Virtual trip to the Abric Romaní site and its lithic procurement areas

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Abstract:

This paper introduces the virtual field trip organised on the occasion of the 13th International Symposium on Knappable Materials in Tarragona from 4th to 6th October 2021, showing the Abric Romaní site (Northeastern Iberian Peninsula) and the chert procurement areas located within a 30 km radius.

The Abric Romaní section consists of a general presentation of the Middle Palaeolithic site, including a brief description of its 50 m stratigraphic sequence, where more than 20 archaeological levels have been identified dating from 110 to 39 ka BP, and some of the main traits of the archaeological assemblages have been recovered. This was followed by an introduction of the siliceous outcrops of the Panadella cherts approximately 24 km from the Abric Romaní; the Sant Martí de Tous chert outcrops 16 km away and the Valldeperes and Ca l’Alemany chert outcrops at distances of 24 and 25 km, respectively. In all cases, the geological formations, as well as the main chert macroscopic and microscopic characteristics, are described.

This paper yields the most relevant aspects of a field trip that had to be recorded due to the COVID-19 pandemic, but which brought us back together and facilitated the presentation of the main source areas frequented by the Neanderthal groups of this referential site.

Keywords: lithic raw materials; chert; Middle Palaeolithic; Abric Romaní; Sant Genís formation; Montmaneu formation; Valldeperes formation; Bosc d’en Borrás formation
1. Introduction

During the 13th International Symposium on Knappable Materials (ISKM) held virtually at Tarragona in October 2021, a virtual field trip was organised. It consisted of the recording of the original field trip, which would never have been done if not for the Covid-19 pandemic, which promoted the first entirely virtual ISKM (link).

This field trip involved a visit to the Middle Palaeolithic site of Abric Romaní and the new sequence of the Abric de la Consagració, both in the Cinglera del Capelló cliff (Capellades, Barcelona), as well as some locations that acted as procurement sources for the Neanderthals occupying the central areas of the Catalanian region.

The Abric Romaní site represents one of the most important Middle Palaeolithic archaeological sequences, becoming a referential site for its fossil record, structures (e.g. combustion structures), spatial distribution and temporal and stratigraphic high resolution. The new Abric de la Consagració excavations started in 2019, confirming an enormous archaeological potential; however, due to the limited information available, we decided not to include it in this presentation.

Regarding the locations presented in the field trip video (link), the symposium participants had the opportunity to virtually visit: (1) the siliceous outcrops of the Panadella chert (Montmaneu formation), located in the towns of Montmaneu and Veciana (Barcelona); (2) the Sant Martí de Tous outcrops in the homonym municipality and; (3) the chert workshop of La Guinardera and a recently discovered Mesolithic - Neolithic sequence, Cal Sitjo, both in the town of Sant Martí de Tous (Barcelona). These locations are evidence of an intense and diachronic occupation of the area due to the chert abundance and availability for procurement and have already been discussed in this and previous volumes (Gómez de Soler et al. 2021; Gómez de Soler et al. 2023a).

With the idea of presenting the main chert outcrops frequented by the Neanderthals of Abric Romaní, we introduce the different chert types according to their importance in the archaeological assemblages, including the Valdeperes and Cal’Alemany cherts as exploited raw materials of the Abric Romaní sequence.

2. The Abric Romaní archaeological site

The Abric Romaní site is located in the town of Capellades (Barcelona, Spain) (Figure 1). It is a large rock shelter situated on the travertine cliff, known as Cinglera del Capelló (Vallverdú et al. 2014; Vaquero et al. 2013).

It was discovered in 1909 and first excavated by Amador Romaní at the beginning of the 20th century (Vidal, 1913: 272). The ongoing project began in 1983 and is currently under the direction of the Institut Catalá de Paleoecologia Humana i Evolució Social (IPHES-CERCA). The research interest is based on the systematic recovery and spatial documentation of all structures and archaeological materials obtained from a large-surface excavation (200–300 m²) focused on H to R (currently under excavation) archaeological levels.

The stratigraphic sequence comprises 50 m of well-stratified travertine sediments dated by U-Series and 14C between 40 and 110 ka years, which contains more than 20 archaeological layers (Bischoff et al. 1988; 1994; Sharp et al. 2016; Vallverdú et al. 2014; Vaquero et al. 2013). All archaeological horizons are associated with the Middle Palaeolithic, except for the uppermost level A, which is attributed to the Early Upper Palaeolithic.

