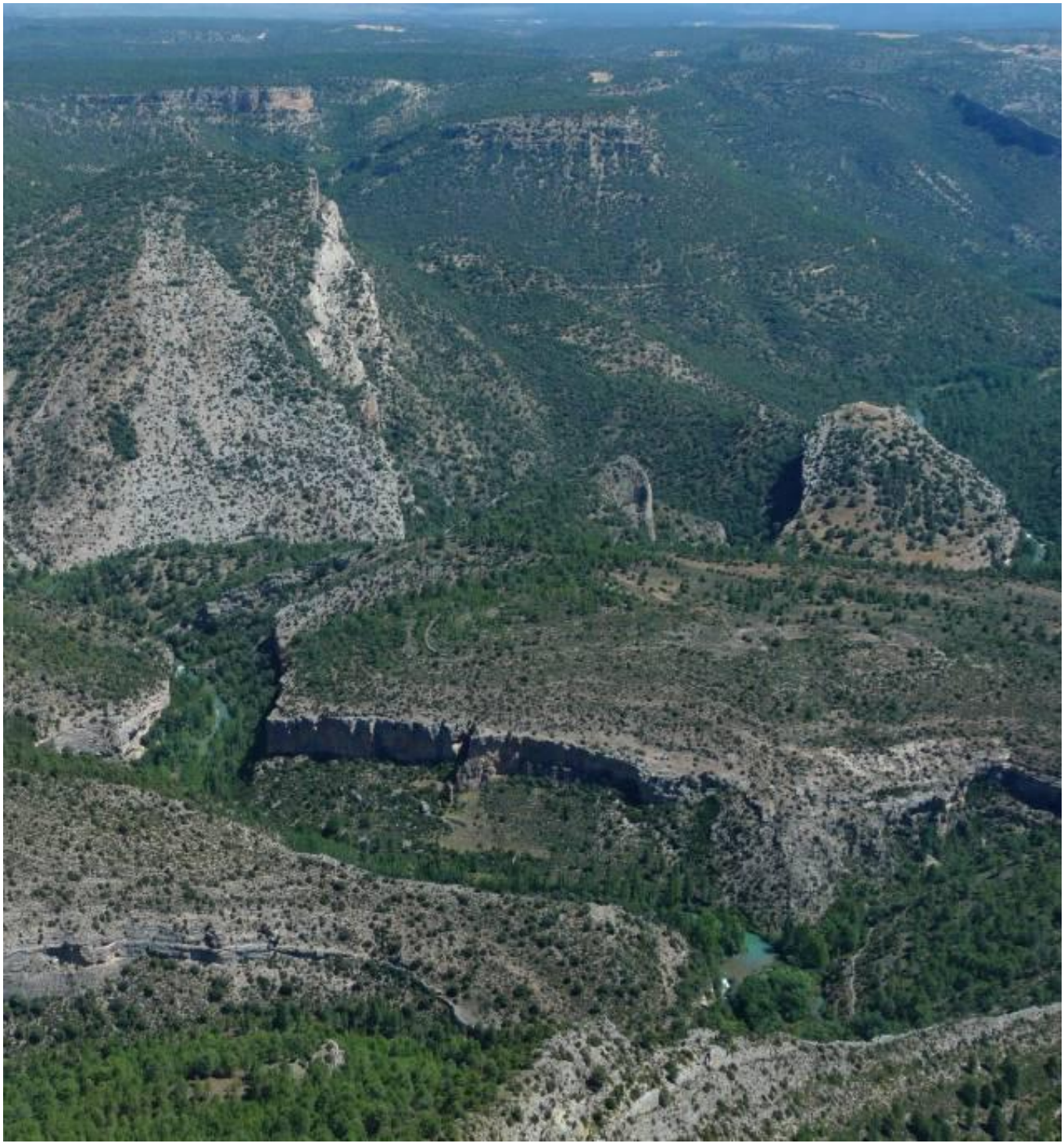
REPORT OF THE OFFICIAL APPLICATION OF "MOLINA & ALTO TAJO"GEOPARK



This official application of Molina and Alto Tajo Geopark has been coordinated and developed by a team work comprised of representatives of the Alto Tajo Natural Park (Advisory Committee of Agriculture and Environment of the "Junta de Comunidades de Castilla-La Mancha"), the Museum of Molina de Aragón and the Local Develop Association of Molina – Alto Tajo. These will be the promoting and organizing bodies of the proposed Geopark through the Geopark Association of Molina and Alto Tajo and the Scientific Advisory Committee.
Hereby the representants sign this document in Molina de Aragón and Guadalajara, October 2012.

D. Juan Manuel Monasterio Cruz	Dª. Ana Guarinos López	D. José Antonio Lozano	D. Jesús Herranz Hernández
Director of Museo Comarcal de Molina de Aragón, President of Asociación de Amigos del Museo de Molina y Coordinator of Molina and Alto Tajo Geopark Project	President of Excma. Diputación provincial de Guadalajara.	Director-Conservator of Alto Tajo Natural Park and Representant of "Consejería de Medio Ambiente de la Junta de Comunidades de Castilla- La Mancha"	President of Molina – Alto Tajo Rural Develop Association

ASOCIACIÓN DE AMIGOS DEL MUSEO DE MOLINA

DIPUTACIÓN DE GUADALAJARA

Junta de Comunidades de Castilla-La Mancha
parque natural Alto Tajo

LEADER+
MOLINA DE ARAGON ALTO TAJO

REPORT OF THE OFFICIAL APPLICATION OF "MOLINA & ALTO TAJO"GEOPARK

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A. DESCRIPTION OF AREA

A.1. Name of the proposal Geopark

In Spanish: Geoparque de la Comarca de Molina y el Alto Tajo.
In English: Molina and Alto Tajo Geopark.
This name comes from the term used to refer to the entire natural region, whose boundaries coincide with the proposed Geopark territory. The Alto Tajo is a natural setting that is in the origin of the Geopark and is a benchmark of natural environment throughout the region.

A.2. Surface area, physical and human geography characteristics of the proposed Geopark

The proposed Geopark (Fig.5 and annex nº3) is located in the interior of the Iberian Peninsula, in the Autonomous Community of Castilla-La Mancha, covering 77 municipalities in the province of Guadalajara. The most important town is Molina de Aragón, located approximately in the centre of the territory (Fig.1). .

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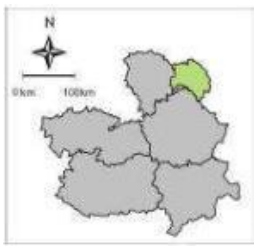
The proposed Geopark area is surrounded by the provinces of Soria (north), Zaragoza (north), Teruel (east), Cuenca (south) and the rest of the province of Guadalajara (west) and covers 4,000 km2, representing a large territory but populated by only 11,500 inhabitants, of which one third live in Molina de Aragón. The population density is only 2.8 inhabitants per km^2.This vast area has a total geographical continuity, there´s no major human elements that fragment or divide the territory, and naturalness is one of its main features. It is a well preserved where man and nature coexist in equilibrium. There are no large intensive livestock facilities or relevance processing industries. Is outstanding the recent introduction of several wind farms of considerable extent, along the axis of the N-211. It is therefore a natural region where various sectors can be identified, but with a common identity. The origin of this geographical area is situated in the middle ages when in the twelfth century, this territory is conquered by the Christian population and to keep Christianized, an administrator is appointed by the king of Castilla under the figure of Lord, so this region becomes known as Señorío de Molina. The feudal connotations of this term, have motivated now the replacement by “Comarca de Molina” (Molina County). From this period dates the division into four parts knows as “Sexmas”: “Sexma de la Sierra”, “Sexma del Pedregal”, “Sexma del Sabinar” and “Sexma del Campo”. These boundaries were used for the purposes of administration as an initial geographic planning and are in the root of current *Mancomunidades*, which are groups of municipalities join for share and optimize costs of services to citizens.

A



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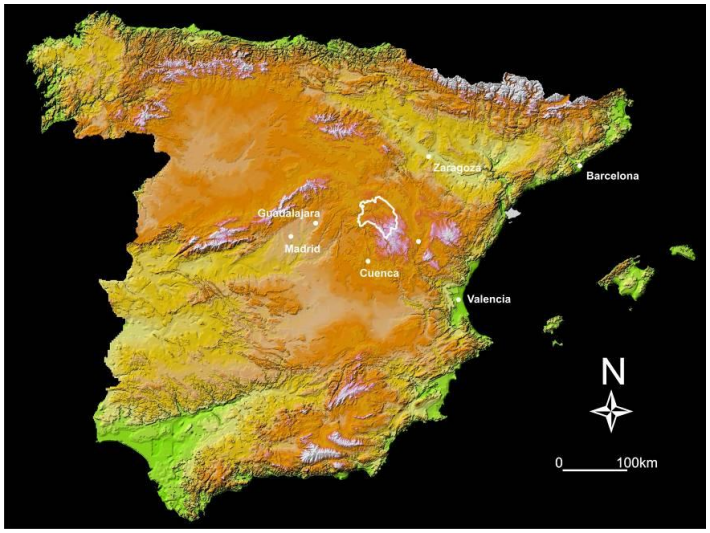

C

Fig.1. Location map of the Geopark territory. A: Location of the Geopark on a map of the Spanish regions (Geopark in red), B: Autonomous Community of Castilla-La Mancha and the Geopark territory (green), C: physiographic map of Spain,

	Molina de Aragón		Corduente		Zaorejas		Villel de Mesa		Orea	
	Distancia	Tiempo	Distancia	Tiempo	Distancia	Tiempo	Distancia	Tiempo	Distancia	Tiempo
Guadalajara	140 km	1h45m	141 km	1h 37m	121 km	1h 52m	161 km	2m6m	189 km	2h35m
Cuenca	127 km	2h14m	129 km	2h 18m	126 km	1h 55m	171 km	3h13m	118 km	2h16m
Teruel	105 km	1h21m	116 km	1h 31m	147 km	2h 10m	150 km	2h20m	76 km	1h11m
Zaragoza	164 km	2h	183 km	2h 23m	254 km	3h 05m	141 km	1h56m	190 km	2h22m
Madrid	204 km	2h 25m	197 km	2h 18m	177 km	2h 33m	225 km	2h45m	245 km	3h15m
Valencia	254 km	3h	254 km	3h	285 km	3h 39m	288 km	3h54m	214 km	2h32m
Barcelona	470 km	4h39m	490 km	5h 15m	533 km	5h 52m	442 km	4h32m	497 km	5h18m

Fig.2. Table of distances and driving times of some of the locations of the proposed Geopark territory and closest capitals province. H = hours; m = minutes.

Fig.3. State Highway frame (left) and road map Geopark area (defined in black) and surrounding areas. The main access routes are the A-2, N-211, N-320 and N-204 and Mudéjar Highway A-23 (Fig. 3).

The closest Geopark is The Maestrazgo Geopark, located 1 hour and 30 min. and 135 Km. far In vehicle. however, the applicant Geopark has a most relevant relationship with Naturtejo Geopark (Portugal), located about 600 kilometres but join by the same river (Tagus) and connected by a natural track that can be travelled on foot or cycling. The location in the centre of the Iberian Peninsula makes a link between the iberic Geoparks (Fig 4).

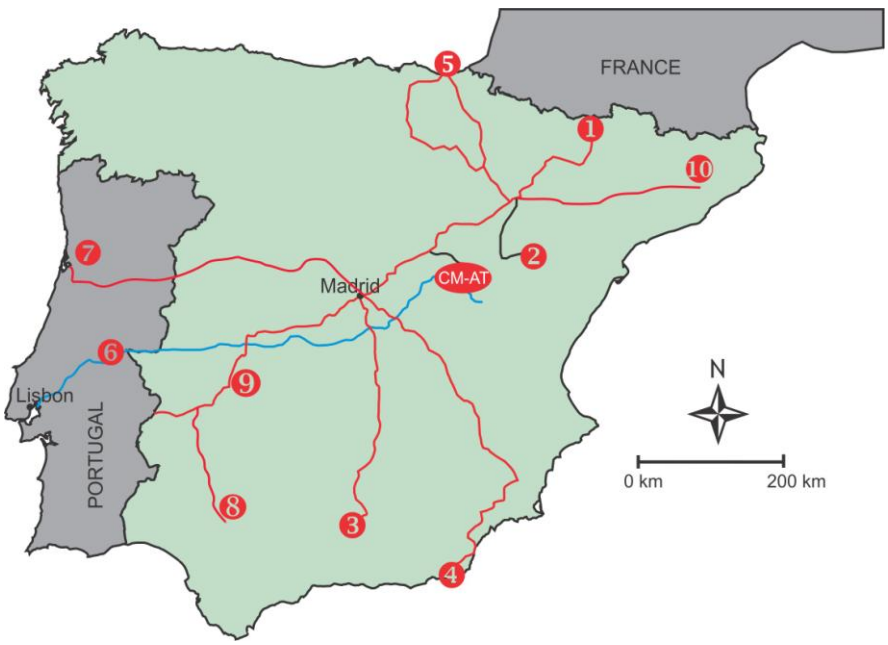

Fig.4. Locations Geoparks Iberian (September 2012). 1 -Sobrarbe, 2 -Maestrazgo; 3- Sierras Subbéticas; 4-Cabo de Gata, 5-Basque Coast, 8 – Sierra Norte de Sevilla, 9 – Villuercas Ibores Jara, 10 – Cataluña Central.In Portugal: 6 -Naturtejo; 7-Arouca.In blue the river Tagus.

Fig. 5. Map of the proposed Geopark Area

This territory is characteristic of the Iberian Range, mountainous area in the inner of Iberian Peninsula that stretches various provinces. Virtually all municipalities as part of the Geopark recorded an altitude over 1,000 meters above sea level. The highest municipalities are located in the eastern part of the Geopark, reaching over 1,400 meters O.S.L.. The altitude and geographical location has a decisive influence on the climate of the area, which is characterized by cool temperatures and moderate rainfall, which give it a continental climatic conditions, part of the Mediterranean area neighbouring regions. It is a harsh climate, the winters are cold and harsh, with temperatures below freezing point in the winter months (Fig 6).

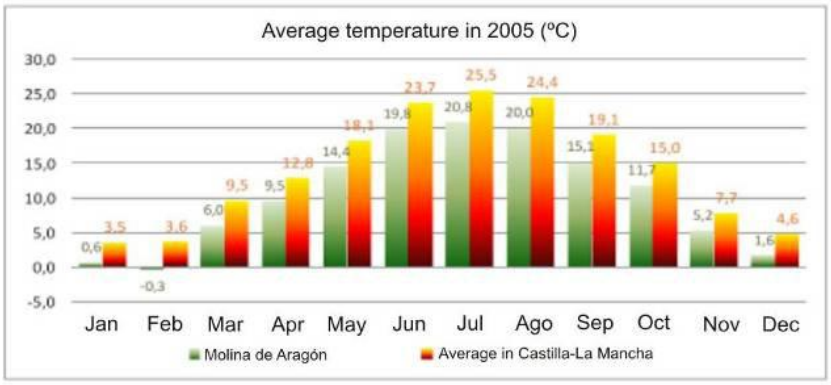

Figure 6. Average temperatures per month in Molina de Aragón and the Comunidad de Castilla-La Mancha.

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The Tagus River is the main axis of the south of the region and its canyon runs continuously in a stretch of over 80 km between the areas of Peralejos de las truchas and Ocentejo. Some of the most prominent sites are the sections located between the Puente de la Herrería the "Hundido de Armallones". In this stretch, the river saves a slope close to a thousand meters. Moreover, compared with other peninsular river systems, the Alto Tajo enjoys high environmental quality in its middle reaches, something very rare in Iberian rivers. The channels are little affected,

with stable margins and riparian vegetation abundant and varied. This succession of watercourses configures a unique landscape, which highlights the canyons and river gorges and unique forms of slope, such as knives, needles and monoliths of red sandstone and limestone mainly. They are also relevant the moorlands, dominant in the central region, are occupied by large juniper and pine forest. In the northernmost area appear wider valleys occupied by farmland and the River Mesa Valley beautiful example of community seated along a water course

A3. ORGANIZATION AND MANAGEMENT STRUCTURES

A.3.1. General Assembly

A work team created to shape the official application of the Geopark of Molina and Alto Tajo which founded the Geopark of Molina and the Alto Tajo Association, and will be in charge of managing and coordinating the Geopark. Such entity was established with the aim of "creating a structure to enable a proper management of the Geopark´s territory". This entity will be the managing entity of the Geopark, under the following structure (Fig. 7):

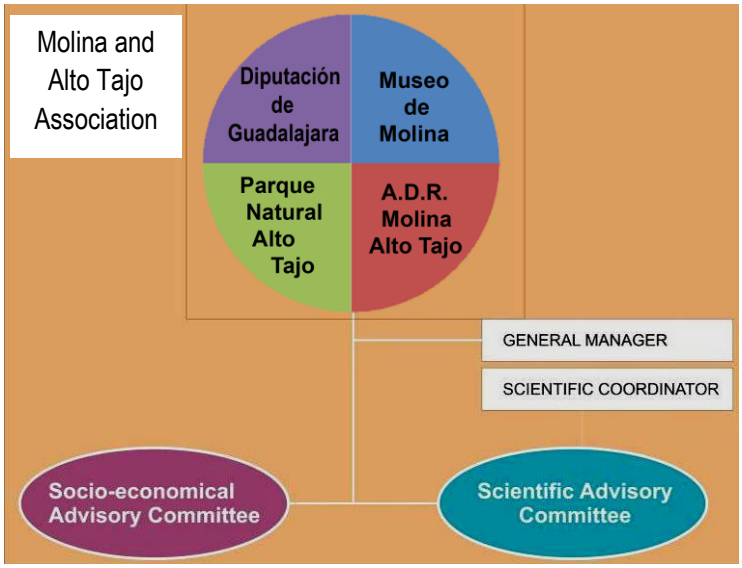

Figure 7. Geopark Management Authority.

