



Human Palaeontology and Prehistory

The Neolithic Necropolis of La Feixa del Moro (Juberri, Andorra): New data on the first farming communities in the Pyrenees



La nécropole néolithique de la Feixa del Moro (Juberri, Andorre) : nouvelles données sur les premières communautés d'agriculteurs et éleveurs des Pyrénées

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ABSTRACT

The excavations carried out from 1983 to 1985 on an Andorran hillside by the former Andorra National Artistic Heritage Archaeological Research Service revealed one of the most important Neolithic sites in the Pyrenees. Directed by Xavier Llovera and Pere Canturri, the excavations uncovered a settlement with two interesting features: 1) it was located in a high mountain area, and 2) the same place possessed numerous domestic and funerary structures. Both factors have made La Feixa del Moro a key site in the prehistory of both

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the Pyrenees and the western Mediterranean in general. Three decades later, a pluridisciplinary team has begun a careful review of the documentation, studied the human remains and artefacts in the graves, carried out several forms of biochemical analysis and obtained new radiocarbon determinations for the individuals exhumed in two of the three burials in stone boxes (or cists). The objective is a better understanding of the first farming communities that settled in the Pyrenees.

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R É S U M É

Les interventions successives réalisées entre 1983 et 1985 sur un versant des vallées andorranes par l'ancien service de recherches archéologiques du Patrimoine artistique national d'Andorre ont abouti à la découverte de l'un des plus importants gisements néolithiques des Pyrénées : la Feixa del Moro. Les fouilles dirigées par Xavier Llovera et Pere Canturri ont permis de mettre en évidence deux aspects remarquables : 1) il s'agissait d'un site de haute montagne et 2) de nombreuses structures à caractère domestique et funéraire étaient concentrées dans un même espace. Ces deux éléments ont conduit à considérer la Feixa del Moro comme un site de référence pour la Préhistoire des Pyrénées et plus largement de la Méditerranée occidentale. Trois décennies après, une équipe de recherche pluridisciplinaire a débuté une intense révision de la documentation, ainsi qu'une étude approfondie des restes humains et du mobilier mis au jour dans les tombes, diverses analyses biochimiques et de nouvelles datations sur les individus inhumés dans deux des trois sépultures en coffres de pierre (communément appelées cistes), avec pour objectif de mieux connaître les premières communautés d'agropasteurs pyrénéens.

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1. Introduction

In the early 1980s, while drafting the first general inventory of Andorran archaeological heritage, a cist burial was documented in the area known as La Feixa del Moro. Owing to the characteristics of its construction and the remains deposited inside it, this grave was attributed to the Middle Neolithic, also known as the "Sepulcros de fosa" culture (Bosch Gimpera, 1919). Later excavations in this area of high mountain terraces revealed, in a small space, several domestic structures as well as a further two cist burials.

The chronology of the settlement, as well as the magnitude of the discovery, made it one of the most important Neolithic archaeological sites in the North-East of the Iberian Peninsula. In addition, the excavation director opted to carry out numerous forms of analysis, many of which were new at that time, three decades ago, making La Feixa del Moro a point of reference for research until present.

Thirty years separate the present paper from that archaeological research, a period which has seen major technical and methodological improvements not only in archaeology but also in countless auxiliary disciplines. Together with the constant discovery and detailed study of new sites, this enables new interpretations of old archaeological deposits, the reopening of debates and, in short, an increase in the breadth and depth of our knowledge of the landscape we perceive of the past.

Within this context, since 2011, through the project "Aproximación a las primeras comunidades neolíticas del NE peninsular a través de sus prácticas funerarias (HAR2011-23149)", new burial sites have been studied and others

have been re-examined, including the site of La Feixa del Moro.

The participants in this research aimed to update information about La Feixa del Moro using the new techniques that have appeared in these 30 years. With the present paper, the authors wish to inform about the new analyses that have been performed and attract the attention of other researchers so that they may continue studying and contributing new data and approaches to understanding Neolithic societies.

In this way, the paper aims to:

- 1) Briefly introduce the site. The existing information has been reviewed and updated, as many of the publications referring to this site contained significant errors regarding the position of the graves, the objects found inside them, etc.
- 2) Present the data obtained through the detailed study of the grave goods.
- 3) Describe the results of the isotope analysis of the human remains still preserved in order to determine aspects of their diet.
- 4) Publish the new radiocarbon determinations of the human bones in Cists 2 and 3.

2. The Site of La Feixa del Moro

In the period the burials at La Feixa del Moro are attributed to, two main kinds of funerary constructions were in use in the north-eastern Iberian Peninsula. Although these were contemporaneous for a long period of time, in the late fifth millennium, their geographical

distribution was clearly different. Thus, while tombs in the form of cists or stone boxes were known in inland areas of North-East Iberia, and in highland areas as in the present case, burials in pits dug in the ground and covered with earth, large rocks or perishable materials were more usual in certain areas near the coast. This is an important point to be able to understand some of the issues that will be explained below.

2.1. Description and situation of La Feixa del Moro

The site of La Feixa del Moro is at 1335 m altitude on the southern side of the Pyrenees, in the Principality of Andorra very near the border with Spain. It is 455 m above the valley bottom, on the left side of the Gran Valira River, in the town of Juberrí (Fig. 1).

This used to be an area of terraces that was abandoned in the early 1960s. Therefore it slopes slightly from east to west at an angle that was increased by the earth that was tipped on it when a road was built a few metres above the site (Canturri and Llovera, 1985: 33).

In the vicinity of the site coordinates (UTM 31 N X: 376004.95 Y: 4699737.01) (ETRS89), there are some seasonal streams and woods like El Fener Wood, with large areas of Scots Pine (*Pinus sylvestris*) and some oak (*Quercus*). The nearest river with a constant flow is the River Runer, 1.2 km from La Feixa del Moro where the vegetation is characterised by ash (*Fraxinus excelsior*), hazel (*Corylus avellana*) and willow (*Salix alba*).

The excavations from 1983 to 1985 opened an area of 65 m², where eight stratigraphic levels were documented (Canturri and Llovera, 1986: 386). The first three (S, 1 and 2) were superficial strata that had been disturbed during the building of the terraces and by ploughing. Level 3a (upper, middle and lower) was anthropic, and related to the old ground level. Levels 3b and 3c, also archaeological, were linked with the dug graves and domestic pits. The latter partly affected the underlying layer, Level 4, which was defined as partly anthropic owing to the signs of small earth movements detected (Llovera, 1986: 16). Finally, Level 5 was compact and natural.

These levels displayed clean transitions, with regular and undulating boundaries and an inclination varying from 15° to 30° from east to west in the direction of the slope (Llovera and Canturri, 1998: 244). The steepest slope was found in the surface strata, owing to the earth tipped when the road was built (Canturri and Llovera, 1985: 33) and it decreased as the archaeological levels were reached. It was precisely in the lower layers where a stone wall, several hearths, domestic pits, postholes and three cist burials (Fig. 2), two of them intact, were documented (Llovera, 1986: 18). Numerous archaeological remains, such as flint blades, querns, axes, chisels, adzes, large ceramic recipients, etc., were found in association with dwelling structures (Llovera, 1991: 15). However, the most significant remains appeared amongst the grave goods accompanying the burials.

2.2. Cist 1

When discovered in 1983, Cist 1 had already been plundered some years previously. Located 20 m south-east of the house known as Feixa del Moro, the grave was completely buried under an earth slope and only a covering flagstone remained clear, with a small opening underneath it allowing access to the interior (Canturri and Llovera, 1985: 33, 1986: 385).

On an east-west line, at the time of the excavation the grave was open on the opposite side, which meant that part of its interior had filled with sediment from outside (Canturri and Llovera, 1986: 35). However, the construction was in a good state of architectural conservation, with all the limestone flagstones in their primary position (Fig. 3), except for those at the visible end and one on the left which had probably been removed in the past (Canturri and Llovera, 1985: 34).

The interior of the grave was 1.30 m long by 0.80 m wide and between 0.70 and 0.80 m high (Canturri and Llovera, 1984: 34). The head was external on both sides and was formed by a single stone. The left side was formed by at least three stones, whereas the opposite side had been built with a single slab. The cover was formed by two large flagstones slightly overlapping (Fig. 4). The cracks there may have been between them were filled with small stones to avoid earth filtering inside. Indeed the structure is thought to have been sealed hermetically in the past and to have stopped any earth entering and filling the burial chamber (Canturri and Llovera, 1985: 34).

As a result, many years after it had been plundered, six potsherds, a variscite bead and three flint blades (Gibaja and Terradas, 2012; Terradas and Gibaja, 2002; Vaquer et al., 2013) were retrieved (Fig. 4). According to the looters' information, they removed eight axes which were grouped in the middle of the grave on the left hand side (Canturri and Llovera, 1985: 34).

