Cave of Lakes
Kastria Achaea - Kalavrita - Greece

GENERAL INFORMATION ABOUT THE MYTHICAL

"CAVE OF LAKES"

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Welcome to the three-story "Cave of Lakes", in the mythological clinic of "Melampa" in ancient times.

The caves are magical and mysterious places. They stand over the centuries as source of inspiration for poets, historians and storytellers. Caves travel the soul and mind of every visitor to places and seasons forgotten by time.

The "Cave of the Lakes", as it has been repeatedly described, is a unique sight, like a magical tale. Prehistoric people, ancient monks and princesses bounce through the myths of the ancient word, historical references and oral traditions. These traditions, as also speleological

and archaeological investigations, draw the visitor to a magical journey in time.

In fact, the Cave is much more than a natural monument. It is a shell that protects and preserves, over the centuries to this day, human and cultural remains. Archeology and biology records the species of cavernous organisms. Also geology, examines the part of the creation and composition of the caves (stalactites, stalagmites, "columns", basins and lakes). All together, unite their strengths to reflect the diversity, splendor of space and to showcase this rare "work of art" of Nature.

The Cave of the Lakes is part of the mountainous area of Helmos and the hydrological basin of the Aroaneio River. It is located at an altitude of 827 meters, surrounded by steep drift hill excursions of the Aragon Mountains.

The old cave was an underground river.

Water came from the plateau "Apanokampos", 4 kilometers from the cave. This water was poured into the cave by natural sinks and underground ducts. These sinks and ducts lead to the springs

of the Aroaneion River, 5 kilometers from here.

Over the centuries the water, due to its corrosive properties, has opened up to lower levels and abandoned the old bed. The cave is perforated on its higher walls, as there are small springs that operate in times of rainfall and snowfall.

That is why the water exists there today. In the remaining seasons, the cave maintains permanent water in its 13 large lakes. That is why it got the name "Cave of lakes".

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Geology

The creation of the caves

Karsification

In nature, there are many mechanisms that create natural cavities and caves. The most common way of creating a cave, is that associated with the so-called karstic process.

The term karst comes from the Carso region of Slovenia. This phenomenon was first observed and studied there, as a result of the solubilization capacity of the carbon dioxide-enriched water in a rock form. This rock form is called limestone.

Limestone consists of calcium carbonate. It has been created from its deposition on

the seabed and lakes. It is almost insoluble in water, but becomes particularly soluble if it is acidic. Especially when carbon dioxide is dissolved in the water. Rainwater is enriched with carbon dioxide. Carbon dioxide exists in the atmosphere as well as on the ground because of plant roots.

In this way, water dissolves insoluble calcium carbonate. Also, passing through the cracks of the rock, expands and deepens them. In the case, where water meets layers of water insoluble and impermeable material, it moves along these layers, dissolving only the limestone. As a result of this process, it is the creation of an extended length of underground cavities.

Karst cavity widening – Caves

Calcium carbonate is never clean. Impurities which are insoluble in water, drifted in it in the form of mud while hitting on the rock. In that

way it becomes more corroded. Thus, we see the chemical dissolution caused by water.

On the other hand, the mechanical erosion depends on the flow rate and the amount of water, but also the insoluble materials transferred from it. Thus, the underground galleries are continuously dispersed, allowing more and more water to pass. This amount of water can transport thin matter and other materials such as sand and stones.

In this way, mechanical corrosion is strengthened and gives forms in the cave, such as pits on the floor and on the walls and domes on the roof. Then, due to the instability of the walls of the cave some parts of it may fall, altering its morphology. This can be caused by their gradual erosion or the earthquakes. The final form of a cave is the result of chemical and mechanical processes that never stop. However, these procedures may gradually lead to the destruction of a section, or of the entire cave. The creation of a large cave can last several hundred,

thousand or sometimes millions of years. However, much less time is needed to destroy it thus we have no right to contribute in any way to a possible destruction.

Decoration of caves

Stalagmithic decoration – caves

As we have seen above, the first phase of the karst phenomenon is that of erosion. But there is also a second phase of creation, the formation of stalagmites.

The water while passing through the cracks, dissolves the limestone chemically and then mechanically. When the underground vault is formed, the water, continuing to flow, reaches the roof of the dome. From the dome, it drops in the form of drops or it flows through the walls and the floor. The phase of creation begins here. It includes various forms, called cave-like or lithographic decoration, and it presents an impressive variety.

