

UNIVERSITY OF NOVA GORICA  
GRADUATE SCHOOL

**THE CULTURAL IMPORTANCE OF KARST AND CAVES**

DISSERTATION

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UNIVERZA V NOVI GORICI  
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**KULTURNI POMEN KRASA IN JAM**

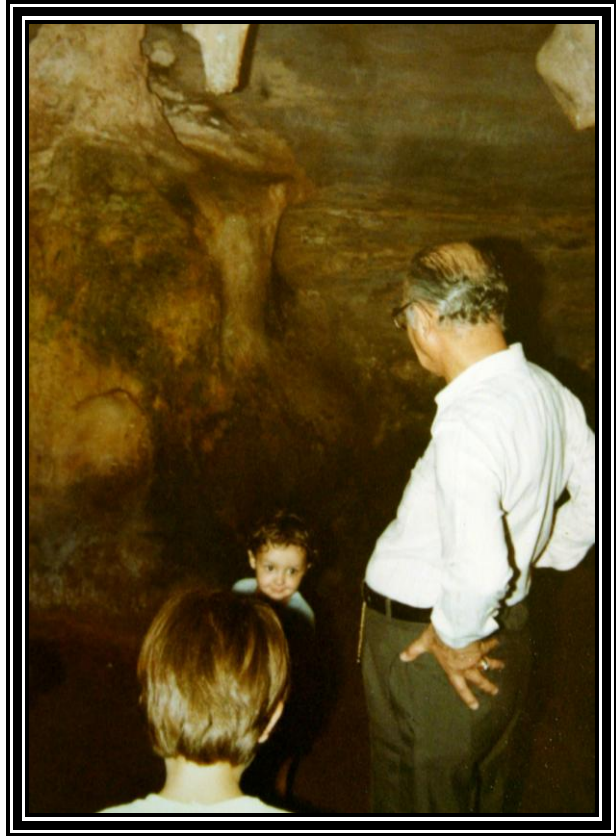
DOKTORSKA DISERTACIJA

**Luiz Eduardo Panisset Travassos**

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Dr. Oswaldo Bueno Amorim Filho

Nova Gorica, 2011

Izjavljam da je doktorko delo v celoti moje avtorsko delo.  
I declare that this thesis is my author work exclusively.



*I dedicate this work especially to my companion Isabela and to who I consider to be my son Bruno, due to the many times when I was absent. Of the several times I have been out, I was asked by my Slovenian friends where was Isabela! And my answer was always that this “holy” companion was not with me in person, but was always by my side in thought.*

*On the first trip we did together to Slovenia, we experienced a native fruit from the region which is called Izabela. Since then, whenever I was in that wonderful country, I remembered her by the coincidence of the name and, certainly, by her constant sweetness towards me.*

*I also dedicate this work to my family, represented here by my grandparents, my parents and my brother due to the good examples that were set to me and I hope I had followed.*

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*It is also important to remember my other grandfather Dr. João Soares Travassos, medical doctor of the underground workers at the Morro Velho Mine, in Nova Lima, Minas Gerais. While checking some books I came in touch with this picture from May 1980, where I appear with him in the “darkness” of the Maquiné Cave, Cordisburgo, Minas Gerais, the region where I did my Masters*

*Here I register my happy record my memories of this and many other happy moments next to him and dedicate this work based also in the underground*



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## **The cultural importance of karst and caves**

**Abstract:** The karst landscape and caves can be perceived by several people in an equally varied way. From laymen to scientists, caves especially assume different meanings according to the historical and cultural conditions of a particular society. Therefore, one can say that the human relationship with caves is not really new in the history of mankind. Also no less new is the motivation for their use as shelters, safe houses and sacred places. Thus caves and karst are important historical and geographic records of specific regions. Often they present common features of various cultures as shown throughout this work. As a general objective of this research, is the investigation of the cultural use of karst and caves based on Cultural Tourism. Through extensive literature review, study of the areas protected by UNESCO, the analysis of the sites visited by Hayes (2005-2009) and the study of four specific cave shrines (two in Brazil, in Minas Gerais) and two in Slovenia-Italy the objective is to undertake a study that helps to promote the dissemination of the cultural use of karst and caves. It is also intended mapping the information and contribute to discussions on the religious use of caves and to insert this topic in the studies of the geography of religion in particular and of the Cultural Geography in general. Sacred and cultural sites occur in a variety of landscapes and, thus, the research should help to start discussions throughout national karstology in a field of study which is still very little researched systematically in Brazil. It is also intended to make a contribution to the union between the preservation of cultural heritage and the conservation of the karst geological heritage and its caves. The work is also based on deeper theoretical issues related to karst landscapes and their relation to the cultural and religious tourism, based on a bibliographical review highlighting the importance of the work of several important geographers who combined the physical and human studies. They were Humboldt, Malte-Brun, Reclus, Nicod, and Gauchon. Thus a timeline was established to the present day. Other naturalists are also mentioned, giving a greater meaning to the cultural importance of karst and caves. The literature review aimed to demonstrate and discuss the applicability of concepts, such as topophilia, topophobia, sacred and profane applied to the karst, linking them to national and international examples. This step was important for the construction of a theoretical base which was essential for the development of the research theme. While developing the work, the researcher introduced the methodology of inventory and quantification for the evaluation of the geomorphological patrimony used by Pereira (2006), and then first applied to the Portuguese karst by Forte (2008) to the Brazilian sacred sites. The results indicate that the cultural heritage of the karst landscape has become a source of distinction in the international and national scientific community, though, little work on the theme is yet made nationally. Equally recent are the works that present the cultural importance of karst and caves. Thus, the issues that were treated in the research should be seen as a contribution to Geography and Karstology, both considered as plural sciences.

**Keywords:** Karst, Caves, Cultural Geography, Geography of Religion.

## **Kulturni pomen krasa in jam**

**Izvleček:** Različni ljudje tudi dojemajo kraško pokrajino in jame različno. Tako za laike kot strokovnjake imajo posebno jame lahko različen pomen glede zgodovinske in kulturne razmere določene družbe. Lahko rečemo, da odnos človeka do jame ni nekaj novega v zgodovini človeštva. Prav tako ni nova želja, da bi človek uporabljal jame za zatočišča, pribežališča in svetišča. Tako predstavljajo kras in jame pomemben zgodovinski in geografski zapis določene regije. Kot je razloženo v tem delu, so to pogosto običajni pojavi v raznih kulturah. Splošna tema tega dela je raziskava o uporabi krasa in jam v kulturne namene na osnovi kulturnega turizma. Na osnovi pregleda obsežne literature, preučevanja področij, ki so pod zaščito UNESCO, analize krajev, ki jih je obiskal Hayes (2005-2009) in preučevanja štirih jamskih svetišč, dveh v Braziliji (Minas Gerais) in dveh v Sloveniji ter Italiji, nameravamo napraviti študijo, ki bo pomagala osvetliti in seznaniti z uporabo krasa in jam v kulturne namene. Nameravamo se tudi poglobiti v prostorske informacije in s tem prispevati k razpravam o uporabi jam v religiozne namene in vključiti to snov v študij posebne geografije religije in splošni študij kulturne geografije. Kraji, ki so sveti ali uporabljani v kulturne namene, so v najrazličnejših pokrajinah in to delo naj bi vzpodbudilo razpravo v krasoslovnih krogih po vsej državi o tem področju študija, ki je zaenkrat v Braziliji še precej neupoštevano. Namen študije je tudi prispevati k medsebojnemu razumevanju med ohranjanjem kulturne dediščine in kraške geološke dediščine ter jam. To delo temelji tudi na poglobljenih teoretičnih spoznanjih o kraški pokrajini in njenem odnosu do kulturnega in verskega turizma, dobljenih s pomočjo pregleda literature, predvsem del pomembnih geografov, ki združujejo tako fizično kot družbeno geografijo. To so Humboldt, Malte-Brun, Reclus, Nicod in Gauchon. S tem je tudi vzpostavljena povezava med preteklostjo in sedanostjo. Omenjamo tudi druge naravoslovce s poudarkom na kulturnem pomenu krasa in jam. Namen pregleda literature je tudi pokazati in razpravljati o možnosti uporabe na krasu konceptov, kot so topofilija, topofobija, sveto in profano ter jih povezati s primeri iz domovine in tujine. Ta korak je bil pomemben za vzpostavitev teoretičnih osnov, na katerih sloni ta raziskava. V pripravo doktorskega dela smo vključili tudi inventarizacijo in kvantificiranje, s čimer je bilo mogoče ovrednotiti geomorfološko dediščino po metodologiji, ki jo je uvedel Pereira (2006) in jo je prvič uporabil Forte (2008) na portugalskem krasu ter za brazilske svete kraje. Rezultati kažejo, da je kulturna dediščina na krasu vedno pomembnejša v narodnih kot tudi mednarodnih znanstvenih krogih, čeprav je bilo v Braziliji na tem področju šele malo narejenega. Pravtako so šele novejšega datuma dela, ki potrjujejo kulturni pomen krasa in jam. Tako je treba tudi na rezultate naših raziskav gledati kot na prispevek h Geografiji in Krasoslovju kot multidisciplinarnima vedama.

**Ključne besede:** kras, jame, kulturna geografija, geografija religije.

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## INTRODUCTION

*The uniqueness of the karst reliefs is such that it seems to lack of ordinary laws of erosion (...).To explain these forms it is needed to foresee a whole new group of erosion process. It is not about modifying details in the normal cycle of erosion, but opening a vast parenthesis and leave a place set a part to the “karst reliefs”*

*E. de Martonne, 1933*

### Object of study

The karst landscape and its caves may be perceived by many people and in varied ways. From the layman to the scientists, especially, the caves have different meanings according to the historical and cultural evolution of a society.

The regions developed in carbonates such as limestone make up about 10 to 15% of the Earth's surface (Ford & Williams 2007). Williams (2008) also states that karst is found mainly in soluble rocks such as limestone, marble and dolomite. However, it also can be developed in evaporites (e.g.: gypsum and halite). The carbonatic outcrops comprise about 15,000,000 km<sup>2</sup> of the not frozen Earth's continental area (11% of area). But the underground carbonates involved in the movement of subsurface groundwater are considerably higher, perhaps about 14% of the world.

Thus, a new proposition of these percentages, especially in the rocky outcrops, was proposed by Williams and Fong (2008). The new proposal shows that about 12,5% of global land surface outcrops have carbonates. The authors emphasize that they try to differentiate the areas where the carbonatic rocks are relatively pure and continuous from those relatively impure and discontinuous (Figure 1 and Table 1).

In some degree one can say that all rocks are soluble. So features of micro-scale dissolution may be found in “insoluble rocks” as the quartzites and basalts. Although showing karstic features, because they are fully formed by dissolution, the landscape in which they are inserted cannot be considered karst; it is composed of rocks relatively insoluble dominated by features produced by other natural processes (Williams 2008).

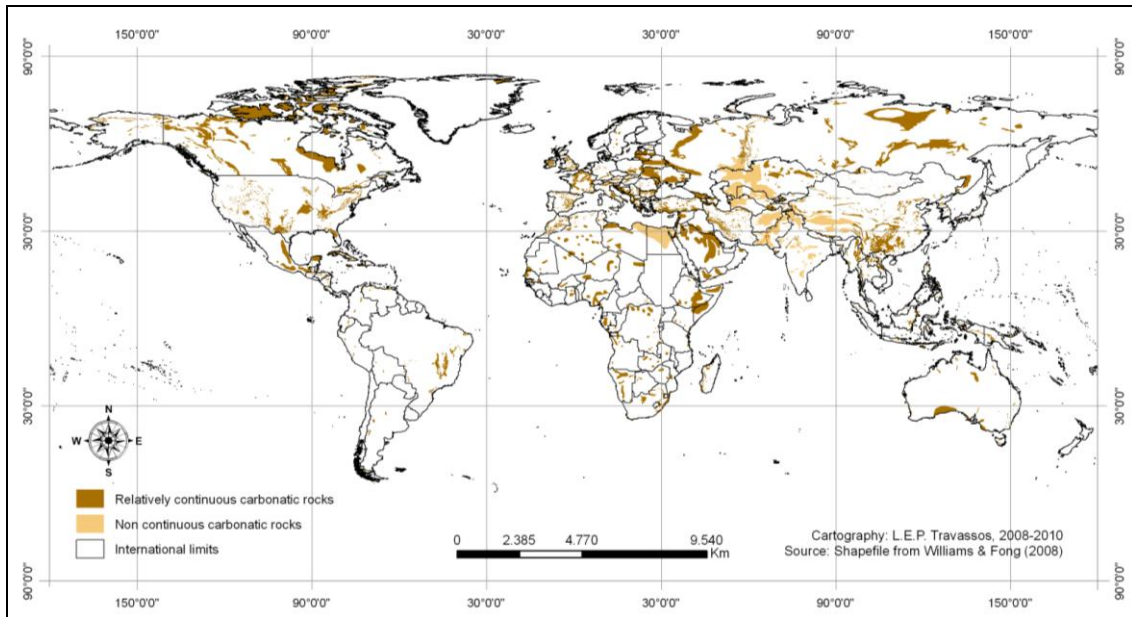


Figure 1 – Spatial distribution of carbonate rocks according to Williams and Fong (2008). Areas in black correspond to regions of relatively continuous carbonatic rocks. Areas in gray correspond to regions abundant in non continuous carbonatic rocks.

As shown in Figure 1 it is possible to see how distributed karst areas are over Earth's surface. So it is not surprising that these regions have been used by primitive man since the beginning. By the very characteristic of relief, karst areas were ideal to be used as shelter and source of natural resources.

In karst regions, the first human settlements were set up. Around the world one can see that whole populations are supplied by karst waters and, in many cultures, the caves are still used as places for religious practice, as cultural manifestations and other forms of use (Travassos 2007d).

The study of this peculiar type of relief could be already seen in the works of Greek and Roman philosophers as highlighted by Travassos (2007d). Brief descriptions of the Classical Karst (Region of the Kras Plateau, Slovenia) have already appeared in works of the 4<sup>th</sup> century BC, as well in the works of Strabo, Pliny, Polybius, among others. In a clear description of a sink and a resurgence, Posidonius of Apameia (135-50 BC) states that the river Timavus disappeared between the mountains, flowing into an abyss and only reappeared at a distance of 130 stadiums, toward the sea (Kranjc 1997; Kranjc 2006a; Travassos, Kohler & Kranjc 2006). The Roman geographer Strabo (63 BC-21 AD) was probably the first to mention Lake Cerknica (Kranjc 2006b).

**TABLE 1**  
**WORLD CARBONATE OUTCROP AREAS**

<b>REGION</b>	<b>COUNTRIES INCLUDED</b>	<b>LAND AREA (Kkm<sup>2</sup>)</b>	<b>MAXIMUM CARBONATE OUTCROP (Kkm<sup>2</sup>)</b>	<b>PERCENTAGE</b>
<b>World</b>	Exclude Antarctica, Greenland and Iceland	133448089	16721876	12,5
<b>Russia</b>	Armenia, Azerbaijan, Georgia, Kazakhstan, Kyrgyzstan, Russia, Turkmenistan, Uzbekistan	20649781	3331673	16,1
<b>Federation plus South America</b>	Argentina, Bolivia, Brazil, Chile, Colombia, Ecuador, Falkland Islands (Malvinas), French Guiana, Guyana, Paraguay, Peru, South Georgia and the South Sandwich Island, Surinam, Uruguay, Venezuela	17792882	370809	2,1
<b>Africa</b>	Algeria, Angola, Benin, Botswana, Burkina Faso, Burundi, Cameroon, Cape Verde, Central African Republic, Chad, Comoros, Congo, Congo the Democratic, Cote D'Ivoire, Djibouti, Egypt, Equatorial Guinea, Eritrea, Ethiopia, Gabon, Gambia, Ghana, Guinea, Guinea-Bissau, Kenya, Lesotho, Liberia, Libya, Madagascar, Malawi, Mali, Mauritania, Mauritius, Mayotta, Morocco, Mozambique, Namibia, Niger, Nigeria, Reunion, Rwanda, Sao Tome and Principe, Senegal, Seychelles, Sierra Leone, Somalia, South Africa, Sudan, Swaziland, Tanzania, Togo, Tunisia, Uganda, Western Sahara, Zambia, Zimbabwe	30001574	2773252	9,2
<b>North America (exclude Greenland)</b>	Anguilla, Antigua and Barbuda, Bahamas, Barbados, Belize, Bermuda, Canada, Cayman Islands, Costa Rica, Cuba, Dominica, Dominica Republic, El Salvador, Guadeloupe, Guatemala, Haiti, Honduras, Jamaica, Martinique, Mexico, Monsterrat, Nicaragua, Panama, Puerto Rico, Saint Kitts and Nevis, Saint Lucia, Saint Vincent and the Grenadines, Turks and Caicos Islands, US, Virgin Islands, Virgin Islands (US)	22229293	4076077	18,3
<b>East and South East Asia</b>	Brunei Darussalam, Cambodia, China, East Timor, Indonesia (excluding Papua), Japan, Korea (north and south), Lao, Malaysia, Mongolia, Myanmar, Philippines, Singapore, Taiwan, Thailand, Vietnam	15638629	1688219	10,8
<b>Middle East and Central Asia</b>	Afghanistan, Bangladesh, Bhutan, Cyprus, India, Iran, Iraq, Israel, Jordan, Kuwait, Lebanon, Maldives, Nepal, Oman, Pakistan, Palestine, Qatar, Saudi Arabia, Sri Lanka, Syria, Tajikistan, Turkey, United Arab Emirates, Uzbekistan, Yemen	11129677	2554380	23,0
<b>Europe (exclude Iceland and Russia)</b>	Albania, Andorra, Austria, Belarus, Belgium, Bosnia and Herzegovina, Bulgaria, Croatia, Czech Republic, Denmark, Estonia, Faroe Islands, Finland, France, Germany, Greece, Hungary, Ireland, Italy, Latvia, Liechtenstein, Lithuania, Luxembourg, Macedonia, Malta, Moldova, Monaco, Netherlands, Norway, Poland, Portugal, Romania, San Marino, Slovakia, Slovenia, Spain, Sweden, Switzerland, Ukraine, UK, Vatican City, Yugoslavia	6125842	1334864	21,8
<b>Australasia</b>	American Samoa, Australia, Baker-Howland-Jarvis, Christmas Island, Cook Islands, Fiji, French Polynesia, Guam, Kiribati, Marshall Islands, Micronesia, New Caledonia, New Zealand, Niue, Norfolk Island, Northern Mariana Islands, Palau, New Guinea (Papua New Guinea plus Papua), Solomon Islands, Tonga, Tuvalu, Vanuatu, Wallis and Futuna Islands, West Iran, Western Samoa.	9611377	592601	6,2

Fonte: SGGES, University of Auckland, New Zealand (11/abr/08). Available at: <[http://www.sges.auckland.ac.nz/sges\\_research/kaerst.shtml](http://www.sges.auckland.ac.nz/sges_research/kaerst.shtml)>.

In the Middle Ages, the *Table of Peutinger* already showed signs of human settlements on the Karst (Figure 2). Evolving with time, the cultural tourism appears in the *Kras* region (even in its primitive form) in *Sveta Jama* (Holy Cave), in 280 AD and at the *Landarska Jama* (Cave of Landarska) around 888 AD. Countless travelers were also attracted by the natural beauty of the *Postojnska Jama* (Cave of Postojna) and the *Vilenica Jama* (Vilenica Cave).



Figure 2 – Section of the *Table of Peutinger* representing the regions of Noricum, Pannonia, Picenum, Etruria, Roma and Africa. Today they are regions of Austria, Slovenia, Croatia, Italy and Tunisia. The detail shows the region of Istria (Source: NÜSSLI, 2007).

Still according to Kranjc (1997, 2006a) and Travassos, Kohler and Kranjc (2006), at the end of the 17<sup>th</sup> century and beginning of the 18<sup>th</sup> century, the region of the *Kras* Plateau became popular by the description of geographers, topographers, scholars and travelers. This popularity also came in large part because Trieste (Italy) had been transformed into a free trade port in 1719.

Authors continue to demonstrate the importance of the region to karstology when they state that many researchers were the pioneers to devote further study to the region of *Kras*. One can mention J.V. Valvasor (1689), Nagel (1748), B. Hacquet (1778-1789), and F. J. H. Hohenwart (1830). In the work of Franc Jožef Hanibal Hohenwart (1830), it appears for the first time the term “*karstes*”. Geographers and geologists of the 19<sup>th</sup> century started to use more frequently the term *karst* and the work

of Jovan Cvijić (1893) provided the scientific basis of the study *Classical Karst*, followed by Kraus (1894) and Martel (1894), among others. Actually, it is accepted that the word *karst* appeared much earlier, at least in the 16<sup>th</sup> century. F.J.H. Hohenwart might be the first one who wrote in 1830 that *karst* is not only on the Kras Plateau but it extends to the Greek islands.

As one can see by the previous history, the German form “*kars*” was originated in the region of the Kras Plateau in Slovenia. Its origin is believed to be pre-Indo-European with the root *kar/gar* or *kara/gara*, meaning *stone* or *rocky*, respectively (Kranjc, 2001). The term *Kras* is widely used in Slovenia to designate rocky areas or those not favorable to agriculture. It is also used to identify some regions of the Dinaric Karst characterized mainly by *karren* fields and dolines.

Gillieson (1996) states that this peculiar kind of landscape is also commonly characterized by having closed depressions, caves and underground drainage. They are mainly formed by rock dissolution. According to Sweeting (1972) and Ford (2007), the Germanic term (*karst*) was popularized by the monograph of *Das karstphenomen* of Cvijić (1893). It is used as a worldwide standard, to describe processes of underground and superficial rock dissolution and underground systems derived from that process.

Another scientific group is trying to use the term *karst* also for landscapes developed in other types of rocks than the carbonates. However, it is believed that the more appropriate term to use is *pseudokarst*. This occurs because siliciclastic rocks are likely to develop similar formations to the “Classical Karst” (e.g.: dolines, caves and underground drainage). They have their genesis in different processes; in these areas the dissolution of the rock is less expressive than mechanical processes. In Brazil, examples can be found in quartzite and sandstone.

In this study, the karstic phenomena which are conditioned by specific hydrogeochemical processes through water rich in CO<sub>2</sub> and naturally acidulated will be acknowledged under its cultural importance.

The fascinating surface and underground scenario will be studied beyond its physical approach. It is important to remember that these features are the legacy of a distant past in association with the climatic aspects of the physical environment. Thus, according to Williams (2008), it is not always easy to separate the effects of modern processes from the old ones. This occurs because it is possible the existence of overlapping geological information climatic features experienced millions of years ago.

Such explanations, however, will not be deeply addressed in this work for being outside its scope.

Lithological, structural and tectonic controls, the geomorphological, hydrological and chemical processes as well as the degree of solubility of the rock covered in Travassos (2007d) will be addressed when necessary to contextualize the main subject under study and thus facilitate their understanding by readers.

When several authors call attention to the problem of sustainable use of karst areas, the cultural and humanistic use is sometimes forgotten. Besides the preservation of its physical resources, one must look ahead to its cultural side, also important. Understanding how a social group may perceive the karst is often the way for its conservation.

Ravbar (2008) when devoting a book on karst water protection chose an epigraph for starting her work that highlights the primary importance of karst areas: “*Never spit in a well, you may have to drink from it later*”. It was written in 1809 and reflects what Humboldt already stated: everything is interconnected, according to the classical principle of geographic correlation.

It is interesting to demonstrate the complexity of this epigraph mentioning Williams (2008): much of the circulating water on karst is from meteoric origin (rain and snow). Usually it circulates at relatively low depths, although the most deep underground water known is to be found at a depth of 2 km (in the Caucasus of Georgia, in the *Voronja* cave). The meteoric water usually has residence time in the underground from a few days to a year; but very deep water can circulate in the underground for a decade or more.

Therefore, one can say that the human relationship with the caves is not really new in the history of mankind. Much less new is the motivation for its use as shelters, hiding or sacred places. Together with mountains, many caves have become important points in mythology, and in the creation of legends, myths and for religions.

About mountains considered to be sacred, Brito (2008) states that due to the predominantly Christian context in which we live in the West, a factor that contributes to the development of its sacred conception (“*things of God*”) happens because many biblical passages and figures refer to massive rock formations.

The same happens to caves. As a consequence of the large number of mountains considered to be sacred (in different beliefs), some have caves that are part of their



history and for this reason they also divide its sacredness. Many, however, are considered sacred regardless. They are considered, therefore, part of the religious practices of a community, being valued as temples, churches, places for meditation and ritualistic practices.

Brito (2008, 4) also says that “*even a little in depth study of the messages contained in the sacred book of Christianity reveals numerous references to hills, mountains and elevations: there are cited the Mount Carmel, the Mount Horeb, the mountains of Ephraim, the Tabor, the Mount Moriá, among others*”.

Unlike other physical features, caves receive a special treatment in the collective imagination of westerners. In the Christian Bible the word “cave” appears many times. They were all given the connotation of the hiding places, shelters and graves. The word “abyss” is also mentioned under the connotation of a bottomless hole in the depths of the earth, serving as the abode of evil and to enclose evil spirits (Lobo & Banducci Jr. unpublished).

About natural or artificial caves mentioned in the Bible, one can identify the Cave of *Machpelah*, *Adullam* and *En-Gedi*, among others. There often also emerge the words cliffs, caves, crevices, grottoes and caves. A survey on the Archaeological Encyclopedia of the Holy Land (Negev & Gibson 2003), one can find about 100 entries related to the term “cave”. Gibson (2008, 110) recalls that “the first book of Samuel (14: 25-27) the Sons of Israel ‘arrive in a bush and there was honey by the floor’, presumably in fissures and cracks in the rocks” (Gibson 2008, 110)

Caves are presented as places of *residence* (Genesis 19:30, Numbers 24:21, Jeremiah 49:16, Obadiah 1:3), of *hiding* (1 Samuel 13:6, 1 Samuel 14:11, 1 Samuel 22:1, 1 Samuel 23:29, 1 Samuel 24:3, 1 Kings 18:4, Hebrews 11:38), of *rest* (1 Samuel 24:3, 1 Kings 19:9), of *burial* (Genesis 23:19, Genesis 49:29 -32, Genesis 50:13, John 11:38) or as places that do not protect an individual against the *divine trials* (Isaiah 2:10, Isaiah 2:19, Ezekiel 33: 27, Revelation 6:15). Abysses or other cavities also emerges as *prisons* (Isaiah 24: 18, Isaiah 51:1, Zechariah 9:11).

Artificially made caverns are analogous to the small shafts spread over karst regions where animals may fall. Moreover, shafts were also seen as the ancient Greco-Roman portals which connect the World to the Hell, for example.

Certainly, the collective imagination and the religious significance of caves vary according to different religious beliefs. However, common or similar traces may be perceived in different cultures.

More recently, Mihevc (2001) and Ferenc (2005) identify numerous caves where atrocities were committed during and after the Second World War. Used as sites for mass murders, many of those places today are being made sacred by the construction of religious memorials and crosses next to these places (Figure 3).



*Figure 3 – Entrance of the Šemonovo brezno (Šemonovo shaft). On the left, Dr. Andrej Mihevc from the Karst Research Institute. In the region of Logatec, it is believed that almost 600 people disappeared during and after the Second World War (Photo: Luiz E. P. Travassos, 2009).*

According to Kiernan (2003), Christianity, professed by about 33% of the world population, may be regarded as the most anthropocentric religion ever, rejecting the pantheism and animism for a monotheistic vision. Still, numerous caves or karstic features are considered sacred by Christians as the Grotto of Massabielle (Grotto of Lourdes), where a Catholic girl (Bernadette Soubirous) is said to have witnessed eighteen apparitions of Our Lady in 1858, for example.

Still according to Kiernan (2003), in Islam (about 22% of the world population), the adoration of a particular landscape seems to be unacceptable, although the Cave of



Hira is very important within that belief. It is believed that it was the place where the Prophet Mohammed received the revelations

In Hindu tradition (15% of the world population), Buddhist (6% of world population) and Chinese beliefs such as Taoism and Confucianism (4%), the caves are very important places. Native or indigenous communities also identify the caves as important places within their local beliefs (3%). For 14% of the world's population, without specific beliefs but not necessarily completely atheists, caves do not have any specific value (Kiernan 2003).

Thus, one realizes that many caves have acquired deep spiritual significance in various parts of the globe. Some carry physical evidence of the adoption of successive traditions while in few cases, other areas continue to be shared by different religions.

In Brazil, of Catholic majority (68.2% of the total population according to IBGE), there are *cave-churches* that influence and, in some way, move the local economy and the sector of cultural and religious tourism.

Especially regarding Catholic manifestation, one can identify the *cave-churches* as analogous to the catacombs used by Christians persecuted by Rome. The Instituto Salesiano S. Callisto (2005), the senatorial decree 35 stated the Christian religion as “*strange and unlawful*”. For Tacitus, it would be “*deadly*”, “*wicked and unbridled*” by Pliny, “*new and harmful*” for Suetonius, “*mysterious and opposed to light*” by Octavius Minucio. Thus, Catholicism was placed as illegal and persecuted for being considered the greatest enemy of the power of Rome, which was based on the old national religion and the cult of the emperor, instrument and symbol of strength and unity of the Empire. However, the persecution was not always continuous and universal, nor equally cruel and bloody. Periods of persecution were followed by periods of relative peace.

Prohibited from exercising their faith for a long period of time, Christians could only be liberated from the “darkness” in 313, when the emperors Constantine and Licinius gave freedom to the Church. From this moment on, they were able to erecting churches on the surface. Maybe the construction of small altars or artificial caves for protection of sacred images comes from the Roman catacombs.

The *space* previously with no value becomes important *places* of devotion for pilgrims who, connected with the idea of personal sacrifice, visit such places. In all these spaces, a variety of objects and forms are venerated for their beauty, alleged

miraculous powers and association with local stories. It is believed that the water that emanates from rocks allows the healing of a wide range of diseases (Figure 4).



*Figure 4 – Small chapel dedicated to St. Lucia at the village of Jakovica, Slovenia. The church was built over a karst spring and oral tradition imputes a sacred value to it. This site is one of the many examples where faith can also be a source of protection in karst areas. A) General aspect of the chapel. B) Right side of the church showing the door which is used to reach the water source. C) The spring (Photo: Luiz E. P. Travassos, 2011).*

Thus, the humanistic and cultural studies of karst areas can offer new essential theoretical and methodological possibilities to understand better the phenomena of pilgrimages or the tourism to *cave-churches*. Therefore, it is not possible to understand these caves only by the inventory, mapping or the simple description of physical features.

It is important to note that many Brazilian caves are not widely known, and others still remain inaccessible to most people. Distant from urban centers, the scene of

darkness provides the emergence and permanence of mysteries that recreate the oral tradition, enriching the local stories.

### **Brazilian and Slovene Karst Areas**

The Brazilian territory has developed on old geological structures, except for the Tertiary sedimentary basins of the Pantanal, in Mato Grosso, the Amazon basin and parts of the coast line. Their ages range from the Paleozoic to the Mesozoic in the case of the meta-sedimentary basins, and the Pre-Cambrian (Archaean/Proterozoic) when it comes to the crystalline terrains of the South American Platform. Among these, the cratonic areas, the ancient folding belts and the sedimentary basins stand out (Schobbenhaus & Brito Neves 2003).

The Brazilian continental area is 8,5 million km<sup>2</sup> and according to Karmann (1994) about 5 to 7% consists of karst terrains. The main units are located in the San Francisco Craton in the region of Minas Gerais, Goiás and Bahia, on carbonatic and dolomite rocks of the Upper Proterozoic period.

Roldan, Wahnfried and Klein (2003) state that the major Brazilian speleological provinces would be mainly four: *the Speleological Province of the Ribeira Valley* (located in the southern portion of the State of São Paulo and the western portion of the State of Parana), *the Speleological Province of the Bambuí* (includes SE portions of Tocantins State, East-central and SE portion of the State of Goiás, West-central and NW portion of Minas Gerais and W of Bahia State), *the Speleological Province of Una* and *the Speleological Province of Serra da Bodoquena* (the largest carbonatic region of the State of Mato Grosso do Sul, extending for about 200 km in N-S direction, in the southwest of the state).

With the increase of research regarding Brazilian carbonatic regions, the work of Auler, Rubbioli and Brandi (2001) and Auler (2002), identifies at least 14 important carbonatic provinces, in addition to less significant occurrences (Figure 5).

Minas Gerais stands out in the national scenery due to the important occurrence of carbonatic rocks and, consequently, the expressive karst areas that are associated with it (Figure 6). According to Piló (1997; 1998; 1999) the State of Minas Gerais has around 3 to 5% (17,600 to 29,419 Km<sup>2</sup>) of that total.

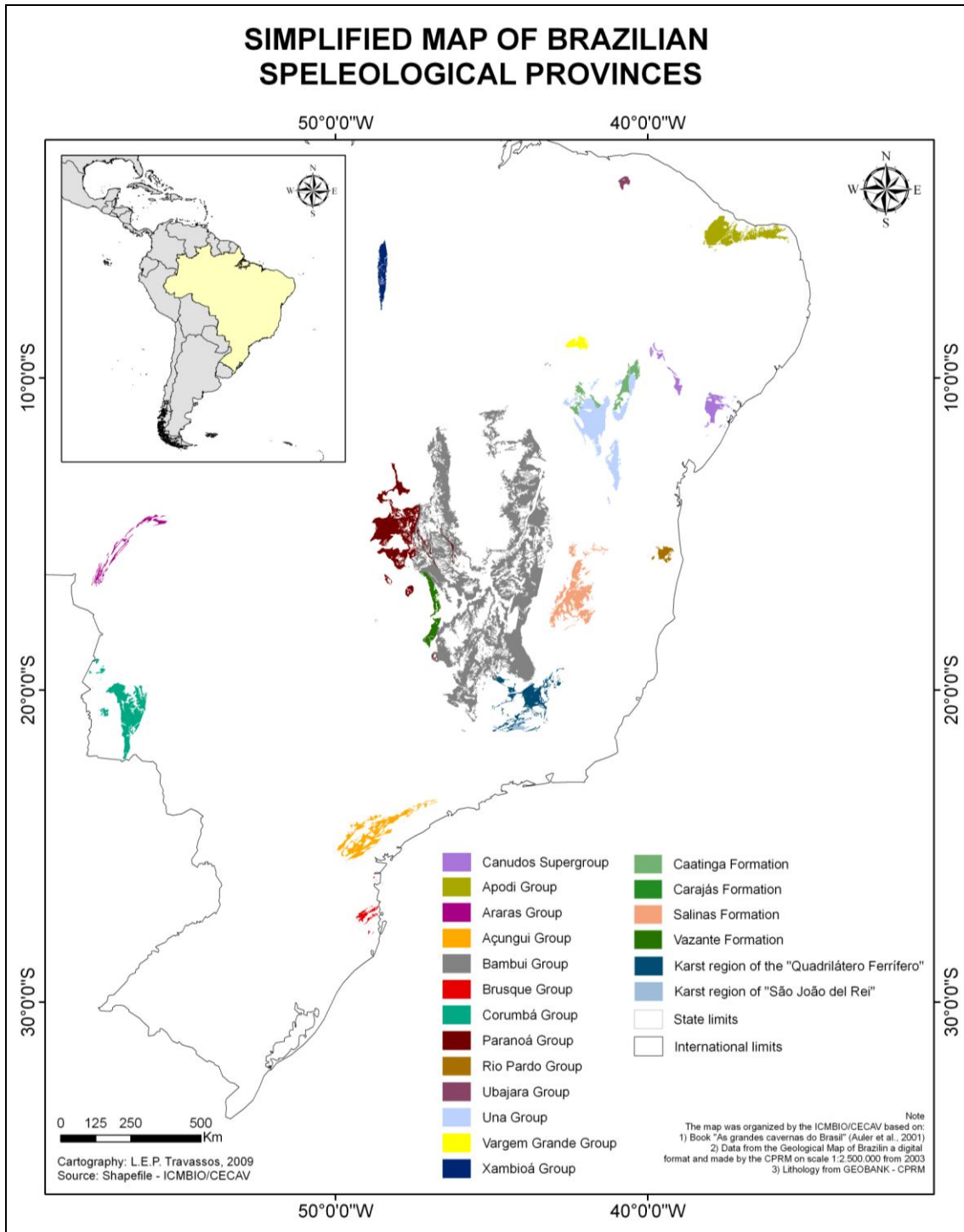


Figure 5 – Main speleological provinces in Brazilian territory.





About the Slovene karst, it is possible to say that from its territorial extension of 20,273 km<sup>2</sup>, 44% are karst areas (Kepa 2001) composed of sequences of different formations ranging from the Cretaceous to the Eocene (Otoničar 2007). The Slovenian Karst can also be divided into two main units: the Alpine Karst (to the northwest) and the Dinaric Karst (to the south). Between them, is still considered to exist an intermediate region called Pre-Alpine Karst or Isolated Karst due to the small amount of isolated carbonatic rocks (Figure 7).

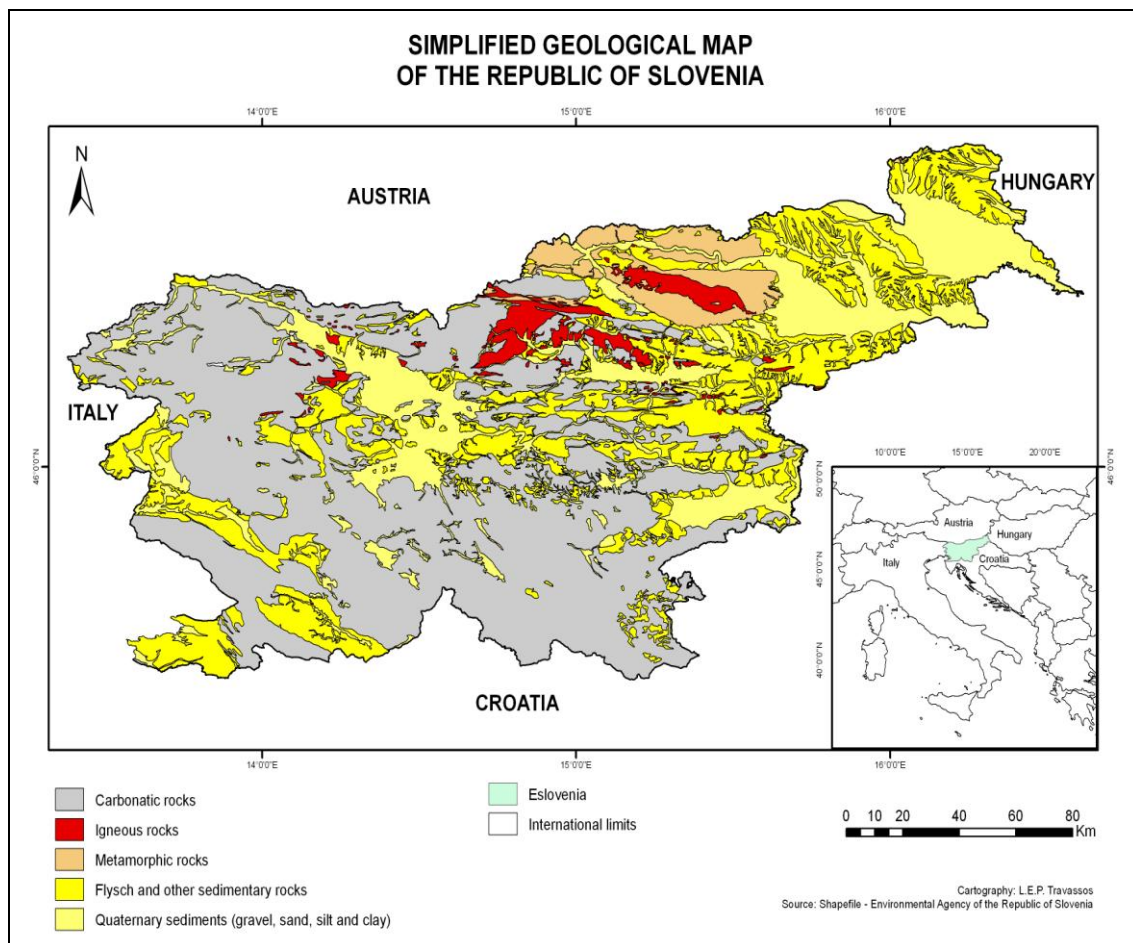


Figure 7 – Geological map of Slovenia.

With the record of some almost 9,000 explored and registered caves, one can understand why these environments have played and still play an important role in the lives of people including faith, religious practices and superstition.

Regarding the majority of the *Kras* Plateau, it is basically composed of permeable Cretaceous carbonates and less permeable dolomites. The Eocene flysch in the region acts as an important impermeable barrier that surrounds the massive

carbonate. As to the age of rocks in the region, we can say that it is defined from the moment in which they were uplifted above sea level. Most of the Dinaric Karst in Slovenia was formed after the Eocene, since there is no evidence of older sediments (Mihevc 2007)

### **Objectives and work relevance**

To the researchers who work with the environment and, especially, natural resources management, it is easy to understand the difficulty between the management and sustainable use of nature. Many argue that the tourism sector is among the biggest promoters of degradation. However, one can say that tourism done in a responsible manner can also act in environmental preservation.

This complex and multidisciplinary phenomenon, carried by the geography, anthropology, economics and sociology, among many other subjects, deserves special attention and to be perceived to be really active as a true agent of conservation and sustainability.

In this context, the karst areas appear as sensitive and vulnerable geoecosystems to the impacts of tourism. Still, it is not acceptable to believe that the mere prohibition of their use for tourism is the only alternative to its conservation. In some cases, drastic and unilateral attitudes might impact an entire regional economy causing serious social impacts. It is therefore necessary to act with responsibility.

Regarding the cultural tourism in karst areas, the central focus of this work is its cultural and religious usage, exposing the urgent need of changing attitude towards these cultural manifestations.

Cultural tourism or the pilgrimages to caves are no new activity. One can say that cultural tourism in karst began in the Middle Ages, when pilgrims sought to know sacred caves and underground churches. To Kranjc (1994), perhaps the tourism of pilgrimages had begun with the Three Kings who visited the newborn Jesus in a cave used as a barn, next to Bethlehem.

Thus, the caves and the karst are important records of specific historical and geographic regions. Often they present common traces in many cultures as will be demonstrated with the present contribution.

In regions that experienced wars, karst and caves (especially shafts) played a sad role as they were used as spaces where atrocities were committed. Similarly in history, they emerged as places associated with evil, and need to be made sacred. In these places where fear prevailed, monuments and oratories were and still are constructed in honor to those who perished. This phenomenon can be seen as society strives to overcome the traumas experienced by these tragedies.

As a general goal it is proposed to research the use and protection of karst landscape as the basis of Cultural Tourism. Through the survey of protected areas from UNESCO and the study of four specific cave-churches (two in Brazil, in Minas Gerais) and two in Slovenia-Italy (*Socerb* and *Landarska*), the researcher aims to carry out a work that contributes for the dissemination of the cultural use of karst areas as well as contributing to the discussions on the religious use of caves in the studies of Geography of Religion in particular, and Cultural Geography in general.

Cultural and sacred sites occur in a variety of landscapes and, thus, the researcher aims to open a path amidst Brazilian karstology in a field still little explored in the country. It is also important that the research can contribute to the union between the preservation of karst cultural heritage and geological patrimony conservation.

### **Methodological procedures of the research**

The work is fundamented on the deepening of the theoretical thematic related to karst landscapes and its relation with the cultural and religious tourism, through an extensive bibliographic review. It is shown the relevance of the work of important geographers capable of combining the physical and human studies. Humboldt, Malte-Brun, Reclus, Nicod and Gauchon. Thus, a sort of time line was organized until the present. Other naturalists are also cited, giving greater weight to the cultural importance of karst areas.

Due to the descriptive nature of the studies mentioned here, it was chosen not to separate caves as artificial and natural ones. Their differences are well known, however, and the separation of these two types of cavities would excessively break the text. Thus, one can remember Forti (2003) cited by Forti (2009a, 4) when stating that Speleology is possible to develop in “*environments both natural and artificial, both in the surface and under it*”.



The bibliographical review was proposed to demonstrate and discuss the applicability of concepts such as *topophilia*, *topophobia*, *sacred* and *profane*, linking them to national and international examples. This was important for the construction of a basic theoretical framework, essential for the development of the thematic presented.

Given the nature of the object of study and the purposes of the dissertation, the researcher chose to perform a descriptive and exploratory study, with some qualitative and quantitative analysis as proposed by the methodology adapted from Steil (1996; 2002), Evia Cervantes (2006; 2007) and Barbosa (2007).

In addition, information were gathered at the library of the Karst Research Institute (Slovenia), on cartographic documents regarding world's karst areas (Williams & Fong 2008), georeferenced satellite images (LANDSAT and GoogleEarth) and radar images (SRTM-NASA). Moreover, for the Brazilian case, the cartographic bases were used from various government projects.

Another stage, held between the years 2006 and 2009, was undertaken to identify the phenomenon of cultural and religious tourism alternating the presence in places of worship and pilgrimage in Antônio Pereira (*Lapa of Antônio Pereira*, *Gruta da Lapa* or *Grotto of Our Lady of Conceição da Lapa*) and Vazante (*Lapa de Pamplona*; *Pamplona Cave*), Minas Gerais Caves and in Socerb (*Sveta Jama* or the *Holy Cave*) and in Antro (*Landarska Jama* or *Sv. Ivan v Čele* (Cave of Landarska or the Cave of St. John in the Rock). Here, historical and geographical data were confronted with the author's field perception on these sites and in others European sacred sites.

This methodological approach took into account the observation of pilgrims and tourists during the celebrations in the Brazilian caves and during the visits to European caves. Thus, it was possible to identify how individuals behave in a sacred space. These observations are complemented by informal semi-structured interviews with the participants - both pilgrims and tourists. The dialogues covered the basic ideas about the history of the alleged apparitions or the legends associated with the knowledge of the cave and other reports. Consequently, the information presented was based on the academic production on the subject and the oral information collected during the field work.

A hundred and thirty questionnaires were applied during the Fiesta of "Nossa Senhora da Lapa" in Antonio Pereira. The information gathered from them is not a final sampling, however, but a suggestion for future studies.

It is also intended to introduce the methodology of inventory and quantification to the evaluation of the geomorphological patrimony for Brazilian sacred sites on karst. The methodology was first introduced by Pereira (2006) and applied for the first time to the Portuguese karst by Forte (2008).

Among the existing methodologies, the one proposed by Forte (2008) was chosen because it deals with the inventory of geomorphosites specifically in carbonate rocks. It allows the insertion of the human variable in judging its importance for a future ranking and better touristic use in caves considered to be sacred. Forte (2008) delimited the area of the Territorial Unit of Alvaiázere in Portugal, and in this research, the author intends to perform state and national ranking in the near future. By using the methodology of Pereira (2006), with minor adjustments, to the caves of religious use in Brazil it is expected to include this variable in national studies.

Thus, one must continue to demonstrate the importance of uniting the human and physical variables in the study of geomorphological sites of cultural importance especially in karst areas, applying this methodology for the first time in a carbonate site of historical and cultural importance in Brazilian territory.

## 1. THEORETICAL BASIS

*It is in the elimination of the traditional division between Physical Geography and Human Geography that new types of synthesis may appear*

*Chorley & Kates, 1969*

The work was partially developed along the general lines of research of Yi-Fu Tuan (1979/2006; 1980; 1983), mainly through the study of the relationship between people and nature and the human perception of landscapes, spaces and places. The works of Eliade (1956; 1983; 1991; 1994; 1995; 1999) related to religion, the imaginary, the symbolism and the relationship between the sacred and the profane provided important data for the characterization of the relationship between man and caves.

Being a study that seeks to establish a connection between the touristic use of karst and its influence on cultural and regional tourism, the works of Steil (1996; 2003), pioneer in the study of the pilgrimages to the Bom Jesus da Lapa cave were used. Furthermore, the contributions of the Brazilian Geography of Religion from Gill Filho (2001; 2002; 2005; 2006; 2007; 2008), Kozel (2002) and Rosendahl (1996; 1999; 2002; 2003; 2007) provided important data for the achievement of the objectives proposed by the author.

### 1.1 Alexander von Humboldt and his physical and humanistic studies of caves

It is believed that in the physical studies of nature, it is not possible to dissociate the figure of Alexander von Humboldt (1769-1859). If one think upon Geography, this separation is even more difficult. Turley (2001) says that many consider him the founder of this science, while others call him the most responsible for modern science as a whole.

Kohlhepp (2006) also agree that Humboldt contributed significantly to the development and consolidation of Geography as science. Working as a physical geographer, he started climatological and phytogeographical studies. Functioning as a human geographer he was engaged in relevant geopolitical aspects and the regional studies of human geography. Being a cartographer, he represented nature very

didactically through maps and beautiful profiles. To Amorim Filho (2008), Humboldt had a major role among the painters of the “exuberant tropical New World”. This statement is proven by Diener (2007) that identifies, for example, how his works had influenced the paintings of Rugendas<sup>1</sup>.

The naturalist Carl Friedrich Phillipp von Martius (1794-1868), also addressed in this dissertation, like many of his time was influenced by Humboldt as well. Henriques (2008, 27) reminds us this fact when he says that “*as a European, Martius certainly had great curiosity for the Americas, due to the reading of the Humboldt’s*” often cited in the journals of his travels to Brazil.

