2e Workshop International d'Archéologie du Paysage des Montagnes Européennes

LA CONSTRUCTION DES TERRITOIRES MONTAGNARDS
THE CONSTRUCTION OF MOUNTAIN TERRITORIES

EXTRACTION DES RESSOURCES ET MOBILITÉ DES PRATIQUES
RESOURCE EXPLOITATION AND PRACTICE MOBILITY

GEODE (UMR 5602/CNRS)
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Maison des Sciences de l’Homme N. Ledoux de Besançon

8-11 Octobre 2009
Université de Toulouse 2
Maison de la Recherche

ABSTRACTS
2nd International Workshop on Archeology of European Mountain Landscapes
THE CONSTRUCTION OF MOUNTAIN TERRITORIES
RESOURCE EXPLOITATION AND PRACTICE MOBILITY

8-11 OCTOBER 2009
MAISON DE LA RECHERCHE – TOULOUSE 2 UNIVERSITY

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S. RIERA (Prehistory and Archeology Dept, University of Barcelona)
K. WALSH (University of York, United Kingdom)

This workshop is in keeping with a series of thematic colloquiums having the ambition to convene the principal european and international teams that work at mountain territories archeology and history in Europe. The first workshop took place at the ICAC (Catalonian Institute of Classic Archeology) in Tarragona, the 4th to 6th June 2008. The second one will take place at the Maison de la Recherche of Toulouse University the 8th to 11th October 2009. It will be organized by a group of French university and CNRS laboratories working on similar thematics, within various and complementary social-environmental mountain contexts.

The workshop will last four days: two days dedicated to oral communications and discussions, followed by two days of field trips and presentation of two interdisciplinary projects of pyrenean research (Ossau valley and Iraty massif). The main theme of this workshop is centered on questions related to resource exploitation by mountain societies and to practice mobility at the origin of long term mountain territory construction.

The teams and researchers brought together at this workshop will aim to understand the peopling and the management of different mountain spaces during the millenaries and to restitute the construction dynamics of territories and landscapes as entities that are at the same time environmental, socioeconomic and cultural. The occupation and the exploitation of mountain environments, both during conquest and maximum demographic phases, or on the contrary, during desertification phases, differ in geographical characteristics of the mountain ranges, but also according to characteristics forms of each social system (peopling system, standards and strategies for resource appropriation and exploitation, structuration of exchange patterns for their products). The triptych mountain-plains-piedmont forms the privileged observation frame, but the current inquireries on general mountain massifs show that the intensity and the nature of the links between these three spaces may vary considerably.

The resource structuring along this transect and the modes of exploitation that have been developed (agro-pastoralism, charcoal and mining activities, etc.) constitute the first marker of these variations. In all documented cases of figure, dynamic models of society movements are executed, at different spatial and temporal levels. So it’s through the prism of practice mobility that the workshop proposes to work on these topics, with the object to update the historical processes that have conducted to a plurimillenial contraction of mountain territories.
2nd International Workshop
on Archaeology of European Mountain Landscapes

THE CONSTRUCTION OF MOUNTAIN TERRITORIES
RESOURCE EXPLOITATION AND PRACTICE MOBILITY

8-11 October 2009
MAISON DE LA RECHERCHE – TOULOUSE LE MIRAIL UNIVERSITY

PROGRAM
Thursday October 8th morning

8:00-9:30 : Reception and Registration

9:30-10:00 : Opening of the Workshop

Chair : Klaus Oegggl (Botanical institute, Innsbruck, Austria)

10:00-10:20 : Cadre chrono-culturel, économique et premières exploitations du cuivre au Bronze ancien dans les Alpes nord-occidentales.
B. MOULIN, E. THIRAUT, J. VITAL et M.-C. BAILLY-MAITRE

10:20-10:40 : Iron mining and smelting at high altitude from the late Roman to early medieval periods in the Mercantour massif (Alpes-maritimes, France).
P. ROSENTHAL et D. MORIN

10:40-11:00 : Aux origines de la métallurgie pyrénéenne : premiers indices d’exploitation de cuivre et de fer dans les Pyrénées occidentales.
A. BEYRIE et E. KAMMENTHALER

11:00-11:20 : Glacial fluctuations and exploitation of copper resources in the high mountain Alps in the late Neolithic and Bronze Age (2500-1500 BC)

D. MOE

11:40-12:00 : Mountain summer farming of Western Norway. Land use history and development of cultural landscapes. Evidence from palaeoecology and archaeology.
M. KVAMME

12:00-12:10 : Evolution of land use at Lake St Point (Jura Mountains, France) since the Neolithic period : palynological and sedimentological analyses.
E. GAUTHIER, V. BICHET, A. LEROUX, A.-V. WALTER-SIMONNET, E. ROQUELLE, C. GROS et H. RICHARD

12:20-14:00 : Lunch break - Buffet
Thursday October 8th afternoon

Chair: J.L. de Beaulieu (CNRS, Marseille)

14:00-14:20: Plant economy of a seasonally occupied site at high altitude during the Neolithic: the rockshelter of l’Aulp du Seuil in the Chartreuse Massif (St Bernard du Touvet, Isère, France).
   L. Martin, C. Delhon, S. Thiébault et D. Pelletier

14:20-14:40: Prehistoric colonization and land use of Central Alpine valleys related to climate data
   K. Oeggl et D. Festi

14:40-15:00: Environmental and rural archaeology of post-medieval terraced chestnut groves sites in NW Italian Mountains
   C. Molinari, A. M. Stagno, C. Vaccarezza

15:00-15:20: Reconstructing past agro-sylvo-pastoral systems from environmental archaeology and historical ecology sites in Ligurian Mountain (Italy).
   R. Cevasco, M.A. Guido, B.I. Menozzi, C. Montanari, D. Moreno

15:20-15:40: Evolution of biodiversity, functioning and human practices in agro-ecosystems: the comparison of Pyrenean (Cerdagne, Capcir) and Romanian (Mont Apuseni) mountain systems.
   C. Brun, I. Tantau, D. Galop

15:40-16:00: Coffe break

Chair: P. Allée (GEOLAB, CNRS, Limoges, France)

16:00-16:20: Contribution of quantitative organic petrography to the reconstruction of high altitude mountains palaeoenvironments during the Holocene: a comparative study of Bramant & Blanc Huez proglacial lakes sedimentary infills (Grandes Rousses Massif, Western Alps, France).

   E. Ortu, S. Klotz, E. Brugiapaglia, C. Siniscalco, R. Caramiello

16:40-17:00: Spatial modeling approach of summer pasture grazing walks in an ethnoarchaeological perspective: a Pyrenean case study
   M. Le Couedic

17:00-17:20: Rythmes et mobilité d'occupation du massif du Morvan du premier âge du Fer au haut Moyen Âge. Spatialisation et croisement des données archéologiques et paléoenvironnementales.
   I. Jouffroy-Bapicot et P. Nouvel
   avec la collab. de J.-P. Guillaume, Ch. Petit, F. Monna, B. Forel et B. Vannière

17:20-17:40: Constructions et fonctionnalités des territoires de montagne en Pays de Soule (pays basque français).
   P. Palu et D. de Bortoli

17:40-18:00: Discussion

18:00: Aperitif-Buffet
Friday October 9th morning

Chair: K. Walsh (University of York, United Kingdom)

9:00-9:20: The EXCAVA project: new data about the human occupation, environmental history and landscape changes in southern Pyrenees.
E. GASSIOT, M-C. BAL, R. CUNILL, V. GARCÍA, A. PÈLACHS, R. PÉREZ-OBIGOL, D. RODRÍGUEZ, J.M. SORIANO

J.M. PALET, H. ORENGO, A. EJARQUE, I. EUBA, Y. MIRAS, S. RIERA

9:40-10:00: Populating and circulations in the valleys of the western internal Alps of Prehistory to Antiquity: the results of the study of a micro-region (hillsides of the Petit-Saint-Bernard Pass) confronted with the state of the knowledge in Tarentaise, Maurienne and Beaufortin.
P.-J. REY, J. COLLOMBET, N. SCOCCHIMARO, J.-M. TREFFORT

10:00-10:20: Territorial practices, landscape dynamics and spatio-temporal mobilities in a French medium mountain: integrated approach combining archaeological and palaeoecological investigations performed in the Cantal Massif and the Mount Lozere (French Massif Central)

10:20 - 10:40: Coffee break

Chair: J.M. Palet (ICAC, Taragona, Spain)

10:40-11:00 Wild fires in European Alps: frequent yesterday, rare today, frequent tomorrow?
W. FINSINGER

11:00-11:20 Exploitation of natural vegetal resources in Chalcolithic Areni-1 cave settlement (Armenia)
R. HOVSEPYAN

11:20-11:40 Mountain anthropization in northern Alps: a multidisciplinary look in the framework of Pygmalion research program
F. ARNAUD, F. DAVID, C. DELHON, C. GIGUET-COVEX, P.-J. REY

11:40-12:00 The HIDRAM4000 project: land use, human occupation and landscape changes in Central Spain during the last 3000 years. The Somolinos lake record (1240 m a.s.l.). Sierra de Pela, Guadalajara province

12:00-12:10: Un exemple d’occupation de l’espace dans la montagne corse au bas Moyen Âge: peuplement et économie dans la pieve de Rostino
D. ISTRIA et E. TOMAS

12:10-12:20: A Cultural Landscape Research in a Mediterranean Mountain Area. The “Massis del Montseny project” (Barcelona-Girona)
A. GARCIA MOLSOSA

12:30: Lunch break
Friday October 9th afternoon

Chair: E. Gauthier (Chrono-environnement, UFC, Besançon, France)

14:00-14:20: L’agro-pastoralisme en milieu montagnard. L’apport des « sépultures saisonnières »
P. Courtaud, P. Dumontier, F. Convertini

14:20-14:40: Prehistory of the Southern Appalachian Uplands of Tennessee
J. D. Franklin

14:40-15:00 A history of transitions: human environmental interactions in the high altitude zone
between the Neolithic and the Roman Period
K. Walsh, F. Moči, S. Richer, B. Talon, S. Tzortzis, M. Court-Picon

15:00-15:20: Approche palynologique des dynamiques du peuplement et des activités agro-pastorales
du massif de l’Aubrac (Massif Central, France)
E. Faure, D. Galop, F. Guiter

15:20-15:40: L’évolution végétale holocène sur le versant sud des Pyrénées occidentales
M.-J. Iríarte, B. Hernández-Beloqui, A. Arrizabalaga, P. Fernández

15:40-16:00: Coffee Break

16:00-18:00: Discussion and conclusion of the Workshop

19:00: Reception at the Toulouse town Hall

20:30: Workshop dinner at the “Caves de la Maréchale”

Program of the excursion

Saturday October 10th
Departure Toulouse: 7:30 (Meeting point will be indicated during the workshop)
Lourdes valley – Gave of Pau valley
Ossau valley
Anéou valley
Arrival at Montory approx. 19:00
Dinner in Montory

Sunday October 11th
Departure from Montory: 8:30
Iraty forest
Walk to the Occabe necropolis and peat bogs of the Iraty massif
Sourzay peat bog
Arrival at Toulouse approx. 20:30
ABSTRACTS
CADRE CHRONO-CULTUREL, ECONOMIQUE ET PREMIERES EXPLOITATIONS DU CUIVRE AU BRONZE ANCIEN DANS LES ALPES NORD-OCIDENTALES.

