

# Techniques & Societies

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# The Grotte du Chameau and the Grotte des Pigeons, Morocco. A project of nature tourism

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## Abstract

The opening project for the public of the Grotte du Chameau in the Eastern Region of Morocco, in the valley du Zegzel, Maroc is presented. The project includes the creation of a large nature park with services for visitors and researchers, integrating the Grotte du Pigeons, Zegzel valley, an important prehistoric site. A local and regional integration project, which will be an important international and economic tourist center in the Eastern Region of Morocco.

## Resumen

**La Gruta del Chameau y la Gruta de las Palomas, Marruecos. Un proyecto de turismo de naturaleza.** Se presenta el proyecto de apertura para el público de la Grotte du Chameau en la Región Oriental de Marruecos, en el valle du Zegzel, Maroc. El proyecto contempla la creación de un gran parque de la naturaleza dotado con servicios a visitantes e investigadores, integrando en su conjunto la Grotte du Pigeons, valle du Zegzel, importante yacimiento prehistórico. Un proyecto de integración local y regional, que será un importante centro turístico internacional y económico de la Región Oriental de Marruecos.

## Résumé

**La Grotte du Chameau et la Grotte des Pigeons, Maroc. Un projet de tourisme de nature.** Le projet d'ouverture au public de la Grotte du Chameau dans la région orientale du Maroc, dans la vallée du Zegzel, Maroc est présenté. Le projet comprend la création d'un grand parc naturel avec des services pour les visiteurs et les chercheurs, intégrant la Grotte du Chameau, la vallée du Zegzel, un site préhistorique important. Un projet d'intégration locale et régionale, qui sera un important centre touristique international et économique dans la région orientale du Maroc.

## 1. Introduction

The opening of the Grotte du Chameau is a tourism and integration project for the Eastern region of Morocco. Situated in the Zegzel valley between the towns of Berkane and Tafoughalt, it is a valley with narrow, vertical walls and offers numerous options for nature tourism.

The Grotte du Chameau, one of the longest running caves in Morocco, was the first cave to be opened to the public in Morocco in 1948 and has been declared a heritage site. Inside, there are large rooms and galleries divided into floors, which can be visited following an initial UNDP project that was partially completed. To the west of the valley is the

Grotte du Pigeons, a large shelter with an important prehistoric settlement where burials and remains of the first artistic manifestations of prehistoric man dating back 82,000 years have been located.

The project of Grotte du Chameau and Grotte des Pigeons, integrates the two caves for the opening and design of a cultural and nature tourism area that will integrate the local populations. A collaborative project with a team of Spanish, French and Moroccan specialists, under the direction of Dr. Mohamed El Kadiri and the local and regional governments, continues with the implementation of the opening.

## 2. History

The Grotte du Chameau (Grotte du Bourbah, 1908) is one of the first caves to be explored in Morocco. It was the first tourist cave in Morocco (1948).

In 1951 it was classified as a National Heritage site and was closed to the public.

It was visited and explored in 1971 by J.-P. Cantet, who carried out a topography and dived the siphon south of 50m, in 1980. B. & J. Lips made a new topography with a development of 600 m.

In 1982, the Groupe Speleo de l'Aragnado explored the siphon reaching 415m and -13., which gives the cave a total development of 1150m.

In 2008, the Chameau cave was included in a cultural and integrated development project for the Eastern Region, Project DÉLIO II, co-financed by the Agence Orientale and the PNDU. The electrical installation was renewed, and the cave was equipped with new walkways and stairs that make



it possible to visit the three floors of the cave, which was completed in 2015 without being opened to the public. In 2016 the public-private initiative under the direction of Dr. Mohamed El Kadiri, continued the work in the cave and its surroundings with a team of Spanish, French and

Moroccan specialists to enhance the value of the cave and carry out the necessary actions for its opening to the public. The Valle du Zegzel Foundation is created to enhance the cave.

### 3. La Grotte du Chameau

The Grotte du Chameau is located in the Eastern Region of Morocco, in the Béni-Snasse mountains, Oued Farrouj valley, a tributary of Oued Zegzel. It can be reached via the P6012 road linking the towns of Berkane and Tafoughalt. It is located at the base of the dolomitic limestone cliff of the Lias, on the ravine of the Farrouj river bed (Bourbah), 1 km from the Zegzel Valley (Fig. 1).

#### La Grotte du Chameau

The cave of hydrothermal origin is formed by three floors of large galleries, with the accumulation of numerous domes on the large roofs in the upper areas. In the lower part, there is an intermittent river that is activated during the rains and dries up again after a few days.

It is over 1,929 m long (EL KADIRI *et al*, 2019), of which 400 m have been prepared for visits.

It has two separate entrances about 20m high. The lower entrance is a large mouth where the water comes out in times of flooding, and is currently closed to the public.

