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18 - THE SIUREN-I AURIGNACIAN OF KREMS-DUFOUR TYPE INDUSTRIES IN THE CONTEXT OF THE EUROPEAN AURIGNACIAN

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Introduction

After defining here the Siuren I Aurignacian industries as Early and Late/Evolved Aurignacian of Krems-Dufour types, we now present the arguments supporting such industrial attributions. Moreover, as will be seen in the archaeological industrial sequence summarized in the next chapter, of the seven occupational events and associated assemblages, the Siuren I Aurignacian industries are the most understandable; their positions within the European Upper Paleolithic and particularly the European Aurignacian technocomplex can be established quite rigorously that unfortunately cannot be said for the other Upper Paleolithic and Final Paleolithic industries at Siuren I. So, given the presence of two different kinds of Aurignacian of Krems-Dufour at Siuren I, they will be discussed separately, starting with the Early Aurignacian.

The Siuren I Early Aurignacian of Krems-Dufour type in 1990s Units H and G/1920s Lower layer in the context of the European Aurignacian

The absence of assemblages in the Crimea comparable to the Early Aurignacian at Siuren I does not necessarily indicate its uniqueness within the European Aurignacian as a whole. On the contrary, there are quite a few Aurignacian complexes outside the Crimean peninsula in Europe which share very similar or even identical techno-typological features, including the bone tools and non-utilitarian objects characteristic of the Siuren I Early Aurignacian. In this chapter, artifact analyses are aimed at determining the geochronological positions of European Aurignacian related complexes and their spatial distribution throughout Europe and, finally, the place that the Siuren I Early Aurignacian may occupy among them.

The Siuren I assemblages from the 1990s Units H and G 1920s Lower layer have the following basic features which should be stressed again here. Technologically, they are characterized by the predominant production of bladelets/microblades from bladelet "regular" and "carinated" cores. Typologically, they include less common but typical carinated and thick/flat shouldered/nosed end-scrapers, show the prevalence of angle and on truncation/lateral retouch burins over dihedral burins with a near-absence of carinated burins, and include some scaled tools, truncations, perforators, retouched blades with only a single piece with "Aurignacian-like heavy retouch", while "non-geometric microliths" comprise from about 40% (in the 1920s Lower layer) to about 60% (in the 1990s Units H and G) of all tools. The composition and morphology of "non-geometric microliths" show that the most typical is the Aurignacian "Dufour bladelet" sub-type with bilateral alternate micro-scalar and/or micro-stepped semi-abrupt retouch made on bladelets and microblades with basically "on-axis" removal direction and flat/incurvate/"weakly twisted" general profiles; the occurrence of Aurignacian "Font-Yves/Krems points" with similar bilateral dorsal and bilateral alternate retouch and blank morphology should be noted as well.

Thus, intensive bladelet/microblade production from bladelet "regular" and "carinated" cores in flint primary flaking processes in conjunction with the rather rare representation of Aurignacian tool types (only some specific end-scrapers, very few retouched blades and no carinated burins) among the "Indicative Upper Paleolithic Tool types", many Aurignacian "Dufour bladelets" sub-type and some "Font-Yves/Krems points", may serve as "industrial keys" for comparative lithic analysis, especially given the very different ways in which such information is published for European sites. Such "industrial keys" can also be supplemented by a rather "simple set" of bone tools (flat points and some shouldered awls) and non-utilitarian objects (shell beads).

The most obvious way to identify industries similar to the Siuren I Early Aurignacian is to focus first on the European Aurignacian assemblages with many and/or characteristic "Dufour bladelets". This simple and definite approach narrows the range of Aurignacian complexes for comparative analysis. Taking this as a "starting point" or initial filter, further checking of the other "industrial keys" of the Siuren I Early Aurignacian leads us to definite identification of comparable European Aurignacian complexes. Taking into consideration the occurrence of such complexes in Western, Central and Eastern Europe, it is better to discuss three huge European re-

gions separately, especially given that quite different industrial attributions of these Aurignacian complexes have been given by local archaeologists.

Western European Aurignacian complexes

We successively discuss the main regions in selected countries with certain concentrations of Paleolithic sites containing relevant Aurignacian complexes, although these often have different "industrial names".

France and Spain

Périgord, Languedoc and Provence, Franco-Cantabria and Catalonia are the main regions for these studies at this western edge of Europe.

In Périgord such Upper Paleolithic complexes were first called "*Périgordien II (Bos-del-Ser type)*" by Peyrony (1933, 1936). Later, de Sonneville-Bordes (1955a, 1955b, 1960) showed that "*Périgordien II*" lithic assemblages with "Dufour bladelets" (usually less than 5% of all tools, probably because of old excavation techniques - Sonneville-Bordes 1960:149) are actually Aurignacian in basic typological composition, often mixed with some Chatelperronian and/or Gravettian artifacts (La Ferrassie, layer E', Bos-del-Ser, Dufour, Chanlat-I and -II). Geochronologically, de Sonneville-Bordes placed the "*Aurignacien à lamelles*" (1955a, 1955b) between the Chatelperronian/Perigordian I and typical Aurignacian - Aurignacian I-II (e.g., at the monumental Paleolithic site La Ferrassie in Périgord) and, therefore, termed it "*Aurignacian 0*" (1960). This latter attribution became quite widely accepted in Paleolithic archaeology. Some of these complexes (e.g., Dufour and Bos-del-Ser) were also called "*Corrézien*" by Pradel (1968, 1972) to distinguish them from the Aurignacian and Perigordian (Chatelperronian and Gravettian) and some combinations of these technocomplexes' typological elements. Then in the 1980s, it became generally accepted that the "Aurignacian 0" was contemporary with the "Aurignacian I" (e.g., Sonneville-Bordes 1982; Rigaud 1982:440-443; Leroyer & Leroi-Gourhan 1983; Harrold 1988). This served as the basis for combining these two Aurignacian phases into the "Early Aurignacian". On the other hand, we should also admit that before such geochronological studies and conclusions in the 1980s, the first step toward this "unification process" was made by Delporte (1968) on a strictly typological basis. He underlined "a polymorphous character" for lithic assemblages of the "Aurignacian 0" phase complexes (La Ferrassie, layer E'; Caminade-Est, layer G; La Rochette, layer 5d) identifying, aside from the presence of Dufour bladelets, the following industrial features. *"Les caractères sont les suivants: grattoirs aurignaciens assez nombreux, plus nombreux que dans les séries de l'Aurignacien I; burins souvent plus abondants que dans l'Aurignacien I, mais sans burins busqués; lames aurignaciennes absentes ou très peu abondantes; souvent, présence de lamelles Dufour. Cette phase initiale, répétons-le, présente plus de caractères communs avec l'Aurignacien II qu'avec l'Aurignacien I»* (Delporte 1968:60).

These initial industrial considerations were much further developed in the 1990s when Dufour bladelets were no longer considered a *"fossile directeur"* at all for the Aurignacian of Périgord subdivision since they were often found in many Aurignacian complexes throughout the Aurignacian 0/I-IV sequence and their presence explained by functional reasons (e.g., Demars 1992; Rigaud 1993; Djindjian 1993).

Without neglecting such functional reasons, we are not inclined to completely ignore Dufour bladelets which are actually different morphologically in the Aurignacian of the Périgord, reflecting techno-typological variability for several complexes. As already noted in the "Classification..." chapter, Demars specifically subdivided "Dufour bladelets" from Aurignacian complexes of the Périgord into two sub-types: "Dufour" or *"sur lamelle à profil courbe"* usually 3.0 - 4.5 cm long and "Roc-de-Combe" or *"sur lamelle à profil torse"* usually 1.5-2.0 cm long (Demars & Laurent 1989:102). Adding to Demars' "Dufour" sub-type of Périgord the other main morphological features of the Siuren I Dufour bladelets (typical occurrence of "on-axis" removal direction, slightly twisted general profile and bilateral alternate micro-scalar and/or micro-stepped semi-abrupt retouch), as well as their manufacture on both bladelets and microblades, we have nearly the same Aurignacian type of Dufour bladelets as for the Crimean site. One more notable thing is that the Dufour bladelet sub-type seems to only occur in "Early Aurignacian" complexes in the Périgord – mostly in "Aurignacian 0" and in much lesser number in "Aurignacian I". In particular, the important Early Aurignacian industry with Dufour bladelets from Le Piage, layer K in the Périgord corresponds strongly to the Siuren I Early Aurignacian. This can be seen especially by the prevalence of "non-carinated"/"thin" end-scrapers over all types of "carinated"/"thick" end-scrapers, the dominance of on truncation and angle burins in comparison to dihedral burins with only a few examples of carinated burins (5.4% of all burin types) and no busked burins at all, as well as quite a few Dufour bladelets (16.4%) and Font-Yves points (6.6%) (Demars 1992; Champagne & Espitalié 1981). It should also be recalled that on sedimentological and stratigraphic grounds Le Piage, layer K is geochronologically related to the period between the Les Cottés and Arcy Interstadials of the Last (Würm) Glacial (ca. about 34000-33000 BP) (Leroyer & Leroi-Gourhan 1983:42), placing this Aurignacian complex among the earliest Aurignacian industries of Western Europe (but contra see d'Errico *et al.* 1998:17; Zilhao & d'Errico 1999:7). New excavations at the site (Bordes *et al.* 2008) will certainly add much information about the site and its Aurignacian 0 finds. Industrial characteristics of other "Aurignacian complexes with Dufour bladelets" are either very similar to La Piage, layer K - for example, the site of Dufour (Sonneville-Bordes 1955a, 1960) or, like the Font-Yves site, show some possible developmental trends reflected by a more important role of dihedral burins (39.5% of all burins) and a definite increase in carinated burins (23.4% of all burins), although with only a sole busked item among them, and retaining Dufour bladelets and Font-Yves points as well (Demars 1992; Pradel 1968).

Thus, Early Aurignacian 0 with Dufour bladelets and Font-Yves points of the Périgord can be viewed as a type of "Early Aurignacian" with some definite techno-typological differences from both "Early Aurignacian I with absent or rare Dufour bladelets and Font-Yves points" and "Late Aurignacian II-IV with Roc-de-Combe bladelets and no Font-Yves points", also highly likely reflecting changes in the Aurignacian through time in the Périgord.