B. MOULIN*, E. THIRAULT**, J. VITAL*** ET M.-C. BAILLY-MAITRE****

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Depuis une décennie, l’étude de la mise en place des cultures de l’âge du Bronze dans le Sud-Est de la France a profité de plusieurs terrains qui sont venus alimenter différentes questions. En moyenne vallée du Rhône, ce sont les bases de la subsistance et les premières formes d’architecture agglomérante qui sont illustrées. Dans les Préalpes, l’occupation synchrone de plusieurs grottes bergeries permet d’avancer quelques hypothèses sur les réseaux économiques du Bronze ancien. A une échelle plus globale, intégrant les Alpes internes nord-occidentales, la succession chronométrique et la définition des cultures bénéficient d’une précision accrue qui permettent d’aller au-delà d’une référence le plus souvent conventionnelle à l’âge du Bronze, pour tendre vers une approche plus dynamique sur de larges espaces géographiques. Ainsi, nous pouvons tenter d’articuler les emprises culturelles méditerranéennes, nord-italiques et rhodaniennes. En conséquence, des notions classiques comme celle de la « Civilisation du Rhône » peuvent être discutées. Les prospections en cours sur le massif des Rousses, en Oisans (Isère), alimentent depuis peu cette même problématique culturelle et économique à la suite de la découverte d’un vaste district minier d’altitude (2500 m en moyenne) exploitant des ressources en cuivre. Ce nouveau champ de recherche complète le panorama des différentes modalités de circulation et d’occupation des milieux de montagne entre la fin du Néolithique et la première métallurgie du bronze. Il ouvre également des perspectives sur une approche technique de cette activité et ses conséquences paléoenvironnementales.
IRON MINING AND SMELTING AT HIGH ALTITUDE FROM THE LATE ROMAN TO EARLY MEDIEVAL PERIODS IN THE MERCANTOUR MASSIF (ALPES-MARITIMES, FRANCE).

**P. ROSENTHAL* et D. MORIN**
*UMR 6249 Chrono-environnement, Besançon, France  
**UMR 5608 Traces, Toulouse, France

Field investigations we carried out throughout the Argentera-Mercantour massif since 2001, threw important new light on the origin of iron metallurgy in the southern Alps, up to now not very known (Despine, 1823, Roux, 1862, Domergue and Leroy, 2000, Mangin, 2004). The results obtained make it possible to draw up a chronological assessment of three mining and smelting districts in this context of high altitude (fig.1). Each of them includes one iron mine or quarry site on a ridge which supplied downstream one or more metallurgical areas showing remains of bloomeries, early forms of furnace capable of smelting iron.

![Image: Location of the investigated areas](image)

**fig. 1 : Location of the investigated areas**

In the Saint-Etienne-de-Tinée district, field investigations identified open pit mining works on the top of Tortisse valley between 2 500 and 2 700 m. They are related to theprimary mineralized lodes in the paleozoic micaschists of the Cime du Fer, and a sedimentary breccia in the triassic cargneules, reworking micaschists and hematite fragments from the lodes. Ore dressing areas are located below the scree.

Downstream, charcoal kilns and smelting sites with slags and furnace wall fragments have been identified at an altitude of between 2 050 and 2 070 m, close to settlements and dry stone enclosures (fig. 2).

In the Isola district, a single exploration, in 2008, provided the first elements of an iron district in connection with the hematite occurrence of Tête rocheuse de la Guercha (Pierrot et Al., 1974). The mineralization, located in the gneisses and migmatites of the series of Rabuons shows that the vein of iron oxide has been hollowed out as a mine at several points around 2600 m, below the summit.

Downstream, in the Vallon de la Guercha, three places of bloomery have been already discovered near 1600 m (fig.2).

In the Valdeblore district, the iron ore resources of Col Ferrière are located in the upstream part of the Millefonds valley, between 2 225 and 2484 m high. They are associated with the mylonitized gneiss formation of Valletta-Molières (Faure-Muret, 1955). Mylonite and its margins are affected by a multidirectional fracturing : cracks and joints are cemented by ferruginous hematite fillings (Pierrot and Al, 1974). Hematite outcrops were mainly exploited by open quarries. They supplied three main areas of metallurgy (fig. 2) :
- Towards the South, in the *Millefonds* valley sorting and crushing were carried out directly by the mines at an altitude of 2 400-2 484 m. The ore was smelted in bloomeries, whose remains spread out from 2010 m to 1480 m (Morin, Rosenthal, 2006).
- Towards the North in the *Margès* valley, metallurgical remains were found between 2 145 m and 1 785 m.
- In the *Mollières* valley, slags and furnace fragments were discovered at an altitude of 1 675 m to 1 670 m. Footpaths connected the mining works to the smelting sites.

Charcoals samples for $^{14}$C dating were collected on the sites with slags by coring or directly on outcropping structures of combustion. Calibrated dates gathered by sites (fig.3) highlight a metallurgical activity between the II$^\text{nd}$ century BC and the VII$^\text{th}$ century AD, for the *Valdeblore* district. In the *Saint-Etienne-de-Tinée* and *Isola* districts, the ages range between the III$^\text{rd}$ and the VI$^\text{th}$ centuries AD. The three iron mining and smelting districts recognized in the Mercantour massif show a similar pattern of organization. Mining and ore dressing took place directly in the alpine level between an altitude of 2 700 and 2400 m. Sorted and sized ore was transported downstream. The higher smelting workshops are located at an altitude between 2 145 and 2 000 m, near the present higher forest limit, and the others bloomeries range mainly in the subalpine zone and lower. This activity spreads out between the II$^\text{nd}$ century BC and the VII$^\text{th}$ century AD. The mines and slags deposits of Valdeblore are the highest elevation iron metallurgy remains dated known in Europe. The field investigations inventory sets the localisation and the age range of the Mercantour iron mining and smelting. Saint-Etienne-de-Tinée and Valdeblore districts hold the highest known and dated iron metallurgy remains in Europe.

References :

**fig. 2 :** Altitude of iron resources and bloomeries (Iron districts of Saint-Etienne-de-Tinée, Isola and Valdeblore - Mercantour massif, Alpes-Maritimes, France). Organic diagrams without horizontal scale.
fig. 3. Radiocarbone dating of iron bloomeries (Iron districts of Saint-Etienne-de-Tinée, Isola and Valdeblore – Mercantour massif, Alpes-Maritimes, France). (M. Fontugne, CNRS-LSCE). This diagram clearly shows two distinct series of occupations. Millefonts and Marges, two complementary opposite small valleys whose furnaces are supplied with the Col Ferrières, show a virtually identical occupation span ranging from 160 BC to AD 520. The slag deposits of Plateau de Morgon, Mollières valley and the only one dated of la Guercha are more recent, covering a period ranging between AD 205 and AD 660. Over the whole area, the metallurgical activities span between the second century BC and the seventh century AD.
AUX ORIGINES DE LA METALLURGIE PYRENEENNE : PREMIERS INDICES D’EXPLOITATION DE CUivre ET DE FER DANS LES PYRENEES OCCIDENTALES.

**A. BEYRIE et E. KAMMENTHALER**
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Les vestiges d’activités minières et métallurgiques se trouvent en abondance à l’extrémité occidentale de la chaîne pyrénéenne, sur l’ensemble du territoire montagnard qui s’étend d’ouest en est de l’océan Atlantique aux vallées du haut Béarn (Pyrénées-Atlantiques). Les gîtes métallifères, souvent modestes mais particulièrement abondants, y ont été exploités pour l’or, l’argent et principalement pour le cuivre et le fer.

Les recherches menées depuis une dizaine d’années dans le domaine de l’archéologie minière et de la paléométallurgie permettent aujourd’hui de retracer les grandes lignes de l’histoire minière de l’extrémité occidentale du massif.


Les recherches menées en Béarn dans le domaine de l’archéologie des mines ont également mis en évidence une phase d’activité beaucoup plus ancienne, coïncidant cette fois avec la naissance de l’activité minière en Europe occidentale. Comme le laissaient augurer les résultats des études paléoenvironnementales menées au Pays Basque (D. Galop et F. Monna), la découverte de la mine de cuivre de Causiat en vallée d’Aspe permet de situer le démarrage des activités minières et métallurgiques dans l’Ouest pyrénéen au IIIe millénaire av. J.-C.
Copper exploitation developed in the southern half of France during the late Neolithic – between the 4th and 3rd millennia before our era – (‘La Capitelle’ in Péret: 3200-2900 BC; Ambert et al. 2005). On the southern edge of the Massif Central and in the Pyrenees, the mining and metallurgical districts developed low-productivity metal extraction. The production was then diffused thanks to local networks. This first type of metallurgy is mostly to be found in lower and medium altitude mountainous areas. This model, which could be called the ‘Neolithic system’, was completed in the second half of the third millennium, between the 25th and 24th centuries BC, with the end of the mining operations and a modification in metal consumption and supply networks.