Tuan cited by Rodaway (2007) notes that Humboldt, while widely known to explain the physical world, was among the first to use the representation of landscape and poetry to broaden the geographical experience with feeling and emotion.

Worthy of emphasis was the fact that “*he knew how to combine the concentration of its scientific activities and enthusiasm in a clear and communicable way*” (Kohlhepp 2006, 272). In examining his works one can say, without a doubt, that he deserves all the “labels” and countless honors awarded.

Accompanied by the French botanist, Aimé Bonpland, when embarking his famous expedition toward Latin America in 1799, he had already considerable geographical, chemical, botanical, mineralogical and physical notions. After his return, he published several books that raise his name to a place in the history of science. In the words of Turley (2001, 22), being tireless as an “*explorer and adventurer, enthusiastic student of other sources of information and a skilled observer and writer, Humboldt redesigned the geographical perception of the world*”.

He has developed the image of the “New World” in Europe and presented to “*the European scientific circles, all the facets of the tropics of Central and South America, and their differentiations.*” (Kohlhepp 2006, 272)

Riesco Jr. (2004) states that more than any other scholar of his time, Humboldt influenced science in several countries. He set new ways and methods of investigation, allowing to exceed the limitation comprehension of isolated phenomena, always seeking their inter-relationship

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<sup>1</sup> Johan Moritz Rugendas, (1802-1858), German painter known for representing the daily life and scenarios of the Colonial Brazil.

His works are masterpieces of geography, cartography and even literature. Pratt (2001, 156) notes that “while seemed to be taking the project of descriptive science to its encyclopedic extreme, Humboldt has always felt uncomfortable with the spiritual and aesthetic impoverishment of the scientific speech, with its inevitable tediousness”. Thus, for Ricotta (2003), Humboldt was a scientist concerned about the manner of language treatment and its effect on the reader. Detailed descriptions of the landscape and processes were done by him, giving rich narratives to the reader.

His brilliancy was also in his ability to perceive and describe nature. Nearly half a century before Darwin, he had sketched ideas that blend with the most modern knowledge of biological and geological evolution of the planet; he has anticipated “so prodigiously” major theories that would arise and consolidate only during the next two hundred years. (Ezcurra 2002)

Even with all the scientific papers about Humboldt and his research, what many don't know is his importance to the study of karst and caves. In his “*Personal Narratives*”, “*Views of Nature*”, “*Cosmos*”, “*Essay on the Superposition of Rocks in Both Hemispheres*”, “*Political Essay on the Kingdom of New Spain*” or in “*The Island of Cuba*” he describes caves in massive carbonate and granite outcrops, ponors, and minerals.

The use of the underground as dwelling places, shelter, spaces for the practice of funeral rites or worship of gods are also present in these works. In addition to describing the physical aspects of the Cave of the Guacharos, for example, he noted the religious rites of the natives who were accustomed to conduct ceremonies at the entrance of the cave. Inside the cave they consulted powerful spirits that would intervene against the evil spirits that inhabited the darkness.

During the time that he was in Venezuelan territory, he explored the mountains north of the country, the *Llanos*<sup>2</sup> and the Guyana to the south as much as in San Carlos de Rio Negro in the Venezuelan state of the Amazon (Urbani 2003). He also made descriptions or references (not so abundant) from caves in Mexico and Cuba.

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<sup>2</sup> *Los Llanos* is a vast stretch of land ranging from the extreme west of the state of *Apure* to the eastern state of *Monagas*. It corresponds to almost a third of the Venezuelan territory which is limited to the northern *Andes*, the central and eastern mountains, and the southern border with *Colombia* and the *Orinoco*.

His activities in the underground had begun in 1790 in the caves of Peak, Eldon and Pooles, in England. In the next year he had began his studies at the Freiberg Mining Academy. When working in underground mines, he studied their microclimate and developed equipment for breathing in confined spaces of hazardous atmosphere. (Urbani 2003)

In the first volume of the *Political Essay on the Kingdom of New Spain* and the *Essay on the Superposition of Rocks in Both Hemispheres*, he studied the geology of mining districts, describing underground mines in both hemispheres. He compares, describes and makes connections with various types of limestone (Humboldt 1811; 1822a; 1823). His scientific strictness concerning his works can be confirmed in the following passage:

I do not deny the utility of the denominations marine sandstone or marine limestone for local descriptions; but, according to the principles which I propose following in this essay on formations, characterized according to the place which they occupy as the terms of a series, it appeared to me that I ought here carefully to avoid them. (Humboldt 1823, 63)

Still regarding the underground, but now in natural cavities, he visits caves in Europe, in the Carpathian region, France, Switzerland, Poland and Germany, for example. Thus, he could carry out comparisons with some of the features found in the “*New World*”

In 1799, when he started his American journey with the Aimé Bonpland, he performed many searches that were notable in the history of Natural Sciences. Before reaching the “*New World*”, goes to the Canary Islands and explores a cave of ice (the *Cueva de Hielo*) during his climb to Mount Teide in Tenerife. The cave is located

below the limit of the perpetual snows in this zone. Probably the cold which prevails in this cavern is owing to the same causes which perpetuate the ice in the crevices of Mount Jura and the Apennines, and on which the opinions of naturalists are still much divided. This natural ice-house of the peak has, nevertheless, none of those perpendicular openings, which give emission to the warm air, while the cold air remains undisturbed at the bottom (...) During winter the cavern is filled with ice and snow; and as the rays of the sun do not penetrate beyond the mouth, the heats of summer are not sufficient to empty the reservoir. The existence of a natural ice-house depends, consequently, rather on the quantity of snow which enters it in winter, and the small influence of the warm winds in summer, than on the absolute elevation of the cavity, and the mean temperature of the layer of air in which it is situated (Humboldt 1818, 157-158).

Also in Tenerife, he mentions the work of O'Donnell and Armstrong (1806), which “*discovered in 1806 a very abundant spring in the Malpays, a hundred toises above the cavern of ice, which is perhaps fed partly by this snow.*” (Humboldt 1818, 166). He continues saying that “*everything consequently leads us to presume that the peak of Tenerife, like the volcanoes of the Andes, and those of the island of Manilla, contains within itself great cavities, which are filled with atmospheric water, owing merely to filtration.*” (Humboldt 1818, 166-167)

In Mexico he identified sources of pure water, which were carried to villages through “*long and magnificent*” aqueducts. In other cases, he has identified acid thermal springs, some hot, others cold (Humboldt, 1811:146). He refers to the region of *Madre de Dios Cave* as an “*enormous calcareous mass.*” (Humboldt 1811, 148).

He shows the unsustainable exploitation of water for the process of amalgamation and its possible impacts. He affirms that the miners use the abundant source of *Cueva de San Felipe* and in the night of February 16<sup>th</sup> to 17<sup>th</sup>, the stream had been lost. Meanwhile, “*five days afterwards a new spring was found at five leagues distance from the cavern, near the village of Platanillo.*” (Humboldt 1811, 283). This statement possibly refers to excessive sedimentation of a ponor and its consequent deactivation.

The same event is described in Humboldt (1822a, 228), which continues unfolding the importance of the Mexican geological region: There “*exists in this country, between the villages of Chamacasapa<sup>3</sup>, Platanillo<sup>4</sup> and Tehuilotepic<sup>5</sup>, in the bosom of calcareous mountains, a series of caverns and natural galleries, and that underground rivers, like those of the county of Derby in England, traverse those galleries.*” (Humboldt, 1822a, 228-229).

He identified in 1822a, other sources of drinking water close to the present-day Mexico City; one on the hill of *Chapultepec*<sup>6</sup> and another in the hills of *Santa Fe*, near to the mountains that separate the valley of Tenochtitlán<sup>7</sup> from the valleys of *Lerma* and *Toluca*. He affirms that King Charles V of Spain was informed about the source of *Amilco*, near *Churubusco*, still in the outskirts of Mexico City. The water was piped

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<sup>3</sup> Maybe the present-day Chilacachapa, at about 140 km southwest of Mexico City, State of Guerrero.

<sup>4</sup> City located at about 66 km to the southwest of Mexico City, State of Morelos .

<sup>5</sup> Village in the municipality of Taxco, around 110 km to the southwest of Mexico City, State of Guerrero.

<sup>6</sup> Located in the central portion of the State of Mexico (known as Central Mexico).

<sup>7</sup> Ancient Capital of the Aztec Empire, located in an island in the Texcoco lake, next to Mexico City.

from there to the city in ceramic pipes. In *San Agustín de las Cuevas*<sup>8</sup>, he said that water quality was better. He have also found traces of an ancient aqueduct in the road that connects this “*charming village*” to Mexico City. (Humboldt 1822a).

Humboldt (1822a) stressed that the observation of water behavior in caves by the Jesuits led the monk Francisco Calderon to imagine the execution of an enormous engineering project.

This monk pretended that at the bottom of the lake of *Tezcucó*<sup>9</sup> near the Penol de los Baños there was a hole (*sumidero*) which on being enlarged would swallow up all the water (...) The monk and Jesuits kept sounding in vain for three months (...) but no *sumidero* was ever found though even yet many Indians believe as firmly in its existence. (Humboldt 1822a, 102).

While describing other ponors, he says that they are interesting phenomena, relating them to facts already known in other parts of the world: “*Water and sand are sometimes thrown out twenty feet high. Similar phenomena have not escaped the observation of the ancients who inhabited parts of Greece and Asia Minor abounding with caverns crevices and subterraneous rivers.*” (Humboldt 1822b, 220)

He also registered fresh water upwelling in several small coral and sand islands during his visit to Cuba. He theorized that perhaps it had some underground communication between the limestone formation of the beach that accumulates rain water and, by hydrostatic pressure, it emerged from soil (Humboldt 1856b): “*The abundance of water that infiltrates through the fissures of the stratified rock is so great that, from the hydrostatic pressure, springs are found in the sea at some distance from the coast.*”(Humboldt 1856b, 143)

On another occasion he says that, in *San Carlos de Rio Negro*, the Venezuelan state of Amazon, they had spent a few hours between the rapids of *Atures* waiting for the boat. Much of the river seemed dry and blocks of granite pile over the river bed. The river then disappeared inside the caves formed by the collapse rocks; for him, on one of them they could hear the water passing beneath their feet. The river seemed to divide into multiple branches or torrents, and each of them was seeking to force passage in the rocks. In short, Humboldt affirms that they have been perplexed by the lack of water in the river bed, the frequency of underground waterfalls, the turbulence and the noise of water hitting the rocks and producing foams (Humboldt 1818; 1850; 1852).

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<sup>8</sup> Municipality near to Mexico City.

<sup>9</sup> Municipality of Texcoco, northeast of Mexico City.



In Cuba, on the region of Trinidad, it is possible to see steep carbonatic outcrops

resembling the mountains of limestone of Caripe, in the vicinity of Cumana<sup>10</sup>. They also contain great caverns, near Matanzas and Jaruco, where I have not heard that any fossil bones have been found. The frequency of caverns in which the pluvial waters accumulate, and where small rivers disappear, sometimes causes a sinking of the earth. (Humboldt 1822b, 165-166).

Specifically in the *“The Island of Cuba”*, he deals with the *“sinking of the earth”* as natural hazards where the *“(…) frequency of caverns, in which the rains accumulate and the brooks disappear, sometimes causes great disasters”* (Humboldt 1856b, 133), in a clear reference to karst subsidence processes.

In *Cosmos*, Humboldt speaks about the temperature of ponors or springs of thermal waters and its relationship with volcanic areas. His doubts about the temperature of these waters in the tropics were extended when he explored the *Cueva del Guacharo*, measuring the air temperature in the external environment (18,5°C), inside the cave (18,7°C) and of the underground river (16,8°C), observing its probable source in the mountains (Humboldt 1856a).

On the Island of Cuba, he affirms that the central and western portions of the island contain two compact limestone formations: the first presents some resemblance to the limestone formation of the Jura and the second resembled the limestone of Papeheim. *“All this formation I shall call Güines limestone, to distinguish it from another much more modern formation in the hills of San Juan, near Trinidad; whose peaks remind me of the limestone mountains of Caripe, in the vicinity of Cumaná.”* (Humboldt 1856b, 133).

Visiting the peninsula of Araya (Punta de Araya), he makes a geological description indicating the presence of breccias or calcareous sandstone, as *“a local and partial formation, peculiar to the peninsula of Araya, the coast of Cumana and Caracas.”*(Humboldt 1822a, 10). From Araya, the visit was quickly followed by an excursion to the mountains of the Chayma Indians mission, where a variety of interesting objects caught his attention. In a convent, located in a narrow valley, it was possible to feel a *“cool and delicious climate in the center of the torrid zone.”* In the region, *“the surrounding mountains contain caverns haunted by thousands of nocturnal birds; and, that affects the imagination more than all the wonders of the physical*

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<sup>10</sup> North of Venezuela.

world.”(Humboldt 1822b, 1-2). Here one can already noticed the reference to studies of the imaginary and the caves.

After they “*had suffered great fatigue, and were quite drenched by the frequently crossing the torrent*” they reached the caves of Cuchivano. They observed a wall of limestone rock that was rising perpendicularly to the height of 800 toises. He affirms that it is rare that in an area where the density of vegetation practically covers the soil and rocks, it wasn’t easy to find sections of exposed rock. Finding a piece of visible outcrops amidst the thick forest, he perceived two caves opening like fissures “*unfortunately inaccessible to man (...). We were assured, that they are inhabited by the same nocturnal birds that we should soon become acquainted with in the Curva del Guacharo of Caripe.*”(Humboldt 1822b, 80-81).

Regarding mineralogy, near the limestone caves of *Cuchivano*, he describes “*rock-crystals, enchased [enclosed] in beds of alpine limestone. They were hexahedral prism, (...) perfectly transparent, were solitary, and often three or four toises distant from each other. They were enclosed in the calcareous mass, as the quartz crystals of Burgtonna<sup>11</sup> and the boracites of Lunebourg<sup>12</sup> are contained in gypsum.*” (Humboldt 1822b, 80-81).

Granite caves are described near to the Mission of Uruana, popularly known as the village of *La Concepcion de Urbana*:

This small village, which contains five hundred souls, was founded by the Jesuits, about the year 1748, by the union of the Ottomac and Cavere Indians. It lies at the foot of a mountain composed of detached blocks of granite, which, I believe, bears the name of *Saraguaca*. Masses of rock, separated one from the other by the effect of decomposition, form caverns, in which we find indubitable proofs of the ancient civilization of the natives. Hieroglyphic figures, and even characters in regular lines, are seen sculptured on their sides; though I doubt whether they bear any analogy to alphabetic writing. (Humboldt 1852b, 196)

In Quito and in Peru, he describes the influence of caves in the *Quichua* language to designate the mountain ranges of the region:

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<sup>11</sup> Present-day Gotha, Germany. The region is well known for the rimstone pools formed by carbonatic waters.

<sup>12</sup> Lüneburg, city in Lower Saxony, around 45 km SE of Hamburg.

These porphyritic caverns, in the cordilleras of Quito and Peru, bear the Indian name of Machays. It is a word of the Quichua language, called commonly by the Spaniards the *Inca's language*. Thus *Callancamachay* means "a cavern as large as a house" (...). They are in general of little depth, lined with sulphur, and differ by enormous size of their openings from those which the volcanic tuff present in Italy, at Tenerife, and in the Andes. (Humboldt 1822b, 147).

In 1865, he identifies an other cavity in granite, the *Cueva de Antisana* in the northern portion of the *La Hacienda* volcano. The cave, about 16,000 feet above the Pacific, was used as a "base" for the observation of the condors which were flying above the Andes (Humboldt 1850).

For what was shown so far, one can mention Rodriguez (2001) who states that of nearly two hundred naturalist travelers who visited Venezuela during the 19<sup>th</sup> century, leaving important historical records on the physical and human geography of the region, the name of Humboldt stands out as the most important one.

His researches in the caves of the "New World" makes Urbani (2003, 55) give Humboldt the title of "*father of Venezuelan speleology*" because it had presented for the first time, works on anthropospeleology, biospeleology and regional geospeleology. It should therefore be considered the "*scientific traveler by excellence*." (Rodriguez 2001, 238).

Of all caves described and identified by Humboldt, Urbani (2003) considers the Cave of the Guacharos (*Cueva de los Guacharos*) his best speleological contribution. In the cave he studies for the first time biospeleology, geospeleology, anthropospeleology and cave climatology. It is interesting to remark that the information gathered about the underground microclimate from the *Guacharos* remains practically the same as it was 200 years ago. (Urbani 2003)

This enchantment with nature, described in the previous pages, should be a source of inspiration for the karstologist never, however, forgetting the scientific rigor. This is how Humboldt wrote his works giving the readers the possibility of mental image construction very close to reality, going from the Physical Geography to the Human Geography.

For him, in South America there was a kind of communion with nature and the spiritual life of man, being easy to impress with its sense of greatness; nowhere else in the world could one see this relationship so powerfully as in the tropics. (Humboldt 1850)

Regarding the unknown and the mysteries involving certain caves, Humboldt (1818/1852b) says that some travelers, not familiar with flammable natural gases expelled from the *Cueva del Serrito de Monai*, were frightened by indigenous people that light up the gas combination constantly accumulated at the top of the cave<sup>13</sup>. Urbani (2003) also notes that, in the vicinity of *Cumana*, the local population reported to Humboldt that this phenomenon is also repeated in the *Cueva del Cuchivano* where the flames could be seen at a reasonable distance. Such phenomena have also been documented in several other parts of Venezuela.

Humboldt (1850) already identified examples of spaces full of symbolism, as places for the practice of sacred ceremonial burials. In the *Cueva del Ataruipe*, he brings to the reader an image of six hundred well-preserved skeletons placed inside palm-leaf baskets (Humboldt 1850), confirming the sacredness of the cave.

On another occasion he realized the importance of the collective imagination for the preservation of a bird species in the Cave of the *Guacharos*. He was able to describe to the reader that the *guacharos* would have been extinct years ago if the natives were not superstitious. Their beliefs prevent the natives from going to the darkest places of cave, where other nests are made (Humboldt 1852). This gives the birds time to reproduce.

Another interesting phenomenon capable of scaring naive travelers, but not the experienced boat drivers of the “New World”, was described: “*I have observed the same phenomenon on several coasts, for instance, in the promontories of Tenerife, in the limestones of the Havannah, and in the granite of Lower Peru, between Truxillo and Lima.*” (Humboldt 1829, 393). He was referring to the high noise, like a snoring, issued periodically by the compression of air by the sea waves in a cave.

In the Canary Islands, he mentions the existence of the *Guanche* mummies that, unlike other natives, “*lived in caves.*” (Humboldt 1814, 83). About the mummies, he says that they are “*the mark of a great civilization*”, and he was amazed by finding them even with the presence of “*mercantile nations, especially the Spaniards and the Portuguese, sought for slaves at the Canary islands.*” (Humboldt 1814, 274). Later in

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<sup>13</sup> The fire occurs due to the accumulation, mainly of methane gas originated from the organic-matter decay. A legend associated with a region of the interior of Bahia (Brazil) will be described in another section and may be related, perhaps, to the same phenomenon.

the same work, he demonstrates the importance of the caves for the preservation of mummies:

At the time I visited the Canaries they were very scarce; a considerable number, however, might be found if miners were employed to open the sepulchral caverns which are cut in the rock on the eastern slope of the Peak, between Arico and Guimar. These mummies are in a state of desiccation so singular, that whole bodies, with their integuments, frequently do not weigh above six or seven pounds; or a third less than the skeleton of an individual of the same size, recently stripped of the muscular flesh. The conformation of the skull has some slight resemblance to that of the white race of the ancient Egyptians; and the incisive teeth of the Guanches are blunted, like those of the mummies found on the banks of the Nile. (Humboldt 1814, 278-279).

On the islands of Cuba, San Domingo and Jamaica, he inquires where would be “*the abode of the primitive inhabitants of those countries?*” (Humboldt 1814, 274). He also states that the *Guanches*, like the *Biscayans*<sup>14</sup>, the Hindus, the Peruvians, and all primitive nations, named places after the quality of the soil, the shape of the rocks, the caverns that gave them shelter, and the nature of the tree that overshadowed the springs (Humboldt 1814), showing among other subjects, the importance of karst and caves as a valued space by many cultures.

In plain of Maita (Venezuela), some piled blocks of granite formed a kind of cave. It was called the home or abode of the *Tamanacs* ancestors. (Humboldt 1818; 1827; 1852).

The Cave of *Ataruipe*, celebrated by the *Atures* as a place of ceremonial burials was magnificently described as follows:

In this tomb of a whole extinct tribe we soon counted nearly six hundred skeletons well preserved, and regularly placed. Every skeleton reposes in a sort of basket made of the petioles of the palm-tree. These baskets, which the natives call *mapires*, have the form of a square bag. Their size is proportioned to the age of the dead; there are some for infants cut off at the moment of their birth. We saw them from ten inches long, the skeletons in them being sent together. The bones have been prepared in three different manners, either whitened in the air and the sun, dyed red with anoto, or, like mummies, varnished with odoriferous resins, and enveloped in leaves of the heliconia or of the plantain-tree. The Indians informed us that the fresh corpse is placed in damp ground, that the flesh may be consumed by degrees; some months afterwards it is taken with sharp stones. (Humboldt 1852b, 483)

For the naturalist, the *Atures* almost completely disappeared; most were not anymore known, except for the graves described. They resemble those of the *Guanches*,

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<sup>14</sup> Primitive people of the Spanish Biscayan province.

found in Tenerife. In the caves, where the mummies and skeletons of the *Atures* were discovered, the natives had also discovered iron boxes containing numerous European tools, remnants of clothing and rosaries (Humboldt 1818; 1827; 1850; 1852). Would this be a brief evidence of religious use of caves in the “New World”?

The conflict also observed nowadays about the “profanation” of sacred sites, even for archaeological research, was registered by the researcher when describing that they left “*the cave at nightfall, after having collected to the extreme annoyance of our Indian guides, several skulls and the perfect skeleton of an aged man.*” (Humboldt 1850, 172). Unfortunately, the skeleton along with much of its collection of natural history was lost in a shipwreck on the coast of Africa.

Still showing the importance of Humboldt for the development of karstology or speleology in Latin America, it is interesting to highlight a little known letter from 1810 which Urbani (1996) describes and publishes. In the letter sent to Paris to Mr. *Louis Mathieu Langle* (member of the Institute of the Imperial Library of Paris), Humboldt was seeking for explanations about the meaning of petroglyphs found by Father Ramon Bueno in a cave of *Uruana*<sup>15</sup>, Venezuelan state of Bolivar. Based on Urbani (1996) we identified the texts of Humboldt which the specific mention of such petroglyphs.

The priest Bueno and Humboldt met in 1800 while he was collecting turtle eggs from an island in the Orinoco River (Isle of *Cucuruparu* or *Boca de Tortuga*). Talking to the missionary, that claims to he had discovered a cave covered with “*figures or (as he would say in Portuguese) verias letters.*”(Humboldt 1827, 594). To them, the characters discovered by Father Ramón are similar to an alphabet, however they still had “*many doubts.*” (Humboldt 1827, 595)

Regarding the development of these petroglyphs in granite and not in limestone, Humboldt makes an interesting observation: “*whatever may be the meaning of these figures, and with whatever view they were traced upon granite, they do not less merit the attention of those, who occupy themselves with the philosophic history of our species.*”(Humboldt 1827, 595). The expression “*with whatever view [they] were traced upon granite*” is perhaps a confirmation of the fascination usually caused by karst landscapes on travelers.

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<sup>15</sup> City of *La Urbana*.

Finally, one can conclude that Alexander von Humboldt, important researcher for several areas of knowledge, stands out again. This time with the pioneer works of Latin America speleology or even karstology.

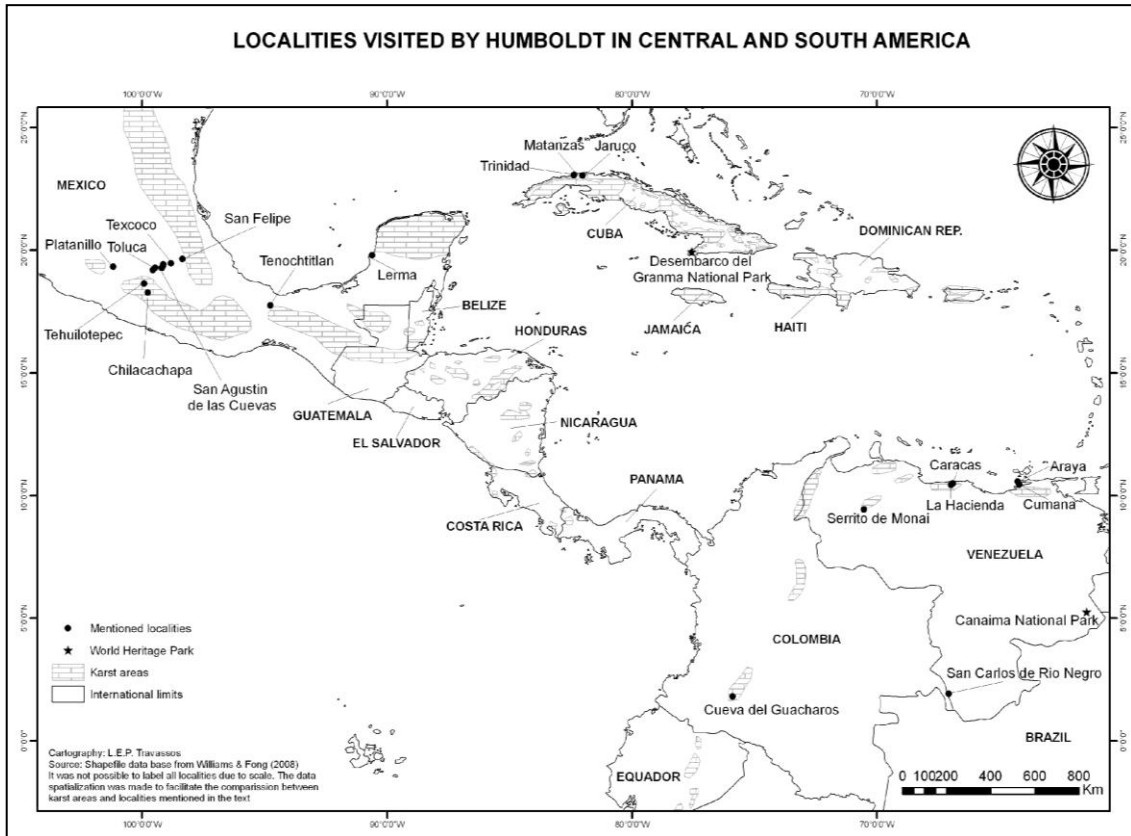


Figure 8 – Map of some localities cited in Humboldt’s work mentioned in the text.

## 1.2 Other important travelers of karst and classical geographers

Also demonstrating the scientific and cultural importance of karst in the scope of this research, two more travelers from the 19<sup>th</sup> century will be cited, and in particular two important classical geographers: Conrad Malte-Brun and Elisée Reclus. For Amorim Filho (1988, 18) the “Universal Geographies”, particularly from these two authors, were written with the objective to “cover the geographic knowledge of the whole Earth, based on macro-regional divisions”, developing from the French “geographical school”.

Previous to that, it emphasized the historical importance of Slovenia and the Cave of Antonio Pereira which were recorded by Spix and Martius (1824). In this work, they present evidence of religious use of the underground, either in natural or artificial

caves, in Germany, Italy and Africa, before arriving in Brazil. Other travelers of the Slovene karst will be addressed, particularly when the Caves of Socerb and Landarska are presented in this research.

Preparing for the travel to Brazil, the naturalists Spix and Martius described the region of the *Kras Plateau*, visiting “near Adelsberg the caves in what is called the cavern limestone in which are found not only loose skulls and other human bones together with rosaries but also remains of animals resembling the tapir imbedded in the limestone.” (Spix & Martius 1824, 10). Besides the caves, they wanted to know the lake *Zircknitz*<sup>16</sup>, famous for its seasonality. The object of his journey “required haste and we set out immediately after having by a fortunate chance obtained eighteen living specimens of the *Proteus anguinus*<sup>17</sup>.” (Spix & Martius 1824, 11). Although widely known today, at the time, it was “not yet fully decided whether this animal which in its structure is between lizards and fishes is only a larva or a perfectly developed animal.” (Spix & Martius 1824, 11).



Figure 9 – Detail of the *Proteus anguinus* in the Cave of Postojna (Photo: Luiz E. P. Travassos, 2007).

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<sup>16</sup> *Cerkniško jezero* or Lake of Cerknica.

<sup>17</sup> Species of cave salamander found in the *Kras Plateau* Slovenia.



Moving to the major port of Trieste, the naturalists described the city on the edge of the Adriatic, as well the limestone, “*masses of rock containing petrified shells lie scattered*” in the region (Spix & Martius 1824, 11). After leaving Trieste, they arrived in *La Valletta*<sup>18</sup>, “*Lavaletta is one of the most glorious monuments of the Order of Saint John of Jerusalem founded during the crusades.*” (Spix & Martius 1824, 32). At the entrance to the port of Lavaletta, observe an imposing fortress above the limestone rock “*which present formidable rows of batteries towards the sea.*” (Spix & Martius 1824, 32-33). From Lavalletta to *Citta Vecchia*<sup>19</sup>,

over naked fields between innumerable little country houses the first thing shown to strangers here in the old town is the church of Saint Paul the Apostle (...). Not far from the church is the grotto of St Paul where there is an image of the apostle as large as life The stone of which the cavern consists supposed by the inhabitants to possess the miraculous power of curing all kinds of fevers is a marl like light white brittle limestone of recent formation in which there are traces of petrifications of marine shells still found in the adjacent seas. (Spix & Martius 1824, 33-34)

Before leaving the city, they had to visit the local catacombs. “*The entrance to them is in a garden very near the church of St Paul. They are extensive intricate passages hewn in the soft rock.*” (Spix & Martius 1824, 34). The popular tradition still attached to its existence the

first Maltese Christians who to escape persecution built a subterraneous town and the inhabitants therefore fancy that they can distinguish the church with the altar and the font the dwellings of the families with the kitchen (...) tables hewn in the rock. Others suppose them to have been the repositories of the wounded brought hither during the crusades or the burying places of those who died in that period. (Spix & Martius 1824, 35).

Still regarding the religious use of Malta’s underground, it is important to remember Shaw (1952; 1953). In 1952 the author records the existence of numerous caves used as churches, which many of them were originally rock shelters that have been adapted towards the outside to constitute a church. However, he draws attention to the underground church of *Wied Hanzier* that has been modified by human actions through the enlargement of several fissures in the limestone. Shaw (1953) highlights the small cave near *Sliema* which was also used as a church. According to regional legend, a small shepherd used to live in the vicinity of the cavity before the church was built.

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<sup>18</sup> Capital city of Malta, located in a rock peninsula in the east of the Island of Malta.

<sup>19</sup> It was the capital city of Malta until it was suppressed by La Valletta in 1570.

The girl had a habit of disappearing for a while during the day. Once, after much seeking for her, she was found just inside the cave praying at the place where the altar was placed afterwards.

In Gibraltar, the limestone was described as “*of a grayish white or yellowish brown color (...) especially towards the NW side more stratified on the surface than deeper down and contains several smaller and larger caves.*” (Spix & Martius 1824, 59).

The largest cave of Gibraltar, the Cave of San Miguel<sup>20</sup>, is adorned by many speleothems, many of which were in the house of the regional governor. Other smaller caves and regional limestone were also described. They call attention to the predominantly bones of herbivores in Gibraltar, contrasting with the bones of bears and carnivorous often found in limestone caves of the interior of Europe (Spix & Martius 1824)

Already in Brazil, Spix and Martius (1824, 277), traveling in the Portuguese colony at that time, also passed by karst regions. Clearly more interested about the gold found in the region and the procedures of extraction and processing, they made a quick register of the Cave of Antonio Pereira. The region of the *Quadrilátero Ferrífero* (QF) in Minas Gerais, which is characterized by the presence of iron deposits widely exploited by the mining industry, is still considered one of the most important mining districts in Brazil due to both the concentration and variety of minerals that are found in the area (e.g.: gold, iron and manganese) like in Spix and Martius time:

In the pleasant valley not far from the village a very compact light grey calcareous stone stands out in large masses and extends pretty far up the mountain. In this probably primitive limestone which sometimes shows on its rifts a mammillated coating of sulphur there is a cavern with stalactites which has been transformed into a Capella de Nossa Senhora da Lapa. (Spix & Martius 1824, 277).

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<sup>20</sup> The cave has received this name because of a presumed sighting of Saint Michael. In modern times, the cave was prepared to serve as a field hospital during the Second World War but was never used for that purpose. Currently, it has a large theater with seats where cultural presentations can take place.

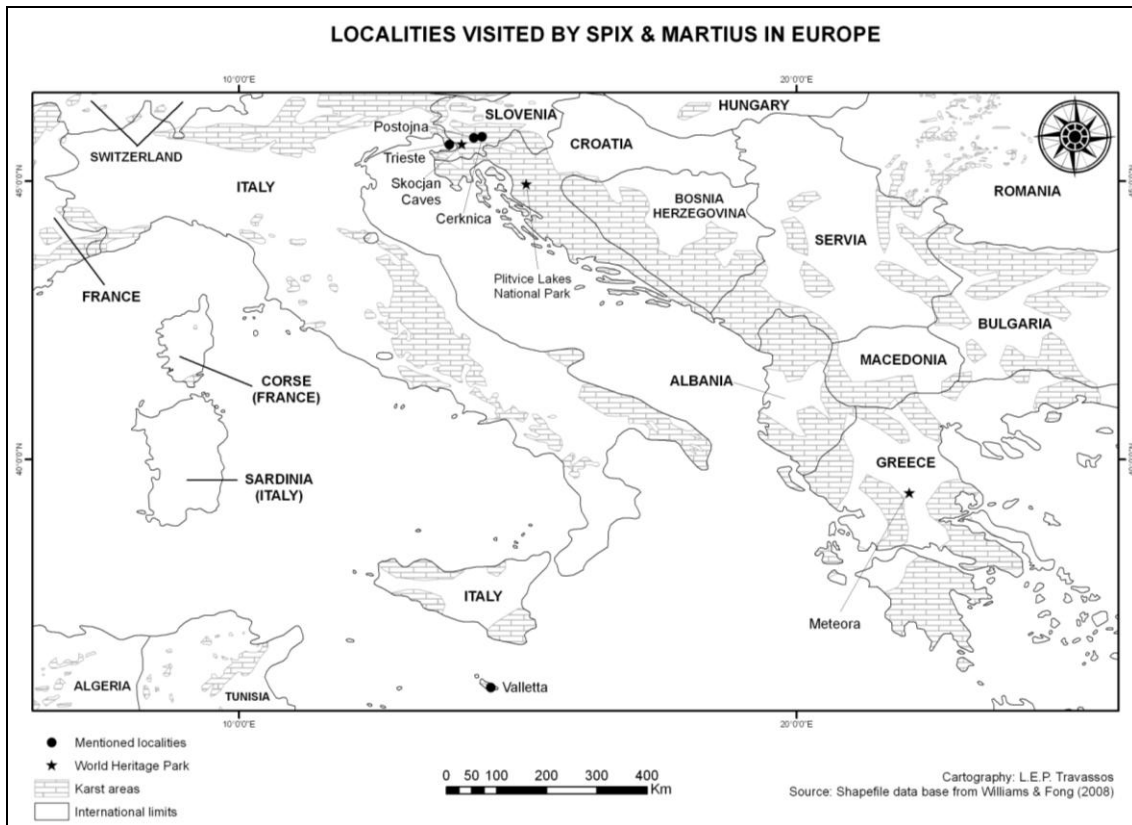


Figure 10 – Location map of some relevant regions which were visited by Spix & Martius in Europe.

### 1.2.1 Conrad Malte-Brun

The first major work of “encyclopedic inspiration in the domain of European geography was the Universal Geography (‘*Geographie Universelle*’) of Conrad Malte-Brun, a Danish geographer who was forced to exile in France due to his ideas, considered too liberal for the time.” (Amorim Filho 1988, 19). He aimed to provide a renewal in geographical ideas which he thought to be crucial at that time. (Amorim Filho 1988)

Karst and caves are pictured under the same perspective of integration of physical and human studies. Numerous references to the geology and the type of limestone from various regions of the world are made. Caves used as dwellings places and temples are also identified. Descriptions of cavities filled with fossils and concretions are also common in the 8 existing volumes.

In his preface to the volume 1, Malte-Brun (1827) says that the idea of the work is to group in a series of historical speeches, all the Ancient World and the Modern Geography in a way that provides the reader a vivid picture of the whole world, with all

the different countries, their memorable places and their societies. He recognizes that “*It appears an immense undertaking, when we consider how many varied details require to be combined in a work of moderate size.*” (Malte-Brun 1827, iii).

Continues stating that, in studying the physical aspects of the world, “*we shall take a view of the leading features of nature; the mountains (...), the seas (...), and the rivers and the valleys by which it is intersected. We shall seek our way downward, through caverns and through mines.*” (Malte-Brun 1827, iv). “*Cavities and fissures of the Globe*”, grottos, caves, underground water, bones and even volcanic caverns are described. (Malte-Brun 1827, 84-91). Affirms in other parts of the work that he will

point out and occasionally describe at length the most remarkable caverns and grottos of our globe; but we must here confine ourselves to general views (...). Among the numerous caverns of Carniola<sup>21</sup>, that of Adelsburg<sup>22</sup> is said to afford a subterranean walk of two leagues; but this computation of rather too enthusiastic a writer requires to be confirmed. (Malte-Brun 1827, 86).

Still regarding the region of Slovenia, he states that many caves contain deep “*contain deep pits of water, or wells, sometimes so extensive as to acquire the name of subterraneous lakes.*” (Malte-Brun 1827, 86). He registers the presence of other cavities from where rivers appear from underground. Such examples are the “*innumerable cavities of the Julian Alps, in Carniola and Croatia*” that maybe affect the seasonal regime of the “*lake of Cirknitz.*”(Malte-Brun 1827, 86).

The mountainous region which stretches to Illyria<sup>23</sup> are, in great extent, composed of

calcareous rocks which geologists have called secondary, and which, from their tendency to give way so as to form numerous cavities, might well be termed cavernous. It seems, indeed, as if all these heights were hollow; at least it cannot be denied that almost as many rivers flow below as above the ground. The stranger who follows their course observes them entering and returning at different distances from the depths of the earth. Others become wholly dry at certain seasons of the year, and afterwards reappear.(Malte-Brun 1832, 212)

He still affirms that is possible to enumerate

more than a thousand caverns in the chain that traverses Illyria from north-west to south-east; but none can be compared in point of extent with the one at Adelsberg, which is situated in a small valley at no great distance from that burgh. Some writers consider it equal in length to five miles. It is by no

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<sup>21</sup> Region of present-day Slovenia.

<sup>22</sup> City of Postojna. Malte-Brun was referring to the Cave of Postojna.

<sup>23</sup> Region which covers Serbia, Montenegro, north of Albania, Bosnia and Herzegovina and Croatia.

means easy to trace the rapid declivities in the labyrinth, or the narrow and tortuous passages which lead to immense halls. All agree that it surpasses most places of the kind; the soil is encrusted with fossil bones; a torrent rushes through the cavities with a frightful noise, which is repeated by many echoes ; stalactites adorn the halls, and appear in some places like the ruins of old palaces, in others like magnificent columns. (Malte-Brun 1832, 212)

Not too far away Malte-Brun (1832, 212) describes the “*Cave of Magdalene, although not nearly so large as the last, is fully as deep, and perhaps as remarkable on account of its stalactites (...). Their calcareous concretions exhibit the most varied forms.*” and the aquatic species “*known by the name of Proteus anguinus abounds in a small marsh at the extremity of the cave.*” (Malte-Brun 1832, 212).

About the Lake of Cerknica (Figure 11), he states that it has been the most

frequently examined by naturalists than any other (...). Calcareous mountains bound it on every side; Mount Jovornick commands it on the south, and the Sliviza on the north. It may be about four or five leagues in circumference in dry seasons, and in wet about seven or eight. The waters of eight streams flow into it, and four or five islands rise in the middle of the lake; the village of Vorneck has been built on the largest of these islands. The lake disappears at irregular periods, and flows through forty clefts or apertures in its channels. The inhabitants then collect the fish that have not been carried away by the water, and shoot the aquatic fowl that seek in vain for their haunts. The husbandman deposits the seed in the fertile ooze, trusting that his labors may be crowned by an abundant harvest; but his labor, his outlay, and his hopes, are often vain. By the same issues, which served to drain the lake, the waters rise suddenly with a tremendous noise resembling thunder; the fish reappear, the teal and water birds find their wonted asylum, and man complains of his improvidence.<sup>24</sup> (Malte-Brun 1832, 212).

About sinks and ponors of Asia Minor, he states that the water from the Duden river (Turkey), “*often disappears in a subterranean cavern.*” (Malte-Brun 1824, 80).

In another volume, he affirms that

The rivers which disappear under ground have excited the wonder both of ancients and moderns (...). The ancients have mentioned a great number of rivers which lose themselves under ground, to reappear in a lower level; but this phenomenon, which most frequently is closely connected with that of subterraneous caverns, has been examined in a rational and sober manner only by the moderns. (Malte-Brun 1827, 139).

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<sup>24</sup> Nowadays it is known that the Lake of Cerknica is the major karst *polje* of Slovenia. The intermitent lake covers an extension of 26 km<sup>2</sup> when full. It has 10,5 km of length and almost 5km wide. Its major tributary is the Cerkniščica river. Important karst springs are the Žerovnica, Šteberščica and Stržen.



Figure 11 - Panoramic view of part of Lake Cerknica. B-C) One of the many fissures (ponors) of the Lake (Photos: Luiz E.P. Travassos, 2008-2009)

Phenomena like the fire that came out from the cave fissures observed by Humboldt are also recorded by Malte-Brun. The difference of the reports, however, is the addition of an element of the European imagination: the dragons.

a succession of these fires will therefore appear to the spectator to be one single flame, which moves with rapidity from place to place, when we attempt to approach it. The air, driven on before us, forces the lambent flame to recede. There are other similar fires, which appear to be immovable when viewed from a particular spot. (...) which was supposed to issue from the mouth of a dragon that kept watch over some hidden treasures. (Malte-Brun 1827, 175).

Malte-Brun also registers the same phenomena in the Corycian cave (in the Mount Parnassus, Greece). He makes reference to Strabo who had described this “*a romantic grotto of Cilicia<sup>25</sup> the spot near Hephestion in Lycia, whence issued an inflammable gas.*” (Malte-Brun 1824, 71). In 1825, he literally cites the researches of Humboldt in Tenerife referring to the *Gaunches* (Malte-Brun 1825b, 474-475)

<sup>25</sup> Present-day *Çukurova*, south of Turkey.

Aspects of the imaginary and the caves are mentioned when he describes the Cape of Rasocolmo, in Sicily:

At a league and a half from the Pharus, situated near cape of Rasocolmo, stands a rock famous in antiquity, as being most dangerous to ships. Rising like a peak, the base of Scylla is pierced by many caverns; the billows enter them, mingle with each other, and make in breaking a tremendous noise, which explains why Homer and Virgil have painted Scylla<sup>26</sup> roaring in her cave, and guarded by wolves and fierce dogs. (Malte-Brun 1829, 602)

In another moment, caves and dolines are registered near the Ural Mountains, Russia “*The numerous caverns abound in stalactites, and the one near Koungour is divided into four large apartments. The sinking of the ground is frequently caused by subterranean waters, which undermine the marshy land, and the beds of many small lakes are thus formed.*” (Malte-Brun 1828, 439).

He describes caves as dwelling places of the “(...) *Arabs, or Syrians, who inhabited these perennial dwellings, were perfectly secure from the burning summers and the still more chilling winters of the climate.*” (Malte-Brun 1824, 113). And continues observing Christian processions and the presence of about 200 convents of Saint Anthony where was possible to affirm that “*there are numbers of individuals who lead the lives of hermits in the caverns of the mountains.*” (Malte-Brun 1824, 141).

In Mount Carmel, in Israel, Malte-Brun (1824, 149) is informed about the supposed miracles of Elijah and in the region, “*There thousands of religious Christians once lived in caves of the rock: the mountain was then wholly covered with chapels and gardens. At the present day nothing is to be seen but scattered ruins amidst forests of oaks and olives, the verdure of which is interrupted by the whiteness of the calcareous rocks.*”

He identifies in Palermo, Capuchin catacombs as cavities sculptured in the rocks under the Church of the Capuchins. “*On certain festivals, these bodies are clothed in gorgeous apparel; relatives, friends, perhaps lovers are then admitted to see those who were dear to them.*” (Malte-Brun 1829, 746). He continues comparing the catacombs with the “*several unfinished sarcophagi have been found in the caverns dug by the Romans.*”(Malte-Brun 1831, 352) in *Chaine des Puys*<sup>27</sup>.

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<sup>26</sup> Monster of Greek mythology which lived in the opposite side of *Charybdis*, the water vortex that supposedly sucked and disgorged the sea water, swallowing anything near by.

<sup>27</sup> French Central Massif of volcanic origin. South-central region of France.

Cave sanctuaries are described at some miles of *Gaya*<sup>28</sup> where is located a enormous granitic cave and Indian temples full of inscriptions. The author makes reference to various books that registers the existence of “*several extraordinary caverns in it, (...) and contains two gigantic figures of Buddha, twenty feet high, showing that the works belonged not to the Brahminical, but the Buddhist system of faith.*” (Malte-Brun 1825a, 161). Continuing, Malte-Brun states that

The Portuguese converted the place into a Christian church. They did not destroy the images as in many other instances, but, not having coolness enough to allow them to stand as simple monuments of art and of antiquated opinions, they converted them into Christian emblems, painted them red, and with pious zeal, cherished them as valuable proselytes (Malte-Brun 1825a, 161).

In the same volume, Malte-Brun (1825a, 253) identifies the cave-temples in Ceylon<sup>29</sup>: “*A little way from the top there is a remarkable natural cave, and two artificial caverns, forming gloomy temples of Buddha, containing many statues, and hieroglyphic paintings. At the foot of the rock are the houses of ten priests.*”

Describing Russia, he states that is possible to identify “*holy places*” and among them, “*a number of lakes, springs, and caverns.*” (Malte-Brun 1828, 529).

Many other records to physical processes and caves are found in the work of Malte-Brun; however those mention here is focused more on the cultural and religious use by humans.

### ***1.2.2 The Universal Geography of Elisée Reclus***

Continuing the time line from the to the end of 19<sup>th</sup> century to the 20<sup>th</sup>, there appear the names of Elisée Reclus (1830-1905) and Jean Nicod (1923-).

About Reclus, Amorim Filho (1988) states that the largest work of Reclus and also the greatest work of regional geography written by a man is his ‘*Nouvelle Géographie Universelle*’.

Elisée Reclus became renowned by his *Nouvelle Géographie universelle* (1876-1894), among other works. “*Even though criticized by some French geographers and, sometimes, thought as superficial in some issues (geological bases of Geography, for*

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<sup>28</sup> Province of India.

<sup>29</sup> Present-day Sri Lanka.



*example), the work of Reclus may be described as magnificent.*”(Amorim Filho 1988, 24). All the 19 volumes of the Universal Geography approach the thematic of caves, ponors, springs and the use of karst by different cultures.

The books are divided as follows: Volume 1 – Southern Europe (Greece, Turkey in Europe, Romania, Serbia, Italy, Spain and Portugal); Volume 2 – France and Switzerland; Volume 3 – Austria-Hungary, Germany, Belgium, and the Netherlands; Volume 4 – The British Isles; Volume 5 – The northeast Atlantic. Islands of the North Atlantic, Scandinavia, European islands of the Arctic ocean, Russia in Europe; Volume 6 – Asiatic Russia; Volume 7 – East Asia; Volume 8 – India and Indo-China; Volume 9 – South-western Asia; Volume 10 – North-east Africa; Volume 11 – North-west Africa; Volume 12 – West Africa; Volume 13 – South and East Africa; Volume 14 – Australasia; Volume 15 – North America; Volume 16 – The United States; Volume 17 – Mexico, Central America, West Indies; Volume 18 – South America (The Andes regions); and Volume 19 – Amazonia and La Plata.

Like the other authors mentioned, the karst phenomena which most caught Reclus’ attention were caverns, dolines, ponors and springs. He often showed the relationship of legends associated with these places. Next will be showed some of the most significant passages in accordance to the thematic of this dissertation.

#### **1.2.2.1 Southern Europe (Greece, Turkey in Europe, Rumania, Serbia, Italy, Spain and Portugal)**

In Volume 1, he describes sceneries of Greece, Turkey in Europe, Romania, Serbia, Italy, Spain and Portugal. About Greece, he talks about waters which are “*are swallowed up by the ground so as to form a subterranean delta. To the south there is a cavernous opening in the rock, but this is merely a sort of tunnel passing underneath a promontory, and, except during the rainy season, it may be traversed .*” (Reclus 1876-1894a, 52).

Beyond this, another opening swallows up one of the most important branches of the Cephissus, which makes its reappearance in the shape of bounteous springs pouring their waters into the sea. Two other branches of the river disappear in the rocks about a mile farther north. They join soon afterwards, and flow northwards beneath the bottom of a sinuous valley. The old Greek engineers dug pits in this valley, which enabled them to descend to the subterranean waters, and to clear away obstructions interfering with their flow. (Reclus 1876-1894a, 52).