• **Governing Board**: It involves:

-Alto Tajo Natural Park, as a representative of the Ministry of Agriculture of the Regional Government of Castilla-La Mancha

-Museum of Molina de Aragon
-Council of Guadalajara, on behalf of the territory municipalities
- Rural Development Association Molina - Alto Tajo, local action group that manages
Their representatives will be:
Geopark-Manager: Elected by the Board of the Association.
-Scientific coordinator: Elected by the Board of Directors of the Association. The manager and / or the scientific coordinator will be geologists.

Functions of the Governing Board:
- Elect the Geopark Manager and representatives of the Advisory committees,
- Representation of Geopark face administrations.
- Coordinate activities of various governments for the proper functioning of the Geopark.
The Governing Board, along with the manager and the coordinators of the two advisory committees (scientific and socioeconomic) constitute the management body of the Geopark.

GOBERNING BOARD		
ENTITY	**DUTY**	**NAME**
Associaction Molina-Alto Tajo Geopark	General Manager	Juan Manuel Monasterio
Alto Tajo Natural Park-	Manager of Natural Park	José Antonio Lozano
Museum of Molina Cultural Association	Representative of Association	Joaquin Yarza
Municipalities	Diputación de Guadalajara (Provincial Govern)	Lucía Enjuto
ADR Molina – Alto Tajo	Chaiman	Jesús Herranz Hernández

• **Advisory Committees:** consisting of:

- Scientific Advisory Committee: Formed by a team of researchers linked to the Geopark territory, mostly geologists. Launched in September 2010. It is run by the Scientific Coordinator, belonging to the Geological Survey of Spain (IGME), although this position will cease when the Geopark works.
Scientific Advisory Committee Functions: promoting scientific studies in the area, advise the Government Board scientifically, arbitrating and advising on decisions affecting the scientific content of the Geopark.

SCIENTIFIC COMMITTEE. Scientific Coordinator: Luis Carcavilla (IGME-Spanish Geological Survey)		
ENTITY	**NAME**	**TRAINING-SPECIALITY**
Spanish National Research Council (CSIC)	Juan Carlos Gutiérrez-Marco	Geologist
Geo-minning Museum-Spanish Geological Survey (Madrid)	Isabel Rábano	Paleonthologist
Complutense University of Madrid	Alfonso Sopeña	Geologist
Complutense University of Madrid	Antonio Goy	Geologist
Polytechnic University of Catalonia	Josep María Mata Perelló	Geologist
Complutense University of Madrid	José Francisco Martín Duque	Geologist
Complutense University of Madrid	Álvaro García Quintana	Geologist
Spanish Geological Survey (IGME)	Enrique Díaz Martínez	Geologist
National Institute for Aerospace Technology (INTA)	Raúl Gorgues	Geologist
Royal Botanic Garden	Luis Mariano Ferrero	Biologist
Madrid Autonomous Comunity	Leopoldo Medina	Biologist
Research Institue of Molina de Aragón	Jesús Arenas	Archaeologist
Complutense University of Madrid	María Luisa Cerdeño	Archaeologist
Ayuntamiento de Madrid	Rafael Ruiz	Forest engineer
Spanish Geological Survey (IGME)	Alfonso Arribas	Paleontologist
Distance Education University of Madrid (UDIMA)	Plácido Ballesteros	Historian
Alcalá de Henares University	Ignacio Martínez Mendizábal	Paleontologist
Spanish Geological Survey (IGME)	Ramón Rodríguez	Geologist

Natural Protected Areas Govern of Guadalajara	Angel Vela Laina	-Forest Ingineer
Human Evolution UCM-ISCIII Research Centre	Juan Luis Arsuaga	Paleontologist
University of Zaragoza	Guillermo Meléndez	Geologist
University Autonoma of Madrid	Juan Antonio Gómez	Geograph
Pyrenean Institute of Ecology (IPE)	Ana Moreno	Geologist
Alcalá de Henares University	Amelia Calonge	Geologist
Spanish Geological Survey (IGME)	Ramón Rodríguez	Geologist

- Socioeconomic Advisory Committee: Composed of representatives of social and business associations in the area. Has a representative elected by the Committee itself. Roles of the socio-economic advisor committee: Represent business of the area, guide decision-making aid distribution of socio-economic, collaborate on promoting the Geopark geotourism and promoting entrepreneurship training in matters relating to Geopark.

SOCIO-ECONOMICAL COMMITTEE. Coordinator: Inmaculada Martínez Parrilla		
Leader	General Manager of the Programme Leader Plus	Inmaculada Martínez Parrilla
Alto Tajo Natural Park Active Tourism Companies Association	Representative	José Carlos de Santiago
Rural Tourism Association of Molina and Alto Tajo (ATRAMA)	President of the Association	Marta Corella
Research Centre of Molina de Aragón	Representative	Javier Aragoncillo
La Común (Local Goverment)	Mayor of Molina de Aragón	Jesús Herranz Hernández
Management Board of the Natural Park	President of the Management Board	José Antonio Lozano

A.3.2. Human resources

In addition of Government Body of the Geopark, human resources will consist of staff currently working on the Museum of Molina and the Natural Park:

3 technicians (Nature Park management team)
6 guides informants in the 4-Interpretation Centres
Four informants in information booths
Three environmental vigilantes support public use management
one maintenance crew (1 foreman and three labourers)
40 environmental agents

A.3.3. Geopark founding

Much of the economic and human resources of the County Museum and the Natural Park is made available to the Geopark, as both entities assumed as one of the priority work on achieving the goals of Geopark. Thus, it is considered that much of the infrastructure and staffs form directly, but not exclusive, part of the Geopark, since as they will have other competences and different jobs as well. The budgets are secured annually for each of the institutions so that they need not be restarted or are subject to temporary subsidies.

A.3.4. Partners

Currently negotiations are taking place with public and/or private institutions as possible partners of the Geopark. The negotiations aim to define the implications of being a partner, with its compromises and cons. As of today there are negotiations under way with Ibercaja (Caja de Ahorros y Monte de Piedad de Zaragoza, Aragón y Rioja), which sponsor developing projects of different type within this territory, but no agreement has been reached so far.

A.3.5. Organization of the territory, zonification

This official application would mean creating a Geopark that would encompass the whole Molina and Alto Tajo area, identifying three kinds of territories (Fig. 8 and 9):

- Areas with Geoconservation as a priority: it would comprise the Alto Tajo Natural Park, the Natural Monument of Caldereros´ range and all of the places of Common interest (belonging to Natura web 2000) within the territory. Within these sectors the current management would not be altered nor modified by the current rules on preservation and usage, as they are territories which are already protected with specific management measures. That accounts for 60% of the Geopark´s territory.

- Area of socioeconomic management: This accounts for the rest of the territory of the shire. The generic geoconservation programmes would not be applied within this area, but touristic and economic development programmes would be carried out. That accounts for 39,4% of the Geopark´s territory.

- Areas of potential value for geoconservation: A range of small enclaves (usually less than 10 ha) within which there are geological value elements currently out of protection. There will be a short-term goal to establish geoconservation measures to prevent the potential degradation of the aforementioned elements, with the collaboration of the councils. Currently there is an inventary with more than 200 places of Geosites, some of which would become part of this group. There are currently 5 places to become part of the first list, with the short-term goal of ensuring its preservation, promoting scientific investigation and public usage. Furthermore, the Geopark would furnish these towns with orientation to approach these geoconservationist activities and other protection initiatives of the natural and cultural heritage. This accounts for 0,6% Geopark´s territory for the first 5 sites proposed.

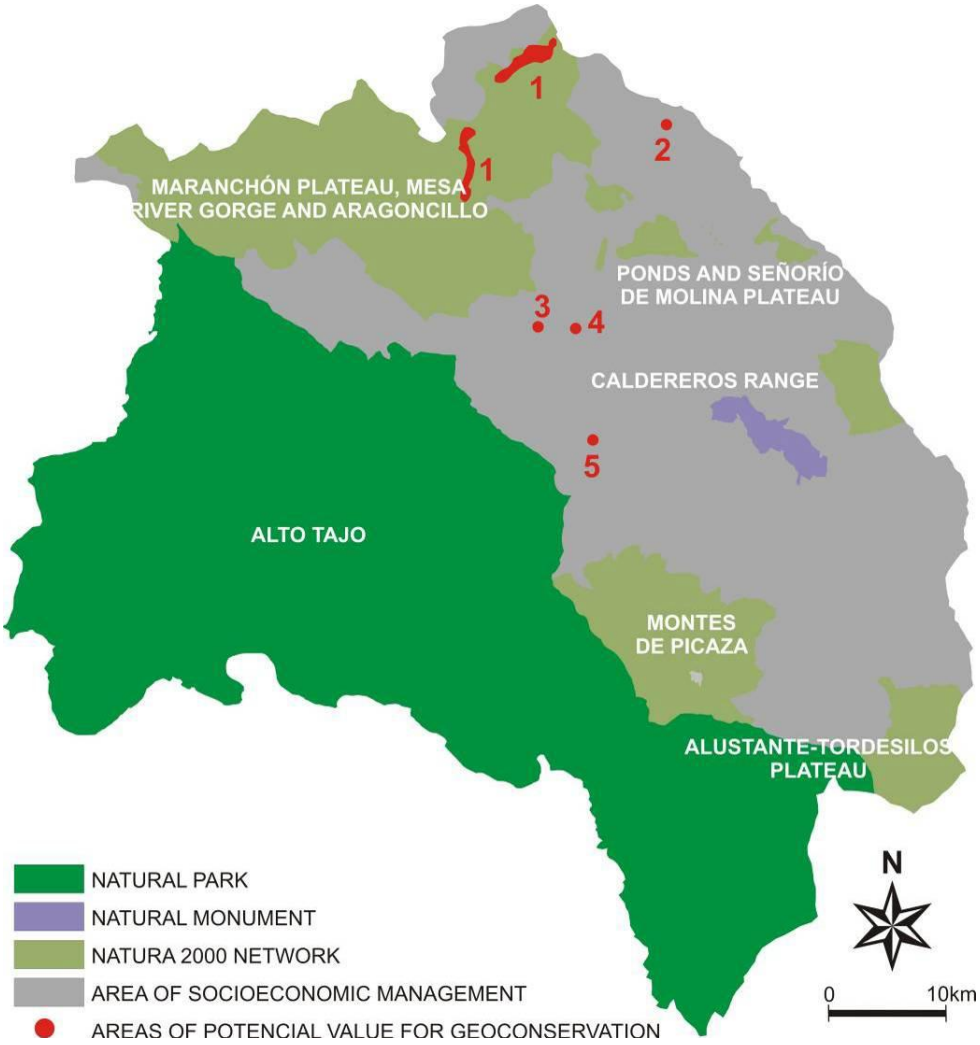

Fig.8. Geopark map and zoning.

The declaration of the new Geopark would not imply changes of municipal attributions, nor any changes on the regulations included in the already existing management tools of the protected spaces that already exist (PORN y PRUG) on these three types of areas. At any rate, the Geopark will promote the protection of potential value areas in terms of geoconservation on a municipal level, organizing informative meetings with the involved councils. And where the right conditions are met, the implantation of protection bodies as ruled by the conservation law 9/1999 for these places so that they may belong to the Regional Web of Protected Areas.

ZONA DE GEOCONSERVACION PRIORITARIA		
Figura de protección	**Nombre**	**^{2}**
ZEPA, LIC	Parameras de Maranchón, Hoz del Mesa y	494,42
Monumento Natural y LIC	Sierra de Caldereros	23,68
Parque Natural, ZEPA, LIC	Alto Tajo (incluida ZPP)	1.712,65
LIC	Montes de Picaza	151,03
LIC	Lagunas y parameras del Señorío de Molina	61,54
LIC	Sabinares rastreros de Alustante-Tordesilos	73,76
	TOTAL	2.517,08 (60%)

ZONA DE INTERÉS POTENCIAL PARA LA GEOCONSERVACIÓN	
Lugar	**^{2}**
Hoces del Mesa (1)	15
Estratotipo (GSSP) de límite Toarciense-Aaleniense de Fuentelsaz (2)	0,15
Árboles fósiles del Pérmico de la Sierra de Aragoncillo (3)	0,5
Serie Permo-Triásica de Rillo de Gallo (4)	0,5
Localidad tipo del Aragonito (5)	0,1
TOTAL	16,25 (0,6%)
ZONA DE INFLUENCIA SOCIOECONÓMICA	
Resto del territorio	1653,67 (39,4%)

Figure 9. Sectors of the Geopark and their surface. See figure 8.

A4. Contact person

Juan Manuel Monasterio Cruz
City Councilman Molina de Aragon
Director of the Museum of Molina
President of Museum of Molina Cultural association.
Expert in working teams coordination.
Expert in Rural development and enhancement of heritage
Tlf. 949831102, 696 226 302; Monaste1@gmail.com

Detail of Molina de Aragon Alcazar Castle

B. GEOLOGICAL HERITAGE

B1. Location of the proposed Geopark

Figure10. Location of Molina and high Tajo Aspirant Geopark

GEOGRAPHIC COORDINATES:
Longitude: W from 2 ° 24 '45 "W 1 till 32' 40"
Latitude: from N 41 º 10 '16 "N 40 º 24 till' 23"

B2. Geological general description of proposed Geopark

B.2.1. Geologic and geographic framework of the area.

With respect to geological framework, de Molina-Alto Tajo, is situated in the Castilian Branch of Iberian Range. The materials from which the geology of this region are mostly Mesozoic, although there are also materials Palaeozoic and Cenozoic. Outcrops of **Palaeozoic materials** appear discontinuously forming a series of "massif". These outcrops whose orientation is NW-SE, are restricted to the nucleus of large structures of Castilian Branch of the

Iberian Range. From a cronostratigraphic point of view these materials exhibit some ages ranging from the Ordovician to the Permian. The main materials are slate and quartzite. .

As **Mesozoic materials**, make up the biggest part of the geology of the region of Molina and even large part of the province of Guadalajara. Triassic and Jurassic materials outcropping in the region are represented by a succession of clastic and carbonate interbedded with marly rocks units formed in continental environments and marine. These materials continue NW orientation structures generated during the compressive phase of the Range (Gomez and Canales, 2008). The Cretaceous of the Comarca de Molina is located in the SW and NE in the region. The outcrops of this period consist mainly of carbonate rocks (limestone and dolomite) and marl. Over this Mesozoic materials are arranged discordant Neogene outcrops of small extension. Overall, the Shire of Molina is characterized by a remarkable geodiversity, highlighting the presence of important stratigraphic series of great continuity. In addition, is remarkable the tectonic lithological and geomorphologic variety and present throughout the area, including also very fossiliferous levels of different ages. .

This region is also noted for its biodiversity. The vegetation of the southern valleys in the Alto Tajo canyon are slopes covered by forests of black pine and Scots pine. These are natural forests that have spread favoured by human action, which took the opportunity to use the timber. On sandstone and other siliceous fields are extending masses of resinous pine, also extended by human action, traditionally used for resin. These pines have un interesting pyrenean oak and rockrose understory, consolidated following the abandonment of the resin activity in recent times. Outside the area of influence of the canyon, on the moorlands rise juniperous (Which here, as in most of its range, appears in a feature of open stands structure) and Scots pine. In the moorlands whose altitude exceeds 1500 m. creeping juniper appear, alternating or interleaved with masses of pine. This peculiar landscape receives the name of "leopard skin". The floristic catalogue of Natural Park Alto Tajo reaches the 1,500 species and subspecies of vascular plants, which comes to represent 18% of all existing in Iberian Peninsula and the Balearic territory. Approximately seventy are officially listed in Castilla-La Mancha as threatened, some even as "endangered", such as *Atropa baetica*. As the fauna includes a total of 124 species of birds, 42 mammals, 15 reptiles, 9 amphibians and 10 fish species. The Alto Tajo distinguished by its community of cliff-nesting birds. The cliffs of the river canyons are used by one of the largest European populations of vultures, estimated at more than 900 pairs. They also use these cliffs to breed species as significant as the vulture, golden eagle, Bonelli's eagle, short-toed eagle, the pilgrim hawk, owls and chough among others. Another animal community of interest is that associated with the rivers, so rapid and general well-oxygenated waters in this natural region. The native trout fish is the jewel of these habitats, like the otter, which is here one of his best Iberian populations. The Comarca de Molina is one of the last refuges for native crayfish, on the verge of extinction in Spain. Finally, in forests and thickets retreats good number of animals, many of them favoured by the abandonment of rural areas. Wild boar, roe deer, wild goats, foxes, badgers, bobcats, martens, genets, booted eagles, buzzards, owls, owls, and many species of small birds, are some of these inhabitants in forest environments. One of the main natural attractions of this area is the close relationship between geodiversity and biodiversity. The incredible biodiversity of the Shire of Molina is absolutely conditioned by geodiversity, and may establish unique associations between bio and geodiversity, something that is of great interest to the visitor side. .




B.2.2. General geological description

The Shire of Molina and Alto Tajo are part of the Iberian Range, one of the main items forming the Iberian Peninsula (Fig. 11).
Below is a description lithologic summary of the geology of the region of the territory of Molina-Alto Tajo based on a review of several studies conducted by various authors throughout the area (see annex 8).