The most known forms of caves are those of stalagmites and stalactites, coralloids, curtains, dams and helices. These forms can be combined with each other, creating the unique natural decoration of the caves.

From these forms we see the following in the “Cave of Lakes”:

Stalactites and Stalagmites

While the water passes through the cracks lays in a room with less pressure and higher temperature. These conditions disrupt its chemical balance, and so the water loses its carbon dioxide and leaves a calcium carbonate precipitate. Calcium carbonate crystallizes into calcite form, usually less rarely aragonite. These small crystals are cyclically distributed at the base of the water drop while still hanging from the ceiling. However, continuous flow increases weight so the drops fall on the floor, dragging along

with them a portion of dissolved calcium carbonate. The remaining calcium carbonate has been left on the roof. This phenomenon can continue for centuries or even for thousands of years. The effect of this phenomenon, is the creation of the stalactites on the ceiling, from top to bottom, or the stalagmites on the floor, from the bottom to the top. Their creation speed is usually a few millimeters per year.

The shape of stalagmites differs from that of stalactites, usually conical, with the cone tip down.

Coralloid shapes

The coral forms include a set of forms reminiscent of corals. Their size varies from a few centimeters to several tens of centimeters.

These shapes are formed either directly on the walls of the cave, or on other forms of decoration. There are many and complex mechanisms through which they are formed.

Most of them are related to the presence of a finest layer of water, that flows over pre-existing irregularities and deposits carbonaceous material.

More complicated processes are the airborne, the transfer of water, droplets and the condensation of water vapor to specific horizons.

All these processes, are related to the conditions of air circulation in a cave.

Curtain-like forms

The curtain-like forms are the hallmark of the decoration of most caves. This shape resembles a curtain hung from some points on the roof, creating characteristic longitudinal folds. Their formation is attributed to a combination of surface flow and drooping. It is initially formed by the flow of a thin layer of water, along a side surface of the walls of the cave. Small anomalies of this surface create

micro-patches in deposits. Finally, as the curtain-like form develops, the drooping creates new and complex ends at their extremity.

Dams - "gur"

The dams, also called "gur", are in the form of laceloid vertical walls formed at the edges of stagnant water concentrations.

Their size and development vary and can often reach several meters, forming impressive formations. Very well-known and impressive examples of this decoration are the dams of the "Cave of Lakes".

Aspirated forms or disks

Aspirated forms are disk-shaped formations, often reaching a size of 2-3 meters. They are formed at the tips of a fine crack, where the water exits under pressure and deposits carbonaceous material. Impressive are the

aspirated forms. They are formed along the breaks of stalagmites, thus interrupting their continuity with a new form. Typically, the drip at the edges of the aspirated forms creates characteristic stalagmite shapes, decorating the whole of the formation.

Helectite

Helectites are complicated subtle forms. All helices are characterized by the existence of a central hole, through which the edge is fed with water.

They are formed where there is a porous background. Also, their development does not obey the laws of gravity. That's why the first researchers of the phenomenon created many theories concerning how helectites were formed.

Today, it is believed that their creation is due to capillary phenomena (very fine conduits), combined with the amount of outgoing water (less than 1 litre per year).

ARCHEOLOGY

Uses of Caves

Humans used caves since the beginning of their appearance on earth. If the use was not permanent, then it was for casual living just like shelters in bad weather or hostile raids.

Also, caves where used for seasonal accommodation for hunting or shepherding accommodation, animal housing, etc.

The caves were often used as places of burial of the dead, but also as places of worship or divination. Important factors for the use of caves were their shape, size, lighting, humidityand temperature inside, as well as their location.

Their location was isolated or near a settlement and a sanctuary. Access to a cave and proximity to rivers or other sources of water where of particular importance.