In the Alps, the expansion of copper exploitation in high mountain areas from the 24th century BC has been observed. The exploitation of bornite in Saint-Veran (Hautes-Alpes) began around 2350 BC. The trench pillar – known as the ‘Tranchée des Anciens’, delivered nearly 400 m3 of ore processed in workshops situated at an altitude above 2300 m. The carbon datings show that the whole mining and metallurgical site operated for less than 500 years, between 2400 and 1900 BC, at the end of the Neolithic period and during the early Bronze Age.

Further North, in the Grandes Rousses massif, a large mining area was discovered recently (Bailly-Maître, Gonon, 2008) and the identification of metal pollution (copper and lead) in proglacial altitude lakes (Lake Bramant, 2500m, Guyard et al., 2008) shows a mass production of copper in the early Bronze Age (2200-1650 BC). The copper resources are situated at an altitude between 2250 and 2600 m and, unlike in Saint-Veran, are distributed over a very wide area. The exploitation of the mining district seems to have stopped during the 17th century BC, at the beginning of the Middle Bronze Age.

Among the reasons which could account for the intensification of the exploitation of copper resources, the causal link between the complexity of the techniques and mineral processing has long been put forward. Changes in weather conditions – as they imply the conditions of access to copper- can offer an alternative scenario. The core samples taken in the Bramant Lake and the Blanc d’Huez Lake (‘Grandes Rousses’) show fast fluctuations of glacial activity during the Neolithic period and the Bronze Age (Chapron et al., 2008). In the Bramant Lake, the predominance of organic layers-dated from the early Bronze Age to the beginning of the late Bronze Age – reflects declining glacial phases.

Evidence suggests that the favorable climatic conditions which developed at the turn of the 3rd and 2nd millennia BC promoted –to the benefit of glaciers- the exploitation of previously inaccessible copper resources. A return to less favorable conditions, marked from 1600 BC by newly advanced ice, would signal the disuse of mining sites, to the benefit of resources located at a lower altitude, such as the Austrian Tyrol and the Italian Trentino.
**VAL FEBBRARO-VALLE SPLUGA : A SURVEY OF THE USE OF AN UPPER MONTAIN-ALPINE AREA IN CENTRAL ITALIAN ALPS**

**D. MOE**  
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**Abstract (Valle Febbraro-Valle Spluga)**  
An interdisciplinary palaeoecological study in the low-alpine and subalpine zones of Val Febbraro, upper Valle di Spluga in Italian central Alps, between 1830 and 2304 m a.s.l., suggests the temporary presence of early Neolithic groups at about 6000 uncal b.p. Evidence for local woodland clearance and charcoal dust were found. Phases of woodland and treeline disturbances, and indications of increased human presence are evident at about 5500, 5100, and 4000 b.p. A marked increase in disturbance, mainly related to pasturing, is dated to the beginning of the Bronze Age. The last major stage of human impact on the vegetation coincides with the Final Bronze phase and the beginning of the Iron Age, with a small temporary reduction during the Roman period. 14C dated archaeological sites and finds are broadly concordant with the phases of human impact on the vegetation.  
The former use of a present day tourist path using the Baldiscio Pass between Valle Febbraro (I) and Valle Mesolcina (CH), is dated back to between 3500 b.p. and 3000 b.p.  
A summary figure is presented. No locally significant climatic changes have been traced during the last 6000 years, and if present, they are probably overshadowed by the vegetational changes caused by human activity.
The total landscapes of Norway are dominated by mountains, forests, open heathlands and grasslands. Only about 3% of the land surface is suited for cultivation or arable farming. The land use patterns of uncultivated areas were therefore of great importance to traditional farming economy, and even today they have impact on present day cultural landscapes.

The practice of summer farming has been widespread over most of the country. It implied that the livestock was sent away to remote parts of the farm for most of the growing season. As a majority of the farmers had to keep their animals indoors half-the-year, it was necessary for them to collect as much as possible of the summer production close to their homesteads and secure it for winter fodder. In particular in the fjord districts of Western Norway this was important, as the habitable areas at the bottom of the steep mountainsides along the fjords are very limited. These areas had to be utilized for winter fodder production, and the livestock was sent into the mountains to take benefit of the production of the high altitudinal pastures. In general they were only accessible from mid-June to mid-September due to the snow cover. The proper summer farms were normally situated so far away from the major settlement of the farm that people (mostly young women) had to stay there in small cabins to look after the livestock and take hand of the milk production, in order to make cheese and butter. These products were regularly transported back to the settlement at the farm or in the village. In most cases several farmers placed their cabins at the same summer farm for safety reasons and to facilitate the work. They also shared the pastures belonging to the different farms.

The summer farms also became arrowheads for the utilization of other resources of the mountain areas, as wood collecting, hunting, hay making at outlying meadows, iron production or fishing in mountain lakes. The value of these resources to the total farm economy could be as important as the production of cereals, meat, butter and cheese.

The activity at the summer farms created distinct cultural landscapes that still are visible, even though most of the traditional land use today has ceased. In addition to the cabins themselves, the impact of the livestock led to the development of gradients in the vegetation according to different intensity of grazing at different distances from the cabins. In the summer farming areas, the forest line became lowered compared to its natural climatical limit, and much of natural shrub vegetation was replaced by open grasslands. Many species were established at higher altitudes than expected due to this type of land use. Summer farming is closely related to similar traditional types of land use found in high altitudinal parts of Switzerland, Germany, Austria, Northern-Italy and Eastern-France. In German it is called “Alm-Wirtschaft”, and this must not be mixed up with the “transhumance” traditions of Southern-Europe. Summer farming, Alm-Wirtschaft and similar land use practices are based on winter foddering of the livestock, whereas transhumance is based on all-year-round grazing in different regions.

The history of summer farming is difficult to trace. In most of the country it seems to origin earlier than the oldest written source materials. Archaeological excavations of prehistorical cabins and other settlement remains have given valuable information, but the interpretation of this kind of source material alone impose uncertainties as very few items or constructions can be specific related to summer farming. Palaeoecological studies of the cultural landscape development can also contribute to solve the question, but there are many methodological problems related to e.g. low local pollen production, pollen transport and dispersal, and sediment disturbances. However, by combining the three types of source materials, it has been possible to improve the understanding of prehistorical land use in summer farming areas.

Most farmers in the fjord areas had intermediate spring pastures where livestock could graze during springtime before the snow had disappeared from the higher altitudes. These pastures were used for different purpose later in the summer. From studies of the cultural landscape development at such sites, it has been possible to achieve new information about the land use history of the total farm resources. This also facilitates the interpretation of the source material from the summer farms at higher altitudes.
EVOLUTION OF LAND USE AT LAKE ST POINT (JURA MOUNTAINS, FRANCE) SINCE THE NEOLITHIC PERIOD: PALYNOCLOGICAL AND SEDIMENTOLOGICAL ANALYSES.

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Lake St Point (850 m ASL) is located in the central part of Jura Mountains. The vegetation surrounding the lake is represented by wood pastures. Pasture woodland is a very ancient form of land use, characterized by a mosaic landscape, from the open pasture to the closed forest. In the context of human impact on vegetation, the aim of this study is to investigate chronology and details of the transition between the original ecosystems to the sylvo-pastoral ecosystem.

The deepest part of Lake St Point was cored from a floating platform. Chronology of the sequence is based on 24 AMS radiocarbon dates spread over the upper 7 m of the core. Concerning the recent period, $^{137}$Cs measurements were processed on the 20 upper centimeters of the sequence. The first results confirm the high quality of the deep lacustrine records and their scientific interest. The sediment succession collected in Lake St Point reveals a stratigraphically continuous profile spanning the entire Holocene period, and showing particular sensitivity to Human impact on vegetation. Pollen analysis reveals the first human impact as soon as the early Neolithic period, around 5300 cal. BC. Then, first farmers disappear until 4000 cal. BC. From this period to the end of Bronze Age, a particular land use takes place. Distinct pulses of forest clearance as a result of human activity can be observed. Among anthropogenic indicators, peaks of Cerealia type are followed by the increase of open landscape herbs. In a third phase, shrubs and light demanding trees (Juniperus, Acer...) develop in the clearance. Sedimentological analyses show that silicates and detrital carbonate fractions progressively increased, due to the erosion of soil. From the end of Bronze Age to the end of Iron Age, both Cerealia type and plants of open landscape curves increase and decrease together. This different signal suggests a new type of land use, with permanent fields. The Hallstatt period is characterized by regular human impacts while La Tène period correspond to a decline of agriculture. However, human pressure remains perceptible with regular clearance in the Fagus and Abies forest. Silicates content still increased while detrital carbonates input became steady due to a change in pedogenetic processes affecting the catchment. The two last millennia have recorded the most important human impact: large-scale deforestation, especially during the Middle Ages, altered the vegetation cover drastically. Grassland became used more intensively and during the modern period, silicates and detrital carbonate decreased, probably due to wood pastures development.
The site of l’Aulp du Seuil is located on the eastern border of the Chartreuse Massif at an altitude of 1727 meters. The site, at the bottom of a small valley dug into an urgonian perched syncline, is isolated and difficult of access. At present a subalpine mountain pine forest, associated with pastured grasslands and subalpine heaths occupy the surroundings of the site.

Numerous blocks were deposited during the last glaciation (fig 1). They were used as shelters and seasonal hunting camps since the Mesolithic. Especially animals like chamois, alpine ibex, red deer or wild boar were hunted.

Recent excavations directed by David Pelletier (2004-2005) in the block-shelter “ALP 1” uncovered several occupations from the Mesolithic to historic periods.