The current access is through the upper entrance which is accessed by a path. The interior is equipped for visitors' access with stairs and a cemented path. To its right, there is a camel-shaped formation that gives its name to the cavity. From the upper entrance, you can access the third floor of the cave, a large gallery. The ceiling has numerous large convection domes at the end of which you can reach a large well of about 30 m in diameter and 40 m deep, from which you can see the intermittent river at the bottom. A balcony formed by a metal structure and stairs (made as part of the PNDU 2015 project), allows the view of the underground river bed at the bottom. Opposite is the recently explored Nadia gallery, which must be passed through using ropes and safety systems, and is currently not open to visitors.

Access to the first floor of the cavity is via the metal stairs installed for the tourist visit. This gallery, called Amélineau, is located below the entrance. At the bottom it has an important filling of rocks from the outside that closes what could be an old exterior entrance.

In the Amélineau gallery to the south, there is a small gallery annexed to a room that has been fitted out for visits. On the opposite side, to the north, narrow galleries lead to the lower floor.

At the end of the descent of the stairs in the Amélineau gallery and to the east, a small descent leads to a large gallery to the south. Here, the large balcony gallery opens to a balcony which ends in a wall of about 5 m to the base of the river, the end of the area of tourist use. Going down this wall and continuing south, the cave continues to follow the intermittent river until it reaches a siphoned area. In this zone, the exploration has recently surpassed the 300 m siphon, up to new aerial galleries, discovering a second siphon (EL KADIRI *et al*, 2019), the explorations continue.

Returning to the base of the descending stairs, at its lowest part one arrives at a circular room with a lake, which overflows and circulates in a gallery that leads to the exterior in a northern direction and with a 150 m route to the lower exterior exit, being impassable in periods of flooding. It is currently closed to the public and will be made available for visits.

The opening is scheduled for 2020, the cavity will be equipped with modern and current services for visits such as online reservations, audiovisual means that allow the visitor to virtually enter the deep cave. Explanations in several languages with personalized audio guides and professional guide service with specific training on the cavity, its use and conservation.

#### La Grotte du Pigeons

To the west of the valley seven kilometers away is the Grotte du Pigeons, a large shelter with an important prehistoric settlement where burials and remains of seashells, perforated shell pearls of *Nassarius gibbosulus*, have been located, these findings imply an early distribution of the manufacture of beads in Africa and Southwest Asia at least 40 millennia before the appearance of similar cultural manifestations in Europe. They are some of the first artistic manifestations of prehistoric man with an antiquity of 82,000 years, the remains found allow us to know the habitat of prehistoric man in this region, the creation of an important museum has been planned. (BOUZOUGGAR *et al*. 2007).

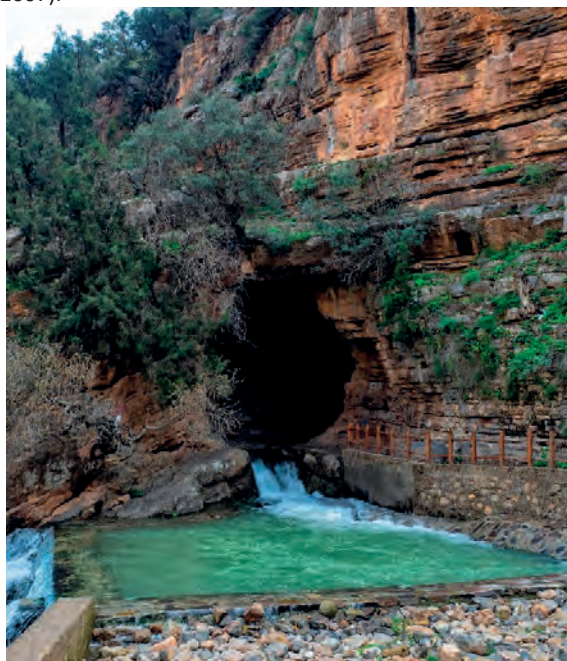


Figure 1: Grotte du Chameau, lower inlet, thermal water upwelling

## 4. Opening project

Since 2016 a team of specialists from Spain, France and Morocco has been studying and working on the development and opening of the cave under the direction of Dr. Mohamed El Kadiri, the Valle du Zegzel Foundation and the local, regional and state authorities. This project is one of the main driving forces for the development of the populations of the Zegzel Valley.

The works carried out during the year 2015 allow an accessible tour to visit the three floors of the cave (Fig. 2).



Figure 2: Upper floor

The current project for its reopening plans a new access, which will facilitate the routes for disabled people, together with an interior refurbishment of lighting and services, such as the installation of audio-guides in several languages and interactive virtual reality VR exhibitions, and a large outdoor park for nature activities. These facilities and equipment will make this cave the most modern and accessible in all of Morocco and a place of nature and history next to the Grotte du Pigeons in the entire Zegzel Valley and a world reference in North Africa.

