

The Early and Mid-Upper Palaeolithic of the North Black Sea region: an overview

Das frühe und mittlere Jungpaläolithikum im nördlichen Schwarzmeergebiet: ein Überblick

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ABSTRACT - The Great North Black Sea region covers most of the southern part of Eastern Europe. During the Würmian Interpleniglacial and Upper Glacial the region formed a continuous belt of land from the eastern Balkans in the west to the northern Caucasus in the east. The Early and Mid-Upper Palaeolithic (EUP/MUP) periods in the region have been studied applying criteria and terminology standard in current European Palaeolithic research. The EUP period in the region has two stages and is dated from 36 000/35 000 to 29 000/28 000 BP. It features a prolonged geochronological coexistence of Late Middle Palaeolithic (Micoquian and Levallois-Mousterian) industries and Early Upper Palaeolithic (Szeletian *sensu lato* and Aurignacian) industries with the noticeable appearance of Aurignacian industries only during the period's second stage (ca. 32 000/30 000 - 29 000/28 000 BP). The latter fact does not support the acculturation model for the origin of local Early Upper Palaeolithic industries in the region. The MUP (ca. 28 000/27 000 and 19 000/18 000 BP) demonstrates hominin (Szeletian) presence in the region only during the very beginning of the period (ca. 28 000 - 26 000 BP) and at its very end (Epi-Aurignacian: ca. 22 000 - 18 000/17 000 BP). Accordingly, there was a hiatus in human occupation in the region from ca. 27 000/26 000 - 22 000/21 000 BP which is illustrated by the complete absence of Gravettian industries. The chronological and technological framework for the Early and Mid-Upper Palaeolithic periods of the region presented here helps understand better features they have in common with the general European Palaeolithic record but also others distinct from this.

ZUSAMMENFASSUNG - Das nördliche Schwarzmeergebiet umfasst einen großen Teil des südlichen Osteuropas. Während des Interpleniglazials und des jüngeren Glazials der Würm Eiszeit gehörte dieses Gebiet zu einer zusammenhängenden Landmasse vom östlichen Balkan im Westen bis zum nördlichen Kaukasus im Osten. Das frühe und mittlere Jungpaläolithikum (EUP/MUP) dieser Region wurden unter Anwendung der gültigen europäischen Kriterien und Terminologie untersucht. Das frühe Jungpaläolithikum kann in zwei Phasen unterteilt und in die Zeit von 36 000/35 000 bis 29 000/28 000 BP datiert werden. Kulturell wird diese Zeit durch das Nebeneinander von Industrien des spätem Mittelpaläolithikums (Micoquien und Levallois-Mousterien) und frühen Jungpaläolithikums (Szeletien *sensu lato* und Aurignacien) geprägt, wobei das Aurignacien nur in der jüngeren Phase (ca. 32 000/30 000 - 29 000/28 000 BP) auftritt. Dieses Ergebnis spricht gegen ein Akkulturationsmodell für den Ursprung des lokalen frühen Jungpaläolithikums. Für das mittlere Jungpaläolithikum (ca. 28 000/27 000 und 19 000/18 000 BP) kann menschliche Anwesenheit in der Region (Szeletien) nur für den frühen Abschnitt (ca. 28 000 - 26 000 BP) und für die ausgehende Phase (Epi-Aurignacien: ca. 22 000 - 18 000/17 000 BP) nachgewiesen werden. Es sieht so aus, als habe es zwischen ca. 27 000/26 000 und 22 000/21 000 BP einen Hiatus der menschlichen Besiedlung gegeben, was das Fehlen von Gravettien-Fundstellen erklären würde. Die hier vorgelegten chronologischen und technologischen Grundzüge des frühen und mittleren Jungpaläolithikums im nördlichen Schwarzmeergebiet ermöglichen es, Gemeinsamkeiten und Unterschiede im Rahmen des europäischen Jungpaläolithikums besser zu verstehen.

KEYWORDS - Great North Black Sea region, Late Middle Palaeolithic (LMP), Early Upper Palaeolithic (EUP), Mid-Upper Palaeolithic (MUP), Epi-Aurignacian
Nördliches Schwarzmeergebiet, spätes Mittelpaläolithikum (LMP), frühes Jungpaläolithikum (EUP), mittleres Jungpaläolithikum (MUP), Epi-Aurignacien

Introduction

This paper aims to shed light on fundamental Early Upper Palaeolithic (EUP) and Mid Upper Palaeolithic

(MUP) data and problems in southern Eastern Europe. This is a vast region, extending from the Crimean peninsula and the Lower Dniester river in the west, along the Lower Dnieper and Lower Don rivers to the north-western Caucasus in the east. In geographical terms, all these areas can be combined as the Great

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North Black Sea region, to some degree presenting an analogy with the Greater Mediterranean region (see Bar-Yosef & Pilbeam 2000), although at a much smaller territorial scale.

Palaeolithic studies of different but adjoining areas within one large geographical region offer possibilities for defining fundamental general and specific features of their Palaeolithic industries. Such investigations are particularly important for the south of Eastern Europe as a pendant to the usual micro-regional research tradition, in which the Crimea is usually analyzed separately from other northern Black Sea areas, and the Lower Don river and north-western Caucasus areas are generally considered as representing other, very different Palaeolithic provinces.

In palaeogeographical terms, the Great North Black Sea region formed a continuous but nevertheless heterogeneous belt of land containing the southernmost territories of Eastern Europe, extending from the eastern Balkans in the west to the northern Caucasus in the east. For the entire Würmian Upper Palaeolithic (UP) time range, ca. 40 000/35 000 - 12 000 BP (all dates given are uncalibrated) the region was united due to the considerable lowering of the level of the Black Sea by 30 - 90 m, and even by as much as 100 - 120 m (Alexeev et al. 1986: Fig. 46, p. 170-180; Velichko & Kurenkova 1990: Plate 1; Kaplin & Selivanov 2004). During the Last Glacial Maximum (LGM) Black Sea Novoeuxinian regression (18 000 - 17 000 BP), there was *"a low-lying coastal plain"* instead of the modern Sea of Azov and *"the mouth of the Don River was situated 50 km south of the Kerch Strait, whereas the mouths of the Dnieper and Danube rivers lay 200 km south of the present ones"*, while *"on the Caucasian coast, river mouths reached the heads of submarine canyons"* (Kaplin & Selivanov 2004: 23). Accordingly, the proposed concept of a Great North Black Sea region is highly relevant for analyzing various Palaeolithic technological and chronological assemblages in the territories of southern East Europe.

Studies of the region applying criteria and terminology standard in current European Palaeolithic analysis are certainly needed for the following reasons. On one hand, from the 1960s until today, archaeologists in the Ukraine, Moldova and Russia have normally used the convention of "archaeological cultures". Consequently, the standard terminology for pan-European Upper Palaeolithic technocomplexes such as the Aurignacian, Gravettian or Epi-Aurignacian has either been replaced by local Upper Palaeolithic terminology, or has been modified with reference to specific territorial and/or fundamental data. This has led to the creation of terms such as "Eastern Gravettian" (Amirkhanov 1998), of chronologically and technologically unclear and poorly defined "-oid" technocomplexes (e.g. the "Aurignacoid" one - see Anikovich 1991; 2003; 2005, but see contra Demidenko 2003b; 2004), or even, bizarrely seen in

the context of the European Upper Palaeolithic as a whole, to particular technological hybrids such as the "Gravettoid Epi-Aurignacian" and "Aurignacoid Epigravettian" (Sapozhnikov 2003, contra Demidenko & Nuzhnyi 2003-2004).