Before discussing other French and Spanish regions with important Aurignacian complexes having Dufour bladelets, we have to raise some methodological questions. Around the same time that de Sonneville-Bordes began to study and publish intensively on the Périgord Aurignacian, since the late 1950s Laplace also initiated large-scale investigations of Western and Central European Early Upper Paleolithic industries where the role of "Aurignacian with Dufour bladelets" had a crucial importance in his hypothesis of the "*Aurignaco-gravettian synthetotype*" (e.g. Laplace 1958, 1970). He had a broad knowledge of the subject as he had personally excavated new sites in Italy, France and Spain, and studied lithic collections of already known sites in these countries as well as Austria, Hungary and Czechoslovakia. His theoretical ideas and system for lithic artifact descriptions are still applied today (e.g. Levêque *et al.* 1993). His "*Aurignaco-gravettian synthetotype*" will not be discussed here since it has already been criticized in the past (e.g. Bordes 1963; Kozlowski 1965:50-51) that is correct from the points of view of modern Paleolithic archeology. Here instead we would like to underline his studies of European "*Protoaurignacien à pieces à dos marginal*" and the influence of his studies on archeologists from many countries. Namely, under the influence of these initial studies of the Aurignacian by de Sonneville- Bordes and especially Laplace, many archeologists involved in research on "Early Aurignacain complexes with Dufour bladelets" in the Mediterranean zones of Spain (plus Cantabrian Spain), France and Italy accepted the "polymorphous and undeveloped" industrial characteristics for these complexes that led them to use the following industrial definitions as synonyms in the 1980s and 1990s, still in use today: "*Aurignacien primitif*" (Bazile 1983, 1984), "*Protoaurignacien à lamelles retouchées*" (Onoratini 1986), "*Aurignacien à lamelles Dufour*" (Broglio 1993), "*Protoaurignacien à lamelles Dufour*" (Gambassini 1993), "*Aurignaziano a dorsi marginali*" (Palma di Cesnola 1993), "*Aurignacian 0*"/"*Archaic Aurignacian*" (González Echegaray & Freeman 1971; Freeman 1982; Bernaldo de Quiros 1982; Bernaldo de Quiros & Cabrera Valdes 1993; Soler-Masferrer & Maroto-Genover 1993). Accordingly, these archeologists separate such Aurignacian complexes special types or facies of the Early Aurignacian (see also Le Brun-Ricalens 2005). Moreover, their geochronological determinations within either separate site sequences or Aurignacian successions of local regions indeed often indicate very early positions for these complexes predating the "Aurignacian I with no Dufour bladelets", although both of these Aurignacian types/facies are still basically contemporaneous in more general correlations, keeping in mind very early Aurignacian dates for Geißenklösterle and Willendorf II in Germany and Austria.

The main sites with "Protoaurignacian with Dufour bladelets" complexes in Asturias, Franco-Cantabria and Catalonia (Spain), Languedoc and Provence (France), and in Italy are briefly presented below, followed by a discussion of industrial techno-typological differences between them, as well as their common chronological ranges with some exceptions.

Asturia, Franco-Cantabria and Catalonia

La Vina, level XIII inferior (Asturia) (Zilhao 2006), Gatzarria, levels Cjn1 and Cjn2 (Laplace 1966a) and Isturitz, level C4d (Normand & Turq 2005) (Basses-Pyrénées), Labeko Koba, level VII (Cantabria) (Arrizabalaga *et al.* 2003; Arrizabalaga & Maillo Fernandez 2008), Les Abeilles, lower and middle levels (Haute-Garonne) (Laplace 1966b), Cueva Morin, levels 9, 8b and 8a (Cantabria) (González Echegaray & Freeman 1971; Maillo Fernandez 2005, 2006; Arrizabalaga & Maillo Fernandez 2008), Abric Romani, level 2/A (Catalonia) (Laplace 1962; Vaquero 1992), L'Arbreda, level H/BE 111 (Catalonia) (Soler & Maroto 1987; Ortega *et al.* 2005), Reclau Viver, lower layer (Catalonia) (Laplace 1966b, 1970).

Southern France – Languedoc and Provence

La Laouza, level 2B1 and l'Esquicho-Grapaou, levels SLC1B-SLC1A (Languedoc oriental) (Bazile 1983, 1984, 2005), Tournal à Bize, level G (Languedoc occidental) (Tavoso 1987), Rainaude, level 10 (Provence orientale) (Onoratini 1986), Mandrin, upper level (Occitanie orientale) (Slimak *et al.* 2003), as well as Roclaine (dep. Saône-et-Loire) (Combier 1951; Laplace 1966b, 1970) which might also be in more or less territorial proximity to this region.

Italy

There are several local regions with some occurrences of "Protoaurignacian with Dufour bladelets" complexes in Italy.

These include the following three sites in Northern Italy (close to the Alps): Riparo Mochi, layer G in Liguria (Blanc 1953; Laplace 1977; Broglio 1993; Palma di Cesnola 1993; Kuhn & Stiner 1998), Tagliente, levels 25a-c (Bartolomei *et al.* 1982; Broglio 1993; Palma di Cesnola 1993) and Fumane, levels A3-A1, D6 and D3 (Broglio 1993; Palma di Cesnola 1993; Bartolomei *et al.* 1994; Broglio *et al.* 2005) in Verona and Venice provinces.

There are two more such Aurignacian assemblages at La Vallombrosina (Cocchi 1951; Laplace 1966b; Palma di Cesnola 1982, 1993) and La Fabbrica, levels 3-4 (Pitti *et al.* 1976; Palma di Cesnola 1982, 1993) in Tuscany province (Central Italy).

Two other important sites are located further to the south – Castelcivita, upper layer "rsa" (Campanie) (Cioni *et al.* 1979; Gambassini 1982, 1993, 1997; Palma di Cesnola 1982, 1993) and Paglicci, levels 24B2-B1 – 24A4-A2 (Puglia) (Gambassini 1982, 1993; Palma di Cesnola 1982, 1993, 2006).

Thus, the "Protoaurignacian with Dufour bladelets" is known from 20 sites in Spain, France and Italy. All of these assemblages are techno-typologically similar to the Siuren I 1990s Units H and G/1920s Lower layer assemblages. As identified by us for the Siuren I tool-kits, the "Indicative Upper Paleolithic tool types" have nearly the same characteristics: nearly equal representation of end-scrapers and burins or a dominance of burins over end-scrapers excluding "carinated/thick" end-scrapers; a general scarcity of carinated and thick/flat shouldered/nosed end-scrapers with true bladelet "carinated" cores often classified as carinated end-scrapers (e.g. González Echegaray & Freeman 1971: Fig. 85, 6, 10, for level 9; Fig. 91, 13-15, 22 for levels 8b and 8a of Cueva Morin (Cantabria); prevalence of angle and on truncation/lateral retouch burins over dihedral burins except for Roclaine which has a dominance of dihedral

burins although not significant; the absence or single examples of carinated burins with true busked burins usually absent; the presence of some scaled tools, truncations, perforators and retouched blades with only a few if any items with "Aurignacian-like heavy stepped retouch". Bone tools (awls and points) and non-utilitarian objects (mainly shell beads) were also, if present, characteristic by a "rather simple set" of items. The basic difference is related to some characteristics and internal composition of "non-geometric microliths" which divide most of these "Protoaurignacian with Dufour bladelets" assemblages into two basic groups: 1) Dufour bladelets with mainly bilateral alternate retouch and Font-Yves/Krems points (Cueva Morin, Gatzarria, Labeko Koba, Les Abeilles, L'Arbreda, Reclau Viver, Mandrin, Fumane, Tagliente), and 2) Dufour bladelets with mainly lateral ventral retouch and no or very rare Font-Yves/Krems points (Abric Romani, La Laouza, l'Esquicho-Grapaou, Tournal à Bize, Rainaude, Roclaine, Riparo Mochi, La Vallombrosina, La Fabricca, Castelcivita, Paglicci). With this subdivision, however, all other morphological features of the Protoaurignacian's Dufour bladelets remain almost exactly the same for both groups – generally "on-axis" removal direction, no real twisted general profile, micro-scalar and/or micro-stepped retouch, especially on ventral side for alternatively retouched pieces, both bladelet and microblade blanks often close to 3.0 cm in length (Demars' "Dufour sub-type"). The differences within the Protoaurignacian complexes related to "non-geometric microliths" may evidence their varying and specific destination and use as composites of projectile points, a common function usually assumed for Dufour bladelets (e.g. Rigaud 1993:183).

In light of this twofold subdivision of the "Protoaurignacian with Dufour bladelets" assemblages from the Mediterranean zone/southern part of Western Europe, it is clear that the Siuren I Early Aurignacian easily fits into the first defined group, including here La Piage, level K (Périgord) as well, with almost identical techno-typological features.

Geochronological ranges for "Protoaurignacian with Dufour bladelets" assemblages of the Western European Mediterranean zone

The complete geochronological period for the Proto-Aurignacian covers the time span from the Hengelo/Les Cottés Interstadials (formerly Würm II/III) until the beginning of the Arcy Interstadial. In absolute and uncalibrated chronology, this falls between ca. 38,000 and 31,500 BP. Our examination of the available data leads us to propose a twofold geochronological subdivision: 1) Hengelo/Les Cottés Interstadials – ca. 38,000-34,500 BP and 2) a period between the Hengelo/Les Cottés and Arcy Interstadials – ca. 34,500-31,500 BP. At the same time, it is not easy to perfectly fit each of the complexes discussed into one or another of these two chronological phases due to either incomplete "dating data" or difficulties in correlating absolute dates (conventional C14 AMS, TL and uranium-series dates) with the available sedimentological, palynological and faunal data. Therefore, first, we try to list the sites which appear to be attributable, with high probability, to one of these geochronological phases.

The following complexes may be attributable to the first phase (Hengelo/Les Cottés Interstadials – ca. 38000-34,500 BP): Abric Romani, level 2/A – an average of 36,780 ± 870 BP from five AMS dates (NZA and AA labs) on bone samples, 35,000 ± 500 and 36,300 ± 1,300 BP conv. C14 dates (USGS lab) on carbonate samples for two travertine levels sandwiching the level at the site, an average of 43,000 ± 1000 BP Uranium-series dates on 38 carbonate samples and faunal indications of a temperate climate (Bischoff *et al.* 1994); L'Arbreda, level H – BE 111 – an average of 38,500 ± 1000 BP from four AMS dates (AA lab) on charcoal samples (Bischoff *et al.* 1989) and another AMS date (OxA lab) on a bone sample – 35,480 ± 820 BP (Hedges *et al.* 1994); La Laouza, level 2B1 – no appropriate absolute dates but some palynological indications of the end of the Würm II-III Interstadial (Bazile 1983, 1984, 2005; Leroyer & Leroi-Gourhan 1983); Tagliente, levels 25 a-c – from sedimentological studies with "*phase pédogénétique au sommet (25a)*" (Broglio 1993:201; Bartolomei *et al.* 1992).

The following complexes may be attributable to the second phase (period between the Hengelo/Les Cottés and Arcy Interstadials – ca. 34,500-31,500 BP): Gatzarria, levels Cjn1 and Cjn2 – from sedimentological data (Laville 1983); Tournal à Bize, level G – absolute Uranium-series and ESR dates indicate a period of ca. 35-34,000 BP (Bischoff *et al.* 1989), as well as palynology suggesting an "episode of climatic instability" (Leroyer & Leroi-Gourhan 1983:42); Fumane, levels A3-A1, D6 and D3 – more than twenty AMS dates between 34-32,000 BP and sedimentological and fauna data indicating a dry cold climate (Broglio 1993; Palma di Cesnola 1993; Bartolomei *et al.* 1994; Broglio *et al.* 2005); Castelcivita, upper layer "rsa" – stratigraphic position between the Uluzzian (conv. C14 date 32,930 ± 720 BP on burnt bone – F lab) and Aurignacian with "*micropointes à dos marginal*" (conv. C14 date 31,950 ± 650 BP on burnt bone – F lab) and microfaunal data (Gambassini 1993, 1997; Palma di Cesnola 1993; Riel-Salvatore 2007); Paglicci, levels 24B2-B1 – 24A4-A2 – two AMS dates for level 24B1 (34,000 +900/–800 BP) and for an Aurignacian with bladelets treated with unique fine marginal abrupt dorsal retouch considered to be related to Arcy Interstadial situated above level 24A1 (29,300 ± 600 BP) (Palma di Cesnola 1993, 2006).