The palaeoecological record from Abric Romaní indicates a mosaic landscape, with different vegetal communities, including forests, riparian forests, prairies and steppe environments (Burjachs et al. 2012). Climate variations include alternating wet and dry phases along the sequence with colder conditions than today (Vaquero et al. 2013).
The excavation of such a large area, combined with the high temporal resolution of the archaeological units, has provided a detailed picture of the spatial organisation strategies of the Middle Palaeolithic human groups (Figure 2). The occupations are mainly focused around on well-preserved hearths that form a clustered distribution on most archaeological levels (Vaquero & Pastó 2001). These are the result of an unknown number of long term occupation events or short occupation or non-residential ones (Vallverdú et al. 2005; 2010; Vaquero et al. 2012).

A general characteristic of the archaeological levels of Abric Romání is the fragmentation of the lithic reduction sequences, although refitting studies have shown that some of them were carried out on the spot in well-defined knapping areas (Vaquero et al. 2007; 2012). The main objective of the lithic sequences was to obtain as many knapping products as possible, and these form the predominant category on all archaeological levels. Cores and retouched objects are scarce (Figure 3). Chert was the main exploited raw material, usually representing at least 80% of the whole lithic assemblage, followed by limestone and quartz (Gómez de Soler et al. 2020b). Chert was mainly collected in primary or sub-primary position in a regional range (between 15 and 20 km from the site), with fluctuations in the percentage of chert procured in outcrops approximately 30 km west (W) - north-west (NW) from the site (Gómez de Soler et al. 2020a; Soto et al. 2014).
Technological analysis has also allowed us to describe different reduction sequences performed at the site (Bargalló 2014: Chapters 5, 6 & 8; Chacón, 2009; Chapters 8, 10 & 11; Chacón et al. 2013; Romagnoli et al. 2018; Vaquero, 1997: Chapters 5, 6 & 7; Vaquero et al. 2012, among others): tested cores without later transformation, hierarchical centripetal cores, Levallois method (essentially recurrent centripetal), discoid methods, polyhedral morphologies and core on flakes with some removals without any predetermined organisation. The distribution of the different strategies is not homogeneous on all levels. At the upper levels (level E), there is a tendency for hierarchical strategies. However, in the intermediary levels (levels I, J, K, L, M and N), there is a preference for non-hierarchical and expedient strategies. In lower levels O and P, the existence of hierarchical strategies is identified again, with a high number of cores and knapped products showing the use of the Levallois method (level O) and laminar production (level P). Levels Q and R are currently under study. The main retouched artifacts on all levels are denticulates and notches (up to 90%), but scrapers are also present (Figure 3).

The faunal assemblage presents 13 different taxa, although deer (*Cervus elaphus*) and horses (*Equus ferus*) are the most common species at all archaeological levels. Aurochs (*Bos primigenius*) and chamois (*Rupicapra pyrenaica*) are also present (Marín et al. 2017a; 2017b). The presence of rhinoceros (*Stephanorhinus hemitoechus*) has also been documented at various levels, although the remains are very scarce. Despite the high predominance of herbivores, some carnivore remains have also been recovered. These are more abundant in the upper part of the sequence (up to level E), where a cave environment allows the presence of these animals along with occasional dens. Apart from the natural intrusion of carnivores on levels B and O, the remains of *Lynx sp.* and *Felis silvestris* with cut marks have been documented as the result of their processing and consumption (Gabucio et al. 2014; 2017).

The skeletal profiles show a high presence of survival items: cranium, jaws and diaphysis fragments of long leg bones (Figure 4). This representation is attributed to the development of various transport strategies for medium-sized and large animals. The postcranial axial skeleton was transported only in a few events, and once at the site, it was highly sensitive to destruction due to taphonomic processes. However, the decision to transport or discard at the kill or butchering site was not made according to the size-weight difference (Marin et al. 2017a; 2017b).
The sedimentary context of Abric Romani is characterised by the dominance of travertine formation dynamics, which provide tufa deposits covering most of the archaeological levels and allowing an excellent preservation of the remains, especially wood imprints and hearths. Wood remains have been identified on all levels excavated on the large surface (from H to R)

Figure 4. Examples of faunal remains from different levels of the Abric Romani site: A) Mandibular specimens of *Cervus elaphus*. B) Mandibular specimens of *Equus ferus*. C) Specimens with anthropogenic and carnivore modifications (Photos P. Saladié & J. Marín IPHES-CERCA)
Their use for various activities has been documented: (1) as fuel, the wood imprints are documented as charred firewood on the combustion structures or as accumulated reserves; (2) as structural elements, to organise the occupied surface and; (3) as wooden objects and for tools, making it possible to document the use of wood by Neanderthals (Allué et al. 2017; Carbonell & Castro-Curel 1992; Castro-Curel & Carbonell 1995; Solé et al. 2013).