Furthermore, the Great North Black Sea region is very unusual in its use of criteria of geochronological periodization for the distinction between the EUP and MUP periods (see Stanko et al. 1989; Smolyaninova 1990; Stanko 1997). This idiosyncratic approach has reached its apogee in the 21st century, with many colleagues now dropping all application of the principles of an archaeological classification for the Upper Palaeolithic and defining it only in terms of geochronological periodization (Anikovich 2001; Krotova 2003; Sapozhnikov 2003; 2004). As a result of this approach, the EUP "period" in the region is dated from 34 000/32 000 to 23 000/22 000 BP, while the MUP "period" falls between 23 000/22 000 BP and 17 000/16 500 BP. This classification is very different from any other European one, in which the boundary between the EUP and MUP is normally placed ca. 30 000 - 28 000/27 000 BP and equated with the disappearance of Middle Palaeolithic and Aurignacian industries and the appearance of Gravettian ones, while the dividing line between MUP and the Late Upper Palaeolithic (LUP) lies ca. 22 000 - 19 000 BP and relates to the disappearance of the Gravettian and emergence of Epi-Aurignacian, Solutrean and Epigravettian industries during the LGM (see Mussi & Roebroeks 1996; Roebroeks et al. 2000). It is therefore clear that existing approaches to Upper Palaeolithic periodization will suggest that the Great North Black Sea region is unique within Europe, with a seemingly serious delay in Upper Palaeolithic development. That this is not true at all when standard European Palaeolithic chronological and technological criteria are applied will be shown below.

Using pan-European data, the current study is based primarily on stratified sites in the Great North Black Sea region with suitably clear geochronological determinations and technologically homogeneous artefact collections. In addition to such reference sites, the study will refer to others which are undated or have technologically heterogeneous finds, but which are also characterized by very indicative artefacts, as well as to other localities at which artefacts are either redeposited or only surface finds, but show clear technological analogies with the type sites and materials.

The geographical setting

The Great North Black Sea region itself is subdivided from West to East into the following five areas:

- 1) The western part of the Ukrainian North Black Sea region from the Lower Dniester river to the right-bank territory of the Lower Dnieper river
- 2) The Crimea

3) The eastern part of the Ukrainian North Black Sea region from the left-bank territory of the Lower Dnieper river to the northern part of the Sea of Azov

4) The eastern part of the Sea of Azov and the Lower Don river in Russia

5) The north-western Russian Caucasus

On physiographical criteria, the region is characterized by the Black Sea coastal lowland, the Crimea with its northern steppe and southern mountainous regions, the Sea of Azov coastal upland in the Ukraine and the southern spurs of the Donetsk mountain ridge, the Kuban river lowland and the Caucasian foothill areas in Russia. Furthermore, the studied area is bounded to the north by various Eastern European upland chains along the middle courses of the Dniester, Southern Bug, Dnieper and Don rivers. Finally, the palaeogeographical context of the analyzed region provides a good connection to Central Europe, which complements well the proposed novel comparative approach.

During the Würmian Interpleniglacial and especially the period of the LGM, the southern margin of the region was characterized by the total or partial absence of the water-filled basins of the modern Gulf of Odessa and Sea of Azov, among other marine features. The Crimea was not the modern peninsula but merely formed the central southernmost terrestrial area of a region connected to areas further west and east by the Danube and Kuban rivers (flowing from west to east and east to west respectively). For this reason, the Great North Black Sea region should definitely be included in any discussion of the eastern extension of so-called "Danube Corridor" hypothesis (Conard & Bolus 2003), with the implication that Aurignacian early *Homo sapiens* could not only have entered Europe in a westerly direction, but also have followed an easterly route. Representatives of *Homo sapiens* would thus have been able to pass through the Danube Valley to its mouth, with easy access to the Crimea and then follow the Kuban valley into the north-western Caucasus.

The EUP period in the Great North Black Sea region

The beginning of the UP in Eastern Europe is remarkable for a rather lengthy coexistence of Late Middle Palaeolithic (LMP) and EUP complexes, which was recently well documented by V. P. Chabai (2000; 2003; 2004). Taking into account the disappearance of LMP industries ca. 29 000/28 000 BP and the first appearance of UP industries ca. 38 000/36 000 BP, Chabai has proposed a chronological framework of approximately 10 000 years for the Transitional period from Middle to Upper Palaeolithic (alternatively described as the EUP period with the survival of some LMP complexes) in Eastern Europe.

Furthermore, he subdivided the period into two stages defined by the appearance of Aurignacian industries in Eastern Europe and using available geochronological data, the first of these occupying the Les Cottés Interstadial and the stadial between the Hengelo and Arcy Interstadials, the second one within the Arcy Interstadial (*sensu lato*, including the Maisières Interstadial). By applying Chabai's data to the Great North Black Sea region (with some additions and modifications) two chronological stages of the Transitional/EUP period can be proposed (see Demidenko 2007).

First Transitional/EUP Stage (Les Cottés Interstadial and Hengelo - Arcy Stadial: 36 000/35 000 - 32 000/31 000 BP)

The first Transitional/EUP Stage extends from ca. 36 000/35 000 to 32 000/31 000 BP, geochronologically preceding the Arcy Interstadial, and is represented by sites in the Crimea, the north-western Caucasus and possibly the eastern part of the Sea of Azov and the Lower Don river area (Figs. 1 & 2, see next page).

LMP sites are well established for this period in the Crimea and the north-western Caucasus. Two industries are known from the Crimea: the Micoquian, with a bifacial "plano-convex" tool tradition and minimal core preparation, and the Western Crimean Mousterian of Levallois-Mousterian type, with Levallois and blade core primary reduction methods but no bifacial tools.

The Micoquian is represented at a series of Crimean sites: Zaskalnaya V, layer 2; Zaskalnaya VI, layers II-III A; possibly also at Prolom I and Kiik-Koba (upper layer). At present, the Western Crimean Mousterian occurs only at the Kabazi II site, in levels II/7-II/1A.

The north-western Caucasian record documents only Micoquian complexes for this time range at Mezmaiskaya, levels 2-2A and Matuzka, levels 4B-4C. Although the eastern part of the Sea of Azov and the Lower Don river do not contain any unambiguous *in situ* and/or well-dated LMP sites, their presence there cannot be excluded and it is the present author's opinion that redeposited Middle Palaeolithic artefacts at Marieva Gora, near the Mius river and finds from geochronologically unclear Middle Palaeolithic levels at the Biryuchiya Balka 1a and 2 sites on the lower course of the Seversky Donets river show clear technological analogies with materials of levels II/7-II/1A at Kabazi II in the Crimea (Demidenko 2007).

EUP complexes from the first Transitional/EUP Stage are only known for level C of Buran-Kaya III (Crimea), and possibly from the lower UP levels at Biryuchiya Balka 2, levels 3a-36 (eastern part of the Sea of Azov and Lower Don river). It is noteworthy that the find complexes at both sites belong to an identical Szeletian (*sensu lato*) industry, referred to the so-called "Eastern Szeletian" at Buran-Kaya III and the



Fig. 1. The Great North Black Sea region: During the Early Upper Palaeolithic (EUP) period (36 000/35 000 BP - 29 000/28 000 BP) site locations are restricted to the three areas of the Crimea, the eastern part of the Sea of Azov and Lower Don river and the north-western Russian Caucasus. Broken lines show the ancient low sea level shore line and probable courses of major rivers.