For another group of Aurignacian complexes, dating data indicate possible continuity of several human occupations within thick cultural archeological layers or a series of levels at some sites during both geochronological phases: l'Esquicho-Grapaou, levels SLC1B-SLC1A – one conv. C14 date for level SLC1B – 34,540 ± 200 BP and three conv.C14 dates for stratigraphically overlying level SLC1A – 31,850 + 1280 – 1700 BP (MC lab), as well as sedimentological studies (Bazile 1983, 1984, 2005; Leroyer & Leroi-Gourhan 1983); Riparo Mochi, layer G – pollen data indicate the Hengelo-Arcy Stadial period (Leroi-Gourhan & Renault-Miskovsky 1977), while five AMS dates on charcoal samples between 35-32,000 BP (OxA lab) (Kuhn & Stiner 1998) may also evidence the end of Würm II-III Interstadial as well.

Geochronological data for the "Protoaurignacian with Dufour bladelets" complexes of sites (Les Abeilles, Reclau Viver, Rainaude, La Vallombrosina, La Vina, Isturitz and Labeko Koba) are not definite enough to place them into one of the two geochronological phases with certainty, although La Fabbrica,

levels 3-4 can probably be attributed to the Arcy Interstadial (Pitti *et al.* 1976; Palma di Cesnola 1993).

The great complexity of the two geochronological phases for Aurignacian 0/Protoaurignacian in Western Europe and in simply a preliminary view can be well-illustrated by problems of geochronological determinations at Cueva Morin, levels 9, 8b and 8a. These have been long debated and different interpretations proposed. First, there is a reverse order for conv. C14 dates of the Lower Aurignacian sequence at the site. It is also worth noting that all of the 1970's C14 dates are conventional ones on charcoal from the SI lab (see Maillo Fernandez *et al.* 2001: Table 1). The underlying Chatelperronian level 10 is dated to 36,950 ± 6580 and 28,610 ± 560 BP where the first date has a much too broad standard deviation. Three dates for the "Archaic Aurignacian with Dufour bladelets" in level 8a group around 28,000 BP (28,600 ± 1285, 28,435 ± 540 and 28,155 ± 735 BP), while three dates for the "Aurignacian I" levels above are older: ca. 29,000 BP for level 7 (29,515 ± 840 and 29,055 ± 1490 BP) and 32,415 ± 865 BP for the contact between levels 7/6 (see Bernaldo de Quiros 1982b). With such rather contradictory C14 dates, the site's sedimentology, palynology and fauna are needed to attempt to place these levels into geochronological periodization of the Last Glacial, as all archeologists agreed that the absolute dates for the "Archaic Aurignacian" are too young (Freeman 1982; Bernaldo de Quiros 1982a, 1982b). It is worth summarizing further such attempts, keeping also in mind that the "Archaic Aurignacian" levels 9, 8b and 8a, based on environmental and faunal data, are characterized by a temperate climate. Arl. Leroi Gourhan attributed level 9 to the end of the Hengelo/Les Cottés Interstadial and levels 8b and 8a to the initial inter-Hengelo/Les Cottés-Arcy Stadial (Leroi-Gourhan 1971; Leroyer & Leroi-Gourhan 1983). Bernaldo de Quiros (1982a, 1982b) argued for attribution of levels 9, 8b and 8a with the Arcy Interstadial. In the 1990s, Djindjian (1993b), first taking into consideration the characteristics of the different assemblages, placed levels 9, 8b and 8a into the Würm II-III Interstadial. So, there was little agreement, although in our view, Bernaldo de Quiros' early 1980s proposal appeared to be the best supported. This is because both C14 dates and indications of a temperate climate for these Archaic Aurignacian levels at Cueva Morin were rather similar to the data for the Siuren I Lower Aurignacian, that would indeed argue for the later survival of this Early Aurignacian industry at both edges of Europe: westernmost – Cueva Morin and easternmost – Siuren I.

The geochronological problem for the Archaic Aurignacian at Cueva Morin was, however, resolved in the beginning of the 2000s. Two more C14 (AMS) dates were obtained on charcoal samples (GIFA lab) for the uppermost Mousterian level 11 (39,770 ± 730 BP) and Archaic Aurignacian level 8 (36,590 ± 770 BP) (Maillo Fernandez *et al.* 2001: Table 2). Accordingly, the temperate climate for the Cueva Morin Archaic Aurignacian can be correlated with the Hengelo/Les Cottés Interstadial, fitting it geochronologically into the earliest, or first, phase of this Early Aurignacian in Western Europe.

Thus, more work is needed to be done to date these sites and their archeological levels – both absolute dates and geochronological determinations (geology, pollen, fauna etc.) – in order to place them within a rigorously dated chronostratigraphic sequence.

Concluding remarks

All in all, the "Archaic Aurignacian/Protoaurignacian with Dufour bladelets" Western European complexes are characterized by quite uniform techno-typological features and by an early geochronological position within the Aurignacian *sensu stricto* in Europe. The Siuren I 1990s Units H and G/1920s Lower layer Aurignacian complexes would surely "feel comfortable" within this Western European Aurignacian if it had been territorially located there.

Central European Aurignacian complexes

Having already analyzed data on the Western European Archaic Aurignacian as related to the Siuren I Lower Aurignacian, it is not difficult to identify similar Aurignacian complexes in Central Europe. Surprisingly enough, there were initially only two regions in Central Europe with sites having such Aurignacian 0/Protoaurignacian complexes: the Middle Danube basin in Austria (Krems-Hundssteig); and the Banat region of southwestern Romania (Tincova, Cosava, levels I and II, Romanesti-Dumbravita I, levels II-III, and Romanesti-Dumbravita II). After recent field work, two other sites can be added to these: Beregovo I in the Upper Tisza river basin (Ukraine) and Kozarnika Cave, layer VII (Eastern Balkan area, Bulgaria). But that is all for this huge European territory. It is also important to emphasize that all of these sites except Kozarnika are open-air sites, in striking contrast with the Western European sites which are almost exclusively found in caves and rock-shelters. Thus, by site location, the Central European region is very different from the Western European one for Aurignacian 0/Protoaurignacian sites.

Middle Danube basin (Austria) – Krems-Hundssteig

This is the type-site for defining the "Aurignacian of Krems-Dufour type" in Central Europe (**K**ozlowski 1965; Sachse-Kozlowska 1978; Kozlowski & Kozlowski 1975, 1979) or "*Kremsien*" (Fridrich 1973; Bánesz 1993). Although the site was recognized as a Paleolithic site, it was investigated not by regular excavation but rather the collection of finds during loess quarrying for the Danube high dam construction at the end of the 19th century and the very beginning of the 20th century (Strobl & Obermaier 1909; Nigst 2006). Its abundant lithic assemblage was thoroughly analyzed and published in the 1960s-1970s by G. Laplace, A. Broglio and J. Hahn (Broglio & Laplace 1966; Laplace 1970; Hahn 1977) and thanks to them, all basic and unique industrial features are thus quite clearly described. The Krems-Hundssteig complex is techno-typologically within the first group for the Western European "Aurignacian 0/Protoaurignacian", with numerous alternatively retouched Dufour bladelets (Demars' Dufour sub-type) and Font-Yves/Krems points, including the Krems alternatively retouched variant of the latter. Many "non-geometric microliths" (about 60% of all tools, or about 1900 items, an astoundingly large number for a surface find collection) and a variety of both carinated cores and end-scrapers with, at the same time, the near absence

of carinated burins (ca. 1.5% of all burin verges, including multiple burins), are the most prominent characteristics of the assemblage. The flint artifacts were also accompanied by 128 shell beads and two bone awls. Accepting the general industrial similarity of the Krems-Hundssteig and Siuren I 1990s Units H and G/1920s Lower layer assemblages, we would like, first of all, to stress the great similarity in "non-geometric microliths" types, as well as the occurrence of the same "grinding tools" with a series of short shallow striations on limestone pebbles (Hahn 1977: Tafel 118, 8).

Direct indications of the geochronological position of the Krems-Hundssteig Aurignacian are absent. However, the inter Hengelo-Arcy Stadial period has been proposed for it (e.g. Kozlowski 1965:40). The single conv. C14 date, with a quite large sigma, obtained in 1970 by J. Hahn on an early 20th century charcoal sample – 35,200 ± 2000 BP (KN lab), and faunal data do not appear to contradict such a proposal.

But with all these considerations of Krems-Hundssteig, it should be recalled that the finds do not all originate from a single archeological layer, based on the loess quarry profile (Strobl & Obermaier 1909: Tafel XI). J. Hahn already noted the multi-layer structure for the Aurignacian at the site and also mentioned the presence of Gravettian pieces among the Aurignacian lithics (Hahn 1977). Regarding the Aurignacian finds, some doubts on the Aurignacian 0/Protoaurignacian homogeneity of Krems-Hundssteig finds were also expressed by N. Teyssandier (2003, 2006, 2008). Particularly, he specially admitted the "presence of wide-fronted carinated scrapers and wide, robust blades, some modified into end-scrapers or blades with lateral retouch tending toward the Aurignacian or strangled blade form" and stated that "these elements are more typical of the Early Aurignacian (Aurignacian I – Yu.D.) in south-west France" (Teyssandier 2008:496). The occurrence of Gravettian artifacts for the site was confirmed by new fieldwork at the site in 2000-2002 headed by Ch. Neugebauer-Maresch (2008a), although the new excavations were conducted some distance to the south from the previously known site area (Neugebauer-Maresch 2008a: Abb. 207 – 208; 2008b: Abb.1). Two very limited areas of archeological horizon 4 (AH 4) with no lithics, but with charcoal lenses, were excavated and surprisingly the attribution to the inter Hengelo-Arcy Stadial period finds support from a new C14 date on charcoal, 32,810 +420/–450 BP (VERA lab), while "malacological analysis … indicates a loess tundra landscape rich in herbs and grasses and with scattered undemanding bushes and/or tree species" (Neugebauer-Maresch 2008a:330). At the same time, a series of Gravettian levels (AH3.1–AH3.8) stratigraphically above the Aurignacian provided several C14 dates on charcoal ranging between 27,200 and 28,750 BP, strongly supporting the presence of Gravettian lithics in the 1890s and 1900s loess quarry area. Moreover, the lowermost archeological level (AH5) for the 2000-2002 excavations, again with no artifacts and recorded only by drilling holes, yielded a single C14 date on charcoal of 41,000 +1300/–1100 BP, allowing Neugebauer-Maresch to suggest even a Middle Paleolithic occupation for the site, which may be possible given the discovery of some definite side-scrapers of Middle Paleolithic types published by Strobl and Obermaier (1909: Tafel XIII).