The present study focuses on the archaeobotanical analyses (charcoals and other plant remains) of one level dated to the middle Neolithic and including several earths. The results permit to evoke the plant economy of these human groups.

In this presentation, we will approach questions like:
- How did they manage fuel-wood?
- How did they use wild local plants?
- What was the consumption, on the site, of gathered and domesticated plants?

Results highlight the mobility of Neolithic people, their knowledge of environmental setting and their capability to exploit the resources of mountain environment.

**Fig. 1 : vue du vallon de l’Aulp du Seuil**
PREHISTORIC COLONIZATION AND LAND USE OF CENTRAL ALPINE VALLEYS RELATED TO CLIMATE DATA

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Climate impact on ecosystems is a matter of thresholds and scale. Here we present the compilation of the pre-historic colonization of central Alpine valleys tracked by pollen analyses, which we correlate with the record of sub-fossil logs from altitudes above 2000 m, as well as with the oxygen-isotope curve from Greenland ice cores (NGRIP). Both serve as proxies for the climate development in the Alps, but also on a larger northern hemispheric scale. On long-term scales no relationship between settlement and climate is detectable, but shorter time-scales (< 500 years) indicate a positive correlation, at least for parts of the Neolithic between ca. 4500 and 3000 and ca. 2800 and 2400 BC. A negative correlation is indicated for the period from ca. 3000 until 2800 BC. Climate deteriorations (e.g. as around 2700 BC) seem not to have severely affected the settlement in central alpine valleys indicating robust and resistant agricultural structures. From the Bronze Age onwards there is no significant correlation between climate and settlement of the Alps apparent. These examples suggest that climate has been an important trigger, but the relationship between climate and settlement seems to be more complex (e.g. influence of socio-economic structures, ore resources, etc.). For example this is shown by the striking early indications of transhumance in connection with the Neolithic Iceman “Ötzi”, which is scrutinized and discussed by new multidisciplinary studies in the Ötz mountains.
ENVIRONMENTAL AND RURAL ARCHAEOLOGY OF POST-MEDIEVAL TERRACED CHESTNUT GROVES SITES IN NW ITALIAN MOUNTAINS

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Keywords: Land-use changes, geographical historical microanalytical approach, rural archaeology, historical ecology, archaeobotany, local history

A series of spatially and temporally precise studies were undertaken in the Ligurian Apennines, Northern Italy, with the aim to document the post-medieval archaeology of sweet chestnut plantations in different sites (Lagorara, Lemmen, Perlezzi, San Rufino). Chestnut groves investigations have been developed recently on a special research project devoted to “Les paysages de l’arbre hors forêt: multivalorisation dans le cadre d’un développement local durable en Europe du sud”, funded by the French Ministry of Ecology and Sustainable Development and carried out by the Universities of Genoa (Italy), Toulouse (France) and Granada (Spain).

The reconstruction of past management practices and the interpretation of change factors in the study of historical processes and functions of chestnut plantations is the main focus of this contribution. The most important aim is to point out the differences between the discussed case studies and the different sources employed (historical cartography, archaeobotany, archaeological and oral sources).

Perlezzi (Borzonasca, GE) site is an irrigated terraced sweet chestnut grove connected with a water management system having a continuity of use at least since late 17th c., as shown by archaeological evidences. Archival documents testify the presence of sweet chestnut groves in this area since the medieval period, but archaeological surveys date the construction of the terraces system since the end of 17th c. and - for the moment - do not permit to identify different utilizations. In this case, more information about the past management practices of environmental resources of the area could be reached with the help of archaeobotanical data.

In San Rufino (Levi, GE) site the study of archival and field evidences documents a particular practice of co-plantation of sweet chestnut grove with black alder, spread in Entella River basin, since late 18th until the half of 20th c.

Lagorara (Maissana, SP) site is a terraced sweet chestnut grove planted after the second half of the 19th c. on a wooded meadow pasture. In this case study, the question about whether a particular management practice of environmental resources (like the planting of small sweet chestnut groves) can be detected in pollen and microcharcoal diagrams is discussed. Of particular interest are the results of the palynological analysis of a terraced soil profile matched with historical ecology information.

In Lemmen (Riomaggiore, SP) site, located in the Cinque Terre Natural National Park, the employment of different sources allowed to reconstruct the regressive history, until the first half of the 19th c., of a rural landscape characterized by grazing areas with a chestnut wooded meadow system developed into a cultural landscape of coast winter pastures of a transhumance system. A system more complex than the present one characterized by olive and vine terraces.
RECONSTRUCTING PAST AGRO-SYLVIO-PASTORAL SYSTEMS FROM ENVIRONMENTAL ARCHAEOLOGY AND HISTORICAL ECOLOGY SITES IN LIGURIAN MOUNTAIN (ITALY).

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The reconstruction of past management practices and the interpretation of change factors in the study of historical processes and functions of past agro-sylvio-pastoral systems are the main focus of the study of a number of sites in NW Italy mountains for the last ten years. We experienced that dynamics and modelling of different local systems need a geographical-historical microanalytical approach to the sites. Moreover, a regressive method and a high resolution in producing and employing field evidences are required. This approach, according to local history and environmental archaeology methods, tests and crosses different kinds of sources, which include archaeobotany, historical geography (archival, cartographic sources), field evidence (historical ecology, environmental and rural archaeology) and oral sources at the topographical scale. As an example of a historical microanalytical approach to the site study, palynological data from two wetlands located on opposite slopes in the upper Aveto Valley (NW-Italy Apennines, municipality of Rezzoaglio) are compared. The pollen catchment areas are different because of altitude (800 m - Lago di Rezzo, and 1100 m - Mogge di Ertola) and distance from rural settlements. Nevertheless, both sites preserved traces of the medieval cultural landscapes that proof their inclusion in the complex agro-sylvio-pastoral system in which chestnut groves, wooded-meadows, pastures and fields appears to be essential components. In both pollen diagrams different tree species (fir and beech vs. oaks) dominate by turns accordingly with altitude, while low percentages of hazel, walnut, chestnut and cereals alternate along the sequence. The occurrence of coprophilous fungi suggests dunging or livestock watering. Microcharcoal frequency fluctuates in connection with other anthropogenic indicators, suggesting a role of fire in the land management. The important changes of the cultural landscape which occurred in the last decades are well represented in the pollen diagrams and associated with historical changes in the ecology of the sites.
La diffusion de l’agriculture et d’espèces domestiques accompagnées de leur cortège d’adventices dans des aires où elles n’existaient pas à l’état sauvage a profondément affecté les écosystèmes naturels. Elle a entraîné la formation d’agro-écosystèmes aux caractéristiques bien définies : (1) la flore compagne des cultures est très spécifique et spécialisée ; (2) elle est dominée par les espèces étrangères ; (3) sa composition est intimement liée aux pratiques humaines et à leurs évolutions. Or le fonctionnement de ces écosystèmes reste encore aujourd’hui largement sous-étudié. Les nombreuses données carpologiques et polliniques, aujourd’hui disponibles, forment un riche corpus paléobotanique indispensable pour retracer l’évolution de ces agro-écosystèmes. Mais pour réévaluer et renouveler les interprétations réalisées à partir de ces corpus, il faut s’appuyer sur de nouveaux référentiels. Le choix d’aires d’étude adéquates doit se faire selon deux objectifs majeurs : (1) prospecter des zones préservées encore gérées traditionnellement pour avoir des situations de références les plus proches possibles des cas anciens ; (2) prospecter des champs avec la flore adventice la plus variée et nombreuse possible. Ce choix est particulièrement difficile car depuis le début du XXème siècle, la densité des populations humaines et l’intensité de leurs activités ont entraîné un déclin de la diversité floristique (Vitousek et al., 1997). Ce déclin généralisé frappe particulièrement les milieux cultivés. L’appauvrissement progressif de la flore des champs est particulièrement marqué en Europe occidentale et croît du Sud au Nord de l’Europe (Sutcliffe & Kay, 2000 ; Fried, 2007).

Deux zones d’études ont été choisies :
- Afin de pallier l’absence de situation agricole favorable en Europe tempérée, un pays d’Europe orientale, la Roumanie, a retenu notre attention pour ses caractéristiques géographiques et historiques originales. Nous nous sommes plus particulièrement intéressés à une région de moyenne montagne de Transylvanie (Monts Apuseni dans les Carpates occidentales).
- Ensuite, le deuxième champ d’étude se trouve en Europe méditerranéenne. On y trouve, en effet, des zones de moyennes montagnes où l’on rencontre une flore adventice encore localement abondante (Aboucaya et al., 2000). C’est le cas notamment dans le Sud français, par exemple en Cerdagne et au Capcir dans les Pyrénées orientales.

La réalisation de référentiels actuels, à la fois floristiques et ethnographiques, dans ces deux zones d’études nous permet d’étudier et de confronter deux modes de gestion traditionnelle des terres. La confrontation des données floristiques, des variables environnementales (altitude, type et profondeur de sol, roche mère, pH, topographie, données climatiques etc.) ainsi que l’ensemble des modes de gestion de la parcelle (préparation de la terre : type et profondeur des labours, semaines, herbes ; systèmes de culture : type d’assolement ; mode d’entretien des cultures : fréquence des sarclages, modes et date des récoltes...) doit permettre de hiérarchiser l’importance de chaque filtre (environnemental ou humain) à l’origine de la composition floristique observée. A terme, ces nouveaux référentiels serviront à améliorer l’interprétation paléoenvironnementale notamment grâce à l’étude menée conjointement de la pluie pollinique actuelle de ces milieux.

CONTRIBUTION OF QUANTITATIVE ORGANIC PETROGRAPHY TO THE RECONSTRUCTION OF HIGH ALTITUDE MOUNTAINS PALÆOENVIRONMENTS DURING THE HOLOCENE: A COMPARATIVE STUDY OF BRAMANT & BLANC HUEZ PROGLACIAL LAKES SEDIMENTARY INFILLS (GRANDES ROUSSES MASSIF, WESTERN ALPS, FRANCE).