Abb. 1. Das nördliche Schwarzmeergebiet: Im frühen Jungpaläolithikums (EUP) (36 000/35 000 BP - 29 000/28 000 BP) beschränkte sich die Verbreitung der Fundplätze auf das Gebiet der Krim, den östlichen Teil des Azov-Sees und den Unterlauf des Don mit dem russischen Teil des nordwestlichen Kaukasus. Die gestrichelte Linie gibt die damalige Uferlinie mit einem niedrigen Meeresspiegel und den vermutlichen Verlauf der Flüsse an.

“Kostenki-Streletskaia culture” at Biryuchiya Balka 2.

Geochronologically, level C at Buran-Kaya III is assigned by AMS dates on an unmodified bone and 2 bone tools (OxA-6672: 32 350 ± 700, OxA-6868: 36 700 ± 1 500, OxA-6869: 32 200 ± 650), by micro-faunal data (Markova 2004) and by a sequence of pollen records (Gerasimenko 2004) to the interpleni-

glacial stadial preceding the Arcy Interstadial (Chabai 2000; 2004). Moreover, it has been proposed by P. Pettitt (1998: 332) on the basis of two standard deviations (95% confidence) of OxA-6869 and OxA-6672 that this represents the interval between 33 750 and 30 950 BP. The artefacts from Buran-Kaya III, level C, are primarily characterized by bifacial

Regions		1) Western part of Ukrainian North Black Sea region	2) The Crimea	3) Eastern part of the Ukrainian North Black Sea region	4) Eastern part of the Sea of Azov and Lower Don river in Russia	5) North-western Russian Caucasus
Industries						
Early Upper Palaeolithic (EUP)	Szeletian (sensu lato)		Buran-Kaya III, level C		Biryuchiya Balka 2, levels 3a-36	
Late Middle Palaeolithic (LMP)	Micoquian		Zaskalnaya V, layer 2; Zaskalnaya VI, layers II-IIIa; Kiik Koba, upper layer; Prolom I			Mezmaiskaya, levels 2-2A; Matuzka, levels 4B-4C
	Western Crimean Mousterian		Kabazi II, levels II/7-II/1A		Biryuchiya Balka 1a and 2; Mariéva Góra, redeposited	

Fig. 2. The Great North Black Sea region during the First Transitional/EUP Stage (Les Cottés Interstadial and Hengelo - Arcy Stadial) 36 000/35 000 BP - 32 000/31 000 BP: chronological and technological framework.

Abb. 2. Das nördliche Schwarzmeergebiet während der älteren Phase der Übergangsstufe/des frühen Jungpaläolithikums (EUP) (Les Cottés Interstadial und Hengelo - Arcy Stadial) 36 000/35 000 BP - 32 000/31 000 BP: chronologischer und technologischer Rahmen.

Regions Industries		1) Western part of Ukrainian North Black Sea region	2) The Crimea	3) Eastern part of the Ukrainian North Black Sea region	4) Eastern part of the Sea of Azov and Lower Don river in Russia	5) North-western Russian Caucasus
Early Upper Palaeolithic (EUP)	Late/Evolved Aurignacian with no retouched micro-liths 28 000 - 30 000 BP					Gubski I, lower UP layer; Monasheskaya Cave
	Late/Evolved Aurignacian of Krems-Dufour type 28 000 - 30 000 BP		Siuren I middle layer/F			
	Early/Archaic Aurignacian of Krems-Dufour type 30 000 - 31 000 BP		Siuren I lower layer/H & G		Chulek I	Kamenno-mostskaya Cave, lower layer; Shyrokiy Mys, redeposited
	Szeletian (sensu lato) 28 000 - 32 000 BP				Biryuchiya Balka 2, level 3	
Late Middle	Micoquian		Buran-Kaya III, level B			
Palaeolithic			Siuren I lower layer/H & G			
(LMP)			Zaskalnaya V, layer I			
			Prolom I, upper sediments			
	Western Crimean Mousterian		Kabazi II, levels A3A-A4			

Fig. 3. The Great North Black Sea region during the Second Transitional/EUP Stage (Arcy Interstadial) 32 000/30 000 BP - 29 000/28 000 BP: chronological and technological framework.

Abb. 3. Das nördliche Schwarzmeergebiet während der jüngeren Phase der Übergangsstufe/des frühen Jungpaläolithikums (EUP) (Arcy Interstadial) 32 000/30 000 BP - 29 000/28 000 BP: chronologischer und technologischer Rahmen.

“bi-convex” leaf points, bifacial trapezes, end-scrapers (including some fan-shaped ones) and a series of worked bone tubes (Chabai 2000; 2003; 2004; Monigal 2004; Laroulandie & D’Errico 2004).

The situation for the Biryuchiya Balka 2 site is much more complicated, as all site data are still preliminary, but its archaeological material seems typical of a workshop context due to the site location at a flint outcrop (Matyukhin 1998; 2002a; 2002b; 2004). Nevertheless, it is possible to make some observations. Archaeological levels 3a-36 are deposited in “a yellowish loam” (lithological stratum 5) and characterized by a limited number of artefacts (Matyukhin 1998). Primary lithic reduction is reflected by the presence of parallel non-volumetric cores and a low proportion of blades (9.8%). The tool-kits contain only 15 items “represented by side-scrapers, end-scrapers and triangular points”; also illustrated is a characteristic bifacial “bi-convex” triangular concave-based point with missing terminal part (Matyukhin 1998). Such technological features correspond well generally to those of the “Kostenki-Streletskaya culture” (Anikovich 1991; 2003). The stratigraphical sequence, some pollen data and the known chronology of the

“Kostenki-Streletskaya culture” suggest the possibility that levels 3a-36 in stratum 5 can be connected geochronologically to a stadial preceding the Bryansk Interstadial, ca. 34 000 - 30 000 BP (Demidenko 2007).

Such a geochronology for the two Szeletian (sensu lato) sites would support Chabai’s (2003; 2004) hypothesis of a generic connection between the early “Kostenki-Streletskaya culture” complex and the Buran-Kaya III “Eastern Szeletian” and the suggestion of a possible migration of Szeletian humans from the Middle Don river area into the Crimea ca. 32 000 BP, keeping in mind the geographically transitional location of Biryuchiya Balka 2.

In summary, the first stage of the Great North Black Sea region EUP is characterized by the geochronological coexistence of two LMP (Micoquian and Levallois-Mousterian) and one EUP (Szeletian sensu lato) industries.

Second Transitional/EUP Stage (Arcy Interstadial: 32 000/30 000 - 29 000/28 000 BP)

The second Transitional/EUP Stage is defined by in situ and redeposited sites from the Crimea, the north-

western Caucasus and, possibly, also the eastern part of the Sea of Azov and Lower Don river area. Geochronologically, it is the time of the Arcy Interstadial *sensu lato* (32 000/30 000 - 29 000/28 000 BP). Again, this stage is characterized by the presence of both LMP and EUP industries (Figs. 1 & 3).

The LMP is only reliably known at Crimean sites and is again represented by both Micoquian and Western Crimean Mousterian industries. The latest Micoquian can be traced in materials from Buran-Kaya III (layer B), the few Middle Palaeolithic artefacts from Siuren I (Lower layer: 1920s excavations/Units "H" and "G": 1990s excavations), Zaskalnaya V (layer I) and perhaps Prolom I (upper culture-bearing sediments). The latest Western Crimean Mousterian, with blade reduction but no Levallois component, has been found only at Kabazi II, levels A3A-A4.