The preservation of numerous hearths has also been used as a proxy for recognising the activity areas, along with the spatial distribution of the lithic artifacts and faunal remains. Hearths played a central role in spatial organisation, as most activities were carried out around them. This gave rise to a spatial pattern characterised by well-defined hearth-related accumulations (Gabucio et al. 2017; Vallverdú et al. 2005; 2010; 2012; 2014; Vaquero & Pastó 2001; Vaquero et al. 2004; 2007; 2012).

The spatial documentation of the combustion structures of Abric Romani supports the argument that the Neanderthals used fire for different purposes. The number of hearths comprises about 300 and shows different construction techniques. The most common combustion structures (>80%) are flat and without stones. There are also flat combustion structures with stones, within concavities with carved tails, in small pits with burned stones and sediments and in re-excavated holes (Carbonell et al. 2007; Vallverdú et al. 2012).
3. Chert outcrops

As previously mentioned, chert was the most exploited raw material by the Neanderthals that occupied the Abric Romani, representing over 80% of most of the archaeological levels (Gómez de Soler et al. 2020b). Systematic surveys performed in recent years have determined that the potential procurement areas are within a radius of 30 km from the site, where up to 32 chert outcrops have been located. The calculation of the chert abundance ratio (Soto et al. 2018), a quantitative approach to measure the raw material availability in specific areas, together with macroscopic and petrographic analyses, confirm the under-exploitation of the local raw materials (<10 km), attributing most of the procurement strategies to a regional framework (15-25 km) (Gómez de Soler et al. 2020a).

The main procurement areas are located between a 16 km (Sant Martí de Tous chert) and 24 km (Panadella chert) radius, indicating different procurement strategies and mobility patterns (Figure 6). For example, stone tool assemblages from levels M and Oa fall within a foraging radius, whereas level P, in part, suggests a logistical radius, suggesting a complex scenario of extensive knowledge and intensive exploitation of the landscape among Neanderthals.

3.1. The Sant Martí de Tous chert

The Sant Martí de Tous chert is included within the Sant Genís formation (Colldefons et al. 1994a), a Cenozoic lithostratigraphic unit which is part of the sedimentary filling of the Ebro Basin, an extensive triangular unit bordered by the Pyrenees and the Basque-Cantabrian

Figure 6. Location of the Sant Genís formation with its chert outcrops (green, SMT), the Montmaneu formation with the three described chert outcrops (yellow, PAN) and the Valdeperes (VLD) and Ca l’Alemany (ALE) cherts (light green and light blue, respectively). The black triangle on the right represents the Abric Romani site, and the black dots indicate the localised chert outcrops. Towns: MONT, Montmaneu; SMT, Sant Martí de Tous; VLD, Valldeperes (modified from Gómez de Soler et al. 2020a: 10).
Ranges to the north, by the Iberian Ranges to the south and by the Catalan Coastal Ranges to the east. This depression is mainly drained by the Ebro River and corresponds to a tertiary sedimentary basin with Paleogene deposits formed by erosive processes affecting the bordering ranges.

The Sant Genís formation has a Priabonian age (Upper Eocene) and is part of the La Noguera Lacustrine system (Anadón et al. 1989), under the denomination of Upper Gray Lutites (Sáez 1987: 60). Currently, it has a maximum extent of 1.5 km width and 12 km length, with a NE-SW orientation, located between Sant Genís (Jorba) and Fillol (Sant Martí de Tous), with a surface area of approximately 5.6 km². It is formed by a succession of 400 m of sandy lutites of red colour, with horizontal lamination and ripples, inserted by occasional limestone layers with charophytes and gastropods (Colldefons et al. 1994a). In the cartographic maps, two formations divide it: one formed by red sandstones and marls, and the other by grey sandstones and marls, with local stratified gypsum (Peón & Alonso 1975).

In the locality of Sant Martí de Tous, where silicifications appear in red sandy lutites interlayered with red tabular limestones, they are associated with lacustrine shallow conditions or sabkha environment type. At the base of the formation, alternant layers of bedded nodular and laminated gypsains are present. Through the SW of the locality, these gypsum layers become massive gypsains with nodular chert (Ortí et al. 2007). These outcrops are located approximately 16 km from Abric Romani.