Moving to the coast, Reclus talks about the promontory of Tainaron<sup>30</sup>, where the sea water passes through its caves “with a dull noise which the ancients mistook for the barking of Cerberus<sup>31</sup>.” (Reclus 1876-1894a, 59). Still making the connection between reality and the collective imaginary, he describes the upper valleys of Peneus or Salembria as being abundant in “natural curiosities, such as defiles, sinks, and caverns. To the north-west of Mount Olympus, the turbid Titaresius flows through the narrow gorge of Sarauta Poros, or of the Four Fords, which was looked upon in former times as one of the gates of hell.” (Reclus 1876-1894a, 113).

In the island of Antiparos, he mentions the Cave of Antiparos (Reclus 1876-1894a, 71). Regarding this cave (Figure 12), Oldham (2002) cited by Duckeck (2008) affirms that famous visitors wrote their names in the walls of the cave. In 1840, the King of Greece, Otto, registered his visit. On three occasions the French ambassador in Constantinople celebrated a mass using a stalagmite as an altar. In its base there is the following inscription: HIC IPSE CHRISTUS / EJUS NATALIE DIE MEDIA CELEBRATO / MDCLXXIII (Here midnight mass was celebrated on Christmas 1673).

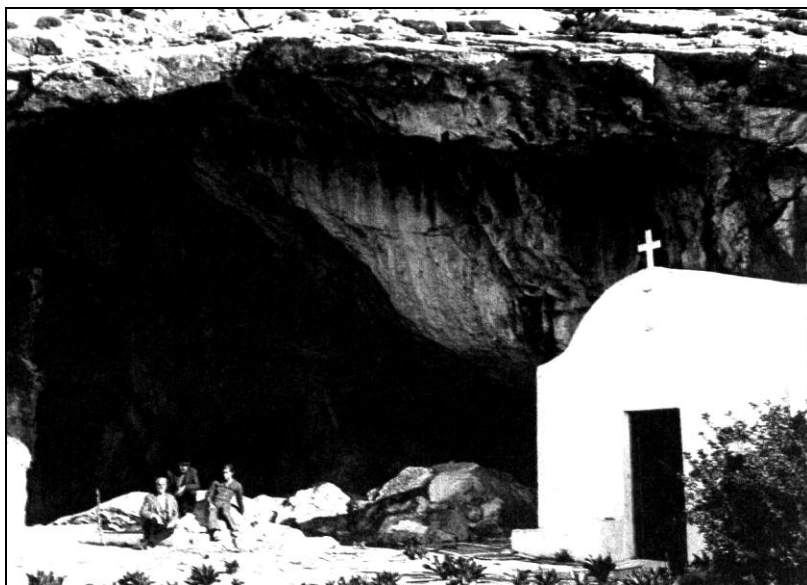


Figure 12 – Chapel of Agios Ioannis Spiliotis located to the right of the entrance of the Cave of Antiparos. According to Petrocheilou (1984), pilgrims gather in this place (Source: Petrocheilou 1984, 110)

Reclus identifies the religious use in the mountains of *Buraikos*, where are located “the grand caverns of Mega-Spileon, which are used as a monastery, and where

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<sup>30</sup> Cape Tainaron.

<sup>31</sup> Name given to the multi-headed dog of Greek-roman mythology. It was believed to guard the gates to Hades.

*the most curious structures may be seen built up on every vantage-ground offered by the rocks, suggesting a resemblance to the cells of a vast nest of hornets.” (Reclus 1876-1894a, 57).*

The cave of *Melidhoni* (Cave of Melidoni, Crete), in the west side of Mount Ida, is remembered as a place of “*terrible events*” in the war against the Turks. “*In 1822 more than three hundred Hellenes, most of them women, children, and old men, had sought refuge in this cavern. The Turks lit a fire at its mouth, and the smoke, penetrating to its farthest extremity, suffocating the unfortunate beings who had hoped to find shelter there.*” (Reclus 1876-1894a, 94).



Figure 13 – View of the Cave of Melidoni entrance and the tomb in honor to those who perished.(Available at <<http://www.crete.tournet.gr/index-en.jsp>> )

In Bosnia, he compares the limestone mountains with the Jura limestone,

rendered complete by the existence of grottoes, sink-holes, and subterranean rivers. Sinkholes from 60 to 100 feet in diameter, and shaped like funnels, are met with in many localities. Several rivers appear suddenly at the foot of a hill, and, after flowing on for a few miles, disappear again beneath some portal in the rocks. The table-land of the Herzegovina especially abounds in phenomena of this kind. The ground there is pierced by “sinks”, or ponors, which swallow up the water derived from precipitation. “Blind valleys” and “troughs” present everywhere the traces of currents of water and of temporary lakes, and after heavy rains the subterranean basins sometimes rise to the surface, and a river then flows for a time along the valley. As a rule, however, the inhabitants are compelled to collect the water they require in cisterns, or to fetch it from long distances. Elsewhere the hydrography of the country is subject to annual changes. Lakes which still figure upon our maps are drained through subterranean passages only recently opened; other lakes are formed in consequence of some passage, which formerly carried off the surface water, having become choked with alluvium. No more curious river probably exists in the world than the Trebinishtitza<sup>32</sup>, in the Western Herzegovina<sup>33</sup>.(Reclus 1876-1894a, 127-128).

<sup>32</sup> Maybe the river Trebišnjica, south of Bosnia & Herzegovina.

<sup>33</sup> Present-day Bosnia & Herzegovina.

In the south of Italy, in the region of *Campania*, he registers the flammable gases which were seen by “*our Greco-Roman predecessors*” as caused by the gods:

hidden furnaces, the gaping funnels communicating with unexplored caverns, lakes which disappeared at irregular intervals, and others exhaling deadly gases—all these things left their impress upon ancient mythology and poetry. At the time of Strabo the shores of the Bay of Baiae<sup>34</sup> had become the favorite resort of voluptuaries, and sumptuous villas rose upon every promontory; but the terrors inspired by hidden flames and mysterious caverns had not yet departed.(Reclus 1876-1894a, 288-289).

To the northeast of *Oristano* (region of Sardinia), “*may be heard now and then a noise resembling the bellowing of a bull. This noise is probably produced by the passage of air through some subterranean cavern, and similar phenomena have been observed on the coast of Dalmatia*<sup>35</sup>.” (Reclus 1876-1894a, 352).

Spain is represented by the “*the caverns of Covadonga*<sup>36</sup>, in which the ashes of the saint have found a last resting-place, and which are conspicuously objects of the highest veneration to patriotic Spaniards.” (Reclus 1876-1894a, 459).

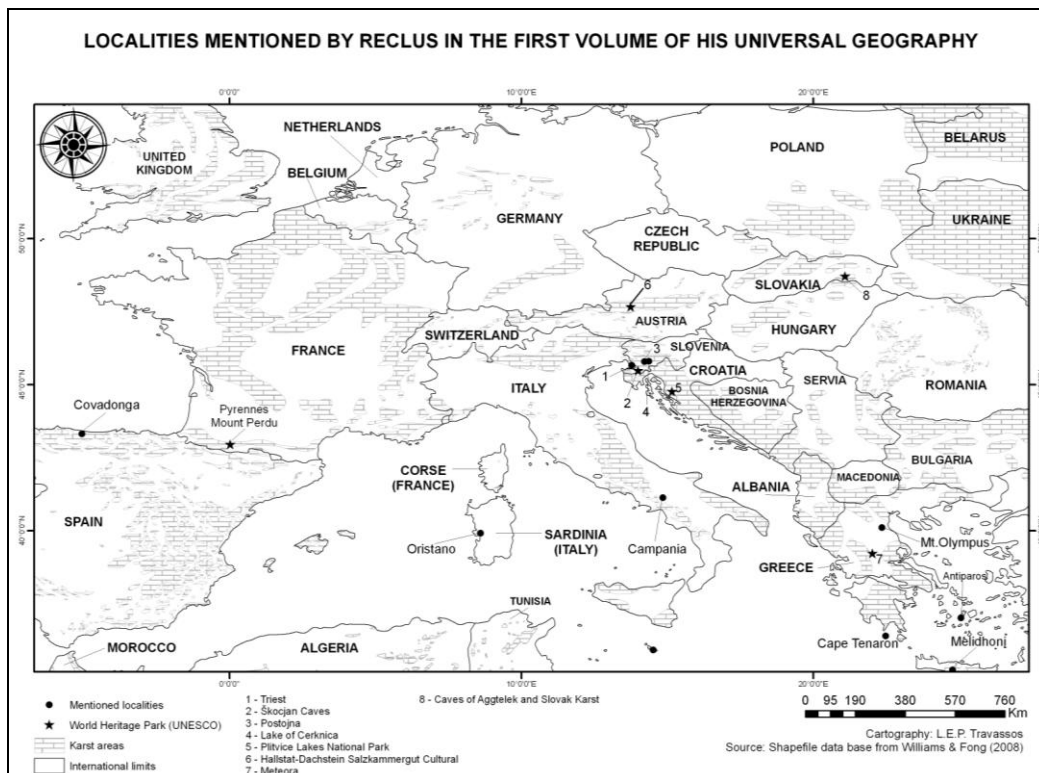


Figure 14 – Map of some localities described by Reclus in the Volume 1 of his Universal Geography.

<sup>34</sup> In the Bay of Naples.

<sup>35</sup> East coast of Adriatic Sea.

<sup>36</sup> In the region of Asturias is located the Cave of Our Lady of Covadonga ou the Saint of Covadonga. The cults in the sanctuary exists since before the 18<sup>th</sup> century.

### 1.2.2.2 France and Switzerland

In Volume 2, attention is given to France and Switzerland, starting with French pre-history and the many caves researched by archaeologists and paleontologists. Here will be mentioned only a few passages which, according to the author, are about some of the most important caves of the country. In them, “*Centuries passed away, and the men who dwelt in the plains bordering upon the Somme and the Seine, on the plateau of Central France, and along the foot of the Pyrenees.*” (Reclus 1876-1894b, 14). He affirms elsewhere that, to archaeologists, “*the men who dwelt in the caverns of the Pyrenees, on the Vézère and the Aveyron, were kinsmen of the Laps, Samoyeds, and Eskimos. Their mode of life, their weapons and implements, and even their style of ornamentation, all appear to support that conclusion.*” (Reclus 1876-1894b, 16).

He states that the basin of the Ariège and Salat, in the Pyrenees, abound in caverns:

The “galleries of Lombrives and Niaux<sup>37</sup> pierce an entire mountain to the south of Tarascon. Equally curious is the cavern of Bédeilhac, the traditional burial-place of Roland. These caverns have proved a rich field of exploration to anthropologists and geologists. Bones of animals now extinct, as well as traces of prehistoric man, have been discovered in them. Until recently many of these galleries were used as places of refuge. That of Ormolac, near Ussat, gave shelter to several hundred Albigenses<sup>38</sup>, but the soldiers of the Inquisition built a wall across its entrance and they all perished, as did the Greeks in the cavern of Melidhoni. (Reclus 1876-1894b, 30-31).

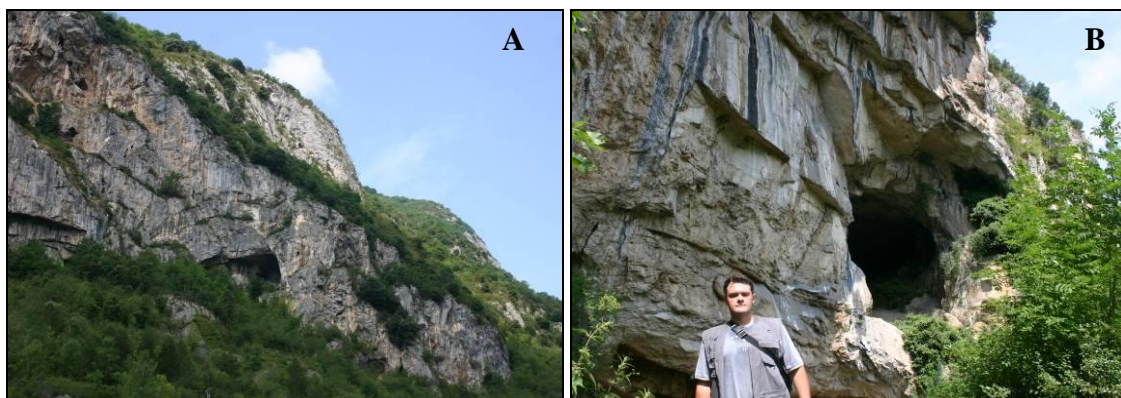


Figure 15 – A) Detail of the limestone outcrops of the Ussat region and the view of the cave entrance from the outcrop base. B) Entrance to the Lombrives Cave. (Photo: Luiz E.P. Travassos, 2009)

<sup>37</sup> Both in the south of France holds important registers of pre-historical times.

<sup>38</sup> Religious sectaries of Medieval France.



At *Fonfricile*, Reclus points to the presence of caves used in ceremonial burials in pre-history. “*East of Mentone*<sup>39</sup>, (...) are located the famous caves of *Baousse-Roussi*, where human skeletons and few tools were discovered.” (Reclus 1876-1894b, 130; 134).

St. Paxlicn (...), there are numerous caverns, and the romantic castle of Lloche-Lambert, admirably described by Georges Sand. Other caverns, formerly inhabited, lie to the south-east of Le Puy near the old hamlet of La Terrasse. The environs of Lo Bugue are famous for their caverns, which have yielded prehistoric remains of the highest interest, and some of the more remarkable of which are near the villages of Tayac and Les Eyzies, on the Vézère. (Reclus 1876-1894b, 190, 199).

Regarding karst waters states that the “*Ain is the most characteristic river of the Jura*<sup>40</sup>. Born of plenteous springs issuing from mysterious caverns, the river winds through narrow defiles and cluses, and frequently disappears between the masses of huge rocks which have tumbled down from the surrounding precipices.” (Reclus 1876-1894b, 150).

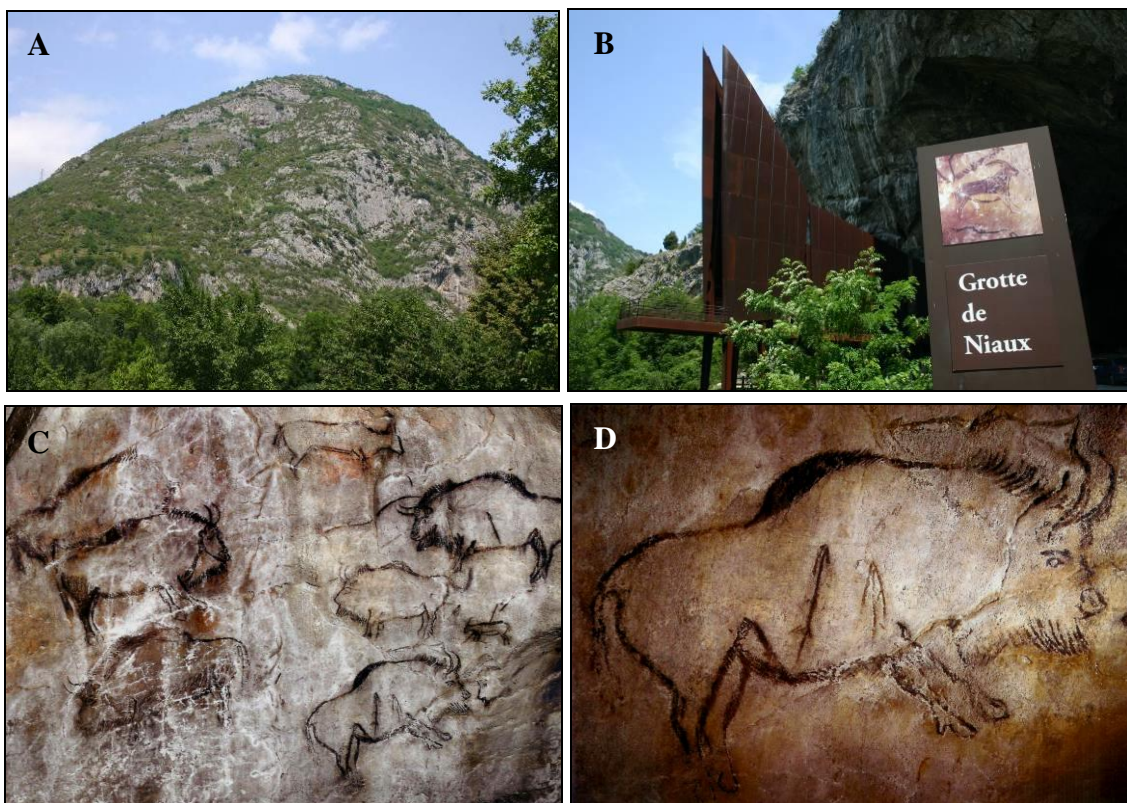


Figure 16 – A) Detail of the carbonate outcrops of the region of Niaux. B) Entrance to the Cave of Niaux (Photo: Luiz E.P. Travassos, 2009). C) General overview of the panel of the Bisons and goats (Source: Sesta 2005, 18). D) detail of one bison from the panel # 6. It is dated from 12.890 years B.P. (Source: Sesta 2005, 160)

<sup>39</sup> Menton, city near Italian border.

<sup>40</sup> Mountain range which separates the rivers Rhine and Rhone.

Another reference made on a karst river is made about the Touvre which is “fed by the Tardoire and the Bandiat, both of which rise on the granitic plateau of Central France, but almost entirely disappear whilst passing through a fissured and cavernous limestone region.” (Reclus 1876-1894b, 207-208).

In Ariège, approximately 70 km south of Toulouse, Reclus mentions the importance of cave to biospeleology<sup>41</sup> because “these caves of the chalk mountains of the Ariège are more especially interesting, on account of the insects without eyes which have been discovered within them.” (Reclus 1876-1894b, 31).

In Switzerland Reclus states that “The rain which falls upon the Jura not only fills the lakes and surface torrents, but a considerable portion of it finds its way through creux (pits) (...) into underground channels and caverns, and reappears again at the foot of the mountains. The most remarkable of these subterranean rivers is the Orbe, the most important tributary of the Rhine (...).” (Reclus 1876-1894b, 412).

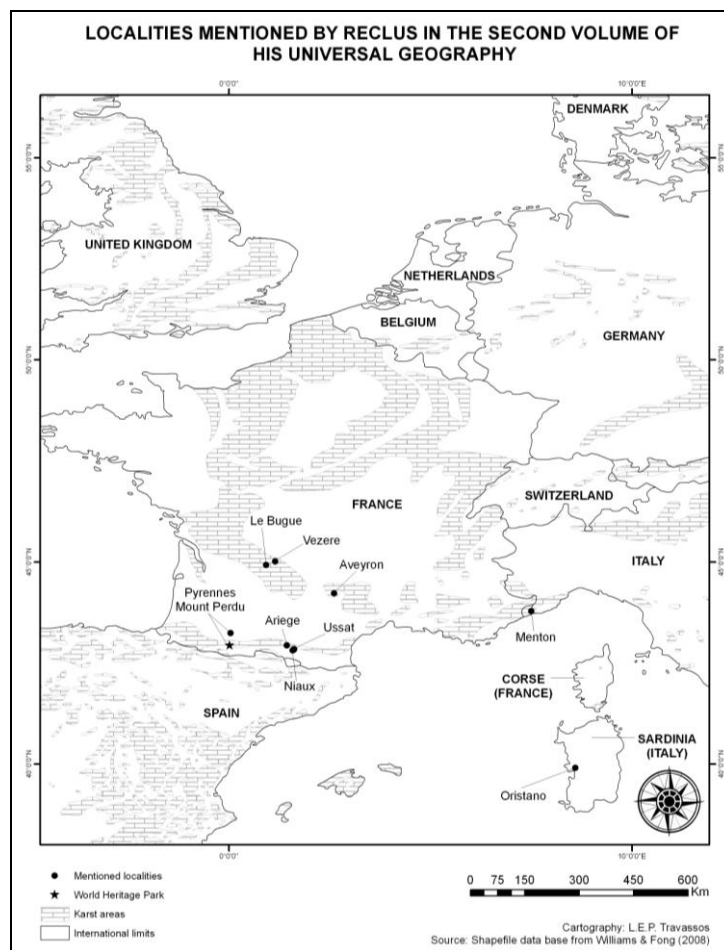


Figure 17 – Map of some localities described by Reclus in Volume 2 of his Universal Geography.

<sup>41</sup> Field of speleology or karstology which deals with the study of cave life.

### 1.2.2.3 Austria-Hungary, Germany, Belgium, and the Netherlands

In Volume 3, maybe the most important book regarding this dissertation, Reclus studies the Austro-Hungarian Empire, Germany, Belgium and Netherlands. About the Austro-Hungarian Empire, he registers the *Kras Plateau*. “*The Carso, with its piled-up stones and grotesquely shaped rocks, presents a unique appearance.*” (Reclus 1876-1894c:40)

He refers to the abundance of dolines:

Sinks of all shapes and dimensions abound, some of them presenting the appearance of amphitheatres surrounded by rows of seats. These sinks swallow up all the rain that falls, when they are converted into temporary lakes, unless the water immediately disappears in the bowels of the earth. (Reclus 1876-1894c, 40).

On the natural fertility of doline bottoms he states that the soil “*suspended in the water is deposited upon the bottom of the sink, and these hidden spots are carefully cultivated by the inhabitants, for upon the open plateau, owing to high winds and arid soil, cultivation is not practicable.*” (Reclus 1876-1894c, 40). Talking about the *Kras Plateau*, affirms that it “*forms a good natural boundary, for it presents great difficulties to a traveler, not so much because of its height, but owing to its formidable precipices.*” (Reclus 1876-1894c:43).

Obviously, he makes important references to the “*Dinaric Alps*” and registers countless seasonal lakes and karst springs. He pays attention to the behavior of these lakes and karst rivers presenting the region as “*a strong strategic barrier, not only because of their height, but also because of the want of water.*”(Reclus 1876-1894c, 43).

The limestone of which they are composed quickly sucks up the rain, and no other country in Europe abounds so largely in underground rivers. These rivers have their waterfalls, their freshets, and other phenomena, like rivers flowing on the surface. M. Schmidt and others, by descending into the sinks and embarking in small boats upon mysterious watercourses, have succeeded in mapping several of these subterranean river systems. Of all these rivers the Rieka, or Recca<sup>42</sup>, near Trieste, is the most famous. Rising upon the Snowy Mountain, it flows for some distance through a narrow canyon, until it disappears beneath the rock, surmounted by the picturesque village St. Canzian<sup>43</sup> Still lower down it flows over the bottom of a sink, then forms

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<sup>42</sup> Reka and rijeka means “river” in Slovene and Croatian, respectively. In Slovene territory there exist a few rivers called Reka which, translation would be named River *River*. In Croatia, Rijeka its also the name of an important city. In this case, Reclus is referring to a particular river.

<sup>43</sup> Present-day village of Škocjan. The region is an UNESCO Patrimony since 1986 (Park *Škocjanske jame*).



some cataracts, and disappears once more, only to appear again after an underground course of 22 miles. (Reclus 1876-1894c, 43-44).

He states that a large portion of Carniola and Dalmatia would be without water if it was not for the layers of impermeable rocks that, occasionally, force to the surface the underground rivers. When they are not visible in the surface, many towns use cisterns for the water supply “*although voluminous rivers flow through inaccessible caverns beneath them.*” (Reclus 1876-1894c, 66).

About the Pivka River he records that it is “*swallowed up by the caverns of Postojna, or Adelsberg (...), is perhaps quite as remarkable a river as the Timavo. After an underground course of about 6 miles the Piuka<sup>44</sup> once more reaches the surface, a calm and powerful river. Soon after its junction with the Unz it is again swallowed up, and only reappears a short distance above Laibach<sup>45</sup>.*” (Reclus 1876-1894c, 66-67)

It is common to observe in the reports of travelers and scholars that, the image of karst areas frequently presents some points in common. In this case, Reclus says that “*on a map, these rivers which hide themselves from time to time in underground channels resemble a serpent cut into pieces.*” (Reclus 1876-1894, 45-46).

Regarding the human relationship with karst (Figure 18), Reclus states that

One of the most difficult tasks of the people dwelling around the Carso consists in their protecting themselves against the sudden floods caused by these subterranean rivers. The water, not being able to spread laterally, rises vertically, fills up the sinks, and even overflows them. The Rieka has been observed to rise 350 feet above its ordinary level in the sink of Trebic. The villages are thus perpetually threatened by inundations. The inhabitants take many precautions to avert the danger. They place gratings over the openings of the sinks, to prevent their becoming choked up ; they occasionally clean cut the underground channels; and sometimes even resort to blasting in order to open more commodious passages for the surplus waters. Permanent or temporary lakes are formed in many places, in spite of these precautions. (Reclus 1876-1894c, 46).

Even with all the precautions, perennial or temporary lakes form in various places, but none can be compared “*with the Zirknitz<sup>46</sup> which lies on the northern slope of the Carso.*” (Reclus 1876-1894c, 47).

In the dry season its water is drained off through the numerous fissures and caverns which perforate its bed. After rains it rises [Stržen river] to the surface, sometimes very suddenly, and occasionally the lake spreads over a surface of 30 square miles. Drainage works have to some extent regulated the

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<sup>44</sup> Pivka River.

<sup>45</sup> Present-day city of Ljubljana, capital city of Slovenia.

<sup>46</sup> *Cerkinisko jezero* or Lake of Cerknica.

ebb and flow of the lake. In former times, however, the whole of the plain was occasionally converted into a lake, and the villagers alternately gained a livelihood by fishing and by tilling the land when it emerged. (Reclus 1876-1894c, 67).



Figure 18 - Pictures that illustrate what the “sudden floods” mentioned by Reclus would be. Both pictures were taken from the same viewpoint in a parking place near the Cave of Postojna, Slovenia (Photos: Luiz E.P. Travassos, 2008).

More recently, Kranjc (2006b) remembered the antiquity of the first citation of the Lake Cerknica. The Roman geographer Strabo (63 BC - 21 AD) was probably the first to mention it and G. Leonberger (1537) the first to publish a printed record. Still according to the author, the early authors from 16<sup>th</sup> and 17<sup>th</sup> centuries often just admired it. In the 18<sup>th</sup> many dedicated themselves to the scientific research of the seasonal behavior, and for the first time proposals to changing the regime, like drying up the lake.

Many projects have been suggested; a lot of research and even some practical works were done until the middle of the 20th century. No project was fully implemented because of fear of flooding the capital, Ljubljana. After World War II, the situation changed. Instead of draining the lake, it was proposed to make the lake permanent. The first experiments were not successful and in the 1980s attitudes towards the lake changed. Green and environmental movements prevailed and work began to protect the lake as a natural phenomenon. (Kranjc 2006b).

The folk imagination is again expressed while talking about the ancient superstition of the inhabitants that believed that “*caverns with demons, vampires, and sorcerers.*” (Reclus 1876-1894c, 47). They perceived shafts as gateways to hell and caves as dwelling places of witches “*who sallied forth at night to steal little children, whose hearts they ate. In a cavern near Ragusa<sup>47</sup> dwelt the serpent of Sculapius,*

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<sup>47</sup> Now Dubrovnik, Croatia.

*guarding three magic coins lying at the bottom of a limpid pool.*”(Reclus 1876-1894c, 47).

The oral folk tradition states that a roaring noise is often heard in these caves at sunrise and sunset during summer and, probably, *“has given birth to and kept alive these superstitions. This curious phenomenon (...) is due, no doubt, to rushes of air through narrow fissures (...) said to have frightened away the inhabitants, who fancied they heard the threatening voices of souls forgotten in purgatory.”* (Reclus 1876-1894c, 47).

In Germany, Reclus made countless mentions of caverns with animal bones and pre-historic men, among other records. About the superstition and the imagination, he records the cavern *“of Venus, in the Horselberg, to the east of Eisenach. Formerly it was looked upon as one of the entrances to purgatory, and the sounds produced by rushes of air were much dreaded.”* (Reclus 1876-1894c, 254).

He also compares caves visited in Germany with those in Carniola and the Pyrenees which are remembered by the existence of one *“curious fauna of insects and other blind animals.”* (Reclus 1876-1894c, 254)

In the districts of Ardennes and Condruz (Belgium), he makes reference to sinkholes (Reclus 1876-1894c:384) and the caves of *“of Han and Rochefort, like most others of the same kind, branch out in every direction, and abound in stalactites, which fancy converts into fairy veils, statues, or even temples.”* (Reclus 1876-1894c, 384). In many of the caves archaeologists found *“precious treasures, including not only the bones of extinct animals, but also those of the aboriginal inhabitants of the country.”* (Reclus 1876-1894c, 392-393). Reclus also talks extensively about the findings and the way of life of the pre-historic man.

He recognizes the sacred importance of caves for ceremonial burials while citing the *“Frontal Hole”*. This cave receives its name because a human frontal bone was found in it. It seems that the place was used as burial space due to the finding of 16 human skeletons together with some objects placed beside the dead. (Reclus 1876-1894c).



Figure 19 – Map of some localities described by Reclus in Volume 3 of his Universal Geography.

#### 1.2.2.4 The British Isles

The British Isles are described in the 4<sup>th</sup> volume. It shows references to limestone reliefs, specially related to caves where animal bones were found. Marine caves are identified locally as “*Hugos, and have been scooped out at the foot of the cliffs, and into these the waves rush with great noise.*” (Reclus 1876-1894d, 77-78).

He refers to the *Kent's Hole*<sup>48</sup> near Torquay, and to a similar cave near Brixham where were made remarkable findings of “*human remains, and bones of animals.*” (Reclus 1876-1894d, 91).

Connecting physical studies with the imaginative, he talks about the cave near to the villages of Axbridge and Cheddar, no less famous for its cheeses than for its cliffs and stalactite caverns. “*Near it, close to the source of the Axe, which bursts forth here a considerable stream, is a famous cavern, the legendary haunt of the Witch of Wookey.*” (Reclus 1876-1894d, 120). Caves in the Shetland Islands are remembered as shelters used by local fisherman against French corsairs (Reclus 1876-1894d).

High sounds that resemble thunder come from the Fingal's Cave, developed in the basalts of the Island of Staffa. In the Island of Eigg, Scotland, he notes around 200 human skeletons which, according to the local tradition “*have been suffocated within the cavern by a neighboring chief, MacLeod, in retaliation for some private injury.*” (Reclus 1876-1894d, 360).

In Northern Ireland, he recorded the murder of Rathlin Island's inhabitants by Sir John Xorris, “*one of the English leaders during the reign of Queen Elizabeth*” (Reclus 1876-1894d:405) who killed the islanders by taking “*all into the caverns, and killing them, as he states in his official reports, as if they had been seals or otters.*” (Reclus 1876-1894d, 405).

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<sup>48</sup> It is known as the Kents Cavern, in Torquay, Devon, England. It is known for its great archaeological findings and its geology.

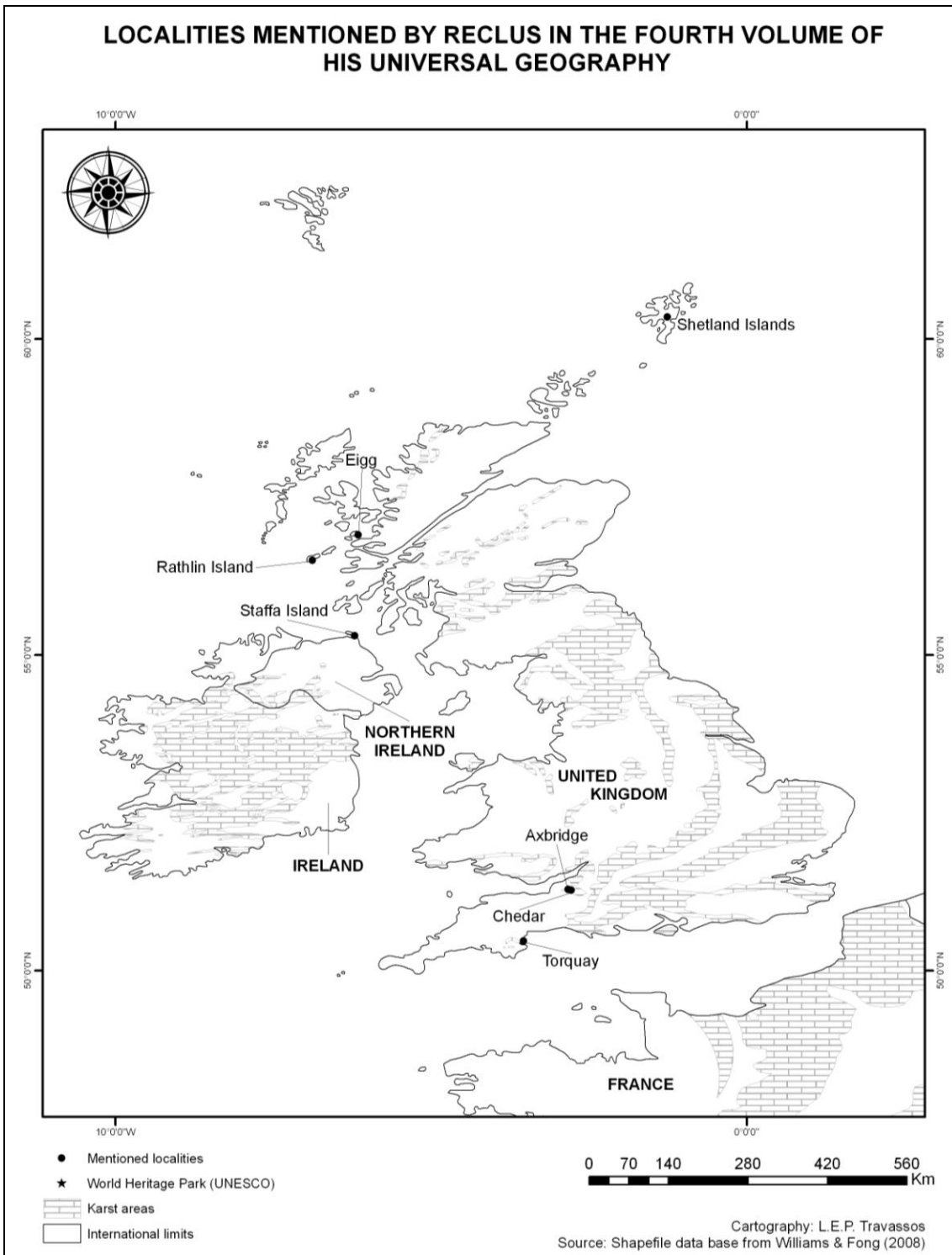


Figure 20 – Map of some localities described by Reclus in Volume 4 of his Universal Geography.

### **1.2.2.5 The northeast Atlantic. Islands of the North Atlantic, Scandinavia, European islands of the Arctic ocean, Russia in Europe**

In the 5<sup>th</sup> Volume one can say that records about caves are quite scarce. However, it was possible to notice that in the cliffs of the Northern Atlantic islands, are “*grottoes and caverns*” (Reclus 1876-1894e, 25). Such places, traces the Scandinavian primitive are not easily described as those found in Belgium or France; “*there having been no time for the men of that age to occupy it at the close of the glacial epoch*” (Reclus 1876-1894e, 113).

Regarding the religious use of caves, he dedicates some paragraphs to a cave visited by the Swedish geologist Dr. Otto Nordenskjöld. Inside it were “*the altars and the hundred idols worshipped by the Samoyeds*<sup>49</sup>.” (Reclus 1876-1894e, 352).

He states that is possible to give credit to the inhabitants of Crimea (which were expelled from Asia Minor) for the construction of underground cities in the limestone cliffs of the region. Thus, he identifies the grottos of Djoufout-Kaleh<sup>50</sup> (Figure 21 and 22) which have been serving as dwelling places in practically all of the region’s history (Reclus 1876-1894e). Although not a single natural cave, the Lavra Monastery in Kiev is also known as the Kiev Monastery of the Caves for being originated from a hermit cave. Nowadays, inscribed in UNESCO World Heritage List, is identified by Reclus as an important “*place of pilgrimage, yearly visited by about 300,000 Great and Little Russian devotees, especially on the feasts of the Trinity and Assumption.*” (Reclus 1876-1894e, 306).

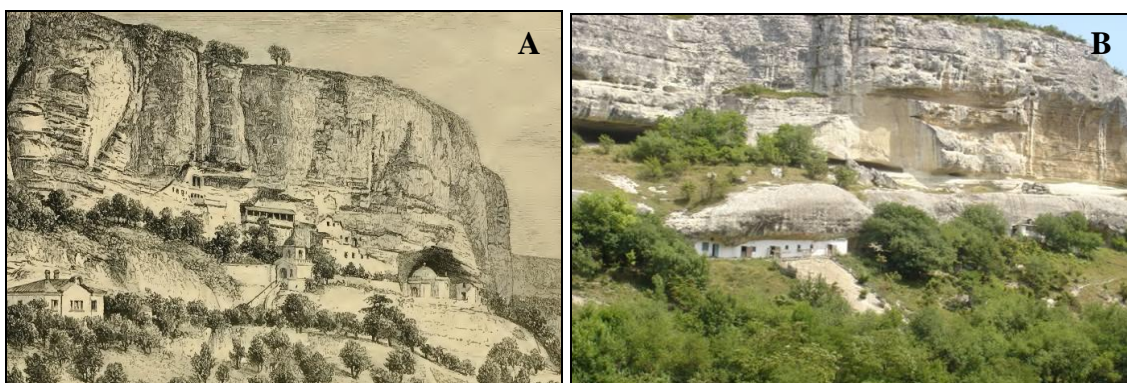


Figure 21 – A) *The Grottoes of Chufut-Kale* (Reclus 1876-1894e, 447). B) *General overview of the region.* (Photo: Anastasiya Oleshchenko, University of Kiev, 2007).

<sup>49</sup> Tribes found in the north of Siberia, in the Taimyr Peninsula.

<sup>50</sup> Chufut-Kale, Crimea.



It is worth highlighting that the old Ukrainian folk stories say that Christianity was brought to Crimea by St. Andrew, one of the apostles of Jesus. It is believed that this occurred in the first half of the 1<sup>st</sup> century AD. In the end of the same century, Saint Clement was accused of preaching Christianity and was exiled in the Crimea. Most cave-monasteries in the region date from the period when local monks, to escape persecution from the authorities, would establish new monasteries in remote places in the mountains where they could worship their icons.

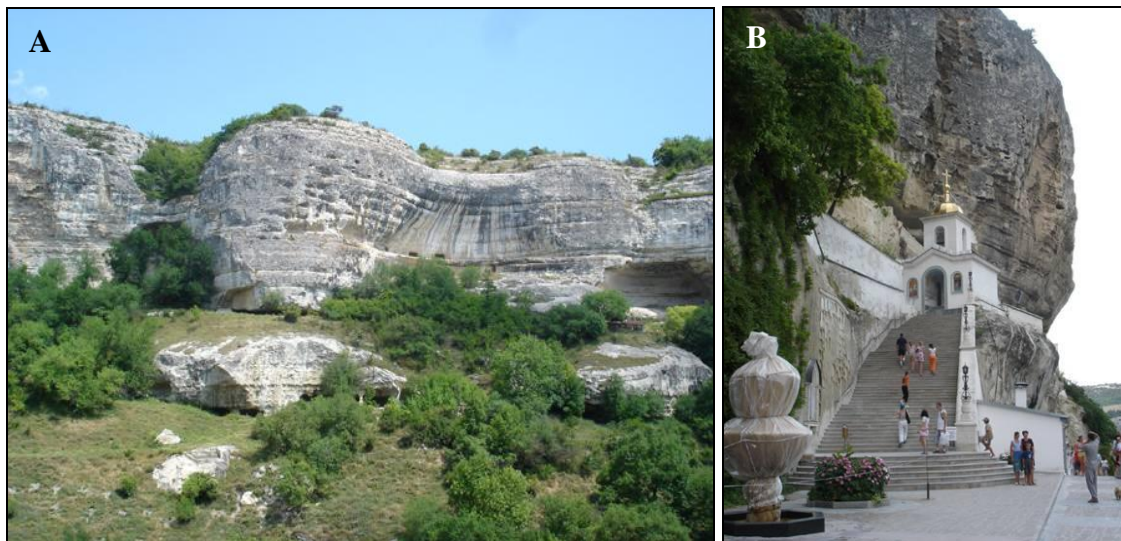


Figure 22 – A) The outcrops of Chufut-Kale. B) View of the Church of the Assumption. The monastery shown in the photo was built in the end of the 8<sup>th</sup> and 9<sup>th</sup> century and is considered to be one of the oldest of Crimea. His foundation is linked to monks fleeing the persecution of Byzantium after the Ecclesiastic Council in the year 754 (Photo: Anastasiya Oleshchenko, University of Kiev, 2007)



Figure 23 – Map of some localities described by Reclus in Volume 5 of his Universal Geography.



### 1.2.2.6 Asiatic Russia

Writing about “Asiatic Russia” in Volume 6, the first mention of a cave is to the rock shelters in the Tibetan Plateau. Furthermore, about the Kuban basin, he identifies karst rivers which go as “*underground streams making their way through caverns excavated in the Jurassic limestone rocks.*” (Reclus 1876-1894f, 51).

Near the village of Yesentuki (south of Russia towards Georgia), Reclus (1876-1894f, 74) identifies “*twenty springs, but of cold waters*”. In the hills to the south-west:

occurs the magnificent spring known to the Cherkesses<sup>51</sup> as “Drink of Heroes”, and now distinguished by the less poetic but more accurate name Kislovodsk, or “Acidulated Water”. The approach to the sacred spring was formerly defended by a wall several miles long, flanked by grottoes and by tombs, the traces of which are still visible. (Reclus 1876-1894f, 74-75).

In the surroundings of Kakhétia (Georgia), he identifies caverns “*said to have been excavated as churches and convents in the sixth century. In all the hilly districts of Karthalia the peasantry is also acquainted with labyrinthine caves, the former abode of a troglodytic people.*” (Reclus 1876-1894f, 113). Regarding the method of construction of these caves, “*The old method of constructing dwellings has persisted for over two thousand years. Whole villages consist of nothing but holes dug in the ground or hewn out of the rock, revealed from without only by masses of foliage, or by clay roofs on which the women sit in the cool of the summer evenings.*” (Reclus 1876-1894f, 114).

Reclus talks about the grottoes of Uflis-tzikhe (10 km from Gori, Central Georgia). They are considered temples previous to the Christian period which was introduced in Georgia in the 4<sup>th</sup> century. He states that these, probably, “*were at first inhabited by barbarous Troglodytes; but their successors were acquainted with the arts and comforts of life, and in these underground chambers are found the remains of Greek, Roman, Arab, and Byzantine architecture.*” (Reclus 1876-1894f, 122-123).

In the *Obdorsk*<sup>52</sup> district, center of the Ostiak tribes, identical implements are used liked those of the “*old European cave men.*” (Reclus 1876-1894f, 342).

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<sup>51</sup> Cherquesses – settlers from the region.

<sup>52</sup> Present-day Salekhard, Russia.

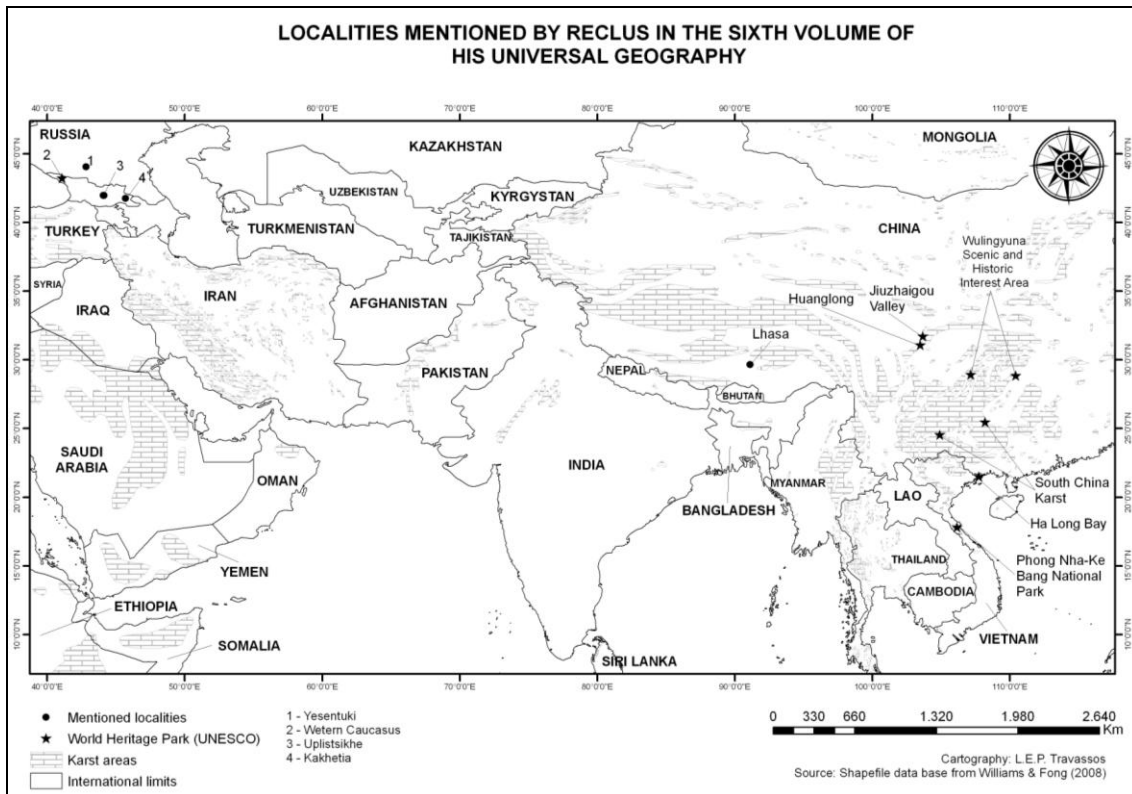


Figure 24 – Map of some localities described by Reclus in Volume 6 of his Universal Geography.

### 1.2.2.7 East Asia

Caves of East Asia are identified in the 7th volume. The renowned karst province of Yunnan appears already in the first pages, contrasting the important carbonate masses with the crystalline rocks of the province.

Cave temples are generally mentioned. However, there is a cave next to that Pinchew which “contains the largest and most famous statue of Buddha in Central China. It is about 56 feet high, and flanked by two others half the size, representing two disciples pointing at the divinity.” (Reclus 1876-1894g, 194).

Reclus records that, in the hills east of Pingyang, the popular tradition says that the Emperor Yao (2300 BC) was buried in a cave of the region (Reclus 1876-1894g). In another passage he states that “more savage tribes” use the caves more as shelters (Reclus 1876-1894g, 274). The imagination is present when he recalls that “wizards cast lots to attract the good spirits, and beat the tom-tom to scare the demons of the springs, rocks, and woodlands.” (Reclus 1876-1894g, 267).

In Japan, he identifies a “colossal Buddha”, carved in one of the peaks in the Kitakami river valley (Reclus 1876-1894g, 467). Furthermore he records a local story

about the reclusion of the monk Shodo Shonin (735-817) in the cave of the “*Thousand-Handed Kwannon*”<sup>53</sup>, in Nikko.

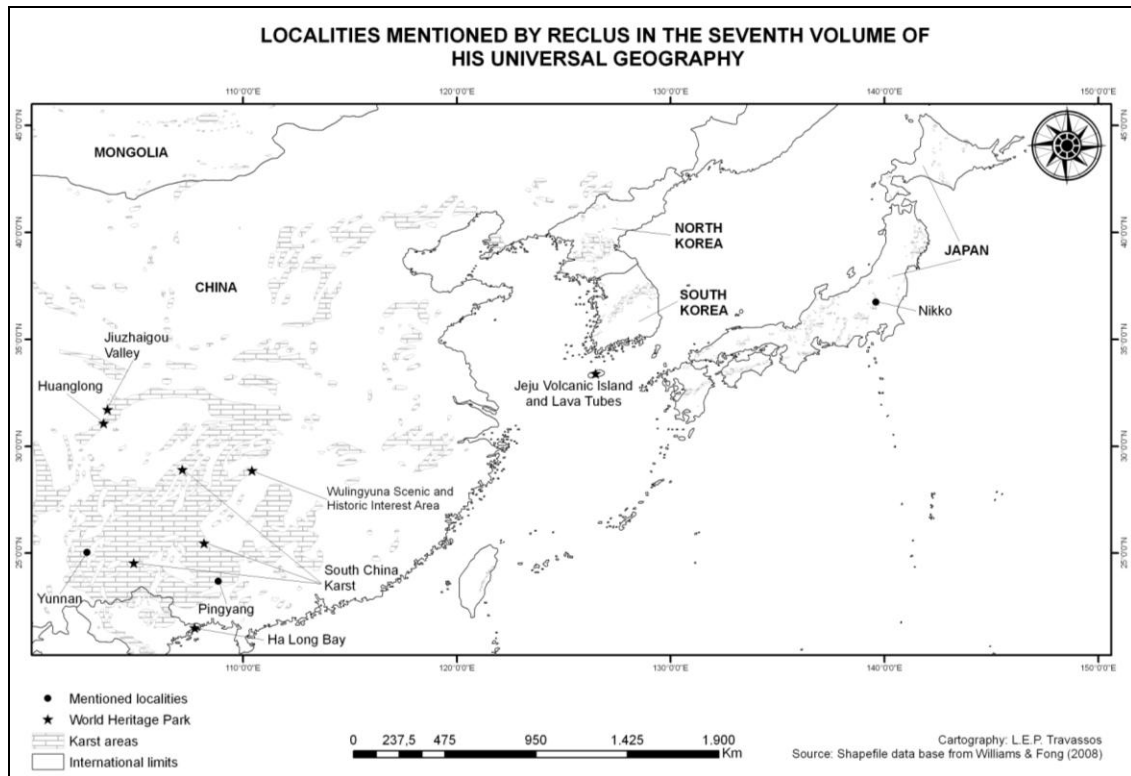


Figure 25 – Map of some localities described by Reclus in Volume 7 of his *Universal Geography*.