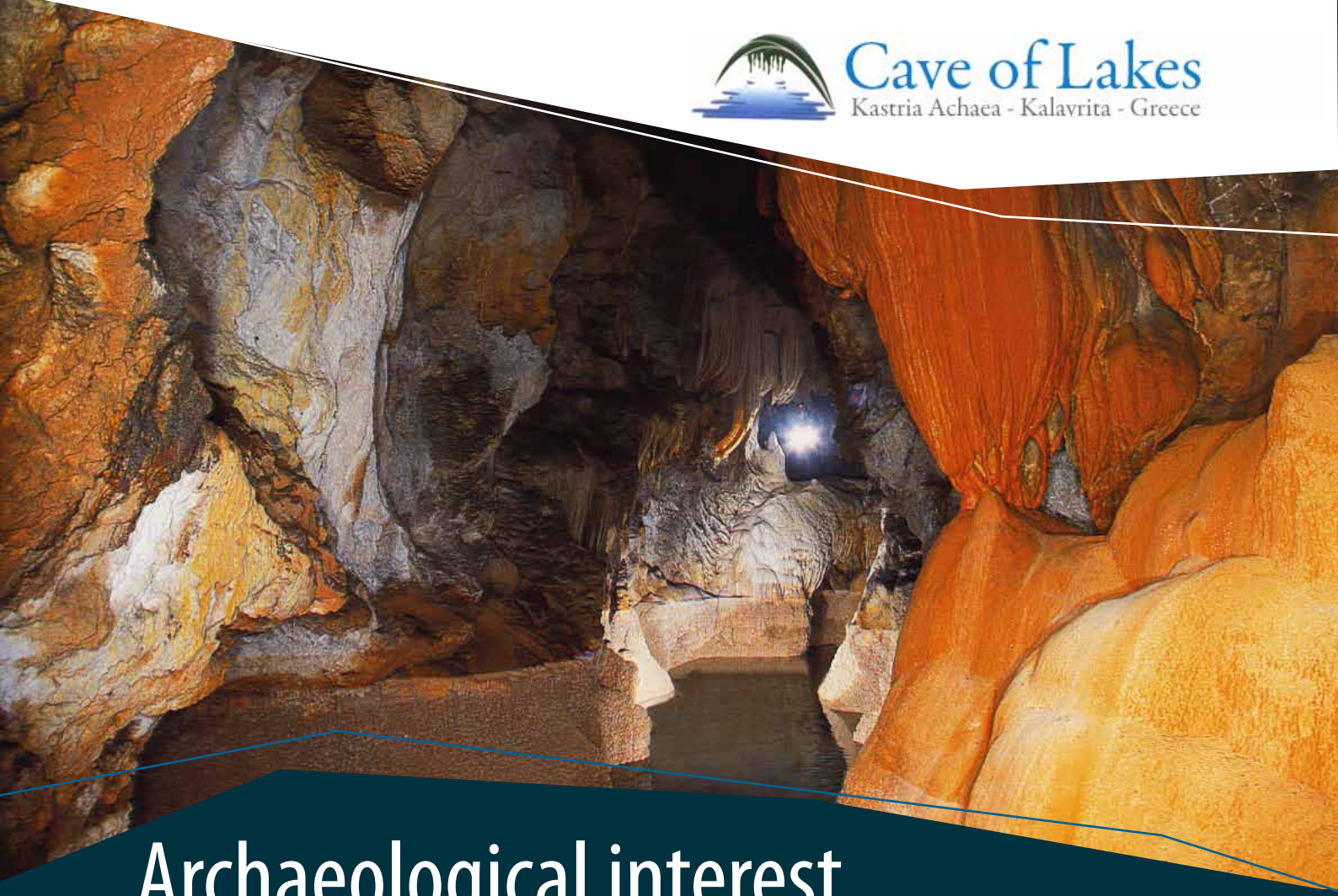
Also the presence of water in the cave was really important. It is known..that a cave has multiple uses at the same time and it is also certain that its use will change over the centuries.

In Greece, man's presence and activity in the caves is detected on the basis of osteological remains.

Detection is also based on food residues like seeds, bones and animal bones.

Everyday vases or worshiping vases and various tributes suggest presence and activity of man.

Man activity is also recognized in the relics of walls and floors, usable structures, such as cooking and heating stoves and sacrificial altars.



Archaeological interest

Some of the above mentioned elements are also recognized in the Cave of the Lakes. It was revealed that this area was used by man. Man used it as a storage site, shelter for shepherds and their flocks and as a burial site for the dead. This use took place mainly during the Neolithic Period (end of the 5th

millennium BC) and the Bronze Age (3rd and 2nd millennium BC).

The revelation occured after the excavations done by the Ministry of Culture.

The excavations conducted at the first level of the Cave, especially during the 90s, underAdamantios Sampson.