It is argued that an Early/Archaic Aurignacian of Krems-Dufour type is geochronologically synchronous with these different Crimean LMP industries. Techno-typologically, the former industry is characterized by the regular presence of carinated cores and end-scrapers but no, or very rare, carinated burins, a prevalence of angle and truncation burins over dihedral ones, the most typical of Dufour bladelets of the Dufour sub-type with alternate retouch, and the characteristic occurrence of some Font-Yves/Krems points among the "non-geometric microliths".

The site of reference for this Aurignacian industry in the Great North Black Sea region (and indeed for the whole of Eastern Europe) is Siuren I (Crimea), with numerous UP finds from the Lower layer (1920s excavations) and Units "H" and "G" (1990s excavations) (Demidenko et al. 1998; Demidenko & Otte 2000-2001; 2007; Demidenko 2002b). This Aurignacian-type industry is also documented for the eastern part of the Sea of Azov and Lower Don river area (Chulek I surface finds) and represented in the north-western Caucasus by UP finds from Kamennomostskaya cave (lower layer) and the Shyrokij Mys redeposited site with mostly UP surface finds (Demidenko 2000-2001; 2007; Shchelinsky 2007).

One other EUP complex in the region which could well have been the geochronological contemporary of the Crimean LMP industries is represented by much material from level 3 of Biryuchiya Balka 2 (eastern part of the Sea of Azov and Lower Don river) probably dated to the Bryansk Interstadial (equivalent to the Arcy Interstadial, *sensu lato*) (see Demidenko 2007). The artefact complex (see Matyukhin 1998) features "a dominance of single- and double-platform core parallel non-volumetric primary flaking method", with a low blade index (on average ca. 10% for 3 different loci) and, from a typological point of view, the following characteristic and numerically abundant types: simple and fan-shaped end-scrapers, bifacial "bi-convex" triangular points and various of their preforms, whereas burins and scalariform tools are few in number with no serial occurrence of types.

Moreover, some "side-scrapers" are in fact preforms of bifacial points. These Biryuchiya Balka 2 materials are thus closely related archeologically to the "Kostenki-Streletskaia culture".

Accepting the represented archaeological and chronological data, the second Transitional/EUP Stage in the Great North Black Sea region EUP is characterized not only by the geochronological coexistence of LMP (Micoquian and Levallois-Mousterian) and EUP (Szeletian *sensu lato*) industries but also, for the first time, the appearance of the Aurignacian. Accordingly, as has been noted for the whole of Eastern Europe (Chabai 2003; 2004; 2006), the Aurignacian was not chronologically among the first EUP complexes in the Great North Black Sea region. The often assumed role of the Aurignacian in an acculturation process leading to a local origin of the EUP following interaction between Middle Palaeolithic Neanderthals and Aurignacian *Homo sapiens* is therefore more than doubtful for the region. Rather, the geochronological coexistence of various LMP and EUP industries in the Great North Black Sea region during both stages of the Transitional/EUP period must be postulated. This very probably did not take the form of a literally synchronous co-occurrence of LMP and EUP humans in one and the same area, or even micro-area, but occurred in the form of alternating and discrete occupations. Such a situation is well illustrated by a series of intermittent visits to Siuren I rock-shelter (Crimea) by Aurignacian *Homo sapiens* and Micoquian Neanderthals during the period of rapid sedimentation of the Lower layer (1920s excavations) = Units "H" and "G" (1990s excavations) (Demidenko 2000). Furthermore, the Micoquian layer B and "Eastern Szeletian" level C at Buran-Kaya III rock-shelter are even more suggestive in this sense, since here the Upper Palaeolithic level is deposited stratigraphically below the Middle Palaeolithic one. This model is also strongly supported by the clear absence of any recognizable features due to mutual influence in the flint artefact material of the geochronologically contemporary LMP and EUP industries (Chabai 2000; 2003; 2004; 2006; Demidenko 2006; 2007).

The interstadial second Transitional/EUP Stage in the Great North Black Sea region EUP is also characterized by a second group of Aurignacian complexes in the Crimea (Siuren I Middle layer of the 1920s excavations/Unit "F" of the 1990s excavations) as well as at Gubski I rock-shelter (lower UP layer) and Monasheskaya cave (with redeposited Aurignacian artefacts in Middle Palaeolithic culture-bearing sediments), both in the north-western Caucasus.

At present it is not possible to define with any precision a geochronological position for these Aurignacian find complexes within the Arcy Interstadial *sensu lato* (32 000/30 000 - 29 000/28 000 BP), although a solution to this chronological question is of great importance for understanding the technological and chronological structure of the EUP for the entire

Great North Black Sea region. However, it is highly likely that the respective culture-bearing sediments at Siuren I and Gubski I rock-shelters can be related to the Maisières Interstadial (29 000 - 28 000 BP: see data in Haesaerts 2004; Haesaerts & Damblon 2004 for the Maisières-Canal type site in Belgium) for the following reasons. The assemblage from Siuren I Middle layer (1920s excavations)/Unit "F" (1990s excavations) is attributed to a classic Eastern European Late/Evolved Aurignacian of Krems-Dufour type (with Dufour bladelets of Roc de Combe sub-type) and is located stratigraphically above the lowermost culture-bearing deposits containing both Micoquian and an Early Aurignacian with Dufour bladelets of Dufour sub-type. Furthermore, the Siuren I Middle layer (Aurignacian-bearing) sediments do not contain any Middle Palaeolithic artefacts (Demidenko 2000; 2002b), which, albeit on "absence of evidence", might indirectly point to the absence of Middle Palaeolithic Neanderthals in the Crimea for that time period. The Maisières Interstadial suggestion becomes still more probable by taking into account unpublished data on the interstadial microfauna (A.K. Markova) and malacofauna (C. Mikhailetsku).

It should be borne in mind that these Crimean and north-western Caucasian Aurignacian complexes are techno-/typologically related to the Late/Evolved Aurignacian, with characteristic consistently carinated burins and end-scrapers and associated with indicative pieces such as Dufour retouched bladelets of Roc de Combe sub-type at Siuren I, although without these at Gubski I rock-shelter and Monasheskaya cave. These features are the most significant typological and chronological markers for the European late Aurignacian. Indeed, while the European Early/Archaic Aurignacian is dated to 38 000/36 000 - 30 000 BP, the European Late/Evolved Aurignacian falls in the range between 33 000/32 000 and 28 000 BP (see Rigaud 1993; 2000; Zilhão & D'Errico 1999; Le Brun-Ricalens 2005).

It might be questioned if additional natural scientific data, whether for the described sites with Aurignacian levels or potential new sites in the Great North Black Sea region, might in future identify a third, separate and later interstadial Transitional/EUP stage in which there is no geochronological overlap with LMP industries. However, this possibility can now be ruled out, since the Late/Evolved Aurignacian in neighbouring western and northern regions has been well dated geochronologically by a range of natural scientific data to the Arcy Interstadial (*sensu lato*), eg. at Mitoc-Malu Galben, levels 12b-8b (Middle Prut river area) to ca. 33 000/32 000 - 28 000/27 000 BP (Haesaerts et al. 2003; Haesaerts 2007), and Kostenki XIV, cultural level in volcanic ash horizon (Middle Don river area), to ca. 32 000 BP (Sinitsyn 2003). Moreover, with the precision of current absolute dating methods it can simply be too hazardous to define an Upper Palaeolithic stage at a resolution of ca. 1 000 years'

duration (see Demidenko & Nuzhnyi 2003-2004; Chabai 2004) unless in combination with a series of distinct archaeological levels in colluvial, alluvial, aquatic or loess sequences several meters in depth and with detailed stratigraphical subdivisions of geological strata, such as those at Kabazi II, Molodova V, Mitoc-Malu Galben, Cosautsi (see Gerasimenko 1999; Chabai 2004; Haesaerts et al. 2003; Haesaerts 2007). At present, the hypothesis of a third EUP stage in the Great North Black Sea region (with only Late/Evolved Aurignacian archaeological contexts) remains purely speculative and Chabai's approach of assigning both the Latest Middle (LMP) and the earliest Upper (EUP/UP) Eastern Europe Palaeolithic to a common (interstadial) Transitional/EUP Stage appears more objective.

