doronichev, 2012a, b; Adler et al., 2006a, b; 2008; Pinhasi et al., 2014; Pleurdeau et al., 2016; Kandel et al., 2017).

New research favours a model of LMP–EUP population replacement and a chronological gap between these two occupational phases. There is a chronological break between the end of the Middle Palaeolithic occupation and the beginning of the Upper Palaeolithic occupation wherever the LMP and EUP occupational levels are documented within one sequence in the Caucasus (Bar-Yosef et al., 2006; Golovanova et al., 2006, 2010a; Adler et al., 2008). Modern research indicates that Neanderthals and anatomically modern humans did not interact in the region. Thus, the Caucasus' archaeological record is essential for understanding the key issues of Neanderthal disappearance and early dispersals of AMHs in West Eurasia.

Modern research also shows that the Caucasus' EUP industry had a highly developed microblade (bladelet) technology and tool types made on bladelets characteristic of the European Gravettian (backed pieces, Gravette and microgravette points), and was different from any variant of the Aurignacian tradition both in Europe and West Asia. This specific EUP industry appeared between 40 and 35 ka cal BP in both the Northern and Southern Caucasus, with the arrival of the first AMH groups.

The similarities between the EUP industry of the Caucasus and the Early Ahmarian industry of the Levant, as well as the apparent absence of

both Aurignacian and Gravettian in the Caucasus (see chapters Two and Four), suggest that there is a need to reassess the identity and origins of the Upper Palaeolithic in this region. Modern studies show that the Upper Palaeolithic industry of the Caucasus is similar but not identical to the Early Ahmarian industry (Golovanova and Doronichev, 2012b).

In comparison to the Levant and other regions, the Caucasus' archaeological record indicates distinct regional peculiarities and a specific pathway of Upper Palaeolithic development in this region. We identify this particular industry as the "Caucasus Upper Palaeolithic" industry (see Chapter Two). Based on long and continuous stratigraphical sequences from Mezmaiskaya cave, Dzudzuana cave, Satsurbliya cave, and Ortvale klde rockshelter, as well as the combined record from these and other sites, the Upper Palaeolithic of Caucasus can be subdivided into two major stages:

- (1) Early Upper Palaeolithic (EUP, ~39/38–30 ka cal BP); and
- (2) Late Upper Palaeolithic (LUP, ~30–20 ka cal BP).

These two stages in the development of the Caucasus Upper Palaeolithic industry are defined on the basis of notable changes in microblade flaking technology, stone tools, and bone artefacts.

After the LGM—a cold event from about 25 to 20 ka cal BP, which interrupted the Upper Palaeolithic occupation in many sites in the Caucasus—a new industry with geometric microliths emerged between ca. 20 and 11 ka cal BP in both the Southern and Northern Caucasus.

Some scholars use the term "Late Upper Palaeolithic" for the microlith-dominated Upper Palaeolithic industries with geometric forms postdating the LGM (Nioradze and Otte, 2000; Meshveliani et al., 2004; 2007; Pinhasi et al., 2014), or apply in parallel a French term "Paléolithique final" (Nioradze and Otte, 2000), or else use the terms "final Upper Palaeolithic" (Lioubine, 1992) or "Terminal Palaeolithic" (Bar-Yosef et al., 2011: tab. 1) to distinguish the post-LGM assemblages with geometric microliths from the earlier Upper Palaeolithic ones.

We were the first to apply the term "Epipalaeolithic" to the Caucasian Upper Palaeolithic assemblages dating between the LGM and the start of the Holocene, and containing variable geometric microlithic tools (Golovanova et al., 2014), following the Levantine scheme (e.g., Belfer-Cohen and Goring-Morris, 2014: tab. 3.3.1.). The term "Epipalaeolithic" avoids inconsistency between the Caucasian and the Near Eastern (first of all the Levantine) schemes which may be caused by the introduction of different terms, and it does fit the Upper Palaeolithic record of the Caucasus, whose common peculiar feature—the early appearance of microlithic geometric tools—has been conservatively stressed by all

scholars (Bader, 1984; Amirkhanov, 1986; Liubin, 1989; Golovanova et al., 2014) as an analogy with the Upper Palaeolithic of the Near East, particularly the Zagros and the Levant (see Chapters Three and Four).