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This report introduces results of lithological, optical and geochemical investigations made on lacustrine sediments from two high altitude proglacial lakes of Grandes Rousses massif (western Alps, France): the lakes Blanc Huez and Bramant. The aim of this work is to reconstitute mountain paleoenvironments of the massif during the last 10,000 years (Holocene) and to put it in relation with high altitude human activities identified by archaeology. Lithological analyses show succession of organic and clastic sequences. Geochemical analyses of organic matter show that total organic carbon could be correlated with physical parameters like magnetic susceptibility, gamma densimetry or spectrocolorymetry. The entirety allows characterizing transitions between our facies. Optical analyses on organic sequences allow us to clarify composition, sources and geochemical conditions in basins. Thus, we underline fossil organic matter from Blanc Huez catchment in the Blanc Huez lacustrine sediments. It leads us to modify bulk dating. We created an age-depth model which allowed us to describe alpine mountain paleoenvironments since Younger Dryas (~12765 cal BP). Two glacial overhangs have been identified during Younger Dryas and since Upper Atlantic (~6800 cal BP). Organical facies of gyttja were deposited at the beginning of Upper Dryas, and from Preboreal (~10200 cal BP) to Upper Atlantic. However, climatic variations have been identified during Subboreal (~5550 à 2590 cal BP) and can be correlated with human activities in the catchments in particular during Bronze Age. More studies in the massif would allow us to validate our results.
ELEVATION-INDUCED VARIATIONS OF POLLEN ASSEMBLAGES IN THE NORTH-WESTERN ALPS: A MODEL FOR THE QUANTIFICATION OF LAPSE-RATES AND TEMPERATURE EVOLUTION DURING THE HOLOCENE.

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Keywords: Alps, lapse rates, model, pollen, temperature, transfer functions.

Modern pollen data collected at various elevations in two different areas of the North-western Alps (the Aosta Valley, Italy with 37 sample points, and the Taillefer Massif, France, with 40 sample points) were statistically analysed to obtain a functional relationship between pollen assemblages’ variations, the elevation and temperature parameters of the sampled points. Correspondence Analysis (CA) was performed on pollen data to underline statistical similarities and differences between pollen assemblages from comparable elevations in the two areas. A transfer function from pollen percentages to elevation was first calculated based on all the taxa. The actual altitudes plotted versus calculated altitudes yield a R2 > 0.9 (figure 1).

![Figure 1: Coefficients of determination (R2) calculated on observed and pollen-inferred altitudes for all the sites.](image)

This step shows the strong relationship between altitude and variations in pollen taxa percentages despite the effect of local parameters and some floristic differences between the two areas. For the reconstruction of temperature, from pollen data, three transfer functions from Aosta pollen assemblages to Tann (mean annual temperature) were created for each parameter, using three different methodologies. Aiming to be reliable for the two areas, the calculation of each function was based on common taxa to avoid biases due to differences in pollen floras. Application to the Taillefer
pollen dataset shows that the best results were obtained using a backward step-created linear multiple transfer function, which is based on a sufficient number of taxa (25) and yielded an acceptable R² (R²>0.6) and a RMSE about 4. A transfer function to TJan (January temperature) and TJul (July temperature) was then created using this same method. The reconstruction appears to be reliable, with a higher reliability at sites located over 1000 m than at sites located at lower altitudes (figure 2).

![Graph showing temperature comparison](image)

Figure 2: Pollen-inferred annual temperature compared to actual temperature values on the Taillefer Massif’s sites.

This elaboration aims to be a first step for the development of a model for reconstructing the evolution of temperature and lapse rates during the Holocene from fossil pollen data from the alpine area.
Pyrenean summer pastures are mostly a collective resource, used by rural communities of the upper valleys. On a large scale, territorial divisions of these mountains summer pastures are mainly defined by the practice from the shepherd’s huts as the livestock is grazing. To consider these practices and partitions at different periods, based on the pastoral sites documented by archeology, this ethnoarchaeological study aims at understanding the physical and social determinants of herd walks, as well as their material correlates in a spatial perspective. The Pyrenean National Park conducted territory mapping of existing herd walks in the Western Pyrenean summer mountains enables the study of the morphology of these territories according to pastoral systems (type of livestock, production, cattle keeping, number of heads) and in terms of environment (orography and vegetation). Then, these territories have borders of various kinds: discontinuous and tight in certain areas, blurred and tangled in others. These variations could show differences in grazing pressure or mode of sharing and access to these areas. Unravel these variations and tackle the physical correlates of walks request to consider these areas on a daily scale, from the huts. From this perspective, the mapping of the Park has been refined by ethnological surveys in the valleys of Ossau and Aspe. These divisions and these areas of cospatiality can thus be understood thanks to the spatial distribution of the huts and with a widening of the perspective to the territorial structuring on valleys scale.
RYTHMES ET MOBILITE D’OCCUPATION DU MASSIF DU MORVAN DU PREMIER AGE DU FER AU HAUT MOYEN ÂGE. SPATIALISATION ET CROISEMENT DES DONNEES ARCHEOLOGIQUES ET PALEOENVIRONNEMENTALES.

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Cette communication a pour objet de présenter les conclusions d’une première confrontation multiscalaire et diachrone des jeux de données issues du paléoenvironnement et de l’archéologie, dans le massif du Morvan. Il s’agira autant de mesurer la fiabilité des méthodes mises en œuvre que de mettre en perspective les résultats obtenus.

La région d’étude, un petit massif granitique, forme l’extension nord-est du Massif Central. C’est aujourd’hui une région peu peuplée, dont le couvert végétal est principalement composé de forêts et de prairies. Contrairement aux régions de grandes cultures voisines, les modalités et l’évolution des réseaux de peuplements anciens y sont très mal connus. Cette situation est essentiellement due au couvert végétal, qui y limite fortement les méthodes de prospection aériennes et terrestres, les terres labourées ne représentant qu’une infime partie du territoire. Sa situation socio-économique marginale n’est pas non plus favorable à l’activité archéologique préventive, moteur actuel des recherches archéologiques régionales.

L’essentiel de nos connaissances repose donc ici sur un site unique, situé dans le sud du Morvan, l’oppidum gaulois de Bibracte. Établi sur le Mont-Beuvray (820 m), il est depuis une vingtaine d’années l’objet d’une intense activité de fouilles programmées dans le cadre d’un centre de recherche européen. Dernièrement, des programmes d’études sur l’environnement humain et naturel du site de Bibracte ont été développés dans ce cadre. Ils ont mobilisés les compétences d’équipes pluridisciplinaires spécialisées en paléoennvironnement et en archéologie du territoire.


* Les secondes ont cherché à rassembler, dans un cadre d’étude limité couvrant la surface d’une dizaine de communes, l’ensemble de la documentation archéologique existante. Cette première étape a été complétée par des prospections systématiques terrestres et aéroportées LIDAR, qui permettent aujourd’hui de proposer des scenarii d’évolution plus précis du peuplement de la région, depuis la fin de la protohistoire jusqu’à l’époque médiévale. Elles mettent également en évidence des modalités d’occupation et de mise en valeur différentes entre le piémont et les espaces les plus élevés.

Ces premiers résultats permettent d’ores et déjà une première confrontation à grande échelle avec les données paléoenvironnementales, permettant de préciser les rythmes et l’intensité de l’activité humaine dans ces espaces de moyenne montagne. Les observations ont été approfondies à proximité de certaines séquences paléoenvironnementales, permettant, à une échelle plus réduite, des analyses plus poussées.
CONSTRUCTIONS ET FONCTIONNALITÉS DES TERRITOIRES DE MONTAGNE EN PAYS DE SOULE (PAYS BASQUE FRANÇAIS).

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THE EXCAVA PROJECT: NEW DATA ABOUT THE HUMAN OCCUPATION, ENVIRONMENTAL HISTORY AND LANDSCAPE CHANGES IN SOUTHERN PYRENEES.


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Recent multidisciplinary researches in western Catalan Pyrenees have provided abundant data on the human occupation and the environmental history that permit state some models about the landscape changes and the factors involved in. Surface archaeological surveys permitted to document hundreds of evidences of past occupation of alpine and subalpine areas since the beginning of the Holocene until the present. The extensive archaeological diggings of the Sardo Cave and Estany de la Coveta Rockshelter confirm the intensive middle and recent Neolithic occupations (5500 to 4400 calBP) showed by the absolute dating of many sites. This paper summarizes these archaeological data and confronts them with the paleoecological evidence provided by the sedimentary cores of Estany de la Coma de Burg and València d'Àneu. The agreements and disagreements of the two kinds of evidences are discussed in order to understand the past models of human settlement and exploitation of high mountain Pyrenean environments and their changes through the time.
L’EXPLOITATION DES RESSOURCES DES VALLÉES ANDORRANES DU MADRIU-PERAFITA-CLAROR ET DE LA CHAÎNE DU CADÍ (PYRÉNÉES ORIENTALES) DEPUIS LE NÉOLITHIQUE À PARTIR DES DONNÉES ARCHÉOLOGIQUES ET PALÉÉCOLOGIQUES: MOBILITÉ DES PRATIQUES ET DYNAMIQUE DES PAYSAGES CULTURELS.


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This paper presents evidence drawn from an ongoing integrated archaeological and palaeoenvironmental research program which aims to understand the long-term shaping of a high mountain cultural landscape. The Madriu-Peraïta-Claror valleys (Eastern Pyrenees, Andorra), included in the UNESCO World Heritage List, show a pronounced spatial variability in geomorphology, vegetation and human practices. This is closely related to the valleys’ verticality (from 1050 to 2905 m.a.s.l.) and the predominant N-S slope exposure. The Cadí chain, placed in the Catalan pre-Pyrenees is characterized by a forest stage and a alpine area intensely exploited.