The indoor facilities will be complemented by services and equipment for research. The Grotte du Chameau will be the first cave in Morocco with an underground laboratory, which will allow international researchers from different universities to continue their work.

The opening is scheduled for 2020, the cavity will be equipped with modern and current services for visits such as online reservations, audiovisual means that allow the visitor to virtually enter the deep cave. Explanations in several languages with personalized audio guides and professional guide service with specific training on the cavity, its use and conservation.

The intervention respects the site at all times while guaranteeing the necessary services so that the environment of the Grotte du Chameau can be used as a museum. Bearing in mind that the value of the site lies inside the cave, the architectural elements incorporated must be discreet, mimetic with the environment, always trying to enhance the value of the cave.

The place is understood as a space surrounded by mountains and nature. The architecture becomes an exterior element that signifies the existence of that fantastic world hidden under the ground, becoming a landmark that serves as a point of attraction that marks the existence of the museum.

They must be discreet, mimetic with the environment, always trying to enhance the value of the cave's interior.

### Urbanization of the environment

The project (Fig. 3) organizes the whole area through different uses and treatments that guarantee the visit to the monument. For this purpose, the following uses are created within the urbanization environment: Multipurpose building, Kiosks, Bathrooms, Restaurant, Parking, Pedestrian paths, Roads of access, Park of activities in the nature (Climbing, Tyrolean trails, Via ferrata, hiking).

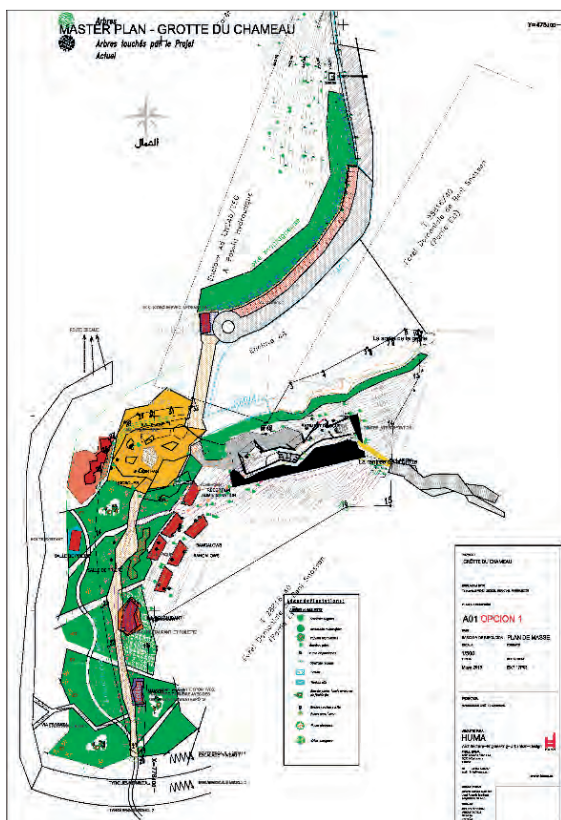
### Multipurpose building

The multipurpose building provides the site with a logistical function by housing the common spaces understood as a prelude to the museum space inside the cave (Fig. 3).

Inside, the building begins with a large entrance hall, understood as an open space. An open area where explanatory panels can be displayed or a souvenir shop can be set up. Attached to this space is a separate male and female bathing area.

A large restaurant area is created with a cafeteria and a restaurant. Both spaces have an interior covered part for tables, with the possibility of also going outside through terraces. The kitchen and storage area connects both spaces.

Once these common spaces have been passed, the entrance control is located, which is the official start of the museum visit. A multipurpose space where you can project some themed audio-visuals about the findings or information about the cave, or 3D or VR recreations (virtual reality of the non-accessible areas).



The idea is that visitors start the tour from the building and go outside to enter the cave without any discontinuities, ensuring the continuity of the museum.

On the outside, the building tries to blend in with its surroundings in such a way that it is perfectly integrated. To this end, local materials are used and a modern language is used in keeping with the times we live in. The final result is an envelope that recalls the profile of a "camel" on the hill. It is as if the vertical profile of the mountain were knocked down, thus generating the building.

A large amount of glass is placed inside, allowing a luminous space to be generated while the visitor feels the surroundings from inside the building.

Figure 3: Grotte du Chameau project master plan environment of services and access to the cave. Exterior set © Huma Architecture, Concept.

## 5. Conclusions

The cavity is well known in the region, easily accessible, of enormous proportions, a singular beauty and an intermittent thermal river. The actions planned inside and outside the cave will create an interpretative and touristic environment, integrated in the natural environment, which

will turn it into an international touristic reference. The Grotte du Chameau is a remarkable tourist incentive for the region and the Zegzel valley, where more than 80,000 visits are expected every year. It is one of the main tourist and development attractions for the eastern region of Morocco.

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