In the Levant, the term "Epipalaeolithic" was introduced in the late 1960s (Perrot, 1968; Bar-Yosef, 1970) to separate Neuville's (1934) last Upper Palaeolithic phase VI from the Mesolithic Natufian. Nowadays, for the Levant, the term Epipalaeolithic designates all Upper Palaeolithic industries dating from the LGM to the beginning of the Holocene at ca. 11.5 ka cal BP and commonly characterized by a high proportion of microlithic tools made from bladelets, including abundant non-geometric backed pieces and geometric backed forms (Bar-Yosef and Belfer-Cohen, 2010; ; Belfer-Cohen and Goring-Morris, 2002, 2009, 2014).

In contrast to the Upper Palaeolithic sequence in Europe, the Upper Palaeolithic sequence in the Near East incorporates two major chronological units—the Upper Palaeolithic (with two sub-stages, the Initial Upper Palaeolithic, not represented in the Caucasus, and the Early Upper Palaeolithic) and the Epipalaeolithic (with three chronological sub-stages and several archaeological entities or cultural groups). The appearance of geometric backed microliths marks a significant cultural transformation: the "Upper/Epi-Palaeolithic transition" (Belfer-Cohen and Goring-Morris, 2014: 1383). This microlithic transformation occurred in the Near East about half way through the Upper Palaeolithic, bringing a distinct subdivision, the Epipalaeolithic, which is treated as the final chrono-cultural stage of the Upper Palaeolithic in West Asia.

By contrast, in Europe, most of the late Upper Palaeolithic industries with microlithic backed tools postdating the LGM, which are generally defined as "Epigravettian", lack geometric microliths. In most parts of Europe, geometric microliths appear much later than in the Levant and the Caucasus (see Chapter Four), during the early Holocene. In Europe, this cultural transformation is traditionally considered a separate period (the Mesolithic) lasting in some regions until the middle Holocene.

In general, as we summarize in chapters Four and Six, modern research indicates that the Upper Palaeolithic sequence of the Caucasus is similar (but not identical) to the Upper Palaeolithic–Epipalaeolithic cultural succession in the Near East, especially in the Levant, in both the character and timing of cultural and behavioural transformations. At the same time, the Caucasian Upper Palaeolithic differs from the Upper Palaeolithic–Mesolithic sequence in Europe.

CHAPTER TWO

THE UPPER PALAEOLITHIC RECORD OF THE CAUCASUS BEFORE AND DURING THE LAST GLACIAL MAXIMUM

Chronology and Environment

Since the mid-2000s, new data has begun to emerge that has changed our knowledge of the character and origin of the Upper Palaeolithic in the Caucasus (Meshveliani et al., 2004; Bar-Yosef et al., 2006, 2011; Adler et al., 2006a, 2006b, 2008; Golovanova et al., 2006; 2010a, 2010b; Golovanova and Doronichev, 2012b; Tushabramishvili et al., 2012a; Pinhasi et al., 2014; Pleurdeau et al., 2016; Kandel et al., 2017). The evidence from Mezmaiskaya cave in the Northern Caucasus, Dzudzuana, Bondi and Satsurbliia caves, and Ortvale Klde rockshelter in the Southern Caucasus, and Aghitu-3 cave in the Lesser Caucasus, as well as a few additional sites, has fundamentally changed our assessment of the chronological frameworks, palaeoenvironmental background, and cultural peculiarities of the Upper Palaeolithic occupation in the region before and during the Last Glacial Maximum (LGM), with important implications for our understanding of the development and spread of Upper Palaeolithic culture in West Eurasia.

Mezmaiskaya cave

Recent discoveries at Mezmaiskaya cave have given a new perspective on the Late Middle Palaeolithic (LMP) and Early Upper Palaeolithic (EUP) interface in the northwestern Caucasus (Golovanova et al., 2006; 2010a; Golovanova and Doronichev, 2012b). This new evidence indicates that the EUP was technologically and typologically quite distinct from the LMP of this region. At Mezmaiskaya, 25 radiometric (mostly AMS) dates have now been obtained by five different laboratories for the Upper Palaeolithic layers, including more recent AMS determinations using ultra-