### 1.2.2.8 India and Indo-China

In the volume dedicated to India and Indochina (Volume 8), Reclus talks about the famous Indian cave-temples of Ellora, Ajanta and Elephanta. Of all the history of the region, the Hindu mythology gets the author’s attention “*The numerous hot springs are also much venerated by the natives, who undertake pilgrimages to bathe in these waters.*” (Reclus 1876-1894h, 94). According to a legend, the high temperature of the waters originated because of the Monkey God Hanuman that “*one day extinguished his burning tail, since which event the water has remained hot.*” (Reclus 1876-1894h, 98). In another part he states that to the “*mysterious animals concealed in the Kailas grottoes were supposed to discharge the four great Indian rivers.*” (Reclus 1876-1894h, 110).

Regarding the numerous antiquities of the Bhilsa (Central India) district there are “*the sculptured grottoes of Udghiri*”<sup>54</sup>, which are associated with cults different from

<sup>53</sup> Goddess of Comptation. Kwannon of the thousand hands.

*that of Buddha.*” (Reclus 1876-1894h, 187). The caverns were constructed to hold Jain hermits and its walls are decorated with paintings of men and animals. In other sectors the cave presents carved inscriptions on the rock.

Natural sandstone caverns of the Ramgarh mountain are covered “*with carvings and inscriptions.*” (Reclus 1876-1894h, 262) and in the mountains next to Catfak<sup>55</sup>, capital of Orissa, it is possible “*found many interesting monuments of the Buddhist, Brahmanic, and Mohammedan epochs, including images cut in the live rock, and grottoes converted into temples.*” (Reclus 1876-1894h, 263).

The central position of Jabalpur in India, between Bombay and Calcutta, is remembered and also the “*the famous shrines of Pachmari*”<sup>56</sup>, or the Five Grottoes.” (Reclus 1876-1894h, 275).

By saying that Bombay or Mumbai, like other great cities of the “*British India*” is served by secondary cities, he describes the limestone caverns of the neighboring Kanheri, to the west. There, carved rocks present

temples dating from the beginning of the new era, and formerly much venerated by the Buddhists. More recent sanctuaries in this district no longer show any trace of the Buddhist cult, and are exclusively decorated with Brahmanical symbols (...). Other sacred grottoes, which, owing to their proximity to Bombay, are more frequently visited than those of Kanheri, are the caves of Garapurl, “City of Caverns”, in the islet of Elephanta, or Deva Levi, “Isle of the Gods”, lying in the harbor east of Bombay. The island takes its name from a group of debased sculptures representing an elephant attacked by a tiger. The hill is pierced by four grottoes, whose entrance is shaded above by brushwood and twining plants. At the extremity of the chief sanctuary stands the colossal figure of Siva<sup>57</sup>, under his three symbolic forms of Creator, Preserver, and Destroyer, as he is also represented in the other underground temples. The Hindus of Bombay, and especially the Baniahs, still resort at stated periods to these shrines for religious purposes. The caves of Elephanta date probably from the tenth, possibly even from the eighth or ninth century of the vulgar era, and their monstrous sculptures, however interesting to the student of theogonies, are mostly of a very repulsive character. (Reclus 1876-1894h, 289).

Even with such a strong impression of the Elephanta caves, Reclus continues his record of important centers of pilgrimage in India. He identifies Nasik as one “*very busy place during the pilgrimages, when the faithful flock in thousands to the holy waters of the Godaveri or to the grottoes of Pandu, noted for their ancient Buddhist monasteries.*” (Reclus 1876-1894h, 303-304).

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<sup>54</sup> Probably the Grottoes of Udaygiri, in Vidisha, district of Madhya Pradesh.

<sup>55</sup> Probably present-day Cuttack, Orissa, India.

<sup>56</sup> Pachmarhi, state of Madhya Pradesh, Central India.

<sup>57</sup> Shiva ou Xiva.

To the northeast of Aurangabad, he records the “*Buddhist grottoes, whose sculptures, bas-reliefs, and columns would attract more attention were they not eclipsed by other subterranean sanctuaries in the same district containing far more precious monuments of antique art.*” (Reclus 1876-1894h, 304). At around 30 km from Aurangabad, he describes the “*underground temples of Ellora*” saying that there were needed for the execution of these works “*as many hands as were employed upon the pyramids of Egypt. The series of crypts is so extensive that it would require several days to thoroughly [examine] them.*” (Reclus 1876-1894h, 304). Obviously he was referring to the fact that, they are in a total of 34 cave-temples: 12 Buddhists from the Mahayana tradition (550-750 AD), 17 Hindus (600-875 AD) and 5 caverns of Jain faith (800-1.000 AD).

About the other famous caves, (Ajanta) he states that these are as famous as the ones of Ellora. However they are far less visited

owing to their remoteness from large towns, and the real danger to which people are exposed from bees swarming out the projecting ledges of the rock. The chambers excavated in the trap are let into the concave face of an almost vertical wall, at the foot of which flows the Wughara torrent. Facing it are other precipices, forming a ravine from which the river descends through a series of seven cascades, the last of which has a fall of 100 feet. Most of the grottoes were viharas, or monasteries, carved only round the porches and windows of the entrance, and in the nave containing nothing but a statue of Buddha on an altar. The cells are simple niches cut in the rock round about this nave. Much more richly sculptured are the shaitiya, or temples proper. But the religious monuments of Ajanta derive their chief interest from the unique remains of paintings which are still visible on the walls and vaults. Dating from various epochs between the second century of the old and seventh of the new era, these frescoes display a certain anatomic knowledge and a true sentiment of proportion. They represent not only religious and symbolic subjects, but also scenes of civil and homely life, the chase, battles, processions, nuptial and funeral rites, laborers at their daily work, women occupied with their household duties. The whole social life of Buddhist India as it existed 2,000 years ago is thus revealed to the eyes of the spectator. Judging from these representations, the Hindus of those times possessed but few offensive and defensive weapons. The Ajanta caves form altogether a vast museum, embracing the whole history of Buddhist art, from the time when the monks took refuge in their narrow rocky cells to the epoch when, already half Brahmanised, they lavished all the resources of painting and sculpture on the decoration of their cave-temples. (Reclus 1876-1894h, 305-306).

Not too far from Bhor ghat, Reclus recorded the caves of Karli, “*which, being more easily accessible, are much more frequently visited than those of Ajanta and Ellora. The shaitya, or great temple, the most perfect and finest underground sanctuary in India, is opened halfway up the side of a hill.*” (Reclus 1876-1894h, 309). To him,

the temple reminds a Christian church and he calls attention to “*an inscription on the porch [which] attributes this cave-temple to a king who flourished some twenty centuries ago.*” (Reclus 1876-1894h, 309).

He describes sepulchral circles which are “*formed of undressed stones, like the megalithic monument of Stonehenge.*” (Reclus 1876-1894h, 315). On another occasion, he notes crystalline caves (in gneiss) pierced by Buddhist caves. “*In another underground temple, on the opposite side, Buddha has been supplanted by Vishnu.*” (Reclus 1876-1894h, 315). He assigns to the sacred caves of Mahabalipur the title of “*the most remarkable monuments.*” (Reclus 1876-1894h, 347).

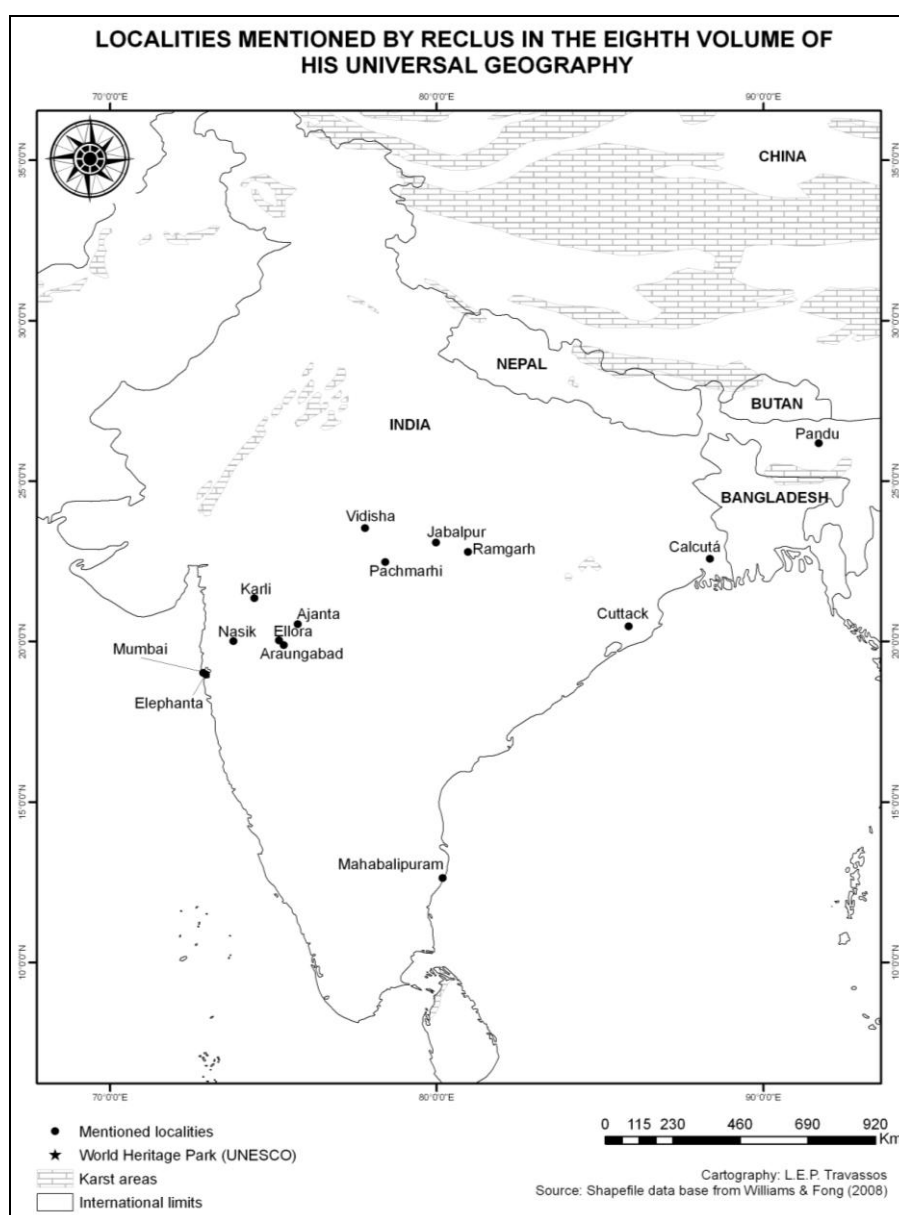


Figure 26 – Map of some localities described by Reclus in Volume 8 of his Universal Geography.

### 1.2.2.9 South-Western Asia

South-western Asia (Volume 9) is represented initially by the volcanic caves of Mount Damavend, northeast of Teerã. According to local legends, “*are full of treasures guarded by snakes, which, however, do not prevent the natives from utilizing the sulphur deposited in the crater and surrounding cavities.*” (Reclus 1876-1894i, 84).

In the central portion of Iraq, he identifies one:

A deep cavern in the mountain emits carbonic acid in such abundance that animals penetrating into this fissure perish inevitably. The entrance is encumbered with heaps of bones, and according to the local tradition it takes the name of Iskanderiah, or “Alexander's Grotto”, because the Macedonian conqueror concealed his treasures in its poisonous atmosphere. (Reclus 1876-1894i, 90).

As occurred in the cave of Melidoni, Reclus (1876-1894i, 178) recalls that the Iraquian Yezidi<sup>58</sup> were “*mostly exterminated in 1838, when those who had taken refuge in the caves were smoked to death, and their women sold into slavery.*”

In Turkey, Reclus records the Sümela Monastery, carved in the side of an outcrop in the valley of Altindere, region of Maçka, province of Trabzon. Dedicated to the Virgin Marry is “*annually visited by 8,000 or 10,000 Greeks in the month of August. Even the Turkish women flock in large numbers to the shrine to implore her intercession against fever or sterility.*” (1876-1894i, 181)

The well-known region of Pamukkale, Turkey, is described by Reclus in this volume. According to him, “*most travelers give it the name of Pambuk-Kaleh, or Pambuk-Kalessi, or “Cotton Castle”, doubtless from the whitish fluffy looking masses precipitated by the waters.*” (Reclus 1876-1894i, 270).

The ground is covered by thick layers of travertine deposited by these springs, traces of whose shifting beds are everywhere visible. All these phenomena produced a vivid impression on the ancients, and Strabo tells us that the Hierapolis waters became so rapidly solidified that when diverted into new channels these were presently converted into a monolithic block. The cavern which in his time was said to emit deadly carbonic acid vapors, seems to have disappeared. (Reclus 1876-1894i, 270)

In the region of Anatolia, Tokat is identified as “*is one of the greater inland cities of Asia Minor, and a chief station on the highway between Constantinople and Upper Mesopotamia.*” (Reclus 1876-1894i, 295). He affirms that the city consists of

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<sup>58</sup> Kurdish religion with ancient Indo-European roots.

houses built of marble taken out from the nearby mountains. In one of them, “*stand the picturesque ruins of a Byzantine castle, while its sides are pierced by natural and artificial caves, which probably served formerly as a necropolis.*” (Reclus 1876-1894i, 295)

The island of Heraclea, or “*Port of Hercules, although much decayed, is still one of the most charming towns on the coast (...). A few remains of the ancient Heraclea still survive within the modern enclosure, and amid the rocks of the northern headland is shown the cave of Acherousia.*” (Reclus 1876-1894i, 302). According to Greek mythology, it was the cave where Hercules descended to shackle Cerberus and vanquish death.

Still in Turkey, Reclus affirms that in Ephes (Ephesus), as well in other religious cities, each rock has its legend “*while every prominent site on the surrounding hills was noted for some miraculous event.*” (Reclus 1876-1894i, 329). He still recalls that, in the region, “*the Christians themselves, heirs of the Hellenic traditions, came to regard Ephesus as one of their holy places. Here were the ‘Prison of Saint Paul’, the tomb of Mary Magdalene, or the cave where the ‘Seven Sleepers’<sup>59</sup> slumbered with their faithful dog for two hundred years.*”(Reclus 1876-1894i, 329-230).

Sandstone caves occupied in the past are remembered and, in Birejik<sup>60</sup>, “*inhabited chiefly by Turks (...) numerous Kurdish families, burrowing amidst the ruins and in the caves of the limestone rocks.*” (Reclus 1876-1894h, 231). Still recalling the underground dwelling houses, he identifies in Hebron (Palestine) near to the Mosque of Abraham, cliffs that are “*pierced with at least two hundred caves, ancient tombs converted into modern dwellings.*” (Reclus 1876-1894i, 233). Furthermore, he uses the name of the “*Cave of Macpelah*” (Reclus 1876-1894i, 423), a place where was built a temple and is considered one of the most sacred places of the region.

Lebanon is highlighted by having plateaus consisting “*mainly of dolomites, coarse limestones, marbles, sandstones, and marls, pierced at innumerable points, without being disturbed, by protruding basalts. (...).*”(Reclus 1876-1894i, 356-357). Specifically regarding the limestone rocks, he affirms “*that [they] are pierced by*

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<sup>59</sup> Cave of the Seven Sleepers – According to the legend the “Seven Sleepers” were seven young men who had been walled up in a cave during the persecutions under Decius (c.250). They fell asleep, miraculously waking up around 435 in the time of Theodosius II.

<sup>60</sup> Southeast of Anatolia, Turkey.



*caverns, some running for miles into the heart of the mountain, and containing animal remains as well as traces of human habitations.”* (Reclus 1876-1894i, 356-357)

In another part of the text he records that, in the “*the necropolis stretching south-eastwards along the foot of the limestone cliffs, are found the most remarkable monuments of ancient Sidon*<sup>61</sup>. *Such are the walls, caves, and sarcophagi, besides the tomb of King Eshmimazar, in the purest Egyptian style, but with a precious Phoenician inscription.*”(Reclus 1876-1894i, 397)

The limestone of Mount Carmel stands out by the presence of the Cave of Elias where “*now stands a sumptuous convent of recent date.*” (Reclus 1876-1894i, 362). According to the Jewish tradition, here “*took place that contest between Elias and the prophets of Baal which symbolizes the everlasting warfare between the local gods of Syria and Palestine.*” (Reclus 1876-1894i, 362). In the Mount Sinai, where also according to the tradition, Moses would have talked to God, there are “*natural caverns, which were formerly occupied by hermits, and which the faithful even regarded as excavated by the recluses.*” (Reclus 1876-1894i, 367).

The church of the Holy Sepulcher in Jerusalem was built over the tomb of Jesus. Reclus notes this church while comparing it with the Church of the Nativity where

the group of churches and convents in Bethlehem forms an irregular collection of structures without any architectural symmetry, belonging to diverse religious communities (...). Beneath the church is a grotto paved in marble and ramifying in various directions, where the faithful gather to worship at the fissure in the rock indicated by tradition as the birthplace of the Redeemer. (Reclus 1876-1894i, 422-423).

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<sup>61</sup> Third largest city of Lebanon. Important Phoenician city in the past.

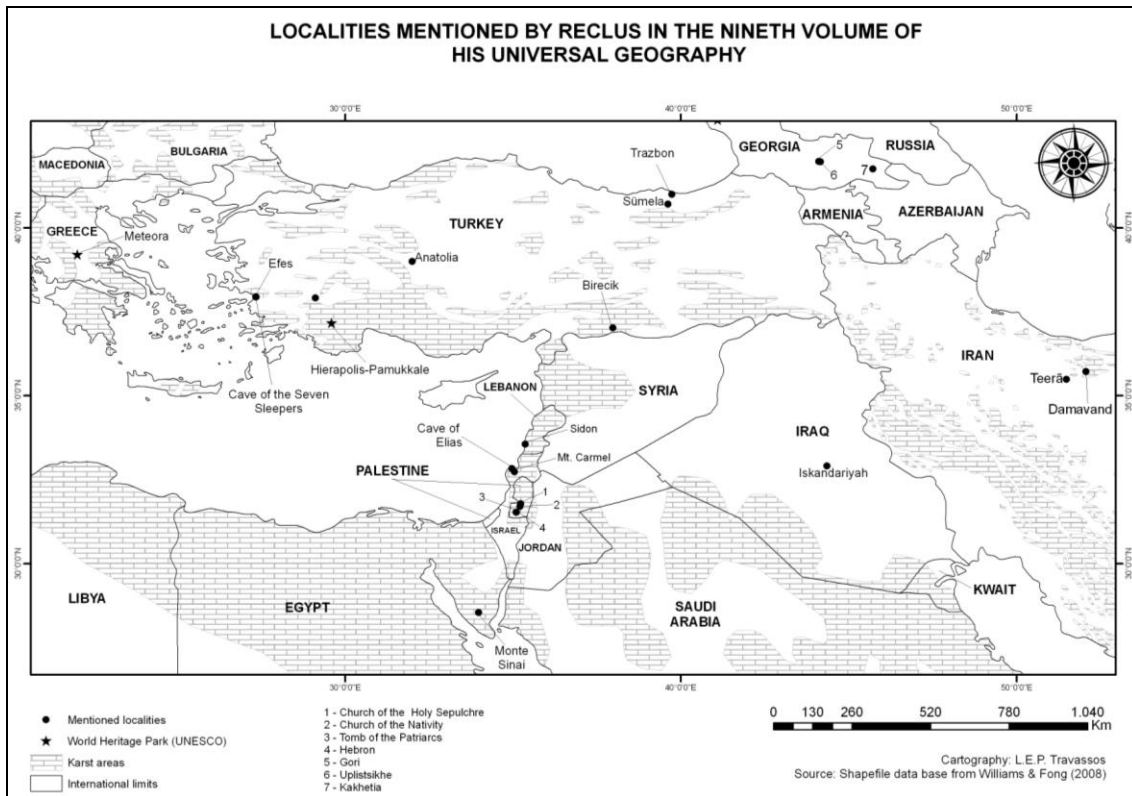


Figure 27 – Map of some localities described by Reclus in Volume 9 of his *Universal Geography*.

### 1.2.2.10 Northeast Africa

The African northeast (volume 10) caught the author’s attention mainly by the existence of volcanic or salt thermal springs. These occur in sandstones and limestones sometimes interrupted by basaltic rocks. More abundant, however, are the records of caves and tombs excavated artificially.

Thus he identifies “*numerous caves, which have been artificially worked into dwellings and in many places connected by galleries. One has even been hewn into a monastery and a church, which is annually visited by thousands of pilgrims from every part of Abyssinia*<sup>62</sup>.” (Reclus 1876-1894j, 133).

Local legends state that some mountains “*are pierced with grottoes which are said to hold the waters of a subterranean lake, and whose labyrinths appear to have been formerly inhabited by man; a few troglodytes are reported even still to live in the galleries of the rocks.*” (Reclus 1876-1894j, 250).

<sup>62</sup> Present Ethiopia. Probably Reclus refer to the churches escavated in the rocks in the city of Lalibela which, by its cultural importance, is listed as an UNESCO patrimony.

Other caves in Darfur (Sudan), however, served as “*prisons, some for the sons of princes, others for the viziers*”<sup>63</sup>.” (Reclus 1876-1894j, 273). In the border between Egypt and Sudan, he identifies the Elba Mountains, as a region of scarce availability of water. However, all the supplies from the springs of neighboring districts “*had been carefully husbanded, (...) crosses surmounted by a circle are still to be seen, indicating the presence of water.*” (Reclus 1876-1894, 284).

The famous sanctuaries of Abu-Simbel (south of Egypt), listed as UNESCO Patrimonies, are described by Reclus for existing “*sepulchral grottoes, gateways, and towers.*” (Reclus 1876-1894j, 306). He registers the “*sepulchral cave of Beit-el-Walli, whose sculptures, representing triumphal processions, assaults, court and battle scenes, have been rendered more popular by engravings than any others.*” (Reclus 1876-1894j, 306).

Still in Egypt, in Jebel Silsileh, he identifies “*several temples excavated in the live rock, as well as sepulchral caves and statues.*” (Reclus 1876-1894j, 318); and in the district of Natron “*The only inhabitants (...) are the inmates of the Baramus, Saint Macarius, and other convents founded in the fourth century of the Christian era, at a time when thousands of monks took refuge in the caves and valleys of this rocky and sandy region.*” (Reclus 1876-1894j, 327).

#### **2.2.2.11 Northwest Africa**

In the 11<sup>th</sup> volume, dedicated to the African northwest, Reclus records soon in the first pages the custom of burying the dead in caves. Cyrene, ancient Greek colony in the modern Libya, is full of these: “*Sepulchral caverns are seen in thousands, and here and there the traces may still be distinguished of their polychrome decorations. Most of the tombs rest on crypts cut in the limestone cliff, which being of a porous nature, was easily worked, and thus converted into a vast underground city.*” (Reclus 1876-1894k, 18).

Leaving Libya, Reclus dedicates several pages to the former French Colony of Tunisia. Obviously he noted the type of Berber houses excavated on sandstone or limestone (Figure 28). Altogether these houses range from “*one thousand to one*

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<sup>63</sup> Counselors or ministers of Persian sultans.

*thousand two hundred*” (Reclus 1876-1894k, 60). However, more recently Golany (1988) stated that there exist around 600 of these houses developed in carbonate and sandy facies. Reclus affirms that, *“before the arrival of the Arabs and the spread of Islam, the troglodytes raised altars to the gods.”* (Reclus 1876-1894k, 50).

Still regarding the Berber people, he describes the region of Mizda. Even though the Arab culture is *“largely assimilated”* (Reclus 1876-1894k, 60) it is still possible to identify in the surrounding districts *“numerous ruins of tombs and other Roman monuments.”* (Reclus 1876-1894k, 60).

Before the occupation of Tunisia by the French, Kasr or the “castle of El-Mudenin” managed to resist the siege of the Turkish army. For this and other reasons, in many cities in the south of Tunisia one can identify the *“gradual transition from the cave architecture to that of houses, properly so called. Buildings are erected in such a manner as to resemble cliffs, in which oval apertures made at various heights represent the openings of caves and grottoes.”* (Reclus 1876-1894k, 140).



Figure 28 – One cave-house in Matmata, Tunis. The region is located about 450 km to the south of de capital Tunis. It is known as the dwelling place of the Berber people who have been excavating the rock for centuries to protect against the extreme temperatures of the desert. (Photo: Luiz E. P. Travassos, 2008).

In the capital Tunis, the most ancient structures are *“sepulchral chambers [which] are still to be seen hollowed out of the soft limestone, are similar in the internal arrangements of their galleries to the caves used as tombs in Phoenicia and Palestine.”* (Reclus 1876-1894k, 157).

Approximately 165 km southeast of Tunis, in the city of Monastir it is possible to identify “a small group of islands, one of which is pierced with some fifty artificial grottoes probably of Phoenician origin.” (Reclus 1876-1894k, 155-156). He states that they “served as places of shelter to the tunny-fishers, and have occasionally been used as places for keeping sailors and travelers in quarantine.” (Reclus 1876-1894k, 155-156).

Regarding the water supply in practically all Tunisia, the “the cisterns, more precious than all other structures, have been always either kept up or repaired under every change of Government.” (Reclus 1876-1894k, 157). In the Tunisian west, south of Sfejerda, Reclus pictures the abundance of water springs, a “feature of paramount importance in these arid regions. One of the springs issues from a cavern decorated with Roman arcades, which can be followed for some distance into the interior of the rock.” (Reclus 1876-1894k, 180-181).



Figure 29 – The Roman cisterns viewed from the top. Tunis, Tunisia. (Photo: Luiz E. P. Travassos, 2008).

In Algeria he records the presence of a cavern which, like others in many parts of the world, was used against those who were seeking shelter in its interior. Mazuna is the home city of

Mohammed Ben Ali-es-Senusi, founder of the powerful order which everywhere preaches a return to the pure teachings of Islam, and hatred of Turk and Christian alike. Farther west, on the heights of Nekmaria are an old fort, beneath which are the stalactite caves of unhappy memory, where, in 1845, Pelissier<sup>64</sup> caused the Uled-Eiah tribe to be smoked to death. (Reclus 1876-1894k, 282).

In the plains of Morocco openings in natural formations enable natives to form caves where “*cereals and other provisions are preserved.*” (Reclus 1876-1894k, 353). In the Cape of Spartel, Reclus recalls the local collective beliefs describing “*One of the caverns (...) excavated by the surf was formerly dedicated to Hercules, and near it stood the tomb of Antaeus*”<sup>65</sup>.”(Reclus 1876-1894k, 355)

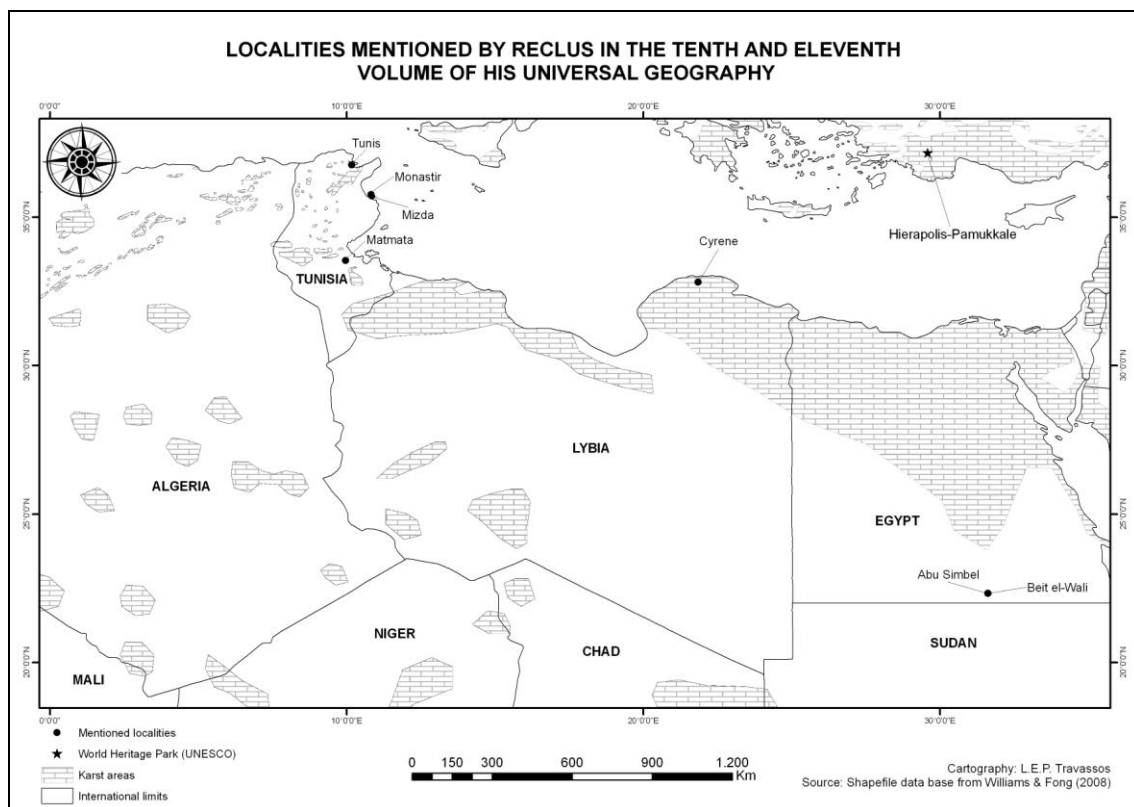


Figure 30 – Map of some localities described by Reclus in Volumes 10 and 11 of his Universal Geography.

### 1.2.2.12 West Africa

The cultural importance of caves in western Africa (volume 12) is first presented by mentioning “*sepulchral caves*” (Reclus 1876-1894l, 63) in Tenerife; the same used by the Guanches and mentioned by Humboldt. In several caves it is possible to find

<sup>64</sup> Aimable Jean Jacques Pélissier, French general during the occupation of Algeria.

<sup>65</sup> In the Greek and Berber mythology *Antaeus* was a giant from Lybia, son of Poseidon and Gaia.

*“fine garments, perfectly worked utensils embellished with ornamental designs and hieroglyphs, side by side with coarse fabrics and earthenware”* (Reclus 1876-1894I, 61) revealing the constitution of the Canaries society and its history.

Inscriptions in characters like those of the Libyan alphabet have even been found at the very extremity of the archipelago, in the Belmaco grotto<sup>66</sup>, La Palma, (...) and in Gran Canaria. Proof is at least thus afforded that relations existed between the Berber peoples of the mainland and the islanders (...) These inscriptions also add great probability to the hypothesis that the natives were of Arabo-Berber origin. (Reclus 1876-1894I, 62).

Again in the Canaries, Reclus states that *“a grotto known as the Cueva del Yelo (Ice Cave) is every year filled with snow and ice, yielding a constant supply to the inhabitants of Orotava<sup>67</sup>.”*(Reclus 1876-1894I, 75). In the opposite side of the island, the city of Guimar presents the *“Cuevas de los Reyes”* as one of *“the most extensive sepulchral grottoes of the former inhabitants.”* (Reclus 1876-1894I, 70).

In the Azores the lava caves or lava tubes are recorded as places that *“served as refuges for the inhabitants and their flocks during the incursions of the Barbary corsairs.”* (Reclus 1876-1894I, 67).

Leaving the islands of the west coast, Reclus takes the reader to the Island of Fernando Po, in the Gulf of Guinea. The name was given after his Portuguese discoverer, Fernão do Poo. From now on, the accounts about the imaginary aspects of caves are more present, and one can see sites inhabited by spirits, demons, snakes and deities.

The Eubis worship the great spirit, Umo, an invisible being, who reveals himself in a dazzling High and in a rumbling voice coming up from the depths of the ground. When a votary wishes to implore his mercy, or obtain a knowledge of the future, he penetrates through a narrow fissure into the cave, and advancing on all-fours lays his offering at the feet of the priest representing the divinity. Suddenly a bundle of rays flashes through an opening in the vault, enveloping the priest in a divine High. He is consulted and transmits the supplications to Umo, and the cavern presently reverberates with the thunder of the god himself, who seems to rise from the abyss to answer the prayers of the suppliant. There also resides on the east coast a “powerful king”, who cannot be approached in person, but who remits the executive and judicial functions to the hula, a society which speaks and acts in his name. At the coronation he retires to a cave in order to hold commune with the demon through the mediation of snakes. (Reclus 1876-1894I, 117).

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<sup>66</sup> Formerly inhabited by the Guanches; nowadays it is an archaeological park. Life and culture of the natives from the Canarias are explained in this cave and its surroundings.

<sup>67</sup> West coast of the Island of Teneriffe.

In Liberia,

“Stone of the Great Devil”, a rock pierced at the base, which is frequented by awe-stricken pilgrims from every part of the Kroo territory. Their presents of corals, glass beads, tobacco, animals, when placed at the entrance of the grotto suddenly disappear in a mysterious way. The sound made by the hidden demon swallowing the offerings of his worshippers is distinctly heard, say the believers. (Reclus 1876-1894I, 227).

In the Gold Coast, former name of Gana, “*is a fetish city, whose tutelary deity, the Dente or Odente, dwells in a neighboring cave shaded by a sacred grove where the oracle is consulted by votaries from all quarters.*” (Reclus 1876-1894I, 253).

In the Niger, “*Tchuku, a powerful god whom mortal eye has never seen, but whose voice may at times be heard (...) dwells at once in a cavern and in the firmament, so that one eye pierces the depths of the earth, the other the heavenly spaces.*” (Reclus 1876-1894I, 330).

According to its writings, “*till recently his wrath was appeased by the sacrifice of hopeless maids, who were dragged over the ground till they expired, and their bodies were then thrown to the fishes and crocodiles.*” (Reclus 1876-1894I, 331).

In the Cameroon, a distant cavern would be the only place where the bodies of the dead would be safe from the enemies’ spirits:

The sight of an owl forebodes great danger ; the ghosts, especially of enemies, are much dreaded, and to them are evidently attributed the tastes of vampire, for at the death of a Mo-Kundu two graves are dug, one in his cabin, the other in the forest, in order to puzzle the spirits and prevent them from knowing where the body has been deposited ; but this precaution not being deemed perhaps quite sufficient, after a certain time it is again disinterred, and removed to a distant cave. (Reclus 1876-1894I, 378).

And, finally, in the present-day Congo, Reclus identifies “*spacious caves, some of which are 20 miles long, forming with their innumerable ramifications vast underground cities occupied by whole tribes of troglodytes with their domestic animals.*” (Reclus 1876-1894I, 451).



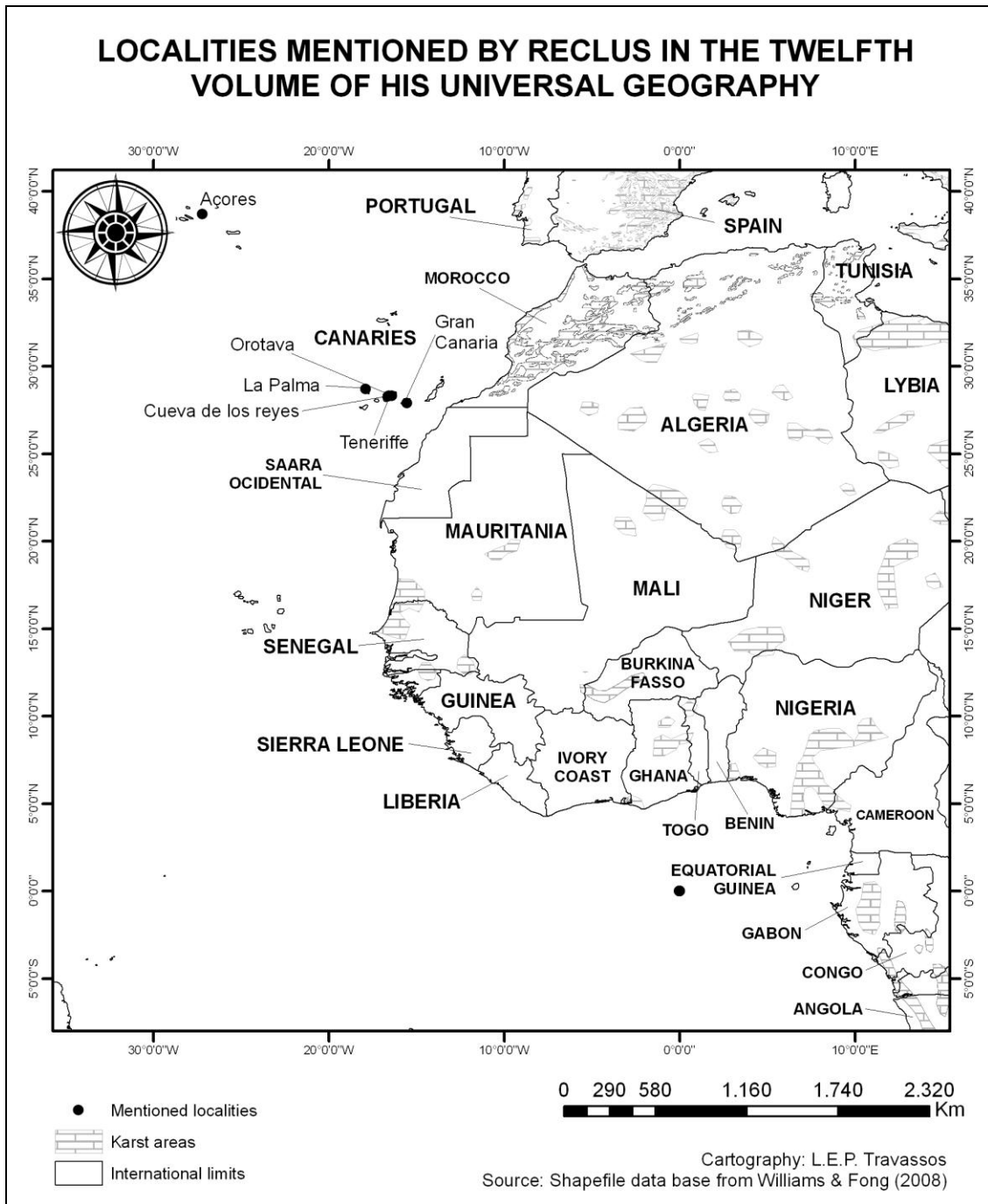


Figure 31 – Map of some localities described by Reclus in Volume 12 of his *Universal Geography*.

### 1.2.2.13 South and East Africa

The journey in the African continent continues in the 13<sup>th</sup> volume, covering the south and east regions. At the beginning while talking about Angola, Reclus connects the physical and humanistic studies of karst: “*The limestone cliffs are in many places pierced by deep caverns, (...) which have given rise to numerous native legends.*”

*Thermal springs occur at various points of the territory; but no volcanic rocks have been found (...).*" (Reclus 1876-1894m, 06).

In Kuruman, South Africa, he records one legend that talks about the existence of a serpent, guardian of a karst spring. It is interesting to highlight that similar legends are found in the oral stories of Yucatan (Mexico) and by Dakota Indians in the United States.

The river Kuruman, on which stands the town of like name, has its source among the hills a few miles to the south-east. From a cave at the foot of an isolated bluff the water flows in such a copious stream as to be navigable for small boats. Through stalactite galleries close to the chief opening the visitor may penetrate over slippery stones far into the interior of the rocky cavity, which is supposed to be inhabited by a sacred serpent, tutelar spirit of the stream. (Reclus 1876-1894m, 161).

Next to Lepelole (Lephalale), makes reference to the cave of Lepelole where, as recorded by Livingstone, "*from this place, says the national myth, came all the animals of the world.*" (Reclus 1876-1894m, 162). Searching for the references in Livingstone (1859), one can find the following:

Near the village there exists a cave named Lepelole it is an interesting evidence of the former existence of a gushing fountain. No one dared to enter (...) the cave for it was the common belief that it was the habitation of the Deity. As we never had a holiday from January to December and our Sundays were the periods of our greatest exertions in teaching I projected an excursion into the cave on a weekday to see the god of the Bukwains. The old men said that everyone who went in remained there forever adding If the teacher is so mad as to kill himself let him do so alone we shall not be to blame. The declaration of Sechele that he would follow where I led produced the greatest consternation. It is curious that in all their pretended dreams or visions of their god he has always a crooked log like the Egyptian Thau. Supposing that those who were reported to have perished in this cave had fallen over some precipice we went well provided with lights ladder lines; but it turned out to be only an open cave with an entrance about ten feet square which contracts into two water worn branches ending in round orifices through which the water once flowed. (Livingstone 1859, 71).

Regarding the myth of origin of all animals, a more precise account would be the reputation of a shaft or pot-hole near the cave of Lepelole which has the reputation "*of having given exit to all the animals in South Africa, and also to the first progenitors of the whole Bakwain race.*" (Livingstone 1874, 446).

In present-day Lesotho, the Mooi River, "*which springs from a cavernous limestone rock, disappears at several points along its course, again emerging in the recesses of underground grottoes.*" (Reclus 1876-1894m, 212). The caves resemble the "*marvelous spectacle presented by the analogous formations in Carniola.*" (Reclus

1876-1894m, 212), reaffirming the importance of Slovenia for the karst research. Regarding Lesotho, it is important to remember Coplan (2003) who made a study regarding the sacred use of the Caves of Badimong for African religious rituals.

Mount Elgon<sup>68</sup>, in the borders of Kenya and Uganda, was recently shown in the news appearing as a place where caves were being used as refuges by the local population. In the mountain, “*these deep caves or pits have been excavated, or at least enlarged, by the hand of man*” (Reclus 1876-1894m, 349) for many years. “*In the centre of this pit, or (as it may have been) mouth of a cave, stood several cows, and a number of the usual beehive arrangements for storing grain.*” (Reclus 1876-1894m, 349)

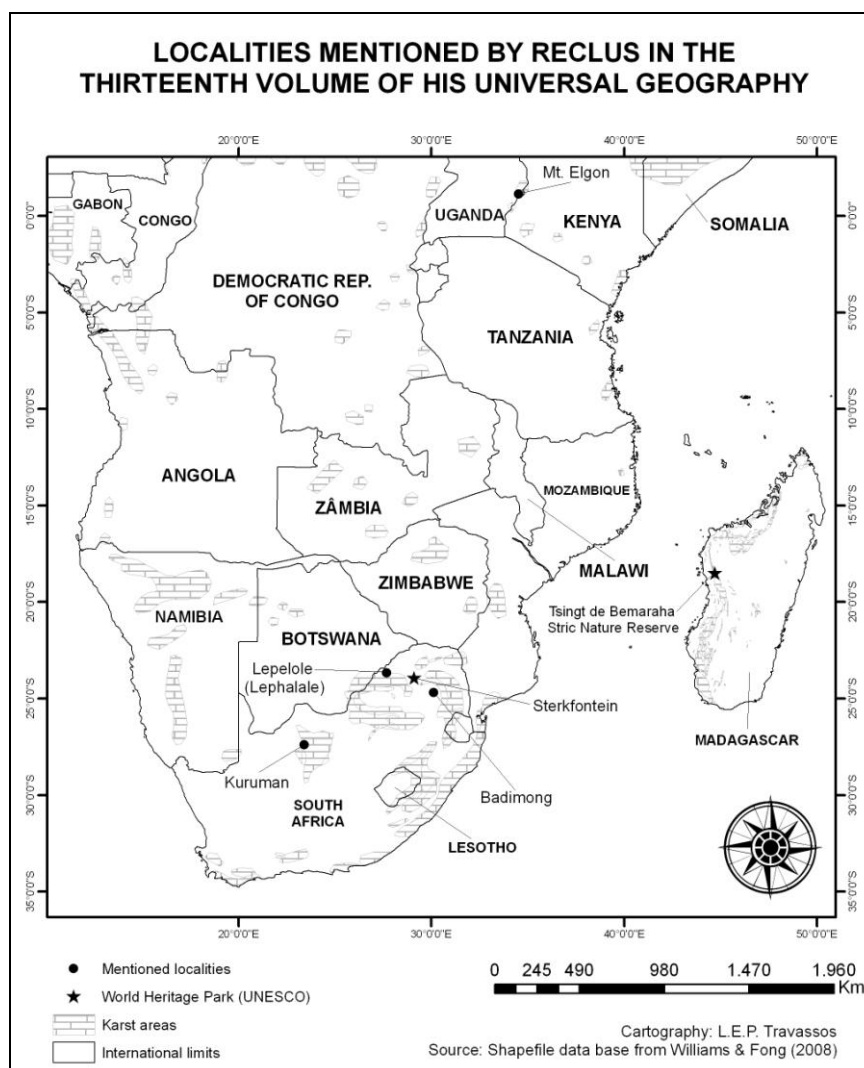


Figure 32 – Map of some localities described by Reclus in Volume 13 of his Universal Geography.

<sup>68</sup> The mountain was named to honor the tribe Elgonyi who lived in their caves in the past. The most famous of its caves is the Kitum cave. It has tribal drawings in its walls. Another curiosity of the regions is the herds of elephants that, every night, come to the place searching for minerals, and therefore scratch the walls with their ivory teeth.

#### 1.2.2.14 Australasia

Leaving the African continent, the 14<sup>th</sup> volume talks about Australia, New Zealand, New Guinea and some of the eastern Indonesian islands. Australian limestone are described in abundance, as well as thermal springs all over Australia. However, what calls up one attention in the scope of this dissertation are the caves of Borneo. Even though its central part is mainly composed of granite and other crystalline rocks, Reclus (1876-1894n, 126) states that “*in the regions near the seaboard nearly all the hills are of sedimentary formation. Of these the calcareous rocks are very prevalent, their innumerable caverns affording shelter to myriads of the esculent swallow.*”

Such caves are known, still today, by sheltering thousands of birds which nests are used to make soup. At the time, Reclus (1876-1894n) stated that the nests were negotiated annually by the Chinese for 5.000 Libras<sup>69</sup>. Maybe this type of commerce had begun in the beginning of the 15<sup>th</sup> century, by the Chinese.

Other different caves occupied by birds and bats “*occur in all the spurs of the North Eornean ranges and especially in the river gorges, and all contain rich deposits of guano still untouched.*” (Reclus 1876-1894n, 148). It is possible to give a high strategic value for the guano<sup>70</sup> since antiquity. It is possible to fabricate gunpowder from it and also fertilizers by being rich in nitrates.

In Java, Reclus states that in the *Dieng*<sup>71</sup> plateau, widely known for its Hindu temples, were discovered inscriptions of this religion, not yet interpreted (Reclus 1876-1894n). Meditation caves are all over the plateau as well as yellowish sulfur springs for ritual practices.

In New Zealand, fossils are discovered in “*beneath alluvial deposits and in caves encrusted with stalagmites.*” (Reclus 1876-1894n, 440) and in the Fiji islands, once more an image of a serpent is associated with the caves: “*Ndegei, the name of a mysterious being, who under the form of a great serpent hidden in the deep caverns created and still preserves the universe.*” (Reclus 1876-1894n, 460)

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<sup>69</sup> In present-day currency, the nests can cost up to US\$ 2.200 a kg (JORDAM, D. Globalisation and Bird's Nest Soup. International Development Planning Review, v.26, n.1, Liverpool University Press, 2004).

<sup>70</sup> The term has its *Quichua* origin and means “sea bird faeces”. The Incas used to collect this guano on the Peruvian coast and used it as a natural fertilizer. Later on the term started also to be used to designate bat faeces.

<sup>71</sup> The term originates from “*Di Hyang*”, meaning “abode of the Gods”.

