

cosquer

MÉDITERRANÉE

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A SITE OF GLOBAL INTEREST THAT IS FIRMLY ANCHORED IN THE REGION



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‘Cosquer Méditerranée’ is the name of a new cultural venue in Marseille, which will open in June 2022 in the Villa Méditerranée, near the MUCEM. It will house a replica of the Cosquer Cave, a major site of cave art dating from the Palaeolithic Period. Initiated by Renaud Muselier, President of the Provence-Alpes-Côte d’Azur Region, and Vice-President of ‘Régions de France’, this major project will give the general public and scientists access to an exceptional heritage site, which is in danger of disappearing.

Discovered in 1985 in the creeks in Marseille, by the diver Henri Cosquer, the cave, which is decorated with Palaeolithic works and is named after him, is a unique archaeological site. This was the first time that this type of cave had been found east of the River Rhône. ‘Classified as a historical monument, this cave is a scientific site of international importance’, stated Xavier Delestre, regional curator of archaeology at the Regional Cultural Affairs Directorate (Direction Régionale des Affaires Culturelles, DRAC).

But studying this exceptional ensemble, which comprises more than 500 works of cave art, is particularly difficult: the site is almost inaccessible, as the entry to the cave, located thirty-seven metres beneath the sea, is reserved for experienced divers; furthermore, due to the rising sea levels, the submersion of the cave is inevitable, in the medium to long term.

The uniqueness of the situation, the wealth and diversity of the engravings and paintings, the long human occupation of the cave during the Upper Palaeolithic Period, and the risk of disappearance of the cave art make the Cosquer Cave a site of global interest and significance, whose preservation and study are matters of urgency.

Only the virtual conservation of the rock art is possible. This is underway. Based on a 3D model, the replication of the cave will provide access to this heritage.

Aware of the urgent need to find a new use for the Villa Méditerranée, the Provence-Alpes-Côte d’Azur Region issued a call for tenders in order to use the building for a major project that is of real regional interest. Thus, the Kléber Rossillon Group was chosen to carry out the project. Indeed, the replication of the cave is a scientific and technological endeavour, combining cutting-edge technologies, expertise, and artistic skill. Specialised workshops, located in the Provence-Alpes-Côte d’Azur Region and in various regions in France, have made the pieces of this unique ‘puzzle’, which will be assembled in Marseille.

The replication of the cave is complemented by a cultural project in an archaeological interpretation centre, created in the Villa Méditerranée’s amazing cantilever. The new ensemble, located on the J4 esplanade, will strengthen the cultural and tourist offering, which is already significant thanks to the Museum of European and Mediterranean Civilisations (Musée des Civilisations de l’Europe et de la Méditerranée, MUCEM).



© Stefano Boeri / Région Provence-Alpes-Côte d'Azur

'Cosquer Méditerranée' at a glance

The Cosquer Cave is owned by the State, as is all the documentation, computer graphics, and the scientific data collected during studies that began in September 1991.

The Villa Méditerranée is owned by the Provence-Alpes-Côte d'Azur Region.

The Kléber Rossillon Group, selected through a call for tenders, is managing the design and realisation phases of the project, and will run the venue with the Provence-Alpes-Côte d'Azur Region until 2045, in the framework of a Public Service Delegation Contract.

Timeline

December 2016	The Cosquer project is initiated by the Provence-Alpes-Côte d'Azur Region
September 2019	The Kléber Rossillon Group is awarded the tender
June 2020	The Region gives the keys to the Villa Méditerranée to Kléber Rossillon
September 2020	Work on the project begins
June 2022	The venue will open its doors to the general public

The Provence-Alpes-Côte d'Azur Region has contributed 9 million euros to funding the project, out of a total budget of 23 million euros, making it the primary financial partner in the project carried out by the Kléber Rossillon Group.

'Cosquer Méditerranée' in the Villa Méditerranée includes:

- A replica of the Cosquer Cave and its panels decorated with cave art
- A scenographical area devoted to underwater diving
- A film about the cave's discovery
- An educational itinerary devoted to prehistory and rising sea levels
- A bookstore and gift shop
- Restaurant facilities
- An amphitheatre and conference rooms



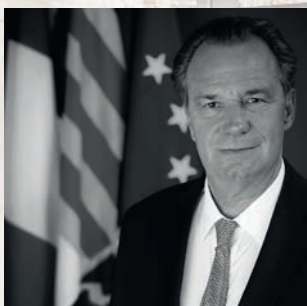
'We have transformed the existing building in order to house a replica of the Cosquer Cave: a heritage site, a place to see science in action, a place of encounters, and a vibrant and popular place. Highly technical and rigorously scientific, it will bear witness to our prehistoric past, and also the rising sea levels.

We will use all our expertise to promote the Cosquer Méditerranée and contribute to the region's development for twenty-five years. The experience we have acquired through the management of eleven cultural and touristic venues, and particularly the replica of the Chauvet Cave in the Ardèche region, will make this regional monument accessible to 500,000 people, once it is up and running.

We are looking forward to immersing the public under the sea, and in the discovery of this submerged treasure.'

Geneviève Rossillon

President of the company Kléber Rossillon



'The aim of this project is to restore this jewel in the heritage of mankind in order to make the inaccessible accessible.

In 2016, we decided together with Christian ESTROSI to give the Villa Méditerranée a new lease of life. The building, which is an architectural marvel but had no real purpose, was costing the local authority and the taxpayer too much money.

This year it will become a setting for the replica of the Cosquer Cave and its conservation.

The underwater cave and its treasures provide an invaluable testimony, which is unique in the world, about the cave art of our distant ancestors.

The replica of the cave will make the inaccessible accessible to all the region's inhabitants, as well as visitors from France, Europe, and around the world.

Working closely with the State, the owner of the cave, and under the management of Kléber Rossillon, the company assigned to the project, we have endeavoured to conserve this exceptional heritage, by making all the paintings and engravings, which are currently only accessible to scientists and professional divers, accessible to the general public. This is a world first and 'Cosquer Méditerranée', a jewel in the heritage of mankind, will be housed here in the Région Sud.

What was once a dream will soon become a reality, thanks to the Région Sud, in June 2022 — enter the Cosquer Cave!'

Renaud Muselier

President of the Provence-Alpes-Côte d'Azur Region,
and Vice-President of 'Régions de France'

A UNIQUE HERITAGE SITE THAT IS IN DANGER OF DISAPPEARING

From 1985 to 2022—from the cave’s discovery to its replication—, thirty years of exploration in very difficult conditions has revealed an exceptional heritage, which is in danger of disappearing and is being conserved virtually.