Palaeoenvironmental and archaeological studies have been carried out in high spatial and temporal resolution. The distribution of the more than 500 archaeological structures recorded from the Early Neolithic to Modern times also suggests a highly dynamic organization of the valleys’ land-use in the past. On the basis of archaeological and palaeoecological data, different chronological patterns and spatial land-use distribution could be formulated at a micro-regional scale during the Prehistory. The pollen record suggests a potential earliest human occupation up to the subalpine belt at the Mesolithic-Early Neolithic transition (ca 6400-6000 BC). However, it is during the Early and Middle Neolithic (ca 4500-3050 BC) that both archaeological and palaeoecological data attest pastoral activities in the highest alpine areas. From the Late Neolithic (ca 2300 BC), an altitudinal landscape structuration is registered, a process which becomes more pronounced during the Early Bronze Age (ca 2100-1700 BC). It has been also reported that land use differs from closer valleys, corroborating the idea of heterogeneity in the management of high mountain areas during prehistory.

Grazing, metallurgy and forest exploitation have been the main activities modelling those areas. The exploitation of high mountain spaces intensifies at Roman times with the development of metallurgic activities and the exploitation of pine resins.

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From 2003 till 2007, within the framework of the program Interreg Alpis Graia then of the annual scheduled operation, an archaeological study was driven on hillsides of the Petit-St Bernard Pass (Savoy-Val d’Aoste). In this region badly known until then in spite of the presence of a transalpine passage historically very important, the objectives were to develop the knowledge of the first populatings of the alpine mountain, to enrich the very incomplete documentation of the regional material culture and to clarify the dynamics of circulations by the pass.

The zone of study covers all the height of hillsides to approach the vertical variability of the modalities of occupations and exploitations of the environment. The approach of ground privileged the realization of big series of manual poll in sectors favorable to the sedimentary piégeage, determined by fast locations. According to vestiges and to big series of datings radiocarbons, the meditative archaeological data divide up of the average Neolithic in the high Middle Ages and present net chronological and vertical fluctuations which will be presented in detail.

The confrontation of these results with the bibliographical compilation of the existing data in the nearby French valleys shows an often rather good correlation. We observe three important conflicts which concern the density of the sites of the ancient Bronze and the first Iron, far better represented in the results of the PSB, as well as the distribution altitudinale neolithic occupations, marked by a bipartition vertical to the PSB. This stake in perspective allows a critical return on the efficiency of the method and on the meaning of the obtained results.

According to the taphonomic and paléo-environmental available data and according to the models of exploitation of the mountain territories, various hypotheses of explanations not exclusive and sometimes contradictory will be advanced, for every big chronological period.
TERRITORIAL PRACTICES, LANDSCAPE DYNAMICS AND SPATIO-TEMPORAL MOBILITIES IN A FRENCH MEDIUM MOUNTAIN: INTEGRATED APPROACH COMBINING ARCHAEOLOGICAL AND PALAEOECOLOGICAL INVESTIGATIONS PERFORMED IN THE CANTAL MASSIF AND THE MOUNT LOZERE (FRENCH MASSIF CENTRAL)

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Two integrated archaeological and palaeoenvironmental research programs have been carried out since 2000 in the French Massif Central at a high spatial and temporal resolution in order to achieve a better understanding of the environmental/anthropogenic interactions in different medium mountain ecosystems ranging from 1000 m to 1600 m a.s.l. from the Mid-Holocene to the end of Modern Times. The data presented here offer the opportunity to examine the long term shaping of two different cultural landscapes. The first one is the volcanic southern “planèze” of the Plomb du Cantal, in the heart of the Massif Central, and whose continental climate is particularly harsh and where heavy snow and rainfall underlines a pronounced oceanic tendency. This zone is also characterized by rich and fertile volcanic soils, though no mineral resources (flint, ore) are available. The second one is the crystalline area of the Mont Lozère, in the east-southern Massif Central. Its mountain climate is noticeably influenced by Mediterranean conditions and mineral resources are abundant and consist mainly in silver. The strength of carrying the same pluridisciplinary approach in these two different socio-environmental contexts lies in providing a higher degree of landscape variabilities and a larger range of available natural resources. It allows thus a comparative reconstruction of the complex land-use models developed throughout the Holocene by human societies and the triggers of their dynamics (climate vs socioeconomic transformations). It better questions the heterogeneity and the complementarities in the management of these mountain spaces (agropastoralism, forest exploitation, coal production, and metallurgy). Although alpine vegetation belt is totally absent in the whole French Massif central, the data presented argue in favour of gradual and differential altitudinal gradients of human practices which fluctuate throughout time, particularly the altitudinal limit for cereal growth and the summer grazing activity. Even if these medium mountain areas must be considered as complex landscapes shaped during a long term land-use history marked by important common thresholds, different chronological patterns and spatial land-use distribution start to be formulated at a micro-regional scale suggesting other gradient of explanation than altitude and, combining to cultural data (social, demographic, politic, system of commercial exchange, ritualistic and symbolic aspects etc.), explaining the construction of these mountain territories.
WILDFIRES IN EUROPEAN ALPS: FREQUENT YESTERDAY, RARE TODAY, FREQUENT TOMORROW?

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Over the past century, profound land-use changes have affected natural ecosystems in European mountain regions. The effects of a massive abandonment of agro-pastoral activities in those regions already translated into an expansion of forests that will likely increase in the coming decades. In combination with increased temperatures and decreased rainfall, as predicted by the majority of climate models, the risk of wildfire occurrence may therefore increase in future. Wildfires, whether natural or human induced, are rare today in the European Alps because they are rapidly suppressed. Hence, knowledge of fire ecology and the long-term role of wildfires in Alpine landscapes are lacking. In Central Europe and in the Alps, wildfires still receive very little attention in both nature conservation and management, and their potential managerial benefits are generally disregarded. In the following communication, I will briefly outline some results of palaeoecological investigations in the European Alps that indicate the higher frequency of wildfires in the past and their relationship to past land-use changes.
EXPLOITATION OF NATURAL VEGETAL RESOURCES IN CHALCOLITHIC ARENI-1 CAVE SETTLEMENT (ARMENIA)

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Recently discovered Areni-1 archaeological site is situated in karstic cave at Arpa River canyon, Armenia, on altitude 1000 m above sea level. The climate of the cave region is very dry and the vegetation is represented with dry steppes and xerophile rare forests.

The cave also is characterized by very dry conditions, which result excellent preservation of organic material inside the cave. As almost nothing was destroyed in the cave during Holocene, the assemblage of recovered vegetal remains and taxa is very diverse: more than 40 Seed Plants already were identified amongst uncountable vegetal remains (desiccated and charred). The most of recovered plant remains are originated from Chalcolithic contexts (dated with end of V – beginning of IV millennia calibrated BC).

Chalcolithic period of Caucasus is characterized with developed agriculture, which main direction was cultivation of free-threshing cereals. Situation of Areni-1 differs from general. Field-crops cultivated in Areni-1 are almost the same as in other Chalcolithic sites: naked bread wheat (Triticum aestivum), emmer (T. dicoccum), hulled and naked barleys (Hordeum vulgare), as well as lentil (Lens culinaris) and grass pea (Lathyrus sp.), but they are very few in comparison with recorded trees and shrubs. The weeds, recovered in Areni-1, also are common for Chalcolithic period of the region: species of Buglossoides, Lithospermum, Vaccaria, Ranunculus, Galium, Polygonum, Camelina, Alyssum, Thlaspi, Scrophularia, Althaea, etc.

Against of situation with field-crops, edible arboreal species are numerous in the site. Large quantities of Chalcolithic desiccated fruits, nutstones and seeds of hackberry ( Celtis sp.), plums (Prunus spp.), cherries (Cerasus sp., C. incana, C. cf. mahaleb), almonds (Amygdalus spp.), hawthorn (Craetaegus sp.), roses (Rosa spp.), blackberry (Rubus sp.), pear (Pyrus sp.), oleaster (Elaeagnus angustifolia), walnut (Juglans regia), juniper (Juniperus sp., seeds), caper (Capparis spinosa), grape (Vitis vinifera) are recovered in Areni-1 cave. Majority of above mentioned woody and shrubby plants are common elements of rare xerophile forests of Daralagez floristic region, where the cave is situated, and have large biological diversity there. Only exceptions could be the walnut and the grape, wild exemplars of which now growing in discussed region are considered as wilded cultigens. Modern Areni is known as region with high developed horticulture (grape, apricot, peach, plums, cherries, apple, pear, etc.).

It is known that prehistoric communities’ existence highly depended from natural resources. In late prehistoric (Pottery Neolith – Eneolith) period of South-Eastern European communities this dependence from natural resources was intermediated with exploitation of territories mostly via agriculture, which accompanied with some gathering and sometimes also with some viticulture and horticulture, as well as animal husbandry accompanied with hunting. In case of Areni-1 Chalcolithic settlement situation is another; the main direction to get vegetal meal is gathering (cultivation?) of available trees’ and shrubs’ fruits and seeds instead of field agriculture, which has been pushed to secondary plan. This can be explained with presence of only very limited space, narrow river bank zone (flat bottom of the canyon), where irrigation and consequently field agriculture was possible in Chalcolithic period.

The case of Chalcolithic Areni-1 site is good example, where the community’s plant economy has been modified according to specific abiotic (relief, climate) and biotic factors (vegetation) of the environment.
MOUNTAIN ANTHROPIZATION IN NORTHERN ALPS: A MULTIDISCIPLINARY LOOK IN THE FRAMEWORK OF *PYGMALION* RESEARCH PROGRAM.

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*Pygmalion (PaleohYdrology and huMAN-climate-environment interactIOns in the Alps) is a multidisciplinary research program funded by ANR that aims to a reconstruction of climate evolution and human impact on the environment, in an area restricted to the northern part of the French Alps and the related forelands. Underlying objective is to improve our understanding of the natural climatic variability during the Holocene in continental contexts, and although of how societies adapted to these variations.

Several study « windows » were chosen from plain area in the lower Dauphiné to the highest mountain in Mont Blanc massive. In this communication, we are going focus on the area including Arve and Giffre valleys (Savoie), which reaches approximately 2300 m at its higher point.