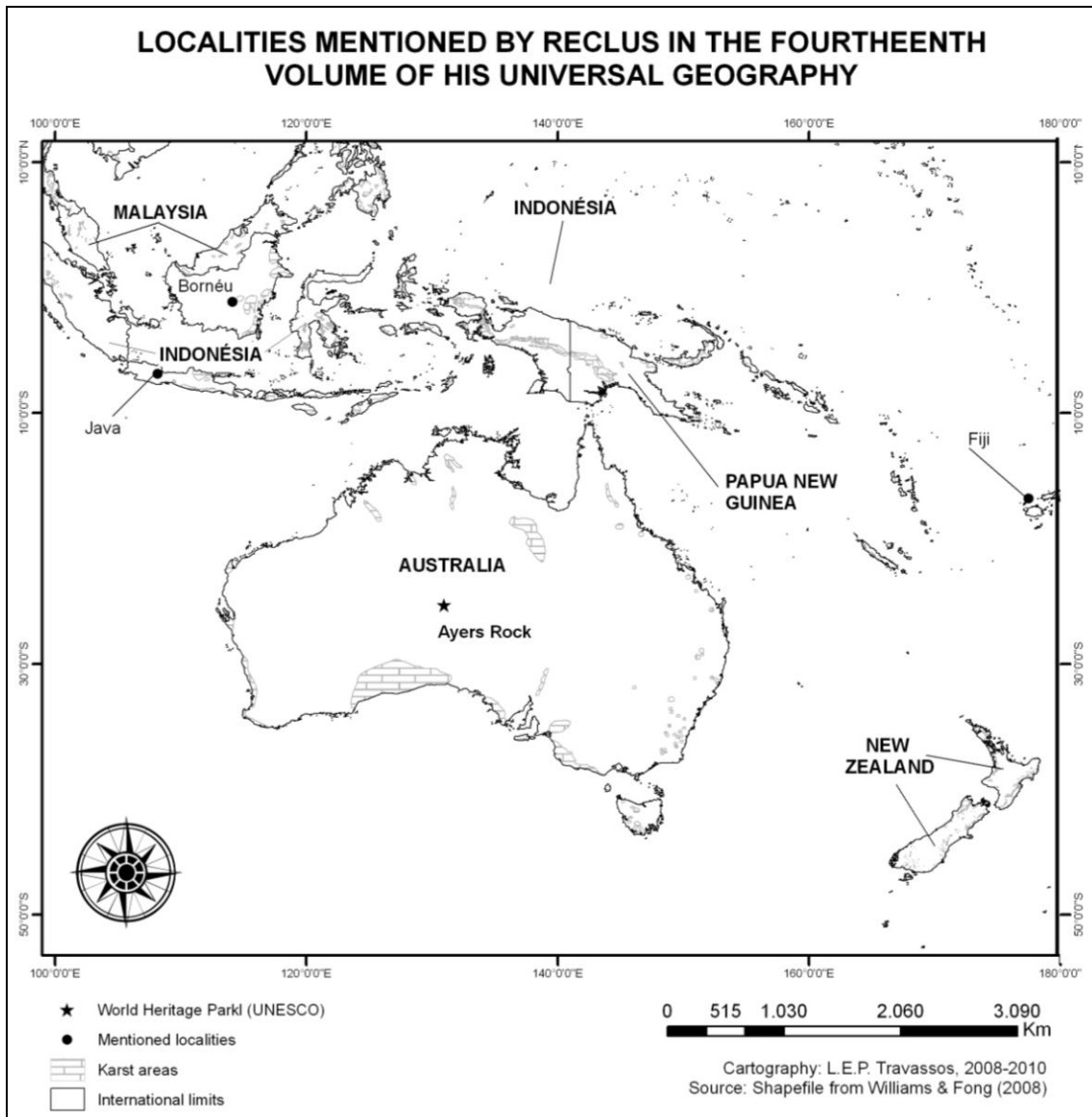


Figure 33 – Map of some localities described by Reclus in Volume 14 of his *Universal Geography*.

### 1.2.2.15 North America and United States

North America is described in the 15<sup>th</sup> volume. However, just a few significant references are made regarding sepulchral caves. Canadian thermal springs appear in many parts of the book and, according to local beliefs, “*sulphurous, saline, and ioduretted waters are regarded as sovereign remedies against rheumatism and other maladies.*” (Reclus 1876-1894o, 305). Other saline sources are frequently reported in the book and correspond to Canadian regions known by its deep aquifers.

Regarding burial caves, Reclus records one in Alaska, (in the Shumagin Islands). It was previously researched by the French explorer Alphonse Pinart (1852-1911). “*In*

*the Shumagin Archipelago Pinart has explored one of the burial caves, where the bodies were surrounded by various objects, such as carved and painted masks, (...) doubtless in order to beguile the evil spirits, and avert their malice.”* (Reclus 1876-1894o, 137).

In St-Georges-de-Cacouna, Quebec, Reclus talks about a river which impressed the travelers. When night falls the surroundings assumed

an even more fearful aspect. From out of the inky darkness strange devilish forms seem to issue and flit in threatening attitudes before you, whilst from out of the depths of the impenetrable caverns, in accordance with your fancy, there come the despairing moans of souls lost in endless torture. The early settlers were at constant feud with the evil spirits of this most demoniacal river, and at its mouth they built a church—the first one in Canada—the ruins of which still exist. (Reclus 1876-1894o, 328).

In Newfoundland , he describes “ *a succession of wild and romantic scenery - overhanging cliffs or terminating in sharp peaks, caverns and cavities where the noisy waters are engulfed, sloping ledges over which the waves expand in thin sheets(...).*” (Reclus 1876-1894o:394). In Lake Huron, Silurian limestone pierced by numerous caves are considered the “*sacred land, abode of the Supreme Manitu*<sup>72</sup> (...).” (Reclus 1876-1894o, 251).

The United States, even though part of North America, is described in a volume totally dedicated to the country (volume 16). There are mentioned thermal springs, ponors, troglodyte dwelling places, caves used as refuge during the Civil War, water with presumed healing powers and important show caves.

Caves used as dwelling places for Native Americans are mentioned, either natural or artificially made. In another place, Reclus states that mountains pierced with caves, by its strategic position above the terrain, were used by the Native Americans against government troops. Thus, “*the indomitable warriors glided from cave to cave beyond the reach of the Federal troops, whom they were able to shoot down from their vantage ground.*” (Reclus 1876-1894p, 48).

The caves of Mesa Verde, Colorado, where for years the Native Americans used them as houses, appear in the text as “*cliff dwellings*” (Reclus 1876-1894p, 46). These natural or artificial caves were excavated in the middle of cliffs are apparently inaccessible, however they can be reached using long ladders. (Reclus 1876-1894p).

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<sup>72</sup> Creator of all things and giver of life.

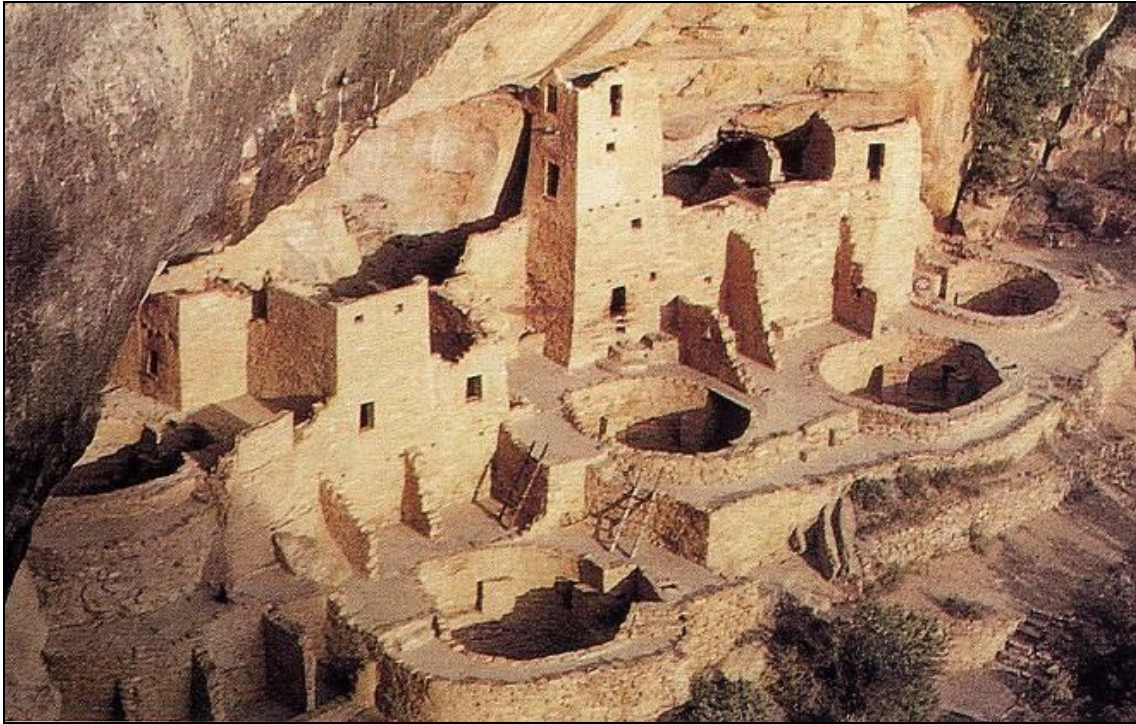


Figure 34 – Cliff dwellings of Anasazi Indians, Mesa Verde National Park, United States (Source: KUSCH, 1993, p.156)

Of all the caves identified he states that the “*largest and the best known is the so-called Mammoth Cave of Kentucky, which lies on the Green River affluent of the Ohio. A portion of the water of this river, (...) disappears in the underground galleries (...).Here are concentrated all the marvels of the subterranean world.*” (Reclus 1876-1894p, 227). He talks about other cave, the Wyandot Cave<sup>73</sup> “*about half-way between Evansville and New Albany, and not far from the banks of the Ohio, is situated the famous (...) Cave, whose galleries have a total length of 23 miles, and whose stalactite formations exceed those of the Mammoth Cave of Kentucky in size and diversity of form.*” (Reclus 1876-1894p, 277).

Regarding Vicksburg, Reclus notes the caves used by the civilian population during the American Civil War. He uses the word “*memorable*” to describe the siege of the city. This event can even be confirmed by the existence of a publication written by the wife of a Confederate Captain; *My Cave Life in Vicksburg*<sup>74</sup>. “*The foot of the cliff is pierced by artificial caves where the civilians lived during the memorable siege of the city in 1863 (...).During the Civil War it also became one of the strongest citadels of the Confederacy.*” (Reclus 1876-1894p, 308)

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<sup>73</sup> Since 1850 the cave has been open for tourism. Mammoth Cave was opened since 1816.

<sup>74</sup> Journals of Mary Loughborough, published in 1864.

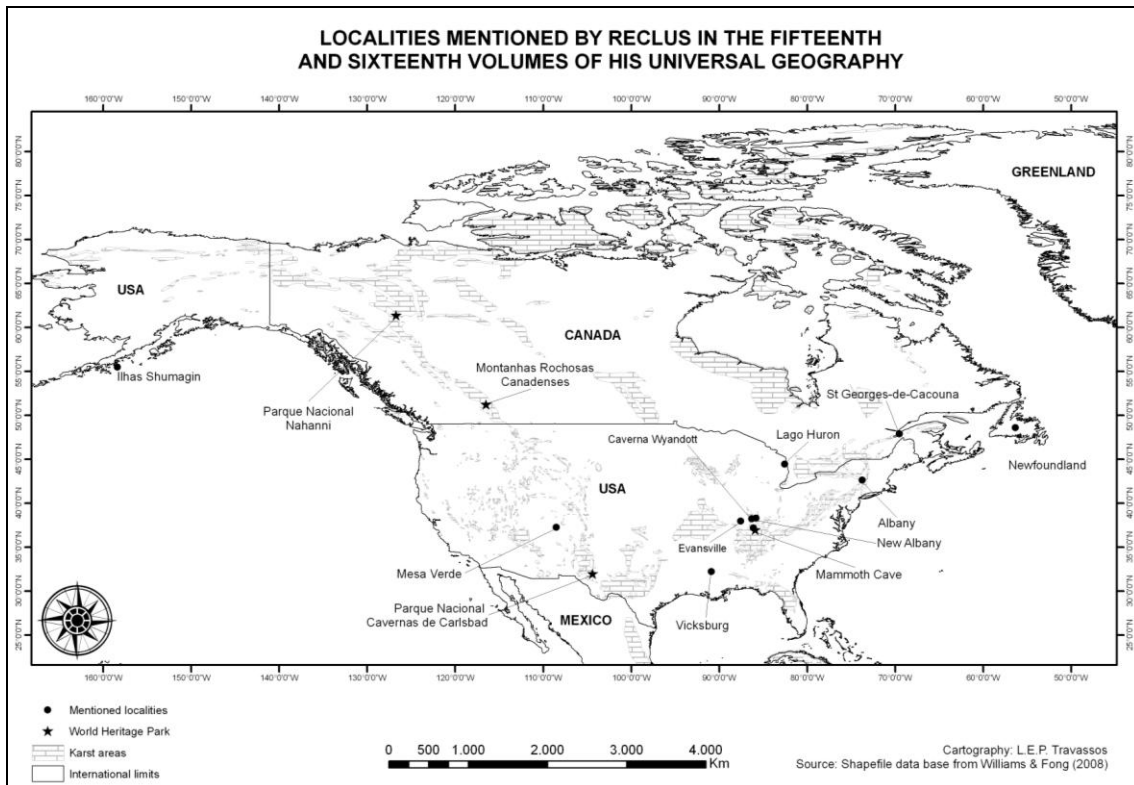


Figure 35 – Map of some localities described by Reclus in Volumes 15 and 16 of his *Universal Geography*.

In Albany, New York, around 28 “*mineral springs, saline, sulphurous, ioduretted, or carbonate, are grouped near a little lake which bore the Indian name of Saraghoga, whence the Anglo-American ‘Saratoga’.*” (Reclus 1876-1894p, 138). He also states that, in 1535, Jacques Cartier heard accounts about “*the marvelous virtues of these waters, and the first white man guided to the spot by friendly Indians in the year 1767 was completely cured.*” (Reclus 1876-1894p, 138). Another karst spring is described as being “*so wonderfully clear that its sandy bed is visible at a depth of nearly 70 feet.*” (Reclus 1876-1894p, 192).



### **1.2.2.16 Mexico, Central America and West Indies**

Mexican with its famous cenotes is described in the 17<sup>th</sup> volume. Central America known at the time as West Indies is also studied. All through the text it is possible to identify springs, ponors, carbonatic and volcanic caves, cenotes, burial and dwelling caves, as well the legends associated with the underground.

In a volcanic cave in Mexico, maybe a secondary cone, “*escape copious sulphurous exhalations. To the genius of the place the neighboring Indians bring propitiatory offerings of shells, darts, and the like.*” (Reclus 1876-1894q, 23).

Collapse rocks of the Chinacamote cave prevent the visitor walking through all its extent. According to the indigenous people, “*this natural curiosity, said (...) to be six or seven leagues long (...).*”(Reclus 1876-1894q, 29). A river which sinks near to Jalpan<sup>75</sup>, continues its flow “*in profound caverns about 2 miles long, which like the arch at Nuevo-Leon also bears the name of Puente de Dios. In these subterranean galleries human bodies have been found covered with stalactites.*” (Reclus 1876-1894q, 38). It is important to say that probably the bodies would be covered by concretions that came from the ceiling forming stalagmites. It seems impossible that the bodies would be covered by stalactites in the ceiling.

The image of a serpent related to caves once more appear as the Aztec name of “*Quetzalcoatl, the ‘Plumed Serpent’, who comes from the east with the east wind and thither returns.*” (Reclus 1876-1894q, 68). It is important to mention one Brazilian legend associated to the Serpent Cave (Cova da Serpente) in Bom Jesus da Lapa, Bahia. In the region, Segura (1937) reminds us that a huge serpent with wings would live in cave neat the village. Coming out, the creature would eat all the inhabitants. For this reason, the missionary Frei Clemente said to all to pray to Our Lady because each time they pray, one feather of the serpent would fall out. Once all feathers are gone, the serpent would not be able to fly and would die.

In the Mexican northwest, Reclus identified the Tarahumaras, or Tarumaros, “*one of the most remarkable for the tenacity with which they have preserved their ancient customs*” (Reclus 1876-1894q, 82), which live “*scattered over the highland region of the three states of Chihuahua, Sonora, and Sinaloa (...).*Some of their groups are still cave-dwellers, and numerous caverns are shown which were formerly

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<sup>75</sup> About 210 km north of Mexico City.

*inhabited. According to many writers the old troglodytic customs explain the legend of the Aztecs regarding their residence in the 'Seven Caves'.*" (Reclus 1876-1894q, 83).

In the mountains surrounding Bolson de Mapimi, state of Chihuahua, have been found extensive cemeteries in caves:

In these graves the bodies are buried in a crouching attitude, and are wrapped in shrouds of agave fiber over which are wound colored scarves. A single cave contained over a thousand of these mummies, nearly all of which were carried off by American explorers, and distributed amongst various collections in the United States. (Reclus 1876-1894q, 102).

One important Mexican show cave is identified between Taxco e Cuernavaca<sup>76</sup> "*Between Taxco and Cuernavaca lies the famous Cacahuamilpa<sup>77</sup>, whose marvelous galleries, sources of springs and rivers, have already been explored for a distance of six miles.*" (Reclus 1876-1894q, 136).

The important *cenotes* of Yucatan are highlighted. Reclus states that many have more than ten meters from the ground surface to the water level, giving to the region an unique geographical configuration. "*This natural distribution of the water, so different from what occurs in other regions, is the essential feature in the physical geography of Yucatan. The fluid is nowhere to be seen, yet its effects are everywhere manifest in the well-irrigated grounds.*"(Reclus 1876-1894q, 151-152).

In Guatemala, the mountains that surrounds Coban, capital of Alta Vera Paz, "*are pierced by numerous caves, and the whole region may be said to rest on limestone vaults, the most remarkable of which is that of San Agostin Langnin, where a little affluent of the Polochic has its source.*" (Reclus 1876-1894q, 236).

The Island of Cuba is mainly made of limestone rocks which appear to have been deposited

to have been deposited in the same way as the present fringing reefs have been formed, presenting the same irregularities, the same fractures and deep cavities. So numerous are the underground galleries that the whole island may be said to form a vast vault, beneath which the waters are collected either in streams or stagnant reservoirs. Explorers have penetrated for leagues into the labyrinthine passages of many caves without reaching the end, and every year fresh discoveries are made. In many places rivulets are seen to plunge into chasms, reappearing farther on as more copious streams swollen by subterranean affluents (...).The best-known caverns are those of Monte Libano (Mount Lebanon) in the eastern peninsula north of Guantanamo. Near Cape Maisi, at the eastern extremity of the island, there is also a famous

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<sup>76</sup> Around 110 km south of Mexico City.

<sup>77</sup> Cave located in the Caves of Cacahuamilpa National Park. It has been open for tourism in 1968.

grotto, in which animal remains have been discovered. (Reclus 1876-1894q, 359).

In Jamaica, as in Cuba, he identifies hills pierced by many caves from which water emerges. This part of the country

is like Yucatan, but the resemblance is still greater to Carniola, owing to the rugged character of the land. There are few regions of the globe more rich in underground reservoirs and streams which again well up to the surface all round the verge of the limestone district. Here and there the subterranean rivers and their branches may be traced by the springs and fountains in the caves occurring at intervals along their course. The slope of the hidden watershed is often different from that of the surface. Lakes also are formed either on the surface or in underground cavities above the rocky sills. (Reclus 1876-1894q, 384).

Another myth of world creation is registered in Haiti where the

The aborigines claimed to have sprung from the soil, and celebrated the origin of the world in certain caves, several of which are still shown, especially in the western districts. According to the natives of the north-west the first man appeared quite suddenly, accompanied by the sun and moon, at the entrance of a cave near Dondon<sup>78</sup>, and here the natives formerly came to offer sacrifices to the divinities of heaven and earth. The figures of turtles, frogs, scorpions, crocodiles, and other animals carved by the primitive artists on the surface of the rocks in this cave have already become encrusted with calcareous concretions. (Reclus 1876-1894q, 404)

The Island of Anegada, the northern most of the British Virgin Islands is remembered by a local legend that says that “*a Spanish galleon laden with gold and silver was lost on this island, and the treasure deposited by some of the survivors in a cave in the interior.*” (Reclus 1876-1894q, 436). However, even with the search made by the inhabitants of local islands, the valuable stores of gold and silver have never been discovered.

About the Bahamas islands the author states that they were formed as in Yucatan, with “*fissured coralline limestones with numerous caves or cavities, the upraised parts of the Great Bahamas Bank are destitute of springs or running waters.*” (Reclus 1876-1894q, 442). Consequently, the rain water, as in Yucatan, “*is collected in underground reservoirs.*” (Reclus 1876-1894q, 442).

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<sup>78</sup> Região ao norte da capital Porto Príncipe.

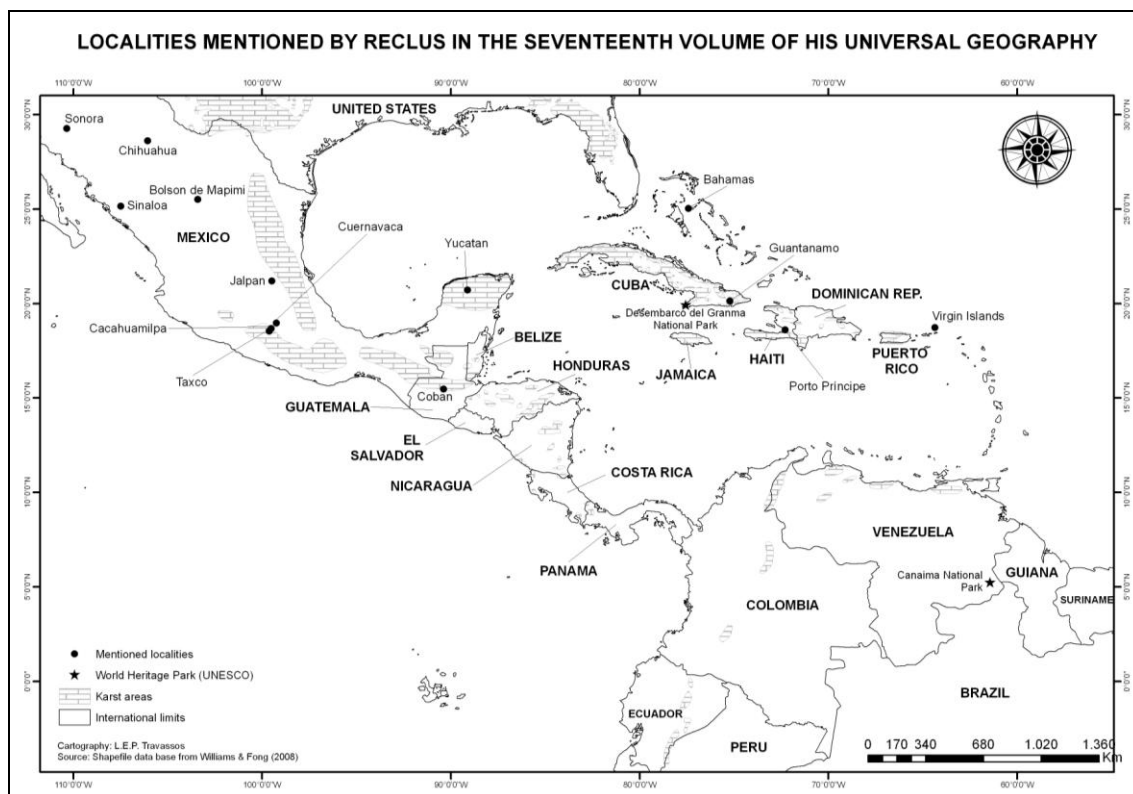


Figure 36 – Map of some localities described by Reclus in Volume 17 of his *Universal Geography*.

### 1.2.2.17 South America (The Andes regions)

South America is represented in the 18<sup>th</sup> volume, as well in the 19<sup>th</sup>. After making a general presentation of the continent in the first pages of the 18<sup>th</sup> volume, the book follows this order: Antilles of the Venezuelan Seaboard, Venezuela, Colombia, Ecuador, The Galapagos Archipelago, Peru, Bolivia, and Chile. There are made important records regarding the perception of pre-Colombian societies towards the underground.

In Venezuela, he talks about the mountains of Cumaná consisted mainly of “*metamorphic rocks, schists, limestones, and sandstones, overlaid round their periphery by cretaceous deposits, (...) famous for their vast caverns, tenanted by myriads of birds which have acquired the habits of bats.*” (Reclus 1876-1894r, 84). In another extract, regarding Colombia, he reminds us of the “*devil-bird that frequents the Caripe caves*” (Reclus 1876-1894r, 192) comparing with the birds that exists in the “*Hoyo de los pajaros (“Bird’s hole”), a chasm 600 feet deep and only 150 in circumference.*” (Reclus 1876-1894r, 192).

Next to the border between Venezuela and Colombia, in the region of the Atures, Reclus identifies the “*Cerro Pintado (Painted Hill), covered with Indian hieroglyphics, and the Cerro de los Muertos (Hill of the Dead), with its cave full of skeletons, besides other rocky heights also containing sepulchral caverns.*” (Reclus 1876-1894r, 93).

Between Atures and Maipures, in Colombia, he records that

Cerro Pintado (...) presents a curious group of figures, including a man, a snake 400 feet long, and various other animals. A few miles higher up, the caves and fissures of the Cerro de los Muertos, the Cerro de Luna, and other caverns contain numerous skeletons deposited by different Indian tribes, and accompanied by a jar of some fermented drink to slake the thirst of the deceased on his journey to cloudland. (Reclus 1876-1894r, 106).

Still in Colombia, in San Agustin, there exists a place of religious connotation that, because of treasure hunters, from the mass of shapeless ruins it is possible to infer “*that the structure consisted of a huge basalt slab resting on pillars and masking an underground recess.*” (Reclus 1876-1894r, 180).

In Peru, a railroad connection between Lima and Huacho caused numerous Peruvian graves to be opened; “*but the most interesting remains have been found near Chancay, midway between Huacho and Lima; here are also seen large underground chambers, which, according to the local tradition, were used as granaries.*” (Reclus 1876-1894r, 322).

While the railway works were in progress a cutting in the dunes at Ancon, south of Chancay, exposed a vast necropolis, containing well-preserved mummies, several often wrapped in a single pack, besides textiles, utensils and an endless variety of other objects, throwing a flood of light on the social life, arts and industries of these populations. (Reclus 1876-1894r, 322).

Still in Peru, Reclus recalls a national legend that talks about a cave where the legendary founder of the Inca dynasty, Manco Capac, dwelt before ruling the Quichua world (RECLUS, 1876-1894r). In Cajamarca, Peru, the relation between hell and the underground is portrayed: “*The spring, which is supposed to rise from the infernal regions, is visited in procession on the great feasts and purified with holy water.*”(Reclus 1876-1894r, 331).

Near Marañon, northeast of Lima, is reported “*a labyrinth of underground galleries. Here is a carved block representing a human monster, whose hair is*

*represented by coiling snakes, and who grasps snakes in both bauds, either the 'Genius of Evil' or more probably, the 'God of Thunder'.*" (Reclus 1876-1894r, 331).

Reclus recalls the foundation of Trujillo by Francisco Pizarro in 1535 and the Moche ruins of temples, palaces, tombs and pyramids which "*according to the local belief it contains vast treasures, and communicates by underground galleries with other structures of a similar character.*" (Reclus 1876-1894r, 319). In the region, "*no other Peruvian necropolis has yielded to collectors such an abundance of statuettes, earthenware, skulls and mummies.*" (Reclus 1876-1894r, 319).

### **1.2.2.18 Amazonia and La Plata**

Finally, in the last volume, Reclus makes a general panorama of the Amazon region and the La Plata basin. Before initiating the work, he congratulates himself for finishing the work and thanks all those who helped him in the researches. After this he starts the book following this sequence: The Guianas, Brazil and its states, Paraguay, Uruguay, Falkland and South Georgia Islands.

Writing about important speleological provinces in Brazil, Reclus (1876-1894s) makes more general records about the presence of caves. Obviously, the findings of the Danish naturalist Peter W. Lund are mentioned as well the important karst region of Lagoa Santa, Minas Gerais.

In the specific case of religious use of caves, Reclus makes reference about the city of Bom Jesus da Lapa "*with its 'miraculous' grotto*" (Reclus 1876-1894s, 319) and writes no more about the subject. Maybe this happened because it is the final volume or for the lack of information about the region and information published by other naturalists.

Regarding the relation between sedimentary rocks, fossils and caves, Reclus starts his account talking about the "*limestone caves of the Maranhao, Piauhy [Piauí], and Ceara mountains, frequented by myriads of bats and vampires.*" (Reclus 1876-1894s, 138). In these places were found "*the remains (...) of huge extinct mammals, such as the mastodon and the megatherium.*" (Reclus 1876-1894s, 138)

In Maranhao, in the valley of Quixeramobim<sup>79</sup> (tributary of the Jaguaribe), was found a cave

contained part of a human skull evidently of great antiquity. But it is uncertain whether it belonged to an ancestor of any of the dominant races - Tupi, Tupinamba, (...)that is 'Brave Men', or Tabajara, 'Village Lords' - with whom the first French settlers in Maranhao entered into friendly relations during the sixteenth century. (Reclus 1876-1894s, 138).

In the former Capitania of Minas Gerais, the author makes important comments about the caves of the Bambui Group, Upper Proterozoic. According to Reclus (1876-1894s), the new world scientific era was initiated by Humboldt. Such scientific records in Brazil were made by several other naturalists: "*The whole land has been traversed by Ton Eschwege, Auguste de Saint-Hillarie, Spix and Martius, Mawe, Gardener, Spruce, Burton, Liais, Halfeld, Wells, Manoel de Macedo, and others. (...)Lund devoted many years to the study of the extinct fauna of the Caves.*" (Reclus 1876-1894s, 153).

In Minas Gerais, from all lithological groups,

the most famous is that of Lagoa Santa, well known in the geological and pre-historic records of Brazil. The limestone district is pierced by innumerable caves, some mere fissures, others vast galleries, huge vaulted chambers, winding passages, ramifying in an endless maze of underground recesses. The rocks seem to have been first crushed by tremendous lateral pressure, and then eroded by running waters. Calcareous concretions hang from the vaults of the caverns, or rise in pillars from the floor, which is covered with argillaceous layers of varying thickness containing land and fresh-water shells identical with contemporary species. In these layers have also been found enormous quantities of animal remains which have been studied by Claussen, and later more successfully by Lund. (Reclus 1876-1894s, 154-155).

He continues, describing the Velhas river "*partly fed by underground streams carrying off the overflow of the numerous reservoirs in the cave district*" (Reclus 1876-1894s:156) and the Lagoa do Sumidouro "*alternately flooded and empty according to the rainy and dry seasons.*" (Reclus 1876-1894s, 156). In the surroundings of Lagoa Santa,

Lund and other naturalists have discovered in about 1,000 caves as many as 115 species of fossil mammals, whereas the living fauna no longer comprises more than 88 altogether (...). Human remains also are found in the caves of Minas Geraes, where Lund has discovered the fossil bones of at least thirty persons of all ages. (Reclus 1876-1894s, 163).

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<sup>79</sup> In the present day the river is located in the State of Ceará.

Reclus (1876-1894s) registers the north portion of Minas Gerais talking about the cities of Montes Claros and Paracatu: “*Like those of Lagoa Santa, the Montes Claros cliffs are pierced by numerous caves, in which have been found the remains of the megalonyx<sup>80</sup> and other extinct animals.*” (Reclus 1876-1894s, 170).

From the north of Minas Gerais, Reclus goes to the south of Brazil to the state of Santa Catarina and records “*the picturesque granite hills of Tubarao. Here Paleozoic limestones and sandstones abut on the crystalline rocks of the Coast Range, and vast stalactite caves traversed by running waters occur in many places.*” (Reclus 1876-1894s, 202).

In Paraguay he recalls the city of Paraguari, at about 66 km of the capital city Assuncion, which have in its surroundings “*an imposing bluff pierced with caverns, where the Apostle St. Thomas is fabled to have resided and preached the gospel to the Guarani nation. The legend is probably of Jesuit origin, for Paraguari was one of the missions founded by the Company of Jesus, which here possessed immense herds of cattle.*” (Reclus 1876-1894s, 316-317).

In Argentinean Patagonia, he identifies the Mount Leon, “*a limestone crag about 1,000 feet high. This solitary eminence is pierced by caverns, the resort of pumas, while the condor builds its nest on its rocky ledges.*” (Reclus 1876-1894s, 361). He affirms that, in all parts of the Argentinean northwest, from

Jujuy to that of Mendoza, numerous ruins, earthworks, towns, and strongholds, are found on the heights and in the surrounding valleys (...) at times on steep escarpments, and even in the clefts of vertical walls, like the Arizona and New Mexico cliffs dwellings. Most of them had to be approached by ladders giving access to thick walls or terraces, whence a descent could be made to the quadrangular courts lined by habitations in the form of caves. (Reclus 1876-1894s, 404).

Obviously all the volumes of the Reclus’ Universal Geography don’t cover all world’s karst provinces. However, many important reports are made and come to reaffirm the importance of the historical, humanistic and physical studies of Geography.

Then, more recently, the name of Jean Nicod must also be remembered when studying the cultural importance of karst and caves. Many of them, known in the present day, show evidence of successive or cumulative use throughout the history as sources of freshwater and for protection (Nicod, Julian & Anthony 1996; Nicod 1998).

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<sup>80</sup> Extinct giant sloth.





Figure 37 – Map of some localities described by Reclus in Volumes 18 and 19 of his Universal Geography.

### 1.2.3 *The modern contribution of Jean Nicod and Christophe Gauchon*

More recently, also belonging to the French School, the names of Jean Nicod and Christophe Gauchon must be remembered when talking about the cultural importance of caves. Many of the caves known today have evidences of successive or cumulative uses throughout the history. These usages can be identified as sources of drinking water in regions struck by seasonal droughts or low availability of surface water, as well as places for protection and religious use.

Nicod, Julian and Anthony (1996) still suggest that the availability of water was, among others reasons, the most important issue responsible for the development of human settlements. The pre-Colombian people already used karst waters for their survival. The Greeks were the first to canalize water from the springs of Syracuse, Sicily. But the Romans were famous for building the aqueducts that supplied abundant cold water for many of their cities. During the Middle Ages, besides the supply, karst waters were used as a source of energy and power as happens today.

Talking about caves that were used as shelters or refuges, Nicod, Julian and Anthony (1996) also associated them with the term *sanctuary* against enemies. Especially in the Balkans, there are numerous records of caves that were used by Christians, *klephts*<sup>81</sup> and *hajdouks*<sup>82</sup> during the Turkish domination. In 1822, in the Melidoni cave, north of the Mount Ida (Crete), the refugees were asphyxiated by the Turks. In Western Europe, during the Crusades, several caves were used and Day (2004) reminds us that the Jamaican karst was the traditional refuge for the Maroons in the resistance against the British in 1690-1796.

Already in the 20<sup>th</sup> century, the strategic use of European caves occurred in the First World War and by the partisans of the former Yugoslavia and the French resistance during the Second World War. In the revolutionary wars of Vietnam, Algeria, Lebanon and Cuba, caves also played an important role in protecting resistance fighters. (Nicod, Julian & Anthony 1996). Naturally throughout history, such *cave-refuges* presented fortifications in the entrances. In Slovenia the oldest well-known examples are the Castle of Predjama (Figure 38) and the Cave of Osp (*Osapska Jama* – Figures 39

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<sup>81</sup>Greek communities formed after the Turkish conquest of Greece.

<sup>82</sup>*Hajduks*; According to Kranjc (2008), these groups formed a sort of guerrilla during the Turkish occupation in the Balkans. They can be considered heroes by some, thieves by others, depending on which side they are perceived.

and 40). This last still presents some traces of a wall that was used to protect the refugees from Turkish attacks in the region. Another cave, among many others in Slovenia, has also the vestiges of a protective wall and is called *Šišca Jama*.



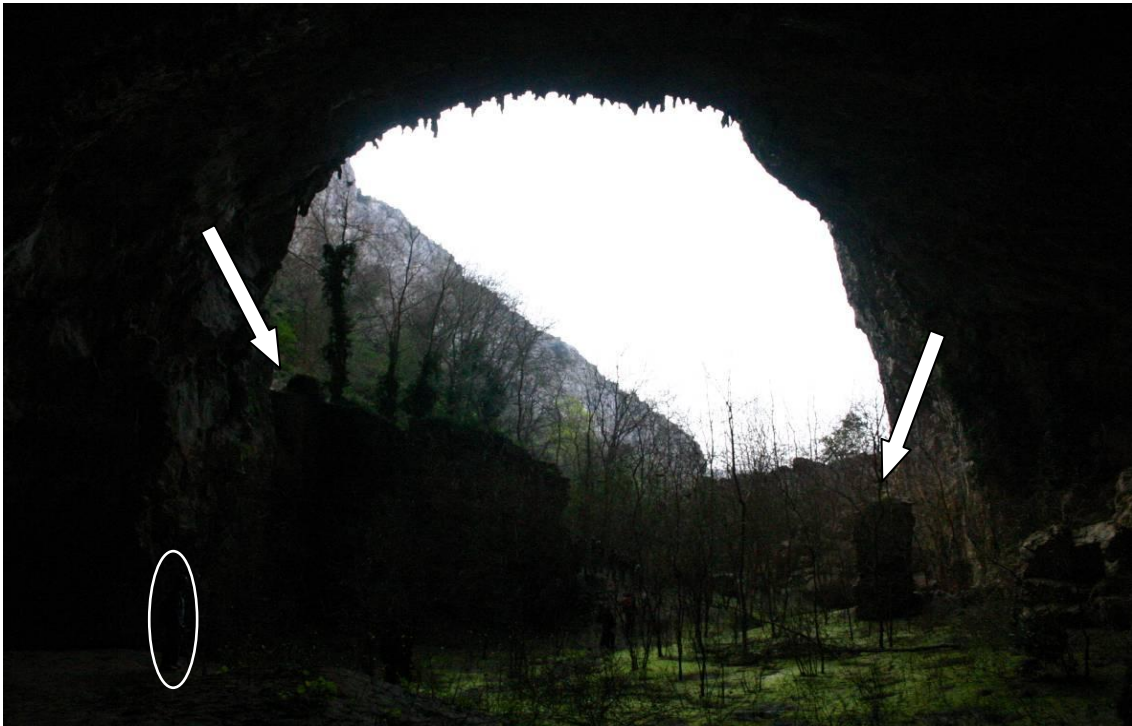
*Figure 38 – General overview of the Predjama Castle. The presence of the castle dates from the year of 1570 and it served as the fortification of the Knight Erasmus (Photo: Luiz E.P.Travassos, 2007).*

About the *Šišca Cave* (Figure 41), Malečkar (2005) notes that around 400 years ago, after the Venetians had set fire to the area, only half of the tower of the castle near it was preserved and it can still be seen today. In the back of the tower, an abrupt hill provides a view of the blind valley of Brezovica and about 15 meters below it is possible to see the traces of the protecting wall of the cave. To Malečkar (2005) the *Šišca Cave* was walled in the second half of the 14<sup>th</sup> century, a period when the Turks invaded the region.

For microclimatic advantages, many caves, natural or artificial were or are still used as temporary or permanent residence. Many of the *cave-churches* known today originated from fortifications. This religious function is also easily identified throughout history.

According to Nicod, Julian and Anthony (1996) and Nicod (1998), they can be divided in three major categories in accordance to function: 1) magic-religious; 2) sepulchers and 3) Christian and Buddhists hermitaries. One could add to the last category, Hindu hermitaries. In most cases, or maybe in all of them, water is perceived with supposed healing and sacred powers.

Caves are also presented throughout history as ancient pagan sanctuaries, surviving through the legends. These usually involve caves as dwelling places of evil and other beings. According to Nicod, Julian and Anthony (1996), to sacralize the profane, there were built in the entry of many of these caves chapels usually dedicated to St. Michael the Archangel who would block the entries of these cursed sites.



*Figure 39 – View from the inside of the Osp Cave. It is still possible to identify by the arrows the remains of the ancient protection wall of the cave. The circle shows a person 1,80 m high as a scale (Photo: Luiz E.P. Travassos, 2007).*





Figure 40 – Detail of the ancient protective wall viewed from the exterior (Photo: Luiz E.P. Travassos, 2007).

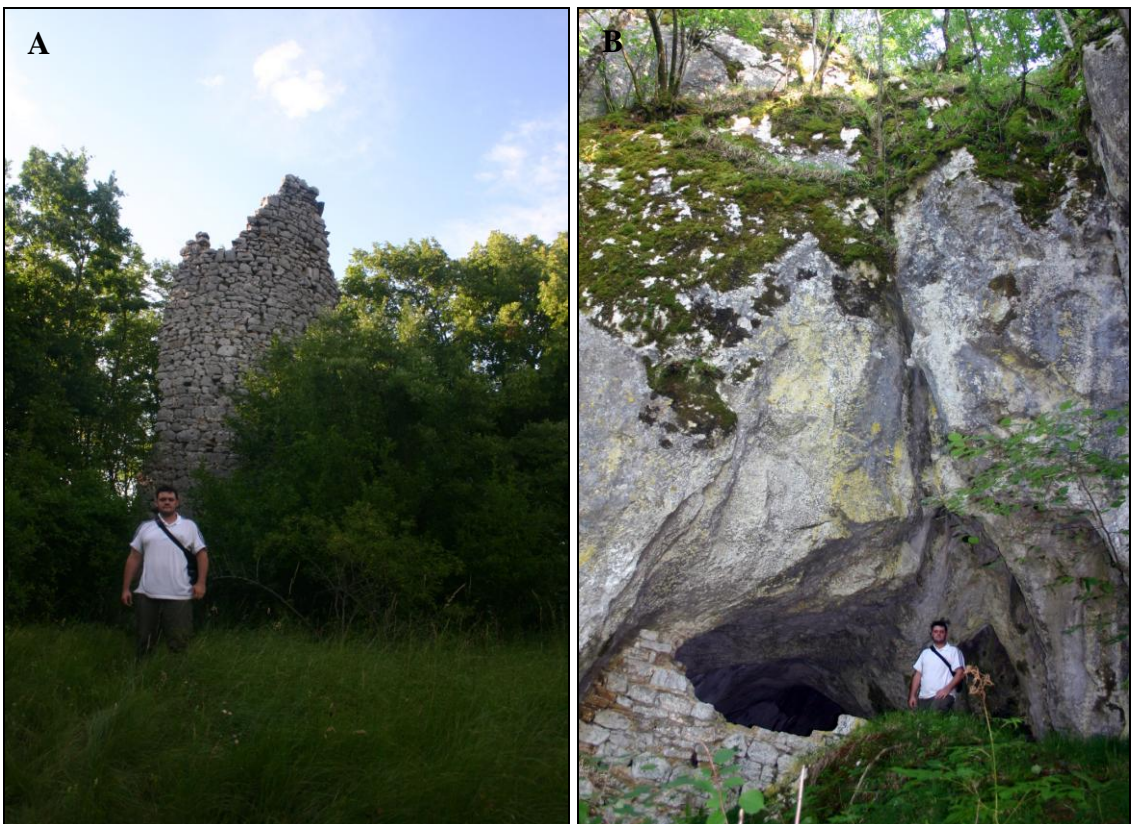


Figure 41 – A) Traces of the tower of one fortification. B) The author in front of the Šišca cave, near to Gradišica, Slovenia. The cave is located at the side of an abrupt hill and the access is made through the back of the castle's ruins by a narrow trail (Photos: Luiz E.P. Travassos e Franc Malečkar, 2009).





Figure 42 – Another example of a fortified cave (Šmajdov Grad) near the city of Kranj, Slovenia (Photo: Gregor Aljancic, 2008).

In the introduction to his work about caves and men, Gauchon (1997) quotes Pierre Defontaine (1933) who says that Human Geography undertakes specially to gather evidence of human presence across the globe. Based on this statement, Gauchon (1997) developed his research showing the cultural importance of the French karst. He has identified caves used as shelters, sanctuaries and various other uses such as wineries and places to make cheese. It is noteworthy that from the five chapters of the book, one is dedicated to the use of caves as shrines, putting caves as “*sanctified places*”. Gauchon (1997) also establishes typologies of “cave refuges”, namely: 1) actual cave fortress, 2) refuges *stricto sensu* and 3) outposts. In relation to diverse types of use, the author mentions the existence of the following categories: 1) underground shelters (large and small), 2) places to explore renewable and nonrenewable resources of the endokarst (drinking water and use of speleothems, for example), 3) traditional places to make cheese and 4) espeleotourism (Figure 43).

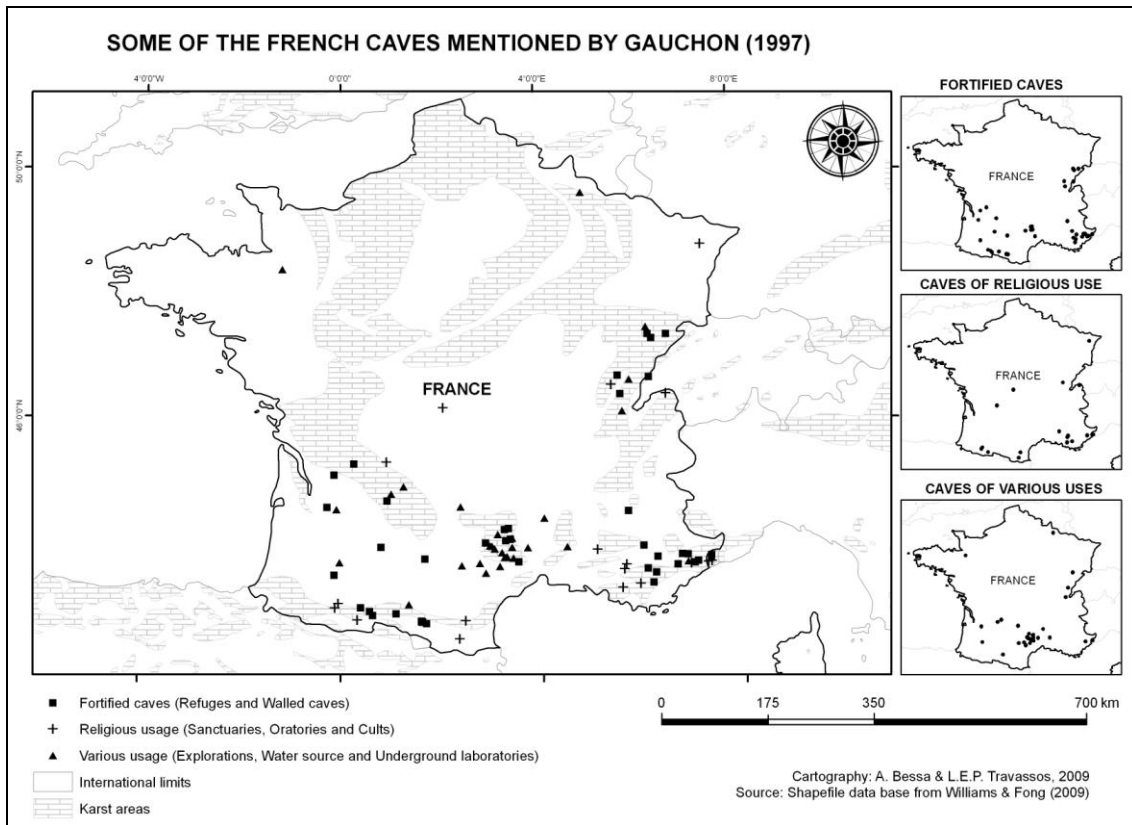


Figure 43 - Location map of some caves mentioned by Gauchon (1997)

Especially for geographers, such concepts of underground usage refer to the concepts of *space* and *place*, often associated with natural landscapes and in particular, to caves.

### 1.3 The concepts of *Space* and *Place*

As with the works of Humboldt and geography, it is also impossible to forget the works of Yi-Fu Tuan regarding human perception of the environment. Thus, linking the concepts of *space* and *place* to karst is of extreme importance in the development of our research.

Rodaway (2007) reminds us that although the first work of Tuan was in the field of geomorphology (studying pediments in southwestern Arizona), his reputation was established as a cultural geographer, being responsible for the redesign of Human Geography as the study of the relationship between human beings and the environment.

Therefore, this section will be dedicated to the applicability of concepts of *space*, *place*, *topophilia* and *topophobia* related to karst and caves. As defined by Yi-Fu

Tuan, *topophilia* is the relationship or the emotional connection between people and *place*. This relationship is influenced by several factors, including the cultural background and historical circumstances in which a society lives. Hoelscher (2006) reminds us that Tuan also considers that the biological and sensory components should be taken into account as well. For him, *topophilia* is perhaps not the strongest of human emotions (due to the variety of responses to a particular environment), however, when “activated” it has the power to bring a *space* to the category of *place*. This feeling usually has the connotation of a positive relationship, and depending on the individual, can be replaced by a sense of *topophobia* or fear of a place. To examine the human relationship with karst and caves, such feelings are more easily perceived.

For Tuan (1980; 1983), the *place* is a unit of *space* mentally and physically organized to meet the basic bio-social needs (real or perceived), of a people. Moreover, their superior aesthetic and political aspirations can also be expressed by the “transformation” of a space into a place. Thus, a space devoid of value becomes a place for an individual or social group, when they come to have a sense of belonging.

The *place* refers, more typically, to a particular segment of the earth’s surface, characterized by that feeling of belonging which makes it different from others. Thus, one can consider the *place* as the most significant portion of a *space* (Cresswell 2006). The caves considered sacred in many cultures exemplify these statements.

Yet regarding the *place*, Tuan (1980; 1983), Norton (2000) and Rosendahl (2007) claim that its conception is a social act, differing among themselves, as people made them so. These authors still consider it as a separate self-reproductive entity, since individuals learn and provide models that nourish certain beliefs and attitudes towards a place. They are not simply the unintentional result of economic, social and political processes and can also be sites of potential sources of conflict.

In the case of cave-sanctuaries or cave-churches, this last characteristic of being a source of potential conflict can be felt between the environmental agencies, environmentalists and believers and also between believers of different traditions as in the Middle East or India, for example .



#### 1.4 Imaginary, topophilia, topophobia and the human relationship with caves

The image of caves in the popular imagination and even in mythology is usually related to places of darkness and abandonment. From this perception, caves are seen as a place where fear dominates. Other representations regard caves as places of resurrection or where religious or sacred figures are said to appear. This clear opposition between topophilic and topophobic feelings, respectively, motivates the reflection by philosophers and religious personnel throughout history.

Clendenon (2009) points out that the history of karstology includes narratives of Ancient Greece that described the behavior of karst waters. Two-thirds of Greece is developed in limestone and, therefore, it was the backdrop of mythology, religious practices and travel records.

Therefore, it is from the conflict between man and space that light, shadow and darkness combine harmoniously springing signals “*that try to explain what is logical, real or intangible*” (Barbosa 2009, 1).