In summing up the chronological structure of the EUP in the Great North Black Sea region, the long (up to 7 000/8 000 years) geochronological coexistence of LMP industries (Micoquian Neanderthals) and EUP industries, with the addition of Aurignacian *Homo sapiens* in its second stage, can be specially emphasized, although it should be observed that no hominin remains have yet been found associated with Levallois-Mousterian and Szeletian (*sensu lato*) industries.

It is also worth noting one more important aspect of the Upper Palaeolithic here. Although the neighbouring regions of Central Europe and the western part of Eastern Europe (e.g. Molodova V, Middle Dniester river area) are well characterized by Early Gravettian occurrences at 30 000 - 28 000 BP, not a single Early Gravettian assemblage is represented in the EUP Stage record of the Great North Black Sea region. In view of this, it is possible to argue that the Great North Black Sea region, indeed the whole of Eastern Europe (with the exception of Early Gravettian levels 10 - 9 at Molodova V) did not lie within the area of Early Gravettian distribution, although, in view of the broad representation of Gravettian industries almost everywhere throughout Europe ca. 27 000 - 22 000/20 000 BP, we might logically expect the appearance of Gravettian industries at a somewhat later date in the Great North Black Sea region, (see Amirkhanov 1998; Roebroeks et al. 2000).

As a final point, it seems impossible not to interpret the total absence of reliable sites with LMP and EUP artefacts in the Ukrainian steppe areas of the North Black Sea region as the expression of a major regional hiatus in settlement.

The MUP period in the Great North Black Sea region (28 000/27 000 and 19 000/18 000 BP)

Archaeologically, the MUP begins at a time when LMP and Aurignacian industries had already gone and ends with the disappearance of Gravettian industries and the first appearance of Epigravettian ones. In the Great North Black Sea region the MUP chronology falls between 28 000/27 000 and 19 000/18 000 BP. This

archaeological and chronological framework corresponds well to the basic UP technological-chronological sequence not only of Eastern, but also of Central Europe.

There are, of course, a few exceptions to this succession, but these only represent slight irregularities within the development of Palaeolithic material culture, perhaps in cases where certain human communities retained their principal flint working methods longer and without significant changes, perhaps because they were best adapted to unchanged landscapes and climatic living conditions. The long duration of the LMP in the Great North Black Sea region might also be included among examples of this phenomenon, while there are also some good indicative cases for the East European EUP. Regarding the Aurignacian, it is important to point out a single case for the very late survival of a fully European Aurignacian assemblage at Kostenki I, layers II-III (Middle Don river area), dated to ca. 26 000/25 000 BP (Sinitsyn 1993; Damblon et al. 1996; Demidenko 2004), which contrasts with a general survival of the Aurignacian (*sensu stricto*) in Europe no later than the Maisières Interstadial (ca. 28 000 BP). In the case of the Gravettian, the most striking late example comes from the fourth occupational stage of the Zaraisk "Kostenki-Avdeevo culture" site dated to ca. 18 000 - 16 000 BP (Amirkhanov 2000). The chronological termination of the MUP is linked archaeologically to the appearance of Early Epigravettian industries around 19 000/18 000 BP, although it is proposed that Epi-Aurignacian industries should be interpreted as still representing the final stage of the MUP, with their existence limited to the LGM (ca. 22 000/21 000 - 18 000/17 000 BP). The MUP period in the Great North Black Sea region can thus be summarized by the following technological-chronological sequence.

Firstly, there are no concrete data for the presence of any LMP and Aurignacian industries in the region at this time. However, of the technologically variable preceding EUP complexes, the Szeletian "Kostenki-Streletskaya culture" industry might possibly have continued to be present during the MUP (Demidenko 2007), e.g. Level 2 (ca. 28 000 - 26 000 BP) at Biryuchiya Balka 2 in the Lower Severskiy Donets river micro-region (eastern part of the Sea of Azov and Lower Don river). Nevertheless, even this assemblage dates to the very beginning of the MUP period, in the final stage of the Würmian Interpleniglacial.

It would be logical to expect the presence of various Gravettian industries in the Great North Black Sea region during the period 27 000/26 000 - 20 000 BP, considering that the study area forms the south-eastern extension of Europe. However, the situation regarding UP sites and industries for this time period in the Great North Black Sea region is in many respects diametrically opposite to the known data for most other European regions. There are two basic peculiarities here.

First of all, throughout the whole region, no reliable data for the period 27 000/26 000 - 23 000/22 000 BP attest to the presence of in situ sites or even find spots with typologically indicative Gravettian artefacts. Moreover, it is crucial to emphasize not only the complete absence of Gravettian industries, but of any kind of UP industries in the region at this time. Of course, it may reasonably be argued that field studies have been insufficient in the region, especially remembering that almost no part of Eastern Europe has been investigated archaeologically as well as most regions of Western and Central Europe. However, it seems that this explanation does not reflect the truth, since the other Palaeolithic periods are represented by enough sites in the region at other times. Hence, there are strong arguments that the Great North Black Sea region was depopulated by UP humans during the first half of the Würmian Late Pleniglacial between 27 000/26 000 and 23 000/22 000 BP.

In view of this problem of the missing Gravettian in the Great North Black Sea region, it is clearly necessary to attempt to identify potentially in situ and dated Gravettian sites within the period 27 000 - 20 000 BP by multi-disciplinary investigations, however so far, only the third "artificial excavation level" of the Upper Layer (1920s excavations)/Level "D" (1990s excavations) at Siuren I rockshelter (Crimea) has been hypothetically identified as Late Gravettian on the basis of techno-typological criteria applied to the few recovered artefacts (Demidenko 2002a; 2003a). Technologically, the most significant artefacts in this complex have no analogies in the Epigravettian industries of the Crimea or in the Great North Black Sea region as a whole. They comprise elongated blade and/or bladelet double-platform bidirectional cores, an elongated Gravette point with truncated base, truncated blades and bladelets, a micro-saw with backed retouched edge, two *pièces à cran* on a blade and a bladelet and two bidirectionally backed bladelets. Nevertheless, even if the Siuren I Late Gravettian episode is a reality, it still only represents one solitary (and late) Gravettian assemblage for all of the five areas in the region under study. On the other hand, if the possibly Late Gravettian finds from Siuren I are not taken into consideration, the MUP cultural-chronological hiatus in the Great North Black Sea region would cover a total period of 4 000 - 6 000 years, from 27 000/26 000 to 22 000/21 000 BP.

It is important to view the archaeological data against the record of palaeoclimatic change established for the period. Following the basically temperate and humid climatic conditions of the Arcy-Maisières Interstadial (ca. 31 000 - 28 000 BP), temperatures fell gradually throughout Europe between 27 000 and 22 000 BP until a period of extreme cold was subsequently reached at ca. 19 000 - 17 000 BP, allowing many natural scientists to speak of an overall duration of the LGM from ca.

22 000/21 000 to 18 000/17 000 BP (see data in Soffer & Gamble 1990).