UNE AVENTURE SCIENTIFIQUE DANS DES CONDITIONS EXTRÊMES

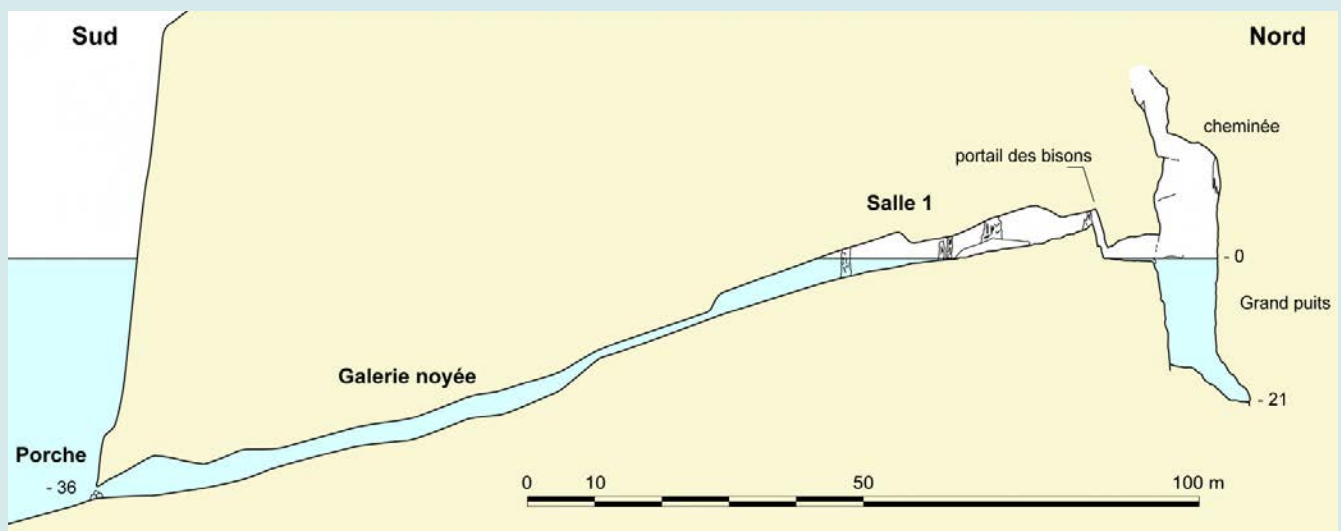
1985, the cave’s discovery. In 1985, a professional diver, Henri Cosquer, discovered the entrance to a gallery 37 metres beneath the sea level. After several attempts, he swam more than 116 metres up an underwater sump, being careful to avoid disturbing the silt deposited on the walls. When he reached a beach in a cavern, he dared to remove his regulator. ‘I went there several times until the day I discovered a handprint .../... I initially thought it was graffiti/ but then I saw six other handprints on the thin layer on the wall’, he stated on France Bleu in September 2020.

The existence of the cave was revealed six years later. News of the existence of a cave containing rock art near Cape Morgiou spread amongst divers, who also went there, but the contents of the cave were not known until 1991 when three divers drowned in the cave on 1 September. On 3 September, Henri Cosquer declared his find to the maritime authorities. The site was secured and access was forbidden to divers who were not authorised by the French Ministry of Culture.

1991: authentication. An initial study to authenticate the cave was conducted at the request of the Ministry of Culture in September 1991. It was carried out by the prehistorian Jean Courtin, joined by Jean Clottes, and revealed the existence of paintings and engravings. Using samples of charcoal taken from the cave, an initial attempt at dating was made. It is indeed a Palaeolithic site.

2 September 1992: the cave was classified as a historical monument.

THE COSQUER CAVE: A SEMI-SUBMERGED SITE WITH A COMPLEX TOPOGRAPHY



The cave is located in the Triperie Creek, near Cape Morgiou and Cassis, in an area that has been damaged by seismic tremors and tectonic movements.

The cave is accessed by a 116-metre-long ascending gallery, which leads to a dry area called ‘the beach’. The cave’s topography is complex. It is comprised of two large chambers connected by narrow passages; many passageways are difficult to access, and a large twenty-four-metre-deep underwater sump is at the back of the second chamber. There are many stalagmitic and stalactitic concretions. Four fifths of the cave’s walls are submerged. Since all the non-submerged areas are covered with engravings, finger tracings, and drawings, it is conceivable that the walls in most of the areas that are now submerged were also covered with rock art.



© MC-DRAC PACA SRA

Thirty years of study and research... Gaining access to the cave requires special equipment and specific physical capacities, thus limiting the forays into the cave, which, moreover, are subject to the vagaries of the weather. But each research campaign, conducted under the aegis of the Regional Directorate of Cultural Affairs (Provence-Alpes-Côte d'Azur), contributed significantly to increasing knowledge about the site. Between 1991 and 1994, the studies and research were initially conducted by the prehistorians Jean Courtin and Jean Clottes. The results, contained in *La Grotte Cosquer. Peintures et gravures de la caverne engloutie*, were published in March 1994, by Éditions du Seuil.

Almost ten years later, in April 2005, following a new programme of research initiated in 2001, Clottes and Courtin wrote their observations in a new book: *Cosquer redécouvert*, also published by Éditions du Seuil, with, in particular, photographs by Luc Vanrell. The latter, a freelance archaeologist, diver, and photographer, has participated in all the research campaigns since 1994 with the Regional Cultural Affairs Directorate (DRAC), and was the cave's chief scientist since 2001. This post is now held by Cyril Montoya.

Ongoing research. The 3D digitalisation of the cave—entrusted to the company Fugro, commissioned by the Regional Cultural Affairs Directorate (DRAC)—began in 2010. Surveys using laser scanning and photogrammetry, with submillimetric precision, as well as high-definition photographic coverage made it possible to create a relevant database in order to make a replica of the cave, and facilitated, in particular, the deciphering of complex overlays that revealed other drawings. Hence, in 2014, the total number of figures identified reached 513, that is to say around one hundred more than when the inventory was made in 2003.

EXTREME CONDITIONS

Each dive to study the cave is a feat, which is both physically demanding and technically complicated. The journey from the Old Port of Marseille to the dive site involves a boat trip of forty five minutes or more in rough seas. Special care is required when moving through the cave: the cave floor, which is partially submerged, is uneven, and, furthermore, any contact with the cave walls has to be avoided. In addition to the time spent in the cave (not in excess of five hours), time is required to deal with the survey and photographic equipment, and the diving equipment.

The study of the cave is an ongoing process, as attested by the latest publications:

- *La Grotte Cosquer en questions*, by Xavier Delestre, published in May 2021 by Éditions Équinoxes
- 'La Grotte Cosquer – trente ans de recherches', in *Dossiers d'Archéologie*, Issue 408, Nov. Dec. 2021.
- *La Grotte Cosquer révélée, les secrets du sanctuaire préhistorique englouti*, by Pedro Lima, published in November 2021, by Éditions Synops.