When preparing his doctoral thesis, Xavier Llovera was able to examine the axes taken by the looters in 1979. According to the researcher, they were all green, perfectly polished, with more or less flat sides and with no traces of having been used (Canturri and Llovera, 1985: 34; Llovera, 1984). Five were apparently made from serpentine, and of these the largest was 17 cm long and 2.8 cm wide (Canturri and Llovera, 1985: 34; Llovera, 1984: 62). The others were made of schist and probably hornfels, and were between 10.6 cm and 5.1 cm long. Because of their manufacture and lack of use-traces, they were thought to be votive objects.

2.3. Cist 2

A second intact grave was found five metres to the north-east of Cist 1. All the flagstones forming the chamber were *in situ* except at the front, where a mechanical digger had damaged part of the cover and partly moved the stone that sealed the grave at the lower end (Fig. 5). The interior of the grave was 1.7 m long, 1 m wide and 0.80 m high. The head was formed by eight stones and the cover was made of four stones, over which some flat stones had been placed to ensure the chamber was sealed off. The left side

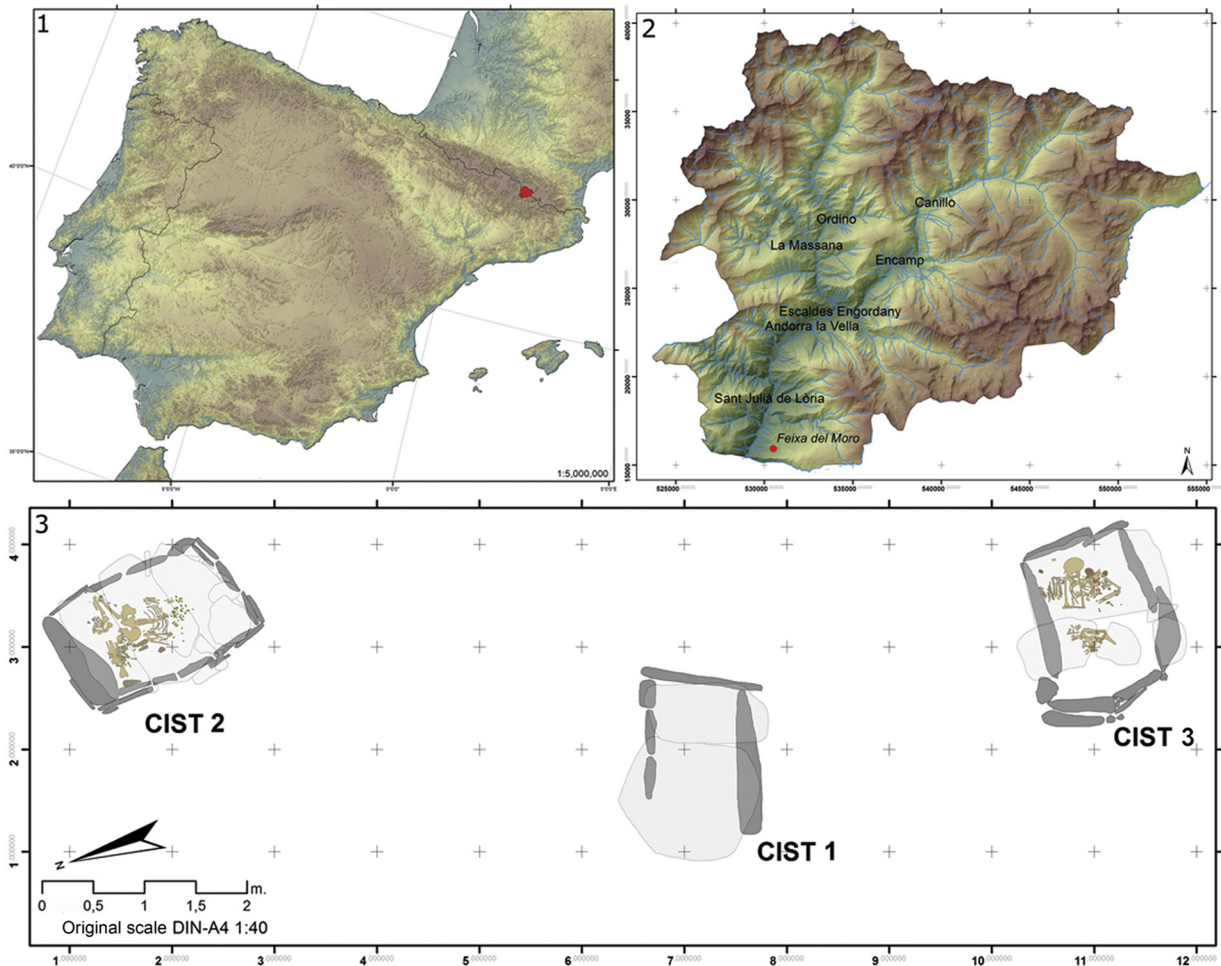


Fig. 1. Location maps. 1. Location of Andorra; 2. Location of the site of La Feixa del Moro; 3. General view of the graves.

Fig. 1. Carte de situation. 1 : situation géographique d'Andorre ; 2 : localisation du gisement de la Feixa del Moro ; 3 : vue générale des sépultures.

was formed by four flagstones and the opposite side by six (Fig. 6).

The grave contained a skeleton in a frontal position with bent legs and the arms flexed over the shoulders and the torso. It belonged to an individual about 163–167 cm tall who died at the age of 20–23 years (Vives, 1987: 9). In a new examination of the remains, Dr. M. E. Subirà determined that this individual was a female. The latest determination of this individual's sex was based on the morphology of the pelvis, following the work of Ferembach et al., 1980. The body faced south-east with the head to the north-west, following the same direction and long axis of the grave (Fig. 6).

This burial was accompanied by 56 variscite beads located near the individual's head, suggestive of a necklace by analogy with other burials on the Catalan coast, and a further 21 beads near one knee, interpreted as a possible adornment sewn on a cloth. In the absence of detailed photographs of the lower limbs, it is difficult for the taphonomic study to confirm this hypothesis. It is not certain whether the beads were found beneath the knees or on the

limb bones, as would be expected in the case of an adornment around the knee. If this was the case, they would form only the second known example of an adornment for the lower limbs, after the *Dentalium* beads found in the burial at Arceda (Castany, 2008; Muñoz, 1965). Accordingly, the most likely explanation is that these beads were sewn to an item of clothing or a bag that was buried with the deceased.

The grave goods also included five ground stone axes that had been used and then deposited in the cist. Two of them were located on the left side of the individual at the height of the pelvis. One was trapezoidal in shape and made from a black rock that might be a local phthanite (Vaquer et al., 2012). The other, larger and pale green in colour, is of pyroxenite and may be classified as the Chelles Alpine type (Vaquer et al., 2012). Two smaller trapezoidal axes were in contact with the right foot, opposite the toes. One is white and may be fibrolite (Vaquer et al., 2012), while the other is made from a green, fine-grained rock (Vaquer et al., 2012). Finally, the largest axe was on the lower right-hand side of the grave, next to one of the side stones (Fig. 6). With a triangular shape and elliptical cross-section, it is probably

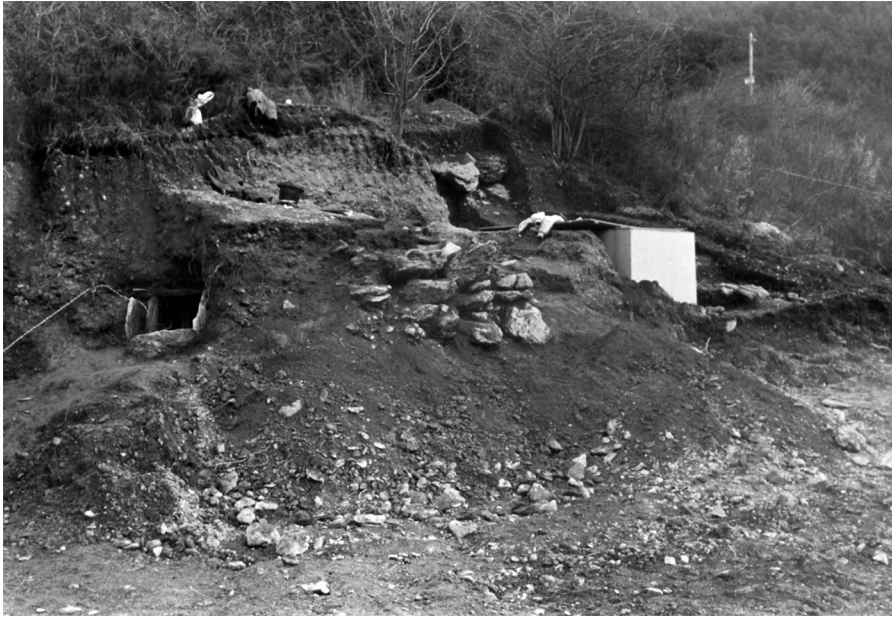


Fig. 2. General view of the excavation in 1985. Cist 2 is in the foreground with Cist 1 behind it. Cist 3 is covered by planks in the background. Photograph deposited in Andorra Cultural Heritage.