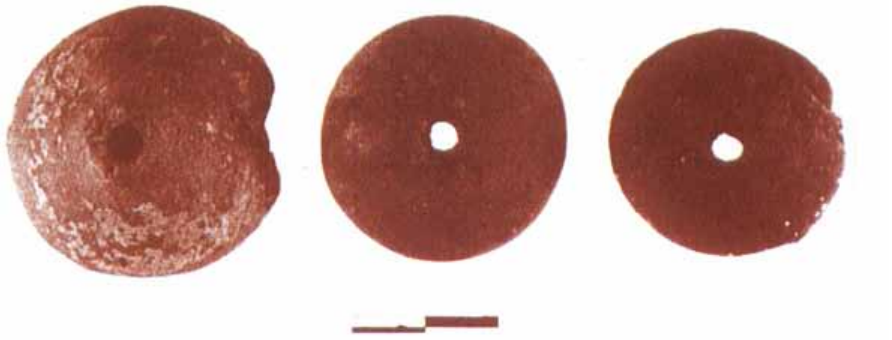
Of course, every attempt of permanent habitation was impossible.

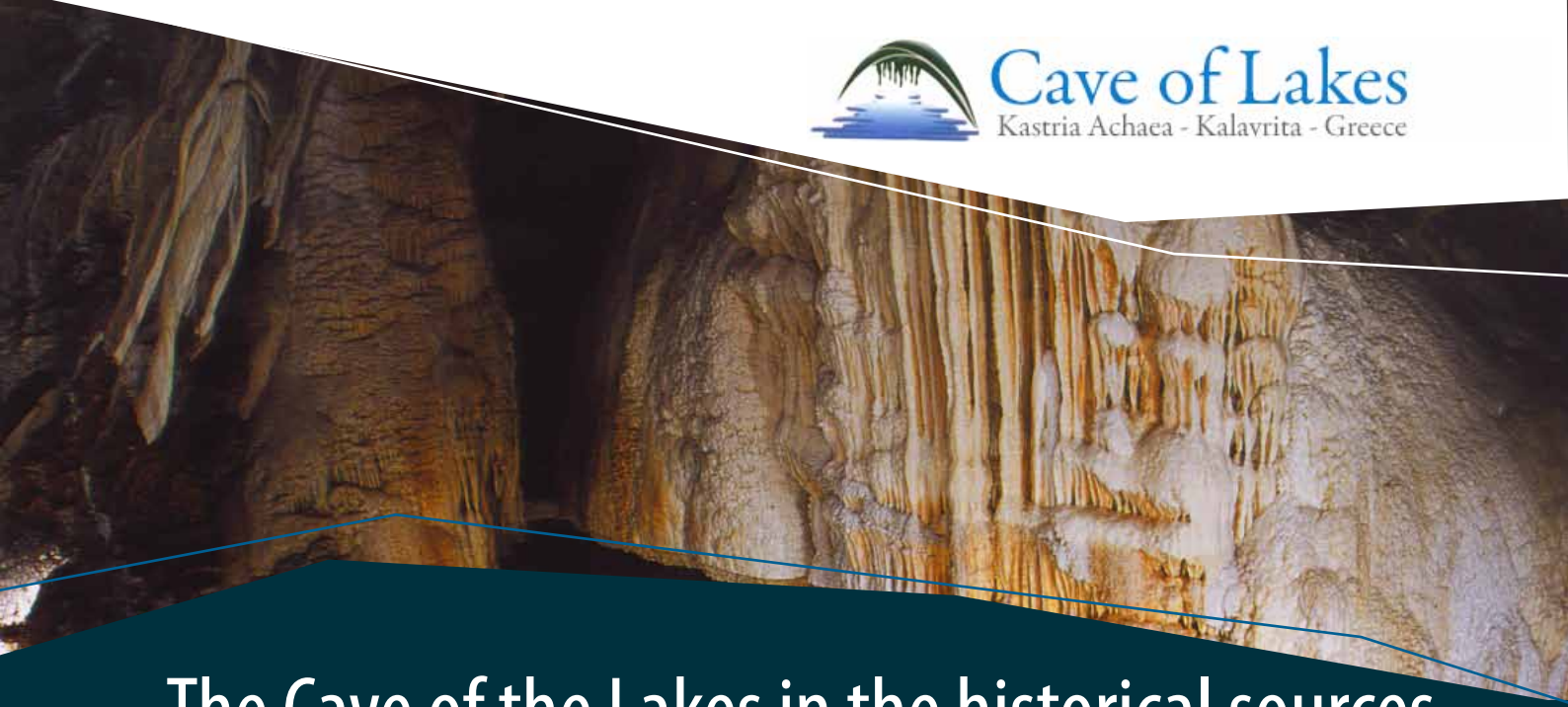
The reason was the velocity of water that fell from the second level. As a result, the use of this level took place mainly during the months with no to little rainfall.