All of these other industrial components within the Krems-Hundssteig site artefacts of the 1890s and 1900s studies are, however, of minor importance within the predominant Aurignacian 0/Protoaurignacian component there. Moreover, some wide-fronted carinated end-scrapers and blades with Aurignacian-like stepped retouch, noted by N. Teyssandier, do in fact occur in some similar Western European Aurignacian 0/Protoaurignacian assemblages – e.g. Cueva Morin. Thus, a new detailed techno-typological re-analysis of the Krems-Hundssteig old lithics collection is once again needed to clarify its specific features, keeping in mind that this is the richest Aurignacian 0/Protoaurignacian assemblage in Europe with ca. 1900 retouched Aurignacian microliths (*sic!*). Regarding the geochronological aspect for the Aurignacian 0/Protoaurignacian assemblage at Krems-Hundssteig, it should be noted that two C14 dates around 33-32,000 and 35,000 BP may well be connected not only to the Aurignacian 0, but also to one of two other possible industrial components there –Middle Paleolithic or Aurignacian I, or even, most likely, to a local steppe fire completely independent of any human occupation there, which is why Nigst's position of being very cautious about the Krems-Hundssteig Aurignacian 0 is quite understandable (Nigst 2009).

Banat (Romania)

The four sites of this region compose a rather compact Aurignacian complex group. Three sites (Tincova, Cosava, levels I and II and Romanesti-Dumbravita I, levels II-III) are relatively homogeneous and the lithic assemblages similar to one another both structurally and techno-typologically (Mogosanu 1972, 1983; Chirica 1996; Hahn 1977). This is expressed by the dominance of bladelet single-platform cores, including "carinated" types, and the following tool indications: the importance of carinated and thick/flat shouldered/nosed end-scrapers, although some fit better into our definition of bladelet "carinated" cores; the rarity of dihedral burins, the absence of carinated burins with a dominance of angle and on truncation burins (see Hahn 1977:131-134 and Tab. 3 on p.338); the presence of some truncations and retouched blades, some with "Aurignacian-like heavy stepped retouch" and, finally, a series of Font-Yves/Krems points and Dufour bladelets sub-type with mainly bilateral dorsal retouch (fragmented Font-Yves/Krems points?) and some bilateral alternate retouch. Less common "non-geometric microliths" in these assemblages (always less than 10% of the tool-kits) is clearly understandable given the lack of systematic sieving of the sediment screening during the excavations. On the other hand, Romanesti-Dumbravita II site could be a very special locus with only eight unretouched bladelets/microblades and 12 "non-geometric microliths": 1 bladelet with bilateral dorsal retouch (a fragmented Font-Yves/Krems point?), 1 Krems point on microblade with bilateral alternate retouch, 9 Dufour bladelets on 7 microblades and 2 bladelets with bilateral alternate retouch and 1 bladelet Dufour on microblade with lateral ventral retouch (Mogosanu 1983: Fig. 4, 11-18 on p. 230; Hahn 1977: p.134 and Tafel 169, 17-28). No other flint artifacts were found at the site. Taking together both tool structures in general and the representation of "non-geometric microliths" in particular, we can clearly infer functional differences between Tincova, Cosava and Romanesti-Dumbravita I, on one hand, and Romanesti-Dumbravita II, on the other hand, where

differences in retouch position on "non-geometric microliths" (although with the same dominance of "on-axis" removal direction, no real twisted general profiles and semi-abrupt micro-scalar and/or micro-stepped retouch) is one of the most interesting features. Often mentioned in the archeological literature (e.g. Kozlowski 1965:38), the industrial similarity between the Krems-Hundssteig and Tincova (the most known Banat Aurignacian site) Aurignacian complexes seems to be evident, while some of their differences may be explained through the proposal that "… Tincova is relatively homogeneous – the result of one or two occupations – whereas Krems-Hundssteig consists of at least ten occupation units" (Hahn 1977:309).

Thus, based on their techno-typological characteristics, the Banat Aurignacian assemblages are quite comparable to the first group of Western European Aurignacian 0/Protoaurignacian complexes with alternatively retouched Dufour bladelets and Font-Yves/Krems points, as well as to Krems-Hundssteig and the Siuren I 1990s Units H and G/1920s Lower layer Aurignacian.

The geochronological position of the Banat Aurignacian complexes is not as yet supported by absolute dates. General geological considerations and pollen data have led M. Carciumaru to attribute the Aurignacian of Tincova and Romanesti-Dumbravita I to the Second Pleniglacial of the Last Glacial and, specifically, to the period from the "Herculane I Oscillation" (the analog of Tursac Interstadial in Western Europe) to the "Herculane II Oscillation" (the analog of Laugerie Interstadial in Western Europe) (see Carciumaru 1980:190-200, 1993:225); in terms of absolute chronology, this covers the period between ca. 23,000 and 18,800 BP. It should be mentioned here that this absolutely surprising geochronological position for the Aurignacian *sensu stricto* proposed for the Banat sites has often been accepted, explaining why the Banat Aurignacian complexes were sometimes attributed to the Aurignacian V (Kozlowski 1993:285). We accept neither the geochronological position for the Banat Aurignacian nor its attribution to a mystical Aurignacian V. First, all archeologists discussing the Banat Aurignacian complexes noted their industrial similarity with the Krems-Hundssteig Aurignacian finds, including J.K. Kozlowski himself (e.g. Kozlowski 1965:38). In light of our own analytical comparisons of the European Aurignacian complexes under discussion, this similarity finds further support, making an "Aurignacian V" definition quite unrealistic. It is also worth noting here that, if it is true, we would be forced to discuss "the Aurignacian 0 Banat island" within a "Late Gravettian and Epigravettian sea" in Romania that is, by the way, very similar to Anikovich's (1992) position on the Siuren I Aurignacian. Finally, Carciumaru's (1980, 1993) geochronological periodization of the Romanian Middle and Upper Paleolithic leaves no doubt that it is generally "too recent" for many sites in addition to the Banat site; see for example the proposed "Ohaba B Oscillation" (the analog of the Maisières Interstadial in Western Europe) for many Middle Paleolithic complexes there. Taking all these considerations into account, the Aurignacian level association with a paleosoil at Tincova, Romanesti-Dumbravita I and Cosava and inferring a temperate Interstadial climate based on pollen data, we instead propose a correlation of the Banat Aurignacian either to the Hengelo or Arcy Interstadial, that would finally place these complexes within a "normal geochronology" for these industrially truly Aurignacian 0/Protoaurignacian assemblages.

A "new breath" for the Banat Aurignacian investigations is now coming. On one hand, a new published re-analysis of the Tincova lithic assemblage with is expected soon (see Teyssandier 2008:496-498). On the other hand, new fieldwork in Banat by German colleagues (J. Richter and Th. Uthmeier) may shed much more light on both industrial and chronological data for the Aurignacian sites. Thus, new possible data on the Banat Aurignacian should much enlarge our knowledge on the subject and may respond to the many open questions.

Upper Tisza river basin (Ukraine) – Beregovo site

Beregovo I is an Upper Paleolithic open-air site and among the first truly Paleolithic sites discovered in the Ukrainian Transcarpathia region (the westernmost region of Ukraine). It was found and first excavated by the famous Czech archeologist J. Skutil (1938:130-135) when the region was part of Czechoslovakia. Next, the site was excavated by S.V. Smirnov in the late 1960s and early 1970s (Smirnov 1974). The final, but limited, 20th century fieldwork was conducted by V.I. Tkachenko in the late 1980s and early 1990s (Tkachenko 1989, 2003). The different parts of the site excavated form a total area of ca. 240 sq. m, with only a little more than 1000 lithic artifacts found. The site's finds, with differences in their industrial and chronological interpretations seen in the publications of Smirnov and Tkachenko, were always considered as representing a Middle or Late Aurignacian with some carinated end-scrapers but no retouched microliths and many similarities to the Typical Aurignacian in Central Europe (first of all, in Slovakia). Geochronologically, the archeological layer was attributed to either the "Paudorf" paleosoil (Smirnov 1974) or to loam-like sediments above it (Tkachenko 1989, 2003). The site's importance was always considered from a geological point of view representing mostly the upper portion of the Würm Interpleniglacial and later periods in the Ukrainian Transcarpathian region (see Gladilin 1989:95; Tkachenko 1989:213-214). At the same time, the Beregovo I lithic analyses, especially Tkachenko's, were not entirely clear and understandable. This led to new limited excavations (ca. 8 sq. m area) at the site by V.I. Usik in 2006 and 2007 to resolve geological and archeological questions there (Usik 2008). The obtained results were quite unexpected and surprising, given the previous interpretations of the site. First, the position of the archeological layer within the site's Pleistocene sediment sequence has been finally precisely established. According to geologist N.P. Gerasimenko (Usik 2008:56-59), the Upper Paleolithic archeological layer is connected to the lower horizon of the Vytachiv (VT3+1) paleosoil; above this paleosoil there is another Vytachiv (VT3c) paleosoil definitely correlated to the Denekamp paleosoil. Taking these geological data into consideration, Usik correctly argues that the Upper Paleolithic layer should be dated to "a time span older than 27-30,000 BP" (Usik 2008:59). The main archeological surprise was the appearance of 55 retouched microliths (57.3%) out of 96 tools recovered in the new 2006-2007 lithic assemblage. Moreover, the retouched microliths (45 microblades and 10 bladelets) mostly include Dufour bladelets of Dufour sub-type with either alternate or ventral retouch.

No Font-Yves/Krems points were reported. Among other typologically indicative tool types, there are some carinated and thick nosed end-scrapers, a single carinated burin, dihedral, angle and on truncation burins. Some refits for artifacts from the 1969, 1975, 1990 and 2006-2007 excavations strongly suggests that all of the site's Upper Paleolithic artifacts originate from the same archeological layer. The appearance of retouched microliths at Beregovo I only during the 2006-2007 excavations can be explained by the practice of systematic water sieving of the sediments. Usik's attribution of the Beregovo I lithic artifacts as belonging to "Early Aurignacian of Krems-Dufour type" (2008:64), using Demidenko's terminology, should be accepted. It is also worth noting the presence of narrow flaked cores and a carinated burin among the 2006-2007 lithics, which is not a very typical feature for the European Aurignacian 0/ Protoaurignacian find complexes. At any rate, it is now clear that the Upper Tisza river basin with Beregovo I should be included within this category of European Aurignacian complexes and further field investigations at the site are surely needed.