The 'Killed Man' panel (detail showing engraved deer)
© Kléber Rossillon & Région Provence-Alpes-
Côte d'Azur/Sources 3D MC

A MAJOR SITE OF CAVE ART DATING FROM THE PALAEOLITHIC PERIOD

Trente mille ans Thirty thousand years ago, the sea level at Cape Morgiou was 120 metres lower than it is now, and the shoreline was six kilometres away from the entrance of the cave, which was dry. Groups of Homo sapiens frequented the site and left handprints on the cave walls. Generations later, other Homo sapiens made drawings of horses, aurochs, deer, and also penguins and seals on the same walls. Palaeolithic artists used several techniques: most of the works were engraved with a flint tool or painted with fingers; around fifty works were drawn with charcoal, and around ten were engraved and drawn with charcoal. A red pigment was used for the handprints.

Carbon-14 dating made it possible to identify the principal periods of human occupation corresponding with the creation of the works: between 33,000 and 19,000 years ago, based on the current data.

What has been found and seen in the cave?

Amongst the rare objects discovered are around a dozen flint tools, seashells, including a scallop shell containing a piece of charcoal, a finger-marked ball of kneaded clay, a flat calcite plaque that was worked and used as a lamp, traces of fire on the cave floor, charcoal smudges left by torches on cave walls ... The charcoal used has been identified as *Pinus sylvestris* (Scotch pine).

More than 500 works of cave art have been inventoried on the vaults and walls:

- **A bestiary of 200 animals.** There are eleven animal species: horses, aurochs, bison, megaceroses, ibexes, chamois, saiga antelopes, seals, penguins, and fish. The most represented animals are the horse (sixty-three representations), ibex, chamois, and saiga antelopes (sixty-three representations), bison and aurochs (twenty-four representations), the megaceros (seventeen representations), a three-quarter view of a feline, and representations of sea animals (nine seals, four fish, and three penguins), and geometric motifs that may evoke other sea animals, that have hitherto not been identified.
- **Rare human representations**, including a figure with a seal's head on the cave floor, which appears to have been pierced by a spear or harpoon, listed under the name the 'Killed Man'.
- **Sexual symbols.**
- **Sixty-five negative handprints in red (21) and black (44);** a number of red hands are covered with striae, which have been engraved or scraped
- **More than 200 non-figurative signs:** rectangles, zigzags, dots, and so on.

Abundant traces of human activity. Throughout the cave, the wall surfaces bear many striations executed with the fingers or a tool; scrape marks where clay has been removed and moonmilk (a soft calcareous secretion on cave walls, which is sometimes several centimetres thick). Concretions have been broken and the tips have not been found: did prehistoric man believe that these mineral deposits had a supernatural power, or were they part of their pharmacopoeia?

The inventory is ongoing, due to the complexity of the cave's topography and superimposed drawings. An animal representation can conceal another ... as Jean Courtin, the first prehistorian to study the Cosquer Cave, stated: '... When you've been there for hours looking at an engraving and taking notes, looking through a magnifying glass to see how the lines were made—with flint or something else—, and trying to adjust the lighting from the lamps, you say to yourself: ah, look! ... and you see another animal representation. You see a fine line ... it intrigues you, you follow it with your eyes, and you wonder where it leads. You find other superimposed engravings ... it's incredible! It'll take years to study all the representations in the Cosquer Cave!'



Panel of penguins (detail) © Kléber Rossillon & Région Provence-Alpes-Côte d'Azur/Sources 3D MC

EMBLEMATIC PENGUINS

Three penguins are represented in the cave: two large penguins drawn with charcoal are facing each other; they seem to be fighting over a smaller female penguin.

Due to their rarity in cave art and the high quality of their representations, the penguins are emblematic of 'Cosquer Méditerranée'.

However, their presence initially raised doubts about the cave's authenticity: for the first time representations of sea birds had been found on the walls of a Palaeolithic site. Were there penguins in Provence? 30,000 years ago, during the Upper Palaeolithic Period, during the last glacial period, the climate in Provence was harsh. The rocky coastline was home to marine fauna, as attested by the representations inventoried in the Cosquer Cave: three penguins, and also seals, fish, and motifs of jellyfish and octopi.

THE MYSTERIOUS HANDS

Direct evidence of a human presence in the cave, the handprints (in black or red) were made by creating negative stencils or making positive prints, which were made by placing paint on the hands and then pressing them against the cave wall.

It is disturbing to note that many of them lack parts of fingers. Furthermore, children's handprints have been observed in the moonmilk, at a height of around 2.20 metres from the cave floor.



Panel of negative handprints in black (detail) © Kléber Rossillon & the Provence-Alpes-Côte d'Azur Region/Sources 3D MC



Engraved horse (detail) © Kléber Rossillon & Région Provence-Alpes-Côte d'Azur/Sources 3D MC

THE HORSES

The most represented animals in the cave are horses (63).

None of them are identical: three were drawn with charcoal, the others are engraved, and, in half of the cases, only the head, chest, and mane are represented.

AN ESSENTIAL PRESERVATION PROJECT

This unique heritage is in danger of disappearing. The process of disintegration began 10,000 years ago: since the end of the last glacial period, the rising sea levels have submerged four fifths of the cave. The remaining fifth that has remained dry is now being threatened by the same phenomenon, due to global warming. At a rate of around 3 mm per year, the effects are already visible, as observed by the research divers. The legs of a horse close to the water have already disappeared, swallowed by the sea, whose level also varies according to the tides, with differences of more than 15 cm.

Other dangers are threatening the site: the creeks where the Cosquer Cave is located have not been spared the effects of pollution. Cortiou, Marseille's sewer outlet since 1896, is still in use. Added to this are microplastic pollution, oil spills, and the risk of collapses and geological shifts due to seismic activity.

Geneviève Pinçon, Director of the National Centre for Prehistory, stated that 'We know that very little can be preserved in this site in France. Something is lost every day in the cave and that's why excavations have become a matter of urgency.'

One day, the replica will be the only record of this heritage. Thirty years after the revelation of the existence of the cave, digital tools have now enabled us to consider making a scientifically accurate replica and give the general public access to a major world heritage site, while raising awareness about the urgent problem of global warming and the phenomenon of rising sea levels.

AN URGENT CAMPAIGN

An urgent campaign of archaeological excavations was launched in the summer of 2021 with the appointment of Cyril Montoya, an archaeologist and director of a multidisciplinary research team composed of around fifteen trained cave divers: scientists, archaeologists, karstologists, hydrogeologists, geomorphologists, and topographers. 'This is a monument that is disintegrating, but a campaign of work has begun that is expected to last several decades. The openings providing access, which depend on the weather, are risky and difficult', stated Cyril Montoya. The forthcoming excavations have several objectives: ensuring the sanitary monitoring of the cave, establishing a chronology of the human occupation of the cave, and analysing the uniqueness of the Cosquer Cave compared with other caves containing cave art in France.