The first level of the caves was used during the Neolithic Period (4500 – 4200 BC) and especially during summer, considering the altitude (800 meters). Several breeders of that period chose to move their flocks from the lowlands to high altitudes.

They used clay utensils and stone tools made of rock existing on the area. Obsidian, black volcanic rock imported from Milos was

also used as is evidenced by some of the stone finds. Archaeological research revealed human graves at various points in the first hall of the cave dated back to the Neolithic period. Also bones safekeeping containing human skulls dated back to the Bronze Age (around 1800 BC).





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The Cave of the Lakes in the historical sources

The ancient traveler Pausanias (second century AD) mentions in "ARCADIKA" (B, 18,7) about the cave:

"There is a cave in the Aroonia Mountains (Helmos). It is said that the daughters of Titus, King of Tirintha, went up and found refuge there, when they went mad ..."

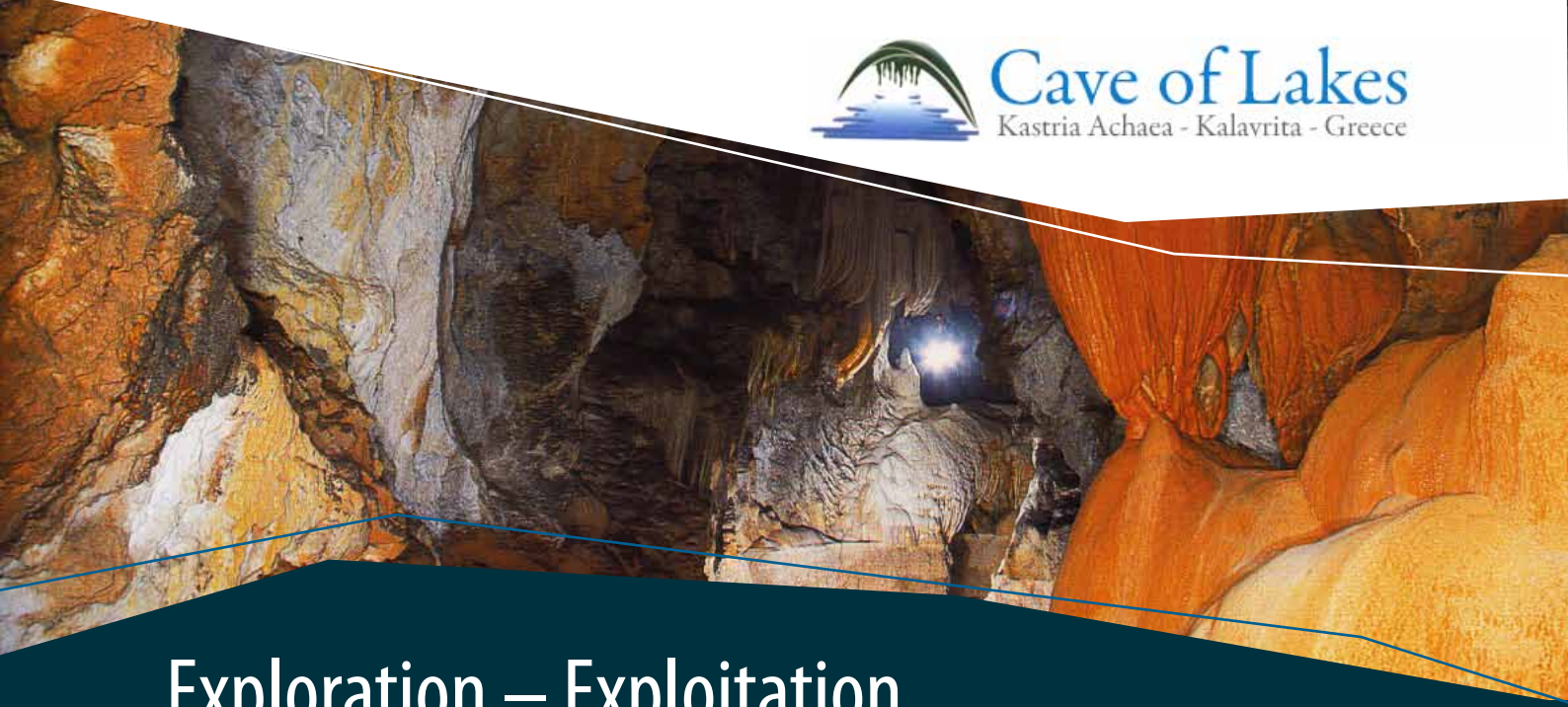
According to Greek mythology, Lissipi, Iphinis and Iphianassa, the daughters of Prito, boasted that they were more beautiful than goddess Hera and contempted the worship of Dionysus.