Fig. 2. Vue générale de la fouille en 1985. Au premier plan se trouve la ciste 2 et derrière elle la ciste 1. La ciste 3 est dissimulée par les planches visibles en arrière-plan. Photo : Patrimoine culturel d'Andorre.



Fig. 3. Photograph of the section in the slope made in 1984 to excavate Cist 1. 1. Frontal view of the grave; 2. Zenithal view of the grave. Photographs deposited in Andorra Cultural Heritage.

Fig. 3. Vue de la coupe réalisée en 1984 dans le talus afin de fouiller la ciste 1. 1 : vue frontale de la sépulture ; 2 : vue zénithale de la sépulture. Photos : Patrimoine Culturel d'Andorre.

made from pyroxenite, perhaps the long Chelles Alpine type (Vaquer et al., 2012).

The grave goods were completed by a fragment of a pierced boar tusk, although its position in the grave could

not be determined, 37 bone awls to the left of the individual, under the tibia and the femur, and 46 potsherds. Three flint blades were also collected; two amongst the awls and the other near the individual's head (Fig. 6).

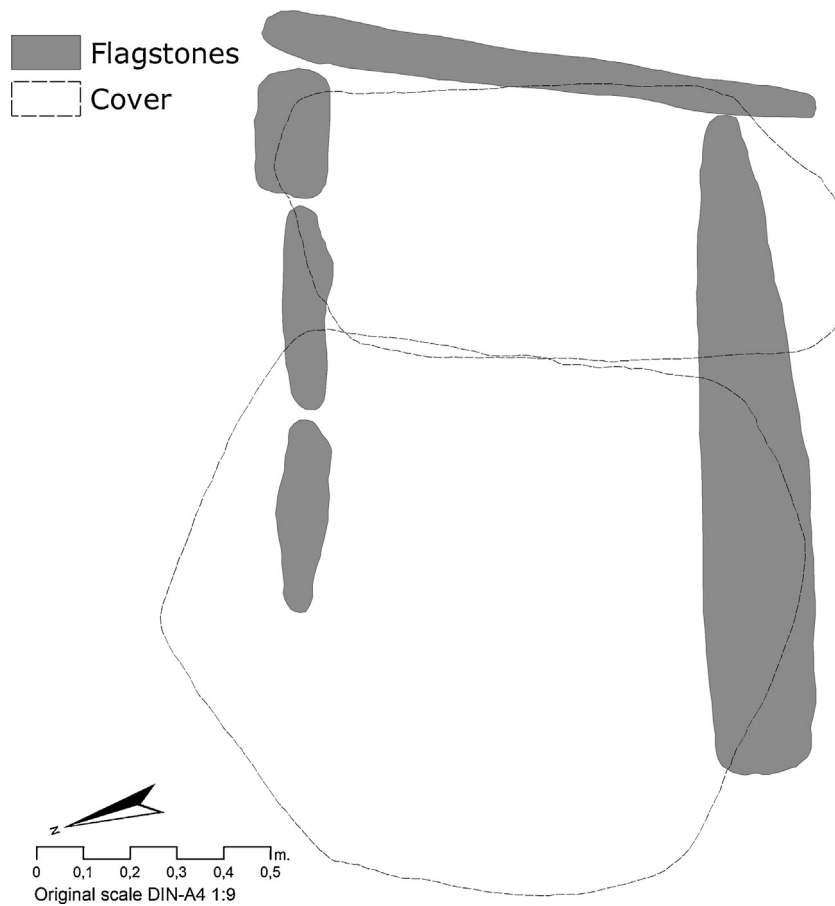


Fig. 4. Plan of Cist 1 and photographs of the grave goods found inside it. 1–8: The looted axes (Canturri and Llovera, 1985; Castany, 2008; Llovera, 1991); 9–11. Flint blades (Llovera, 1991); 12. Variscite bead (Llovera, 1991).

Fig. 4. Plan de la ciste 1 et photos des éléments de mobilier retrouvés à l'intérieur. 1 à 8 : haches pillées (Canturri et Llovera, 1985 ; Castany, 2008 ; Llovera, 1991) ; 9 à 11 : lames de silex (Llovera, 1991) ; 12 : perle en variscite (Llovera, 1991).



Fig. 5. Frontal and zenithal views of Cist 2 during its excavation in 1985. Photograph deposited in Andorran Cultural Heritage.

Fig. 5. Vue frontale et zénithale de la ciste 2 en cours de fouille en 1985. Photo : Patrimoine culturel d'Andorre.

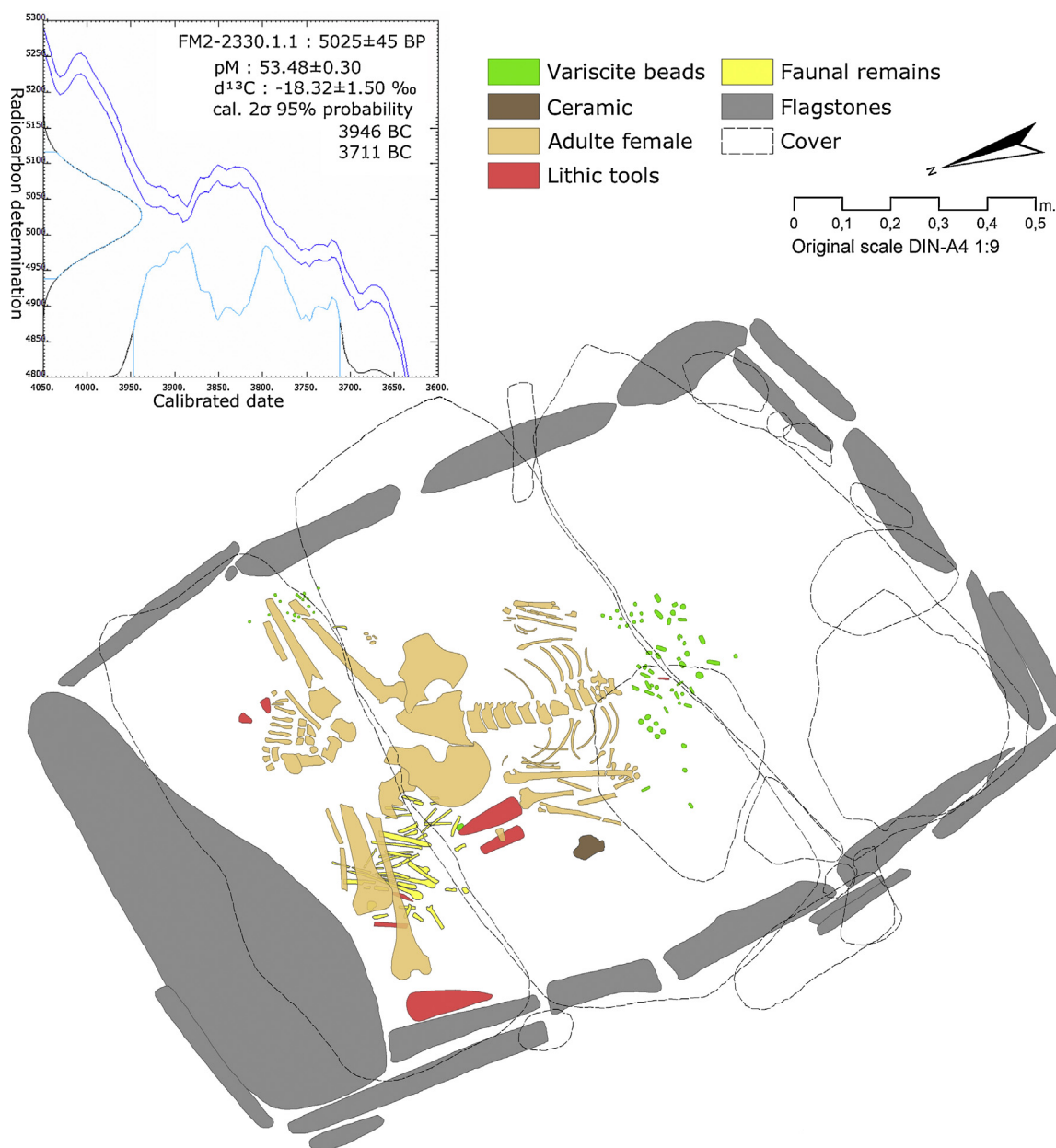


Fig. 6. Radiocarbon date, plan of Cist 2 and photographs of the grave goods found inside it. 1. Pottery recipient; 2. Wild boar tusk; 3–7. Axes; 8–9. Flint blades; 10–12. Best-conserved bone objects; 13. Necklace with variscite beads; 14. Personal adornment with variscite beads.