Panel of hand stencils © Kléber Rossillon & Région Provence-Alpes-Côte d'Azur / Sources 3D MC

THE STAGES OF THE REPLICATION PROCESS

Initiated by the Provence-Alpes-Côte d'Azur Region in 2016, the Cosquer project has mobilised the expertise of many professionals in the study and realisation phases: prehistorians, archaeologists, geologists, climatologists, architects, visual artists, scenographers, and also professional divers, photographers, and virtual reality experts.

THE ESSENTIAL ROLE OF THE PROVENCE-ALPES-CÔTE-D'AZUR REGION

The cave was discovered in 1985. From 2016 to today, the Provence-Alpes-Côte d'Azur Region has striven—as part of a cultural policy to promote heritage—to complete the Cosquer project, whose implications are regional, national, and international.

A combination of objectives contributed to the development of the project: the newly elected Provence-Alpes-Côte d'Azur Regional Council was concerned about the future of the Villa Méditerranée, a costly building without a particular purpose. At the same time, the State was planning to conduct more research campaigns in the Cosquer Cave, which is in danger of disappearing.

In December 2016, the Provence-Alpes-Côte d'Azur Region endorsed the terms of the project, whose purpose was twofold: promoting the heritage of the Cosquer Cave in the Villa Méditerranée under a Public Service Delegation.

In June 2018, as part of a framework agreement between the State and the Provence-Alpes-Côte d'Azur Region, the State undertook to make available all the infographic and photographic material collected between 1991 and 2013 during the various research campaigns, including the results obtained during future campaigns—essential data for the replication of the cave.

Following a call for tenders launched in May 2018, the Kléber Rossillon Group was selected in September 2019 due to the quality of its cultural and scientific project and was entrusted with the creation of the interpretation centre as part of a Public Service Delegation (PSD).

The Provence-Alpes-Côte d'Azur Region, which owns the building and initiated the project, has contributed 9 million euros to funding the transformation of the site and is responsible for the cultural and scientific output of the entire project via two bodies that have supported the teams in all the realisation phases: a ten-member State and regional Scientific Committee and a fifteen-member Steering Committee.



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BEHIND THE SCENES – FROM LASER SCANS TO THE PAINT

Multiple challenges

The project teams had to overcome major challenges: how could a replica of the Cosquer Cave be made thirty years after its discovery, without having direct access to the cave? How do you fit the 2,300-metre-squared eight-shaped cave in a square area with a surface area of 1,750 m², in basement level 2 of the Villa Méditerranée? How do you design an itinerary while recreating the site's complex topography, its narrow passages, its various heights, the presence of water, and the abundance of drawn and engraved works, scattered throughout the cave on the walls and vaults?

In other words, how do you design a qualitatively scientific venue that is culturally attractive and meets the requirements of a building that is open to the public, and which takes into account all the building's constraints (the circulation of people, emergency exits, support structures, networks, the preservation of the existing amphitheatre, etc.)

THE STAKEHOLDERS

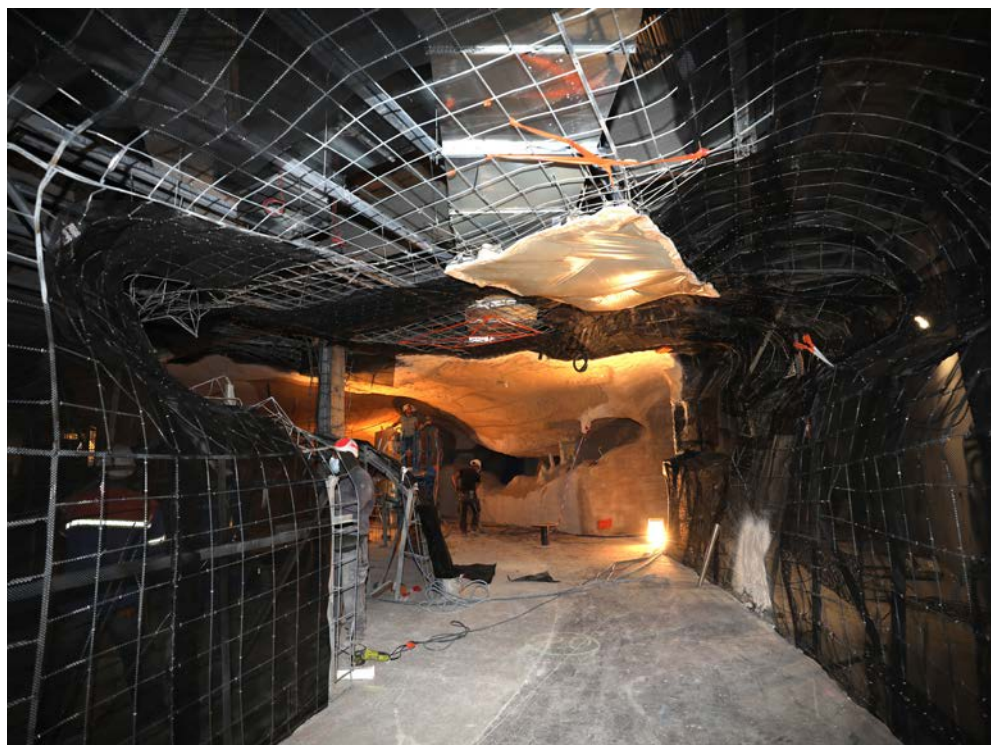
The Kléber Rossillon Group, the Public Service Delegation contract holder, chose Eiffage Construction Provence as project manager to undertake the structural work and coordinate the stakeholders in the design and construction team, which includes:

- PERSPECTIVE(S), a company that specialises in 3D technology
- The architects from the Cabinet Corinne Vezzoni et Associés/the technical design firm Egis, responsible for the refurbishment of the Villa Méditerranée
- The Ateliers Artistiques du Béton (AAB), responsible for recreating the cave's topography
- The Atelier Stéphane Gérard, which specialises in constructing models of speleothems
- Déco-Diffusion and Arc & Os, the two workshops that specialise in the replication of rock art panels
- The scenographers from Arc en Scène and La Prod est dans le Pré
- The audiovisual production companies CLAP 35 and Prélude
- The visual artists and sculptors from the ADESS workshop and the company OPHYS, as well as Pierre-Yves Renkin and Elisabeth Daynès, responsible for making the replicas of the animals and the Homo sapiens woman.

THE KLEBER ROSSILLON GROUP

Established in 1997 with the opening of the Jardins de Marqueyssac to the public, the Kléber Rossillon Group is part of the family-run holding company SOFRA, which now employs more than 400 people.

Drawing on its know-how and experience in the global management of cultural and tourist venues, the Kléber Rossillon Group currently runs twelve venues in France and Belgium, and will welcome two million visitors in 2022. Since 2015, Kléber Rossillon has been managing the replica of the prehistoric Chauvet Cave in Ardèche, which welcomes 350,000 visitors every year. In each of these venues, the company uses its expertise to ensure visitors have the best experience and to provide local authorities with an opportunity to promote their image and region. The Kléber Rossillon Group is responsible for the design and realisation of the Cosquer Cave, and will then run the venue until 2045.