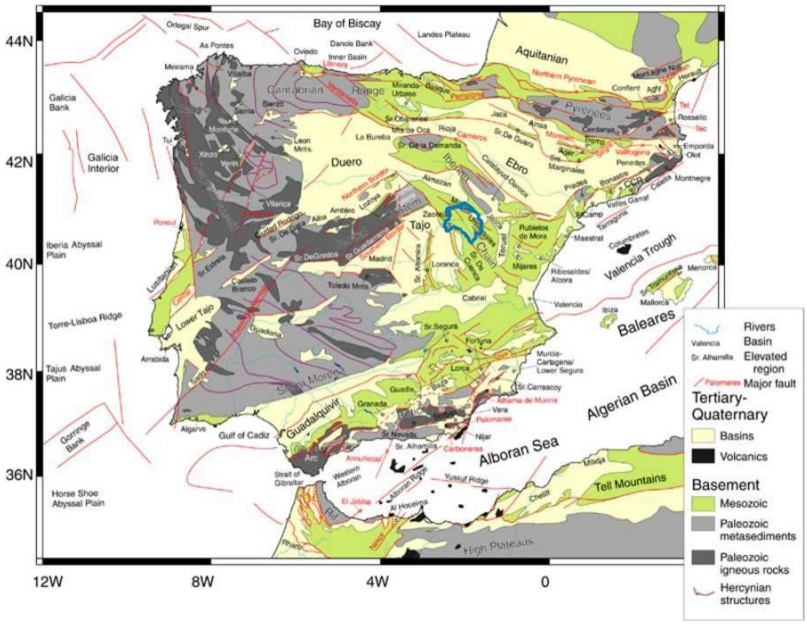

Fig.11. Main geological units Iberian and location of the Shire of Molina and Alto Tajo.

Paleozoic
The outcropping pre-carboniferous rocks are scattered and constitute a series of Palaeozoic massifs. These are isolated outcrops whose orientation goes along NO-SE, and are attached to a core within larger structures of the Castilian branch of the Iberian range. These rocks belong to the SE prolongation of the western Asturian–Leonese area, which does not crop up again until the provinces of Guadalajara, Teruel and Zaragoza. (Gutiérrez Marco *et al*., 2008) (Fig 12). The aforementioned outcrops appear somewhat deformed and have a low metamorphic degree, which facilitates its research. These outcrops, along with slates, another prominent material we can find are quartzites.

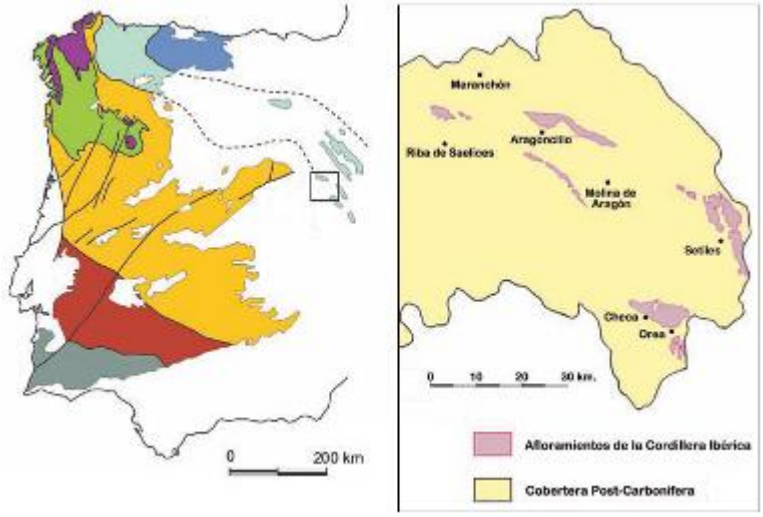

Fig.12. Location of pre-Carboniferous outcrops in the province of Guadalajara and its relation to the extension of Zone Asturoccidental - Leon (blue). (Modified from Gutiérrez Marco et al., 2008).

The oldest rocks we can find in the research area belong to lower Ordovician, roughly speaking, the Ordovician–Silurian series in this zone is made up seven formations (Fig 13). The earliest outcropping rocks sometimes aged as Cambrian, mainly comprising quartzites and slates. On top of these rocks the **Armorican quartzites Formation** lies unconformably, which in this area, reaches more than 400 meters thick. This formation is mainly constituted by thick layers of quartzites with interbedded sandstones and shales. Concordant upon the Armorican Quartzite middle Ordovician continues with **Villar del Saz Formation**, which basal member is characterized by the presence of slates y grawaques, **San Marcos Formation** stands on top of this unit, it is made of two quartzite members separated by an intermediate layer of slates which separates middle and upper Ordovician. Continuing, in a concordant way or upon a stratigraphic gap, the **Ojos Negros Formation**, mainly formed by massive dolomites, preceded by a small member of green shales or marls. The top of this succession is marked by an erosive discontinuity, linked to al eustatic descent related with the glaciations which took place at the end of the Ordovician. Upon this discontinuity there are rocks from the Orea Formation, made up of granulated detritic sediments and pebbles of glaciomarine origin (Fortuin, 1984 en Gutiérrez *et al*., 2008). Finally, on top of the Orea Formation rocks there are quarzites from **Los Puertos Formation**, in which we can find the limit between Ordovician and Silurian.

The start of the Silurian series is marked by a succession of black shales with some stretches studded with nodules, which shape **Bádenas Formation**. The upper part of this formation only arises in nucleus of Ciruelos-Teroleja and Nevera massif, where we may find stretches made up of sandstones y ferruginous quartzites that reach up Pridoli, albeit this zone, in general, from upper Silurian, the geologic record appears incomplete as the rocks belonging to Devonian and to Carboniferous suffer a strong erosion (Gutiérrez-Marco *et al.*, 2008).

Permian in Molina–Alto Tajo área is somewhat scanty, though appearing significally in certain points, as it is the case in Sierra de Aragoncillo. Stratigraphic succession starts with the **Capas de la Ermita Formation**, of autunien age and made up in three lithologic layers (Sopeña y Sánchez-Moya, 2008), out of which, the first appears discordantly on top of the rocks from lower Palaeozoic. This first section is mainly constituted by volcanic rocks. The next section presents an irregular alternation of shales and sandstones with dolomites. The end of the succession is mainly formed by limestones and dolomites with layers of lutites. Apart from this, this unit is characterized by well preserved **silicified trunks**, which are located on the volcanic rocks belonging to the first stretch of Permian rocks.

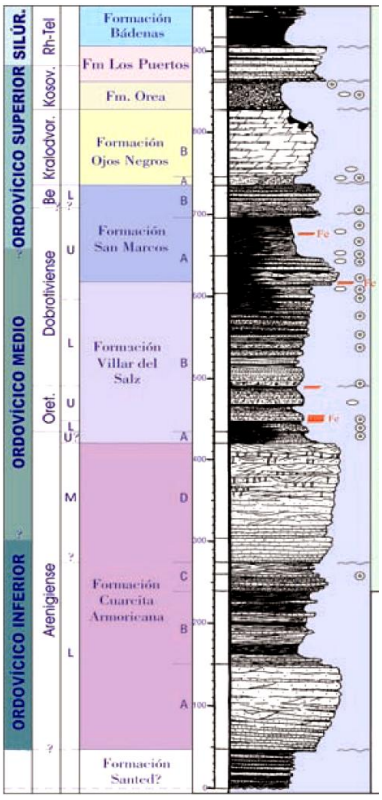

Figure 13. Stratigrafic column of the lower Palaeozoic sequence

On the above materials and forming discontinuous band going from Santa Maria del Espino to Sierra de Caldereros appears the **Montesoro Formation** corresponding to Saxonian stage and consists of a series of materials that evolve from detritic conglomerates to shales in intense reds and have been interpreted as alluvial fan sediments deposited in extremely arid climate.

Mesozoic

Mesozoic rocks are prominent in this region. The earliest rocks belonging to Triassic are discordantly on top of "Capas de la Ermita Formation", within the Sierra de Aragoncillo region (Sopeña y Sánchez-Moya, 2008; and Ramos, 1980) (See fig. 14). .

Triassic

The Triassic materials of this area corresponding with the tree sedimentary Germanic facies: Buntsandstein, Muschelkalc and Keuper. Fig.15

In the area of "Hoz del Río Gallo" and "Barranco del Arrollo Viejo" are located one of the best outcrops of **Buntsandstein facies** and where is established the reference units the compound the "Guadalajara Group" formed by five formation:

- The first materials constitute the unit **Conglomerates of the Hoz del Gallo Formation**. This unit contains the limit Palaeozoic-Mesozoic.
- Following in sedimentary continuity there are the **Sandstones of Rillo de Gallo Formation**, with major crossed stratification in sandstones and some siltstone levels.
- On top of these rocks there is the "**Nivel de Prados" Formation"** mainly comprised by an alternation of siltstones and sandstones (arkoses).
- Concordant with these rocks there´s a sandstones, the **Sandstones of Arandilla´s River Formation**. Then the alternation between the sandstones and siltstones level becomes more frequent.
- This new layout of lithologies constitutes what is known as **Siltstones and Sandstones of Torete Formation**.

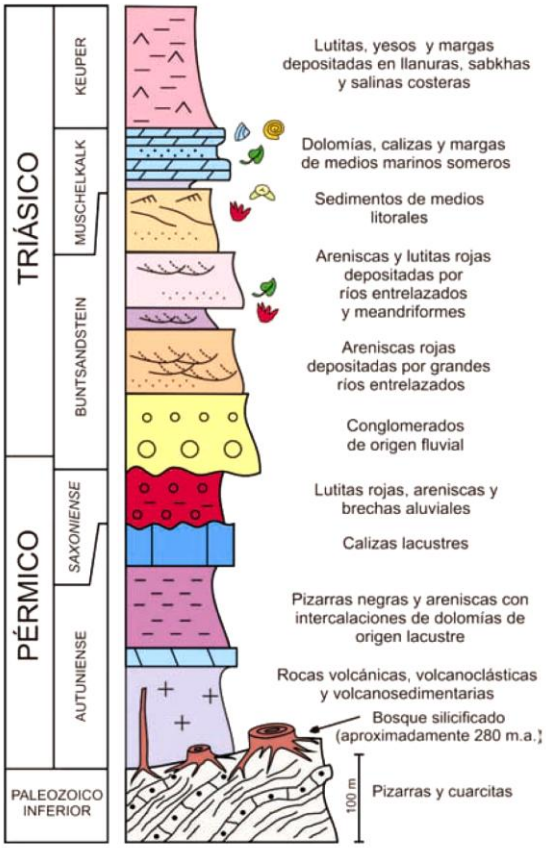

Fig 14. Permo-Triassic estratigrafic column

On top of these former rocks a clear lithologic change can be observed, marked by the apparition of **Capas Dolomíticas Formation**, constituted by dolomites, and "**Capas de Royuela Formation**", formed by an alternance of marls and dolomites. These rocks belong to the **Germanic facies Muschelkalk**.

Sierra de Rueda (Palaeozoic)

Arenas Utrillas (Cretácic)

Cenozoic sediment near Molina de Aragón

The Keuper Germanic Facies is in sedimentary continuity with the unit "Capas de Royuela". In the vicinity of the town of Molina de Aragón two sequences may be distinguished in the facies Keuper series (Sopeña and Sánchez-Moya, 2008): a lower sequence constituted by grey or black mudstones and gypsum with sandstones and carbonates. It is easy to find in these levels minerals as aragonite, red quartz, and gypsum crystals.

Jurassic

Jurassic rocks in this region are mainly carbonate rocks (limestones and dolomites). These rocks follow structures along NW generated during the compressive stage of the range. Jurassic in the western sector of the province of Guadalajara is practically non-existent due to successive erosion stages which took place later on (Fig. 15). However, in the western sector of the province, where Molina and Alto Tajo County is located, all the Jurassic units are preserved (Gómez y Canales, 2008).

The Jurassic sedimentary sequence in this region (Fig. 16) begins with materials that form **"Renales Group":**

- The first unit we can find is **"Imón Formation"**, concordant with Keuper facies. This Formation is made up of grey dolomites.
- Over them is **"Cortes de Tajuña Formation"** characterized by the presence of breccias, usually covered. The limit between Upper Triassic and Lowe Jurassic is usually to be found on the upper stretch of this unit.
- Upon these rocks there is a carbonate unit, **"Cuevas Labradas Formation",** made up of a lower level composed of limestones and dolomites, and an upper one with limestones and dolomites.

After this materials, appears the "**Ablanquejo Group**" with this units:
- **"Cerro del Pez Formation"** is arranged over an ironed surface, whisch acts as a limit to the former "Cuevas Labradas Formation". It is mainly comprised of grey marls.
- The next unit is "**Barahona Formation**", is made up by bioclastic limestones. The upper limit of this formation is defined by an ironed surface.
- "**Turmiel Formation"**, constituted by alternating, sometimes following a rhythmic pattern of marls and limestones can be distinguished (Goy *et al*., 1999).

The next materials form the "**Chelva Group**" and are:
- On top of the previous unit a calcareous section constitutes la "**Chelva Formation"**. This cartographic unit presents a greater surface near El Pobo de Dueñas and it has been feasible to complete a complete section with of 11 units, mainly constited by por limestones and dolomites. This unit represents "**Sot de Chera Formación"**, upon which the "**Loriguilla formation"** is arranged, comprising a rhymical alternation between limestones and marls. On top of these rocks "**Higueruelas formation"** means the end of the Jurassic levels of the region.

Cretaceous

Cretaceous in Molina and Alto Tajo is located along SW and NE of the region. Its mainly a carbonate sequence, a great section of the rocks succession that make up the Cretacic in the region, is near the municipalities of Villanueva de Alcorón and Villar de Cobeta (Giménez y Rey, 1982).
- The first Cretaceous rocks that appear in the area, are limestones, marls, limestone conglomerates and Weald facies sandstones known as "**Huérguina Formation**".
- On top of these rocks and unconformally is "**Arenas de Utrillas facies Formation**", mainly formed by sands, clays, sandstones and microconglomerates. Tha lay over the precedent formation or over Jurassic units.
- A gradual transition is to be found in "**Nuévalos formation"**, characterized by a rich lithological variety mainly formed by limestones and dolomites and marls all of them clearly stratified. In the same way as in the previous case, the transit between this formation and the preceding one (Monterde formation) is gradual. This unit is formed by limestones and marls, with the presence of limestones.
- The upper limit bordering with the next unit, the "**Ciudad Encantada Formation**" sometimes might become erosive. This cartographical unit is quite homogeneous formed by dolomites and limestones.

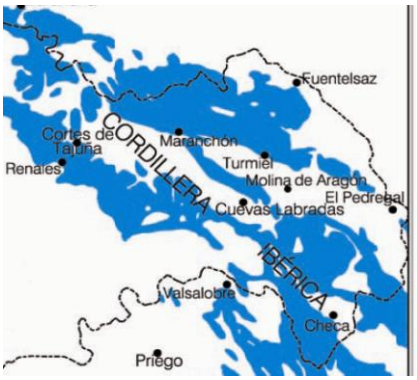

Fig 15. Map of the Jurassic outcrops of Molina Alto Taio area (Gomez v Canales 2008)

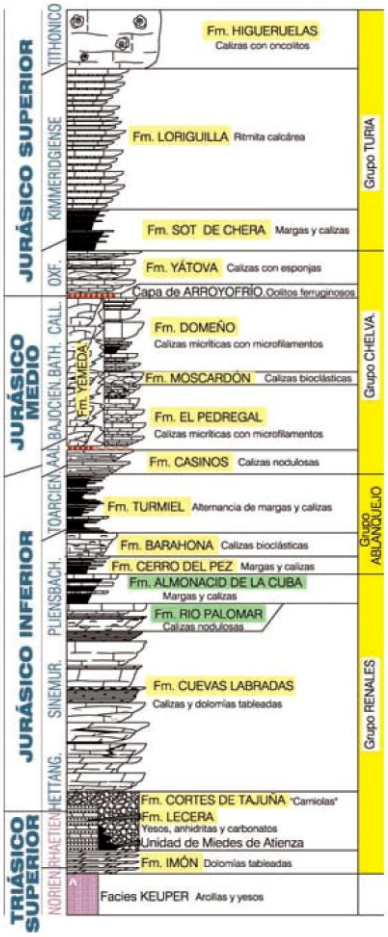

Fig. 16 Jurassic Stratigraphic column

Limestones of "Ciudad encantada Formation" in Peñalén

- Upon this dolomitic and limeston formation, "**dolomías y calizas dolomíticas estratificadas del embalse de la Tranquera Formation"** appear. Within this unit we can distinguish levels of dolomite and dolomite breccias.

- The last unit of the Cretacic in this area is the "**Brechas Dolomíticas de Cuenca" Formation** This unit has a gradual limit with the previous unit, which, as previously mentioned, has a dolomitic breccia level at top. This formation does not appear throughout the whole region, because being the last Cretaceous unit, it may be totally or partially eroded or covered by tertiary rocks (Giménez y Rey, 1982). .

Cenozoic

Some authors (Olmedo et al., 2008) has distinguish four units in this region. The first unit has, at times, a gradual boundary with the latest materials Cretaceous. It consists of a series of levels, calcareous or clay with sandy intercalations casts.

- This unit is **Villalba de la Sierra Formation**, which outcrops in Cuenca´s Range and the Altamira´s Range areas.

- The next unit, known as **Unit T1 or pretectonic** series is presented on the previous jarring and comprises very cemented conglomerate, sandstones and clays, marly sections presenting to top. Later, discordant over the former appears

- The **Unit T2 or Series Syntectonic** is characterized by the presence of quartzitic or calcareous gravel or sandstones and red clays, presenting to top calcareous sandy limestone, limestone and marl.