Fig. 6. Datation ¹⁴C, plan de la ciste 2 et photos des éléments de mobilier retrouvés à l'intérieur. 1 : vase en céramique ; 2 : défense de sanglier ; 3 à 7 : haches ; 8 et 9 : lames de silex ; 10 à 12 : objets en os les mieux conservés ; 13 : collier de perles en variscite ; 14 : parure de perles en variscite.

2.4. Cist 3

Another grave was found four metres to the south-east of Cist 1. Like the others, it consisted of a stone box inside a pit dug in the ground (Fig. 7). The structure maintained all the flagstones in their original positions, although those on the sides had moved slightly inwards. It was 0.90 m wide, between 0.70 and 0.80 m high and 1.5 m long. The sides, cover and ends were all made with two large superimposed flagstones (Fig. 8).

The grave contained a double burial of an adult female and a neonate (Fig. 7). They were oriented south-west/north-east, with the head towards the north-east. The adult individual's legs were bent, her right hand on her waist and left arm over the infant. She would have been about 150 or 156 cm tall (Vives, 1987: 10). The outstanding state of conservation allowed the determination that she suffered neither caries nor any irregular formations in her teeth enamel (Vives, 1987: 10).



Fig. 7. Zenithal view and interior of Cist 3 at the time of its discovery (Llovera and Colomer, 1989). Photograph deposited in Andorran Cultural Heritage.

Fig. 7. Vue zénithale de l'intérieur de la ciste 3 lors de sa découverte (Llovera et Colomer, 1989). Photos: Patrimoine culturel d'Andorre.

Accompanying the burials, the grave goods included a small trapezoidal axe in a greenish-brown stone. This is probably a Pyrenean nephrite (Vaquer et al., 2012). It was found next to the adult's right scapula. Additionally, two retouched honey-flint blades were found (Llovera, 1986: 21); one next to the left ulna and radius of the same individual and the other by the small axe (Fig. 8).

In the same cist, 14 variscite beads were associated with the adult's left arm. This suggests two possibilities: either they belonged to a bracelet or were sewn to a cloth. No well-documented examples of bead bracelets are known in North-East Iberia, but examples of beads sewn to textiles are known (Allièse et al., 2014). This therefore seems to be the most likely interpretation of these beads in Cist 3.

The grave goods were completed by a group of 16 awls, a needle and a spatula, next to the right humerus, and three personal adornments: two made from a wild boar rib and the third from a tusk of the same animal. While those made from the rib were on the right-hand side of the adult, one above the head and the other near the humerus, the tusk was lying among the remains of the thorax (Fig. 8). The first two cannot have belonged to a necklace, because of their distance from the body, but the tusk on the deceased's chest may have been a pendant or sewn to clothing or a cloth that covered the body. Two potsherds were found near the individual's head, on her right.

Table 1

Quantity, taxon and size of the faunal remains found amongst the grave goods in Cists 2 and 3.

Tableau 1

Quantité, taxon et taille des restes fauniques, trouvés parmi les objets de fouille dans les cistes 2 et 3.

Taxon	Cist 2	Cist 3	Total
<i>Ovis/Capra</i>	9		9
<i>Sits</i> sp.	1	1	2
<i>Capreolus capreolus</i>	1	1	2
Large species		1	1
Medium-sized species	2	2	4
Small species	19	5	24
Indeterminate	2	2	4
Total	34	12	46

3. Study of the grave goods and the ornaments

As described above, a large number of implements, ornaments and parts of recipients were found in the graves at La Feixa del Moro. The importance of these objects does not only reside in their number (which is much larger than in other cist graves in North-East Iberia) but also in the fact that their characteristics and the raw materials they were made from links them with other archaeological finds in the western Mediterranean. For example, some of these raw materials probably come from such distant locations as Barcelona, South-East France and the Alps.

3.1. Implements, ornaments and faunal remains

The re-examination of the archaeozoological assemblage from La Feixa del Moro has studied a total of 46 faunal remains found in Cists 2 and 3 (Fig. 9). The taxonomical determination of the metapodials was based on the morphological comparison of the distal epiphyses and condyles, and criteria differentiating ovicaprids and roe deer. There is a small possibility that the metapodials attributed to caprids may belong to a wild species.

The long and relatively slender objects with plano-convex cross-sections are classified as awls and spatulas. The proximal end of both types is suitable for them to be held in the hand during use, while the active zones of both instruments are at the distal ends. The shape of this active zone differentiates the two tools. Awls have a pointed active zone, used for penetrating or piercing. In contrast, spatulas have flat, rounded active zones that will prevent piercing, tearing or breaking the substance being worked. Needles are thin and elongated, whose point and general shape allow them to pierce material.

The grave containing most remains and the greatest diversity of species is Cist 2 (Fig. 9, Nos. 10 to 16), with a total of 34 analysed objects in an assemblage of 37 (Table 1). Ovicaprids (*Ovis aries/Capra hircus*) form the largest taxonomic group, with a total of 9 metapodials. One of the awls was made from a roe deer (*Capreolus capreolus*) metapodial, while it has not been possible to determine the species of the others.

The ovicaprid and roe deer bones used to make awls come from adult individuals over 18 months old. In some cases, the distal epiphysis of the metapodials was maintained and in others only the shaft was used. The proximal

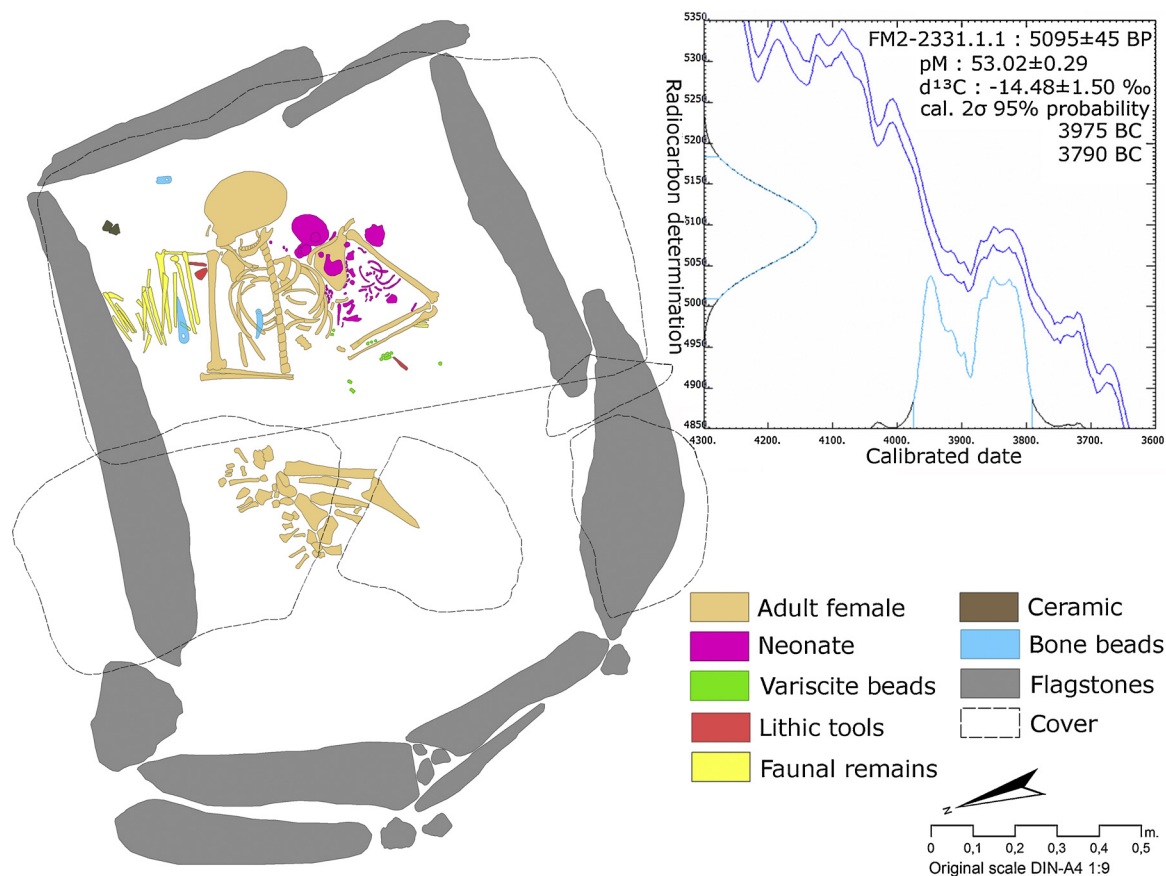


Fig. 8. Radiocarbon date, plan of Cist 3 and photographs of the grave goods found inside it. 1. Wild boar tusk; 2–3. Bone beads; 4. Bone needle; 5. Bone spatula; 6–8 Best-conserved bone artefacts; 9. Axe; 10. Flint blade; 11. Bracelet with variscite beads.