Due to its great variability, it can be defined as heterogeneous chert. Macroscopically, it is characterised by fine-to-medium textures, with blue, grey and brown translucent colours with evaporite relicts. Microscopically, it is formed by microcrypto quartz (50 - 60%), with secondary gypsum (15 - 25%), disseminated, sparry calcite (5 - 10%) and dissolution and nodulisation structures. This heterogeneous character, represented in different shapes, sizes, colours and textures, also confers a highly variable aptitude for knapping, depending on the chosen block.

Applying the chert abundance ratio method (Soto et al. 2018) to the Sant Genís formation, we estimated a chert volume of .0052 km³ in an outcrop volume of .0207 km³, which means a density of .25 km³.

Two main sectors have been defined with high chert abundance: the Guinardera sector and the Fillol sector (Figure 7). In the Guinardera sector, we define two sections: Guinardera and Cal Perdut. The Guinardera section, with a 40 m sequence, contains three chert outcrops in the primary position (from bottom to top: Guinardera -01, -02 and -03). Between the chert outcrops of Guinardera-02 and Guinardera-03, we localised and excavated two chert workshops: the Guinardera workshop (from different chronologies) and the Guinardera Nord workshop (for the configuration of gunflints). The two workshops are located on two different slopes on a small hill, named ‘Serral dels Concos’, 300 m apart from each other (Gómez de Soler et al. 2021).

The Cal Perdut section presents five chert outcrops in the primary position in an 80 m sequence (from bottom to top: Cal Perdut -01, -02, -03, -04 -PER- and in the same layer as Cal Perdut -04, Mas de Tous, the toponym that gives it its name).

At the Fillol sector (Ortí et al. 2007), we define two sections: Cal Tomàs and Fillol. The Cal Tomàs section contains three chert outcrops in a 40 m sequence, formed of 20 m white marls with chert nodules at the base (Cal Tomàs -01 -CT-01-); 10 m of red lutites with chert (Cal Tomàs -02 -CT-02-), corresponding to the base of the Fillol section and 10 m of grey lutites with chert nodules at top (Cal Tomàs -03 -CT-03-).

The Fillol section is formed of 20 m of alternant red massive lutites with secondary gypsum in its basal part, red lutites and cherts (Cal Calaf -CAL-01 and -02) with banded stratifications and nodular and meganodular structures.
3.2. The Panadella chert

The Panadella chert is located in the Montmaneu formation at the NE margin of the Ebro Basin (Catalonia, Spain) and dates back to the Rupelian (Lower Oligocene). It is formed of 120 m of light grey stratified limestones with bedded-nodular chert, associated with the La Segarra lacustrine system (Figure 8). This chert is macroscopically characterised by its homogeneity, with opaque greenish black colours, very fine texture and bioclasts that generate mudstone-wackestone textures. Thin sections show a micro-cryptocrystalline quartz matrix with micritic calcite, abundant charophytes and scattered detrital quartz. These features confer excellent qualities for knapping (Gómez de Soler et al. 2020b).
Only three outcrops of the Panadella chert (PAN) have been located, considering the Montmaneu Formation, a non-continuous chert formation. Raw material sources are circumscribed to the northern part of this formation. The first two outcrops are close to each other. They are grouped together and named Panadella, the toponym that gives name to the type of chert, and are situated at the entrance of Montmaneu town (Anoia, Barcelona). The third one is situated in an old quarry at Veciana (Anoia, Barcelona); this outcrop is known as Pla de la Casilla, defined by Ortega et al. 2016 (Figure 9). The average distance of the three outcrops from Abric Romani is 24 km.
Figure 9. a) PAN outcrop and detail of one of the layers with chert. b) PC outcrop and detail of one of the layers yielding chert (from Gómez de Soler et al. 2020b: 8).

3.3. The Valldeperes chert

The Valldeperes chert is formed in the homonymous formation. Initially, the Valldeperes formation was assigned a Lutetian age (Benzaquen et al. 1972; Anadón 1978;). Later, Anadón and Marzo (1986) attributed it a possible Bartonian age, which was ratified by Ortí et al. (2007) definitively attributing this age to this formation (Middle Eocene). It extends from the town of Vilaverd, in the province of Tarragona, and runs parallel to the Pre-littoral Mountain Range until past Valldeperes (Pontils) in the province of Barcelona, extending along 55 km. It is made up of two stretches of white chalky dolomites with chert and limestone, which intersperse the levels of calcareous and dolomitic marls. It has a width of approximately 120 m. In large areas, it is characterised by nodular gypsum with chert, developed within dolomitic sections, reaching, in some cases, the predominant lithofacies (e.g., in the location of Valldeperes) (Anadón & Marzo 1986). The study of gypsum levels shows that these evaporites have a hydration origin of diagenetic primary nodular anhydrites (Anadón 1978).