- Finally there´s a **Unit T3, or Series Postectonic Series**, which forms the filling Tajo Basin and small intramontane basins that can be recognized in this region. .

Tectonics
The Iberian Range is the result of a succession of several tectonic events (Garcia Quintana, 2008):

- Process sedimentary in the Lower Palaeozoic. .
- Compressive Process in Middle and Upper Palaeozoic. .
- Process of rifting during Mesozoic with several pulses of stretching and extension of the Iberian plate crust and subsequent thinning. .
- Process shortening and compression during the Cenozoic, and consequent thickening.

During the extensive phase of the crust and generated a depressed area which was successively stretched completely filling of sediments, while during the compressive stage, these sediments were folded, faulted and uplifted. Palaeozoic materials located below Mesozoic deposits show signs of folding, breakage and in some cases metamorphism, all as a result of the Variscan Orogeny. These same materials assimilate efforts produced during the Alpine Orogeny generating faults and deformation of large magnitude, becoming the Zocalo Varisco or Hercynian of the Iberian Range. The vertical displacement of some of the fractures present in the materials of Palaeozoic allows them to come to surface in some parts of the region as Aragoncillo or Checa area. .

Geomorphology

But most of all, the variety of geomorfological features which furnish this area with a wide range of different landscapes and as we explain below, an outstanding interest as regards to divulgation-interpretation. Apart from the fluviokarstic canyon of the river Tagus after which the territory is named, we could highlight other canyons carving over sandstones and Buntsandstein conglomerates by rivers as the Arandilla and Gallo. Furthermore, there are plentiful karstic manifestations as it is the case with caves, sinkholes, poljes, springs and tuffs (some of which are currently still active). There could also be added waterfalls and lakes, and several periglaciar features as block fields or block streams. The existence of prominent tectonic features and folds create a structural landscape with deep river incisions.

B.2.3. Geological History

Palaeozoic

The geologic history of the region dates back to 450 million years, where massive marine platforms begun to develop surrounding Gondwana. During this very first stage, The area we are dealing with and, in general, the whole Iberian Peninsula was located in latitudes very close to the South Pole, where major glaciomarine sedimentation took place, a great deal enhanced by a strong glaciations at the end of the Ordovician period, whose consequences deeply affected the weather and the existing organisms of that age which lasted approximately 20 million years. At that time, the sedimentary basin mainly behaved as a passive margin and was altered by extensional tectonics which caused normal faults and gravitational slides. Gondwana´s surface was fraught with glaciers that, sometimes, released huge icebergs that reached the ocean. Some of these icebergs held rock fragments dragged by the erosive effect of the glaciers. These dropstones got to get released from the icebergs as a consequence of their thawing in warmer places. A good example of these phenomena is to be found in Checa.

Later on, at the beginning of Silurian, Gondwana´s continent began to drift towards the North, which caused the region we are dealing with to move towards lower latitudes. These conditions make themselves evident by carbonated sedimentation, as befits subtropical from the lower Devonian on. Slowly, Gondwana´s continent collided with the macrocontinente Laurusia (formed by the previous unification, during the Caledonic orogeny, of the continents Laurentia, Avalonia and Baltica), during Carboniferous (Variscan orogeny). This collision´s result was the formation of the Pangea.

During the Permian, the supercontinent Pangea migrated towards the North causing the equatorial line to go through the current province of Guadalajara. At that age the climate was even warmer and more arid than at previous ages. This caused shores to withdraw and the sea level to dwindle globally, causing the formation of a great amount of evaporites about many epicontinental areas.

Mesozoic

During the late Permian and early Triassic began early extensional movements that would result in the subsequent fragmentation of Pangea and the westward advance of the Tethys Sea. Were generated also broad valleys of ancient faults of NW-SE, with a major river system. The process of widespread rifting and subsidence therefore favoured the accumulation of powerful series of alluvial conglomerates, sandstones and shales of currently constitute some of the most spectacular scenery and famous in the province of Guadalajara (Hoz del Río Gallo, Sierra de Caldereros, etc.). During this period, the evolution vertical drainage networks was largely controlled by regional tectonics and climate (continental and arid). During the Middle Triassic began Tethys advancing the west. In the sedimentary record can recognize two separate transgresive episodes one regressive. The first transgresive episode reached the eastern end of the province of Guadalajara (Molina ands Alto Tajo of). This first transgression can be recognized in some Triassic outcrops at the east Molina de Aragon, characterized by the presence of small levels of carbonates and evaporites above Buntsandstein red series. The second transgression, which affected the entire province, is recognized by the presence of carbonate lithologies (limestones and marls) with some shaly intercalations. These materials, belonging to the Germanic Muschelkalk facies correspond to a complex of shallow marine carbonate with development and supratidal tidal flats, lagoon and inner shelf. A late Middle Triassic, Iberian Massif reliefs is softened following the continuous supply sediment into rivers draining into the Tethys. Also during this time began a further decline in sea level and generated large evaporite deposits in an extensive coastal plain regressive state. These facies, composed by shales with abundant gypsum and some interbedded dolomite are the German Keuper facies. Sediment with salts, which have generated valuable since medieval holdings in the Shire of Molina. Within the study area, specifically around the town of Molina de Aragón, there are two sequences in vertical

succession Keuper facies, consisting of a lower casts dark shales with interbedded sandstones and carbonates, and an upper, generated in an environment of sebkhas or marshes in wet weather, composed by red shale interbedded with anhydrite and carbonates. Early Jurassic, Guadalajara was located under latitude of about 35 ° N, with a slightly warmer and drier climate than today. The installation of marine environments during the Jurassic in the province of Guadalajara took place in a series of transgresive-regressive pulses. The beginning of the Jurassic in this region is characterized by a transgresive episode that.

Cenozoic

Over the Tertiary extensional dynamics ends and passed to a compressive regime with the first movements corresponding to the Alpine Orogeny, which resulted in the final withdrawal of the sea level. From the lower and middle Eocene, as a result of tectonic movements produced basins begin to experience a progressive accumulation of coarse detritic material. In the final stages of these river silting palustric basins, evidenced by the appearance of sections of limestone with algae. Subsequently, a process of generating folding in the Oligocene, for Phase *Castellana of Alpine Orogeny*, which led to the razing of the raised areas, preserving the rest in small trays. During the mid-upper Miocene and Pliocene basins were greater entity, where detritic sedimentation continued contributions of materials with different grain size. These contributions culminated with a system of wide plateau lake. .

From the late Pliocene and Quaternary began the installation of the current river network, and its engagement sedimentary progressive series described above. This is marked by the presence of numerous river terraces and numerous erosion surfaces filled by morphology glacis deposits. These deposits, belonging to the early stages of the Quaternary sedimentation are subsequently dissected by an incipient network river which is currently under development.

Buntsandstein facies in River Gallo canyon

B3. Listing and description of geological sites within the proposed Geopark

The next table shows the main geologic interest items of Molina an alto Tajo as well its characteristics and protection status (see fig. 17 for location).

Nº	NAME	MAIN INTEREST	MAIN USE	DEGREE OF PROTECTION	DIVULGATION FACILITY
G1	Río Tajuña cliffs	Geomorfology	Turistic-Didactic	NIL	NIL
G2	Tufa limestone	Geomorfology	Turistic-Didactic	NIL	NIL
G3	Paleozoic-Mesozoic Discordance at Los Milagros Valley	Stratigraphy	Educational	Natural Park	YES Itinerary+panel
G4	Los Milagros valley and rock towers	Geomorphology	Turistic-Didactic	Natural Park	YES Itinerary+panel
G5	Los Casares Cave	Paleonthologic	Turistic Scientific	Natural Park	YES Itinerary+panel Guided visits
G6	Saelices de la Sal salt Works	Stratigraphy Cultural	Turistic-Didactic	Natural Park	YES Itinerary+panel
G7	Tajo canyon	Geomorphology	Turistic-Didactic	Natural Park	YES Itinerary+panel
G8	Los Cuchillares	Geomorphology	Turistic-Didactic	Natural Park	YES Itinerary+plate
G9	Hundido de Armallones	Tectonics Geomorphologic	Turistic-Didactic	Natural Park	YES Itinerary+panel
G10	Las Cárquimas waterfall	Geomorphology	Educational	Natural Park	NIL
G11	la Inesperada salt works	Stratigraphy Cultural	Educational	Natural Park	NIL
G12	Aragonitos and jacintos de Cobeta´s Outcrop	Mineralógico	Turistic-Didactic Educational	Natural Park	YES Itinerary+plate
G13	Geological resources	Cultural	Turistic-Didactic	Natural Park	YES Itinerary+panel+plate
G14	Arandilla river canyon	Geomorphology	Turistic-Didactic	Natural Park	YES Itinerary+panel+plate
G15	Arandilla hanging valley	Geomorphology	Scientific	Natural Park	YES Itinerary+plate
G16	Alcorón cave	Geomorphology	Turistic-Didactic	Natural Park	YES Itinerary+panel+plate
G17	Claro limestone pavement	Geomorphology	Scientific	Natural Park	NIL
G18	Hoya del Espino limestone pavement	Geomorphology	Turistic-Didactic	Natural Park	YES Itinerary+panel+plate
G19	Utrillas Sandstone old pit	Stratigraphy	Scientific	Natural Park	YES Itinerary+panel+plate
G20	Poveda thrust fault	Tectonics	Scientific	Natural Park	NIL
G21	Arroyo de la Hozn faults and folds	Tectonics	Scientific	Natural Park	NIL
G22	Tajo old meander	Geomorphology	Turistic-Didactic	Natural Park	YES Itinerary+panel+plate
G23	Taravilla lagoon	Geomorphology Sedimentológico	Scientific Turistic-Didactic	Natural Park	YES Itinerary+panel+plate
G24	Poveda waterfall	Geomorphology	Turistic-Didactic	Natural Park	YES Itinerary +plate
G25	Tajo Canyon (Herrería Bridge- Hundido de Armallones section)	Geomorphology	Turistic-Didactic	Natural Park	NIL
G26	Horcajo Cliff	Geomorphology	Turistic-Didactic	Natural Park	NIL
G27	Chequilla sorroundings	Geomorphology	Turistic-Didactic	Natural Park	YES Itinerary +plate
G28	Chequilla monolith	Geomorphology	Turistic-Didactic	Natural Park	YES Itinerary+panel+plate
G29	Graphtolite bed of Checa	Paleonthologic	Scientific Turistic-Didactic	Natural Park	YES Itinerary+panel+plate
G30	Checa´s *Dropstone*	Stratigraphy	Scientific Turistic-Didactic	Natural Park	YES Itinerary+panel+plate
G31	La Aguaspeña tufa waterfall	Geomorphology	Turistic-Didactic	Natural Park	YES Itinerary+panel
G32	El Cubillo poljé	Geomorphology	Turistic-Didactic	Natural Park	YES Itinerary+panel
G33	Tornero cave	Geomorphology	Turistic-Didactic	Natural Park	NIL
G34	Variscian folds in Checa and Orea	Tectonics	Scientific Educational	Natural Park	YES Itinerary+panel
G35	Siluran section in Checa and Orea	Stratigraphy	Scientific Educational	Natural Park	NIL
G36	Vulcanic site of Alcoroches	Volcanic	Scientific	Natural Park	NIL
G37	Stone river of Sierra de Orea	Geomorphology	Turistic-Didactic	Natural Park	YES Itinerary+panel

G38	Vulcanic site of Orea	Volcanic	Turistic-Didactic	Natural Park	YES Itinerary+panel+plate
G39	La Salobreja lagoon	Geomorphology	Turistic-Didactic	Natural Park	YES Itinerary+plate
G40	Peat bogs	Geomorphology	Turistic-Didactic Educational	Natural Park	Itinerary+panel
G41	Karstic Spring	Geomorphology	Educational	Natural Park	YES Itinerary+plate
G42	La Escaleruela tufa waterfall	Geomorphology	Turistic-Didactic	Natural Park	YES Itinerary+panel+plate
G43	El Campillo tufa building	Geomorphology	Educational	Natural Park	NO
G44	San Pedro´s bridge tufa building	Geomorphology	Turistic-Didactic	Natural Park	NO
G45	la Fm. Barahona paleontologic site	Paleonthologic	Turistic-Didactic	Natural Park	YES Itinerary+panel
G46	Folds in Cuevas Labradas limestones Formation	Tectonics	Turistic-Didactic	Natural Park	YES Itinerary+panel+plate
G47	Fm. Cuevas Labradas Stratotype	Stratigraphy	Educational Scientific	Natural Park	YES Itinerary+panel
G48	Muschelkalk facies with salt pseudomorphs	Stratigraphy	Educational Scientific	Natural Park	YES Itinerary+panel
G49	Permo-Triassic section in Barranco de la Hoz (Barranco de la Hoz Canyon)	Stratigraphy Geomorphology	Educational Scientific	Natural Park	YES Itinerary+panel+plate
G50	Aragonite type-locallity	Mineralógico	Scientific Educational	NIL	NIL
G51	River Mesa gorge (I)	Geomorphology	Turistic-Didactic	In proccess LIC+ZEPA	NIL
G52	River Mesa gorge (II)	Geomorphology	Turistic-Didactic	In proccess LIC+ZEPA	NIL
G53	Mesa (isolated hill)	Geomorphology	Turistic-Didactic	NIL	NIL
G54	Sierra de Aragoncillo petrified forest	Stratigraphy Paleonthology	Scientific	NIL	NIL
G55	Permian-Triassic section at Rillo de Gallo	Stratigraphy	Scientific	NIL	NIL
G56	Fuentelsaz stratotype (GSSP)	Stratigraphy Paleontoló	Scientific	NIL	NIL
G57	Caldereros´hills	Geomorphology Stratigraphy	Turistic-Didactic Scientific	Natural Monument	YES Brochure
G58	Mines of Setiles	Mineralógico- Minero	Scientific	NIL	NIL
G59	Museum of Molina de Aragón	Paleonthology Cultural	Turistic-Didactic Scientific	SI	YES Several panels and brochures
G60	Estrella Mine (Copper)	Mineralogic-Minero	Scientific	NIL	NIL
G61	Poveda de la Sierra and Peñalén mines	-Ambiental Geomorphology	Scientific Educational	NIL	NIL
G62	Armallá salt Works	Stratigraphy Cultural	Turistic-Didactic	NIL	NIL
G63	Alustante limestone pavement	Geomorphology	Scientific	LIC+ZEPA	NIL
G64	Peñas Rubias	Geomorphology	Turistic-Didactic	Natural Park	YES Itinerary+ plate

Fold in Jurassic limestones in his type section of Cuevas Labradas

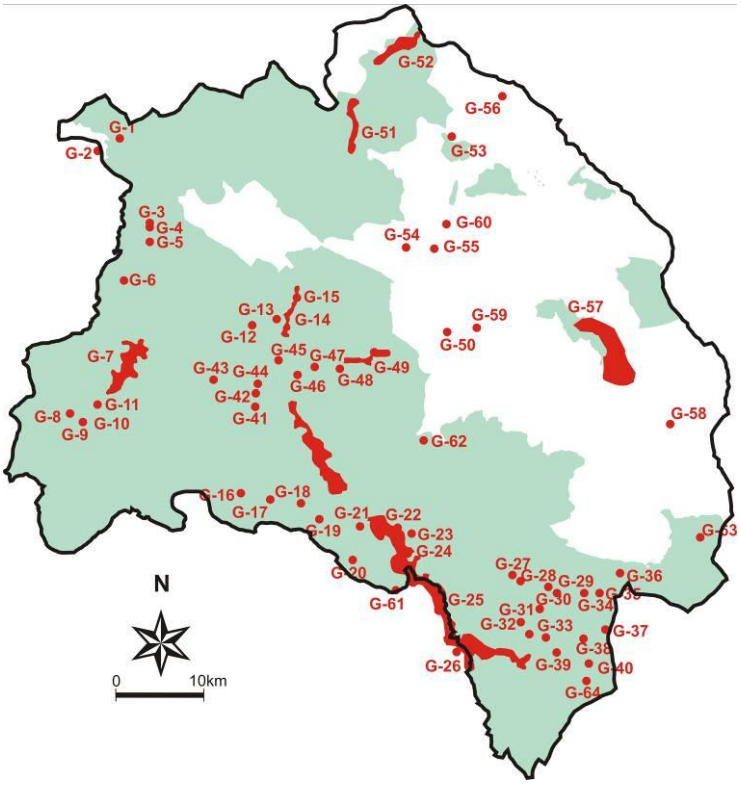

Fig.17. Map of the Geosites in the Comarca of Molina and the Alto Tajo.

B.4. Details on the interest of these sites in terms of their international, national, regional or local value

These sites were selected and evaluated in various inventories:

- Preliminary inventory for the realization of the Plan of Arrangement of the Alto Tajo Natural Park Resources (1999): to delimit the perimeter of the Natural Park, an inventory of 125 sites of geological interest identified and assessed for that remain enshrined in and protected perimeter to Natural Park management attend to his nature.

- Inventory for the realization of the Geo-routes: 80 locations were identified where to focus outreach efforts this project, all equipped with displays and / or ceramic plates, and brochures and a specific description each place in Geological Guide Alto Tajo Natural Park.

- Geosites Global Inventory Project 2000-2007: the national inventory, in which more than 70 specialists geological disciplines, identified 20 contexts (frameworks) international geological significance in Spain, four of which are represented in the territory of the Region de Molina: Series sedimentary and metamorphic Stratotypes Palaeozoic and Mesozoic Iberian Chain Bética. Subsequently identified 144 Spanish Geosites constituting the Spanish contribution to global geological heritage. Four of them are included in the territory of the Geopark: 1-stratotype Fuentelsaz; 2 - stratotype of the Barranco de la Hoz, 3- Graptolites outcrop in Checa, 4-Dropstone and Lower Silurian section of Checa.