Eastern Balkan area (Bulgaria) – Kozarnika Cave

Kozarnika Cave is a new and very important Paleolithic site in the Balkans (Northwestern Bulgaria), with a stratigraphic sequence from the Lower Paleolithic to the Late Paleolithic, as well as more recent layers from the Neolithic to the Ottoman period. The cave has been excavated since 1994 by a Bulgarian-French team headed by N. Sirakov and J.-L. Guadelli (Guadelli *et al.* 2005). Relevant to the present discussion are the "*Kozarnikien ancient*" materials from archeological layer VII at the cave, dated by four AMS dates (GIF lab) to a period in between 39 and 36,000 BP (Hengelo/Les Cottes Interstadial?). T. Tsanova is correct in connecting the layer VII lithic assemblage with the European Protoaurignacian and some Early Ahmarian complexes (Tsanova 2006:310-384). The following European Aurignacian 0/Protoaurignacian industrial features are clearly seen for the "*Kozarnikien ancient*" materials: rarity of carinated forms and absence of carinated burins, with bladelet production mainly producing non-twisted bladelets and microblades through primary reduction of bladelet single-platform cores. Double-platform cores are rare, some of which are not true bidirectional cores but bidirectional-adjacent cores with two striking platforms and two flaking surfaces (see Tsanova 2006: Fig. III. 20, 5). At the same time, end-scrapers are usually simple ones on blades with very few carinated, while typical burins are rare with no dihedral and carinated types. On the other hand, 40 retouched microliths are not only similar to Aurignacian 0/ Protoaurignacian microliths, but also to some Early Ahmarian ones. Using typological classification in the present volume, the Kozarnika cave, layer VII 40 retouched microliths (see Tsanova 2006: Table III.10) can be characterized as follows: Font-Yves/ Krems points with bilateral dorsal retouch – 8 items/20%; fragmented pseudo-Dufour bladelets with bilateral dorsal retouch – 16 items/40%; pseudo-Dufour bladelets with lateral dorsal retouch – 8 items/20%; Dufour bladelets with bilateral alternate retouch – 8 items/20%. Taking into account fragmented pseudo-Dufour bladelets with bilateral dorsal retouch, interpreted by Tsanova as point fragments, the group of Font-Yves/Krems points reaches 60% of all "non-geometric microliths". Such a dominance of pointed microliths is quite typical for Southern Levantine Early Ahmarian assemblages (e.g. the Boker A site – Jones *et al.* 1983; Monigal 2003). On the other hand, the Kozarnika cave, layer VII alternatively retouched Dufour bladelets are very typical of European Aurignacian 0/ Protoaurignacian assemblages with mainly continuous and well elaborated lateral edge retouch, while dorsal and alternate retouch on Ahmarian microliths is usually partial and bladelet production was also very different, obtained from blade/bladelet cores with elongated metric proportions.

Thus, so-called "*Kozarnikien ancien*" find complex opens a clear perspective for a wider look at geographically different Early Upper Paleolithic industries with bladelet production and serial "non-geometric microliths" (see Zwyns *et al.* 2008).

Concluding remarks

Thus, only 7 sites with Early Aurignacian complexes in Central Europe allow us to make the following observations. There are just a few Aurignacian 0/Protoauruignacian complexes with Dufour bladelets of Dufour sub-type and Font-Yves/Krems points in the region, although hundreds of Aurignacian sites (including here very numerous Aurignacian surface find spots in Moravia) have been found. The geochronological positions of these complexes are not yet well-established yet and can be placed within the rather broad interval between the Hengelo and Arcy Interstadials inclusive. It is also clear that both the Central and Western European Aurignacian 0/Protoaurignacian complexes are quite comparable by their techno-typological characteristics that do not contradict their grouping into one circle of Early Aurignacian manifestation in Europe.

Eastern European Aurignacian Complexes

The observed situation of relative scarcity of Aurignacian 0/ Protoaurignacian complexes in Central Europe continues further to the east. In fact, prior to our new comparative analyses in the early 2000s (e.g. Demidenko 2003b, 2004b, 2006; Demidenko & Otte 2000-2001, 2007), no site had ever attributed to this Aurignacian type industry, not taking into consideration Siuren I. This situation is further marked by a real rarity of sites and surface find spots with any Aurignacian *sensu stricto* finds, numbering less than 20 across this vast European territory (Demidenko 2004b, 2006). Nevertheless, we point out three additional sites at the southern edge of Eastern Europe: Chulek I open-air site (Lower Don River area), Kamennomostskaya cave, lower layer and Shyrokiy Mys open-air site (North-western Caucasus) in Russia. Thus, only four sites with Aurignacian 0/ Protoaurignacian assemblages with Dufour bladelets of Dufour sub-type can be identified in Eastern Europe (Demidenko 2000-2001, 2008a, 2008b; Demidenko & Otte 2000-2001, 2007), leaving aside some Kostenki site area data on possible Earliest Aurignacian occurrences there.

Of these, only one site - Siuren I (Crimea) – has a set of AMS dates and fauna, microfauna and malacofauna data enabling us to place its Lower Aurignacian finds from the 1990s Units H and G/the 1920s Lower layer into the regional geochronological scheme. The three other sites lack such natural science data to support any direct or indirect geochronological dating. The

Chulek I and Shyrokiy Mys open-air sites are in fact find spots with no preserved *in situ* archeological layer, but simply surface lithic finds. Kamennomostskaya Cave was only excavated in 1961 over a limited area and was then destroyed by local quarry activity. Therefore, only techno-typological lithic data have allowed us to attribute them industrially to the Aurignacian 0/ Protoaurignacian.

Moreover, surprisingly enough, the sites' artifacts show considerable variability within the proposed Aurignacian 0/ Protoaurignacian features. On one hand, the Siuren I and Chulek-I find complexes fit perfectly into European Aurignacian 0/Protoaurignacian group. As shown in previous chapters here, the Siuren I 1990s Units H and G/1920s Lower layer flint assemblages can be unquestionably considered as "full members" of the first group of the Western and Central European "Aurignacian 0/Protoaurignacian" with numerous alternatively retouched Dufour bladelets of Dufour sub-type and Font-Yves/ Krems points, including the Krems alternatively retouched variant. Some non-utilitarian objects from the Siuren I complexes, specifically *Apporhais pes pelicani* shell beads, are quite interesting in this regard as the same items have been identified in layer G of Riparo Moshi (Italy) with this kind of Aurignacian and not in any of the other many Upper Paleolithic archeological levels there (Stiner 1999). The Chulek I flint assemblage is set apart by the presence of often ventral basal thinning of many retouched microliths; it has even been propose that such microliths be termed the Chulek I type (Demidenko 2000-2001:151). This specific microlith feature is not unique, however, as it is known in some Western European Aurignacian 0/Proto-Aurignacian assemblages with Dufour bladelets of Dufour sub-type, although generally for single pieces. This ventral basal thinning element is the best illustrated for some Dufour bladelets from the Fumane Cave Early Aurignacian levels (Italy) (Broglio *et al.* 2005: Fig.9, 30-35, 37, 39). Accordingly, as with the respective Siuren I finds, Chulek I materials also fit well into the European Aurignacian 0/Protoaurignacian context.

On the other hand, Upper Paleolithic flints from Kamennomostskaya Cave and Shyrokiy Mys have techno-typological elements more in common with the Near East than in Europe. The Kamennomostskaya Cave, lower layer Aurignacian assemblage with a limited tool-kit (n=69) is noted for a series of "inverse truncations" that constitute 11.6% of the tool component. The importance of these tools lies in the fact that these "inverse truncations" are exactly the same as "lateral carinated pieces", widely known throughout the Near Eastern Aurignacian *sensu lato* sequence from its very beginning ca. 36-34,000 BP (e.g. Ksar Akil rock-shelter, levels XIII-X) until its very late manifestation ca. 18-17,000 BP (e.g. Ein Aqev). Although there are tendencies to revise the Aurignacian *sensu lato* internal industrial structure in the Near East (see for discussion Belfer-Cohen & Bar-Yosef 1999; Bar-Yosef 2000, 2006; Marks 2003; Goring-Morris & Belfer-Cohen 2006; Williams 2006), the lateral carinated pieces, among other techno-typological features, occupy a central role in various considerations of Aurignacian industrial determinations there. Nevertheless, keeping in mind all the questions in the Near Eastern Aurignacian debate, the Kamennomostskaya Cave UP materials fit much better into the Near Eastern Early Aurignacian context (complexes like Ksar Akil rock-shelter, levels XII-XI) than into any other possible European parallels. The proposed hypothesis has an additional typological nuance: the presence of some carinated burins in the Kamennomostskaya and Ksar Akil complexes. Shyrokiy Mys, with a very rich Upper Paleolithic assemblage, is very much industrially related to Aurignacian 0/Protoaurignacian. Yet it has unusually high portions of both Font-Yves/Krems points with bilateral dorsal retouch (8.2%), excluding dorsally retouched microliths with projectile "bending" and/or "spin-off" damage and pseudo-Dufour microliths with dorsal retouch (75.9%) present in the retouched microlith sample (ca. 700 items) that clearly calls for some special attention. Moreover, the occurrence of fine Ouchtata-like retouch on many dorsally retouched microliths and the relative scarcity of Dufour bladelets with alternate retouch (13.3%) for the Shyrokiy Mys microliths may well support Near Eastern and Middle Eastern Aurignacian comparisons. This is because, first, Ouchtata retouch is well-represented on many bladelets in Ahmarian and especially Late Ahmarian complexes in Near Eastern Upper Paleolithic context, although it is known to a much lesser extent for Aurignacian complexes as well. Second, the subordinate position of Dufour bladelets of Dufour sub-type with alternate retouch among retouched microliths, along with a noticeable serial presence of Font-Yves/Krems points or their Near Eastern and Middle Eastern typological equivalents, that is, el-Wad and Gar Arjeneh points, seems to be a distinct feature for the Early Levantine and Zagros Aurignacian. Accordingly, the Upper Paleolithic Near Eastern complexes like Ksar Akil, levels X-IX (Bergman 1987, 1988, 2003) and Zagros complexes like Yafteh Cave, lower levels 22-15 in the 1960s excavations (Otte & Kozlowski 2007) appear fairly similar to the Shyrokiy Mys assemblage. All in all, considering the compositions and features of the microliths, as well as common bladelet primary production, an absence of carinated burins and, at the same time, a good presence of carinated end-scrapers, and a minor but still a noticeable occurrence of Aurignacian-like blades with stepped retouch, the Shyrokiy Mys Aurignacian assemblage is in good agreement with some of the Earliest Aurignacian complexes in the Near and Middle East.

Concluding remarks

These data on the four sites from the southern part of Eastern Europe are set apart by the following observations. First, the only site with geochronological determinations, Siuren I rock-shelter in Crimea, is the youngest one of the great number of Aurignacian 0/Protoaurignacian sites in Europe – Arcy Interstadial (ca. 30,000 BP) according to the C14 results, probably older in our opinion (see Demidenko & Noiret this volume). At the same time, if our hypothesis of significant similarity between Upper Paleolithic finds from Kamennomostskaya Cave and Shyrokiy Mys and the Early Levantine and Zagros Aurignacian (especially assemblages from levels XII-IX at Ksar Akil) is correct, then we could hypothesize absolute uncalibrated dates for the North-western Caucasian sites as much older than 30,000 BP. Then, the possible Asian industrial connections for the two North-western Caucasian assemblages, keeping also in mind the late geochronology for the Siuren I Lower Aurignacian, allow us to make several important considerations regarding the origins of the Aurignacian 0/Protoaurignacian and initial

distribution in Eastern Europe. We are of the basic opinion that based on the available data for these very early Aurignacian manifestations, Eastern Europe has nothing to do with a possible Aurignacian 0/Protoaurignacian origin. On one hand, the Siuren I and Chulek I data clearly point to a late geochronology for this Aurignacian industry within the European record. On the other hand, the proposed Near Eastern and Middle Eastern correlations for the other two Upper Paleolithic assemblages in the southern part of Eastern Europe rather indicate the possible penetration of the Aurignacian 0/Protoaurignacian tradition into this part of Europe from Western Asia and not vice-versa, understanding that there is no Early Upper Paleolithic industry in Eastern Europe that could give rise to the Aurignacian tradition earlier than we know it for other parts of Western Eurasia. Thus, the Eastern European Aurignacian 0/Protoaurignacian data can now testify that the southern part of Eastern Europe was the area where carriers of the earliest true Aurignacian industrial tradition arrived from two different directions: from more western European territories for Siuren I and Chulek I and from the south, Western Asia, for Kamennomostskaya Cave and Shyrokiy Mys.