© Kleber Rossillon - Région Provence-Alpes-Côte d'Azur - Sources 3D MC - Eiffage Thierry Lavernos

The realisation of the replica: experts at work

3D modelling, dividing the cave into six segments, recreating the walls in concrete, making the rock art panels in resin, recreating the appearance of the rock and the drawings and engravings: each stage requires specific know-how. Essentially, most of the companies in charge of the project have already worked on similar projects, notably the replica of the Chauvet Cave, an experience that was conducive to the development of new methods, which have now been used in the Cosquer project.

An unprecedented approach

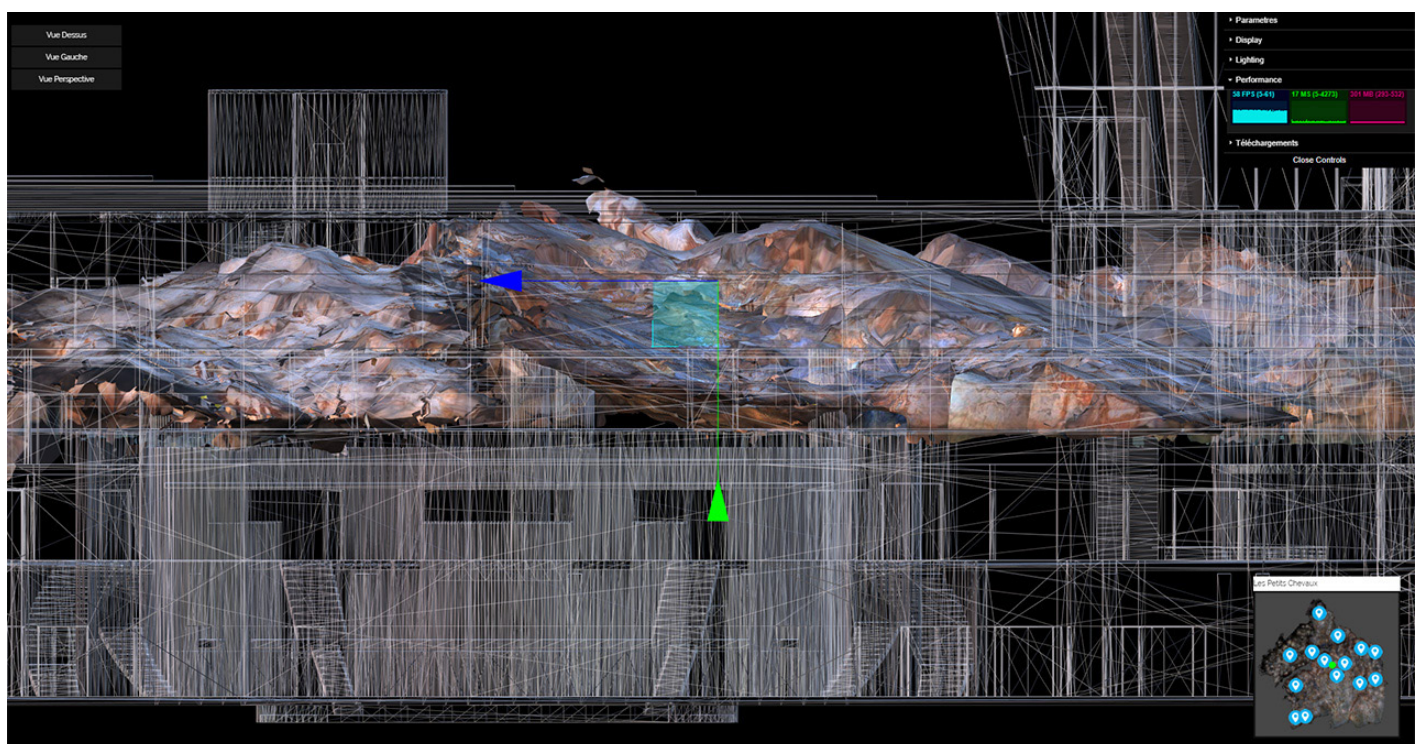
The replication of the cave is entirely based on the data collected during the research campaigns. Indeed, the difficulty of accessing the site has made it impossible to verify the exactitude of the replica in real time. Furthermore, research in the Cosquer Cave is ongoing and new scientific data will contribute to refining the work underway.

A 3D model serving as a reference

The company PERSPECTIVE(S), located in Aix-en-Provence, has developed software for processing the digital data collected by Fugro, the company commissioned by the Regional Cultural Affairs Directorate (Provence-Alpes-Côte d'Azur). The photogrammetry, 344 lasers scans, and the 360-degree HD images have made it possible to create a model of the entire cave by juxtaposing the various scans.

In eight months of work, more than fifty versions were made by PERSPECTIVES, to produce a replica of the cave adapted to the constraints of the Villa Méditerranée, into which an itinerary had to be integrated. The unified model of the cave, which had to be validated scientifically and scenographically, has ultimately made it possible to visit the cave in 3D and in a virtual reality tour.

When the 3D replica had been made, the data was sent to all the key participants in the project, and, in particular, the artists who made the physical replica of the cave in Toulouse, Paris, and Montignac, where the workshops run by Gilles Tosello, Stéphane Gérard, and Alain Dalis are located.



© Perspective(s) - Région Provence-Alpes-Côte d'Azur - Sources 3D MC

'By rotating the segments, without moving them in relation to one another, and without compromising the integrity of the pieces, we were able to fit them into a restricted space', explained Laurent Delbos, the Kléber Rossillon project manager.

'It's a replica, a recreation of the cave, but the rock art panels are life size.'

The replica had to be reduced in size

To reduce the surface area of the replica, and fit it into the area available in basement level 2 of the Villa Méditerranée, the cave had to be reduced in size.

The 3D model of the Cosquer Cave was divided into six large segments: the entrance and the cavern with 'the beach'/ the horse chamber/the northern chamber/the large sump/the bison's fault/the red hand and feline gallery. Dividing the cave into segments was difficult because the entire cave is covered with rock art.

A process of 'sewing' together the segments

In the cave, the segments are not on the same level; an average height setting therefore had to be found between the floor and the ceiling, and then the various segments had to be fitted together geologically. Geologists who specialise in karstology ensured that the 'sewing' work was carried out correctly, using a catalogue of references to create a faithful copy of the cave's geomorphology and recreate the texture of the walls and the concretions.

The recreation of the walls and speleothems: form and colour

AAB and SG Atelier

The Atelier Artistique du Béton, located in Mormant, in the Seine-et-Marne département, made the main steel rod structure: several layers of concrete were applied on steel rod cage structures, on which wire mesh was fitted; it was then sculpted and patinated to recreate the complex topography of the cave. In parallel with this modelling work, the workshop run by Stéphane Gérard, a visual artist who specialises in making replicas of speleothems, recreated the geological formations—the karstic concretions: stalagmites, stalactites, and fistulous stalactites (fine stalactites in which water circulates). In the Parisian workshop, the teams concocted recipes to recreate the matt, transparent, and shiny surfaces, and the lime draperies.