The depositional environment corresponds to very shallow lakes of the beach sabkha-type lake, characterised by the deposition of carbonate muds and marls exposed to emersions in large areas, with the development of diagenetic evaporites, as well as dolomitisation of the initial calcareous muds.

Different chert outcrops have been defined, highlighting those of Vallespinosa, Valldeperes and Cal Salvet (Figure 10). The average distance of the three outcrops from Abric Romani is 24 km.

The Valldeperes formation chert exhibits varying colours of bluish, greyish and brownish. Light colours have opaque transparency, while dark colours have translucent transparency. Both have different aspects. Its texture ranges from fine to medium grains. In many cases, evaporitic relics are lenticular gypsum crystals or gypsum crystal pseudomorphs. From a microscopic viewpoint, it is formed of a microquartz with secondary gypsum.
3.4. The Ca l’Alemany chert

The Ca l’Alemany chert is located in the Bosc d’en Borràs formation, Bartonian age dated (Middle Eocene). Its chert outcrops extend between the towns of Vallespinosa and Valdeperes and lie on the Valdeperes formation. Towards the NE, it passes to the La Portella formation and, in part, to the Fontanelles formation. To the SW of Pontils, it loses development, partially becoming a formation made up of lutites, red sandstones and gypsum.
It has a sequence of 95 m and is characterised by two carbonate units separated by an intermediate unit of lutites and red marls with thin limestone levels. The carbonate tranches are made up of grey and brown micritic and bomicritic limestones with chert that intersperses the levels of marls and lignites (Anadón 1978; Colldefons et al. 1994b; Ortí et al. 2007). It is associated with marshy depositional environments with abundant emersions and traces of soil formation in the primitive carbonates deposited.

Different chert outcrops have been defined, highlighting those of Els Solans and Ca l’Alemany (Figure 11). The average distance of the three outcrops from Abric Romani is 25 km.

The Bosc d’en Borràs formation cherts have brownish and bluish greyish colours, with dark tones for the brownish and light tones for the greyish. It presents matt aspect and translucent tones with a fine texture and evaporitic relicts. Microscopically, it is formed mainly by microquartz, followed by cryptoquartz and length-fast chalcedony. As non-siliceous components, secondary gypsum and sparitic carbonates are described.

4. Conclusions

The Abric Romani site offers an amazing Middle Palaeolithic sequence, allowing us to analyse in detail several aspects of Neanderthal lifeways. The chert sources of the region show a rich territory where lithic raw materials were exploited since at least the Middle Palaeolithic up to historical times.
For Abric Romaní, the main procurement areas were the Sant Martí de Tous chert, approximately 16 km in straight line distance from Abric Romaní, followed by the Panadella chert, approximately 24 km, and the Valldeperes chert and Ca l’Alemany chert, with distances of 24 and 25 km, respectively.

Regarding the chert outcrops presented, Sant Martí de Tous chert is characterised by its great heterogeneity and concentration in a delimited area, which played a key role as a source, supply route and distribution of raw material throughout prehistoric times. In contrast, the Panadella chert is characterised by its great homogeneity and quality knapping but with a scarce presence in the territory, which causes a lower procurement and exploitation of this chert variety.

Finally, the cherts from Valldeperes and Ca l’Alemany, both quite heterogeneous, with a variability in knapping aptitudes are present in the territory in a similar manner. The Valldeperes and Ca l’Alemany cherts are somewhat continuous over an extension of approximately 55 km long between the provinces of Tarragona and Barcelona.

The 13th ISKM virtual trip presented here offered the symposium participants the possibility to know, first hand, a complex territory with abundant and varying lithic resources exploited from the Middle Palaeolithic up to now, becoming a key area for human occupations.

Acknowledgements

Funding for this research was provided by the Catalan Government research group nos. 2017 SGR 859 and 2017 SGR 836 and by the Spanish Government projects PID2019-103987GB-C31 and PID2019-103987GB-C33. The research of B.G.S. and M.G.CH. was funded by the CERCA Programme/Generalitat de Catalunya. M.S. research was funded by the UAM-2019 Tomás y Valiente Program. M.S.R was funded by a PTA contract (PTA2018-016561-I). The Institut Català de Paleoecologia Humana i Evolució Social (IPHES-CERCA) received financial support from the Spanish Ministry of Science and Innovation through the ‘María de Maeztu’ program for Units of Excellence (CEX2019-000945-M).