Final considerations

These brief observations on the European Aurignacian 0/ Protoaurignacian find complexes show, first of all, a great degree of similarity in basic techno-typological characteristics. Such similarity allows us to consider this Earliest Aurignacian industry type as "Pan-European". Indeed, apart from the importance of dihedral and carinated burins in a few complexes (e.g. Dufour in France and Kamennomostskaya Cave in Russia), there are not even any clear techno-typological changes through time for most of the complexes over this quite long, as for the Upper Paleolithic, time span – Hengelo/Les Cottes – Arcy Interstadials (ca. 38/36-30,000 uncalibrated BP). Moreover, even sites geographically situated at the edges of Europe and chronologically very different (Cueva Morin and Siuren I) have nearly the same lithic characteristics. This really means that a hypothetical or "miracle movement" of any site from our list of Aurignacian 0/Protoaurignacian complexes from its original location to a different part of the European continent, excluding, of course, lithic raw material differences, would not archeologically "spoil" the map of their distribution across the continent. Along with this, there is a clear tendency of significant decrease in site numbers for the Aurignacian complexes from west to east in Europe. Should we explain such patterning as the first appearance of this Aurignacian tradition in the southern part (mainly, the "Mediterranean belt") of Western Europe which then spread into Central and Eastern Europe? We would not do so for the moment. Instead, it is worth considering the apparent geographic distribution of these sites not only in Western Europe, but also Central and Eastern Europe as well. So, all but two of these European sites are found in the same southern geographical band in Europe – somewhat above 40°N latitude to around 46°N latitude. The two exceptions (Krems-Hundssteig and Chulek I) mark the northern extension of this Aurignacian industry type to around 48°N latitude, that can be still explained as being within the range of a single human adaptation system materially expressed by one basic flint and bone treatment and use tradition for survival in temperate climate of foothill forest and varying steppe landscapes (Demidenko 2002) with hunting of different ungulate species possible and access to river and/or sea aquatic resources. Also, the Aurignacian of level VII from Grotte du Renne at Arcy-sur-Cure (Northern Burgundy, France) may also connected to the two Austrian and Russian sites on the basis of its geochronological dating to the Arcy Interstadial (two conventional C14 dates – 31,800 ± 1240 BP [Ly-2162] obtained in 1981 on collagen and 30,800 ± 250 BP [GrN-1717] obtained in 1962 on burnt bone – see Schmider 2002: 9; and stratigraphic and pollen data – see Leroi-Gourhan & Leroi-Gourhan 1965; Leroyer & Leroi-Gourhan 1983; D'Errico *et al.* 1998; Schmider 2002: 27-47), location around 48°N latitude and the assemblage's techno-typological characteristics (Farizy & Schmider 1985; Schmider & Perpère 1995; Schmider 2002).

Taking all of these data and comments into consideration, we propose to naming the Aurignacian 0/Archaic Aurignacian/ Protoaurignacian as the Aurignacian of Krems-Dufour industry type to emphasize its Pan-European geographic distribution, following here studies of J.K. Kozlowski on the subject in the 1970s (Kozlowski & Kozlowski 1975, 1979). Additionally accepting both its early geochronological position and the rather uniform industrial techno-typological characteristics within the European Aurignacian, it is logical to specify its basic attribution as the Early Aurignacian of Krems-Dufour industry type, the term which should replace all of the previous names.

The Siuren I Evolved/Late Aurignacian of Krems-Dufour industry type of 1990s Unit F/1920s Middle layer in the context of the European Aurignacian

As with the comparative analysis for the Siuren I 1990s Units H and G/ 1920s Lower layer Aurignacian, the first step for the present investigation on this problem is to present the basic industrial features of the Siuren I 1990s Unit F/1920s Middle layer Aurignacian. Technologically, it is characterized by intensive primary reduction of both "regular" and Aurignacian "carinated" bladelet, mainly single-platform, cores and "carinated tools" (end-scrapers and notably burins) that resulted in pronounced microblade production. Typologically, it is marked by the presence of serial carinated burins, the prevalence of dihedral and carinated types over angle and on truncation/lateral types among burins; the occurrence of carinated and flat/thick shouldered/nosed end-scrapers; the absence of scaled tools and retouched blades, including pieces with "Aurignacian-like heavy stepped retouch" and, finally, the presence of abundant "non-geometric microliths" (about 40% of all tools in the 1990s Unit F) among which the most characteristic types are Aurignacian Dufour bladelets and pseudo-Dufour bladelets with either lateral ventral or dorsal fine marginal retouch on microblades with an "off-axis" removal direction and twisted general profile (Demars' Roc-de-Combe sub-type) in the 1990s Unit F. The rather simple set of bone tools (points with round sections) and non-utilitarian objects (a single broken polar fox tooth pendant and some shell beads) complete this artifact collection.

By about all the above-listed characteristics, this Siuren I one more Aurignacian assemblage is indeed enough different from

the rock-shelter's Lower Aurignacian find complex. Therefore, it represents another Aurignacian industry type.

The absence of any similar industries in the Crimea, again, as for the Siuren I Early Aurignacian of Krems-Dufour industry type, requires us to go beyond the peninsula to search for similar assemblages in Europe. It should be pointed out that industrially similar European Aurignacian complexes are not very common, unlike the Early Aurignacian of Krems-Dufour industry type, although they do exist; we will also discuss them by Western, Central and Eastern regions of the continent. It is also clear that the main "industrial techno-typological keys" for comparative analysis are: serial carinated burins and/or abundance of carinated and thick shouldered/nosed end-scrapers, regular occurrence of Dufour bladelets and pseudo-Dufour bladelets with lateral ventral and lateral dorsal fine marginal retouch mainly manufactured on microblades with "off-axis" removal direction and twisted general profile (Roc-de-Combe sub-type).

Western European Aurignacian complexes

The present knowledge on the respective Western European Aurignacian complexes is mainly restricted to French materials.

The most important relevant sites are known in the Périgord: Abri Pataud, level 8; Roc-de-Combe, levels 6-5 and Flageolet I, levels X-VIII. The main typological features of their lithic assemblages, bone tools and non-utilitarian objects data correspond well to this Siuren I Aurignacian complex with an understandably more important role for the busked variant of carinated burins for the French sites, which is so prominently expressed in the "Evolved/Late Aurignacian" there (see Movius 1977:113-120; Brooks 1995; Bordes & Labrot 1967; Demars & Laurent 1989:45, 47, 54-57, 102-103; Rigaud 1982; Lucas 1997; Djindjian 1993). In accordance with these archeological characteristics, the Périgord Aurignacian complexes are in the ranges of the well-known French Aurignacian II-IV stages – "Evolved/Late Aurignacian". The geochronological position of these Aurignacian complexes is related to the period between the Stadial before the Arcy Interstadial and the Maisières Interstadial (ca. 32,000-28,000 BP) that is based on C14 dates (e.g. conventional C14 date for Pataud, level 8 of 31,800 ± 280 BP – Movius 1977:120; C14 date for Flageolet I, levels IX of 27,000 ± 1000 BP – Lucas 1997:195) and various environmental data (e.g. Movius 1977; Laville 1982; Leroyer & Leroi-Gourhan 1993; Djindjian 1993).

It must be added that this state-of-the-art picture is changing in light of new technological studies. For example, Alexandre Michel has undertaken a new study of the Pataud, Roc-de-Combe, Le Flageolet and La Ferrassie collections (among others); according to him (Michel 2010), it is now possible to distinguish seven different phases in the Aurignacian complex *sensu lato*, including the (1) Proto-Aurignacian and (2) Early Aurignacian with split-based bone points that were discussed above. For the industries that are contemporaneous or comparable to Siuren I's Unit F in a way or another, Michel describes: (3) Middle Aurignacian with nosed end-scrapers, burins on truncation and "Pataud bladelets" (asymmetric with straight right lateral edge, curved left lateral edge, and inverse retouch on the right edge) [Pataud level 8, Ferrassie levels K4-K1], (4) Late Aurignacian with busked burins (mainly), nosed end-scrapers, Caminade end-scrapers, Caminade bladelets (small straight removals with fine direct retouch on the left) and "Roc-de-Combe layer 6 bladelets" (*i.e.* with inverse retouch on the right edge) [Roc-de-Combe layer 6], (5) Late Aurignacian with "destructured" burins and "Roc-de-Combe layer 5 bladelets" (*i.e.* with inverse retouch on the right edge and direct retouch on the left edge) [Roc-de-Combe layer 5, Le Flageolet layer F], (6) Evolved Aurignacian with *burins des Vachons*, and (6) Final Aurignacian with "Font-Yves bladelets" [Pataud layer 6]. These phases are not yet well situated from a chronological point of view, some of the latest being probably partially contemporaneous, but this work indicate at least a greater degree of complexity than usually thought, which does not, however, mean that the situation should be identical outside of the Périgord.

Two other cave sites with similar "Evolved/Late Aurignacian" assemblages are also known in Spain with conventional and AMS dates between 33,000-29,000 BP – Beneito, levels B9-B8 (Valencia) (Iturbe *et al.* 1993:48-54; Villaverde *et al.* 1998:139-148; Zilhao 2006:14-15; 38-40) and Bajondillo, levels 12-11 (Andalucia) (Cortes & Simon 2001:108-110; Zilhao 2006:14-15; 38-40).

Central European Aurignacian complexes

The only Aurignacian complex in this part of the continent, which can be considered as belonging to the Evolved/Late Aurignacian industry type, comes from the Gora Pulawska II open-air site (Eastern Poland). Its small lithic assemblage is quite unique typologically despite the presence of only 35 tools preserved today, obtained during the site's main excavations in the 1920s (Krukowski 1939-1948). Taking into account the low number of tools, it is useful to enumerate them according to Sachse-Kozlowska's data (1978:20 and Tables XLVI-XLVIII): end-scrapers – 19 pieces/54.3%, including 17 carinated and 1 thick-nosed; burins – 2 pieces/5.7% of only dihedral type; retouched blades – 1 piece/2.8%; truncations – 2 pieces/5.7% and, finally, "microblades with fine marginal retouch" – 11 pieces/31.4%. The latter mainly have bilateral dorsal and lateral dorsal retouch, with only a single occurrence of lateral ventral and bilateral alternate retouch. The great dominance of carinated *sensu lato* (including a thick-nosed piece) end-scrapers among the "indicative Upper Paleolithic tool types" is in good correspondence with the presence of two small bladelet "carinated" single-platform cores among a total of three cores in the assemblage. Thus, the presence of serial and numerous carinated end-scrapers and unique pseudo-Dufour bladelets and, at the same time, the absence of any carinated burins, are the main typological indicators of the Gora Pulawska II Aurignacian.