Interestingly enough, several sites occupied during the very harsh climatic conditions of the LGM are known from two areas of the Great North Black Sea region (the western part of the Ukrainian North Black Sea region and the eastern part of the Sea of Azov and Lower Don river in Russia). They are characterized by "Aurignacoid" assemblages with peculiar tiny retouched microliths, which the current author has recently named the "North Black Sea region Epi-Aurignacian of Krems-Dufour type" (Demidenko 1999; 2002b; 2004; 2006; 2007). Site and assemblage characteristics can be very briefly described as follows:

The area of the southern Bug river and the Dniester river outlet (Ukraine) yielded an in situ assemblage from Sagaidak I, lower level, with uniform Epi-Aurignacian finds and ^{14}C dates on a mammoth tooth sample of $21\,240 \pm 200$ BP (LE-1602a) and $20\,300 \pm 200$ BP (LE-16026) (Stanko & Grigorieva 1977). The assemblage from the Anetovka I site, although redeposited, contains technologically uniform Epi-Aurignacian artefacts (Stanko et al. 1984), while at two further sites (Bolshaya Akkarzha, Ivashkovo VI) the same Epi-Aurignacian artefact components are technologically mixed with other UP and/or Final Palaeolithic and Mesolithic finds (see Demidenko & Nuzhnyi 2003-2004).

In Russia (Mius armlet, Lower Don river, Severskiy Donets river outlet) two sites (Muralovka and Zolotovka I) investigated by complex natural scientific methods (Praslov & Filippov 1967; Praslov 1972; Praslov et al. 1980; Praslov & Shchelinsky 1996) and another site (Mikhailovskaya Balka) only recently studied and with very preliminary results (Matyukhin 2002c) also have the same uniform Epi-Aurignacian assemblage type. The archaeological level at Muralovka was deposited within a weakly developed palaeosol of LGM age and two ^{14}C results on bison bone samples date it to the period 20 000 - 18 000 BP (LE-1601: $19\,630 \pm 200$ BP; LE-1438: $18\,780 \pm 300$ BP). Taking the pollen record into account (Spiridonova 1991), it is possible to suggest two geochronological positions for the archaeological level of Muralovka I: either the Gmelin Interstadial (ca. 22 000 - 21 000 BP), or the Laugerie (20 000 - 18 800 BP) and Cosautsi VI (19 400 - 19 200 BP) Interstadials (see Demidenko 2007).

There are two ^{14}C dates for Zolotovka I (GIN-1963: $17\,400 \pm 700$ BP on a charcoal sample; GIN-8002: $13\,600 \pm 1000$ BP on a bison bone), the latter of which is commonly regarded as too young. Geological and pollen data allowed N. D. Praslov and V. E. Shchelinsky to suggest a post-LGM geochronological position for the site archaeological level, although a fully LGM age also cannot be ruled out.

The basic technological characteristics for this Epi-Aurignacian industry are as follows. Technologically,

there is a major tendency to the production of tiny micro-blades from both bladelet cores and atypical (non-lamellar treatment) carinated end-scrapers. Although a few blades are present among the debitage and tool-blanks, it is clear that these were removed only during initial shaping of the bladelet cores and not as intended products. Simple end-scrapers and burins (mainly on angles and truncations) were usually manufactured on flakes and flakes were also produced during bladelet core preparation. Regarding the peculiarities of the tool spectrum, it is worth noting the rare occurrence of dihedral burins and the existence of rather specific transversal burins on lateral retouch.

One of the most indicative typological features is the presence of tiny pseudo Dufour microliths made on chips and shortened microblades, the latter with marginal dorsal abrasion retouch and flat, but not twisted, profiles. There is a clear technological connection between the carinated atypical end-scrapers and the microliths, with the end-scrapers serving functionally as cores for the production of the tiny blanks for the microliths. The noted techno-typological features for this Epi-Aurignacian industry differentiate it greatly from both any truly Aurignacian industries and from Gravettian or Epigravettian ones. This makes it easy to recognize an Epi-Aurignacian component within the archaeologically heterogeneous find complexes of the Ukrainian Bolshaya Akkarzha and Ivashkovo VI sites, and also within those containing predominantly Epigravettian artefacts, e.g. Rashkov VII and VIII sites in Moldova (see Demidenko & Nuzhnyi 2003-2004). It is important to emphasize that the "Epi-Aurignacian" attribution of this LGM Upper Palaeolithic industry in the Great North Black Sea region under study is certain. Its techno-typological status is demonstrated by the presence of two quite specific Aurignacian (*sensu lato*) typological features, the carinated atypical end-scrapers and quite specific microliths, but it is equally clearly chronologically separation from Aurignacian (*sensu stricto*) industries by a period of at least 6 000 years.

It is possible to identify two further Epi-Aurignacian industries in the western part of the Ukrainian North Black Sea region. One of them (see Demidenko 2004) is recognized at the Leski site on the middle course of the Southern Bug river (Smolyaninova 1990). Partly disturbed by erosional processes, the cultural level there is buried within uniform loess sediments and its geochronological position is determined by ^{14}C dates and characteristic artefacts. Two ^{14}C dates on mammoth tooth samples (LE-4456: $23\,770 \pm 1540$ BP; LE-2946: $19\,200 \pm 200$ BP) point to the LGM period. The tool kit recovered at the site is characterized primarily by the great dominance of burins (no less than 60%, not taking into account pieces with marginal and/or irregular retouch), a few simple end-scrapers, some combined tools and retouched blades. Approximately half of the burins are serially worked pieces

and numerous carinated specimens, while most of the remaining ones are dihedral. The flint assemblage does not contain any pieces indicative of the Gravettian and Epigravettian (e.g. backed tools) or of the previously described Epi-Aurignacian type (e.g. carinated atypical end-scrapers and the known specific microliths), however the combination of absolute dates and artefact characteristics has led the present author to identify the Leski material as Epi-Aurignacian (Demidenko 2004). This technological-chronological attribution finds some support in Central Europe, where quite a few Epi-Aurignacian sites of similar LGM age are known from the Czech Republic (a number of surface find spots in Moravia), Austria (above all at Langmannersdorf) and Germany. Assemblages of this type show a dominance of carinated and other multi-faceted, but also dihedral burins, while carinated end-scrapers and backed tools are either totally absent or very few in number.

Furthermore, the current author (Demidenko 2004) has proposed that the industries from Zelenyi Khutor I and II (Lower Dniester river), both represented only by surface finds of flint artefacts (Stanko et al. 1989; Sapozhnikov 1994), can also be assigned to the Epi-Aurignacian. These tool assemblages are characterized by the following indicative types: a number of distinctive carinated end-scrapers, serially

worked carinated and multifaceted burins, and so-called "Klimautsy-type" points. A similar combination of tool types is presently well known from some southern Moravian and Ukrainian Transcarpathian Epi-Aurignacian assemblages (Oliva 1987; 1993; Demidenko 2003b), where "Klimautsy type" points, in particular, correspond morphologically to Lhotka-type end-scrapers, with their elongated and very narrow "nosed-like" tip due to lamellar removals, as defined by M. Oliva. The present catalogue of sites for studies of this proposed Epi-Aurignacian type might be enlarged in future by surface finds from the Lyubimovka I and Peremoga I find spots along the Lower Dnieper river (Olenkovskiy 1991), as well as from the Klimautsy I and II sites in the region of the Middle Dniester (Moldova) (Borziyak 1981; Covalenko & Ketraru 1999). Of the latter sites, Klimautsy II contains two archaeological layers and interdisciplinary investigations at this site may lead to its material becoming of pivotal importance for this Epi-Aurignacian type.