In this context, it is necessary to understand the concepts of the oral tradition, myths and symbols. The works of Cervantes (2006; 2007) and Eliade (1991; 1994) provide the necessary basis for understanding the collective imagination regarding myths. In Brazil, especially in the speleological community, the study of how people perceive caves is still relatively new. It received important contributions from Figueiredo (1999; 2001), Gomes (2003), Mendes (2003), Silva (2003) and Teixeira (2003), and continued on the frame of environmental perception and religious use of caves by Travassos *et al.* (2006), Kranjc and Travassos (2007), Guimarães, Travassos and Varela (2007, 2009), Travassos *et al.* (2007), Travassos (2007d), Travassos and Varela (2008) and Travassos *et al.* (2008). Under the perspective of the religious use of caves important contributions were also made by Barbosa (1999; 2007), Barbosa and Travassos (2008), Kranjc and Travassos (2009), Figueiredo (2010) and Travassos (2010).

The beauty of karst landscape and caves consists, according to Teixeira (2003, 11), in the “*reference factor for the development of the imaginary (...), driving force of creation of legends and ‘tales’ associated to more general myths.*”

The imaginary associated to caves is expressed in the oral tradition of traditional communities and serves to assist researchers in understanding the right or wrong

environmental behavior of each social group. Imagination may be related to feelings of fear (*topophobia*) or affinity (*topophilia*), both common to visitors of cave-churches or cave-shrines.

According to Cervantes (2006; 2007), the oral tradition is presented as a set of “printed” testimonies in the collective memory of a social group. It manifests itself in the communication between members of a society or a specific community. Its contents are orally elaborated, reworked and transmitted by the members of previous generations to members of the new one.

Cervantes (2006; 2007) also states that it is possible to divide the steps for the maintenance of oral tradition:

- 1) the *collective memory*, which is the durability of speech for several generations. It may be manifested individually or collectively. The places known to all are important in the collective memory, because people need to know the location of the facts, increasing the credibility of the story. These sites exist and are known since the existence of the social group in question;
- 2) the *orality*, stage represented by the verbal exchange between the subjects, transmitting knowledge from one generation to another. The basic element here is the word accompanied by gestures, the opportunity to tell the story and the opportunity of the account. one can identify a specific emotional state between the narrator and the public;
- 3) the *tradition* is also an important factor, because just the memory and the oral language alone would not go very far. For its propagation is necessary to evoke memories, reinforced by repetition, acting as a mechanism that embodies the collective memory;
- 4) the plot is considered to be the aspect capable of uniting the elements of the story. The characters, the actions taken by them, the purpose or the reasons they had to act in the circumstances constitute this category.
- 5) the *interpretation*. In oral tradition, the variations happen between one informant and another. It is hardly possible to find two identical versions of the same story.

Cervantes (2006; 2007) still remembers that the study of oral traditions is a difficult task, however worthwhile. This task consists mainly to listen to people, how

they speak, and when they speak and how they do it. The fabulous legends and miraculous stories and apparitions create an enigmatic environment; the atmosphere of the narrative becomes mysterious and often a feeling of respect is experienced in the voice of the narrator.

Therefore, especially regarding the human relationship with caves, it is observed that their formal study is still scarce and virtually unknown in urban areas. This is easily perceived in interviews with residents or with the pilgrims in the cave-churches. In many cases, the ordinary tourist does not have access to these narratives.

As pointed out by Cervantes (2007) in his studies in Mexico, one can say that Brazil also has a very rich oral tradition. This tradition fosters the emergence of myths and symbols throughout the centuries. In South America, Cervantes (2006) states that “the mythology of today” is composed of testimonies originated both from pre-Hispanic period as well contemporary accounts. These public and anonymous sources, address serious and important issues related to the existence and survival of one community.

One can consider the *myth* as a part of something bigger - *the oral tradition*. The collective memory, the orality, the tradition and the interpretation are components of its essence and dynamics. Its protagonists, the *symbols* are, therefore, the images that give essential meanings to explain the existence of the natural elements or the social accounts (Cervantes 2007).

For Limón (1990) cited by Cervantes (2007), *myths* provide satisfactory answers to the deep concerns of human beings. Eliade (1992, 50) also says that they are a “*role model*”, which tells a sacred history or a primary event which took place at the beginning of time. Once said or shown it became true. Thus, it fixes models for rites and human activities.

Myths are, therefore, complex phenomena that can hardly be explained by a single theory. Caves and karst are precisely the scenarios for the emergence of numerous myths and the development of the collective imaginary of the caves. Once the story of the appearance of a saint or the refuge of a blessed man is related to a cave, for example, that *place* hardly stops to be worshiped in favor to others.

Cervantes (2007, 93) says that “*while studying a myth, it is possible to identify that their sequences, contents and active elements have regularity, and these do not match pre-established schemes in other studies or established by known theories.*”

They are also a form of knowledge, explanation and representation of the material and social reality, becoming important means of communication and expression of thoughts, ideas and values of a society. They act as cultural representations structured through time (Cervantes 2007).

Thus, the myth is

one of the genres of oral tradition and as such can be said that it is a *social construction* which is expressed and transmitted in the language of a group from a specific society. The myth as part of culture persists over time, but is not invulnerable to it and can change in form. The source of the myth is the society, but the author is anonymous. It addresses serious issues related to the existence and survival of the community; its protagonists, gods, heroes or animals are represented by symbols. The content of the myth refers to time, explicitly or implicitly, marking the past and its implications, which are dealt with acts and supernatural or magic powers (Cervantes 2007, 100)

Cervantes sees the myth as “*a living being*”. The essence of its capacity of survival lies in its continuous transformation to assimilate the new conditions that are imposed by society. It is the social construction expressed and transmitted orally inside one human group, typical of a particular society. It is an element of culture, persistent over time, but not invulnerable to it (Cervantes 2006; 2007).

Over time, one can say that myths have been acquiring a popular connotation of false or nonexistent. However, for many anthropologists, there is a clear sense that the term brings to reality an account of traditional nature. This report is not necessarily true, but allows understanding of how a group is organized and what are their fears and anxieties. The believers seek in the world explanations that allow them to live a better life. But in this process, the observation of nature is always measured by pre-conceptions of culture. So, according to Tuan (1983, 96), myths develop in the absence of precise knowledge, not being a “*belief that can be easily verified or denied by the evidence of the senses.*”

The ways in which human groups perceive caves may be included in this statement: “*The reality is not contained entirely in our mind, nor wholly outside. We did not invent or observe: we built*” (López Austin 1999:51-55 quoted by Cervantes 2007, 71).

Thus, the symbols, defined here as coded units used by humans to understand their internal and external reality, consolidate the meanings in the cultural spaces. In every culture or society, they sustain a system of beliefs associated with the social

organization, expressed usually in the oral tradition or in the concrete actions of individuals. It is still an image and an object that assigns a meaning; a result of a codification process shared by members of a social group (Cervantes 2007).

Its introduction is indispensable for human beings to structure an explanation of the existence of natural and social deeds. As a result, they consolidate their meanings in cultural spaces during the historical existence linked to human interests of each particular group. For Cervantes (2006; 2007), mankind needs this belief system to understand and try to dominate the field of the intangible that otherwise he could not understand.

Therefore, caves appear in this context with the rock paintings and as the support for the construction of temples, sculptures, rituals, etc. With the reports of naturalists and geographers presented before, it is possible to see that some dominant symbols extend over a broad geographic area, expressing itself in multiple contexts and even different continents. The most notable is the relationship of caves with snakes, as shown before, which presents similar aspects in various cultures.

Cervantes (2006) reminds us of the region of Yucatan, Central America, region rich in elements of the imaginary. In the region, the snake *Tsukán* lives, takes care or owns a cave or a *cenote*. The report states that it is so great that his head is like a head of a horse. Those who come in touch with it mention the brightness of eyes in the darkness of night or the cave. An encounter with this snake is feared by the villagers, because if someone kills the serpent, a disgrace certainly will take place in the aggressor family. This misfortune can range from temporary paralysis, fevers, illness, permanent injury or even death. Reports also state that because of his extraordinary powers, the *Tsukán* feeds itself only by opening its mouth which will attract the preys to be eaten (Cervantes 2007).

This myth, identified by Cervantes (2007), is similar to others existing in various parts of the world. According to Lobo and Baducci Jr. (unpublished), it is a clear relationship between the elements of water, caves and snakes. In Venezuelan mythology, Carreño and Ghneim (2001) also show the relationship between caves and snakes, which also shows a dichotomy of fertility and death.

In Brazil, an entity similar to the Mexican one was described by Segura (1937), and was reproduced by Steil (1996). In general, Cascudo (2001) argues that, according to the Portuguese tradition, in the interior of the country there exists a legend of a snake

that seeks for mothers who are breastfeeding their children, surprising them during sleep to suck the milk. It is like the legend of the enchanted snakes (*mouras*) of Portugal.

*“For the people, they [snakes] have mysterious power of vitality and strength; symbol of evil and wisdom; symbol of evil and temptation of evil, resisting in the Catholic exorcists formulas”* (Casudo 2001, 632) *“where in some areas, monsters drag the immense body into the mountains”* (Casudo 2002, 14).

Wilkinson (1848, 160-161), makes reference to a legend similar to that of Apollo and Python. According to Ronecker (1997) the snake is, without doubt, the animal that has caused more mythic and symbolic interpretations. It has varied symbolic and contradictory values. Beneficial for some people is considered bad for others. It is the mythical “cousin” of the dragon.

An example of this relationship can be observed even in medieval Europe, when Čuk (2008) reminds us of a legend associated with the Cave of Postojna: the legend states that many years ago, a terrible dragon lived in this cave and terrorized the inhabitants of the city. They simply could not be free of this punishment, but one day, a clever shepherd named Jacob, who lived near the mountain *Nanos* had an idea. According to the story, Jacob won the dragon using the trick of filling a calf with lime and offering to the dragon which one gulp swallowed its prey. Thirsty the dragon drank a little water from the Pivka River and the lime reacted with water and burst the belly of the dragon. The grateful people of Postojna used the skin of the dragon to make bags and, of course, the largest and most beautiful was presented to Jacob in gratitude for his heroic deed. This passage shows us, perhaps, the role played by the “darkness” of the cave to the people of that European town as a way to mitigate the fear of the population in relation to the misunderstood darkness.

For Tuan (1979/2006), the fears are particularly experienced by each individual, being subjective. Some, however, are produced by a threatening environment. The very concept of landscape, as the term has been used since the 18<sup>th</sup> century, is a mind construction, as well as a measured physical entity. A “*landscape of fear*” (Tuan 1979/2006, 12) refers to both psychological states, as the real environment. The darkness is frightening.

The sensation of fear is an imminent collapse of one's world and the approach of death. It is the final redemption of the integrity to chaos. The disgrace is personified, the feeling that the hostile force, whatever its specific manifestation, has the will. Before modern scientific ideas were known, it seems that people, in almost every part, saw the forces of nature as animate beings, as deities and demons, good or evil spirits (Tuan 1979/2006, 14).



Figure 44 - Illustration of the legend of the dragon from the Cave of Postojna printed in a wooden plate from an Slovenian apiary (Source: Gift from the Kranjc family to the researcher). The image can also be seen in Čuk (2008,16).

The dragons from European imaginary are still showed related to karst and caves: in the book “*Mundus Subterraneus*” by Kircher (1678), one can identify the illustration of at least 4 types of dragons and the classic struggle between man and this creature (Figure 45). In the 17<sup>th</sup> a famous alpine explorer named Johann Jacob Scheuchzer, devoted himself to the study of plants, minerals and ice movements of the European Alps from 1702 to 1711. At that time he also would have been responsible for the cataloguing of Swiss dragons. According to Scheuchzer, “*the best dragons lived in Grisons, the largest and most sparsely populated of Swiss cantons. The region is so mountainous and with so many caves, that it would be strange not find dragons there.*” (Berr quoted by Tuan 2006, 129).

Thus Gleria (1992) argues that the relationship between caves and animals, whether in reality or in European imagination is quite diverse. This is remembered by the presence of the bear, the fox, the lizard and, the dragon, especially in the folk tradition that involves the caves of Veneto, Italy, for example. Out of these animals, the author states that the fox is the most common to appear in Italian legends due to its being considered to be the symbol of astuteness.

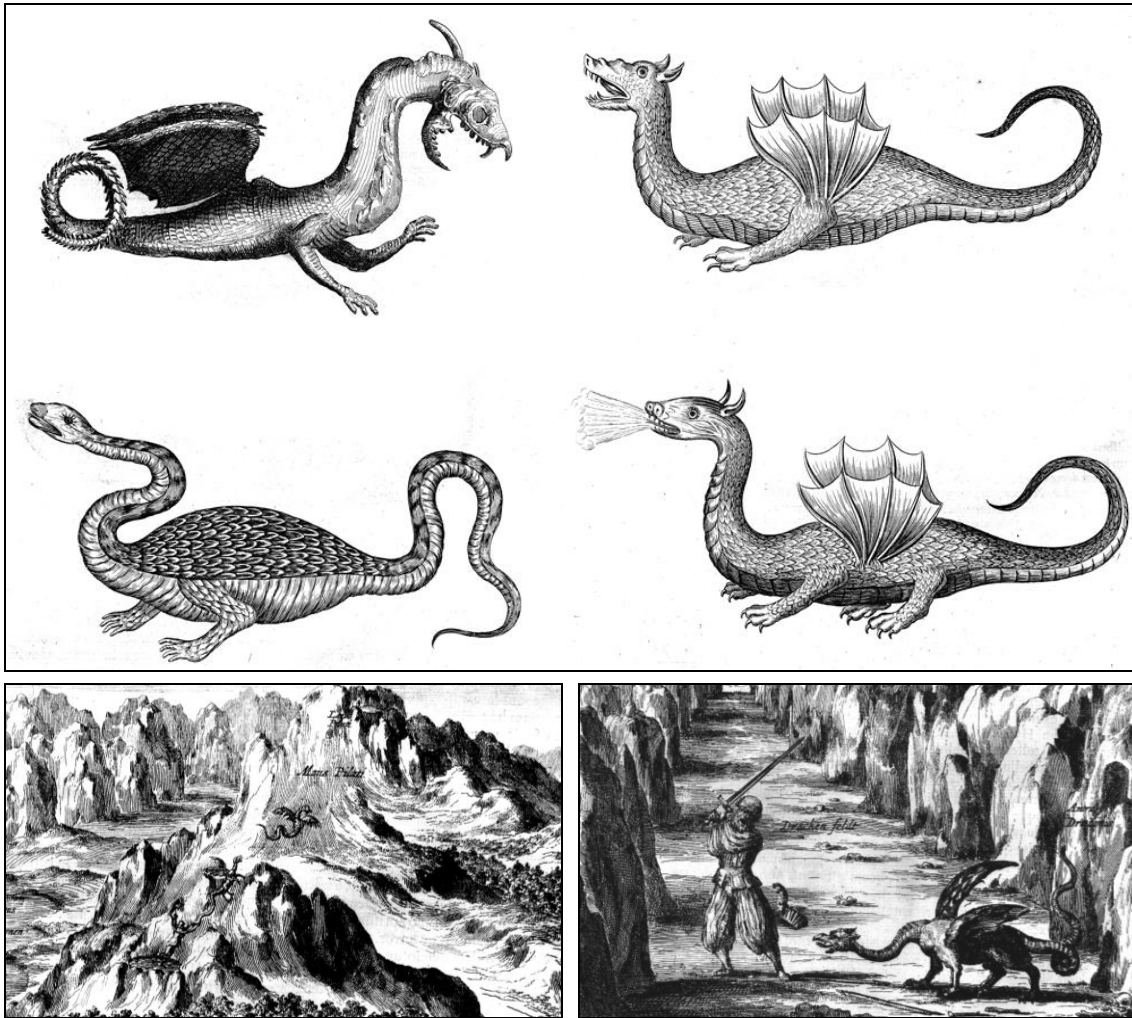


Figure 45 – Illustration taken from the book “Mundus Subterraneus” which shows types of dragons, dragons in the rocky landscape and the classic struggle between man and the creature (Kircher 1678, 96, 99, 100,103,117).

Cervantes (2006) continues affirming that the worries of the inhabitants of rural areas regarding caves range from the fear of getting lost in the maze of conduits to the fear of falling into some deep pit somewhere inside. Furthermore, the caves present themselves as special places with supernatural value, such as the Grotto *Xpukil* in the village of *Calcehtok* and cenote *K’oop*. The caves may close if not respected (like the cave legend of the Lapão Velho, Bahia, Brazil) and to make sure nothing happens while entering the cenote, it is necessary to leave gifts for it such as cigarettes, food and water.

In Fiji Islands, for example, Eliade (2002) resembles a celestial deity called *Ndengei*. Represented in the form of a serpent, it lives in a cave. When disturbed or when it moves, the earth trembles. “*Whilst it is the creator of the World, it’s omniscient and punisher of the evil.*” (Eliade 2002, 50).



Kejonen (1997) says that from the 750 caves listed in Finland, about 473 are connected to some kind of folk tradition or oral narrative. In these records, caves were used by shamans, hermits, thieves, murderers, war refugees, workers and hunters. For the latter, many caves also served as shelters, with anthropogenic modifications. Due to imagination, caves are also portrayed as dwelling place of supernatural beings.

Regarding presence of criminals in caves, Cardoso (2006) speaks of a legend related to the *Gruta da Moeda*, in Fatima, Portugal. According to the story, a very wealthy man from the region, while passing through a forest, was attacked and robbed by a gang of outlaws. After killing him, they had thrown his body into an abyss. At the time they threw his body into the depths, they dropped the bag of coins in the cave, losing it for ever.

In Australia, Hamilton-Smith (1987) states that any “wild” space favors the creation of myths and legends and the Australian caves were also included in this. Thus, he had identified examples of myths about bottomless shafts, conflicts between aborigines and colonizers, as well as the existence of popular heroes.

Clark (2007) affirms in his article on aboriginal Australians, that the study of associations made by aboriginal people and caves should be seen as a rich source of cultural information. As in other cultures, caves, dolines and ponors play an important role in the lives of traditional communities and are often portrayed as the abode of ancestral heroes, spirits and evil creatures. Sometimes they are even perceived as resting places after death.

Many reports gathered by Cervantes (2006) show that it is common to have the perception that caves and their associated deities can punish or protect someone. Bad behavior is punished by a deity, whether it is God or the Devil. In some parts of the Yucatan Peninsula, one cannot enter caves during Holy Week. In 1995, the disobedience of this premise caused the death of those people who did not respect the tradition. If a cave is desecrated, a supernatural force can inflict severe punishments.

Consequently, “*it is necessary to address the landscapes of fear both from the perspective of the individual and the social group and place them even in the form of a historical landmark*” (Tuan 1979/2006, 15) because, “as a man increases his power over nature, he reduces the fear that one can have for it.” (Tuan 1979/2006, 16). For this reason, it is believed that the use of environmental education must be oriented towards karst areas and caves.

Considering the relation between imagination and caves, Bolner-Takács (2006) reminds us how the caves in Dalmatia are portrayed in the works of the Hungarian writer Mór Jókai in the 19<sup>th</sup> century. His special ability to unite romanticism and realism made him also able to be inspired by events in world history. Besides his literary merit, his work

represent an extremely rich collection of knowledge of almost all branches of arts and sciences: history, ethnography, botany, zoology, geography, astronomy, meteorology, hydrology, mineralogy, paleontology, as well karstology and speleology (Bolner-Takács 2006, 17).

One legend that resemble the one of *Cerberus* is that of a legendary animal called *Daboza*. As in Greek mythology, he also lived in caves but on the coast of Dalmatia, especially on the Korcula Island. The animal is one of the dangers that awaited the sailors as they passed through this region. Even as a skilled hunter, *Daboza* also dug up the bodies from their graves, living both on land and in water to attack the vessels that passed through the region (Bolner-Takács 2006).

In Brazil, one can note the name of Devil's Cave (Caverna do Diabo) in popular imagination. Several others could be cited, but this one was chosen due to the fact that it is considered to be the largest and a well known cave in the State of São Paulo (6,237 meters in length).

The origin of the name is associated with an image inside it (Figure 46a) or to a story created by one of the leading promoters of tourism to the region, Colonel Pettená. The legend tells that, long ago, slaves use to hide the plantation production inside the cave (perhaps using it as a silo) and some time later, when they returned to get it back, there was nothing left or what was left was entangled. For this reason, they started to say that it was the work of the devil (Figueiredo 2008). Another Brazilian legend is remembered by Levy, Silva and Maia (2005) when they talk about the *Carijó* natives. They believe that if the drops of water falling from the roof touch a person, he would be transformed into a stone statue, like the stalagmites inside caves.

Another interesting fact occurs in Slovenia regarding the name of the Hell's Cave (*Jama Pekel*) due to the fact that many people see certain similarities in the rocks above its entrance with the face of the devil (Figure 46b). According to Uršič (2008) animal traces inside the cave date back to the Paleolithic, demonstrating its use by humans at that time. For centuries, the local people related the cave with hell and saw at

its entry the image of the devil. Fearing to name it “devil’s cave” they chose to use the name “hell” instead.



Figure 46– A) image that reminds visitors of the Devil's Cave, the image of the devil B) The rocks above the entrance to the Hell's Cave also reminded the local people the image of the devil (Photo: Luiz E.P. Travssos 2009).

Still in Slovenia, Malečkar (2004) recalls the *Jama Dimnice* or the “Devil’s House of Smoke”. The cave, with 7,786 m of passage length, is famous in the country for being considered the most educational one in the *Matarsko Podolje* region as well for having one of the largest curtains and columns of calcite in the country. It was explored by Ivan Andrej Perko in 1905 and was named due to phenomena of air condensation producing mist. The differences of internal and external temperatures creates a “smoke” that reminded the explorers of those gases or smoke that would come out from the Earth interior. Oral tradition records the fact that Perko Slovenian explorer would had descend into the entrance abyss and his colleagues would hear him screaming while descending him by ropes. By pulling him out of the cave, they found some resistance and after a few minutes he was out of the abyss very scared and with

marks and scratches along the body. He would said that the Devil had tried to keep him inside the cave.

In another part of Slovenia, Tavagnutti (2000) identifies a story about Dante Allegieri and a small cave near the Tolmin. In the past, the poet had been invited by Henry II, Count of Gorizia, to see the Cave of Postojna. However, it would have been in Tolmin that a small cave and the atmosphere of the Tolminka River would have impressed and inspired him to write his “Inferno”. No one knows for sure if this is true or just a legend; however, at that the time the region was part of Gorizia. Nowadays, in Slovenian territory, the region of Tolmin presents the “Dante’s Cave” (*Dantejeva Jama*) and in its entrance there is a sign stating that the place was visited by Dante in 1319.

In Northern Ireland, Steward (2005) points out the existence of a medieval pilgrimage center called the Purgatory of St. Patrick. This cave was regarded in regional legend as the entrance to hell. Located in Donegal, it is believed that St. Patrick lived in the cave where he overcame innumerable temptations and received a vision of how hell would probably be. St. John D. Seymour (1918) reported that it was there that St. Patrick would have started the process of converting the Irish to Christianity. Even today, the site receives an annual pilgrimage of hundreds of thousands of people.

Still regarding the human relation with the underground and the belief of the existence of hell, Steward (2005) notes that the Chinese God of Mercy, *Ti-Tsang Wang*, walks through the caves of hell in search of souls to be saved from the underworld.

### **1.5 The Geography of Religion and the concepts of *Sacred* versus *Profane* related to karst and caves**

Combining the concepts mentioned before, it is easy to understand why rock shelters and caves have been sacralized throughout the history of different societies. Their ritual use was, with time, imprinting a distinctive characteristic in the landscape through culture. It is believed that caves, in either carbonate or siliciclastic rocks, are major examples of this type of interaction between man, landscape and culture.

Gil Filho (2007a) claims that religion is an inseparable part of human experience and therefore, men can´t stay passive in the face of immediate reality. Men always try to find the meaning of existence through symbolic practice.

Thus, in this section we will discuss this *sacred* versus *profane* relationship regarding karst and caves.

An example that illustrates this search for meanings or the cultural imprint in caves is shown by Shaw (2006). In his work, the author reminds us that many names of chambers and speleothems of caves around the world derived from architectural forms and other objects such as animals, birds, plants, parts of churches and even parts of human anatomy. Names are also given to evoke cities and monuments that make them notable. Also common are sacred names or names of national heroes and explorers.

Some relevant examples are the Cave of Magdalena (*Črna Jama*), named due to its proximity to the Church of St. Mary Magdalena, for example. In the Cave of Postojna, throughout history, speleothems and chambers were named as *Altar*, *Main altar*, *Saint Mary Magdalene*, *St. Anthony of Padova* (*Sv. Anton Padovanski*), *Baptismal font*, *Pope*, *Calvary*, *Chapel*, *Mount Calvary*, *Grand Cathedral*, *Cave of Saint Catherine*, *Chair of St. Peter*, *St. Stephen*, and of course, *Hell* (Figures 47 and 48). For Shaw (2006), changing of names can occur throughout history, mainly due to periods of political transformations.

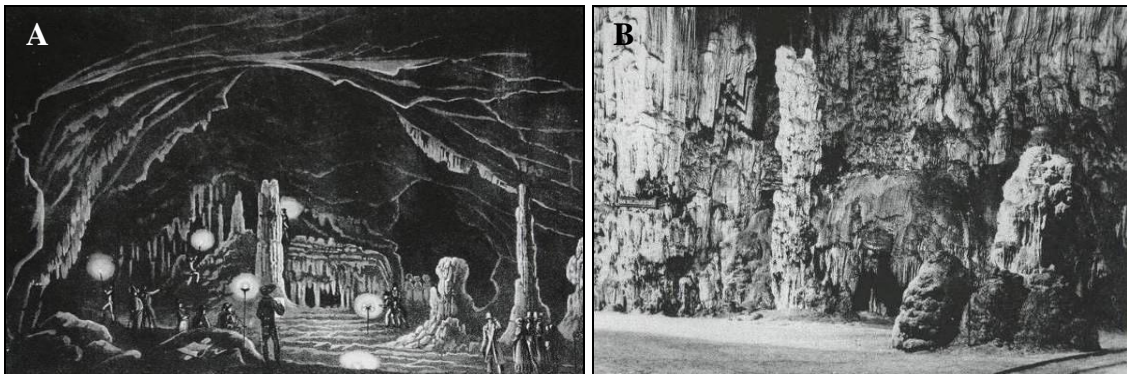


Figure 47 – A) The “Holy Sepulcher” in engraving of Döbler in Hohenwart (1832. This was based in a watercolor by Schaffenrath between 1821 and 1824. B) The “Holy Sepulcher” in photography from 1910 (Notranjska muzej neg. No. 2145. In: Shaw 2006, 126).

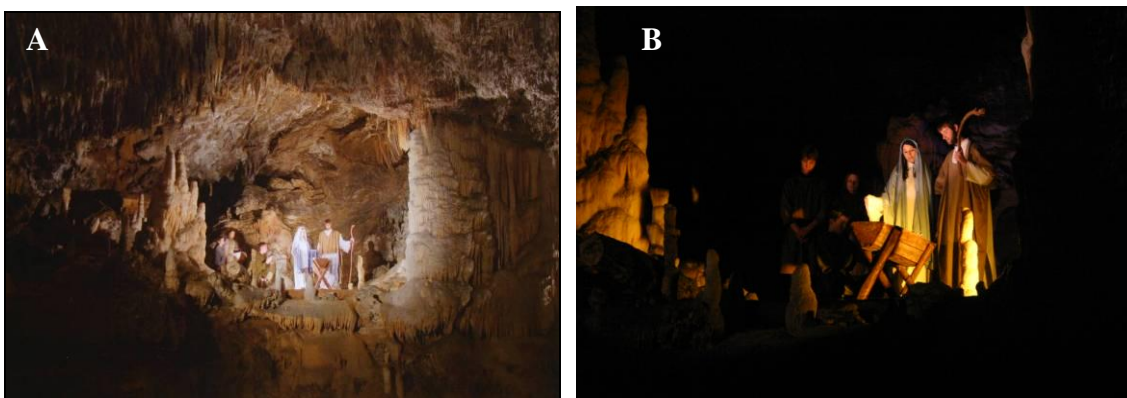


Figure 48 – At Christmas and New Year, there are representations of the Nativity in the Cave of Postojna (Photo A: Čuk 2008, 103 / Photo B: Luiz E.P.Travassos 2008).

This fact is also noted by Carter (2006:103) that tells us about some of the names given to the cave speleothems in the *Gruta da Moeda*, in Fatima, Portugal. The speleothems are named as *crib*, *shepherd*, *Our Lady*, *imperfect chapel* and *source of tears*, for example.

Thus, LeBon (2002) argues that the social environment exerts a significant action on human opinions. Despite will, the social environment determines unconscious interference that dominates a social group. That's what usually happens with the concepts of people in relation to caves: "*In terms of points of view and individual beliefs, deducting our own observations and our reasoning, we have generally very little.*" (LeBon 2002, 198). According to him, most of mankind only has collective opinions (LeBon 2002, 195). To Rosendahl (2007), the religious practice, which is materialized by traveling to the sanctuary, for example, represents one of the several ways in which religion act on people and places.

In sacred caves, these symbolic places are practically created by the human occupation of space and by the use of symbols that transforms the *space* into a *place*. The "driving force" of these places is the spatial-temporal variation of the pilgrims flow and its largest or smallest intensity of flows. This intensity of flows to sacred places produces the local, regional and international scales of pilgrimages. Numerous caves fall into these three scales.

These sacred places can be translated as a kind of cultural significance of the individual or the social group that experiences it in their own way. Such places are saturated by symbolism and are not simply being discovered, founded or built. They are usually claimed, owned and operated by a particular religious community. As previously mentioned, they also play the role of representing rules and meanings for the group involved (Rosendahl 2007).

But what would be called *sacred* or the *sacred place*? For Caillois (1988, 15) "*regarding the sacred in general, the only thing one can say with legitimacy is contained in the definition of the term: it is the opposition to the profane.*" It is opposed to the profane even though it does not suffer apparent physical change. After sanctification, the space can no longer be used freely. Eliade (2002, 372) also states that "*the simplest way to define the sacred is to oppose it to the profane.*"

Eliade (1992, 13) also states that "*man becomes aware of the sacred because it manifests itself, shows itself as something absolutely different from the profane.*"



However, Galimberti (2003, 11) explains this exposed concept better by noting that “*sacred*” is an (...) word that means “*separated*”. Sacredness, then, is not a moral or spiritual condition, but a inherent quality to what (...) mankind is not able to dominate and see as it is superior. As such, these dimensions of lives are set as “*divine*” and “*separate*” in relation to the human world.

Thinking about caves, we see an ecumenical trend of sacralization, with greater or lesser intensity among the belief systems. For Perera (1988), caves began to be converted into natural sepulchers (*and perhaps we can say that they were being converted in holy places*) already from the Neolithic period. In Greek mythology, to the legendary heroes is granted immortality in caves and deep shafts, reserving to these places certain sacredness. Caillois (1988, 19/23) states that any religious view of the world is “the distinction between the sacred and the profane, where the latter is constantly compelled to seize the sacred”. Perhaps this is why their mutual relations are regulated through the rituals.

As proposed at the beginning of this work it is not the author’s intention to deepen the understanding of religious phenomena, but to apply the concepts to this particular type of cave use. For this reason, one recalls Eliade (2002, 7) who states that “*all definitions of religious phenomena presented until today show a common feature: in their own way, each one of them opposes the sacred to the profane (...)*.” As a consequence, “*to define the sacred is difficult task*” (Eliade 2002, 7). Due to the large heterogeneity of religious documents, the author also states that it is difficult to study such phenomena. Each one is a manifestation of the sacred in the mental universe of those who perceive them (Eliade 2002). Still, it is noticed that the underground spaces considered sacred have certain similarities and can be better delimited.

According to Eliade (1956) cited by Hassner (2002), sacred spaces are religious centers where heaven and earth meet becoming the access of Mankind to the Divine. Therefore, it is noteworthy to point out that sacred places have at least three characteristics: 1) they are places of communication with the divine through prayer, movement or eye contact with a divine image, 2) they are places of divine presence that promises cure, success or salvation and 3) they are sites that give meaning to the faith through metaphorical reflection. These three features combined transform the sacred space into a religious center: for the believer, the sacred place becomes the center of the spiritual or geographical world.

The cave-sanctuaries, many of them located in magnificent outcrops or in high positions, remember the concept of “high”, consolidated by Eliade (2002:40) “*The ‘high’ is an inaccessible dimension to man and as such, belongs by right to forces and to the superhuman beings; those who elevates, rising ceremoniously the steps of a sanctuary or a ritual stairway that leads to heaven, ceases to be a man.*”

The caves considered sacred are usually spaces impregnated with shapes and objects that communicate religious meanings over time. “*Within the sacred precincts*” (Eliade 1992, 19) the profane is sacralized favoring an opening to the top that ensures communication with the world of the Gods (Eliade 1992).

According to Gibson (2008), in general, the sacred spaces are perceived as being housed in a temple or sanctuary. However, in the past, places of worship of gods, spirits and worshiped beings could be anywhere in the landscape. They could be in a tree, in a cave, in a mountain or even in a pile of stones. Thus, the “*sanctuaries are places of passage between heaven and earth.*” (Eliade 1996, 41).

The scientist or those who are not part of a particular social group, according to Eliade (1996, 26), may experience some discomfort facing the manifestations of the sacred because “*for many, it is difficult to accept that for some humans, the sacred can manifest itself in rocks or trees (...); it is the case of worshipping the stone as stone, but as a hierophany*”, or the manifestation of the sacred. Likewise, a cave is not worshiped as a cave, but as a place where supposedly the sacred was expressed or manifested. Eliade (1992; 1996) states that the sacred sites hold a single exceptional quality that is to be the sacred place of a private universe. Consequently, it is the scale that creates the phenomenon.

Berger (1994) recalls a sacred cave in eastern Nepal. A place of pilgrimage for Buddhists and Hindus, the cave is visited by Buddhist Sherpas<sup>83</sup>. To this group, the visit to the Cave of Maratika is made to “*win*” or “*accumulate merit*”, a common practice among Buddhism devotees. The holy site is located in the district of Khotang, 185 km southwest of Mount Everest. As in many other caves of the type, in Maratika, both Buddhists and Hindus attribute the sanctity of the cave to a manifestation of the divine.

For Hindus, the cave is a place of worshipping of *Mahadev* (one of the many names of Lord Shiva) which is perceived to be manifested in a stalagmite in the form of

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<sup>83</sup> Ethnically Tibetan group from northeast Nepal.



a *linga* (or phallus) located at the bottom of the cave. Regarding the Buddhists, they consider the cave as sacred because it has been used by Guru *Padmasambhava* in his way to Tibet to introduce Buddhism in the region (Berger 1994).

Once more, the written and oral traditions legitimize the socio-cultural practice of pilgrimage due to an endokarstic feature. By combining a journey to the powerful sacred place, leaving offerings and participating in the rituals, pilgrims hope to achieve all their individual goals.

Perera (1988) says that historical speleology and anthropology share certain theoretical and methodological aspects that focus on the perception and cultural use of caves, both for survival and sacred use. These sacred caves occur in a given historical moment where the sacred manifests itself. In other cases, Eliade (2002, 355) points out that in some cultures, “certain stones become sacred because the souls of the dead - the ancestors - are embodied in them or because they express or represent a sacred power, a deity or even as a solemn covenant or a religious event took place in its surroundings.”

In many mythological stories, the sacred mountain presents itself as a “*variant more or less renowned as the Greek Olympus. All the gods have their places reserved for the cult in heights*” (Eliade 2002, 91), so that the human condition can be transcended “*by the fact that entering in a sacred zone (temple, altar), by the consecration of the ritual, through death, is expressed constantly by a 'passage', a 'rise', an 'ascension'*”. (Eliade 2002, 92).

The chapel of *S. Michele dei Pagani* (Saint Michael of the Pagans) in Braulins, municipality of Trasaghis, Italy, illustrates this statement (Figure 49). To reach the chapel, the visitor needs to go up to the outcrop, where the sacred site was erected. Bergamini et al. (2004, 235) remember that, with the 1976 earthquake little remained from the cultural heritage of the region. However, the chapel, probably from the period of the Longobards<sup>84</sup>, was spared. Restored in the 13<sup>th</sup> century, it conserves frescoes from this period (Archangel Michael) and also from the 16<sup>th</sup> century (Holy Trinity).

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<sup>84</sup> The latin *Langobardi* - the Germanic peoples of northern Europe who occupied the valley of the Danube, invaded the Byzantine Italy in 568. They established the Kingdom of Italy until 774, when they were conquered by the Franks.

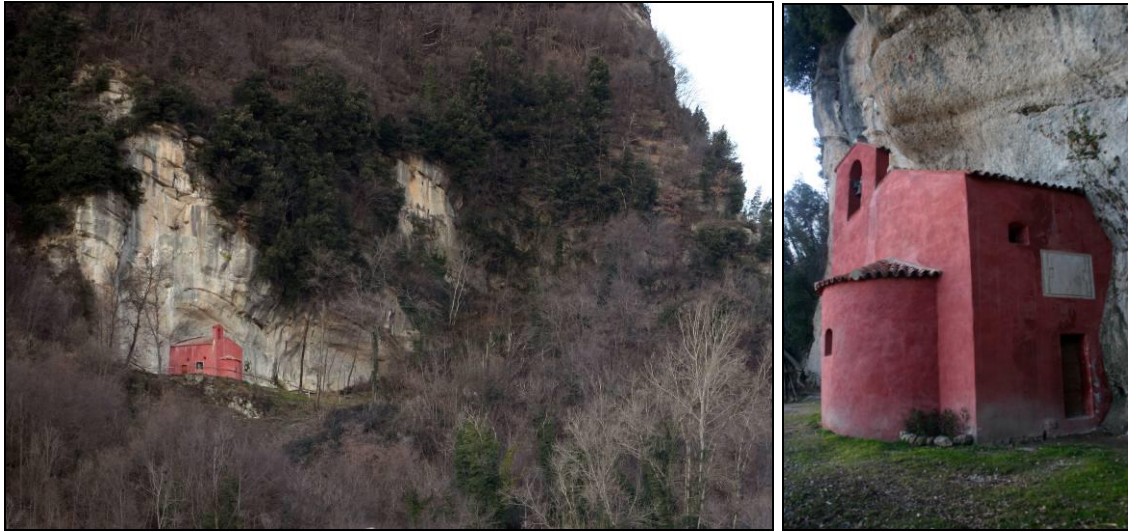


Figure 49 – View of the Chapel of S. Michele dei Pagani (Saint Michael of the Pagans) at Braulins, municipality of Trasaghis, region of Friuli, Italy (Photo: Luiz E.P.Travassos, 2008)

Myloie et al. (2006) state that Mount Alvernia on Cat Island (Bahamas) has 14 stations of the Calvary that take the tourist or pilgrim to a church on the hill. Anson (1957), Evans (1984) and Taylor (2000) cited by Myloie *et al.* (2006), says that the Anglican priest John Hawes, converted to the Catholicism, inhabited a cave on this mountain during the church's construction. He named it as the Grotto of St. Francis and erected an altar for the celebration of masses scheduled for the local population. A small cave, near the top of the path where the church is located, was chosen as his tomb (Figure 50).



Figure 50 – Drawing from the “Grand Cavern”, named as Grotto of St. Francis (Source: Taylor 2000 cited by Myloie et al 2006:16).

Still regarding shrines in rock-shelters or caves, Stoev and Stoychev (1992) compare two existing ones in Bulgaria, in which it was believed that primitive rituals took place. For them, the measure of time by primitive societies served not only for practical activities of everyday life but also to perform cults and lunar rituals.

Antonov (1997) highlights sacred caves in the Strandža Mountains in southeastern Bulgaria. The “Club of Scientific Expeditions” organized an expedition to start a detailed study of the caves of the region between 1975 and 1976. More than 60 caves and shafts were found and studied. Many of them contained interesting archaeological finds. Besides those of Strandža, more than 20 caves are known in Bulgaria with sufficient evidence to be considered sacred by local people. All of them have a spring, a small pond, water dripping from the ceiling or flowing from the walls, and all with alleged healing properties.

According to Stamenova and Zhalov (2008) Bulgarian lands can be considered a region of contact and cultural interaction for over a 1,000 years. For this reason, it has numerous and important archaeological sites, so caves are not an exception to this rule. Such sites have a huge amount of past cultural records and, ironically, they are precisely the places more frequently attacked by anthropogenic activities.

In Gibraltar, Gutierrez Lopez et al (2001) declare that when people ventured by the Mediterranean Sea and the communications between the extremes of the *Mare Nostrum* became constant, the navigators began a process of sacralization of the coastal islands, capes and promontories. The existence of such sacred places was transmitted by Greek and Roman authors from Classical Antiquity, and therefore the surroundings of Gibraltar are well known for the existence of temples and shrines dedicated to Hercules, son of Zeus. With the studies at the Gorham’s Cave, the authors claim that the site was a worship place of one or more deities, being an open sanctuary of “international” characteristics due to the presence of several artifacts found during excavations.

In *Peștera Rece* (or Cold Cave), in the *Bihor* mountains, Romania, Lascu et al. (1994) believe that the cave was used for a kind of primitive worship of the bear. While there may be criticism around the theory of an ancient ritual of worship, the authors point out other works dating from 1917 to 1977 where similar evidence of bear bone arrangements in other caves was recorded as some form of offering for hunting. Such bones organization has also been observed in several Romanian caves since 1672.

In addition to privileged positions in the terrain, the sacred sites in karst and caves also possess supposed powers of their waters. Eliade (2002, 55) states that the most important myth of the Islands of Trobriand<sup>85</sup> shows that a deity lost his virginity as a result of a few drops of water falling from a stalactite. The nymphs, which are common in the Hellenistic literature, are the “*deities who also live in caves where there is humidity*” (Eliade 2002, 166), being common the description of the existence of several “Caves of the Nymphs”.

Thus, Håland (2009) also identifies sacred pre-Christian and Christian rituals related to groundwater in Greece. If previously water sources represented Nymphs, today, these places are usually dedicated to Our Lady (*Panagia*) due to their supposed healing powers. The author also points out that the people of Athens and its surroundings areas go to the Grotto of Our Lady of the Cave on the first Friday after the Easter Sunday to have contact with the sacred.

The cave is located at the southern slope of the Acropolis and the source is located inside a cave where a church was built. Håland (2009) based her work on field visits during the contemporary religious rituals in order to compare them with the records of antiquity. Consequently, she made an interesting comparison with this modern cult that has not been well documented until the present.

The role of karst waters is also remembered by McNatt (1996), studying the Mayas of Belize and Burri (2007), when writing about the karst waters in the ancient world as a sacred item and also a resource.

McNatt (1996) states that, generally, the Maya believed that caves and some water bodies were the entrance to their underworld known as *Xibalba*. This world was inhabited by many deities representing death, disease, old age, sacrifice, etc. The souls of the dead had to go through 9 levels in *Xibalba*, to suffer many hardships of wisdom and courage. To them, the Sun itself used to complete such a journey every night, taking the form of the Jaguar God of the underground (underworld). For these people, the caves also had a very contrasting and positive aspect as sources of clouds, rain, thunder and lightning, being associated with life, fertility and rebirth. In the Mayan world caves were not mere natural features, but, living manifestations of spiritual powers.

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<sup>85</sup> Islands located along the east coast of New Guinea.

Associated with major cycles of both life and death, caves were places logically suitable for rituals and ceremonies.

Thompson (1959; 1975) cited by McNatt (1996, 85) listed several most important uses of caves by the Mayas. They were 1) sources of drinking water, 2) sources of virgin water for religious rituals, 3) places for religious rites, 4) places for burials and cremations, 5) art galleries and 6) places of refuge. Brady (2001) reminds us that most of the Mesoamerican centers of pilgrimage were caves where people worshiped the gods related to water and rain. Such sites where a large number of people converged were seen as sacred places and source a strong divine power.

As pointed out by McNatt (1996), many of these cavities were sources of “virgin water” (*Zuhuy Ha*) used in more traditional ceremonies that required “new / pure / virgin” offerings, including water with these supposed characteristics. Water from springs, cenotes and caves possessed these characteristics and should be collected in special vessels, the *Ollas*. Water courses that could be reached easily or were located near the entrance of a cave could provide “common” drinking water, while less accessible sources were more suitable for the collection of the “virgin water”. In some cases, vessels or containers were found intact and under active speleothems.

In Mexico, Tate (2006) notes that in *Chalcatzingo*, about 90 km to the southeast of Mexico City, researchers found a cave that played an important role as a religious Olmec center dedicated to the Goddess of Water.

Burri (2007) highlights the sacredness and importance of the underground water in ancient times. The first example cited by author is the offering of coins in the 4<sup>th</sup> and 5<sup>th</sup> centuries inside the Deer’s Cave (Grotta del Cervo) in the Abruzzo region, east of Rome. He also mentions the examples of cave-churches where the water that appears from the ceiling or walls are touched and collected by Christian (Figure 51).



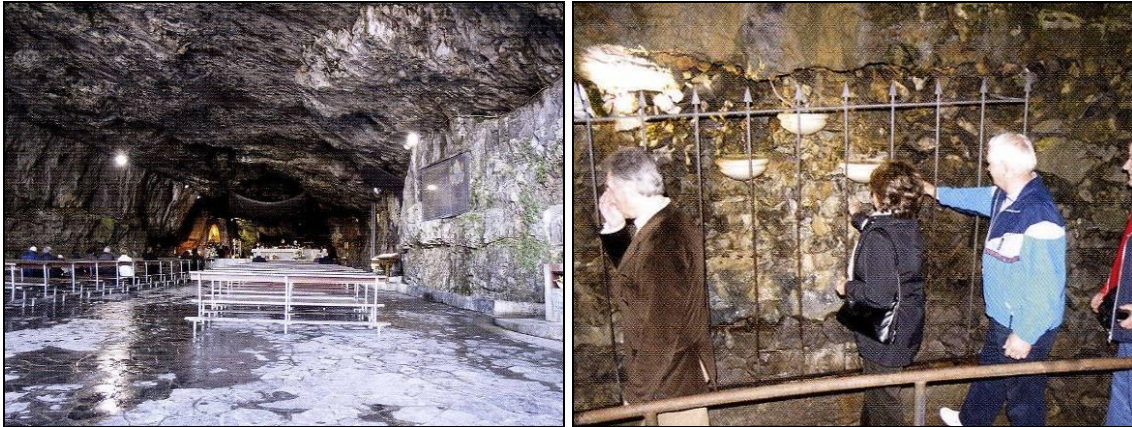


Figure 51 - Church of "Madonna Comabusa" in the Bergamasco pre-Alps, Piemonte region, province of Alessandria, Italy (Source: Burri 2007:29. Photo: Ugo Sauro).

Hayes (2005-2009) records that in Japan, near the Temple *Zeniarai Benten* (city of *Kamakura*), visitors perform a traditional ritual. According to it, if someone washes their coins and money in the water that comes out of a cave near the temple, this action supposedly helps in doubling or tripling the amount of money washed in the sacred water.

In the examples cited, it is observed that these caves or shrines are, for the believer, the “*center of the world*” (Eliade 2002, 302) where the traditions and beliefs are propagated over the centuries.

Here, it is worth remembering the work of Clendenon (2009) that deals with the concept of hydromythology. This term can be translated as the study of legends and myths that, historically, may explain the natural characteristics of water in a non-scientific matter. She also notes the scientists’ increasing demand for mythological stories that can provide important information about the history of natural disasters, for example.

## 2. KARST AND CAVES OF CULTURAL IMPORTANTE

*The reason of geography should be the development of the appreciation of the variety of cultures that make up the contemporary world and how each society develops and evolves in the environment*

*Johnston, 1985*

To get an initial idea of the importance of cultural studies in karst areas it is important to identify a project within the European Union, held in partnership with the Museum of Natural History and Archeology of Montebulla (Italy), the Karst Research Institute (Slovenia), the Notranjski Muzej (Slovenia), the University of Padova (Italy) and University of Nice Sophie Antipolis (France). The project received the name of Karstic Cultural Landscape: Architecture of a unique relationship people/territory.

In addition to describing three different European landscapes in Italy, Slovenia and France (*Montello*, *Udin boršt* and *Méailles*, respectively), the project aimed to involve, as much as possible, the institutions responsible for cultural development of these areas: museums, universities and schools. The result of this interaction was the publication of three volumes that address cultural, geological, geomorphological, pedological, use and occupancy of the ground, among others.

The importance of this project is supported by Johnston (1985), who states that the landscape is constantly modified by human actions. Thus, it considers that the physical environment, where human activities occur, is a product of a series of processes that is continuously changed by the societies. These “cultural landscapes” are produced primarily by language and religion.

In karst, the role of language is visible through the perpetuation of the legends and oral traditions and in the case of religion, the transformation of the caves or nearby areas to sacred sites. Although the origins of the specific reasons that make one group use a cave for sacred purposes are not always easy to identify, Johnston (1985) states that the universality of beliefs and activities related to religion suggests that this is a basic human need. These activities generate a set of moral rules and ethical issues that significantly influence various aspects of the human behavior.

The historical use of the karst and the stories and legends associated with it are described in the three volumes mentioned before. In *Montello*, Bortolli (2005) points out

that the region is the guardian of a long period of interactions between man and karst. Forests inhabited by Neanderthals from Paleolithic to the Mesolithic period and from the medieval period were identified. More recently, during the First World War, the region was the scene of a bloody battle in 1918.