The geochronological position of the Gora Pulawska II Aurignacian is still rather uncertain. There are no absolute dates for the site, but it is commonly accepted that it belongs to the second temperate phase of the Würm Interpleniglacial (Kozlowski 1983:66) – Arcy + Maisières Interstadials. Generally, keeping in mind the northern geographical disposition of the site at 52°N latitude, it seems quite reasonable to suggest a tem-

perate period for penetration of Aurignacian human groups into the European lowlands and, indeed, the Arcy + Maisières Interstadials are the best candidates here because of the Gora Pulawska II "developed/evolved" Aurignacian typological characteristics.

Eastern European Aurignacian complexes

Aside from the Siuren I 1990s Unit F/the 1920s Middle layer Evolved/Late Aurignacian with Dufour bladelets/pseudo-Dufour of Roc-de-Combe sub-type in Crimea, there are few other sites with a similar, to some extent, type of Aurignacian industry in Eastern Europe – mainly the find complexes of Kostenki I, layers 2 and 3 (Russia), Kostenki XIV, ashy layer, and Mitoc-Malu Galben (Romania), if we exclude redeposited Aurignacian finds within the Middle Paleolithic layers at Stinka I (Western Ukraine) and Monasheskaya Cave (North-western Caucasus, Russia). As a consequence, only the famous Kostenki Paleolithic area and the site of Mitoc are relevant to this discussion of Aurignacian materials.

Kostenki I, layers 2 and 3

The lithic assemblages of the two layers from Kostenki I taken together can be summarized as follows, based on the published data after 1951, the 1986 and 1989 excavation campaigns (Rogachev 1957; Sinitsyn 1993) and some of Demidenko's personal artifact observations in 1999 and 2001 in St.-Petersburg. Primary reduction artifacts are characterized by the dominance of bladelet single-platform cores some of which are likely "carinated" types, although many cores are exhausted. The two most common tool classes (each about 25% of all tools) are end-scrapers, of which one-third are carinated and thick shouldered/nosed types, and "non-geometric microliths". A sample of 57 retouched microliths was studied in some detail by Demidenko. These are mostly elongated and narrow (usually 0.5-06 cm wide) microblades with mainly bilateral dorsal (38 items/66.7%) and a few lateral dorsal (4 items/7.0%) fine marginal retouch (pseudo-Dufour bladelets) and with significantly fewer bilateral alternate Dufour bladelets (12 items/21.0%), a few Font-Yves/Krems points (3 items/5.3%) including two items with bilateral dorsal retouch and another with bilateral alternate retouch; Dufour bladelets with lateral ventral retouch are entirely absent. Looking at twisted/non-twisted general profiles, 54 microliths are mainly non-twisted (68.5%), while twisted items comprise only 31.5%. Burins (about 10% of all tools) are represented by dihedral, angle and on truncation types, with a notable presence of some carinated types as well. Scaled tools and retouched blades occur in about equal proportions of ca. 10% of all tools each. The retouched blades include a few items with "Aurignacian-like heavy stepped retouch" and some Aurignacian pointed items. Other tool classes are represented by truncations, perforators and retouched flakes. The lithic artifacts are also accompanied by a rich collection of bone tools and non-utilitarian objects (Sinitsyn 1993) which, however, have not yet been fully described and published.

The geochronological position of the Kostenki I Aurignacian has been determined by data from layer 3: thirteen C14 dates from different, pollen data the layer's stratigraphic position within the "Upper Humus Bed" (Denekamp + Kesselt + Tursac Interstadials, according to Sinitsyn 1993:243). This stratigraphic position is also important because the "Upper Humus Bed" is situated above (*sic!*) an ashy level at some Kostenki sites where the ashy level has been dated by AMS to ca. 32,000 BP or, according to its Campanian Ignimbrite eruption event affiliation, to ca. 40,000 BP. The C14 dates on various samples from different labs for Kostenki I layer 3 are in the range of ca. 38,000-20,000 BP (Sinitsyn *et al.* 1997: Table I on p. 50). Sinitsyn is inclined to accept absolute dates around 32,000 BP as, in his opinion, they are in good accordance with the stratigraphic and palynological data. Therefore, he has proposed the Arcy Interstadial time span for layer 3 (Sinitsyn *et al.* 1997:29). On the other hand, the latest obtained conventional C14 date of 25,820 ± 400 BP (GrN- 22276) on a fresh charcoal sample from recent excavations has been interpreted by Belgian and Dutch specialists as the most reliable absolute date for layer 3, which fits well with six other C14 dates also on charcoal samples between 25,900 and 24,500 BP (Damblon *et al.* 1996:201). At present, we are inclined to support the second proposition for the layer 3 Aurignacian chronology. It gets further support through our more detailed look at all 13 C14 dates for layer 3, choosing only dates with low sigma (less than 1000 years). In this case, four C14 dates (GrN and GIN labs) on charcoal samples form a good cluster between 25,820 and 25,400 BP and another C14 date on charcoal with low sigma is far beyond the noted chronological range – 32,600 ± 400 (GrN-17117). Taking the absolute dates of ca. 25-26,000 BP into account with the already noted common Interstadial(s) characteristics for the "Upper Humus Bed", it is possible to propose a correlation of Kostenki I, layer 3 to the "Pavlov II Interstadial (absolute dates ca. 25,500-25,000 BP) recently proposed for the Central and Eastern European Last Glacial chronostratigraphy (Damblon *et al.* 1996). It is also important to remember here that Kostenki I is geographically somewhat below 52°N latitude, placing it in a series of rare Aurignacian sites in the northern latitudes of the European continent.

The final question focuses on the industrial attribution of the Kostenki I, layers 2 and 3 Aurignacian complex. By the presence of carinated cores, end-scrapers and burins, Aurignacian bilaterally retouched blades and pointed blades, retouched microliths including 21% Dufour bladelets with bilateral alternate retouch, the complex, first of all, is true Aurignacian *sensu stricto*. At the same time, it appears that the complex includes different features of Aurignacian 0 (carinated cores and end-scrapers, retouched microliths), Aurignacian I (various Aurignacian blades) and Aurignacian II-IV (carinated burins). Also, the majority of bilaterally retouched items on unusually narrow microliths adds another unique feature to this Aurignacian complex. Taking all these techno-typological data into consideration, the complex is a special one within the known European Aurignacian taxonomy. Adding here its unusually late geochronological position, making it as the youngest Aurignacian *sensu lato* complex in Europe, it is possible to propose a hypothesis explaining its specific features due to its very late chronology. Moreover, the specific features and late geochronology of the Kostenki I Aurignacian have striking similarities in south-western France with the assemblage from uppermost level 6 at Abri Pataud (see Brooks 1995; Chiotti 1999). It is possible that comparisons of

the Russian and French site materials would demonstrate a special sort of Late Aurignacian at two edges of Europe.

Of course, more work should be done at Kostenki I; new field investigations are underway by St.-Petersburg colleagues so more precise information will hopefully be available soon.

More information also is needed for the site of Kostenki XIV, ashy layer, even if technological analysis seem to indicate many convergences with Siuren I's Unit F (see Zwyns, this volume, and demidenko, this volume, Chapter 20).

Mitoc-Malu Galben

Mitoc-Malu Galben is located on the right bank of the river Prut, in Romania. Known since the 19th century, the main fieldwork began in 1978 by Vasile Chirica, with the help of a Belgian team (M. Otte, P. Haesaerts, Fr. Dambon and P. Noiret) in the 1990s (see Otte, Chrica & Haesaerts [dir.] 2007). It is an open-air location, on a promontory close to the river and to *formations crayeuses* in which flint is available. It was used as a knapping workshop for about 15,000 years, during both the Aurignacian and Gravettian periods. Archaeological remains correspond mainly to *débitage* waste, with few lithic tools, and few faunal remains, due to the purpose of the site, *i.e.* many short-term visits to the site for the preparation of lithic blanks. The Aurignacian sequence contains a set of three main assemblages (namely "Aurignacian I", "II" and "III", from the bottom to the top) with some characteristic lithics of the same cultural tradition slightly below the "Aurignacian I" during a cold episode between the first two climatic ameliorations of the second half of the Middle Pleniglacial. These isolated pieces are dated to around 32,700 BP. But the most important occupations correspond to the "Aurignacian I" assemblage. Many paleosoils are preserved in the stratigraphic sequence, providing one of the best preserved paleoclimatic sequence in Central and Eastern Europe for the second half of the Middle Pleniglacial. This Aurignacian I assemblage corresponds mainly to the paleosoil of the "MG11" interstadial, equivalent to Arcy in Western Europe, dated to 31,100-31,000 BP (Haesaerts *et al.* 2007). A Mladeč point made on reindeer antler confirms the attribution to a typical Aurignacian.

Lithic remains of the "Aurignacian I" assemblage are similar to Siuren I's Unit F, both in terms of technology and typology. Lamellar production in Mitoc was questionable for a long time, since bladelets were rarely recovered during excavations. But hints exist that could lead to the conclusion of a bladelet production, including, among others, the presence of short and twisted bladelets, from the front area of carinated tools (Noiret 2005a). The same bladelets were sometimes found (Otte & Chirica 1993; Otte *et al.* 2007), but in low quantity due to lack of screening. 667 lithics from a sediment sample from a hearth collected for dating, and recovered after careful screening, later proved that such production was really undertaken on the site, with a set of some 120 bladelets and micro-bladelets in less than one square meter (!) (Noiret *et al.* in press), and showing further technological similarities with Siuren I's Unit F (Zwyns this volume). This set of lithics has been directly dated to 31,160 ± 530 BP (GrN-20770).

From a technological point of view, 4 or 5 different bladelet *chaînes opératoires* are distinguishable. End-scrapers or nosed end-scrapers were used to produce small bladelets and this set of lithics contained some corresponding technical pieces (platform rejuvenation tablet, lateral preparation flakes to correct the angle of the flaking surface on the core-tool). Carinated burins also produced bladelets, probably of rectilinear or slightly curved profile and slightly longer than those from end-scrapers. A third method corresponds to small prismatic or pyramidal cores and a fourth is assumed from the presence of pieces and cores with long lamellar negatives on their narrow side. A fifth method could even be suspected due to the presence of flat lamellar scars on some burins, showing some similarity to the *burin des Vachons* (Noiret *et al.* in press). These *chaînes opératoires* were intended to produce blanks to be exported from the site, as proven by the total lack of any retouched bladelet!

Concerning the tools, the main characteristic of the "Aurignacian I" assemblage in Mitoc is the number of carinated burins (n=48, for a total of 200 tools), the most frequent tool, followed by carinated and nosed end-scrapers (n=44), and with notably three busked burins (Noiret 2004, 2006b). Chronological data for this assemblage are totally coherent with the three dates from Unit F in Siuren I, helping also to consider that Units G and H of the same site should probably be older (see Demidenko & Noiret this volume). And the presence of busked burins together with carinated burins recalls sub-units Fb1-Fb2 at Siuren I (Zwyns this volume).

Other sites?