- Study of valuation and potential use of different geological attractions in Molina and Alto Tajo included in the Diploma Advanced Studies (DEA) conducted by D. Alberto Lebron and directed by Amelia Calonge (University of Alcalá de Henares) and Luis Carcavilla (IGME).

- Letter Geological of Molina: sponsored by the Museum of Molina, seeks to identify the geological outcrops and paleontological sites that have been investigated by any research group and make a tab for the systematic data collection.

Within this area we may find geological elements truly noteworthy, some of which can be deemed scientific references worldwide. But aside from this rich geological heritage, the huge geological diversity might be from a geological point of view the factor that renders such singularity to this territory. Diversity is the most used term for describing the biotic values and the geological characteristics. As regards the geodiversity and geological heritage of

the Molina and Alto Tajo we should highlight the presence of outstanding series from Silurian, Ordovician, Triassic, Jurassic and Upper Cretaceous. The ones from the Lower Silurian among the most important, being a bioestratigrafic reference worldwide; Lower Triassic Series are included in the Spanish list of the project *Global Geosites*; and the Toarcian-Aalenian section in Fuentelsaz, until lately the sole *Global Boundary Stratotype Section and Point* (GSSP) in Spain passed by International Commission on Stratigraphy od the International Union of Geological Sciences (IUGS;http://www.stratigraphy.org/aalenian.htm). The lithological diversity is remarkable as well, with powerful outcrops of shales, quartzites, sandstones, limestones, dolomites, sands, salt deposits, gypsum and volcanic rocks (dacites). The presence of rich levels of minerals as Compostela red quartz (red coloured ferruginous quartz) and aragonites is another outstanding feature, which is precisely named after the Comarca de Molina de Aragón, whence the very first described units were found.

There are also rich fossil levels, among them one of the most important deposits in the Peninsula graptolites, we should add other plentiful Mesozoic outcrops.

Besides, there is an inventary derived from PORN in which 70 geomorphological sites in the Natural Park were identified where Geoconservation focus and efforts should be enhanced, in which no spreading initiatives nor public usage have been carried out so far (due to its difficult access and other inconveniences). But whose protection is nevertheless mandatory by law. These places are described, assessed and placed in a research backed up by the Natural Park (Fig.18). As a result of the analysis of these enclaves, the First Inventary of Geosites in the Geopark will be completed, currently amounting to 64 places.

Variscan folds in Checa (south of Molina and alto Tajo territory)

C. GEOCONSERVATION

C1. Current or potential threats of geological attractions

The main threats to the conservation of these interest places are:

a).Mining: Perhaps the main potential threat because research permits, mining concessions and subsequent holdings, typically cover large areas and in case of damage, they are irreversible in the area, mining there Poveda Sierra, Peñalén and to a lesser extent, in Villanueva de Alcorón. Administrative requests are common in mining areas of Sierra Aragoncillo (fossil forest) and recently in Sierra de Caldereros. The issue focuses on the following fronts and concessions:
1. Lower Cretaceous caolinic sands: Using systems that opencast open large fronts quasi vertical or stepped profile and move large volumes of material, forming large dumps.
2**. Uranium**: There are mineral deposits of this investigation since the 70´s, however, there are no operating fronts, having been declared open to exploitation unviable for their environmental impact.
3. Iron oxides: Exploited since antiquity, currently in Sierra Menera removal has been slowed, but is a threat to some type sections Palaeozoic formations, which are reference for the Iberian Range.
4. Clays: Materials from alteration of slates and shales, used for the ceramic industry and / or equivalent.

b) Facilities for communication: Basically roads, which can be added with less noticeable effects roads, canals, etc.
c) Wind farms: There are several wind farms in the area, noted for its present size in the immediate environment of Maranchón. This is the second wind power generated over Europe. While the construction and presence of the wind turbines produce significant environmental and landscape impact, the fact remains that is a determined by alternative energy and contributing to the fight against global climate change.
d) Hydroelectric power stations, involving the modification of river flow, which is the main modelling agent in the area.
e) Travertine, high geological fragility and while considered especially valuable in this area because of its peculiar geomorphological significance and bioclimatic record containing. Construction of motorways, alteration of its natural hidrochemical dynamics, material extraction and erosion caused by stepping over areas frequently crowded by visitors.
f) Chasms and caves, geological forms equally valuable and fragile, the direct plundering speleothems (stalactites and stalagmites) work experience massively caving or without taking appropriate measures to avoid negative impacts.
g) ridgesescarpes, mainly the impact of some infrastructure.
h) Permian volcanic rocks, located in Orea are susceptible to exploitation as aggregates, although forbidden by the law of the Park.
i) periglacial Forms slope, screeds and rocky, are very fragile to any activity involving earthworks, such as building highways or roads and their exploitation, although currently not seen on these remarkable and widespread damage, merely occasional mild conditions.
j) Waterfalls: These are rare and very fragile to any transformation of its geological structure, the processes that generated them or flow that feeds them.
k) Fossil deposits: They may be vulnerable to a high level of collection, although included in the protected areas are monitored and regulated and limited collection.

Human activity has focused until recently on extensive exploitation of renewable natural resources that did not involve substantial relief transformations. However, as in any country, shows the existence of risk factors for the conservation of geological elements outside protected perimeters derived orientation change in land use and the use of new technologies with great capacity for transformation.

The state of conservation of sites of geological interest is good. Even when compared to the situation in previous years, the state has improved since the implementation of various geoconservation initiatives allowed to recover and restore degraded elements. The future outlook is good, since most of these elements are protected and, although they have identified these potential threats, theoretical, many of them are not a real threat in the short and medium term.
Undoubtedly, the main threat is mining, as in the territory of the region are located various opencast exploitations. To mitigate the impact, rectify and propose corrective measures, was created in 2008 a working group in order to find appropriate ways to minimize operational impact. This working group is made up of researchers

specializing in environmental restoration of mining wasteland belonging to the Universidad Complutense of Madrid and the University of Alcalá de Henares, and Natural Park technicians; so far the results are very satisfactory, with several papers published in scientific journals.

Silicified trunk in Aragoncillo Range (Molina an Alto Tajo)

Jurassic Lower/Medium GSSP of Fuentelsaz

C2. Current status protection of geological attractions

In the protected areas of the of Molina and Alto Tajo, protection status of geological reservoirs is very satisfactory, with initiatives that are related to the rest of Spain, in the rest of the region, the project team of the Geopark, works to equalize geoconservation guarantees and neutralize some threats.

Since the creation of the Alto Tajo Natural Park in 2000, has been conducted in this area a number of geoconservation initiatives, enhancement and dissemination of geological framed in different programs of public use of the natural heritage. The process of declaration of Natural Park is a model example of territorial planning considering geological heritage as an element of the first order. Specifically, the process of creating the Natural Park began with the scientific studies that would complete the Plan of Management of Natural Resources (PORN). These studies examined the geology and geological heritage of the territory, identifying 125 sites of geological interest. Recommended in this management document, a protected perimeter, depending on the geological heritage (along with other aspects such as botany, vegetation, limnology, socioeconomics and fauna). Thus, the Natural Park was declared in 2000. Later he was drafted and approved in April 2005, the Regulatory Plan for Use and Management (PRUG) Natural Park, which is catered for geoconservation and promoting geological heritage research and public use. Therefore, in the planning and management instruments Natural Park, the geological heritage plays an important role.

88% of the Geosites in the area are already protected, being as they are inside protected areas. As a matter of fact, 61% out of the territory of the Geopark is under protection by some of protected area type and two or more areas are in process of protection. Geosites lacking protection reach approximately 2% of the Geopark´s total territory. Within the area there could be defined four different levels of protection:

1- Geosites included within protected spaces (Natural Park and Natural Monument): It accounts for a specific and real protection. In fact, PORN establishes the definition and diagnosis over conservation status of the values in terms of geology and the lookout of its future development as to face risk factors or threaten. After the declaration of Natural Park del Alto Tajo in 2000, the PRUG was passed in 2005 to establish the legal framework and action management planning. When it comes to geological elements, PRUG specifies the implantation of **conservation measures, restoring and monitoring its preservation state**. Besides, PRUG regulates the activities developed in the Natural Park and, among them, the activities that pose a risk to the conservation of the geologic resources, such as open mining, gravel pits, trash dumps, small quarries for local usage, hydroelectric power stations, road and path building, any kind of works that entail removing land or altering the slope profile constructions, or amusement activities such as climbing and speleology.

The regulation of these activities is stricter in areas categorized by PRUG as Geosites. In the same way, PRUG set forth rules on fossil and mineral removal in the Natural Park, the implantation of residue removal from karstic caves and the modification of talus slopes in geological elements affected by roads, fossil and mineral picking legislation and management measures set forth by PRUG, as well as the performance criteria in terms of geoconservation in the Natural Park. Moreover, in most of them (but in the cases in which any conservation risk has been detected due to vandalism or plunder) have spreading initiatives. The latter are 49 out of 64 included in the Geosites Catalogue (76%). There should be added up 70 enclaves not included in the current inventary yet although they will be eventually added.

2- Geosites included within Red Natura 2000 (Sites of common importance –LIC- and/or areas of special protection
for birds –ZEPA- as well as geological elements of special protection: There are but 3 out of the already included in the listing of "Geopark Interest Points". They are undercover of the generic protection of 9/1999 law (arts 54-56) by being included in Natura web 2000. We should add up to them a series of enclaves placed outside of the boundaries of the Natural Park that are entitled with generic protection by Nature Conservation law of Castilla-La Mancha (Ley 9/1999). It entails a horizontal approach which comprises the whole regional territory, equivalent to that applied to threatened species that does not protect enclaves, but it protects elements in a generic way. This classing entails a generic protection bestowed by the aforementioned law (art. 93 y 94), by forcing ambient impact researches and urban planning instruments to highlight the presence of these geomorphologic features and also to determine specific measures to ensure its preservation. It also entails the urban zoning of these areas as rustic zone with protection in terms of ambiental, natural and landscape features. Besides, generic prohibitions in terms of destruction or actions that lead to its negative alteration are implemented. The location of these places is shown below Fig 18.

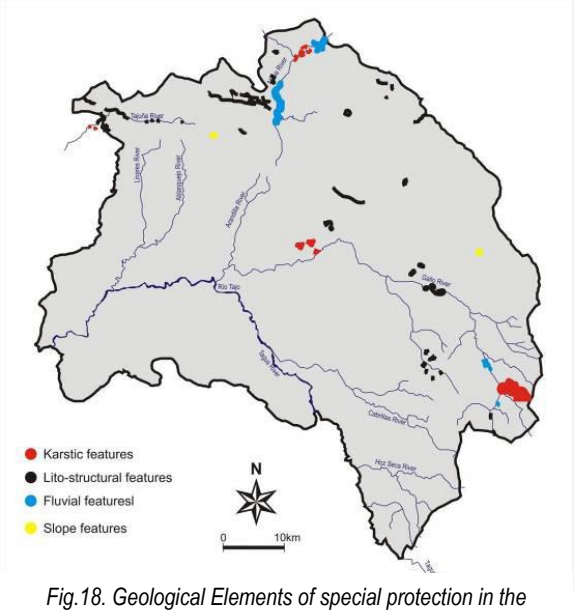

Fig.18. Geological Elements of special protection in the Geopark (omitting the ones included in the Natural Park as they are already highly protected as they were selected before the declaration of the Natural Park).

3-Places where geoconservation is a priority: these are places identified as a priority in terms of the Geopark´s management whose listing will be reviewed with the renewal of the Geopark Management Plan. The goals of such plan include guaranteeing their conservation and, where it applies, furnish them with touristic facilities, both recreational and didactic. In the very first stage, the listing includes the ones shown in Fig.17, although in the future new places identified in the geosites inventory will be added up.
4-Territory lacking protection: territory that does not have any specific legal tool for its geoconservation. This accounts for39% of the territory. All of above mentioned reasons place Molina and Alto Tajo at national level as a paradigmatic example of approaching a suitable strategy to preserve the geologic heritage of a massive natural region, whose management model has been showcased in both congresses and scientific meetings.

C3. Management structures and maintenance of geological attractions

The administrative body responsible for the conservation of the natural heritage of the region of Molina are **Peripheric Services of the Ministry of Agriculture in Guadalajara of the Delegation of the Agriculture of the Regional Government of Castilla - La Mancha**, with the corresponding team manager and technical staff to perform such work. Protected areas, Alto Tajo Natural Park and Natural Monument of Sierra de Caldereros, have specific regulations that ensure the preservation of their values. The rest of the region is protected by the generic standards of Agriculture Ministry. The aims of the **Guadalajara Provincial Council** are focused on maintaining infrastructure, service delivery and promoting development through their areas of their areas of Environment, Culture and Tourism. (See Annex nº5)

Also worth mentioning the "**Común de Molina"**, for the relevance of its properties that reach 10% of the territory of the region.

C.3.1. Organization of Peripheric Services of the Ministry of Agriculture in Guadalajara of the Ministry of Agriculture of the Regional Government of Castilla - La Mancha

Provincial Coordinator

Provincial Secretariat

Service Coordination and Regional Offices

Service Infrastructure and Rural Development

Service Quality and Environmental Impact

Natural Environment Service

Agriculture and Livestock Service

C.3.4. "La Común de Molina"

This medieval institution was created to represent the people of the region against the central administrator sitting in Molina de Aragón and currently owns approximately 10% of the territory. Its governing body is made up of two representatives from each of the four *Sexmas* that divides this territory, who are elected by the people, and chaired by the Mayor of Molina.

C4. List and description of non geological attractions

C.4.1. Natural Heritage

Alto Tajo Natural Park

Besides geological values described above, the treasures of Molina de Aragon and Alto Tajo territory are remarkable biodiversity and excellent state of preservation of ecosystems and landscapes. The floristic catalogue of Alto Tajo Natural Park reaches the 1,500 species and subspecies of vascular plants, which comes to represent 18% of the existing throughout the Iberian Peninsula and Balearic Islands. Approximately 70 are officially listed in Castilla-La Mancha as threatened, some even as "endangered". A total of 124 species of birds, 42 mammals, 15 reptiles, 9 amphibians and 10 species of fish make the initial catalogue of vertebrates that live in the park area. As rivers and other limnological enclaves, compared to other peninsular river systems, the Alto Tajo enjoys high environmental quality in its middle reaches. The channels are little affected, with stable margins and riparian vegetation abundant and varied. Also highlighted in the vicinity as enclaves limnological interest Laguna de la Parra or Taravilla, Valtablado River Lagoon, and Salinas Salinas de Armallá Saelices. The Alto Tajo Natural Park is the flagship of the conservation of the natural heritage in the province of Guadalajara.

Puente de San Pedro (Alto Tajo Natural Park)

Sierra de Caldereros Natural Monument

Area of outstanding natural beauty in the north-eastern part of the region, declared a national monument in 2005, it is also important from the point of view of history and archaeology as an example of integration of human been in the environment from prehistory.

Some rocks from Caldereros Range Natural Monument

Campillo, Setiles, Tordesilos and La Yunta Pools.
In the vicinity of the villages of Campillo de Dueñas, Setiles, Tordesilos and Yunta we can find remarkable pools and lagoons. The former of a permanent character, whereas the latter are of a temporary character. All of them very interesting from an ornithological point of view during wintering and migratory pass of water birds periods (march-april and October November). During these periods the variety to be found is overwhelming: from numerous flocks of common crane hailing from Scandinavia and eastern Europe, to colourful flocks of ducks, as well as grebes, coots, shorebirds and diverse species of herons. During spring and summer the level of water dwindles and even though the number of fowls decreases, these lakes make a nesting habitat for coots, mallards, great and little grebes among others. These pools and lagoons are also key water supplies for the survival of the great and a varied steppe birds population that dwell in the steppes and surrounding plateau as bustards and sand grouses. The origin of some of these pools is that they derive from small sinks (dolines) from the eroded limestone cropping out Albian sands (Lower Cretaceous), which enables a peculiar aquatic flora to spring de siliceous soil preference: Marsilea, isoetes etc. These “soil islands” enrich the steppe monotony of the moor with variety in terms of flora and are used by the aquatic fauna as well. Most of this area is included within Natura Web 2000 as a LIC.

Steppes and plateaus in the north of the Comarca
The sprawling steppe area located between Maranchón, Molina and Teruel´s border is a landscape which alternates crops, pasture and plateaus the result of the old farming management. This landscape, at first sight tedious and lacking diversity constitutes one of the most interesting zones as regards to steppe birds of the northern part of the Iberian Peninsula which shelters a wide range of these birds as great and little bustards, sandgouses, Greater Short-toed Lark, common larks, stone curlew and the very scarce Duponti lark; some of the best European populations dwell in this area. This discreet bird is easier to detect by its peculiar canto than by its cryptic feathers which lives on spiders captured among the moors of the area.
During winter the breeding steppe birds population is increased by larks, marlins, buzzards and common kestrels hailing from the north of Europe.

Microreserve of the Wet Meadow in Torremocha del Pinar
Included within the Geopark territory, it was declared in 1999, a few months before the declaration of the Natural Park that eventually took over its territory. It sprawls over 11 hectares and holds one of the few known populations en Castilla-La Mancha of the bracken *Ophiglossum azoricum*, it is singular threatened specie. Furthermore the presence of a series of vegetal communities enhanced by the wet soils which comes as a result of favourable topographic conditions, of considerable ecologic worth and extremely frail to the exploitation changes in the soil.