Hera did not forgive their arrogance and their indecency towards Dionysus. So she blamed

their senses. She made them think they were heifers and wandering around Peloponnese.

They conveyed a fury of childhood among the women of Argolis. Sometime they arrived at the Cave of Aroaneia, where Melampa found them and healed them.

Melampa was the first mortal to whom the gods gave the ability to cure diseases and to anticipate the future. He then led them to the neighboring village of Lousoi.



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Exploration – Exploitation

The discovery of the Cave was quite recent (1964). Only the first level, which is located next to the road and accessible by the natural entrance of the cave was known until then.

Nevertheless, no one dared to enter the first level until that time due to the large quantities of water, which drained from the natural spout, especially during periods of heavy rainfall. There are reports of large quantities of water, which flooded the first level and were rushing down the road in 1922 and 1940. This, like various superstitions of the past, was the main reason for the delay of the cave discovery.

The initiative belongs to the local resident Vassilis Tempelis. He managed, along with other residents of Kastria village, to overcome the vertical rocks. So they passed the first level and ascended to the second and so they reached the first lake. In order to accomplish it, they used an improvised wooden 9-meter staircase and some ropes.

During the next year, Greek and foreign mountaineers-speleologists, began more systematic exploration and mapping. They distinguished the specificity and uniqueness of the Cave. Professor of palaeontology Yiannis Melentis and speleologist Anna Petrochilos were in charge.

The most complete exploration and depiction of the Cave, has been done within the framework of a study by the Ministry of Culture.

This was carried out under the responsibility of the Geologist Vasilis Giannopoulos.

The explored length of the cave is 1980 meters, physically divided into three levels. The second level, 500 meters long, is the only one accessible to visitors at the moment.

A 40 meter long tunnel was opened for easier access at the side, 23 meters higher than the natural entrance. The tunnel leads the visitor straight to the beginning of the second level. Along the tunnel are placed color slides with the most impressive third-level snapshots.

These snapshots, have not been exploited yet. The photographs belong to Giorgos Avagianos, Giorgos Gklavas and Filippa Panoulia, members of the Hellenic Speleological Society.

The temperature in the cave is constant throughout the year, between 15-17 degrees Celsius. This phenomenon is called isotherm.

The moisture level is also constant and is always above 70%, sometimes up to 99%. This is the reason why there are succes-

sive doors in the tunnel. The doors keep the temperature and humidity levels constant.

Also, they do not alter the stalactite and stalagmite decoration of the cave.

The exploitation of the cave started in 1981, by the Greek National Tourism Organization.