Fig. 8. Datation ¹⁴C, plan de la ciste 3 et photos des éléments de mobilier retrouvés à l'intérieur. 1 : défense de sanglier ; 2 et 3 : perles en os ; 4 : aiguille en os ; 5 : spatule en os ; 6 à 8 : objets en os les mieux conservés ; 9 : hache ; 10 : lame de silex ; 11 : bracelet de perles en variscite.

epiphysis was never maintained. This is due to a technical decision while the awls were being made; it is necessary to remove one of the epiphysis to form an end with the cortical zone of the bone shaft. Anatomical observations show that it is usually the proximal epiphysis that is removed. In those cases when the distal epiphysis is missing, that is probably due to its destruction by natural postdepositional effects.

The faunal assemblage found in Cist 2 is completed by the canine (Fig. 9, No. 20) of an adult swine (probably an adornment) and a small group of four medium-sized faunal remains displaying no signs of having been worked.

Cist 3 contained 12 faunal remains, consisting of 6 awls (Fig. 9, Nos. 1 to 5 and 7), 2 spatulas (Fig. 9, Nos. 6 and 8), 3 pendants (Fig. 9, Nos. 17 to 19) and a needle made from a long bone of a medium-sized animal (Fig. 9, No. 9). Five of the awls/spatulas were made from long bone fragments of small animals (ovicaprids or roe deer) while one of the fragmented awls was made from a roe deer metapodial and the needle from the long bone of a medium-sized animal.

The pendants were made from the lower canine of a male swine and two flat bones whose taxonomical attribution could not be specified.

3.2. Lithic tools and their function

The lithic assemblage found in the cists at La Feixa del Moro consists of whole or fragmented blades made from a rock type known as “honey flint”. This type of flint is very common during this phase of the Neolithic and probably comes from South-East France. Its provenance cannot be determined for certain but it is very similar to the flint found in the area of Provence and the technology used to work it is the same. As yet, no diagnostic analytical studies have been carried out to able to affirm that the source is definitely South-East France (Gibaja and Terradas, 2005, 2012).

The abundance of blades, cores, geometric microliths and points made from this flint type found mostly in pit burials in areas near the Mediterranean contrasts with their scarcity in cist graves in inland regions.

A functional study has recently been performed on a part of the lithic tools found in the cists in order to determine whether these tools had been made and deposited *ex profeso* in the grave, and therefore had never been used, or they had indeed been used before being left as part of the grave goods. In this way, of the six flint fragments



Fig. 9. Photographs of the implements, ornaments and faunal remains found in Cists 2 and 3. 1–7. Best-conserved bone artefacts in Cist 3; 8. Bone spatula in Cist 3; 9. Bone needle in Cist 3; 10–16. Best-conserved bone artefacts in Cist 2. 17–18: Bone beads in Cist 3; 19. Wild boar tusk in Cist 3; 20. Wild boar tusk in Cist 2. Andorran Cultural Heritage Service Collections.

Fig. 9. Photos des outils, parures et restes de faune mis au jour dans les cistes 2 et 3. 1 à 7 : objets en os les mieux conservés découverts dans la ciste 3 ; 8 : spatule en os découverte dans la ciste 3 ; 9 : aiguille en os découverte dans la ciste 3 ; 10 à 16 : objets en os les mieux conservés découverts dans la ciste 2 ; 17 à 18 : perles en os découvertes dans la ciste 3 ; 19 : défense de sanglier découverte dans la ciste 3 ; 20 : défense de sanglier découverte dans la ciste 2. Objets conservés au service du Patrimoine culturel d'Andorre.

and blades stored in the premises of Andorran Cultural Heritage, the three blades from Cist 1, one from Cist 2 (FM-2-57) and one from Cist 3 (FM-2-216) were analysed.

Of the three objects from Cist 1, the largest blade ($77 \times 18 \times 4$ mm) was used on both sides to cut non-ligneous plants (Fig. 10, No. 9). The use-traces were faint and therefore the tool had been used for a short time (Fig. 11, No. 1). The second blade, a proximal fragment ($30 \times 15 \times 2$ mm) had been used on both edges to cut a soft substance, possibly meat. It had also been used for a short time and the edges were still perfectly effective (Fig. 10, No. 8). Finally, a small blade fragment ($22 \times 8 \times 2$ mm) displays no traces of it having been used (Fig. 10, No. 10).

The distal fragment conserved of a blade from Cist 2 was also analysed (Fig. 10, No. 7). As explained above, during the excavation the blade was found whole, but now only the distal fragment is conserved. Consequently, it is difficult to interpret the use of the object as it was not possible to study it in its entirety. However, this fragment does not display any use-traces.

Lastly, a small whole blade from Cist 3 has been analysed (Fig. 10, No. 11). It is retouched on both sides, and has been used in several places. Both sides were used to cut nonligneous plants, then the edges were resharpened and the right side was reused to scrape dry hide (Fig. 11, No. 2).

Only the polished axes and adzes from Cists 2 (Fig. 10, No. 1 to 5) and 3 (Fig. 10, No. 12) have been studied as those from Cist 1 are in private hands. These tools are generally in a perfect condition with perfectly effective edges. Their surfaces are totally polished, except for two of the five objects in Cist 2, of which the sides are not polished, only pecked or unmodified. However, these tools had not been made *ex profeso* to be deposited as grave goods. Functional analysis has demonstrated that all the axes had been used in certain tasks and then repolished or resharpened before being placed inside the cists (Fig. 11, Nos. 3 and 4).

In short, the inhabitants of La Feixa del Moro not only selected the knapped and polished implements according to the raw materials they were made from, but also because they were in perfect condition to continue in use.

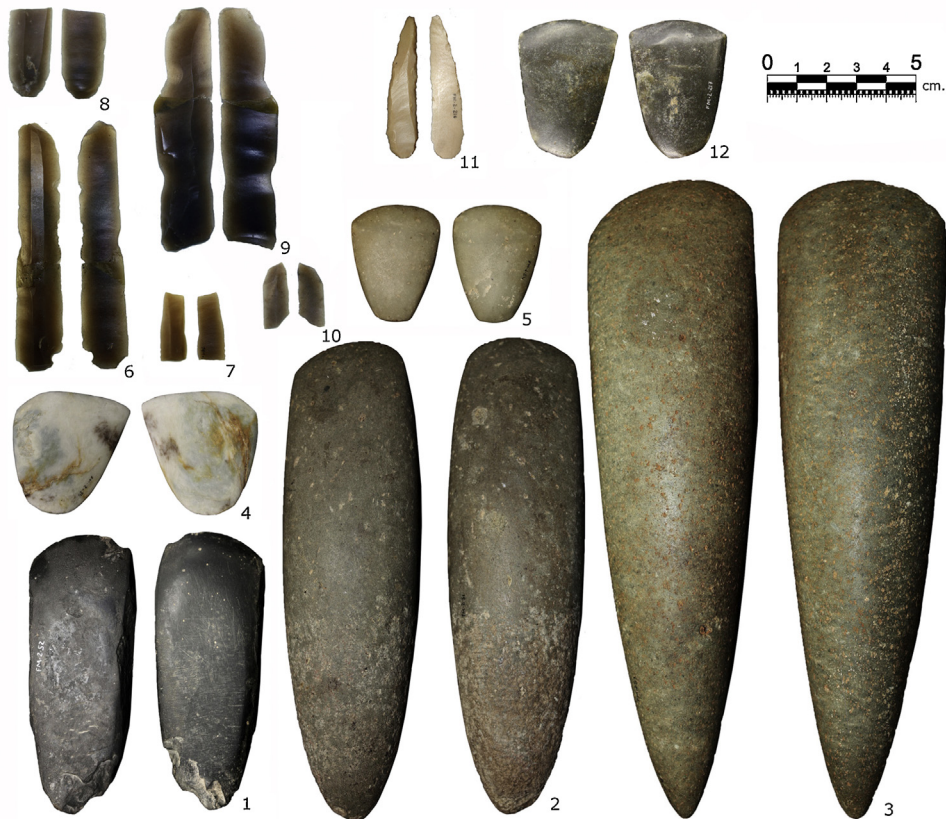


Fig. 10. Photographs of the lithic implements found in the cists. 1–5. Polished axes in Cist 2; 6–7. Flint blades in Cist 2; 8–10. Honey flint blades in Cist 1; 11. Honey flint blade in Cist 3; 12. Polished axe in Cist 3. Andorran Cultural Heritage Service Collections.