The question is to determine whether other sites could have existed in the area, showing the same kind of Aurignacian industry. The site of Corpaci-Mâs (Borziac *et al.* 1981; Borziac & Chetraru 1996) is located on the other bank of the Prut River, in the Moldavian Republic, but very close to Mitoc. The lithic industry includes some carinated tools (end-scrapers), but also two foliate points that may indicate some problems of mixing for this assemblage. The presence, at any rate, of two Mladeč points, seems to indicate that a typical Aurignacian occupation also took place at this site, at one moment or another. In the same country, but along the Dniestr, the site of Climăuţi II may also have been the place of some Aurignacian occupations (Borziac *et al.* 2007), but chronological uncertainties still exist, and the lithic assemblage should be the focus of new and more detailed analysis.

Final considerations

So, the data on the Kostenki I and Mitoc Aurignacian, with only some techno-typological similarities to the Siuren I 1990s Unit F/1920s Middle layer Evolved/Late Aurignacian, allow us to make the following conclusions and hypotheses which may be especially interesting for comparisons to the European Early Aurignacian of Krems-Dufour industry type complexes observed above in this chapter.

First, the number of European Aurignacian sites comparable to the Siuren I Evolved/Late Aurignacian is smaller than the number of sites that can be compared to the Early Aurignacian of

Krems-Dufour type. Next, many European Early Aurignacian of Krems-Dufour industry type complexes were strikingly uniform in terms of industrial features and the characteristics of bone tools and non-utilitarian objects. The opposite is indeed true for the Evolved/Late Aurignacian complexes – they are represented by only a few important sites which are often quite different. Accordingly, a thought experiment in which dislocation of almost any Early Aurignacian of Krems-Dufour industry type find complex from one region to another one on the European continent would not "spoil the overall archeological picture", appears impossible for the Late/Evolved industry type assemblages under discussion due to the many differences between them.

Now let us discuss the shared and different traits of these Evolved/Late Aurignacian industry type complexes in Europe. It is possible to subdivide these Aurignacian complexes into two groups based on archeological characteristics and geographical position.

The first group would include the Crimean Siuren I 1990s Unit F/1920s Middle layer and the sites discussed here in south-western France and southern Spain. All of these are more or less similar in the main archeological and geochronological characteristics summarized above. The important moment is also a geographical one. Both the Crimean and French sites are located on the same "geographical band" around 45°N latitude and in similar environments – along river valleys within piedmont hill areas of medium elevation. The two Spanish sites are similarly located but further south in south-western Europe.

Mitoc is close, at about 48°N latitude. The lithic technology include a wider range of methods for the bladelet production than the above mentioned other sites, but as the retouched bladelets are completely lacking, precise comparisons with Siuren I or the French and Spanish sites are not easy (let us remember, nevertheless, presence of a few busked burins in Mitoc and Siuren, with carinated burins being the main characteristic of Mitoc's "Aurignacian I").

The second group of Aurignacian complexes can be created by considering together Polish Gora Pulawska II and Russian Kostenki I, layers 2 and 3. Because these Central and Eastern European complexes exhibit some significant differences with the Aurignacian assemblages from the first group and also between them, further discussion is needed here. Regarding the lithic artifacts, the Gora Pulawska II and the Kostenki I Aurignacian complexes in comparison to the Western European and the Siuren I complexes have a much more important role for microblades with fine dorsal marginal retouch (pseudo-Dufour bladelets). The Gora Pulawska II Aurignacian is also known by very limited tool class varieties – carinated and thick nosed end-scrapers and retouched microliths together comprise 82.9% of all tools (!) that definitely evidences a very specialized activity taking place at the site, which is also seen by the spatial distribution of flint artifacts in the archeological level – "4 small concentrations of artifacts around the hearths" (Sachse-Kozlowska 1983:177). On the other hand, the Kostenki I Aurignacian find complex contains products reflecting a great variety of activities undertaken at the site and, therefore, in our opinion, they certainly differ from Gora Pulawska II in typological features and the abundance of different bone artifacts. Moreover, while the Gora Pulawska II assemblage is highly likely the result of a single human occupational episode, in contrast, the Kostenki I, layer 3 assemblage, according to Rogachev (Rogachev 1957:30-34), is the combination of several archeological horizons and the result of multiple human occupational episodes. Thus, this variability in number of occupations can in fact explain the observed artifact differences which, in this case, can be transformed into the more understandable simple variability within the same Aurignacian artifact production and use system. Accepting this, we might go further to sites at the same geographical position – at around 52°N latitude. Finally, geochronological positions for the Gora Pulawska II and the Kostenki I Aurignacian find complexes are also notable because the latest chronology for the Kostenki I is actually beyond the "chronological upper limit" for European Aurignacian development *sensu stricto* (around 28,000 BP) and perhaps the same applies to the Gora Pulawska II Aurignacian. Taking all these considerations together, we may further suppose some special kinds of adaptations of Aurignacian human groups during their penetration into the European Lowland areas at the very end of the Würm Interpleniglacial ca. 26,000-25,000 BP, expressed, first of all, by the increasing role of carinated *sensu lato* end-scrapers, including thick shouldered/nosed ones, (small "mobile" bladelet/microblade cores?) and changing of fine marginal retouch placement from bilateral alternate and lateral ventral to bilateral dorsal and lateral dorsal, possibly reflecting a different use of these pseudo-Dufour bladelets on microblades as composites of projectile points.

Now finishing our "*summa summarum*" on the Siuren I 1990s Unit F/1920s Middle layer Aurignacian and the related European Aurignacian complexes, we think that it is possible to attribute all of these complexes to the Evolved/Late Aurignacian of Krems-Dufour industry type. This shows both changing industrial traits through time from the European Early Aurignacian of Krems-Dufour industry type and the internal development from the first group to the second of this Aurignacian type of complexes as the most likely result of adaptation to different environments and climate. Chronologically, the complexes of the first group should be dated from before the Arcy Interstadial to the Maisières Interstadial (ca. 33/32-28,000 BP), while the complexes of the second group may possibly be dated to the Pavlov II Interstadial (ca. 25,500-25,000 BP) at the very end of the Würm Interpleniglacial.

Concluding remarks

Putting the Siuren I Aurignacian complexes of 1990s Units H and G/Lower layer and of 1990s Unit F/1920s Middle layer into the context of the European Aurignacian indeed evidences their attribution to this Early Upper Paleolithic technocomplex. Moreover, the Siuren I Aurignacian complexes do, in fact, fit into the European Aurignacian of Krems-Dufour industry type complexes corresponding to this Aurignacian type, with two sub-types which we propose to name the Early and Evolved/Late. Each of these sub-types is quite distinct with respect to their archeological find characteristics, basic geochronological positions within the Würm Interpleniglacial and geographic distribution in Europe.

On the other hand, we are not inclined to consider the European Aurignacian of Krems-Dufour industry type as a "culturally" Aurignacian type completely separate of the Typical Aurignacian in Europe. This is explained by the fact that all basic "Indicative Upper Paleolithic Tool types" (carinated and thick/flat shouldered/nosed end-scrapers; carinated burins, including busked type; retouched blades with "Aurignacian-like heavy stepped retouched", particularly for some complexes in Central and Eastern Europe for the latter type), bladelet "carinated" cores, bone tools and non-utilitarian objects occur in both these types of European Aurignacian, keeping also in mind the notable occurrence of a few Dufour bladelets in Typical Aurignacian complexes as well. Thus, different proportions of the same artifact types cannot be used to support such a radical Aurignacian separation. Instead, we consider the European Aurignacian of Krems-Dufour industry type as reflecting a special adaptation system of human groups of the Early and then Late Aurignacian traditions to their environmental surroundings and to meet survival needs. In addition to a cultural interpretation, our opinion is in many aspects in accordance with J.K. Kozlowski's point of view on these Aurignacian problems, expressed by him in the late 1970s and which is cited below.

"… *the distinction between Typical Aurignacian and Krems-Dufour culture is partly a question of functional-ecological adaptation, and partly the expression of the stabilization of this distinction and of the formation of a separate cultural tradition. Subsequently, this tradition developed independently of any further adaptation processes*" (Kozlowski & Kozlowski 1979:29).

Specifically, Kozlowski's accent on "functional-ecological adaptations" and "this tradition development" correspond well to our proposals, although since the 1980s, J.K. Kozlowski has not continued to define the Aurignacian of Krems-Dufour industry type in Europe as a separate Aurignacian culture (e.g. Kozlowski 1993:287). Thus, considering these "functional-ecological adaptations" and "this tradition development" together, common changing trends through time for the European Aurignacian (e.g. the more important role of carinated burins in Evolved/Late Aurignacian), we see the development of both Typical Aurignacian and Krems-Dufour type complexes in similar ranges with, at the same time, changing of "non-geometric microlith" types for the latter type complexes, continuing their further adaptations to varying environments and climates. The "Pan-European" spatial distribution of these complexes additionally confirms a "genuine" basic Aurignacian uniformity.

Finally, the Aurignacian *sensu stricto* possibly left some successors in the European Upper Paleolithic after the end of Würm Interpleniaglacial (e.g. see Hahn 1977; Oliva 1993 on Central European Epi-Aurignacian dated ca. around 22-18,000 BP). The same is also true for the Central and Eastern European Evolved/Late Aurignacian of Krems-Dufour industry type, represented by Gora Pulawska II and Kostenki I, layers 2 and 3. During the Würm Second Pleniglacial and specifically its Cold Maximum phase (LGM) between ca. 22,000-18,000 years BP with the expansion of the polar front and extreme periglacial climatic conditions and environments much further to the south in comparison to the Würm Interpleniaglacial, the Aurignacian groups with the Central and Eastern European Evolved/Late Aurignacian of Krems-Dufour industry type complexes located at around 52°N latitude also had to move to the south to "refugia areas" as was assumed for the entire Northern European Upper Paleolithic population around that time (see Jochim 1987). We suggest (Demidenko 1999, 2008a) that the appearance of the "North Black Sea region Epi-Aurignacian of Krems-Dufour industry type" (Sagaidak I, Anetovka I, Muralovka, Zolotovka I sites) at ca. 22,000-18/17,000 years BP, in southern Ukraine and Russia below 48°N latitude was the result of such a migration of Aurignacian groups with already existing adaptations to the harsh European Lowland environments during the end of the Würm Interpleniglacial with "mobile" carinated *sensu lato* end-scrapers and pseudo-Dufour bladelets. The Epi-Aurignacian complexes in the southern part of Eastern Europe are, first of all, characterized by carinated atypical (i.e., with shortened non-lamellar removals) end-scrapers and numerous pseudo-Dufour microblades and chips of "Sagaidak-Muralovka" type with bilateral dorsal and lateral dorsal fine marginal abrasion retouch (see Praslov & Philippov 1967; Praslov 1972; Praslov *et al.* 1980; Praslov & Shchelinsky 1996; Stanko *et al.* 1989; Smolyaninova 1990). The main industrial traits of these Epi-Aurignacian complexes can be interpreted as a further step towards diachronic change of Aurignacian tool types which at ca. 22-20,000 BP became the only Aurignacian ones there. Both the time span and these Aurignacian tool types are reasons to term these complexes "Epi-Aurignacian of Krems-Dufour industry type". Such are the closest "historical traits" of the Evolved/Late Aurignacian of Krems-Dufour in this part of Europe.