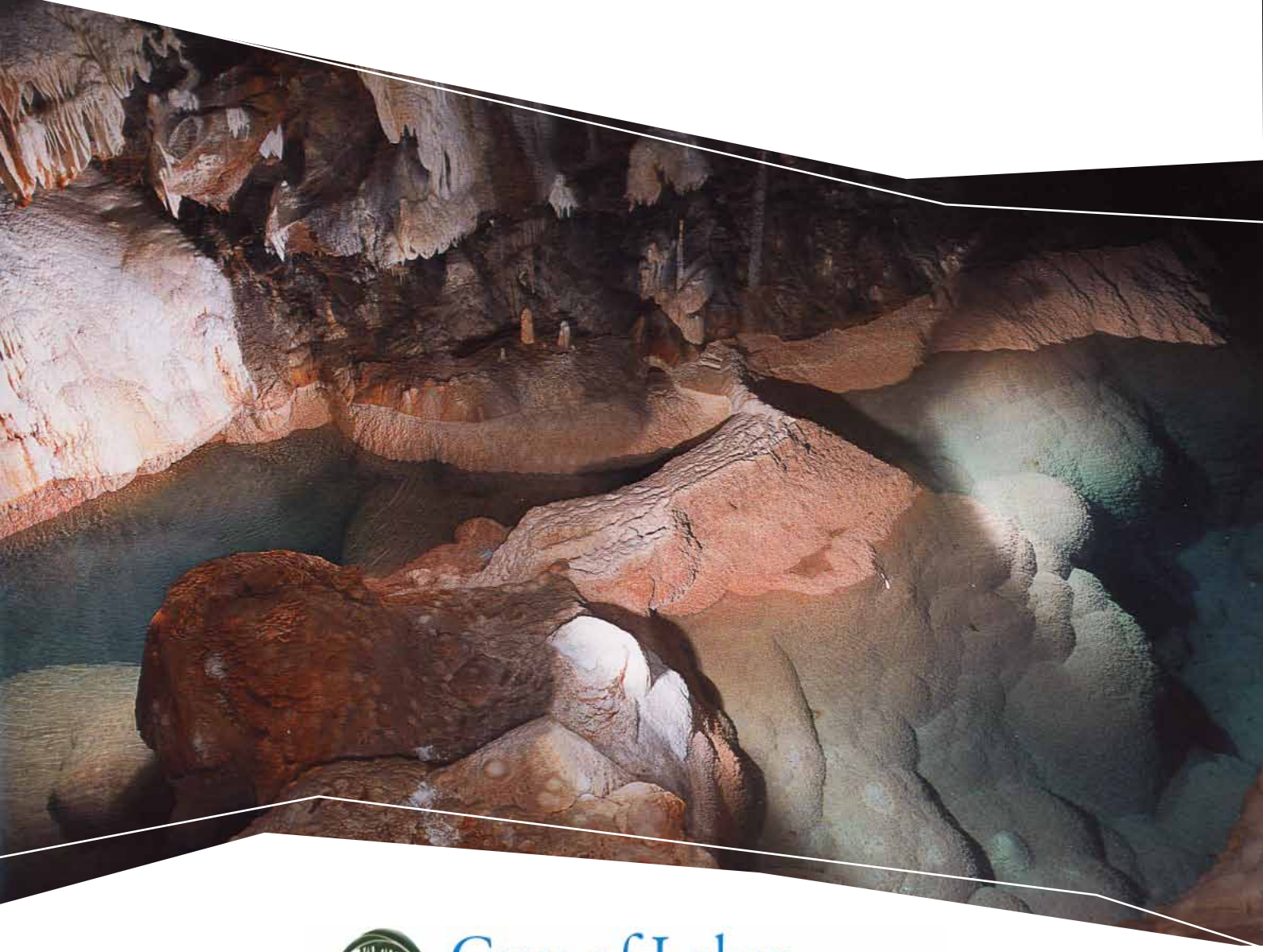
The exploitation was continued by the Municipality of Kalavrita and the Ministry of Culture. Subsidies from European Union programs and from the operating income of the cave, contributed to the exploitation.

The exploited section extends to a length of 500 meters. It has access from an artificial entrance and a tunnel leading directly to the second level of the Cave.

The main factors considered during the caves exploitation were the null alteration and respect of this unique masterpiece of Nature.

The materials that were used for the

infrastructure, in terms of the bridge, the lighting, etc., coexist harmoniously with the natural decoration.



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Administrative bodies
of the Cave of the Lakes

Due to its archaeological interest, the Lakes Cave is an ancient monument subject to the protective provisions of the archaeological law.

The Cave as a monument of nature also forms part of the Geopark of Helmos - Vouraikos. The

Helmos - Vouraikos Management Organization, in cooperation with the Municipality of Kalavryta, the Regional and Central Administration (Western Greece Region, relevant Ministries, etc.), the Klitoria Environmental Education Center and the Cave of the Lakes are the main partners responsible for the protection and promotion of the Geopark. They aim to promoting actions for the sustainable tourism development of the area (alternative tourism and promotion of certified local products). They take initiatives to inform and sensitize people and they encourage active participation of local society concerning sustainable tourism activity and environmental education in relation to the rational management of natural resources.

The Geopark Managing Authority of Helmos - Vouraikos is a member of the Greek network of geoparks. It is also a member of the corresponding European Network and the Global Network of Geoparks, set up under the support of UNESCO.

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