The recreation of the rock art panels

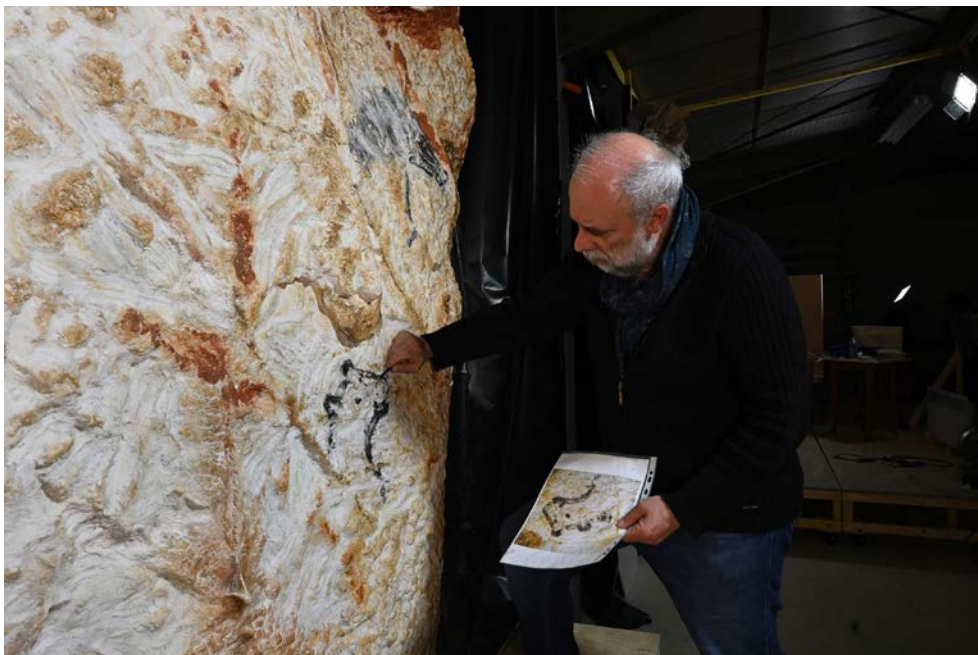
Arc&Os

For twenty-five years, the workshop Arc & Os at Montignac, located near Lascaux, has specialised in making copies of caves containing rock art. Based on 3D modelling of the cave, a digital milling machine sculpts polystyrene blocks into negative moulds used to make the resin panels, on which are projected the photographs taken in the cave. The panels are entrusted to the expert hands of visual artists who recreate the texture, the granulometry, and the colours of the rock, and, ultimately, engrave and draw representations like *Homo sapiens*.



The Arc & Os workshop at Montignac © Kléber Rossillon & Région Provence-Alpes-Côte d'Azur/Sources 3D MC

'A cave wall is never uniform: there are parts of the surface that are matt, shiny, and translucent, due to flows of water and calcite. Everything has to be recreated: the rock, rock with markings, soft rock...', stated Alain Dalis, director of Arc & Os. *'There comes a time when you move beyond the projection phase and really try to work like a painter by learning how the representations were made and trying to equal the speed with which the works were executed ... you have to recreate the emotion you felt when you first saw the painting.'*



The Déco Diffusion workshop in Toulouse © Kléber Rossillon & Région Provence-Alpes-Côte d'Azur/Sources 3D MC

At Déco Diffusion, in the Lot et Garonne *département*, Gilles Tosello, a prehistorian and visual artist, and Bernard Toffoletti, technical director, have teamed up again after working on the Chauvet cave project. They are working on eight rock art panels (on the shells made by Arc & Os). As Gilles Tosello stated: *'Although the replication work is based on 3D scanning technology, everything that the visitor sees has ultimately been recreated by hand. And everything that can be seen has to be recreated.'*

THE STATE AND REGIONAL SCIENTIFIC COMMITTEE

The committee's purpose is to support the project to create an archaeological interpretation centre throughout the life of the project to ensure quality and the centre's reach in terms of scientific research, education, and heritage.

Jacques Collina-Girard

President of the scientific committee. Geologist and prehistorian.

Lecturer at the Aix-Marseille Université and researcher at the LAMPEA research centre.

Member of the Cosquer project Steering Committee.

Geneviève Pinçon

Director of the National Centre for Prehistory (General Directorate for Heritage – the Sub-Directorate for Archaeology, the French Ministry of Culture and Communication), responsible, in particular, for caves and shelters decorated with rock art. Qualified member of the Regional Steering Committee.

Michel L'Hour

General Heritage Curator, ex-director of the Department of Marine and Underwater Archaeological Research (Département des Recherches Archéologiques Subaquatiques et Sous-Marines, DRASSM), member of the Académie de Marine, ex-member of the Scientific and Technical Advisory Board of the UNESCO 2001 Convention on the protection of underwater cultural heritage. Qualified member of the Regional Steering Committee.

Pierre-Jean Texier

A geologist by training and a prehistorian. Emeritus director of research at the CNRS-LAMPEA laboratory.

Anne-Marie Adam

Professor emeritus of archaeology at the University of Strasbourg. Member of the National Committee for Archaeological Research (Conseil National de la Recherche Archéologique, CNRA).

Christophe Morhange

A geomorphologist and specialist on sea-level changes, particularly in the Mediterranean, at the European Centre for Research and Teaching in Environmental Geosciences (CEREGE).

François Marchal

Paleoanthropologist, CNRS-UMR ADES. President of the Advisory Steering Committee.

Philippe Lefranc

Doctor and professor of historical sciences (Université de Strasbourg 2). Specialist in the Neolithic period.

Roberto Ontanon-Peredo

Director of the Museum of Prehistory and Archaeology in Cantabria.



1985-2022 LES TEMPS FORTS DU PROJET COSQUER

1985

The diver Henri Cosquer discovers the entrance to the gallery leading to the cave

1991

3 September: Henri Cosquer declares the cave to the Department of Marine and Underwater Archaeological Research (Département des Recherches Archéologiques et Subaquatiques et Sous-Marines, DRASSM)

1991

19–21 September: initial study is conducted by the Department of Marine and Underwater Archaeological Research (DRASSM), entrusted to the archaeologist Jean Courtin (CNRS)

1992

The cave is classified as a historical monument

1992–1994

Survey and study campaigns conducted under the direction of Jean Courtin and Jean Clottes

1994

A partial survey of the volumes using 3D laser scanners, conducted by the EDF

1995–2000

The site is developed by the Department of Marine and Underwater Archaeological Research (DRASSM)

2000

The cave comes under the control of the Regional Archaeological Department of the Regional Cultural Affairs Directorate (DRAC) (Provence-Alpes-Côte d'Azur), of which Xavier Delestre is curator

2000–2005

Surveys conducted by Luc Vanrell, Jean Clottes, and Jean Courtin

2006

Beginning of 3D surveys

2013

7 April: inauguration of the Villa Méditerranée

2016

16 December: decision of the President of the Région, submitted to a vote by the Regional Council Assembly, to launch a project to Promote the heritage of the Cosquer Cave in the Villa Méditerranée

2018

29 June: agreement between the State and the Région Sud to launch a project to make a replica of the cave

2019

16 October: public service delegation contract awarded to the Kléber Rossillon Group



VISITING 'COSQUER MÉDITERRANÉE': A GLOBAL EXPERIENCE

The Villa Méditerranée, a splendid building that has been completely refurbished, will immerse visitors—like discoverers—in the Cosquer Cave and extend their experience thanks to the archaeological interpretation centre, located in the building's cantilever. A permanent exhibition, open to everyone, will be devoted to prehistory and the rising sea levels.