Fig. 10. Photos des outils lithiques mis à jour dans les cistes. 1 à 5 : haches polies découvertes dans la ciste 2 ; 6 et 7 : lames de silex découvertes dans la ciste 2 ; 8 à 10 : lames de silex blond découvertes dans la ciste 1 ; 11 : lame de silex blond découverte dans la ciste 3 ; 12 : hache polie découverte dans la ciste 3. Objets conservés au service du Patrimoine culturel d'Andorre.

3.3. The adornments

Adornments made particularly in variscite are some of the most characteristic elements found in graves dated in this phase of the Neolithic. Even so, it should be noted that Cist 2 at la Feixa del Moro contained one of the largest necklaces deposited in a Neolithic burial in northeastern Iberia (Fig. 12, No. 2). However, this necklace is not the only kind of adornment made with variscite beads in the three cists at the site.

The two groups of best-conserved ornaments have been studied in detail: the necklace in Cist 2 and the bracelet found in Cist 3 (Fig. 12, No. 4).

The beads in both objects are made of variscite. The determination of the raw materials has been performed by X-ray diffraction (XRD) (Edo et al., 1990, 1992). While the necklace in Cist 2 consists of 56 beads (Table 2), the bracelet in Cist 3 is made up of 14 beads (Table 3). In both cases, beads of different shapes were used.

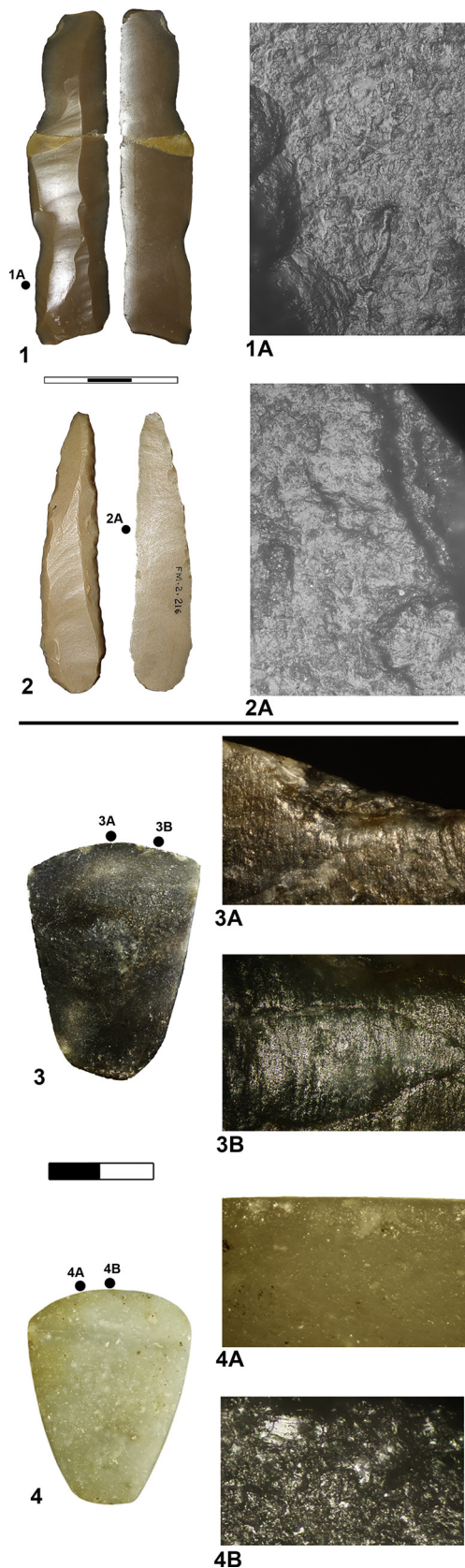
According to the marks left by their manufacture, the beads were made by intensive abrasive polishing of their whole surface and edges, starting with the initial pre-form of a fragment. Traces of abrasive lines are seen in all directions. Then consecutive rotational bipolar perforations were made with a lithic drill (flywheel type) on

the two faces of the central part of the pieces. These perforations left traces in the form of concentric striations and grooves inside the holes. In the case of the biconical globular bead, the perforation is concentric rotational bipolar, with a biconical cross-section and carried out in two stages. In the case of the barrel beads, they were polished abrasively at the ends to prepare a perforation surface in which consecutive rotational bipolar perforations were made. In most beads, the perforation has a biconical cross-section and was carried out in two stages, i.e. in two attempts.

3.4. Ceramic remains

Numerous pottery remains were found in the graves. However, the information they provide is very biased and does not always agree with the data in the inventories or in the publications. In any case, the high degree of fragmentation and heterogeneity of the remains, together with scarce recognisable forms, suggests that most of the sherds found inside the cists were not offerings but that they reached them together with the sedimentary fill.

In Cist 1, among the earth disturbed by the looters, the 6 potsherds that were found may belong to a minimum number of 3 recipients. During the excavation, 55 ceramic fragments were recovered in Cist 2. Two profiles have been



reconstructed from 17 of these sherds which respectively correspond to the upper and medial parts of a pot that, according to its typology, may have formed part of the grave goods. Currently, only one of those profiles is conserved; it consists of 11 fragments (Fig. 13), it is carinated and has a rounded lip, 140 mm in diameter and a tubular handle. It has a concave base and is characterized by its irregular firing. The other profile is currently being studied by another scholar (it consists of 5 sherds) and thus it is temporarily unavailable for analysis.

Finally, there is an additional assemblage of 34 fragments from Cist 2 (four of the 55 fragments originally recovered have been lost). Our analysis indicates that those fragments correspond to a minimum of 16 vessels of different sizes.

Owing to the characteristics of the ceramic assemblage, it is thought that only the most complete vessel in Cist 2 might have formed part of the grave goods.

4. Stable isotope analysis ($\delta^{13}\text{C}$ and $\delta^{15}\text{N}$)

In order to learn more about the subsistence economy and social aspects of the Neolithic society at La Feixa del Moro, the two adult individuals in Cists 2 and 3 were analysed by measuring the $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ stable isotopes in the human remains.

The analysis was performed in the Biological Anthropology Unit at the Autonomous University of Barcelona. The collagen was extracted following Richard and Hedges' method (1999), including the modifications of Brown et al. (1988) regarding ultrafiltration. The proportions of $^{13}\text{C}/^{12}\text{C}$ and $^{15}\text{N}/^{14}\text{N}$ ($\delta^{13}\text{C}$ and $\delta^{15}\text{N}$) were measured in the Institut de Ciència i Tecnologia Ambientals (ICTA) using the V-PDB standard from carbon and AIR for nitrogen, with their values expressed as parts per thousand (‰). The results display correct collagen preservation according to the quality controls established by DeNiro (1985) and Van Klinken (1999).

To determine the dietary background of the community at La Feixa del Moro, faunal data from other sites in the North-East of the Iberian Peninsula, like Horts de Can Torras, Bòbila Madurell and Can Roqueta-Can Revella have been used (Fontanals-Coll, 2015). Indeed, no local faunal data were available for this comparison and the few faunal remains at La Feixa del Moro could not be destroyed as they are in the form of bone implements. Data available in the literature were used to estimate the freshwater and

Fig. 11. Examples of tasks performed with the lithic implements and identified by functional analysis. 1. Traces caused by cutting plants. Flint blade from Cist 1 (1A 200 ×); 2. Traces produced by scraping dry hide. Flint blade from Cist 3, FM-2-216 (2A 200 ×); 3. Hide-working traces. Axe FM-2-217 (3A 15 ×, 3B 200 ×); 4. Marks caused by striking a hard substance. Axe FM-2-54 (4A 6 ×, 4B 200 ×).

Fig. 11. Exemples d'activités identifiées par l'analyse fonctionnelle des outils en pierre. 1. Traces de coupe de végétaux. Lame de silex ciste 1 (1A 200 ×). 2. Traces de grattage de peau sèche. Lame de silex ciste 3 FM-2-216 (2A 200 ×). 3. Traces de travail de la peau. Hache FM-2-217 (15 × 3A, 3B 200 ×). 4. Traces de choc contre un matériau dur. Hache FM-2-54 (4A 6 ×, 4B 200 ×).



Fig. 12. Photographs of the lithic adornments found in the cists. 1. Variscite bead in Cist 1; 2. Necklace of variscite beads in Cist 2; 3. Beads found next to the knee in Cist 2; 4. Variscite bracelet in Cist 3. Andorran Cultural Heritage Service Collections.

Fig. 12. Photos des parures en pierre mises au jour dans les cistes. 1 : perle en variscite découverte dans la ciste 1 ; 2 : collier de perles en variscite découvert dans la ciste 2 ; 3 : perles retrouvées à la hauteur du genou droit de la défunte de la ciste 2 ; 4 : bracelet de perles en variscite découvert dans la ciste 3. Objets conservés au service du Patrimoine culturel d'Andorre.