In *Udin Boršt*, Kranjc (2005a) records legends and traditions of the region. It is believed that there was a human-headed dog (*Pesoglavec*), who used to track down people who, then fled and hid in the *Arneševa lunkja* cave. Another legend records the disappearance of a White Castle that supposedly had been “swallowed” by a cave. Kranjc (2005b) also points out that in the 19<sup>th</sup> century, bandits who frightened local residents used to hide in the surrounding caves. During the French occupation of the area residents took shelter in these places and during the Second World War, the *partisans* used them.

In the book dedicated to *Méailles*, Bigot (2005) records the cultural significance of rock paintings, of the fortified caves of *Pertuis* and the *Baume Murade*. Regarding the religious use, he says that many of the caverns are simple excavations in the rock massif. The most outstanding of these examples is the Cave of *Notredame*, which has been inhabited by a hermit in the 13<sup>th</sup> century and where a Templar would have erected a chapel between the 17<sup>th</sup> and 19<sup>th</sup> centuries.

Continuing to demonstrate the cultural importance of karst landscapes, the IUCN (*International Union for Conservation of Nature*), edited a major publication on the current situation and future proposals for the management of karst areas recorded in the list of World Cultural Heritage from UNESCO. According to the Committee of the World Heritage Site

karst systems (including caves) are relatively well represented on the World Heritage List. Worldwide there are a large number of protected karst landscapes with caves and at a detailed level every one of these can assert that it is in some way unique. Therefore in the interests of maintaining the credibility of the World Heritage List, IUCN considers that there is increasingly limited scope for recommending further karst nominations for inclusion on the World Heritage List. In particular, IUCN recommends that the World Heritage Committee should consider indicating clearly to States Parties that further karst nominations should only be promoted where:

- There is a very clear basis for identifying major and distinctive features of outstanding universal value that has been verified by a thorough global comparative analysis;



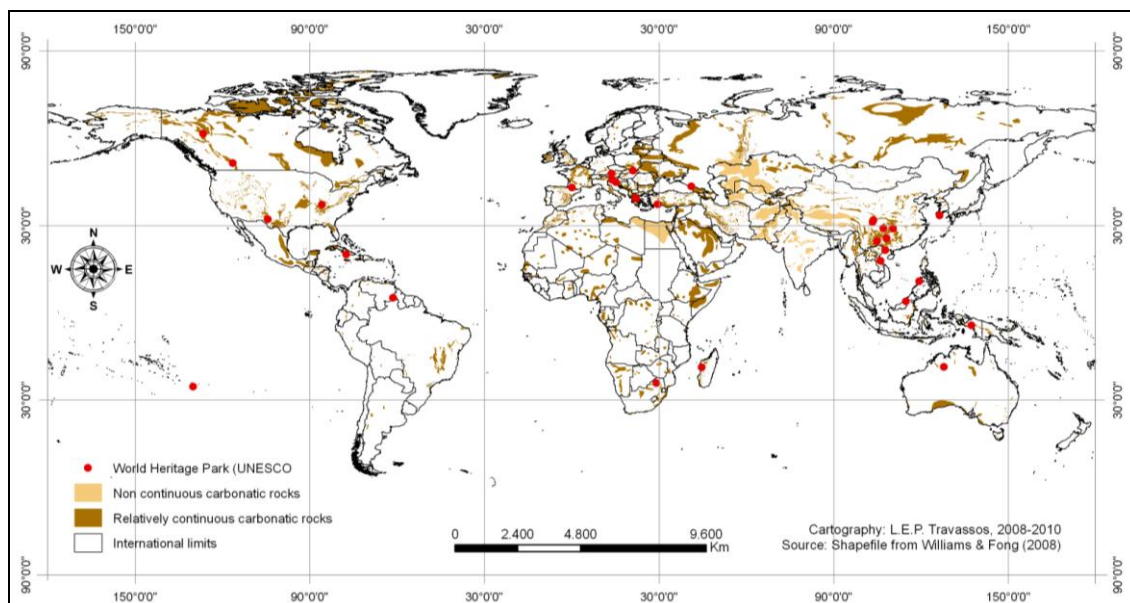
- The basis for claiming outstanding universal value is a significant and distinctive feature of demonstrable and widespread significance, and not one of many narrow and specialized features that are exhibited within karst terrains. IUCN recommends that States Parties considering karst nominations carry out an initial global comparative analysis prior to proceeding with the development of a full nomination, in order to minimize the possibilities of promoting a nomination that will not meet the requirements of the World Heritage Convention, including those concerning the conditions of integrity (Williams 2008:1).

Also according to Williams (2008), in order to assess the coverage of the karst in the World Heritage List, the site should be reviewed in the context of three basic components: 1) its climatic environment and type of karst, 2) the extent of its karst system and 3) the landscape geology and history.

Thus, taking into account such components, it is possible to make a survey to identify possible *places of geomorphological interest* (LIGeom) defined by Pereira (2006) and adapted for the Portuguese karst by Forte (2008).

Furthermore, it is important to emphasize that the karst landscape also presents unusual biological values due to the interaction of surface and underground environments. Williams (2008), while examining the landscapes included in the World Heritage List, notes that karst is sometimes included in the list due to other reasons. In such cases, it is necessary to consider whether it has regional, national or international significance. Although the present dissertation is considering the karst landscapes and caves under the terms of *geodiversity*, it is necessary to recognize that these regions are often the basis for extraordinary biodiversity above and below the surface.

Currently, the UNESCO registered about 45 World Cultural Heritage sites with important karst features or international significance. They can be identified in a map organized by Williams (2008) as shown on figure 51. However, the cultural value of karst landscapes is not identified in its totality as landscapes that have been elaborated by the actions of both man and nature. Only 7 of the sites identified by William (2008) present the cultural criteria “i” to “vi” proposed by the UNESCO guidelines. In the same document, the 6<sup>th</sup> Extraordinary Session of the Cultural Heritage Committee decided to unite the ten criteria and no longer separate them into cultural and natural.



Figures 52 - Location map of UNESCO World Cultural Heritage sites and karst areas.

Table 2 – Properties of the World Heritage Patrimony with karst features internationally significant. Criteria (i-vi) are cultural and (vii-x) are natural.

SELECTION CRITERIA	MEANING
(i)	<ul style="list-style-type: none"> <li>to represent a masterpiece of human creative genius.</li> </ul>
(ii)	<ul style="list-style-type: none"> <li>to exhibit an important interchange of human values, over a span of time or within a cultural area of the world, on developments in architecture or technology, monumental arts, town-planning or landscape design.</li> </ul>
(iii)	<ul style="list-style-type: none"> <li>to bear a unique or at least exceptional testimony to a cultural tradition or to a civilization which is living or which has disappeared.</li> </ul>
(iv)	<ul style="list-style-type: none"> <li>to be an outstanding example of a type of building, architectural or technological ensemble or landscape which illustrates (a) significant stage(s) in human history.</li> </ul>
(v)	<ul style="list-style-type: none"> <li>to be an outstanding example of a traditional human settlement, land-use, or sea-use which is representative of a culture (or cultures), or human interaction with the environment especially when it has become vulnerable under the impact of irreversible change.</li> </ul>
(vi)	<ul style="list-style-type: none"> <li>to be directly or tangibly associated with events or living traditions, with ideas, or with beliefs, with artistic and literary works of outstanding universal significance. (The Committee considers that this criterion should preferably be used in conjunction with other criteria).</li> </ul>

Source: UNESCO, 2008. Available at < <http://whc.unesco.org/en/criteria>>

## 2.1 Important World and Brazilian Examples

UNESCO considers that there are 878 sites included as part of the cultural and natural heritage. These sites have considerable universal values. In about 145 countries, 679 sites have cultural values, 174 have natural values and 25 sites have both values simultaneously. In November 2007, a total of 185 countries have ratified the Convention of World Cultural Heritage

Therefore, for the present dissertation, beyond the study of the 45 karst regions identified by Williams (2008), others sites of cultural significance listed by UNESCO were studied and some of them identified by Hayes (2005-2008) which brought together more than 1,100 sacred sites in 55 countries. Many of them are cave-temples or cave-churches. These sites do not necessarily have the three components proposed by Williams (2008), but stand out in the cultural tourism scenario due to strong connection with the imaginary which has previously noted in this work (e.g.; water considered to be holy, sacred caves, caves of mythology, etc.) .

One realizes the difficult task of trying to define the broad field of karst and caves cultural studies in a few pages. Therefore, this work presents some of the most significant Brazilian and international examples, according to the researcher's opinion. This judgment of value and importance was assigned when consulting the numerous references read. The researcher tried to identify at least two examples grouped by macro-geographical regions according to historical and scientific records as well as the proximity of the researcher with some of these places. The examples by regions are *North America and Canada, Mesoamerica, South America, Europe and Australasia*.

Due to the vast amount of research in Europe, one can see a greater number of examples from the "Old World". Just to illustrate this statement, it is noted that European karst and caves were identified by various travelers and even in the Encyclopedia of Diderot and d'Alembert (1751-1772): in this work, it is possible to identify the Holy Cave or *La Sainte Baume*, between *Aix, Marseille* and *Toulon* (France), the Lake of Cerknica in Slovenia, and several other caves.

Also, many are the examples of sacred caves in Central America and Brazil. In many of them and in nearby sites, one can see that many traces of pre-historic man were found, ranging from arrowheads and stone tools to ashes from bonfire. However, the ritualistic use of these environments is still little known. For this reason, the researcher sought to demonstrate how some of the archaeological findings already were pointing out to a kind of sacred use of the cave environment around the world.

### **2.1.1 North America and Canada**

According to Boyd and Boyd (1997), caves used as graves by prehistoric Native American are known throughout the southeastern U.S., especially in Virginia and

eastern Tennessee. According to the authors, more than 500 individuals were excavated in 10 counties from 38 caves and rock-shelters. Hubbard Jr. and Barber (1997) demonstrate the importance of caves to the Native Americans by claiming that these sites were used as portals to the unknown in ritualistic ceremonies and later as burial sites.

The sacredness of these sites is attested by archaeological findings and analysis of burial techniques inside caves, which varies greatly over time and space. In many vertical caves, the distribution of bone material usually suggests that the bodies were lowered from above a pit as part of a ritual (Hubbard & Barber Jr 1997).

Brick (2009) remembers the belief of the existence of the “*snake god of the cave of iron*”, one of the most spread native myths of the New World related to caves. To the South Dakota Native Americans, the myth is related to the underground origin of man.

As dwelling places, beyond the example mentioned before by Reclus (1876-1894p) one can highlight the example of the region of the Tonto National Monument in southeastern Arizona. There, shallow caves served as shelter for the natives for over 700 years (Figure 53).



Figure 53 – Ruins of native Americans houses at Tonto National Monument, Arizona, United States (Photo: Susan Schroeder, 1999)

Although not classified as a carbonate cave, it is relevant to remind the Kaneana Cave, one of the Hawaiian sacred sites. This and other caves are mentioned in the texts compilation made by Thrum (1907) where he affirms that the Hawaiian gods are well alive in regional legends. They are currently points for tourism and maintenance of the collective imaginary. Hayes (2005-2009) identifies this site as a sacred cave, where the oral tradition claims that the place gave rise to humanity from the womb of the Earth goddess. Its name *Kaneana* is derived from *Kane*, considered the god of creation of native Hawaiians.

Hayes (2005-2009) identifies a mountain in the U.S. state of Arizona, known by Native Americans as Superstition Mountain. The region, considered sacred by the natives, have sites with hieroglyphs and the Geronimo's Gold Cave, in which, according to legend, was the place where the precious metal hidden by the Spanish has disappeared.

In Canadian limestone, one can identify the petroglyphs of Peterborough, Ontario. Discovered in 1924 by the historian Charles King, it is believed to have been prepared by the Algonkian people between 900 and 1,400 AD. They are known by the early natives of Ontario as *Kinomagewapkong*, or "rocks that teach". From the nearly 900 images represented, about 300 include representations of shamans, solar symbols, animals and geometric shapes (Hayes 2005-2009).

At the Jasper National Park, Canada, the lake that disappears seasonally due to connection with a system of caves is called Medicine Lake by the natives. Like almost every sinkhole or ponor, its waters reappear downstream recharging a major regional river.

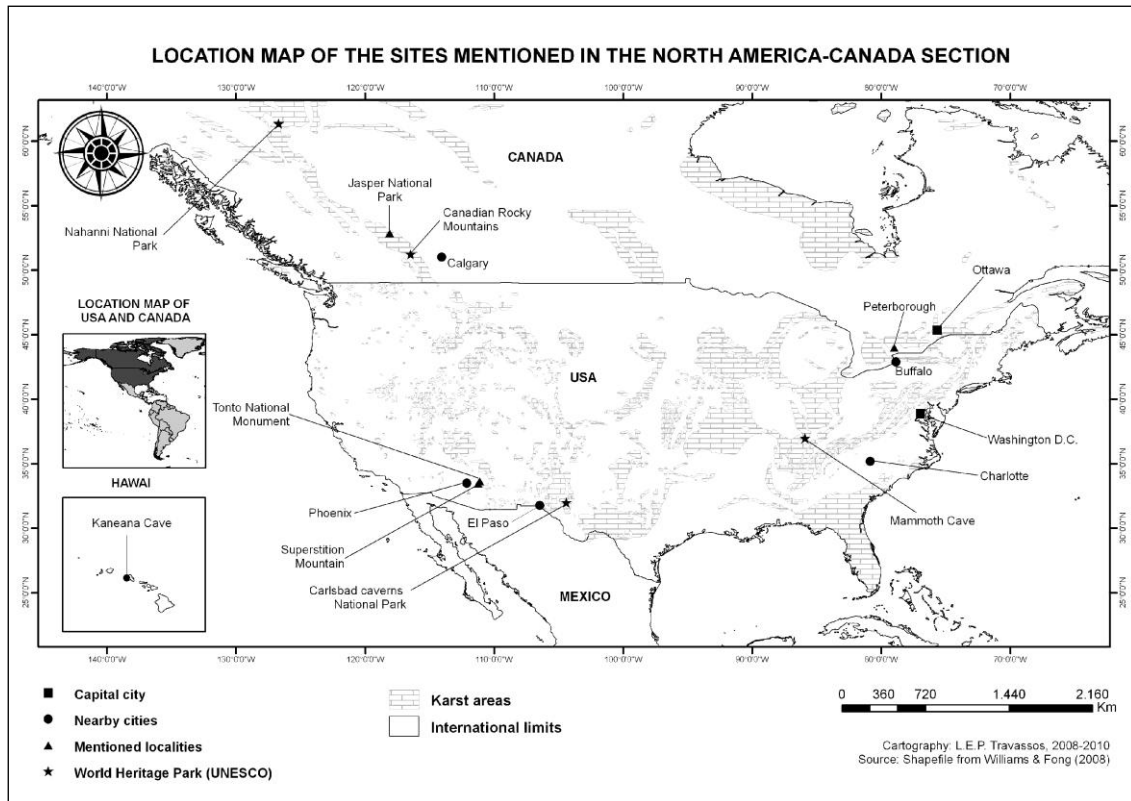


Figure 54 - Location map of the sites mentioned in this section.

### 2.1.2 Central America

Several caves of cultural use can be identified in this macro-region. Regarding the several Mayan sites registered by UNESCO, they are visible in several Central American countries (e.g.: Belize, Guatemala, Honduras, and Mexico) and its religious use should be emphasized. Brady (2001) reminds us that most of the Mesoamerican pilgrimage centers were caves where the natives used to worship the gods related to water and rain. Such sites, where a great number of people used to go, were seen as sacred places of an enormous divine power.

Stone and Brady (2005) point out that the Mayan cosmology states that the first humans would have emerged from a cave, the womb of the Earth, the symbol of world creation. Thus, the ritual use of these spaces was varied, but consisted mainly in ceremonial burials, modifications (removal and arrangement of speleothems), rock art and the construction of artificial caves.

At the *Talgua*<sup>86</sup> cave, in Honduras, Brady, Hasemann and Fogarty (1995) recorded ceremonial burials in its interior. The material was excavated and dated from about 3,000 years. According to the authors, the site is extremely important, because only a few caves of this kind were found in Honduras. Moreover, it was the first cave of this type to have been widely studied.

Under spatial terms it is interesting to note that the place of burials is located about 152 meters from the two entrances, in a central portion of the cave. If we analyse this spatial information from the perspective of the geography of religion, the site occupies the position of the “center of the world” for that particular social group.

Sandstones of Guatemala were carved by the Mayas in *Quirigua*<sup>87</sup> since the second century, but there is no record of the usage of specific caves. However, this UNESCO’s cultural site can be interpreted as a sacred place sacred to Mayans because due to the presence of monuments and carved monoliths.

For McNatt (1996), the Mayas artificially modified caves by building walls to separate rooms. Sealed chambers in the aphotic zone appear to increase the ceremonial connotation of the sacred place. Other structures such as terraces, walls, platforms and stairs in the euphotic zone of large entries may have been used for dwelling porpoises than strictly for ceremonial ones.

McNatt (1996) has identified about 23 caves in Belize that have traces of ceremonial burials of around 200 individuals. Such sites may even be classified as 1) main burial sites, 2) places of elite burials and 3) caves sacrifice practices. Of these, the author states that the identification of human sacrifices in caves is extremely difficult to demonstrate only based on the archaeological evidences. For Roberts (1990), mutilation after death can be observed including, apparently, beheadings, removal of hands and feet, and intentional drilling and crushing of skulls and long bones.

Pendengarst (1971) mentioned by McNatt (1996) notes that the difficulty of distinguishing between sacrifices and honorable/honorary burials is due to the lack of clear signs of violent death. Thus, because of these limitations, the confirmation of human sacrifice will depend on the discovery of knives or obsidian knives piercing the skull or the chest of an individual.

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<sup>86</sup> About 105 km northeast of the capital Tegucigalpa.

<sup>87</sup> About 175 km east of the capital Guatemala.

In many caves of Belize, where they found evidence of burials, McNatt (1996) states that the sites are easily accessible and the region where the individuals were excavated were located near the entrance with no evidence of possible sacrifices. However, at least two caves that had large rooms that are only accessible after difficult hikes have been identified in the country. This type of configuration refers to the idea of a possible site for sacrifices for ceremonial reasons and they are also convenient: the darkness, the isolation and environment acoustics of the caves would provide ideal conditions for a solemn ritual. It would also be much more logical to accompany a living person to sacrifice than drag a heavy body along a difficult and tortuous path.

In the ruins of Mesoamerican cities, the apparent lack of cave usage can deceive unaware researchers. Under many of these people pyramids, caves were used to store the bodies of their leaders. Hapka and Rouvinez (1997) point out that in 1971, scientists discovered a cave under the Pyramid of the Sun at *Teotihuacán*<sup>88</sup>, Mexico. This discovery opened a new perspective on the role of the underworld in Mesoamerica. Discoveries in other regions inhabited by the Mayas have confirmed the role of sacred caves associated with temples, like those discovered in Petexbatún<sup>89</sup>, Guatemala (Brady 1991).

The sacredness of these regions and Mesoamerican caves are also confirmed by Brady (1988; 1989; 1995; 1998) and Brady and Stone (1986) while studying the rituals of bloodletting in the cave of *Naj Tunich*<sup>90</sup> and other cavities where the researchers found obsidian blades generally used for bloodletting rituals.

The bloodletting rituals normally did not take place in public areas, but in hidden spaces or in caves. They were made by the elite “to bring the gods to the presence of man.” The practice would promote the views of the snake *Yaxchilan*. To Schele and Miller (1986), these events may result in excessive loss of blood that affects the brain and induces hallucinogenic experiences. Thus, the members of the elite would communicate with their ancestors and the supernatural, establishing his divine status in society. These rituals were performed during special events, both in celestial and annual cycles. Moreover, it is possible to relate these rituals with births, weddings,

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<sup>88</sup> About 40 km northeast of Mexico City.

<sup>89</sup> About 210 km to the north of the capital Guatemala, near to Dos Pilas.

<sup>90</sup> Region of Poptún, south of Peten, about 225 km from the capital Guatemala.



inaugurations of structures/buildings and most importantly, the accession to the throne by a member of the elite (Brady & Stone 1986).

Still according to Brady and Stone (1986), from all rituals recorded in Mesoamerican caves, the bloodletting seems to be the most important event, and is even recorded on the walls of some caves. In the *Naj Tunich* cave, the researchers found a piece of pottery that depicts a human figure with a liquid dripping from its hands, leading to the belief that it was a ritual of self-sacrifice. The bloodletting was defined by Brady and Stone (1986) as one of the most important ritual performed in the underground.

At Cerro Rabón<sup>91</sup>, Mexico, Hapka and Rouvinez (1997) claim that the underground constructions, adaptations and remains found in caves of this region are related to different uses: funerary practices (tombs), shrines, and the catchment of water for both domestic and ritual use.

Still regarding Mexico, *Chichén Itzá* emerges as the largest Mayan city of the Yucatan Peninsula. It is believed that its construction began in the 7<sup>th</sup> century and peaked after the arrival of the Toltecs in the 10<sup>th</sup> century. In the city there is the *Xtoloc Cenote*, considered sacred by the natives for providing drinking water (Figure 55).

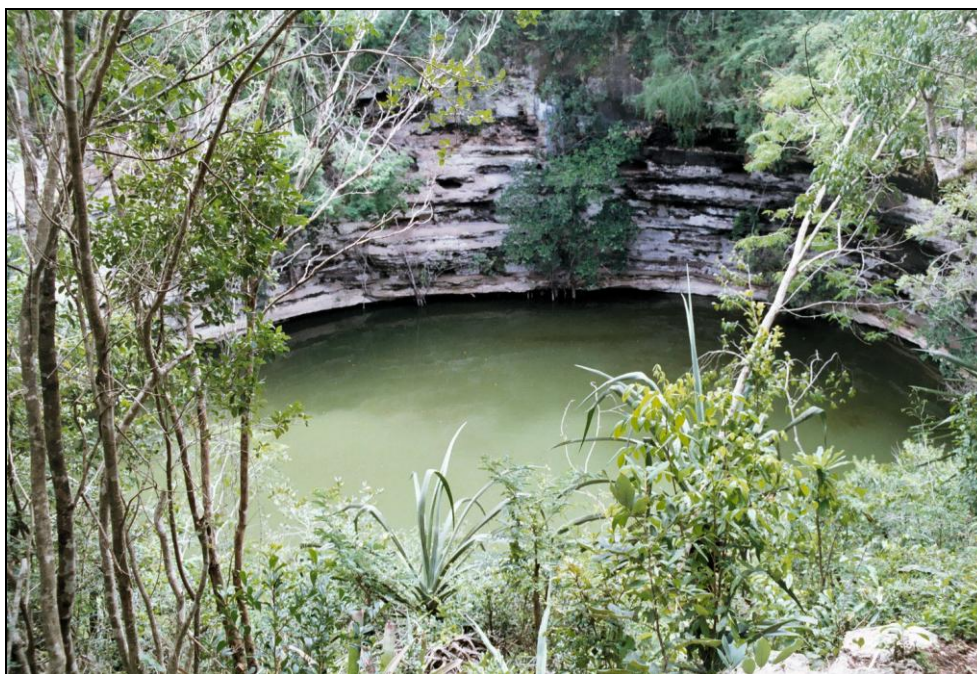


Figure 55 – The sacred cenote of Chichén Itzá, Mexico (Photo: Carlos Evia Cervantes, Universidad Autonoma de Mexico)

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<sup>91</sup> Monte à cerca de 300 km a sudeste da Cidade do México, localizado na Serra de Mazateca, na fronteira de Oaxaca, Puebla e Veracruz.

To the Mayas, caves were sacred and associated with the basic ideas of life and death, proving the existence of topophilic and topophobic feelings of the man regarding the underground. MacLeod and Puleston (1978) cited by McNatt (1996), theorized that the isolation and darkness of the cave environment was an ideal characteristics for spiritual insights and, perhaps, to the bloodletting rituals of self-sacrifice. The ritual offerings included artifacts such as pottery, bones, shells, incense and other perishable items. However, it is considered that the archaeological evidence does not always provide the answers about which specific rituals were performed in a site. Some caves were used in preference to a specific type of ritual and others were used for a variety of ceremonies, being multifunctional.

The well-developed karst plateau of Vaca, located in central-western Belize, has many karst features such as dolines, blind valleys, hums, cliffs and caves. The cave *Oh'Em P'ix* hosts a series of small rooms containing human remains, intact polychrome ceramics, ritual ceramics, artifacts, stone tools, shells and jewels of jade and turquoise. A kind of ceremonial path linked the various features of the cave, connecting the upper levels to lower one (Colas, Reeder & Webster 2000), a fact which confirms the sacredness of the place.

In some cases, the identification of altars and idols is also possible. In an unnamed cave near *Penque Viejo* (Belize), Gann (1925) noted that the top of a stalagmite in the main hall had been modified to represent a human head. In front of it was placed a block of a more or less cubic stone, which may have been used as an altar (McNatt 1996).

Even the extraction of clay in Mesoamerican caves can be interpreted as being part of religious rituals. MacLeod and Puleston (1978) cited by McNatt (1996), argue that places at the aphotic zone shows the evidence material extraction and would be part of a ritual. The darkness and difficulty of access could perhaps have been used for choosing the location for the manufacture of ceremonial ceramic which should be placed in tombs.

In Cuba, Menchaca (2009) notes the sacredness of some places for the solar cult of native Cubans. The author states that the island has about 200 stations with petroglyphs, mainly located in caves and rock shelters.

In the islands of Guadeloupe and Martinique (West Indies), Mouret (2009) identifies a series of natural caves used for this purpose. Many, besides serving as places

of worship, served as hiding places for native Caribbeans. In the cave of Santa Maria, it is believed that the Virgin Mary has appeared once. The author cites another version told by Josse et al. (2007) that record the fact that a priest took a statue of Our Lady to the cave. The legend says that the statue disappeared and reappeared on the site in 1953. Since then other artificial caves began to be built in its surroundings. In the northeast portion of Martinique, in Macouba, not far from the homonymous river, Mouret (2009) identifies the Holy Cave of Lourdes. Artificially constructed, attracts pilgrims every Good Friday.

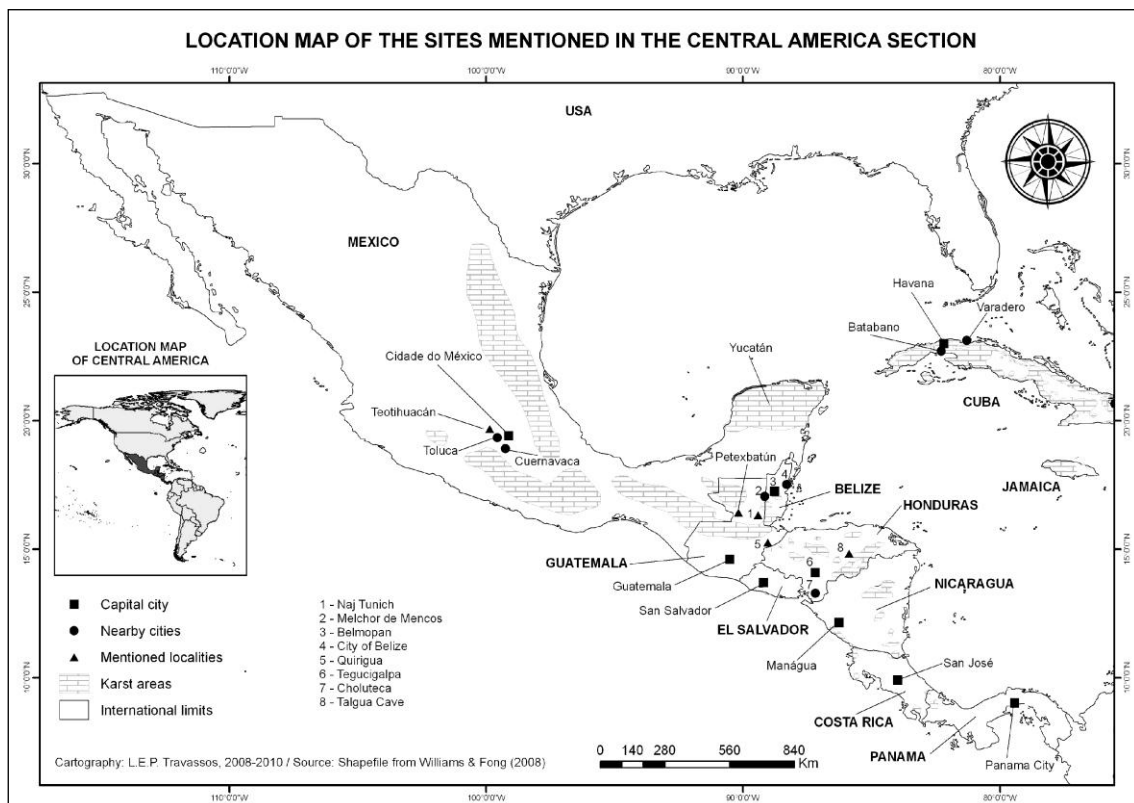


Figure 56 - Location map of sites mentioned in this section.

### 2.1.3 South America

Listed at UNESCO and identified by Hayes (2005-2009), there stands out the *Cueva de las Manos*<sup>92</sup> in Argentina. Inscribed in 1999, the site consists of an important gathering of rock art dated between 13,000 and 9,500 years ago. Its name comes from the hand paintings made on the walls of the cave. However, it also contains important examples of zoomorphs and hunting scenes. The sacredness of the place is shown by the

<sup>92</sup> Site located in the West portion of Santa Cruz province.

paintings which are related to hunting rituals as those shown in several European sites, for example.

In Brazilian territory it is possible to identify numerous caves of religious use. Only one site is listed under the World Heritage List of UNESCO and was also quoted by Hayes (2005-2009): the *Serra da Capivara*<sup>93</sup>. In 1991, the region, due to its cultural value was included in the World Heritage List. In the limits of the Serra da Capivara National Park it is possible to identify many records of human occupation, especially rock paintings (Figure 57).

Other examples, even if they were no identified by UNESCO or mentioned by Hayes (2005-2009) must be highlighted here. The primary example of a Brazilian underground church is the Cave of Bom Jesus da Lapa<sup>94</sup> in Bahia. Besides Steil (1996; 2003), other studies have addressed the relationship of pilgrimages to this particular cave.

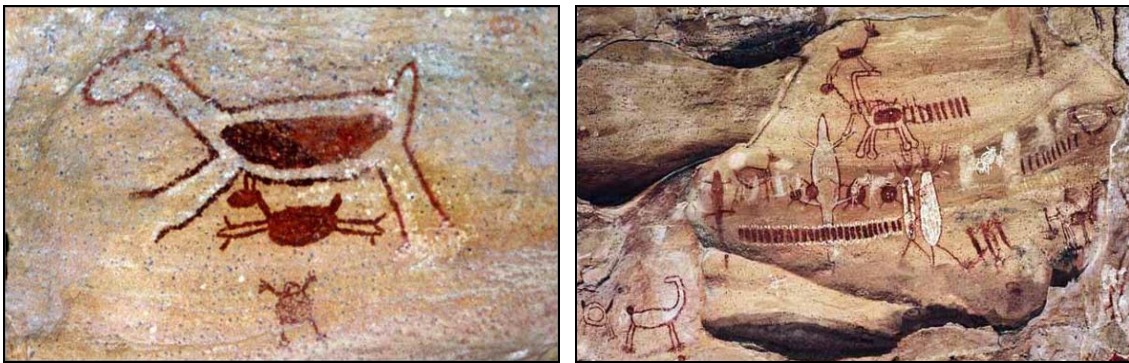


Figure 57 - Toca do Boqueirão da Pedra Furada. A) Painting chosen for the logo of the National Park. B) Examples of various polychromatic zoomorphs and anthropomorphs (Photos: Fundação Museu do Homem Americano).

More recently, Oliveira (2008) points out the importance of the limestone outcrop to the emergence of Bom Jesus da Lapa city. In 1691, amid cacti and other vegetation, Francisco de Mendonça Mar establish residence in a hidden cave inside the outcrop. Like European hermits, he decided to isolate himself in the region. Latter he was unexpectedly discovered by hunters. Since then the news spread, and the local population was curious to know this strange man who was “*living a life of saint.*” According to Segura (1937), the chapel was erected in 1680 and since then has attracted thousands of believers and also tourists.

<sup>93</sup> Site located in the southeast portion of Piauí State, about 370 km from the capital Teresina.

<sup>94</sup> Site located around 535 km west of Salvador.

As happened with many other international examples, the sacralization of karst topography and caves led to the settlement which later became a city. The three existing pilgrimages that take place at Bom Jesus da Lapa (the *Romaria da Terra*, the *Romaria do Senhor Bom Jesus* and the *Romaria de Nossa Senhora da Soledade*) are responsible for the source of revenue of many residents and drive the regional economy. Oliveira (2008) states that many live specially by renting rooms in their own houses. They also live on the selling of souvenirs.

These behaviors, common to various places of pilgrimage or religious festivals recalls, especially in Latin American context, the work of Brady (2009) on the multiple role of the Mayan pilgrimage centers. The author identifies the pilgrimage as a part of an intricate economic and cultural system that still survives nowadays in Central America. Its structure often refers to the structures found at pilgrimage places in Brazil, for example.

In Bahia, Barbosa and Travassos (2008) identify the caves of Bom Jesus da Lapa, the Cave of Patamuté (also known by the pilgrims as the Sacred Heart of Jesus from Patamuté), the Brejões Cave and the Guta Milagrosa (Figure 58). In these spaces, it is clear to identify the manifestations of a popular tradition that perceives these cavities not only as the entry for an underground world, but also a place for encountering the Creator.

In Goiás, Matteucci and Nascimento (2001) described the pilgrimage to Bom Jesus da Lapa at the Terra Ronca State Park<sup>95</sup>, in São Domingo. The authors state that no one knows for sure when the pilgrimages to the cave began, however, research information along to the records of the Parish of São Domingos already reported the existence of systematic pilgrimages. The altar found the interior of the cave was built in 1953 when the pilgrimage was growing importance.

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<sup>95</sup> Site located at 485 km from Goiânia.



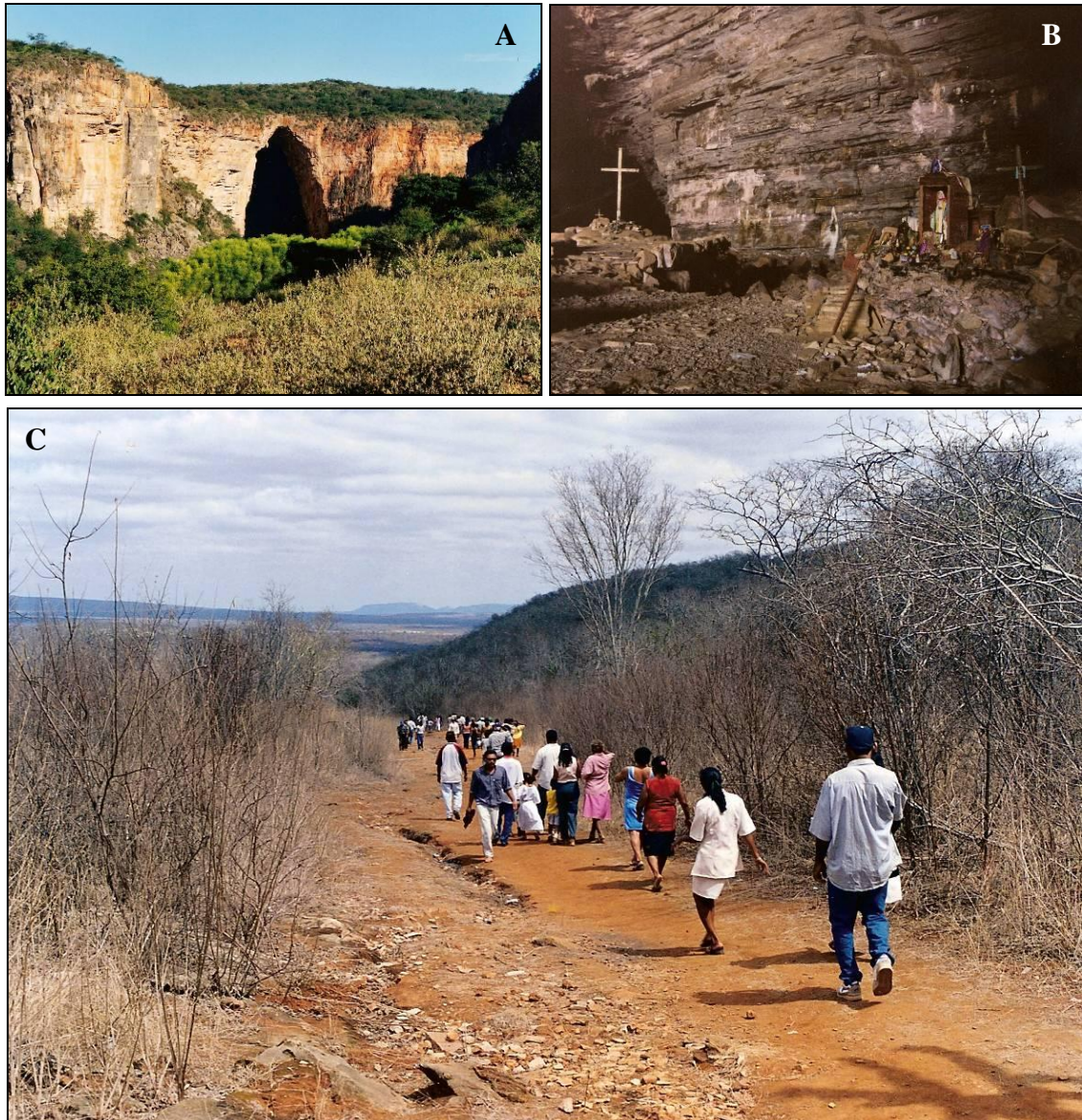


Figure 58 – A) The entrance of the Lapa dos Brejões. B) The cross and votive altar inside the Lapa dos Brejões. C) Pathway of the pilgrims to the Patamuté Cave at Curaçá-BA (Source: Barbosa e Travassos, 2009).

For Matteucci and Nascimento (2001), the creation of the State Park can be considered one of the reasons for the decrease in the number of pilgrims to the sacred site. With the development of the management plan of the park, many prohibitions were established and, perhaps, by fear and lack of understanding of the regulation, many pilgrims started to say that the pilgrimages were totally prohibited.

In a study focused on the state of Minas Gerais, Sarmiento and Travassos (2009) remind us of some religious use of caves in the northern portion of the state. These are the Lapa do Santo Antônio (Figure 59), Lapa do Espírito Santo, Gruta da Lapinha and the Lapa do Padre Cicero (Figure 60).



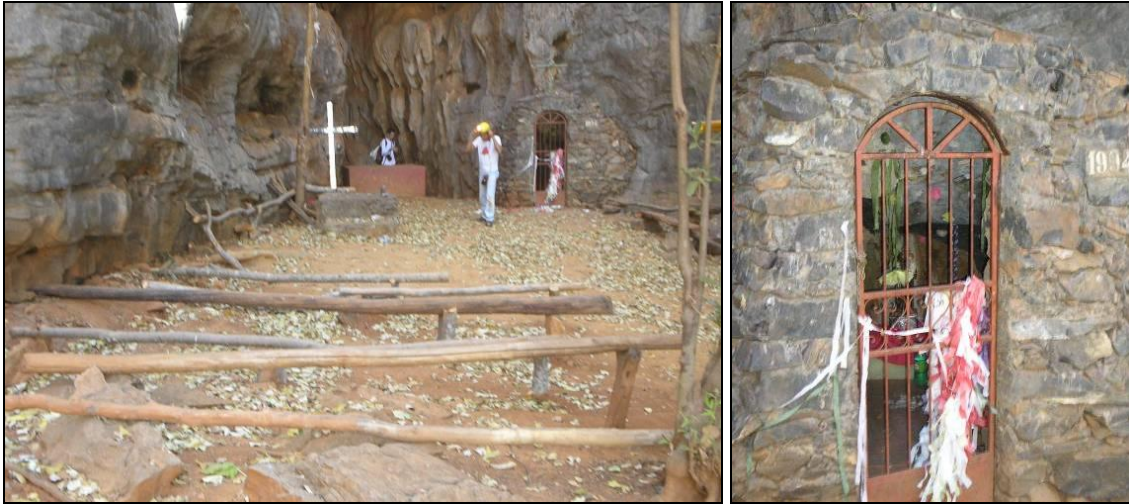


Figure 59 - Details of the main altar in the Lapa de Santo Antonio. It is possible to identify seats, altar, cross and oratory where is kept the image of St. Anthony (Photo: Ronaldo Lucretius Sarmento, 2008).



Figure 60 - Detail picture of Priest Cicero inside the Lapa do Padre Cicero (Photo: Eduardo Gomes de Assis, 2007).

It is believed that the strong presence of Catholicism in Brazil, especially in areas of harsh living conditions where the karst terrain presents itself as an magnificent scenario and at the same time feared, the most underprivileged people ultimately make use of such areas to express their faith.

In the rural area of Unai<sup>96</sup>, Minas Gerais, Magalhães (2009) records the annual event of the “festa da lapa”, dedicated to Our Lady of the Cave from Sapezal. Also in Minas Gerais, Sarmiento and Travassos (2009) point out that in the region of Montalvânia, there are several caves and rock shelters with pictographs. Oral information states that there are also caves and rock shelters with rock paintings which are also recorded to have registers of past or present religious use. Thus, it is important to note that there are several other caves of religious use in the north of Minas Gerais, however, many of the records could not be proven personally.

In July 2009, at the 30<sup>th</sup> Brazilian Congress of Speleology, Travassos and Varela (2009) recorded what is, perhaps, the only example of institutional Catholic use of a sea cave in Brazil. Located in Saquarema (about 75 km east of Rio de Janeiro), the cave (a small rock shelter) is developed in a region with crystalline rocks and appears to be the only occurrence of this type of use in the state of Rio Janeiro (Figure 61). Another similar occurrence may be the Grotto of Our Lady of Lourdes (ES-01) on the island of Trinidad (state of Espírito Santo), although its “sacralization” was performed for different reasons.

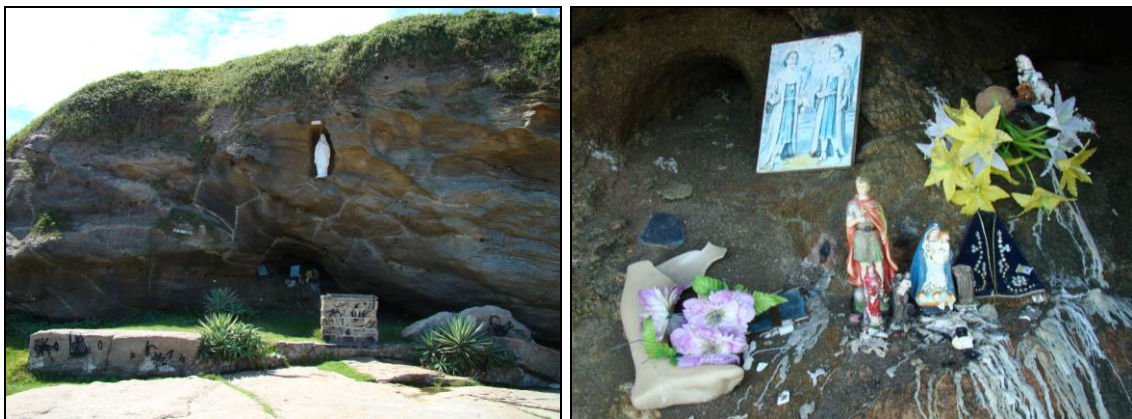


Figure 61 - A) View of the small grotto of Our Lady of Lourdes. Above the small altar one can see the image of Our Lady. Lourdes. However, the image of St. Bernadette is not in place, probably victim of vandals. B) Detail of images left by pilgrims at the Grotto of Our Lady. Of Lourdes in Saquarema, RJ. A variety of images left at the place assure the feeling of affinity by pilgrims that perceive this space as a sacred place (Photo: Luiz E.P. Travassos, 2009).

<sup>96</sup> Municipality located at 125 km southeast of Brasília and about 500 km northwest of Belo Horizonte.



More recently, Travassos *et al.* (2008) and Guimarães, Travassos and Varela (2009) have emphasized the importance of the cultural use of caves from rituals of African origin. The authors call attention to such records as a less common or less well documented form of religious use, mainly because of prejudice that exists in relation to that religion (Figure 62 and 63).

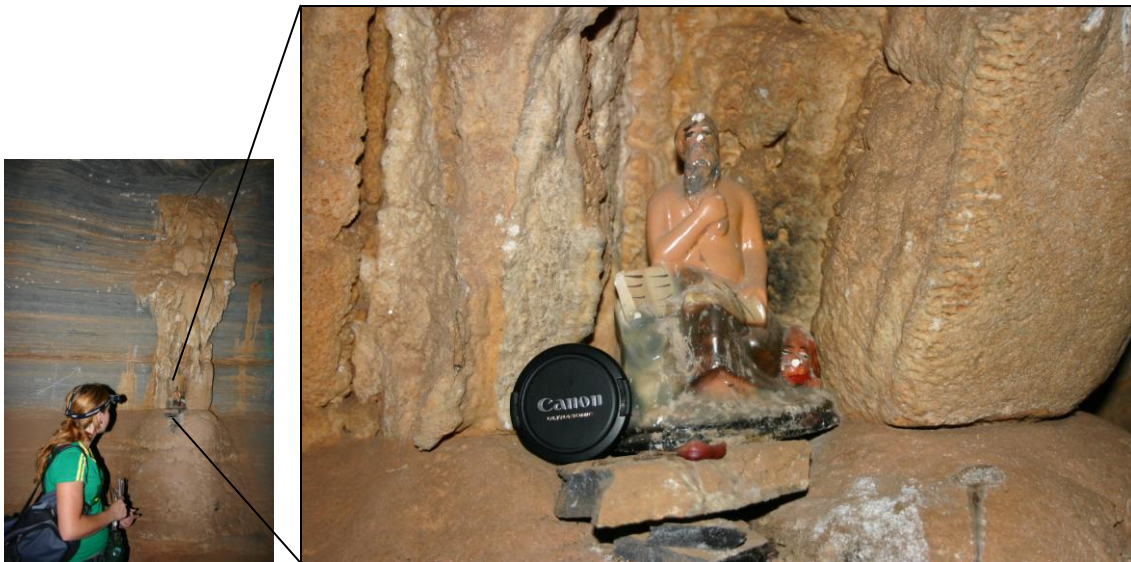


Figure 62 – Altar of Xangô, the 'Orixá' of lightning, thunders and fire (Photo: Luiz E.P. Travassos, 2007).

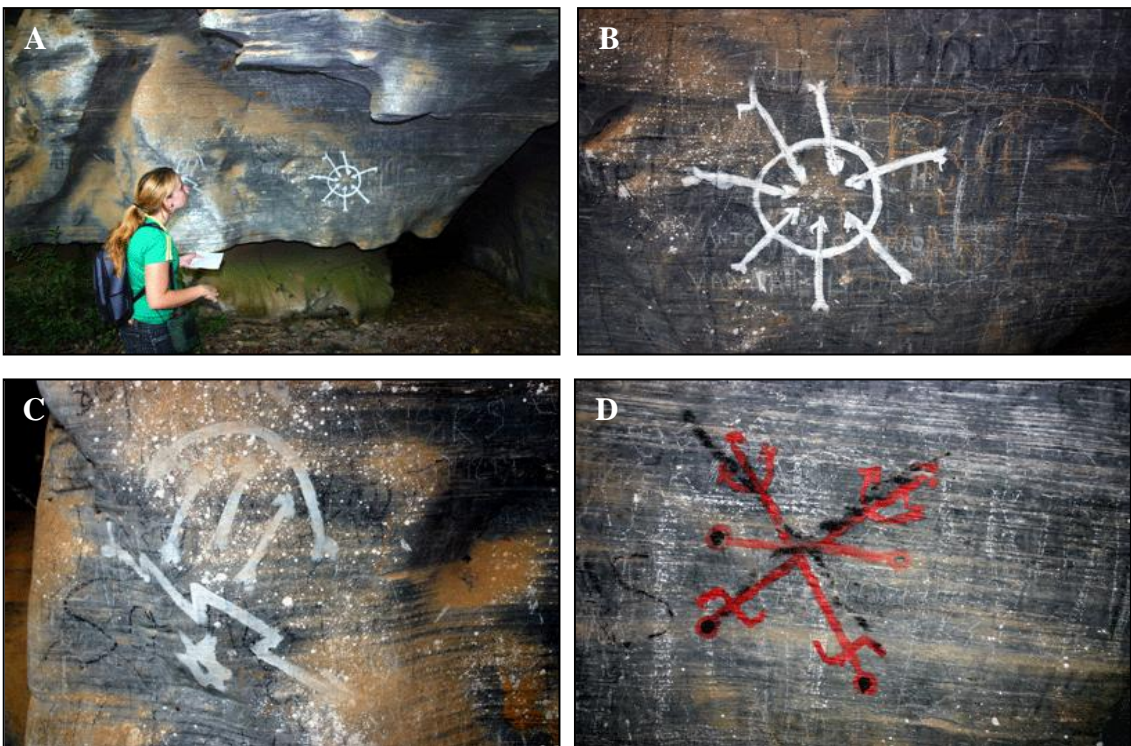


Figure 63 – 'Pontos riscados' outside of the Gruta do Feitiço (Cave of Spell). In A and B the Seven Spears of the 'Caboclo'; in C the drawing of 'Iansã' or Santa Barbara. The image of the 'Pombagira' is represented in D (Photo: EP Luiz Travassos, 2007).