Overall, the Epi-Aurignacian of the Great North Black Sea region can be summarized as follows (Figs. 4 & 5): Two types of Epi-Aurignacian (Krems-Dufour and Leski) basically correlate geochronologically with the LGM period, ca. 22 000/21 000 - 18 000/17 000 BP. Taking into consideration typological analogies



Fig. 4. The Great North Black Sea region: During the Mid-Upper Palaeolithic (MUP) period (28 000 BP - 18 000 BP) site locations are restricted to the western and eastern parts of the Ukrainian North Black Sea region and the eastern part of the Sea of Azov and Lower Don river. Broken lines show the ancient low sea level shore line and probable courses of major rivers.

Abb. 4. Das nördliche Schwarzmeergebiet: Im mittleren Jungpaläolithikum (MUP) (28 000 BP - 18 000 BP) sind die Fundstellen im westlichen und östlichen Teil der ukrainischen, nördlichen Schwarzmeerregion sowie im östlichen Teil des Azov-Sees und am Unterlauf des Don verbreitet. Die gestrichelte Linie gibt die damalige Uferlinie mit einem niedrigeren Meeresspiegel und den vermutlichen Verlauf der Flüsse an.

Regions Industries		1) Western part of Ukrainian North Black Sea region	2) The Crimea	3) Eastern part of the Ukrainian North Black Sea region	4) Eastern part of the Sea of Azov and Lower Don river in Russia	5) North-western Russian Caucasus
End of Mid-(MUP)/beginning of Late (LUP) Upper Palaeolithic	Epigravettian (various industry types) 15 000 - 17 000 - 19 000 BP	Bolshaya Akkarzha; Anetovka II	Buran-Kaya III, levels 6-1, 6-2; Siuren I basic Upper layer/ Unit A; Adzi-Koba, Upper layer	Novovladimirovka II; Amvrosievka	Kamennaya Balka II	Gubski I rock-shelter, lower UP layer
	Epi-Aurignacian with carinated end-scrapers (of Klimautsy-type) undated	Zelenyi Kutor I, II; Klimautsy I & II				
	Epi-Aurignacian with carinated burins ca. 19 000 - 20 000 BP	Leski				
	Epi-Aurignacian of Krems-Dufour type 17 000/18 000 - 21 000 - 22 000 BP	Sagaidak I, lower level; Anetovka I			Muralovka; Zolotovka I	
	Late Gravettian 20 000 - 23 000 BP		Siuren I upper layer/D			
Mid-Upper Palaeolithic (MUP)	Szeletian (sensu lato) 26 000 - 28 000 BP				Biryuchiya Balka 2, level 2	

Fig. 5. The Great North Black Sea region during the Mid-Upper Palaeolithic (MUP) and the beginning of the Late Upper Palaeolithic (LUP) periods (28 000 BP - 15 000 BP): chronological and technological framework.

Abb. 5. Das nördliche Schwarzmeergebiet während des mittleren Jungpaläolithikums (MUP) und im frühen Abschnitt des späten Jungpaläolithikums (LUP) (28000 BP - 15000 BP): chronologischer und technologischer Rahmen.

with Central European Lhotka-type Epi-Aurignacian assemblages, a third group of Epi-Aurignacian industries from Zelenyi Khutor I and II might be also assigned to the LGM time range. Territorially, Epi-Aurignacian sites are limited to only two areas of the studied region, the western part of the Ukraine and the eastern part of the Sea of Azov and Lower Don river in Russia. It is noteworthy that no areas of the Ukrainian steppe in the North Black Sea region have produced any reliable finds which are technologically and chronologically related to the EUP and MUP periods. It therefore seems that an "Epi-Aurignacian explosion" occurred in the region at the end of the MUP period. Equally remarkable is the complete absence of any Epi-Aurignacian finds in the southernmost areas of the region, in the Crimea and the north-western Caucasus.

In summary, against the background of Epi-Aurignacian technological-chronological developments, the Late Upper Palaeolithic (LUP) with the first Early Epigravettian industries appears at ca. 19 000/18 000 BP. The fundamental and most significant feature of this LUP period is the ubiquitous presence in all five areas of the region under study of Epi-Gravettian industries, which appear from the second half of the LGM and continue until the emergence ca. 9 000 - 7 000 BP of Final Palaeolithic and Mesolithic assemblages in the Boreal and initial Atlantic periods, manifested in the Early Holocene by Epi-Tardigravettian industries such as the Crimean "Shpanskaya Mesolithic

culture" (see Yanevich 1993; Demidenko 2003a). Within this continuity, the archaeological component of the Epigravettian industries also shows great variability, both in traditions of flint working and with regard to migration routes into and out of the Great North Black Sea region. However, this subject is a different one and beyond the scope of the present article.

Defining characteristics of the EUP and MUP periods in the Great North Black Sea region

Within the Great North Black Sea region, which comprises almost the whole of southern Eastern Europe, the EUP and MUP periods differ strikingly, not only in their technological and chronological components, but also in the numerical occurrences of sites and their find complexes.

For the EUP period, the presence and also the technological variability of both Middle and Upper Palaeolithic complexes have been established for both of the two defined chronological stages. Two LMP industries are known, the Micoquian and the Levallois-Mousterian, while the EUP is also represented by two archaeologically distinct industries, the Aurignacian and the Szeletian (sensu lato), which are in themselves also variable. The Szeletian is represented by two

complexes referred to the "Eastern Szeletian" (at Buran-Kaya III, level C in the Crimea) and the "Kostenki-Streletskaia culture" (at Biryuchiya Balka 2, levels 3a-3c and 3 in the eastern part of the Sea of Azov and Lower Don river area). The Aurignacian is even more variable. It is represented as an Early/Archaic Aurignacian of Krems-Dufour type in the Crimea (UP finds from Siuren I, Lower layer of the 1920s excavations/Units "H" and "G" of the 1990s excavations), the eastern part of the Sea of Azov/Lower Don river area (Chulek I) and in the north-western Caucasus (Kamennomostskaya cave and Shyrokiy Mys). A Late/Evolved Aurignacian industry of Krems-Dufour type is also present in the Crimea at Siuren I (Middle layer of the 1920s excavations)/Unit "F" of the 1990s excavations), while Late/Evolved Aurignacian assemblages without retouched microliths are found in the north-western Caucasus (the lower UP layer at Gubski I rock-shelter and redeposited Aurignacian artefacts in Middle Palaeolithic culture-bearing sediments at the Monasheskaya cave).

The described EUP industries are chronologically heterogeneous. The Szeletian (*sensu lato*) is assigned to both the first and second stages of the EUP period, whereas the first appearance of Aurignacian industries at ca. 30 000 BP restricts them to only the second stage of the EUP period. The "acculturation model" popular among many colleagues therefore does not apply to the Great North Black Sea region, nor indeed for the whole of Eastern Europe (see also Chabai 2000; 2003). We also cannot rule out the possible existence of Late/Evolved Aurignacian industries in the Crimea and north-western Caucasus during the Maisières Interstadial, when LMP industries were no longer present in the region. This aspect of the EUP in the Great North Black Sea region needs to be investigated further by multidisciplinary analyses at the known sites and at any which might be discovered in future.