Except mineral cliffs surrounding Anterne mountain, the whole massif is located in the subalpine vegetation belt, and represents the western boundary of larch and arolla pine forests. Nevertheless, present day vegetation is mainly asylatic, and woody formations are limited to expanding green alder thickets and rhododendron heaths, in spite of the presence of scarce larches and spruces growing on unreachable cliffs.

Unless the landscape is obviously deeply anthropized, the history of the relationship between societies and their environment haven’t been much studied in the area. *Pygmalion* program is an opportunity for crossing the data from various disciplines from natural and human sciences (archaeology, history, palaeobotany, geosciences). The results obtained after only one year of work through palynology, sedimentology, plant macro-remains analysis and archaeology are convergent and identify key-phases of landscape evolution.

Impacts of human activities on the vegetation as well as on erosion are recorded as early as the end of the Neolithic period. The decline of woody vegetation is continuous all along Protohistory to the benefit of alder thickets. Several badly preserved stone structures that evoke folds and shepherd shelters seem to be linked to pastoral practices. According to field observation, they could date back to Protohistory or even to the end of the Neolithic, but this still have to be confirmed by 14C data (forthcoming). Finally, the dramatic decline of trees really began during the Roman period, which seems to be also the date of arolla pine local extinction. The corollary of that gradual deforestation is slopes destabilization which makes them more sensitive to climate-driven erosive phenomena.
THE HIDRAM4000 PROJECT: LAND USE, HUMAN OCCUPATION AND LANDSCAPE CHANGES IN CENTRAL SPAIN DURING THE LAST 3000 YEARS. THE SOMOLINOS LAKE RECORD (1240 M A.S.L.). SIERRA DE PELA, GUADALAJARA PROVINCE.

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Since 2005, the HIDRAM4000 project aims to analyze human-environment past synergies in order to understand the effects of climate variability over environmental and socio-economic systems in central Spain during the Late Holocene. In addition, socio-environmental interactions have largely influenced land management choices and cultural landscape shaping especially in those processes related to grazing, farming and water management activities.

This project integrates archaeology, history and multi-proxy palaeoenvironmental analyses such as pollen, non-pollen palynomorphs (NPP), charcoal, ostracoda, diatoms, cladocera and sedimentology. These analyses have been carried out at high resolution in lacustrine sediments of the Somolinos karstic lakes (1240 m a.s.l.). They are located in a mountain area in central Spain (Sierra de Pela, Guadalajara province) which is characterised by a sub-continental Mediterranean climate.

Two cores were studied, one from the current active lake (SOM-a) covering from 1600 to 2005 AD, and a second one from a drained lake, covering from 900 BC to 700 AD (SOM-PAS).

From the 9th to the end of the 1st century BC, SOM-PAS shows a first environmental phase which is characterised by a forested landscape dominated by pines and evergreen oaks. Early signals of human management are witnessed at the 8th century BC, while diatoms indicate a freshwater permanent lake.

From the 6th to the 1st century BC, successive oscillations of Arboreal Pollen, together with the increase of macrocharcoal particles and metals, suggest the existence of human activities (grazing and metallurgy). For this period, archaeological evidences are reported in the basin highlands.

Woodland clearance in the area started at the 1st century BC. From this time onwards, pollen and NPP show the expansion of farming and grazing practices, while mining activities are also evidenced by geochemical data. Such deforestation process resulted in an open grazed landscape between the 2nd and the 5th century AD. The increase of diatom benthic species suggests a change in the water trophic state.

Whilst a change towards a regeneration of evergreen oak forests is evidenced in this open landscape during the 5th century AD, pine woodland did not recover in the area, as documented in pre-clearing phases. This period is otherwise coincident with the decline of farming and grazing activities, while mining expanded during the 6th and the 7th centuries. The lake was desiccated by a drain cutting across the travertine dam, most probably during the Early Medieval period.

From the 14th century onwards, the region was largely grazed due to the development of the Spanish pastoral transhumance. This activity resulted in a large number of pastoral structures, some of them radiocarbon dated at the end of 15th century. Unfortunately, this period is not covered by the Somolinos lake cores.
**SOM-α** records farming and industrial activities in the region for the last 400 years. During modern times, the lake was employed as an energetic resource. In this respect, cereal and fulling mills are documented at least from the 16th century, and 17 cereal mills and 8 waterfall copper forges were already working in 1752. Despite these pre-industrial facilities, the area was progressively depressed and depopulated during the 19th century due to the end of the transhumance after the Mesta abolition (1836) and the propriety privatisation (1855).

From 1600 to 1675 AD, farming activities (cereal and chestnut cultures are also reported in written sources at 1584. The abundance of planktonic diatoms suggests a deep water column.

From 1675 to 1730 AD, farming activities decline, while cereals, chestnuts and vineyard crops remain. Geochemistry analysis records metal peaks (Co, Cu, Zn, Mn), suggesting mining and possible metallurgy. During this period, the organic matter content, the dolomite high percentages and the decrease of calcite suggest a drop in the lake water level.

From 1730 to 1910 AD, the pollen record shows a new decrease in farming activities, resulting in a reforestation of the area which is consistent with the documented demographic decline. Residual metallurgical activities are otherwise recorded by peaks of Zn at 1780 and Cu at 1900 AD, which agree with 18th century writing sources. The water level slightly increases, as shown by the progressive decline of quartz. Between 1730 and 1810, biotic remains either decrease or are absent, suggesting low lake productivity which is probably linked to a cold period of the LIA. The occurrence of damaged frustules and the abundance of benthic diatoms suggest a turbulent sedimentary environment. In 1910, an electric power station was installed in a former mill.

From 1910 to the present, oak forest and riparian trees expand. The presence of vine, cereal and walnut croppings indicate a new farming expansion. The increase of benthic diatoms suggests lake eutrophication while grain size and calcite content indicate a progressive fall in the water level. Geochemistry data record a peak of Pb, Cu, Zn, Cr at 1940, which is previous to the present-day industrial development.
UN EXEMPLE D’OCCUPATION DE L’ESPACE DANS LA MONTAGNE CORSE AU BAS MOYEN ÂGE : PEUPLEMENT ET ÉCONOMIE DANS LA PIEVE DE ROSTINO

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La piève de Rustinu est située au coeur de la Corse. Vaste de 97,74 km², elle est encaissée dans la vallée du Golo et se caractérise par un réseau de collines peu escarpées et de hauts sommets aux versants abrupts qui aboutissent aux terrasses alluviales du Golo. L’altitude varie entre 126 m (Bisinchi) et 1650 m (le Monte Goio, Gavignano), avec une moyenne qui est comprise entre 400 et 600 m. Cette microrégion est essentiellement en situation d’ubac et protégée des masses humides venant de l’Est par les puissants massifs du Monte Castellare et de San Petrone. Cette situation est propice au développement de la forêt composée essentiellement de quercus, castanea et pinus.

Le Rustinu est depuis dix ans le cadre d’une étude archéologique dont l’objectif principal est l’analyse du peuplement et de l’économie de la fin du Moyen Age. Le programme se décompose en deux volets complémentaires :
- des prospections systématiques et une recherche dans les archives corse et italiennes fournissent les éléments nécessaires à l’élaboration d’un catalogue des fortifications, habitats, édifices de culte et voies de communication, mais permettent aussi d’appréhender, au moins dans ses grandes lignes, l’économie de la région ;
- fouilles étendues et sondages archéologiques, réalisés dans des sites abandonnés considérés comme représentatifs, donnent quant à eux une image plus précise à la fois de la topographie, de la chronologie et de la culture matérielle de ces établissements, mais aussi de leurs occupants.

Ces recherches archéologiques ont permis de mettre en evidence les spécificités de cette espace montagnard de l’intérieur de l’île par rapport aux zones côtières. L’occupation du sol est marquée au milieu du XIVe siècle par l’abandon et la destruction de l’unique castrum de la piève. Les petits habitats ouverts, exploitations isolées et hameaux de quelques maisons, ne connaissent en revanche aucun changement. Ce n’est qu’à partir du XVe siècle que leur nombre augmente sensiblement, même si beaucoup d’entre eux vont très vite disparaître. Ces créations, qui viennent compléter un réseau déjà dense (36 habitats), s’inscrivent dans une lente croissance démographique et semblent principalement destinées à assurer une plus large exploitation des terres. Si la sylviculture occupe encore une place importante dans l’économie locale diversifiée, l’élevage des caprinés, marginale jusqu’au début du XVe siècle, devient désormais l’activité dominante. Une partie de la production de laine, de lait et de viande, semble alors être destinée à un marché extrarégional, à un moment où la région s’ouvre très largement aux importations ligures et génoises en particulier.
A CULTURAL LANDSCAPE RESEARCH IN A MEDITERRANEAN MOUNTAIN AREA. THE “MASSÍS DEL MONTSENY PROJECT” (BARCELONA-GIRONA). 

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The present research constitute our PhD Project. It is developed in the ICAC’s Landscape Archaeology team, and its main objective is to obtain a deeper knowledge of this mountain area as a cultural landscape. The research try to advance in the knowledge of the formation processes of mountain landscapes as a cultural product, and as a result of the socio-environmental interactions. The research is developed in a part of the Catalan prelitoral chain, called “Massis del Montseny”, characterized by an important biodiversity and hard anthropization.