Finally, we would like to thank the anonymous reviewers for their comments and suggestions that have improved the manuscript, as well as the members of the editorial team of the JLS Dr. Anne Ford, Dr. Otis Crandell and Dr. Alejandro Prieto.

Data accessibility statement

All data generated or analysed during this study are included in this published article.

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Viaje virtual al yacimiento del Abric Romaní y sus zonas de aprovisionamiento lítico

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Resumen:

En este trabajo se presenta la salida de campo virtual organizada con motivo del 13th International Symposium on Knappable Materials organizado en Tarragona del 4 al 6 de octubre de 2021, en el que se muestra el yacimiento de Abric Romaní (NE de la Península Ibérica) y las zonas de captación de silex situadas en un radio de 30 km, la cual tuvo que ser grabada por la situación de pandemia causada por la COVID-19.

La sección del Abric Romaní consiste en una presentación general del yacimiento del Paleolítico Medio, incluyendo una breve descripción de su secuencia estratigráfica de 50 m, donde se han identificado más de 20 niveles arqueológicos datados entre 110 y 39 ka BP, y se presentan de manera general los principales rasgos de los conjuntos arqueológicos. A continuación, se han introducido los afloramientos sílicos de los silex de la Panadella a unos 24 km del Abric Romaní; los afloramientos de silex de Sant Martí de Tous a 16 km y los afloramientos de silex de Valldeperes y Ca l’Alemany, con distancias de 24 y 25 km, respectivamente. En todos los casos se describen las formaciones geológicas, así como las principales características macroscópicas y microscópicas del silex.

Entrando un poco en detalle, el yacimiento de Abric Romaní ofrece una asombrosa secuencia del Paleolítico Medio, incluyendo una breve descripción de su secuencia estratigráfica de 50 m, donde se han identificado más de 20 niveles arqueológicos datados entre 110 y 39 ka BP, y se presentan de manera general los principales rasgos de los conjuntos arqueológicos. A continuación, se han introducido los afloramientos sílicos de los silex de la Panadella a unos 24 km del Abric Romaní; los afloramientos de silex de Sant Martí de Tous a 16 km y los afloramientos de silex de Valldeperes y Ca l’Alemany a distancias de 24 y 25 km, respectivamente. En todos los casos se describen las formaciones geológicas, así como las principales características macroscópicas y microscópicas del silex.

En un poco en detalle, el yacimiento de Abric Romaní ofrece una asombrosa secuencia del Paleolítico Medio, que nos permite analizar en detalle varios aspectos de los modos de vida de los neandertales. Las áreas fuente de captación de silex de la región muestran un rico territorio donde se explotaron materias primas líticas desde al menos el Paleolítico Medio hasta épocas históricas.

Para el Abric Romaní, las principales zonas de captación de silex fueron las de Sant Martí de Tous, a unos 16 km en línea recta de Abric Romaní, seguido del silex de Panadella, a unos 24 km, y el silex de Valldeperes y el silex de Ca l’Alemany, con distancias de 24 y 25 km, respectivamente.
En cuanto a los afloramientos de sílex presentados, el sílex de Sant Martí de Tous se caracteriza por su gran heterogeneidad y concentración en un área delimitada, que jugó un papel clave como área fuente, vía de abastecimiento y distribución de materia prima a lo largo de la prehistoria. Por el contrario, el sílex de la Panadella se caracteriza por su gran homogeneidad y calidad de talla pero con una escasa presencia en el territorio, lo que provoca una menor obtención y explotación de esta variedad de sílex.

Por último, los sílex de Valldeperes y de Ca l'Alemany, ambos bastante heterogéneos, con una variabilidad en las aptitudes de talla, están presentes en el territorio de forma similar. Los sílex de Valldeperes y Ca l'Alemany tienen cierta continuidad en una extensión aproximada de 55 km entre las provincias de Tarragona y Barcelona.

El viaje virtual del 13º ISKM ofreció a los participantes del simposio la posibilidad de conocer de primera mano un territorio complejo con abundantes y variados recursos líticos explotados desde el Paleolítico Medio hasta la actualidad, convirtiéndose en un área clave para las ocupaciones humanas.

Keywords: materias primas líticas; sílex; Paleolítico Medio; Abric Romani; Formación Sant Genís; Formación Montmaneu; Formación Valldeperes; Formación Bosc d'en Borràs