© Stefano Boeri / Région Provence-Alpes-Côte d'Azur

THE RENAISSANCE OF THE VILLA MÉDITERRANÉE

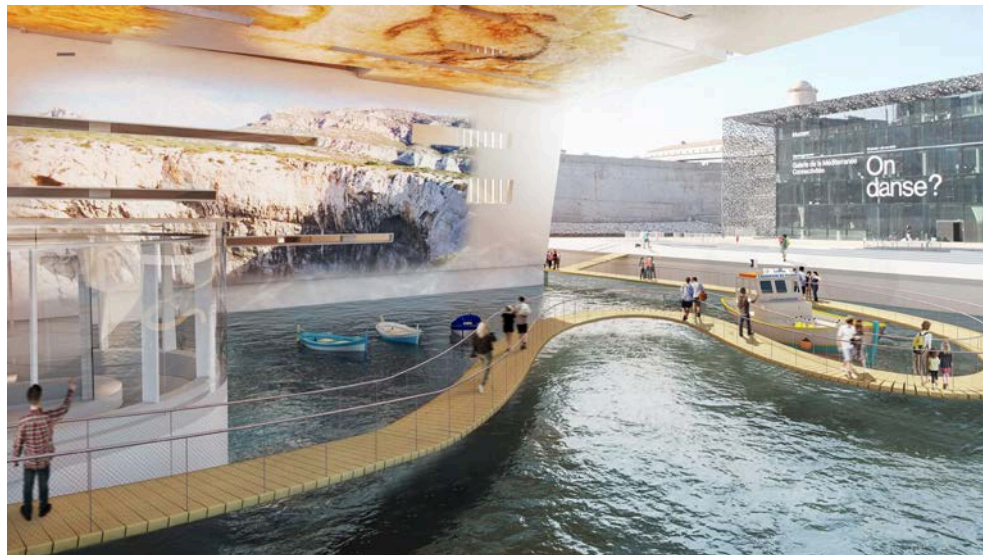
A splendid building in an attractive location. Unlike other centres of rock art (Lascaux and Chauvet), 'Cosquer Méditerranée' is located in an urban area, in the heart of Marseille, and is housed in an existing building: the Villa Méditerranée.

Designed by the architects Stefano Boeri and Ivan Di Pol, and inaugurated on 7 April 2013, the Villa Méditerranée, owned by the Région, had no real purpose until now. The building, with its unusual shape, is designed like a skiff: it has an overhanging 40-metre-long cantilever, which is 19 metres above an artificial sea basin with a surface area of 2,000 m². The building's location is an asset to the Provence-Alpes-Côte d'Azur Region: on the 'J4' esplanade, named after the warehouse that was located there, at the entrance to the Old Port in Marseille, at the foot of the Fort Saint-Jean, and 500 m from the Cathedral.

The proximity with the Museum of European and Mediterranean Civilisations (Musée des Civilisations de l'Europe et de la Méditerranée, MUCEM)—physically and thematically—, centred around knowledge of the Mediterranean, will increase the attractiveness of the esplanade, which attracts 1.5 million visitors.

From the basement to the third floor, the building has been refurbished to house the various parts of an itinerary that is entirely inside the building and leads the visitors from the ground floor to basement level 2 and back up into daylight, on the third floor, in the areas in the cantilever, which is a veritable 'watchtower' in the Marseille harbour.

The architect Corinne Vezzoni has coordinated the unprecedented refurbishment: 'The main constraints of the building, with its large cantilever, are the many transversal metal support beams, between which I have to 'wind' the replica of the cave, that is to say 60% of the entire replica'. The aim is to restore the building, and to use and optimise all the available space with all its constraints and potential. The building's refurbishment helps immerse visitors in a marine environment as soon as they enter the Villa Méditerranée.



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THE HIGHLIGHTS OF THE TOUR – UNDERWATER EXPLORATION

Visitors enter the venue via a winding floating walkway, supported by floating pontoons, over a basin where a replica of the boat (called Cro-Magnon) used by Henri Cosquer for his diving expeditions is moored.

‘Visitors will begin their maritime exploration by walking on this construction. The itinerary over the water will evoke the boat journey along the creeks to reach the submerged Cosquer Cave.’
(Maxime Claude, associate of the firm Vezzoni)

An introduction to the world of diving: in the atrium, on the ground floor, a scenographical area evokes the world of deep-sea diving in Cassis, when the cave was discovered. The visitors enter a ‘diving club’ where autonomous diving suits dating from the 1980s–‘90s, deep-diving breathing gas mixes, and also objects, posters, and documentation (safety regulations, sign language, cartography of the diving clubs, etc.) are displayed. After the diving centre, the tour continues with a full-size replica of ‘Le France’ in the 1980s, a bar that was frequented by local divers. Visitors need only to walk down a cobbled street in Cassis to reach the atrium and begin the underwater part of the tour, in a nautical elevator.

Like a diver. Designed to accommodate twenty-four people, the elevator is designed to look like a nautical elevator for divers: screens simulate the descent to 37 metres as visitors are taken to an underwater station in basement level 2. A ‘Twenty Thousand Leagues Under the Sea’ metallic environment, where visitors embark on exploratory vehicles.

A tour of the cave on board exploratory vehicles. The vehicles* are quiet electric vehicles, with a capacity of 6 people. They take thirty-five minutes to complete the 220-metre itinerary in semi-darkness, at a speed of 0.377 km/h. Wearing audio headsets that are synchronised with the panels, the visitors gradually discover the rock art panels that light up as they approach. The circuit enables visitors to see all the types of rock art and understand their significance. Everything, including the presence of bodies of water, contributes to creating the illusion of being in a real cave.



© Kléber Rossillon & Région Provence-Alpes-Côte d'Azur / Sources 3D MC

Relive the discovery and study of the Cosquer Cave in eight minutes. Complementing the tour of the cave, the general public is invited to watch a film in the Jean Courtin amphitheatre on basement level 2. The eight-minute film about the Cosquer Cave tells the story of the cave's discovery and the subsequent research, conducted under the direction of the Regional Cultural Affairs Directorate (DRAC) (Provence-Alpes-Côte d'Azur).