All the data summarized above allow us to establish that, figuratively speaking, the "melting pot" of various LMP and EUP hominin communities "simmered vigorously" in the Great North Black Sea region between ca. 36 000/35 000 and 28 000 BP. Moreover, this vast territory also acted as a crossroads for different migration routes of LMP and EUP communities (see also Chabai 2006), as well as providing the setting for their geochronologically independent and mutually exclusive existence, a situation demonstrated by the clear lack of any indication of technological and typological involvement and/or exchange of ideas on flint-working technology. Consequently, the EUP chronological period in the region appears to present a complex and mosaic picture, in which local LMP hominins with Micoquian (made by Neanderthals) and Levallois-Mousterian industries continued to exist and survive, while at the same time UP technologies (made by *Homo sapiens* in the case of the Aurignacian) were imported by "immigrants" from

other regions, Eastern Europe in the case of Szeletian (*sensu lato*) industries and Central Europe (Aurignacian industries).

Finally, the data now available suggests that the possibility of an eastern Aurignacian route within the "Danube Corridor" hypothesis can now be more closely characterized in two ways. Firstly, the existence of sites with Aurignacian technologies in the Crimea, the eastern part of the Sea of Azov and Lower Don river area, and the north-western Caucasus definitely makes it highly probable that Aurignacian communities infiltrated into the southernmost areas of Eastern Europe by following the Lower Danube river through the Crimea and then following the Kuban river and its tributaries. On the other hand, the absence of any evidence for Aurignacian expansion before ca. 31 000/30 000 BP would imply that the eastern pathway of the "Danube Corridor" only became effective for Aurignacian *Homo sapiens* well after its western one, although it is important that this interpretation should be tested in the light of subsequent analyses.

The MUP period (28 000/27 000 - 19 000/18 000 BP) in the Great North Black Sea region is very distinct from that of the EUP. Considering all potential site data from its five sub-areas objectively, it appears that there is definitely a total absence of material evidence for human presence in the region from the beginning of the Upper Pleniglacial until the start of the LGM period (ca. 27 000/26 000 - 22 000/21 000 BP). Moreover, even for some time before that, at the end of the Würmian Interpleniglacial (ca. 28 000 - 26 000 BP), there exists only a single possible, very localized record of "Kostenki-Streletskaia culture" humans at Biryuchiya Balka 2, level 2 (eastern part of the Sea of Azov and Lower Don river area), and this is not yet confirmed by multidisciplinary scientific data.

At the other end of the MUP period, during the LGM (ca. 22 000 - 18 000/17 000 BP), some zones of the Ukrainian western part of the North Black Sea region and of the Russian eastern part of the Sea of Azov and Lower Don river area are characterized by series of sites and find localities that possibly represent three distinct technological complexes of Epi-Aurignacian type. At the end of this chronologically short but impressive Epi-Aurignacian episode, beginning from ca. 19 000 BP, the Great North Black Sea region fills up with human communities bearing various Epigravettian traditions, which form the technological basis for the Late Upper Palaeolithic of the region.

The MUP technological and chronological framework represented in the Great North Black Sea region currently permits only one interpretative scenario. Following the disappearance of Aurignacian humans at ca. 28 000 BP, and with the possible single exception of a very localized and brief survival ca. 28 000 - 26 000 BP of "Kostenki-Streletskaia culture" humans in one micro-region, the entire Great North

Black Sea region becomes completely depopulated between ca. 27 000/26 000 and 22 000/21 000 BP. This demographic situation during the MUP period is in stark contrast to the known data for the human population of most other European regions during this time range. Indeed, this period is often justifiably described as an Upper Palaeolithic "Golden Age", characterized by the widespread occurrence across Europe of various Gravettian assemblages presenting many of the most remarkable known aspects of Upper Palaeolithic material and spiritual life (see Roebroeks et al. 2000; Amirkhanov 1998).

The essentially Gravettian technological character of the MUP in other parts of Europe greatly helps place the "depopulation" of the Great North Black Sea region in perspective, since, with the exception of the still-hypothetical Late Gravettian (ca. 23 000 - 20 000 BP) at Siuren I in the Crimea, the Gravettian is totally absent from the whole region. It is, of course, a question of critical palaeogeographical and palaeodemographical importance, as to why human communities bearing Gravettian traditions did not populate the southern territories of Eastern Europe. The "Gravettian hiatus" of the Great North Black Sea region also becomes very apparent when seen against the well-known records of Gravettian sites (ca. 28 000/27 000 - 20 000 BP) in neighbouring regions to the north-west (on the middle course of the Prut-Dniester river interfluvies) and the north (central part of the Eastern European Plain).

Finally, one further important question must be considered. It is well established that, during the LGM period (ca. 23 000/22 000 - 20 000 BP), there was a dramatic human population decrease in most of the northern and central regions of Europe, with a concomitant withdrawal of the human population into the southern areas of the continent (see Jochim 1987; Soffer & Gamble 1990; Street & Terberger 1999; Roebroeks et al. 2000). However, the palaeodemographic development in the Great North Black Sea region occurs in reverse order: the region is depopulated during the first half of the Würmian Upper Pleniglacial (ca. 27 000/26 000 - 22 000/21 000 BP) but becomes repopulated by humans during the LGM (ca. 22 000/21 000 - 18 000/17 000 BP).

In this scenario, the Great North Black Sea region received the "second wave" of immigration in the guise of the Epi-Aurignacian. Seen against the background of the significant movement of human communities into various European southern territories at the beginning of the LGM (ca. 22 000 BP), the vast depopulated southern territories of Eastern Europe and the Great North Black Sea region appear to have provided an "uninhabited oasis" necessary for the immigration of specific Upper Palaeolithic human groups. To a certain extent, the three Epi-Aurignacian type industries identified in the Great North Black Sea region reveal a number of technological parallels and analogies with the Epi-Aurignacian assemblages of

Central Europe, an observation first suggested long ago for the "Epi-Aurignacian of Krems-Dufour type" assemblages described above (see Gvozdover & Ivanova 1969; Praslov 1972; Stanko 1982; Stanko et al. 1989).

All these data are useful for pursuing more concrete investigations into the archaeological links between the Epi-Aurignacian of Central and Eastern Europe. A similar, but much better studied example of migration from Central to Eastern Europe, albeit for different underlying reasons, is documented ca. 23 000 BP for Upper Palaeolithic humans bearing the "Gravettian with shouldered-points tradition", which resulted in the development of the so-called Eastern Gravettian "Kostenki-Avdeevov culture" in the central part of Eastern Europe (see Amirkhanov 1998).

In conclusion, an integrated assessment of the problem of human migration into the Great North Black Sea region during the EUP and MUP periods established the following basic points. LMP industries (both Micoquian and Western Crimean Mousterian of Levallois-Mousterian type) had long been present in the region and their hominin makers were therefore the local communities here at the onset of the EUP period. By contrast, all UP hominin communities (Szeletian sensu lato, Aurignacian, Epi-Aurignacian and even the Late UP Early Epigravettian) were certainly newcomers to the region. Accordingly, the present author has recently proposed that, for the Upper Palaeolithic, "the south of Eastern Europe has been rather 'a kind of thoroughfare' on a path of various human migrations caused by different reasons" (Demidenko 2001: 41; see also Chabai 2006; Demidenko 2007), an hypothesis which increasingly receives added confirmation, but which, of course, requires further studies.

Finally, it is necessary to emphasize once again the importance of the basic approach applied to the study of the EUP and MUP periods in the Great North Black Sea region in leading to the observations presented here. It has only been possible to characterize and interpret the complex chronological and technological structures of the region against the background of fundamental archaeological and chronological data established at a European scale. This perspective has allowed the recognition of universally valid characteristics and permits the integration of this south-eastern European region into the overall framework of the European Palaeolithic, but has also identified features distinct from these and specific to the region.

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