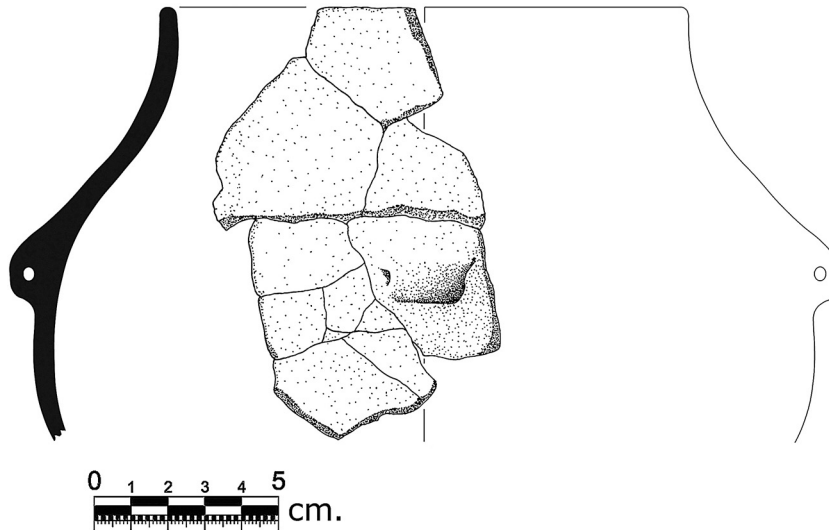


Fig. 13. Ceramic recipient found inside Cist 2. Andorran Cultural Heritage Service Collections.

Fig. 13. Dessin du vase en céramique retrouvé dans la ciste 2. Objet conservé au service du Patrimoine culturel d'Andorre.

Table 2

Number, typology and measurements (mm) of the necklace beads in Cist 2.

Tableau 2

Inventaire des perles en pierre mises au jour dans la ciste 2 (nombre, typologie et mesures).

CIST 2					
Bead	Quantity	Diameter	Thickness	Length	Width
Circular	22	6.7–10.4	2.3–7.3		
Discoïdal	8	7.1–10.9	1.8–4.3		
"Barrel"	25	6–11		3.7–7.9	6–11
Biconical globular	1			11.4	11

Table 3

Number, typology and measurements (mm) of the bracelet beads in Cist 3.

Tableau 3

Inventaire des perles en pierre mises au jour dans la ciste 3 (nombre, typologie et mesures).

CIST 3					
Bead	Quantity	Diameter	Thickness	Length	Width
Circular	8	5–8	1.5–4.5		
“Barrel”	5	5–8	8.4	7–14	5–9
Irregular	1	One side wider than the other, tending towards biconical			

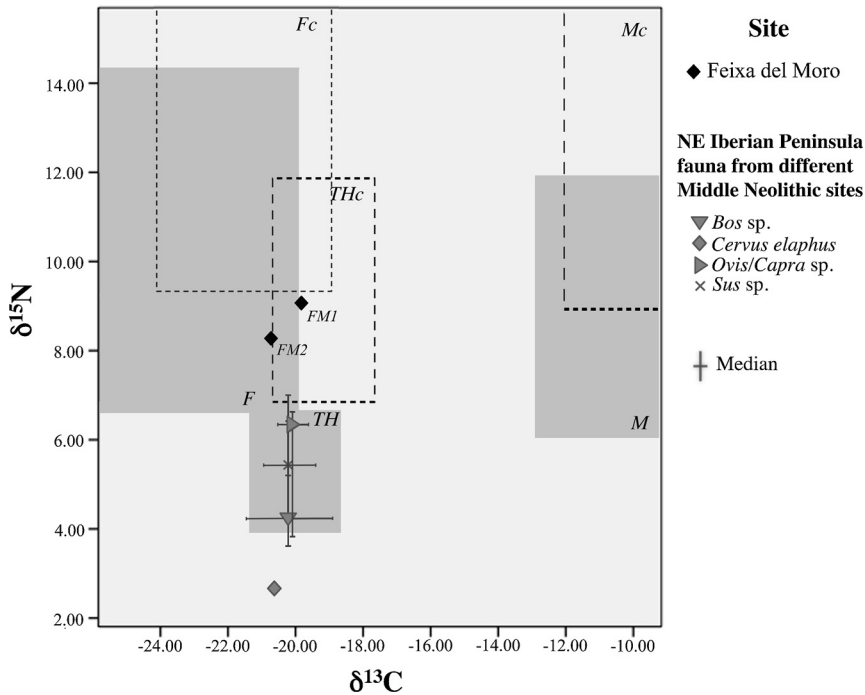


Fig. 14. Representation of the $\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values from La Feixa del Moro and the mean values of Neolithic fauna for this period in North-East Iberia. The grey boxes correspond to terrestrial and aquatic ecosystems (F: Freshwater, TH: Terrestrial Herbivore, M: Marine) while the empty boxes correspond to the consumers of the resources in each ecosystem (Fc: Freshwater resources consumer, THc: Terrestrial Herbivores consumers, Mc: Marine consumers).

Fig. 14. Représentation des valeurs de $\delta^{13}\text{C}$ et $\delta^{15}\text{N}$ de la Feixa del Moro et les valeurs moyennes de la faune néolithique pour cette même période dans le Nord-Est de la péninsule Ibérique. Les rectangles gris représentent les écosystèmes fauniques, aussi bien terrestres qu'aquatiques (F : eau douce, TH : herbivore terrestre, M : marin), tandis que les rectangles vides représentent l'alimentation des individus qui consomment les ressources au sein de chaque écosystème (Fc: consommateur de ressources d'eau douce, THc: consommateur de ressources herbivores terrestres, M: consommateur de ressources marines).

marine resource signature (Drucker and Bocherens, 2004; Fisher et al., 2007; Richards and Hedges, 1999).

With the combination of terrestrial fauna and the appropriate adjustments due to the trophic chain, theoretical $\delta^{13}\text{C}$ values have been calculated for completely terrestrial diets (-19%) and diets based completely on marine resources (-12%). A significant proportion of animal protein would be indicated by a $\delta^{15}\text{N}$ range of about 8–10‰.

The mean value of the $\delta^{13}\text{C}$ analyses of the community at La Feixa del Moro: 20.3 ± 0.7 (1σ)‰, is indicative of a diet based on terrestrial C3 plants (Fig. 14). Furthermore, as C4 plants were not grown in southern France and the Pyrenees in the Neolithic (Marinval, 1988), it is thought this diet mainly involved the consumption of cereals. However, the mean $\delta^{15}\text{N}$ value, 8.7 ± 0.6 (1σ)‰, clearly places the humans on a higher trophic level than terrestrial herbivores (approximately 3‰ higher), indicating that they also

consumed animal proteins. In addition, this isotope information shows that the two individuals consumed very few or no freshwater or seawater resources (Table 4).

5. Chronological framework: radiocarbon determinations

In the late 1980s, Xavier Llovera, the supervisor of the excavation at La Feixa del Moro, published two dates analysed at Teledyne Isotope Laboratory in Westwood, New Jersey (U.S.A.). The results gave dates of 4930 ± 170 BP (I-15025) and 5310 ± 310 BP (I-14177) (Llovera, 1986; Llovera and Colomer, 1989) (Table 5).

No documentation has been found specifying the origin and nature of the samples that were dated. Whereas J. Mestres and A. Martín (1996) noted that charcoal had been dated, J. Castany (doctoral thesis, 2008) stated that both

Table 4

$\delta^{13}\text{C}$ and $\delta^{15}\text{N}$ values of the human remains at La Feixa del Moro, according to age, sex, sample and collagen quality controls (C:N, %C and %N) (data from Fontanals-Coll, doctoral thesis in preparation).

Tableau 4

Valeurs de $\delta^{13}\text{C}$ et $\delta^{15}\text{N}$ des restes humains de la Feixa del Moro, ainsi que l'âge et le sexe de l'individu, l'os échantillonné et les valeurs de contrôle de qualité du collagène (C:N, %C et %N). Données issues de Fontanals-Coll (thèse de doctorat en cours).

Code	Lab. Code	Age	Sex	Fragment	$\delta^{13}\text{C}$ (‰)	$\delta^{15}\text{N}$ (‰)	C:N	%C	%N
FM 2 Cist 2	FM 1	21–24	Female	Fibula	−19.8	9.1	3,3	43.1	15.3
FM 2 Cist 3	FM 2	15–17	Female	Tibia	−20.7	8.2	3,4	32.2	11.1

Table 5

Dates obtained at the sites mentioned in this section. While 1–13 are cist burials, 14–25 are pit burials. Calibrated dates at 2σ (95.4%) with OxCal v4.2.3 (Bronk Ramsey, 2009; Bronk Ramsey and Lee, 2013); IntCal 13 atmospheric curve (Reimer et al., 2013).