Visitors come back up into daylight via a staircase... taking them to the third floor, in the cantilever where the archaeological interpretation centre is located.

* The exploratory vehicles are manufactured by ETF Ride System, a Dutch manufacturer, a subsidiary of which specialises in the construction, provision, and installation of vehicles used in amusement parks.



© Stefano Boeri / Région Provence-Alpes-Côte d'Azur

THE TOUR IN FIGURES

1700 m²: surface area of the replica of the cave Cosquer on basement level 2

44: number of exploratory vehicles in the replica

6: number of people per vehicle

0.377 km/h: speed of the vehicles

48 seconds: interval between each vehicle departure

220 metres: length of the itinerary in the cave

35 minutes: duration of the itinerary

404: number of seats in the Jean Courtin amphitheatre

1,325 m²: surface area of the permanent exhibition area on third floor

13: number of stuffed animals

THE ARCHAEOLOGICAL INTERPRETATION CENTRE

Find out more. What happened during the Upper Palaeolithic Period around Marseille? In what type of environment did the small groups of Homo sapiens who left their mark in the cave live? What can still be learned about their activities before the cave is completely submerged by the rising sea levels? And what will happen on the Mediterranean coastline in the future?

The archaeological interpretation centre is centred around these questions, and is organised into two main themes: prehistory and rock art, and the rising sea levels and global warming.

Resource persons, in particular historians and climatologists, have helped design the itinerary and create the scenography. Historical collections, copies, digital tools, and stuffed animals are mediation tools that enable visitors to explore the Cosquer Cave.

The Upper Palaeolithic Period. Models enable visitors to see what Cape Morgiou was like 30,000 years ago. A copy of a rock shelter and an animated optical theatre recreate the Provençal environment during the last glacial period. A life-size bestiary brings to life the animals represented in the cave (see inset), and shows visitors the areas in which they lived. Ornamental objects and the teeth of sea animals show attest to the activities of the groups of hunter-gatherers in the sea. How did they navigate? Based on archaeological data, a Palaeolithic boat will be made.

And what did Palaeolithic man look like? The plastic artist Elisabeth Daynès has made a model of a female Homo sapiens. Where did she live? A one-metre-diameter luminous globe shows the phases of the expansion of Homo sapiens around the world.

Rising sea levels and global warming. The unique situation of the Cosquer Cave, which is almost completely submerged, demonstrates the effects of rising sea levels over the long term, from the Last Glacial Maximum (LGM) until 2130. An eleven-metre-wide dynamic projection, reproducing the Marseille harbour with a simulation of the rising sea levels over the last 25,000 years, animated models, and videos will address the sea-level changes, explain them, enable visitors to understand the effects and much more, and raise public awareness about the current consequences of global warming.

A venue open to the general public. 'Cosquer Méditerranée' is designed to accommodate a large number of visitors—around 500,000 visitors a year—and undoubtedly a greater number in the year in which the venue opens its doors to the public.

The venue is open to everyone: from connoisseurs of prehistory to explorers who are scuba diving enthusiasts, from specialists to people who are curious, and visiting tourists, and, of course, schoolchildren who will be welcomed throughout the year, with special admission fees.

The educational programme will focus on the active participation of the pupils in educational workshops adapted to the school curriculum and that cover prehistory through rock art, underwater archaeology, man's relation to the sea ... it will, in particular, be highlighted as part of a partnership with the French Federation of Underwater Studies and Sports (Fédération Française d'Études et de Sports Sous-Marins). Secondary school students will be able to gain admission to the facilities with an 'e-Pass Jeunes' card provided by the Provence-Alpes-Côte d'Azur Region.



© Kléber Rossillon & Région Provence-Alpes-Côte d'Azur / Sources 3D MC

LE BESTIARY GRANDEUR NATURE

The animal species represented on the cave's walls are displayed in the interpretation centre. Thirteen full-size models have been made by three companies:

- The company OPHYS (based in Prayssac, in the Lot-et-Garonne département) made the ibex, the large stag, the chamois, the saiga antelope, the megaceros, the steppe bison, and the cave lion.
- The Atelier Adess (based in Aveyron) made the Przewalski horse, the Mediterranean monk seal, and the aurochs.
- Pierre-Yves Renkin, an animal sculptor, made the three penguins.

Some of the animals, notably the chamois and the stag, have been stuffed, but essentially they are protected or extinct species; fur from other animals and synthetic fur have been used to make them. The aim of recreating the bestiary in the Cosquer Cave is not just naturalistic: the public is invited to link them with cave art, and think about what governed the work of artists during the Palaeolithic Period.

THE COSQUER SEMINARS

Attesting to the scientific rigour with which the 'Cosquer Méditerranée' project has been carried out, two-day multidisciplinary seminars, entitled 'Rencontres Cosquer', brought together experts and scientists. Organised by the company Kléber Rossillon and the Provence-Alpes-Côte d'Azur Region, in collaboration with the State and regional Scientific Committee and the Ministry of Culture, the first seminar, entitled 'Cosquer, la grotte, l'homme et les animaux', was held on 7 October 2020, by videoconference; the second seminar was held on 9 September 2021, in the amphitheatre of the Museum of European and Mediterranean Civilisations (MUCEM). Devoted to the rising sea levels, the seminar's programme was developed under the auspices of Édouard Bard, a professor at the Collège de France, a member of the Académie des Sciences, and a researcher at the CEREGE research centre in Aix-en-Provence.

The content of the two seminars can be seen on YouTube.

A SCIENTIFIC RESOURCE CENTRE

'Cosquer Méditerranée' will become a place of reference for scientists and a place for the dissemination and popularisation of knowledge for everyone. There are many areas of exploration: the Cosquer Cave, whose study is ongoing, prehistory, archaeology, rock art, and also the environment and the world of deep-sea diving. The interpretation centre will echo these themes during conference cycles and film screenings, by participating in national events linked to archaeology, heritage, and science. Lastly, the Internet site www.grotte-cosquer.com will provide digital resources to help prepare visitors for the tour of the cave, and will provide educational resources and links to the latest research developments.







PRACTICAL INFORMATION

www.grotte-cosquer.com



ADMISSION FEES

Individuals

Adults: €16

Children aged 10–17: €10

Children aged 6–9: €5

Groups

Adults: €14

Students: €5

Cruise ship passengers

Adults: €12

Children aged 10–17: €9

Children aged 6–9: €4

IMAGES AVAILABLE FOR THE PRESS

grottecosquer@pierre-laporte.com

IMAGES OF THE ORIGINAL CAVE

To obtain images please contact:

the National Centre

for Prehistory head office:

centre.national.de.prehistoire@culture.gouv.fr

at the DRAC, webmaster:

catherine.cauche@culture.gouv.fr

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