Besides, in the vicinity of the area under research, but outside its boundaries we should highlight:
The Natural monument of the River Cuervo spring (province of Cuenca)
It is located in the vicinity of the Geopark eventually declared Natural Park in 1999. Sprawls over 1.709 hectares and corresponds to tufa spring water, remarkable nationwide because its development extension, and its scenic beauty as well. Its high altitude enables the survival of a numerous species fauna y flora not to be found in other parts of Castilla-La Mancha due to their peculiar ecological demands.

Natural Park of the Serranía de Cuenca (province of Cuenca)
A Natural Park since 2006 it is a big protected space (130.000 has) sharing a great deal of features from the southern of Molina Alto Tajo area. This territory stands out for the presence of numerous peculiar karstic enclaves, as “La Ciudad Encantada” (The haunted Town) in Cuenca, the fluviokarstic canyon of Júcar or plentiful chasms and caves.
Monasterio de Piedra (Monastery of Stone) (province of Zaragoza)
Renowned geo-touristic site visited by hundreds of thousands a year, located close to the Geopark (22km from Fuentelsaz). It consists of a private enclosure fraught with waterfalls with formation of tufas.
Wild Fauna shelter in the Pool of Gallocanta (Zaragoza),
Located deep within an endorheic basin which is located at one thousand metres of altitude, it is 7,7 km long and 2,8 km. wide. Its maximum depth is one metre and a half, albeit its level dramatically fluctuates depending on the precipitations. Its main feature is that of sheltering more than 220 species of birds, as eagles, vultures, common shelducks and wintering cranes and geese. Among the mammals we can find roar deer’s, weasels, foxes, wildcats, wild boars, rabbits, badgers, etc.
We can find frogs, toads, lizards, Iberian ribbed newt and various species of snakes in pools and creeks.

C.4.2. Cultural heritage

Cultural World Heritage
In the area there are two enclaves listed as a World Heritage Site by UNESCO. They are called Rillo Rillo I and II. They were found in 1998 and are included within the Rock Art of the Mediterranean Basin on the Iberian Peninsula. Overall they are mural painting of recent prehistory. They are all the largest rock art in Europe and are an exceptional picture of human life in a critical period of human cultural evolution. Its singularity lies in its interweaving in a humanized landscape and ecological value, and their value as artistic and documentary evidence. They are located in rock shelters or cliffs which have been found type graphics or figurative images ranging from simple geometric lines to scenes depicting animals and humans in compositions rituals of hunting, gathering, or war dance. The periods in which these manifestations are confined the Epipaleolithic and Neolithic, between 10,000 and the second millennium B. C., when the climate is stabilized and begins the current geo-climatic conditions.


Molina de Aragón Castle

Assets of Cultural Interest
There are 15 places in the cultural heritage census of the area (Fig.20). They are mainly monuments and archaeological zones. Other monuments are related with the exploitation of salt Works or examples of religious architecture (churches) and civil (fortressed houses).They are Santiuste Castle (Corduente), Saelices de la Sal Salt works (Saelices de la Sal), "Castro El Ceremeño" archaeological zone (Herrería), "Valdeherreros- la Azafuera" archaeological zones (Riba de Saelices), Los Casares Cave (Riba de Saelices), Santa Catalina Church (Tartanedo),

Utrera Bishop Palace (Tartanedo), Molina de Aragón historic town (Molina de Aragón), Molina de Aragón Castle and medieval Walls (Molina de Aragón), Santa María de Buenafuente del Sistal cister Monastery (Olmeda de Cobeta), Posada de los Comuneros (Molina de Aragón), Castilgriegos celtiberic fortress in Checa, Santa María del Espino Cave (Santa María del Espino, Anguita), and the "Casa Fuerte" (Tierzo).Anguita and Riba de Saelices hold two archaeological deposits and two caves which feature engravings and painting of great archaeological worth.
The workteam that promotes the nomination for Geopark of this territory has get to include in this list the archaeological sites of "Castro de Peña Moñuz" celtiberic hillfort in Olmeda de Cobeta and "Castro de los Rodiles" cetiberic hillfort in Cubillejo de la Sierra.

Castilgriegos Celtiberic hillfort in Checa

Santa Catalina Romanic Church in Hinojosa

The Celtiberia

The region of Molina is within the territory known from a historical point of view as Celtiberia (Fig 19). This name comes from the name gave by the Roman conquerors for area occupied by the Celts of Iberia, a heterogeneous population sharing mixed culture between Celtic and Iberian and extends from La Rioja to Cuenca from north to south and from Guadalajara to Teruel from west to east between the rivers Ebro and Tajo. It comprises six provinces

of four regions. The Celtiberia is characterized territories that share a same integrated socio-geographical conditions and low industrial development.

LEADER groups of this region, 9 in total, in collaboration with the University of Teruel and the Museum of Molina promote interregional cooperation program "Paisajes de la Celtiberia" (Landscapes of Celtiberia) to promote joint development strategies, taking advantage of this singularity and using it as a tourist cultural resource. This has promoted various initiatives from the past few years among which are:

- Tourist routes that cross the main sites of this culture.

- Musealization of archaeological sites.

- Visitors centres.

- TerritorioIberkeltia.com, the website that provides information of the Celtiberia.

- Cultural Days were put together the tourism situation, shared ideas and arise of new initiatives.

Celtiberic Archaeological sites of the region of Molina, hillforts and necropolis, have been studied by universities like Alcalá, Zaragoza and Teruel, this have arise numerous discoveries about the culture and ways of life, in annex 10 there´s a list of scientific publications based on work carried out in this region.

Fig. 19.The Celtiberia area in the spanish map

Other examples of Cultural heritage

Practically all the municipalities boast any kind of an actual monumental manifestation of Cultural heritage, adding up to 148 registered assets within the influence area. Churches should be highlighted dating back to practically every age, rural hermitages are remarkable as well, many of them with a remote origin. There are also plentiful manors, big houses and fortressed houses. Other categories of monument include several typologies as bridges, aqueducts, former factories, former tombs, rests of walls, salt works and the characteristic "pairones" which are ornamented columns and in the entrances and exits of many towns in the Molina and Alto Tajo.

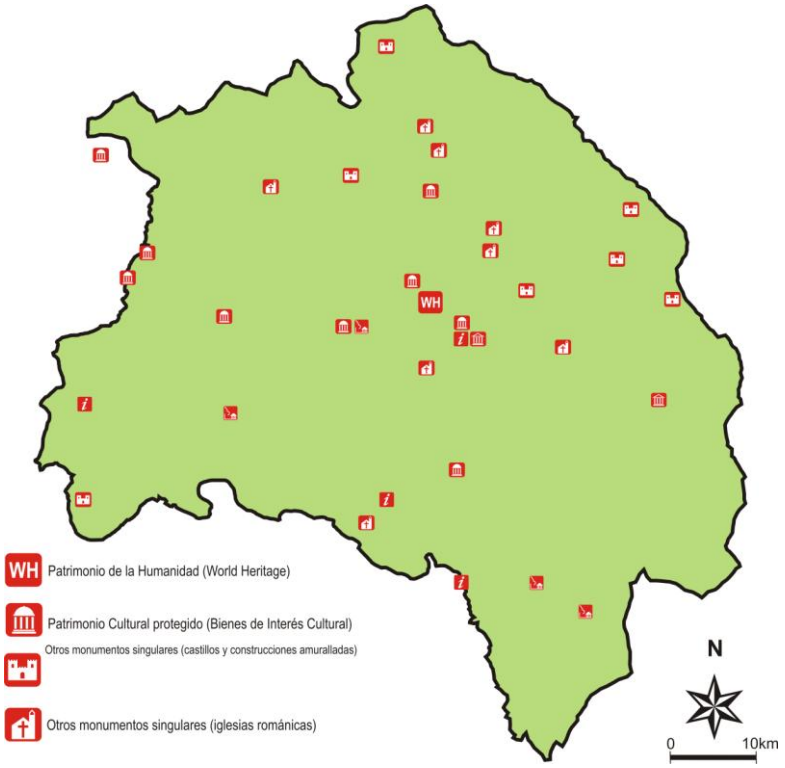

Figure 20. Cultural interest places in Molina and Alto Tajo.

Ethnographic resources

There are several ethnographic resources present in the region, most of them related with agriculture cattle raising and mineral and salt works. Mainly comprised by:
- Sabin Huts (Chozones Sabineros): dwellings for shepherds present in the sabin forests. They date back to the middle Ages, although its precise origin is somewhat diffuse. They are usually arranged clustered in a way of seasonal villages. Three ethnographical routes have been set up fitted with interpretative panels and brochures to enable the visit of the chozones. Some hut has been restored for the visitor.
- Caleras: ovens used to cook limestone in order to obtain lime, one of the ovens currently undergoing refurbishing to have it available as a touristic resource.
- Inland salt works: They are located in the Park and have a high historic-cultural worth. The salt works of Saelices are also undergoing refurbishing to be in working order again, their adjoining salt store will be revamped as a salt museum. These will have a specific interpretative route. In the salt Works of Armallá a view point is going to be built with interpretative panels to spread this ethnographic heritage.
-The gancheros career: It consisted on hauling logs of chopped trees an drift down the river (ganchero means "Hooker"). Currently 6 towns of the territory belong to Association gancheros Municipalities of the Alto Tajo constituted to promote and preserve this tradition.
Besides, due to their singularity several celebrations should be highlighted as the pilgrimage to Montesinos sanctuary in Cobeta, San Bartolomé´s celebration and bullfigting in Checa and the "Gancheros party" as well, which takes place in September in the municipality of Peñalen, Peralejos de las Truchas, Poveda de la Sierra, Taravilla and Zaorejas.


Medieval castle


Salt works


Grindstones quarry


Sabin Hut


Zafra Castle in Campillo de Dueñas (Caldereros´s Range, north of Molina And Alto Tajo)

D. ECONOMIC ACTIVITY AND BUSSINESS PLAN

D.1. Economic activity in the proposal Geopark

The main economic activities are present:
a) Agriculture, livestock and forestry activities, which are the more traditional uses of great importance and implementation planning. Both livestock and forestry have a regressive trend in the area, similar to that experienced by these sectors in the rest of the country caused by the loss of profitability of these activities, with reduction of livestock in the area and volume of forestry. The agricultural sector, supported by grants lines, remained stable over the past five years.
b) Mining, with great importance in Poveda de la Sierra, Peñalén and to a lesser extent, in Villanueva de Alcorón and Traid, to engage the workforce in these municipalities primarily to mining. The four existing mines in the area, maintain their activity levels similar to those of 5 years ago, and has even increased in the case of Machorro Mine in Poveda de la Sierra). Industrial activity is limited to the wood, either dedicated to the first processing, sawmills, or final production, woodworking, and from recent times the wind power generation after installing one of the most powerful wind farms in Spain
d) The provision of services to the population are engaged in trade in consumer products, banks, pharmacies, gas stations, auto repair shops, freight, etc., centred on bigger populations.
e) In the tertiary sector the construction has particular relevance, activated not only by demand for the permanent population, but by the summer population or weekends, and the opening of new hotel establishments. Although recession has been considerable in recent years, remains a relevant activity.
f) The tourism sector linked to the enjoyment of nature is one that has experienced the greatest increase in recent years. Entering service many new catering establishments offering accommodation to tourists in the municipalities of the region, Most of these new facilities have been financed by the Program "LEADER PLUS Alto Tajo-Molina de Aragón". Has also increased during this period the number of companies of active tourism in nature (canoeing, diving, hiking, climbing, horse-riding, etc.), Established in the area.
g) Eolic parks, Extend in recent years in the north area of Molina and Alto Tajo, the electric wind generators has become a notably money input for small villages and his maintenance, a source of jobs for the whole territory

D.2. Existing and planed facilities in the proposed Geopark

D.2.1. Education

Educative centres of Molina and Alto Tajo:
- CEIP Virgen de la Hoz. College of kindergartens and elementary schools located in Molina de Aragón.
- IES Molina de Aragón Institute of secondary school located in Molina de Aragón.
- Sexma de la Sierra Rural Centre, located in the town of Checa, is a primary educative centre.
- Villel de Mesa Rural Centre, located in this county, centre of kindergarten and primary school.
- Centre for Adult Education Río Sorbe, located in Molina de Aragón.
- A seat of the National University of Distance Education
- More than 30 facilities for outdoor sports towns scattered among which the Municipal sports Molina de Aragon track, covered and covered pavilion.

D.2.2. Tourism

One line of work in which more has been done in recent years is to promote geotourism and nature tourism. Proof of this is that Alto Tajo Natural Park completed the September 12, 2009 accession to the European Charter for Sustainable Tourism (see Annex 8). This prestigious European accreditation involves a commitment to lead the protected area tourism development in the area to ensure their sustainability and opting to several financing of tourism.

EUROPARC FEDERATION
EUROPEAN CHARTER FOR SUSTAINABLE TOURISM IN PROTECTED AREAS

Molina District Museum

Corduente Visitors Centre (Alto Tajo Natural Park)

Note that the as result of these efforts, in the last ten years have been discharged 18 rural hotels, 16 rural apartment complexes, 2 hotels, 7 restaurants and 5 active tourism companies. Most have been impulse by the Regional Government, either through rural development programs or line of support for business initiatives.

The area features the following accommodation facilities:

Groups of rural houses	23	Bed and Breakfast inns	1
Apartment complexes of rural tourism	13	Camping	1
Rural Hostel	2	Campament	1
Lodging	2		
Hotel	2		

Business associations and tourism outreach and interpretation
In the area there are two tourism associations and / or active tourism.
- Rural Tourism Association of the District of Molina de Aragón (ATRAMA): territorial association comprising the LEADER group of Molina de Aragón and the Alto Tajo Natural Park. Represents a large number of business and tourism activities in the region being in a period of expansion. It was founded in 1995.
- Association of active tourism companies Alto Tajo Natural Park: integrates active tourism companies and nature tourism with tax domicile in Alto Tajo Natural Park and its peripheral protection area.
Both associations are represented on the Advisory Committee's socioeconomic Geopark.

Recreational facilities
The area has a large infrastructure of recreational facilities, but has a patchy distribution in the territory; it is concentrated mainly in the south of the Shire. Precisely one of the Geopark Molina-Alto Tajo project objectives is giving greater facilities to the north and balance the distribution, although in the south are concentrated higher environmental values. In total, the area has:

- An comarcal Museum
- 4 Visitors centres
- Celtiberic Local Museum de in Herrería.
- 2 Urban Tourism office
- 11 Self- guided Geo-routes
- 15 Local Routes
- Recreative Areas
- 12 Panoramic Viewpoints
-15 Tematic Routes
-3 Touristic information points
-9 Touristic camps

Equipment currently being launched by the Ministry of Environment, Rural and Marine is the Natural Track of the Tagus River. This project has created a topoguide, an audiovisual and adequacy of a journey of a thousand Kilometres long that runs along the Tagus River from its source to its mouth in Lisbon (Portugal). This road does, therefore, natural link between de Molina-Alto Tajo and Naturtejo Geopark (Portugal), so that two different countries Geoparks are bound by the same river and a road that connects them.

D.2.3. Geoturism

In the region of Molina and Alto Tajo there´s a great number of routes and way marked attractive to have access to knowledge of their natural heritage. We highlight the following.

Geo-routes of Molina and Alto Tajo
This plan begins in 2006 when it launched the project Geo-routes of Alto Tajo Natural Park, which aimed to provide this protected area of a set of geological interpretation resources, among them: Signposted routes with interpretative displays, experimental areas, leaflets with more complete information, a geological guide Alto Tajo Natural Park and guided trips by geologists trained in outreach.

These geo-routes have grow in 2012 joining the Caldereros Range and Mesa River Valley ones, so that today the Molina and Alto Tajo is equipped with this type of scientific infrastructure. As a result of the project, the District of Molina now has 11 routes with self-guided geological interpretation displays (with a total of 150 kilometres and 108 stops equipped with panels and plates), a collection of ten leaflets to visit these routes and diverse geological

information in the four visitors centres of the Natural Park and Museum of Molina. So do designed itineraries to tour the main geological features of the region comprise its genesis and its importance that can be explored on foot or by car, with most of them mixed. Many of the routes begin or end in recreational areas or villages with geotourism services which facilitate the logistics of the visit.

The Geo-interpretative trails are a resource that has had great success with a significant impact on the local media, regional and national levels. The leaflets have been reprinted three times (with a total of 200,000 copies) and the first edition (2,500 copies) of geological guide is exhausted and ha been re-editing (another 1,000 copies). In addition, the Geological Guide Alto Tajo Natural Park, received an international award that recognized his quality science book and has been reissued by the Geological Survey of Spain in 2012. The project Geo-rutas of Alto Tajo Natural Park is a reference to the outreach of the geology through which promoters are often interested territories disclosure EGN members. So now the Molina and Alto Tajo area, is a national reference in relation to the diffusion of his geological heritage, performing visits and excursions to see the initiatives launched at conferences, seminars, courses and trips for doctoral scientific geological societies.

Geological Bike Route of Molina and Alto Tajo.
Plotted and launched during 2012, has roadbook available in tourist information points of the region. This way linking, over 300 km, the geological attractions highlights of the territory. It has been designed so that also makes it attractive in motor vehicle (respecting current legislation) and walking.

Official routes and viewpoints framework
There are 11 general visiting routes and 12 panoramic viewpoints, created from 2004 and was intended to trace the sequence of varied landscapes that make up the region of Molina and Alto Tajo. They are equipped with signage and interpretive panels and some interpretive brochures have environmental values of the route.