In the poster we present the initial part of the research. In this phase we analize all data that can help us to characterize the human influence in the landscape (archaeological inventories, ethnographical inventories, paleoenvironmental data, ancient cartography). We are also working in the development of GIS Technologies in order to analyze all these information from an spatial perspective. The preliminar data obtained allows us to plan future archaeological works (field-walking, archaeological pits) which will be perform in the next months.
La présence, à des altitudes élevées, où le séjour d’hiver était difficile (sinon impossible), de sépultures sous tumulus et en grottes, aux mobiliers étroitement comparables à ceux que l’on trouve dans les basses terre, suggère qu’une partie de la population était soumise à des déplacements saisonniers (Roussot-Larroque1996). Nous pouvons raisonnablement supposer que les défunts qu’elles ont accueillis sont décédés uniquement durant l’estive, ou bien alors durant la transhumance. Etant donné l’éloignement supposé avec l’habitat de vallée, l’éventualité qu’il y ait eu un déplacement des morts vers la moyenne montagne peut être rejetée. L’approche de la composition du noyau humain en déplacement nécessite avant tout l’hypothèse d’une relation stricte et exclusive entre ce dernier et l’ensemble sépulcral, que nous définirions comme une « sépulture saisonnière ».

Nous avons exploré récemment deux cavités sépulcrales de moyenne montagne, celle de Droundak et celle de l’Homme de Pouey. Ces deux sites archéologiques des Pyrénées-atlantiques ont été utilisés pendant les Ages du Bronze ancien et moyen. Ils présentent des similitudes quant à leur nature, leur altitude, leurs périodes d’utilisation et leur contenu. Leur étude a démontré que l’ensemble du groupe humain, peut-être à l’exception des plus âgés était concerné par le déplacement. Pour l’Homme de Pouey, la cavité était intacte et n’avait pas subi de perturbations anthropiques. Le faible effectif n’autorise pas une exploitation développée du recrutement. Avec un N.M I. de cinq, dont deux enfants, un adolescent et deux adultes, nous pouvons cependant affirmer que la population inhumée, et par extension la population vivante, comprenaient des enfants et des adultes des deux sexes. Pour la grotte de Droundak, l’effectif plus important, 23 ou 24 sujets, a permis de préciser que le recrutement correspondait à celui d’une population naturelle.

En outre, le mobilier associé à ces sépultures apporte des données nouvelles et vient documenter le corpus des céramiques du Bronze, particulièrement pour le Bronze Moyen. Nous pouvons percevoir les relations avec les vallées, ceci avec les deux versants des Pyrénées. L’analyse pétrographique des pâtes utilisées pour la confection des récipients montre que plusieurs céramiques ont été réalisées pendant les estives, autour des sites, alors que certains vases ont été réalisés en vallée, sur le versant nord des Pyrénées. La conservation exceptionnelle du contenu de deux vases a permis une série d’analyses et ce, avec deux approches distinctes (Bui Thi Maï et al. 2009):
- Réalisation d’une analyse pollinique des contenus conservés et du sédiment environnant (Bui Thi Mai, Girard);
- Chromatographie en phase gazeuse et chromatographie couplée à la spectrométrie de masse (Miraibaud, Regert). Les résultats nous informent sur la variabilité des offrandes (produits laitiers, quartier de viande, produits végétaux, cire/miel ?) mais aussi sur des pratiques que l’on retrouve sur les deux sites (présence d’un “produit” élaboré à partir de fougère).
Upland and highland regions are often characterized as marginal zones occupied by peoples more out of necessity than preference. This characterization has its origins not in the archaeological record but rather in folk assumptions that are largely untested. I discuss 13 years of archaeological investigations in the Southern Appalachian uplands of Tennessee, USA, with particular focus on the Upper Cumberland Plateau. This research indicates that upland zones were not marginal zones at all, but rather vibrant regions with unique and complex cultural adaptations and historical trajectories. The Upper Cumberland Plateau landscape is dominated by rock shelters and caves. These geologic features are often thought of by scholars as special purpose site locations. However, my research indicates that rock shelter and caves in this region were used for many purposes by prehistoric peoples, including intensive and long term habitation. I demonstrate that rock shelters and caves on the Upper Cumberland Plateau were as much a part of the cultural landscape as the natural landscape. In fact, the two are intertwined. Traditional thinking suggests that these upland regions served as resource exploitation zones by peoples living in lowland areas, e. g. river valleys, during certain times of the year. However, my work strongly suggests that this is not the case. Certainly by at least 5000 years ago, the Upper Cumberland Plateau was occupied year-round by prehistoric peoples. This fact has important implications for traditional mobility pattern models suggesting movement between lowlands and uplands. My research suggests mobility patterns within the uplands themselves by peoples who lived here year round.
A HISTORY OF TRANSITIONS: HUMAN ENVIRONMENTAL INTERACTIONS IN THE HIGH ALTITUDE ZONE BETWEEN THE NEOLITHIC AND THE ROMAN PERIOD

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Understandably, archaeologists tend to characterise cultures, and the transitions between cultures via an assessment of material culture. It is the ceramic material, the flint and other objects, along with evidence for buildings and monuments that provide the foundations for the definition of chronology and the investigation of certain types of economic practice. Since the 1960s, scientific archaeology, in particular the study of past environments and evidence for the exploitation of plants and animals, has made an important contribution to these discussions. However, more often than not, the assessment of transitions is still one founded on the study of artefacts and the associated chronologies rather than one that also considers changes in cultural ecology. A cultural ecological approach must underlie the study of milieux where there is a dearth of material evidence, such as in the Alpine zone. Here, the premise is that each society’s engagement with the environment is culturally specific; consequently, if we can elucidate the manner in which past peoples manipulated and responded to their milieux, then this is an effective hermeneutic for the investigation of past cultures and the transitions or changes in culture across a given landscape. This contribution will consider two important “transitions”; first, the Neolithic-Bronze Age transition; the second, the Iron-age Roman transition. This discussion will interpret palaeoenvironmental and archaeological evidence from the Ecrins and the Ubaye Valley in the southern French Alps. This first “transition” comprises the third and second millennia BC. The early part of this period saw the continued use of this landscape as a hunting zone, as represented by lithic scatters, with pastoralism concentrated towards the lower altitudes. From c. 2500 BC onwards, there was a fundamental change in the use of and engagement with this landscape. The appearance of the first substantial pastoral structures at high altitude (2000m and above) made from stone appear at this time. This first section, that deals with the Late Neolithic and Bronze Age will consider the archaeological and palaeoecological evidence within a framework that assesses the evidence for so-called “cultures” that were present in this region, and assess the difficulties of identifying these so-called archaeological cultures. The archaeological and palaeoenvironmental evidence for pastoralism and probable manipulations of the forest environment will be assessed. We will then consider the Iron Age to Roman transition. Here a far greater range of archaeological evidence allows us to present a more sophisticated assessment of alpine cultures than for the preceding prehistoric periods. However, archaeologists rarely consider how attitudes towards the environment changed during these periods. Despite palynological signals that imply continued human impact on these landscapes during the first millennia BC, and into the Roman period, there is a relative absence of archaeological sites in the high altitude zone. There is however a radical reconfiguration of the valley bottoms with the development of towns and associated route ways. For the Iron Age, this may well have been due to climatic deterioration, although we must also consider the importance of changing cultural perceptions of the mountains. The presence of cultic sites, such as the burnt mound at Les Sagnes, is indicative of a complex pattern of different uses the high altitude zone during this period. For the Roman Period, a continued absence of activity in the high altitude zones is implied by the archaeological evidence. However, some of the environmental evidence indicates pastoral activity. Here we must consider how the archaeological, environmental and historical evidence intersect with one another. It is important to consider Roman attitudes to the mountains and how these may have influenced the ways in which people lived at worked in the Alps. At one level, Rome may have adapted existing agricultural systems, and the relative absence of Roman sites at high altitude might be a continuation of Iron Age system. This part of the communication will consider the archaeological and environmental evidence for these periods and will develop a cultural ecological assessment for these periods.
This communication presents some preliminary results of a research focusing on the anthropisation in the Aubrac Massif (Massif Central, France). This study is pursuing a series of work initiated by the laboratory of historical botany of Marseille in the 80’s. It has been recently included in the Eclipse project and is also in the continuity of a research carried out in the PCR “The Aubrac mountain during the Middle Ages”, directed by L. Fau (Ministry of Culture). The preliminary data are supported by five sedimentary recordings providing from peat bogs (Vergne Noire, Trois Airelles, Source du Roc, all in the Aveyron department, Roustières and the lake of Born, in the Lozère department).

Comparison of different pollen recordings highlights local variations and specificities. Indeed, if the landscapes of the Lozère part of the Aubrac area seem to have been fashioned quite early by man, this doesn’t seem to be the same in the Aveyron part, nearby the edge of the plateau.

Open landscapes seem to be noticeable in the eastern part since Antiquity (arboreal pollen drop, development of Cerealia type, first occurrences of Secale and simultaneous occurrences of anthropogenic pollen indicators like Urticaceae, Rumex acetosa/acetosella, Plantago lanceolata...), whereas forest dominates more on the west (between 60 and 80% of beech at the same time on the Vergne Noire site for exemple) at least until the end of the Early Middle Ages. This time difference and these disparities underline many questions, in particular with regard to the methods of soil use and local resource management.
En esta comunicación se presenta una síntesis de la evolución vegetal en la vertiente sur del sector más occidental de los Pirineos. La evolución de esta región, con intensa presencia humana durante los últimos once milenios, se ve condicionada por dos factores sucesivos: los procesos naturales de colonización forestal de los espacios abiertos tras el cierre del último ciclo glacial en primer término; posteriormente, a partir del 6500 BP aproximadamente, la antropización intensa (y progresiva) del medio vegetal, dirigida a despejar tierras en las que desarrollar nuevas actividades económicas. Estas actividades humanas van a ser acumulativas y van a imponer una presión creciente sobre el medio vegetal, hasta épocas muy recientes. Si las primeras actividades agrícolas y ganaderas sólo requerían la apertura de pequeños espacios, la extensión de los núcleos de población estables (urbanos posteriormente) implica grandes necesidades de material constructivo. La metalurgia, en especial la del hierro, requiere el uso de grandes cantidades de carbón vegetal, tanto para la reducción de mineral, como para el trabajo del metal. Todo ello va a derivar en una interesante dinámica del medio vegetal, que puede correlacionarse con los grandes eventos de la evolución durante la Prehistoria y la primera Historia del medio pirenaico.
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