Tableau 5

Datations obtenues pour les gisements cités dans cet article. Les échantillons 1 à 13 correspondent à des tombes en ciste, tandis que les échantillons 14 à 25 sont des sépultures en fosse. Dates calibrées à 2σ (95.4%) avec OxCal v4.2.3 (Bronk Ramsey, 2009; Bronk Ramsey and Lee, 2013); courbe atmosphérique IntCal 13 (Reimer et al., 2013).

	Site	Burial	Laboratory	Sample	BP	cal BC (2σ)
1	Feixa Moro	Cista 2	CNA2330	Human Bone	5025 ± 45	3946–3710
2	Feixa Moro	Osta 3	CNA2331	Human Bone	5095 ± 45	3978–3787
3	Feixa Moro	?	1–15025	?	4930 ± 170	4225–3356
4	Feixa Moro	?	1–14177	?	5310 ± 310	4848–3381
5	Segudet	?	Beta-160374	Human Bone	5350 ± 40	4323–4052
6	Pala de Coma	Cista 1	?	Human Bone	4800 ± 100	3785–3364
7	Pala de Coma	Cista 2	?	Human Bone	4800 ± 100	3785–3364
8	Garrics de Caballol	Cista 1	UBAR-127	Human Bone	4950 ± 70	3943–3638
9	Garrics de Caballol	Osta 2	UBAR209	Human Bone	4860 ± 90	3932–3377
10	Camp del Ginebre	T2	?	?	5100 ± 60	4039–3715
11	Najac	Coffre 1	?	?	5354 ± 50	4327–4050
12	Najac	Coffre 2	?	?	5265 ± 50	4233–3979
13	Najac	Coffre 3	?	?	5268 ± 50	4234–3980
14	Can Roqueta	Level 1	Beta-189077	Human Bone	5220 ± 50	4230–3955
15	Can Roqueta	Level 1	Beta-189075	Human Bone	5130 ± 50	4040–3796
16	Cal Oliaire	Fosa 6	Beta-147811	Human Bone	5080 ± 80	4041–3698
17	Pla Riu Marcetes	?	UGRA-349	Human Bone	5040 ± 100	4040–3644
18	Can Gambús 1	Burial E246	UBAR-902	Human Bone	4865 ± 40	3758–3532
19	Can Gambús 1	Burial E110	UBAR-900	Human Bone	5260 ± 40	4231–3979
20	Can Gambús 1	Burial E515	UBAR-903	Human Bone	4570 ± 60	3516–3091
21	Le Crès	ES2	?	?	5405 ± 30	4339–4177
22	Le Crès	ES3	?	?	5230 ± 35	4226–3965
23	Le Crès	ES5	?	?	5385 ± 35	4336–4071
24	Saint-Antoine 2	SEP 2423	?	?	5370 ± 35	4331–4059
25	Saint-Antoine 2	SEP 2514	?	?	5260 ± 40	4231–3979

dates came from human bones collected in Cist 2. Owing to this uncertainty as to the provenance of the samples, the material dated and the validity of the dates, due to the high standard deviation of the results, two new determinations were performed for the human remains of the adult individuals in Cists 2 and 3 (CNA-2330 and CNA-2331).

The analysis was carried out at the Centro Nacional de Aceleradores in Seville by Accelerator Mass Spectrometry (AMS). No corrections to the calibration were needed because, as has been explained above, the diet of both individuals was based mainly on terrestrial fauna and cereals.

The results show that both burials took place in the same period of time, in the early fourth millennium cal BC (Table 5). These dates are contemporaneous with other cist burials dated by the same team and which are in the process of being published (El Solar, Vilar de Simosa, El Llord and Ceuró). Other cists, however, have provided older dates, such as the burial at Segudet, also in Andorra, or more recent ones, for example the funerary structures at Costa

dels Garrics del Caballol and Palà de Coma (Castany, 1990; Castany et al., 1990; Coca, 2012; Yáñez et al., 2002).

On the other hand, the dates of the inhumations at La Feixa del Moro are also similar to those obtained for the other type of burials in the North-East of the Iberian Peninsula and the South-East of France; the graves dug in the ground. Some examples are the sites of Can Roqueta, Cal Oliaire, Pla del Riu de les Marcetes and Can Gambús 1 (Gibaja et al., 2012) to the South of the Pyrenees, and Camp del Ginebre (Vaquer, 2007; Vignaud, 1998), Najac (Le Bras-Goude et al., 2013), Le Crès (Loison and Schmitt, 2009; Loison et al., 2004) and Saint-Antoine 2 (Furestier et al., 2012; Michel and Sendra, 2014) to the north.

6. Discussion

This paper has updated information about the site of La Feixa del Moro, after a review of written and graphic records and the materials deposited in Andorran Cultural

Heritage. Numerous errors had been detected in publications about the location of the graves, the type of objects found inside them, their place in the grave, etc. and thus it was deemed necessary to make a detailed introduction to the site and the funerary structures that have been the object of this study.

This new detailed description of the cist burials and the grave goods associated with the individuals has been completed by a series of analytical studies complementing those that Xavier Llovera carried out in his time.

The results confirm the short span of time in which two of the individuals at La Feixa del Moro were buried. This suggests that the site was occupied by the Neolithic communities for a short time; the area was not reoccupied and its archaeological record became covered.

The new radiocarbon determinations have given results resembling the dates for other archaeological sites in the vicinity, like Camp del Colomer. A. Fortó et al., 2013 describe two occupation phases at this site; the first between 4500 and 4350 cal BC¹ and the second between 4324 and 3956 cal BC². The latter occupation would be coetaneous with the burials at La Feixa del Moro. However, until the domestic structures at La Feixa del Moro are dated, the chronological attribution and simultaneity of these structures and the graves cannot be considered totally reliable.

The paleodiet reconstruction indicates that the individuals consumed mainly terrestrial resources consisting of the meat of herbivores and derived products, as well as C3 plants, possibly cereals as occurred in other societies in southern France (Le Bras-Goude et al., 2013). However, the small number of samples and the fact that they were both from females means that a more precise reconstruction of the diet is not possible.

The study of the grave goods has shown that, although cist burials are common in areas near to both sides of the Pyrenees, such as at Solsonès, Bergudà, Caramany and Siran (Cardona and Guàrdia, 1995; Castany et al., 1989; Le Bras-Goude et al., 2013; Mathieu, 1992; Muñoz, 1965; Serra Vilaró, 1927; Vignaud, 1998), grave goods like those found at La Feixa del Moro are more characteristic of the burials, especially the pit grave burials, located in areas nearer the Mediterranean coast of North-East Iberia and southern France (Beeching, 2003; Duday and Vaquer, 2003; Gibaja et al., 2012; Loison, 1998; Muñoz, 1965; Schmitt, 2015; Vaquer, 2014; Vignaud, 1994). This is important, because it is not usual to find cist burials with so many grave goods of such high value, bearing in mind the provenance of the raw materials some of the implements and adornments are made of: the honey flint, probably from Provence, some polished axes made of stone from the Alps, and the variscite from the town of Gavà, near the city of Barcelona.

¹ Two samples were dated; one from Structure FS29: 5630 ± 40 BP (Beta-325686) 4538–4364 cal BC; and the other from the possible hut floor EI2: 5600 ± 35 BP (CNA-2257.1.1) 4496–4355 cal BC.

² Three samples were dated: the first was SJ24: 5350 ± 40 BP (Beta-325684) 4324–4051 cal BC, the second SJ7: 5205 ± 35 BP (CNA-2257.1.1) 4222–3956 cal BC, and the third EI11: 5300 ± 30 BP (Beta-325685) 4236–4042 cal BC.

The inhumations at La Feixa del Moro show that the community that performed them was not foreign to the exchange networks that had formed in the north-western Mediterranean in the late fifth millennium cal BC. This is undoubtedly a crucial time within this chronological phase and the following one, characterised by megalithism and collective mortuary sites.

This reappraisal of the available data and the application of specific techniques and approaches to the burials at La Feixa del Moro have achieved a new perception of Neolithic occupations in high mountain areas. The existence of well-studied sites in the same area, like Balma Margineda (Guilaine and Martzluft, 1995) and recently discovered deposits in other parts of Andorra, such as Juberrí (Fortó et al., 2009), Segudet (Yáñez et al., 2002) and in the valleys of Madriu, Perafita and Claror (Orengo, 2010) confirms the importance of the occupation of Pyrenean valleys by the first farming communities. From this time on, the management of the high mountains and the exploitation of certain resources would never be abandoned. It is very likely that the same community would have exploited different parts of the modern Principality of Andorra, from the valley bottoms to the high mountain ecosystems.

Acknowledgements

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