Information Points
There are six permanent tourist information points: In Molina de Aragón are two tourist information offices in addition to the Museum of Molina, where among other services offered to visitors is this information.
Other data points are in the villages of Peralejos de las Truchas, Poveda de la Sierra and Ocentejo. All of them are available to both visitors and local people about the natural values of the region and supply routes and operates there, the tourist infrastructure, and delivery documentation such as leaflets and other publications.

Local Routes
There are 13 routes that have a route home pane which explains the features of it and are marked with beacons of white and green colours. Some of these routes have interpretive panels along the route and leaflets explaining the natural and ethnographic values.

Thematic routes
They come in two types: ethnographic and fauna.
The first buildings near the visitor linked to traditional uses developed by the locals as salt, huts, farrowing or lime ovens.

Tagus River Natural Track
Itinerary with diverse equipment as panels, directional beacons and pedestrian bridges among others, lets go all the channel of this river from its source to its mouth in Lisbon.

Camino del Cid
Route theme that runs through the medieval historical sites related to the exploits of this historical figure.

Activities program
The Museum of Molina and Alto Tajo Natural Park promotes numerous environmental free activities aimed to disseminate environmental and cultural values of the region. Many experts have collaborated in the development of

the environmental agenda. Have involved more than 3,000 people on the period 2008-2012. Notable scientific dissemination events and guided tours, in which the specialists who develop scientific research work explain to citizens the object of its investigations, the activity and the results obtained. Also scheduled guided tours, workshops and conferences.

Alto Tajo Natural Park Visitors Centres
Strategically located, have a threefold objective of disseminating and interpreting environmental values of the park, assisting and informing visitors and develop awareness and environmental education.
- C.I.N. Dehesa de Corduente: The reference centre and was opened in 2006. Audiovisual room features a permanent exhibition, temporary exhibitions room for workshops and diverse geological information.
- C.I.N. Sequero de Orea: Opened in 2007 and focused on traditional uses as a tribute to the inhabitants of the reserve. It has a permanent exhibition and audiovisual room.
- C.I.N. Zaorejas Tagus River: Opened in 2009, dedicated to the Tagus River from its source in the Universal Mounts to its mouth in Lisbon.
- Museum of Traditional Livestock Alto Tajo of Checa: Opened in 2009, has a permanent exhibition and audiovisual room.

Environmental volunteer programs of Alto Tajo Natural Park
With the Spanish Ornithological Society (SEO), with the conservation partnership "Rivers for Life" and the prison of Alcalá-Meco.

Museum of Molina
Museum aimed to describing the life and environment. Contains galleries of palaeontology, archaeology, human evolution and wildlife. It is supported and managed by the Museum of Molina Cultural Association, cultural institution since its founding in 2000, also promotes a great number of activities aimed at the valorisation, dissemination and preservation of natural and cultural heritage (see Annex No. 4)

Geopark Visitors Centre
In order to develop the activities of the Geopark, is considered essential to have one or several locations that can function as the administrative headquarters of the same, as well as place of activities focussing and generator. For now, have a Geopark Museum (Museo de Molina) and a Geopark Interpretation Centre (Corduente). Currently, the Museum of Molina is restructuring its facilities in the San Francisco Monastery, in order to have specific facilities for a new visitors centre, which is estimated process require a minimum of two years.

Recreational facilities (accessibility for disabled and conditioning)
The Comarca de Molina has interpretive material adapted for disabled:
- The four centres are adapted for blind interpretation and are wheelchair accessible
- The viewpoint of the Tagus, one of the most visited, is equipped to be wheelchair accessible and panels are prepared Braille inscriptions blind people.
- There is a natural park braille leaflets for blind
- The Museum Molina is undertaking a review of its facilities to suit disabled visitors.

Audiovisual equipment and graphics

The area has the following audiovisual equipment and graphics to promote ecologic, geological and / or cultural tourism:

- Edition of 8 newsletters Natural Park (between 8 and 14 pages) with a circulation of 7,000 copies and a digital version for emailing.
- Bulletin monograph (2008) interpretive resources existing in the Nature
- General Information Leaflet Natural Park

- Leaflets of nine routes Geo-specific brochures for each of the Geo-routes
- Leaflets of Monumento Natural de la Sierra Caldereros
- Natural Geological Park Guide (267 pages)
- Guide threatened interest flora of Natural Park (296 pages)
- Book "The Alto Tajo Natural Park in Pictures" (131 pages)
- Overview leaflet routes and park officials six booklets specific interpretation of the environmental values of the routes
- Once popular leaflets of natural and cultural values of local routes in the Commonwealth of the Sierra
- Leaflet of chozones sabineros
- Leaflets wildlife
- Bloc Tourist information of tourism resources of the area
- Environmental education Notebook
- Four videos about the Alto Tajo Natural Park of 90, 12, 6 and 8 minutes
- Didactic Guide of Molina Museum

Visitors affluence Information

There´s no specific visitors data to the territory of the Geopark, since it is a very large area and there are no control systems. But information is available for visitors to the National Park, showing a notable increase in visitors since the creation of the reserve. Furthermore data are available to the visitor interpretation centres. For example, for 2009 data points attended an average of 38 people by opening day, visitors being Poveda Centre: 5,800, that of Peralejos 7227, and the 1745 Ocentejo. Meanwhile Molina Museum receives an annual average of 7,000 visitors.

D.3. Geoturístic potential analysis

The potential for geo-tourism in the Shire of Molina derived from the following circumstances:

- The rich geological heritage, natural and cultural that this region, described in section B.

- Extensive tourist infrastructure, described in Section D.2

- In the vicinity there are relevance tourist attractions for visitors whose could reach this region. These centres are:

- Monasterio de Piedra, located in the province of Zaragoza, about 60 kilometres far to the north, is a destination of religious and natural that receives an average of 500,000 visitors every year.
- Enchanted City of Cuenca, located about 70 km. to the south in the province of Cuenca, is a tourist destination that receives natural character 450,000 visitors per year.
- Cuervo River Source in the province of Cuenca.

-It is in a major arterial road connecting the centre of the peninsula with the East Coast.

- **The climate** of this region is a powerful attraction during the summer for its cool temperature, attracting visitors seeking refuge from the high temperatures reached in the surrounding cities.

- **The roads have improved in recent years** to the point to say that this region is close to cities such as Madrid, Zaragoza, Valencia, Cuenca and Soria.


Monasterio de Piedra (Zaragoza)


Source of "Río Cuervo" (Cuenca)


"Ciudad Encantada" (Cuenca)

Despite the abundance of resources and extensive geotourism provision of infrastructure and facilities for the visitor's attention, Molina and Alto Tajo receives a minor tourist influx to other locations with similar potential, the work team for Geopark Project of Molina and Alto Tajo County a auxiliary project of analysis of the reasons for this low number of visitors in order to design a comprehensive program to correct the causes of the deficit and undertake the necessary actions for achieve the expected tourist influx. The integration of the region of Molina and Alto Tajo in the European Geoparks Network can provide the necessary tourist attraction to increase the number of tourists driving the economy of the region while also promoting interest in the natural environment.

D.4. Overview and politics for sustainable development

D.4.1 Geotourism and economy

Since the enactment in 2005 of the Law for Sustainable Rural Development, Ministry of Environment Rural and Marine, and the implementation of Local Agenda 21, all competent authorities in the region of Molina have adopted the sustainable development as a model for economic policies and revitalization of the region.

Structures for sustainable development
The development plans in the Comarca of Molina de Aragón and Alto Tajo are based on the existence of several funding systems of public source, which enables to boost different plans and initiatives.
The Main sponsoring sources are:
-at communitarian level: The European Union
-at national level: The central administration of the State
-at autonomic level: "Junta de Comunidades de Castilla la Mancha" (Castilla-La Mancha Council)
-at provincial level: "Diputación provincial de Guadalajara" (Guadalajara Council)

The funds from the European Union Grants they are framed within a series of programmes already working with the target of improving living conditions in the rural areas. Among which the most remarkable are FEDER (European grants for rural development) and LEADER funds both of them related to the Geopark.
The Axis 4 LEADER plan is truly significative being managed by Molina de Aragón-Alto Tajo´s rural development association as a result of an agreement with the "Consejeria de Medio Ambiente de Castilla la Mancha". This entity is made up of a profitless local action group which promotes a comprehensive development of the shire by allocating these grants properly.
The Geopark´s territory exactly coincides with the area under LEADER programme in the Comarca of Molina in the Alto Tajo.
Its activity dates back to 1992 when Leader 1 plan (1992-1995) was carried out by the "Mancomunidad de La Sierra", this meant a new concept of thorough development. The latter was followed by Leader II (1995-1999) managed by the "Comunidad del Real Señorio de Molina y su tierra" and eventually Leader + (2000-2006). The result of these programmes was totally satisfactory as they have backed up many businesses and many jobs have been secured as well. Currently this association is working on the Rural Development programme 2007-2013.
Molina de Aragón-Alto Tajo´s rural development association, which belongs to the Socio-economical Advisory Committee (as a advisory body and as coordinators of such committee), manages these grants through its executive committee which is its decision making body comprised of representatives different economical, social and political sectors within the territory.
At national level. The central administration of the state passed by Royal Decree 752/2010 4th of July, the practical implantation of the law 45/2007 13th of December which deals with sustainable development in rural areas. In order to start it Castilla-La Mancha has been divided into 29 zone plans, which will be the tools for planning the measures and actions to be carried out along with Rural Development groups. 13 rural zones have been deemed as top priority as they require prompt boosting action. The "Comarca de Molina de Aragón-Alto Tajo" is one of these and it coincides 100% with the Geopark´s territory. The Geopark´s Territory is thus one of these 13 priority zones to be boosted by rural development grants. The Geopark can allot these funds towards Geotourism promotion as a potential tool in terms of local development.
At autonomic level, the rural development grants coming from the Autonomous Government of Castilla la Mancha materialize themselves through different programmes. The most remarkable of these programmes is that of FORCOL (Regional funds for local cooperation) aimed at both rural development and its economical dinamization. During 2010-2012 54 millions of euros will be invested to ease up investment on productive economy and thrift in councils. Besides, to carry out the aforementioned rural development plan both Castilla-La Mancha and central´s government, through the Departament of Enviroment (in Spanish Medio Ambiente y Rural y Marino Departament) intend to devote almost 226 millions of euros, co financed at 50 per cent basis during 2011-2015. The state will add up 2.8 millions of Euros to this amount for general interest rural infrastructures.

At provincial level, The development strategy approach is shaped by the implantation of "Agenda local 21" in Molina de Aragón and Alto Tajo. Agenda Local 21 constitutes an ever improvement process which sources from the local development opportunities, it encourages the citizen participation and aims to achieve social justice and equity in the Town. It is an integral management tool based on sustainable development, which caters for all the local needs without mortgaging other areas´ development capabilities and/or future generations. It also envisages improving the organization of the Towns and providing the citizens with services through a working schedule which involves and

benefits everyone. This Plan is complemented by belonging to the Web of Sustainable Cities and Villages in Castilla la Mancha which constitutes an agreement and coordination tool for implantation of the Agenda Local 21 criteria.
The "Diputaciones provinciales" (Provincials councils), being a council coordinating body must promote the Agenda Local 21implementation in their Towns, their specific functions for belonging to the web are the following:
Being a highly depopulated area, comprised by small villages clustered in "Mancomunidades de Servicios", the Agendas 21 have been carried out in a joint way although once the Action Plan has been established this have been passed by each council locally.
As of today there are the following mancomunated local and joint Agendas 21 in the Comarca:

-Molina de Aragón
-Mancomunidad La Sierra
-Mancomunidad Alto Tajo
-Mancomunidad Rio Gallo
-Mancomunidad Sesma del Pedregal
-Mancomunidad Campo Mesa (Its Action Plan still in process of creation)
-Mancomunidad Sierra Ministra
-Mancomunidad Tajo-Dulce (Some of the Towns)

The "Diputación Provincial de Guadalajara" (member of the Board of Directors of the Geopark) supports this process through engineers belonging to Advisory Firms and also through Agenda 21 coordinators hired by this administration.
The "Diputación Provincial de Guadalajara" has mainly contributed by providing qualified personnel to carry out the necessary activities for the proper operation of the Towns. It also collaborates to manage grants provided by higher institutions.
The "Diputación Provincial de Guadalajara" also supports economically through agreements with councils or Mancomunidades to implement any kind of project that improves the daily life of the deprived rural areas´ inhabitants. (See annex 4)

Sponsorships

There is a "Fondo Verde" within the natural protected spaces. This is a sponsorship line aimed to carry out Works, the betterment of infrastructures and urban nucleus embellishing and promoting sustainable development initiatives in firms, councils and associations following the management guidelines for natural protected spaces. Ever since its beginning in 2005 more than 4,5 million euros have been allocated in the Alto Tajo Natural Park (Figure 21) and Caldereros´ Range, (see annex 7).

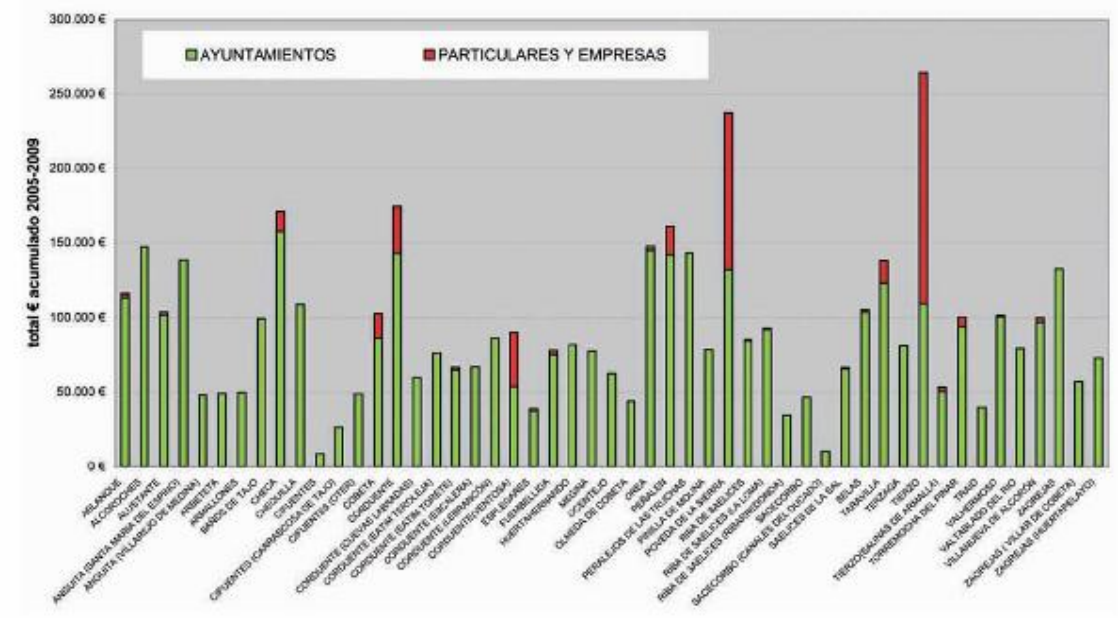

Figure 21 "Fondo Verde" aid founds for Alto Tajo Natural Park municipalities

New initiatives

The team for the Geopark candidacy has had several meetings with businessmen from the region to analyse the tourist and explore improvements. These meetings have detected the possibility of improving the service offered to visitors in certain aspects, we emphasize the following:

Marketing in general and products related with the environment in particular that have arisen actions aimed at catering establishments provide a variety of products ranging from clothes, small items like key chains, ornaments, sweets and other and souvenirs like pastries inspired in motifs taken from historical and natural heritage.

Traditional cuisine, for completing catering establishments with traditional recipes inspired by the products of this region.

Tourism services. Employees of accommodation and tourist companies maintain a close relationship with visitors so it is appropriate providing them with adequate training and media such as leaflets, guides and other graphics to offer visitors of the region of Molina and Alto Tajo for give full attention to both such as native clients who are interested in the assets of the territory. For this will be developed a Revitalisation Geotourism Plan of training activities coordinated by Museum of Molina.

Promotion Geotourism Plan of Molina and Alto Tajo. Being responsible for him the Cultural Association of the Museum Molina by agreement signed with the Municipality of Molina de Aragón and the participation of Provincial Council will try to determine the nodes and tourist Geo-routes structured for making provision of catering establishments laying the groundwork for the development of a digital platform to manage the stocks and flows of visitors.

The Municipality of Molina will be released soon a contract for **exploitation of hotel Palace of "La Subalterna"** this will consolidate touristic services in the Molina town.

Exploitation of Resin. Guadalajara Council has established a new operating revitalization plan for the exploitation of pine resin, that beginning in the territory of the future Geopark, raises again the traditional use of this resource.

Truffle, climate and frequent calcareous substrate of Molina and Alto Tajo area make it an ideal ground for the cultivation of this fungus. For several years the Local Action Group Molina and Alto Tajo Development Association promotes the "Truffle of Castilla - La Mancha" program to enhance the recollection, cultivation, commercialization and introduction into the cuisine of the region.

This program includes various lines of work:

- Information days in which information is provided free to all interested in this product.
- Training through courses on farming techniques, optimization of operations, administration and support of geographic information systems that provide data for the potential of the plots and croplands.
- Courses on gastronomy.
- Research for the improvement of this agricultural activity.
- Creating Regional Truffle Observatory of Castilla - La Mancha, to carry out monitoring of the sector.
- Truffle Fair of the Comarca de Molina, days in which you perform various activities related to this product as tasting, collecting and breeding competitions.

Bee honey is another traditional product of the region in diffusion, which production is boosting from various government as the province's flagship product.

Interregional cooperation program "Abraza la Tierra" (Embrace the Earth) This program involving 18 local action groups of five regions, including the District of Molina, aims to combat the lost of population of rural areas, attracting new residents. Contains several action lines:

- Creating a network of offices host.
- Creating a web page.
- Drafting of a of good practice manual against depopulation.
- Develop a resource inventory.
- Dissemination for the population.

D.4.2 Geo-education

The Cultural Association of Museum of Molina, holds several plans to collaborate with educational institutions of the region, with the aim of both geosciences literacy of the school population and the general population as well as the dissemination of the project of Geopark.

We highlight the following:

Formal Education

In the region of Molina is provided primary, secondary and adult education in a way that meets the demand for these levels of education by the population through the following schools:

-CEIP Virgen de la Hoz. College of kindergartens and elementary schools located in Molina de Aragón.
IES-Molina de Aragón Institute high school and high school located in Molina de Aragón.
- Grouped Sexma Rural Centre of Sierra, located in the town of Checa, taught primary education.
- Grouped Villel Rural Centre Board, located in this county, taught kindergarten and primary
- Centre for Adult Education "Río Sorbe" for adult people.

Molina Museum promotes a advising program to schools for introduction of the geology of the region in the curricula taught. This program began in the 2011-2012 academic year with a series of lectures and symposium about the geological heritage came from this territory for teachers, continuing a series of field trips to give the opportunity to learn firsthand that wealth, this is particularly interesting for they, because mostly of them come from other counties and provinces. The previous days were completed with round tables where arise some interesting ideas about the introduction of geology, both directly in the traditional science subjects as transversely in other like arts, body language, etc.. It is anticipated that during the 2012-2013 academic year, is put into practice these proposals to the geology of this region, either directly or as a base for other content, is part of the training of students of this school, we highlight the following concrete actions:

Teachers. The introduction of the geology in the training should start in teachers, as they are teachers who have contact with pupils, know their capabilities and develop the work of transmitting knowledge. For this we organized a series of lectures and symposium was for introduce him in the rich heritage of the region, often ignored by teachers because of their foreign origin and were visited archaeological and geological outcrops. Emphasize collaboration between the Museum of Molina and the Association for the Teaching of Earth Sciences (AEPECT) with the aim of improving the education provided on geosciences by educational centres, that based on the optimal conditions that this region offers, maintains a program for the development of educational activities for teachers in the field of Molina and Alto Tajo.

Secondary education. Curricula will be revised to enrich didactic with elements taken from nature of the region in the subjects related to the Earth sciences. Local history will be included in the subjects of history and texts about the region in the language subjects. Also studying how to introduce such elements geology elements in the other subjects and make field trips to the outcrops of the region.

Primary Education. Complete the subjects related to the environment with examples from the region, workshops and plays with items related to geology and field trips make them get in touch with nature and use items related to natural and cultural heritage as models in the subjects of plastic subjects.

Adult Education. Preparation of graphic documentation that offers a complete vision of the cultural and natural heritage of the region and organization of field trips to meet him with this spots.

Tutoring university courses. For students of tourism arts, sciences and history related studies through agreements signed with major universities.

-It also offers guided tours of the many places of scientific and / or cultural benefit to students and teachers of both schools in the province of Guadalajara as other next. The number of schools that have requested this service has grown significantly in recent years.

-Inclusion of Regional Museum of Molina in the Resource Educational Guide of Guadalajara Province, as of this year. Thus the visit to this museum will be part of the extracurricular activities of all schools in the province of Guadalajara.

Non-formal education

The Museum of Molina held every summer, since several years, an outreach program of natural and cultural heritage of the region by taking advantage of the influx of people who are results from the festivities, this program of activities includes:

Mobil Exhibitions of Molina Museum on fauna, palaeontology, entomology, geology and archaeology, disabled accessible.

Conferences and lectures - symposium about the heritage of the region and an introduction to geology as a basis for understanding what this heritage means for human culture and complement the information provided in the exhibitions.

Workshops on recognition of fossils, minerals and making reproductions for children and adults, carried out both at the Museum of Molina and in the villages of the region.

D.4.3 Geologic heritage

Museum of Molina undertakes the integration of natural and cultural heritage in sustainable development of the region through four lines:

1 Inventoried

The geological heritage of Molina and Alto Tajo is wide and its interest is due to various aspects such as the scientific, educational, recreational, anthropological, etc.

It calls for a comprehensive work of inventorying, cataloguing and characterization to make available a list of the community with detailed information about each LIG involving many scientific disciplines interested in this heritage as a source of information and outcrops required.

The task of inventorying of these places of geological and archaeological interest has been made in the protected areas of the region as Alto Tajo Natural Park, but in the rest of area, there are no official data of existing geological elements, although the Molina Museum has an inventory of geological attractions available upon request.

2 Geoconservation

Similar to the inventory, the work of geoconservation have performed satisfactorily in protected areas, but is less advanced in the rest of the region. In these spaces this work has been collected in the use and management plans of space that have implemented rules that ensure the proper preservation of these places of geological interest. Sometimes to complete the effectiveness of this legislation has been necessary to construct physical barriers as in the Dropstone of Checa. In the area of the region not equipped with protective figure, the Museum of Molina Cultural Association promotes geoconservation measures of both standards consistent use of certain spaces as installing physical barriers where the fragility of the elements of geological advice. In the last year we have made significant progress in the protection of the fossil forest of the Sierra de Aragoncillo and Fuentelsaz GSSP.

3 Support for research

Many scientific institutions have developed and develop today geological investigations in the area (see annex nº10), notably the following:

-Spanish Geological Survey (IGME)	- Consejo superior de Investigaciones Científicas (CSIC)
- Faculty of Geology of the University Complutense of Madrid	- Faculty of Geography History de la University Complutense de Madrid
- University Politecnic of Barcelona (UPB)	- Institute Pirenaic of Ecology
- University of Zaragoza	- University of Alcalá de Henares (UAH)
- Centre UCM-ISCIII of Human evolution and Behaviour	- Faculty of Geography of University Autonoma of Madrid

It is important to note that this region has one of the oldest geological history studies in Spain. In fact, the first texts that refer to some aspect of the geology of the region date back to the mid eighteenth century, thanks to the various paleontological discoveries (and mineralogical) made by the religious José Torrubia, which were published in his popular work "Apparatus for Natural History" (1754). This work is considered as the first treaty of Spanish palaeontology and it highlights the discovery of remains of various groups of marine organisms in the vicinity of the town of Molina de Aragon, among others. It also describes the finding of "a series of reddish coloured hexagonal crystals found around Molina de Aragón", what is now known as aragonite whose type locality is in the territory of the proposal Geopark and received its name around the world in honour of Molina de Aragón.

A century later, in 1851, Verneuil et al. describe the discovery of several species of trilobites in Pardos shales as *Calymene tristani, Calymene Arago* and *Placoparia tourmeminei*. Furthermore, Verneuil and Collomb, cited in a 1853 publication, the discovery of graptolites in the vicinity of Checa. In the late nineteenth century highlight the works of Salvador Calderon and Carlos Castel. The first (1874, 1897 and 1898) provided important data regarding the geology of the region, such as the discovery of traces of *Cheirotherium* in Triassic materials in Molina de Aragon, and report about the first profiles of Molina de Aragón Lias and the existence of stratigraphic levels attributed to the Carboniferous period. In addition, Castel (1878 and 1881) refers in his articles, various fossil finds in Triassic sandstones in the vicinity of the town of Rueda de la Sierra.

In recent decades have developed numerous works within the region of Molina and Alto Tajo, all related to specific aspects of the regional geology. There are many articles and research papers focused on the region (see Annex No. 9). We highlight those made by Gutierrez-Marco in lower Palaeozoic and Antonio Goy for Jurassic in leading to recognition as GSSP a section of Toarcian - Aalenian of Fuentelsaz.

As a result of these investigations, in the region of Molina are described the type sections of a large number of stratigraphic formations of reference for the whole Iberian Range, include:

- Formation “San Marcos”, middle- superior Ordovician.
- Formation “Ojos Negros”, Upper Ordovician.
- Formation “Orea”, Upper Ordovician.
- Formation “Los Puertos”, Upper Ordovician - Lower Silurian.
- Formation “Bádenas”, from lower Silurian.
- Formation “Capas de la Ermita”, from Permian.

- Formation “Montesoro”, from upper Permian.
- Formacion “Conglomerados de la Hoz del Gallo”, from upper Permian - Triassic.
- Formation “Areniscas de Rillo de Gallo”, Triassic.
- Formation “Nivel de Prados”, from Triassic.
- Formation “Areniscas del Río Arandilla”, Triassic.
- Formation “Limos y Areniscas Abigarradas deTorete”.
- Formation “Calizas Tableadas de Cuevas Labradas”, from Lower Jurassic.
- Formation “Cerro del Pez”, Lower Jurassic.
- Formation “Turmiel”, Lower Jurassic.
- Formation “Calizas del Pedregal”, Middle Jurassic.

In recent years, Molina and Alto Tajo has emerged as a reference for field education of earth sciences, their outcrops have been mentioned in numerous symposia, conferences and scientific meetings and often were visited as the XV Symposium on Geology Teaching held in July 2008 in Guadalajara or Geoschools meeting in June 2012.
The Museum of Molina Cultural Association maintains a program to support research in collaboration with universities of Alcala de Henares, Madrid and Zaragoza to facilitate travel, accommodation and field work of those researchers who do their work in the Molina and Alto Tajo.
Also noteworthy are the following agreements signed by the Association of Friends of the Museum of Molina with different universities:
- Educational cooperation agreement between the University of Alcalá de Henares and Museum of Molina Cultural Association.
- Agreement for the development of educational cooperation programs between the University Rey Juan Carlos I and Museum of Molina Cultural Association.
This association in collaboration with the Museum of Natural Sciences of Madrid is conducting the first scientific paleontological excavation carried out in the region on a outcrop of Miocene mammals.
Another of the initiatives promoted by the Museum of Molina is creating a database of scientific articles published by authors who have studied this region to serve as a reference for finding scientific information of the region, both geological as biological and archaeological.

4 Dissemination
The Association of Friends of the Museum of Molina Conducts information to establish bridges between the scientific community and the local population in which play an important role the local media. This work takes the form of lectures, exhibitions and field trips that make accessible the scientific discoveries being made in the region to the population, with the necessary adaptation of the language work to get arouse interest in the earth sciences and awareness the natural and cultural heritage. This task involves awareness raising and training to avoid the obstruction of scientific work by the visitors, can involve disagreements between the two groups.
The Museum promotes Molina editing several publications among which Nautilus Magazine, annual scientific publication and paleontological Guide Middle Ordovician Trilobites of Castilla - La Mancha and collaborations in other reference on the regional geology as the book Geology Guadalajara de Calonge and Rodriguez 2008.

D.5. Policies for, and examples of, community empowerment (involvement and consultation) in the proposed Geopark

For several years the Museum of Molina promotes an outreach program, enhancement and sustainable use of natural and cultural heritage of the region of Molina that includes several lines of action:

In collaboration with the Coordinator of Cultural Associations of Molina and alto Tajo which brings together more than 50 cultural organizations based in the municipalities of the region, will perform a great number of activities with the aim of spreading the rich heritage, guidance on its use and illustrate about the Geopark project, the main activities are:
Conferences, lectures and symposiums. Experts in geology, archaeology, biology and art of museum presenting lectures on Museum site and in villages, taking advantage of the population increase that occurs on the occasion of the summer celebrations.
Museum of Molina Travelling Exhibitions performs environmental exposures, palaeontology and archaeology available to municipalities, associations and any institutions that request with the intent to promote the science and culture of the region.
Documentary filmmaking about environment and culture related to the region.

Workshops organized in the premises of the Museum of diverse topics but with the common denominator of promoting familiarization of the participants with the natural and cultural heritage.

Media, Molina Museum maintains a partnership with different media in order to achieve a presence of issues of the region. The presence on various websites, newspapers and, especially, "Acotenas por la Radio" radio show , in which one day a week for two hours stars the Geopark Project Molina County.
These activities seek to alleviate the leak of well knowledge that existed towards the natural heritage by visitors and the local population, as well as the possibilities this offers heritage for sustainable rural development, this situation is being corrected by the above initiatives, integration into the EGN would move to a new framework of knowledge, participation and sustainable use of resources of the region.

Collaboration agreement with Municipality of Sigüenza
Molina Museum's collaboration with other cultural institutions has transcended the boundaries of the District of Molina with the signing of a cooperation agreement with the municipality of city of Sigüenza for the creation of a new archaeological museum in this town.

D.6. Policies for, and examples of, public and stakeholder awareness in the proposed Geopark

Collaboration with ATRAMA
The main institution representing hospitality companies in Molina and Alt Tajo is the association ATRAMA (Rural Tourism Association Molina and Alto Tajo) founded in 1995. Molina Museum maintains a program to show members of this association the natural and cultural heritage of the region and show its potential for use as a tourist resource and improve the service offering to customers. Within this program is highly relevant the involvement of this business people in the Geopark project for taking part in the economic benefits that may result from such involvement. This is a series of conferences scheduled for guidance about European Geoparks Network.

Workshop of Geology and Archaeology for Environmental Agents
The Museum of Molina has detected some leaks in the training of environmental agents of Molina and Alto Tajo in essential aspects like geology or archaeology, in order to correct this anomaly, since 2011 will offer lectures, workshops and field trips with, In order to form this group in these areas as well as introduce them to the European Geoparks Network and the integration project of Molina and Alto Tajo.

Virtual Tourist Portal of the Shire of Molina
The Museum of Molina is working on creating of a website that integrates all tourist services in a coordinated way for Molina and Alto Tajo, with the objective of making available to the visitors an internet website that serves as a reference for planning the stay and leisure in the region. This page collect both the supply of hotel services as the cultural and entertainment available resources, thus proving useful for planning the holidays of visitors to serve as a unified notice board for all events taking place in this territory. It should have a section of suggestions that would help improve services.

E. INTEREST AND ARGUMENTS FOR JOINING THE EGN/GGN

E.1. Benefits for Molina and Alto Tajo

Geology and geoconservation

- Strengthen scientific and outreach activities that perform both the Alto Tajo Natural Park and the Museum of Molina de Aragón.
- Create an administrative structure that works for coordinate the activities of the Alto Tajo Natural Park and the Museum of Molina de Aragón.

- Extend the benefits of geological heritage well management of the Alto Tajo Natural Park to the territory situated in the north of the Molina and Alto Tajo area.
- To ensure the preservation of unique geological sites outside protected areas.
- Promote social and municipal participation in geoconservation.
- Establish further links between the scientific community, the scientific and cultural heritage of the area and local people.
- Developing relationships between geological heritage, natural and cultural.
- Complete a stage promotion of geological heritage started ten years ago by the alto Tajo Natural Park and the Museum of Molina and start a new under the axis of the European Network of Geoparks.

Geo-tourism and sustainable development

- Publicize the exceptional geological heritage of the region and its potential use to promote tourism.
- Create an organizational structure firm and consolidated with the participation of governments, scientific groups, and neighbourhood associations and entrepreneurs to seek common goals of conservation and tourism promotion.
- Provide the territory of an important resource based tourism promotion geotourism, leveraging existing infrastructure and promoting numerous creating new ones.
- Create new job opportunities in the region through the creation of an infrastructure for dissemination and promotion of geological heritage, natural and cultural, as well as continue the training of entrepreneurs and professionals in the area of tourism.
- Promote the development of tourism infrastructure in the north and east of the Shire, which are less abundant.
- Start the Geopark Visitor Centre, as a distributor of information and activities.
- Create a Geopark that, because of its location, act as link between the north and south Peninsula Geoparks, and between the Spanish and Portuguese Geoparks.
- Establish effective links with Naturtejo Geopark (as more akin Geopark), as both are linked by the same river and a nature trail that connects them, trying to implement territorial cooperation projects with it.

E.2. Benefits for the EGN/GGN

- Offer to European Geoparks Network a territory with a exceptional historical record land, which are clearly preserved the main events of the geological history of this region of the planet from more than four hundred million years ago to the present. Also, provide an area in which there is a series of archaeological sites documenting the settlement of the various human cultures, from the Palaeolithic to the present, showing in great detail its evolution, the relationship between human beings and the natural environment, and the dependence of its cultural roots and lifestyles of the geology, placing it in its global context. Therefore it is an area suitable for realizing the goal of Geopark Network of place the human being on his historical, evolutionary, geological and environmental context.
- Geological materials, archaeological outcrops and environment features of Molina and Alto Tajo are present in optimal conditions for scientific study and for dissemination to the public, because their excellent preservation, accessibility and geotourism resources that accompany them.
- Publicize the exceptional geological heritage of the region to the rest of the network
- Meet and share experiences applied elsewhere on geoconservation, disclosure and geotourism
- Establishing effective linkages with the rest of the Iberian Geopark
- A vast territory with remarkable geodiversity
- High quality geological informative material, recognized with international awards (See annex nº4)
- High quality facilities for dissemination and promotion of geotourism, and operational experience in the last seven years.
-Integrate in the European Network of Geoparks two institutions like The Alto Tajo Natural Park and the Museum of Molina with resources, infrastructure and experience in preservation, dissemination and enhancement of natural and cultural heritage, as well as in supporting the research.
- Integrate the European Geoparks Network are the two institutions as the Alto Tajo Natural Park and the Museum of Molina with a recognized and prestigious career in the promotion of sustainable development of the region. In the case of the Park, to function as a Geopark for 12 years, the results of his work are visible in terms of economic dynamism based on sustainable resource use.