Still recalling the African roots of the country, one can identify the Gruta dos Crioulos at Jaguaribe (SP). The oral tradition of the region says that the site was used by runaway slaves in the past. Inside the cave it is possible to identify an altar, a cross, a statue of Our Lady, candles and various offerings. On special occasions religious ceremonies are held inside it.

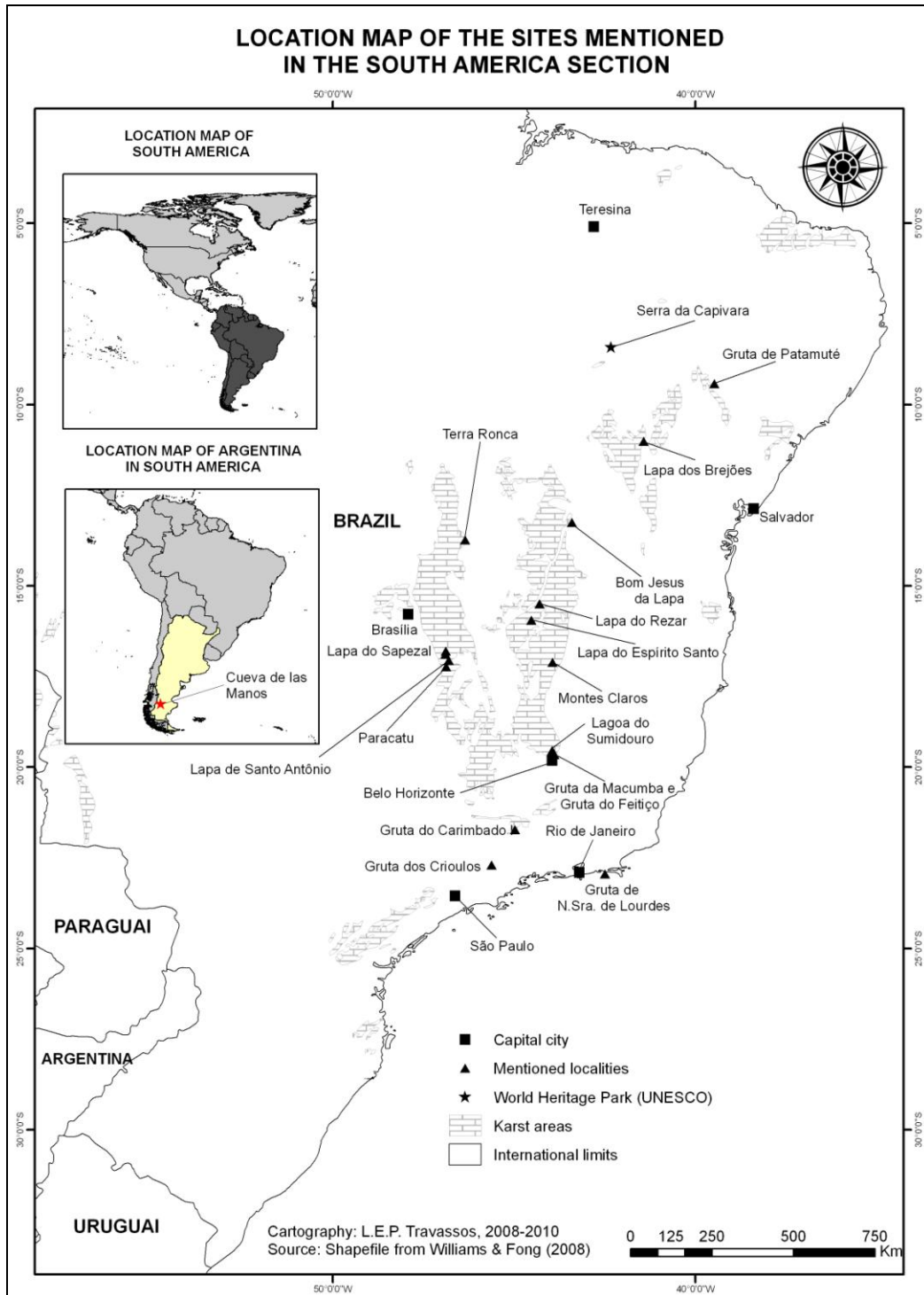


Figure 64 - Location map of sites mentioned in this section.

## 2.1.4 Europe

### 2.1.4.1 Portugal

In this country, Hayes (2005-2009) recalls the mountains of the Côa Valley, northeast of Tomar<sup>97</sup>, Portugal and west of Salamanca, Spain. The rock art in the Côa dates from the Paleolithic (40.000-10.000 B.P.) and consist mostly of zoomorphs. The site was listed as a World Heritage Site in 1998.

In the mountains of Alvaiázere<sup>98</sup> Forte (2007, 158) argues that religion is also an subject present in the Serra de Alvaiázere. The Chapel of Nossa Senhora dos Covões is an important religious landmark for the whole region. Duarte (2007, 137) states that, as in other chapels of the country, the limestone of the Chapel became the adornment that refers to a “*symbolic universe in which myth, religion and art come together in the intricate human experience with nature.*”

Aubry et al (2007) argue that in a cave<sup>99</sup> developed on Jurassic carbonates that was discovered in 1933, organized bones were identified inside appearing to be a single individual sepulchral deposit. For the authors, at that period the researchers didn't consider necessary to remove the skeleton because the cave was relatively of difficult access. However, in 2005, it was found that the skeleton had been vandalized.

Another important work on the Portuguese sacred places was written by Forte et al (2008). In the article, the authors identify a series of cave-churches, including the existing one in the village of Lapa in Sernancelhe<sup>100</sup> (Figure 65).

On this site is located the most well known religious cave in Portugal: the Grotto of Our Lady of Lapa. “*According to the older residents, in this place the cult of Our Lady of Lapa started (...). In 2008 the town celebrated the 510 years since the beginning of the worship of the image of Nossa Senhora da Lapa*” (Forte et al., 2008, 174).

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<sup>97</sup> About 120 km northeast of Lisbon.

<sup>98</sup> Located at 140 km northeast of Lisbon.

<sup>99</sup> Gruta Brutiais, located at the Sicó Massif, 145 km northeast of Lisbon.

<sup>100</sup> Site located at 280 km northeast of Lisbon.





Figure 65 - Internal view of the Church of Lapa, Portugal. It may be noted that the church was built embedded in the granite rock, keeping the original cult in the cave where the image of our lady was found (Photo: Gustavo Medeiros quoted by Forte et al 2008, 174)

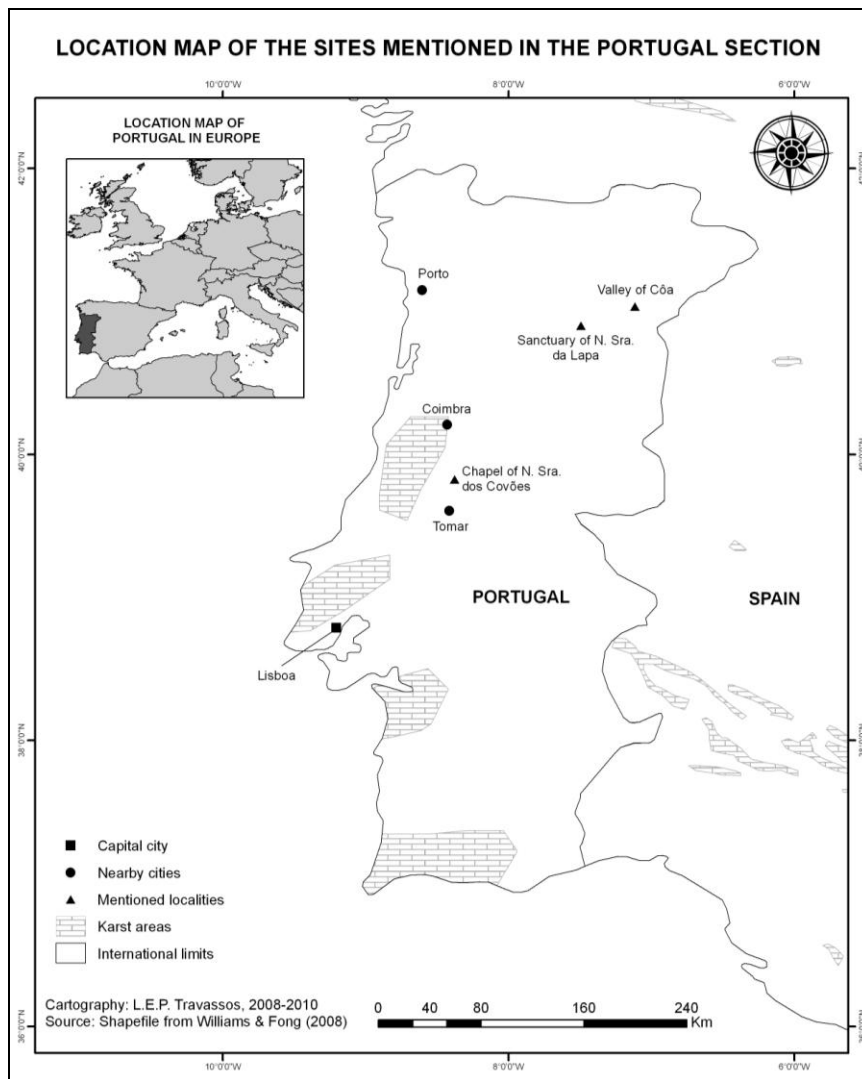


Figure 66 - Location map of sites mentioned in this section.

### 2.1.4.2 Spain

As important as the Cave of Lascaux in France, the Altamira Cave in northern Spain is a good example of Paleolithic rock art. Inscribed in the UNESCO World Heritage List in 1985, the site presents 17 caves with records of human occupation from 35,000 to 11,000 B.P. Their deep galleries promote the conservation of the paintings for being less exposed to abrupt climate changes (Figure 67).



Figure 67 - Images of the paintings in Altamira Cave, Spain (Photo: Museo de Altamira, 2009).

Hayes (2005-2009) identifies the Basilica of Our Lady of Montserrat<sup>101</sup>, not far from Barcelona, as a popular Spanish pilgrimage site (Figure 68). According to the tradition, the statue of the Black Virgin Mary of Montserrat was carved by Saint Lucas about the year 50 AD and brought to Spain. It was hidden from the Moors in a cave (the Santa Cova) where it was rediscovered in the year 880.



Figure 68 – A) General overview of the Region of Montserrat (Photo: Elizabeth Gomm cited in *Sacred Destinations*, 2005-2009). B) View of the Sanctuary over the Santa Cova (Photo: epteamadv cited in *Sacred Destinations*, 2005-2009).

<sup>101</sup> Site located at about 40 km northeast of Barcelona.

As noted in other stories related to the appearances of religious figures inside caves, the regional tradition remembers that the image was discovered by a shepherd who saw a bright light that led them to the grotto. By entering the underground they could salvage the image of the Saint.

Recalling Reclus (1876-1894a, 459) who talks about the Caves of Covadonga<sup>102</sup>, it is necessary to say that this site, has not been listed by UNESCO or identified by Hayes (2005-2009). Located in the Asturias, the site is considered an important sanctuary where, according to the oral tradition, the early cult of Our Lady is related to the reclusion of a hermit who started the cult of Our Lady of the cave at the site.

Information from the Sanctuary of Covadonga records the regional legend where Don Pelayo, the first monarch of the kingdom of the Asturias, together with other Christians, arrived at a cave in the mountains of Covadonga while pursuing a criminal. When entering the cave, instead of finding the criminal they came across with a hermit who asked for mercy and said that he was in that place under the protection of Our Lady. Pelayo agreed and forgave him. Then, during the conquest of the Moors in the region in 711, the many caves of the region served as refuges of Don Pelayo during the “Battle of Covadonga”, the first major Christian military victory in Iberia. It is claimed that Pelayo had said that the hope of victory would be in Christ and that from those mountains would begin the salvation of Spain.

Since then, King Alfonso I and his wife Dona Hermesinda, built a church that would later originate the monastery. After about 200 years of silence about the region, during a period in which little is written about Covadonga, King Philip II sent Ambrosio Morales to the Sanctuary to write a report about its current conditions. Morales came to the region in 1572 and described the condition of the Santa Cova chapel and his work entitled “*Holy Journey*”:

They say that this church was built as it is by King Alfonso the Chaste (Alfonso I), and has miraculously lasted since then without the wood rotting. God can do more than this; I see more manifest signs in new works, and not from the time of that king. A well-made image of Our Lady is on the main altar. Great devotion is given in this land through this image, and celebrations are made, and there is a great event on the day of Our Lady in September, due to which it is given the name "Monastery of St. Mary of Covadonga." There is always a large, silver cross on the altar. (SANTUÁRIO DE COVADONGA 2009).

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<sup>102</sup> Site located in the northwest of Spain at round 65 km East of Oviedo.



According to the Sanctuary of Covadonga, thereafter, the region has experienced new construction, fires, renovations and construction of the monumental temple in July 30, 1877 which can be visited today. The highlight of the recent history of the Santa Cova was the visit of Pope John Paul II in 1989 (Figure 69).



Figure 69 - Details of the Santa Cova in Covadonga. From left to right, the overview of the Santa Cova and the visit of Pope John Paul II in the region in 1989 (Photos: Santuario de Covadonga 2009).

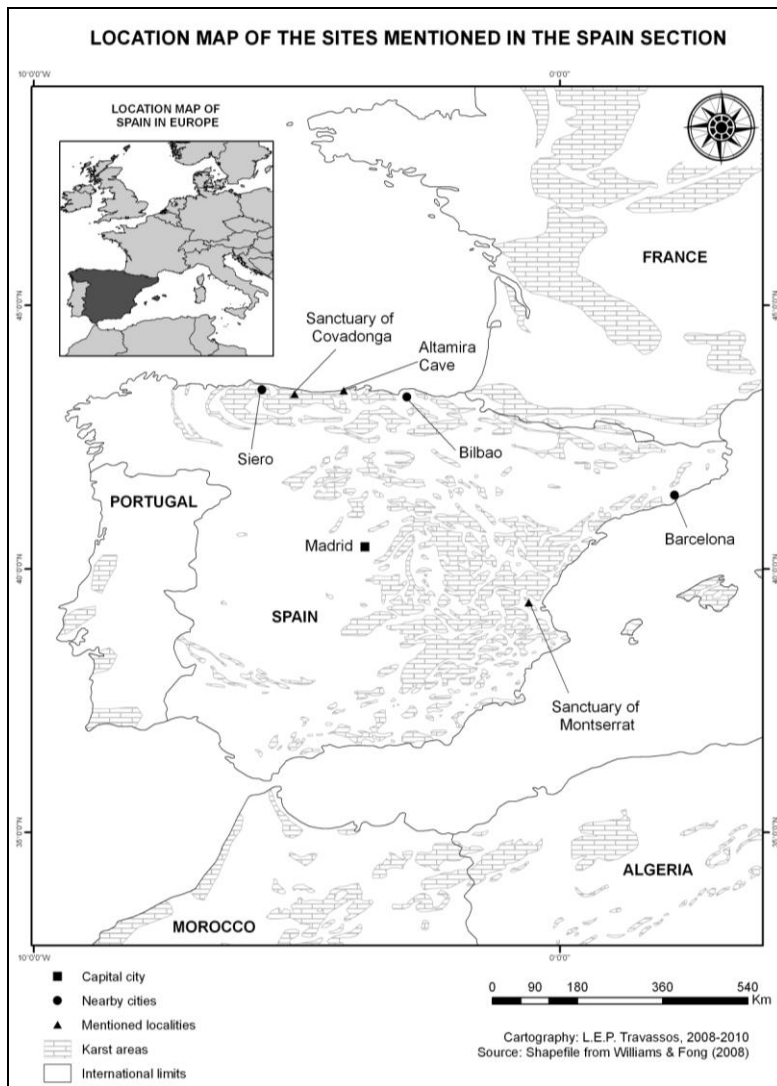


Figure 70 - Location map of sites mentioned in this section.



### 2.1.4.3 France

It is possible to affirm that there are many examples of holy places associated with the French carbonate rocks. In relation to the sacredness of the cave spaces, Gowlett (2007) recalls a ritual cemetery considered to be the oldest ever discovered in *La Ferrassie*, Dordogne region. When discovered, the cave had skeletons of about 100,000 years. They were carefully arranged with the same orientation from east to west. The care regarding the layout of the bones suggests the execution of a ceremony.

The western portion of the Central Massif and the north side of the Pyrenees are known for the exceptional concentration of Paleolithic caves, which record the presence of about 130 prehistoric sanctuaries. Thus, especially for its cultural importance, the valley of Vézère was registered by UNESCO in 1979. A total of 147 sites and 25 Paleolithic caves with cave paintings are known.

Regarding scientific, cultural and touristic importance, one can identify the Cave of Lascaux. Located on the left bank of the Vézère River, between Moustier and Bugue, the cave possesses perhaps the most extraordinary examples of Paleolithic cave art dated from 15,000 years. There are approximately 100 zoomorphic paintings rich in details and colors.

The cave was discovered in 1940 and visitation was allowed until 1964. Currently, due to the extreme fragility of the cave environment and importance of its paintings, the tours are conducted in a replica built for that purpose in 1983 (Figure 71).

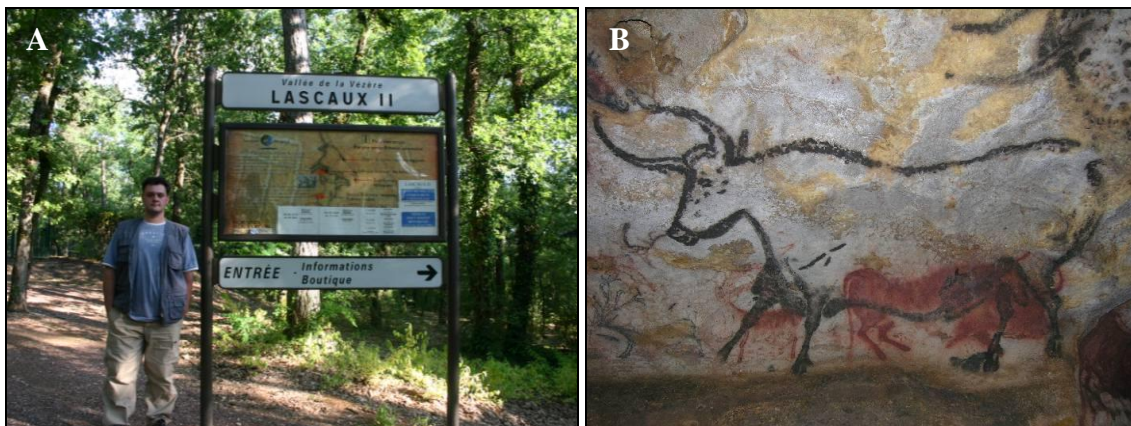


Figure 71 – A) The entrance to the Cave of Lascaux II, at 200 m from the original Cave of Lascaux (Photo: Luiz E.P.Travassos, 2009). B) Detail of the rock images of Lascaux (Photo: UNESCO / F. Bandarin, 2006).

In France, one can also mention the Grotto of Gargas (also known as the “Sanctuary of Hands”) and the Cave of Pech Merle. The first (Figure 72), located south of Aventignan (about 45 miles east of Lourdes), was identified for the first time in 1575 by a French cosmographer named François of Belleforest. In the mid-nineteenth century the city of Aventignan made available a guide for regular visits to the cave because the region has famous hot springs baths and, thus, was well visited. However, only in 1906 after 30 years of research, that Felix Régnault discovered by chance the hands painted in red on a stalagmite in the center of the cave, suggesting some kind of ritual or ritualistic significance (Rumeau 2002).



*Figure 72 – entrance of the Grotto of Gargas. It is possible to identify the structure built in order to protect and orientate the tourism (Photo: Luiz E.P. Travassos, 2009).*

Regarding the Pech Merle Cave, one can locate it about 100 km north of Toulouse in Cabrerets-Lot. It is considered by many as one of the most important legacy of rock art of prehistoric together with Lascaux and Niaux, for example. The visit is guided and lasts approximately 1 hour. It is organized in groups of no more than 25 people and about 700 visitors per day. Near the cave entrance there is a museum that brings together an important collection of paleontological and archaeological region (Figura 73 e 74).





Figure 73 – A-B) General aspects of the anthropogenic interaction with the karst of Cabrerets-Lot. C) Information sign regarding the Management plan of the cave. D) General aspects of the Pech Merle Museum. E) Archaeological vestiges in exhibition at the Museum. F) Photographic reproduction of one of the paintings of Pech Merle. G) Structure that protects the access to the Cave. H) Detail of the stairs that leads the tourist to the cave interior (Photo: Luiz E.P. Travassos 2009).



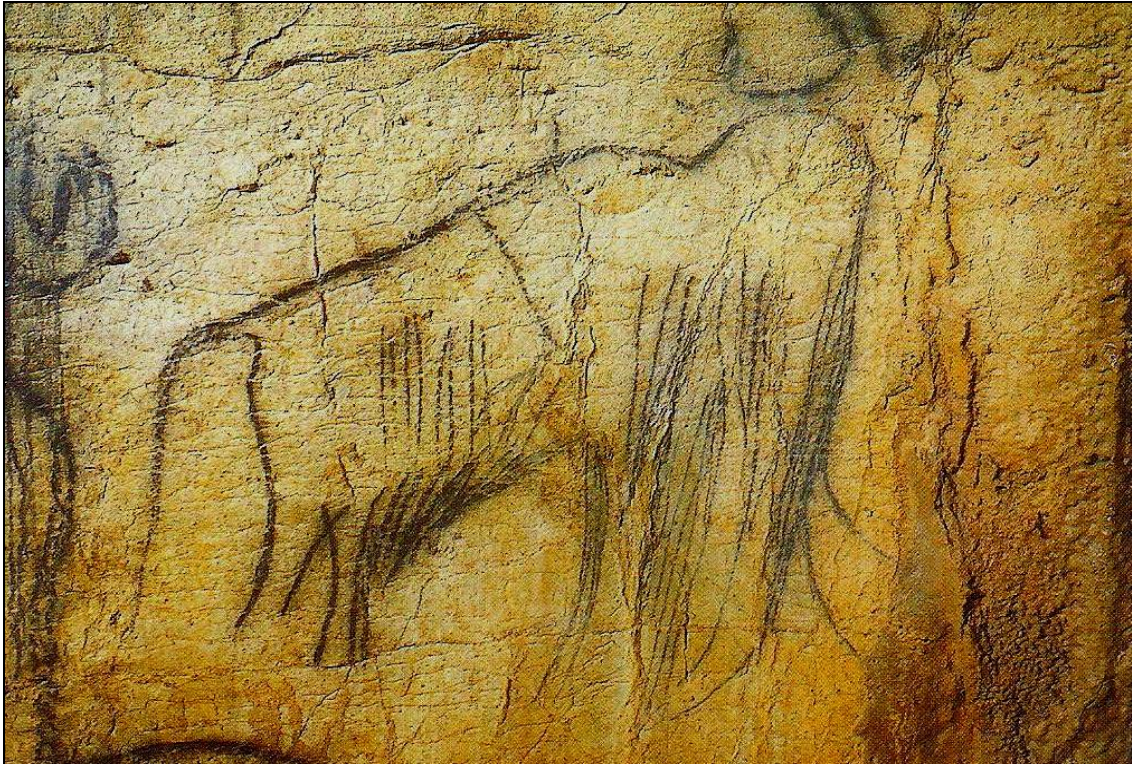


Figure 74 – Image of a Mammoth in the interior of Pech-Merle (Source: *Guide de visite de La Grotte Du Pech-Merle, Cabrerets-Lot 2007, 8*).

Briefly, according to the *Centre de Préhistoire du Pech Merle* (1997-2007), the upper galleries of the cave have no evidence or traces of prehistoric use and are known since the turn of the century. It is, therefore, in the lower galleries network discovered in 1922 by youngsters André David (16 years old) and Henri Dutertre (15 years old), that it is possible to identify the prehistoric imprints. Immediately after the discovery, the paintings were examined by the priest of Cabrerets, Amédée Lemozi and in 1926, the cave was opened to the public. With more than 2 km of horizontal development, visitors are allowed to visit 1/3 of its passages and seven spacious chambers that keep the records of rock paintings from at least 20,000 years.

Perhaps the most famous example of religious use of a cave in France is the Grotto of Massabielle, also known as the Grotto of Lourdes, Miraculous Cave or the Cave of Apparition (Figure 75). Located in the Sanctuary of Our Lady of Lourdes, the site is the place of the 18<sup>th</sup> alleged Marian apparitions to a young woman named Bernadette Soubirous in 1858. Since then, a temple was built in the vicinity of the cave temple and receives millions of people around the world. As shown in the previous chapter, the water which comes out of the cave is said to have miraculous properties, a common concept observed in the relationship between man and sacred caves.



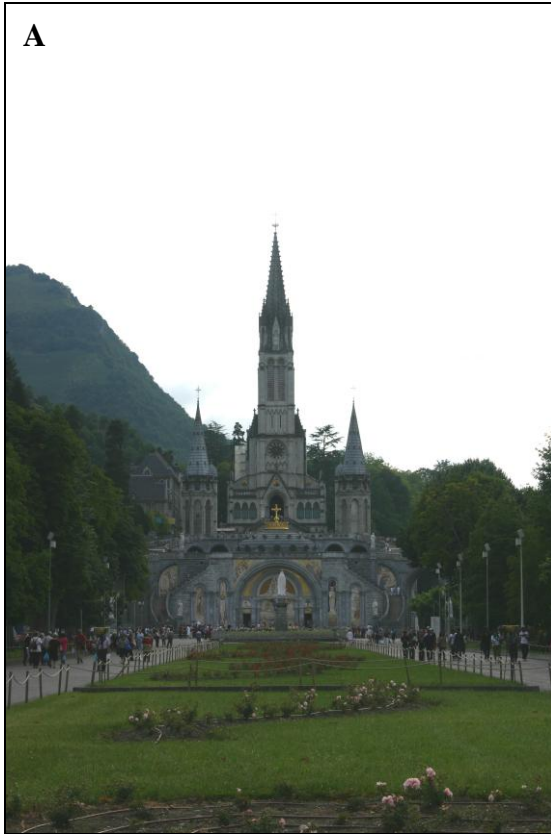


Figure 75 – A) The first sight of the pilgrim when entering the Sanctuary of Lourdes. B) Detail of the Cathedral built on the top of the grotto. C) Detail of the Grotto of Lourdes and the line of pilgrims that touch its walls in searching for Grace and in thank for those achieved. (Photos: Luiz E. P. Travassos 2009).

Due to its global presence, it is observed that there are several other “Grottoes of Lourdes” around the world, like the original one in France. From the geographical point of view, Neame (1968) cited by Gesta (1996) states that Lourdes occupies a central place for the other nine Marian temples in the region. Thus, we can say that the cave holds the position of the “center of the world” for an area of influence far greater than just the boundaries of the Sanctuary.

Like most of the sites considered to be sacred, the region also has natural scenic beauty. To Gesta (1996), another common feature of sacred places is their relative geographic isolation for centuries and the creation of a circular geometric structure, going from center to the periphery. Thousands of pilgrims moved (and still do) long distances to the so-called “center of the sacred world” (the cave) to achieve their religious goals.

Another important example to be cited from the perspective of the religious use of caves is that of the *La Sainte Baume* or the Holy Cave, in the Provence region (Figure 76 and 77). Even before Christianity the cave was already considered sacred by the Greeks, Celts and Romans who believed that the place was inhabited by goddesses of fertility. The Association of Friends of the Dominican Brothers of the Sainte Baume says that massaliots pilgrims went to the site to worship the goddess Artemis and several other caves of the region kept for centuries, remains of Roman occupation such as coins dated first century BC. For Christianity, many tombs attest the connection of religion with the underground of Provence. Also notable were two other small cavities used by Dominican Brothers: the Cave of Dalmace Moner and the Cave of Father Elie.

The regional importance of the religious use of the underground is seen even more strongly when the oral tradition of the region strengthens the information that Mary Magdalene spent the last years of his life in the Sainte Baume. For this reason, Buysson (1993) states that since at least the 5<sup>th</sup> century there has been a nonstop religious and monastic presence in the place. Within the Apostolic itinerary of St. Mary Magdalene, the cave is considered an important point of pilgrimage.

The path to the cave-church is a trail in the midst of a century-old forest, considered by the popular imaginary as mysterious and sacred. These characteristics are shown in the first century by the Roman poet Marcus Annaeus Lucanus: “*Its entwined branches created a tenebrous atmosphere and cool shade, unpenetrated by sunshine (...) birds were fearful of perching on the branches of this wood and wild animals of*

*sleeping in its lairs*” (Lucanus cited by Buysson 1993). Perhaps because of this description, Buysson (1993) states that the pilgrims or tourists that visit the site are also moved by the desire to overcome the fearful and hostile environment.

Many say that the exact date of the beginning of this pilgrimage has been lost in time. However, Buysson (1993) states that the visits of Pope John VIII (872-888) and King William the “Liberator” were already mentioned in written sources. Since then, the region’s oral tradition says that the cave is the stopping point for pilgrims who go to Compostela coming from the Alps and Italy. According to the author, the first detailed description of the pilgrimage to the Sainte Baume was made by the Franciscan Friar named Salimbene, in 1248. The priest stated that women and noble ladies of Marseille arrived at the cave in large numbers.

In 1279, when Charles II (Count of Provence) rediscovered the remains of Mary Magdalene that were buried for fear of the Saracens, the pilgrimage gained a new impulse and became famous again in Christianity. Crusaders on their way to the Holy Land came to the cave before embarking on their journeys and many other religious pilgrims from all over Europe (e.g.: popes, princes, princesses, kings and queens) started to head to this sacred site (Buysson 1993).

According to Father Lacordaire (1860) cited by Buysson (1993), the tomb of Mary Magdalene at Saint Maximin is considered to be the third most important Christian tomb in the world. It is only below the tomb of Jesus and the tomb of St. Peter.

Like most sacred sites worldwide, in the region, it is observed that the historic flows of pilgrims vary due to regional geopolitics. They consisted, therefore, in phases of peaks of visits, revival and decay of pilgrimages.



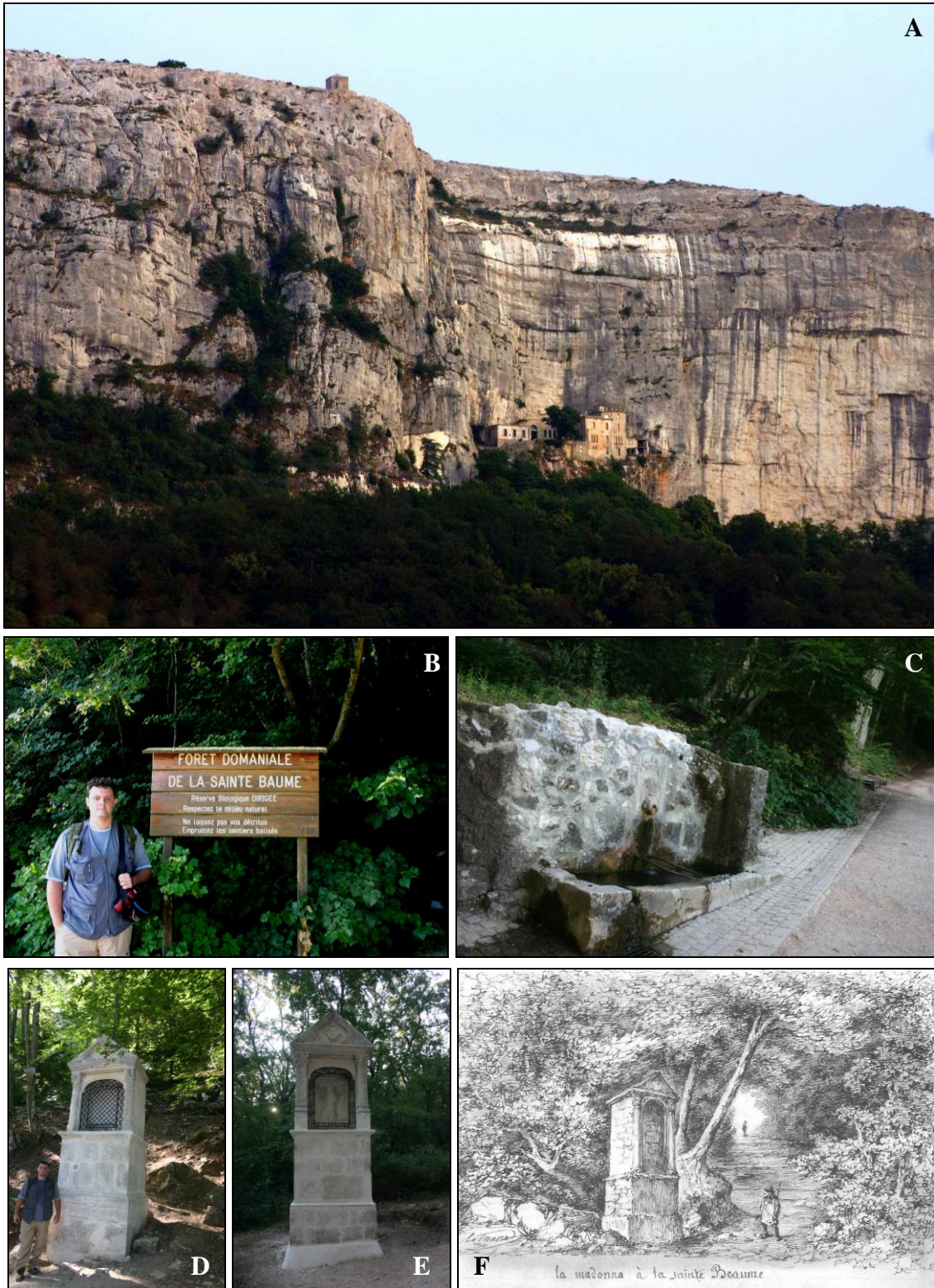


Figure 76 – A) The massif of Sainte Baume with its centennial forest, the chapel of Saint-Pilon (in the top of the massif at the right of the picture), the entrance of the Sainte Baume and the Dominican Monastery. B) Entrance to the trails of the Sainte Baume Forest. C) Source of water considered to be sacred found on the way to the cave. D-E) Two of the four oratories which exists on the path to the cave. Originally there were seven structures which represent an important event in the life of Mary Magdalene (Photo: Luiz E. P. Travassos 2009). F) Oratory in a postcard as it was centuries ago. Drawing of Pierre Letuaire (1798-1884) reproduced by the Dominican Monastery of Marseille.





Figure 77 - A) Detail of the cave entrance and the Dominican Monastery of the Sainte Baume in relation to its position at the limestone massif. B) Stairs of Access to the Sainte Baume. C) View of the main altar of the Cave of Saint Maria Magdalene. D) Panoramic view of a karst plain from the entrance of the Sainte Baume (Photos: Luiz E. P. Travassos 2009).

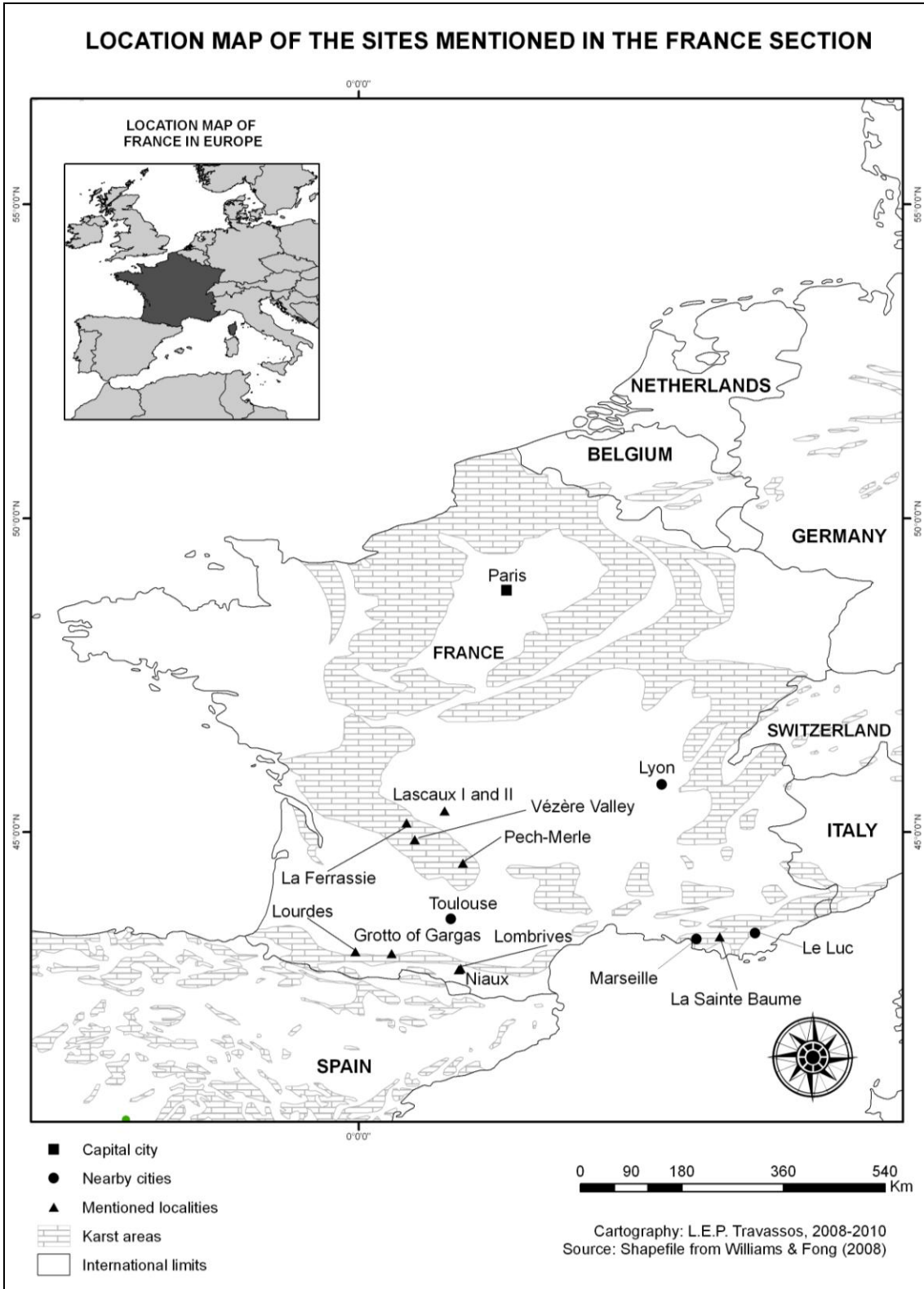


Figure 78 - Location map of sites mentioned in this section.

#### 2.1.4.4 Italy

Especially in this country, there are numerous occurrences of caves used as underground sanctuaries. As in many other regions of the world, the use of these spaces by Prehistoric man also could already be considered to be religious or ritualistic. Gowlett (2007) states that in a cave on the west coast of Italy, at Monte Circeo<sup>103</sup>, stone tools were discovered inside the cavity. In the center of the chamber, a skull of a Neanderthal had been put on purpose in the middle of a circle of stones. This arrangement suggests that the individual would have been buried with some religious or sacred feeling at about 50,000 years ago.

Cigna (2005) points out that Pliny, 2,000 years ago, already described and recorded visits to the Dog's cave, near the city of Naples. The cavity was visited by human curiosity to know the fumes of carbon dioxide which, being denser than air would stay close to the ground killing small animals. This fact sparked human curiosity and boosted tourism to the place. It is interesting to remember Badino (2009) that argues that this process is just another legend of the underground.

Regarding Roman mythology, Steward (2005) recalls the Sibyl's Cave, located in the ancient city of Cumae<sup>104</sup>, also near Naples. It is believed that it was the place of residence of the prophetess Sybil. Many of his prophecies would have been written on leaves that were placed in the mouth of the cave for people to find. They were then consulted by the Romans in periods of crisis.

It is believed that Romulus and Remus, the twin founders of Rome, were taken away and raised by a female wolf at Lupercal Cave, located in the Palatine, one of the seven hills of Rome (Figure 79). The cave was discovered by archaeologists in 2007 and show evidence of been used as a sanctuary by the ancient Romans.

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<sup>103</sup> Site located 90 km southeast of Rome.

<sup>104</sup> About 17 km West of Naples.



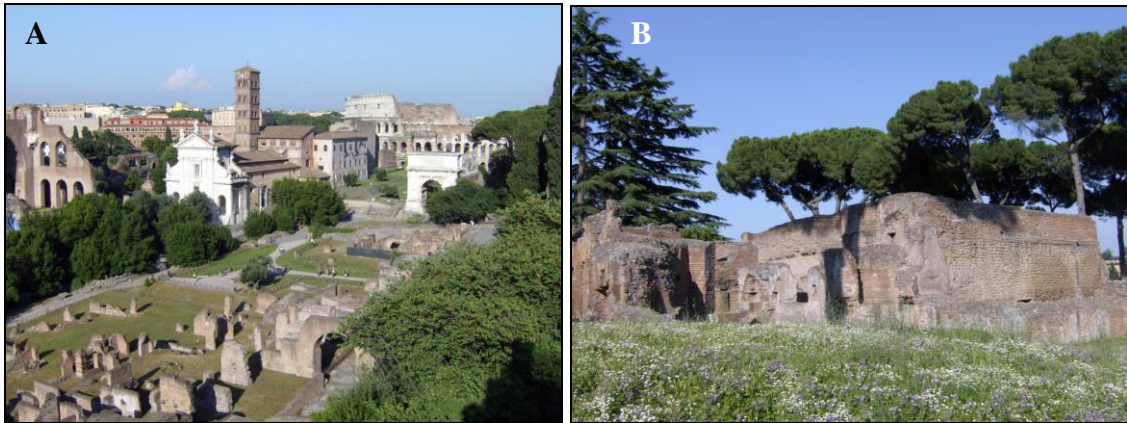


Figure 79 – A) Detail of one section of the Palatine in Roma, with the Coliseum in the back. B) Ruins of the Palatine (Photo: Luiz E.P. Travassos, 2008).

Also in Rome, although not natural caves, it is necessary to recall the catacombs, mainly because they are underground and form a labyrinth of galleries which conserves the first signs of use and Christian art of the underground. Hayes (2005-2009) notes that the burial was part of the Christian rituals, and they were not able to bury their dead on the surface. That's why they started to dig the catacombs. Moreover, these sacred places would serve to bond the Christians by the performance of their rituals. The first catacombs were dug in the second century AD and were located just outside the city walls because the laws did not permit the burial within the city limits. After Christianity was regarded as the official religion of the Roman Empire and the worship of relics had been established as part of the Christian worship, the catacombs became places of pilgrimage.

In the country, besides the chapel of S. Michele dei Pagani (Saint Michael of the Pagans) in Braulins that was previously identified and the Landarska Jama which will be described later, it is worthy to highlight some other sanctuaries.

Starting from the northern part of Italy and moving towards the south, many caves can be identified in the regions of Friuli and Veneto. At first, Montina (1992) argues that, probably, this is one of the regions with the oldest historical and folk tradition related to the underground and caves. This is mainly due to the large number of events identified among epigeal and hypogean environment in the regional karst. In this region the author of the present dissertation was able to visit the caves of San Giovanni d'Antro and the small chapel of San Michele dei Pagani.

In the region of Veneto, Gleria (1992) states that the use of manmade caves is varied being used as fortified shelters throughout history (*Covolo fortificato di Trene,*

*Covolo della Guera*, etc.), caves of military usage or caves used as Catholic churches . These are classified as hermitages, chapels or votive shrines. They are scattered throughout the territory but as in Brazil, do not have many formal records of its history.

It is possible that many of these caves have been used even before Catholicism, but it is difficult to verify such information with certainty. The primitive rituals were certainly suppressed by the new catholic rituals.

Gleria (1992) calls attention to the *Eremo di San Cassiano*<sup>105</sup> (Figure 80) already described by Pigafetta in 1580 and the imposing sanctuary of the *Madonna della Corona*<sup>106</sup> (Figure 81). Besides these two examples, the author highlights the presence of small shrines in rock shelters as the one found in the small Grotto of San Lucano (Figure 81). About the Hermitage of San Cassiano, Marchetto (2004) claims that his religious use occurs since at least 29/02/1164 according to the inscription on its entrance.

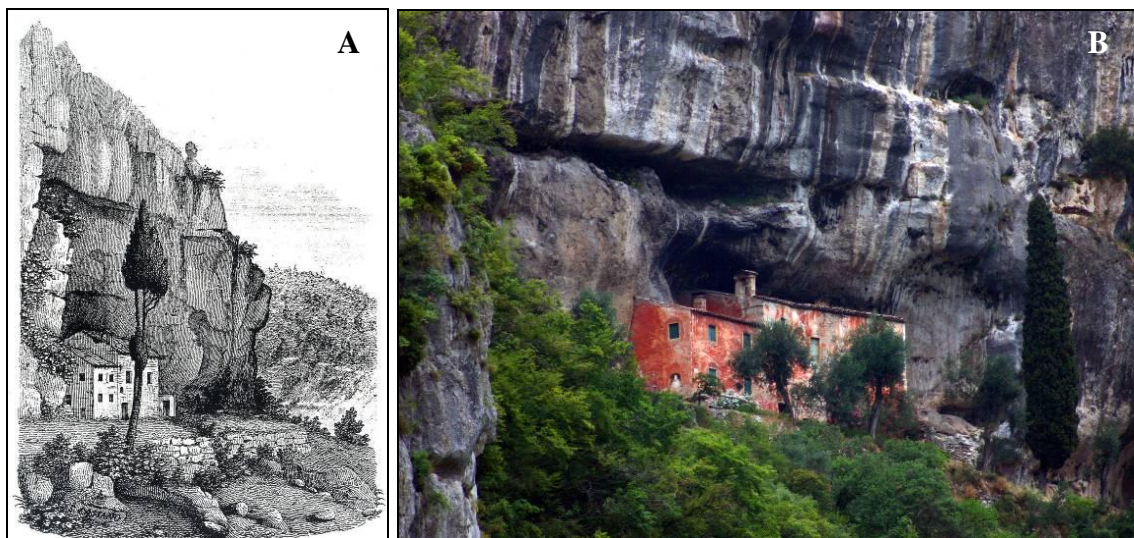


Figure 80 – A) *The Hermitage of San Cassiano* in drawing of G. da Schio (1850) (Source: Gleria 1992, 66). B) *The site as it is today* (Photo: Luiz E. P. Travassos 2009)

According to information from the Basilica Santuario Madonna della Corona, the regional tradition says that a small temple was erected to honor the Saint. However, only after the appearance of the statue in a cavity of Monte Baldo on June 24, 1522 the pilgrimages began. Thus was originated the first chapel, located several feet below the place where is located the shrine today. A little more than a room, it was inaugurated in 1530 after the historical visit of the Bishop of Verona on May 10 of that year. Since

<sup>105</sup> Located at Lumignano, about 25 km northwest of Padova.

<sup>106</sup> Site located about 28 km northwest of Verona or 85 km northwest of Padova.



then, the increasing number of pilgrims was the reason for expanding the chapel in 1625. The works were completed in 1680, and the temple remained intact until 1898. Other works were made after this date leaving the Sanctuary how is today.

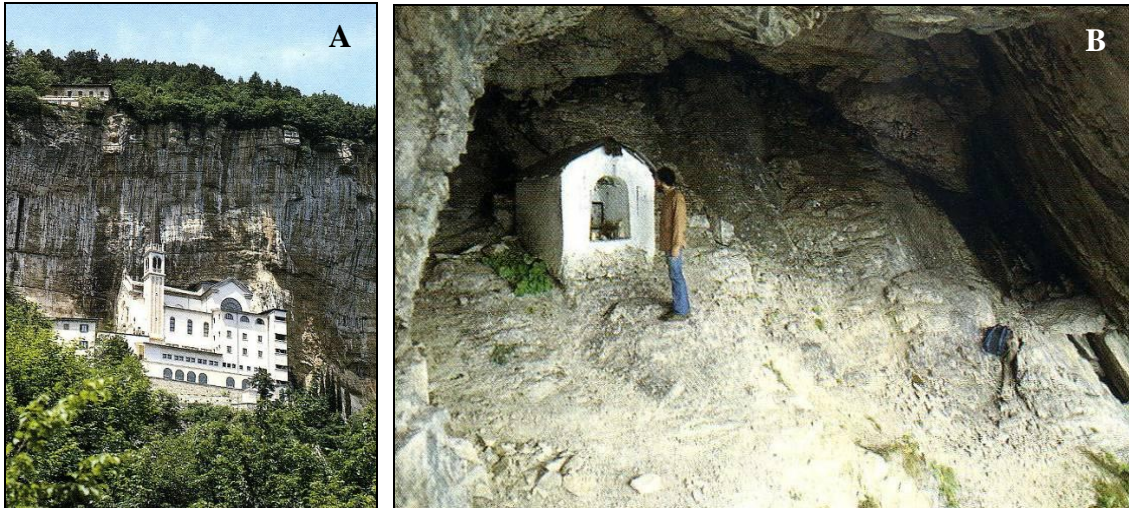


Figure 81 - A) General overview of the Sanctuary of the Madonna della Corona. B) A modest oratory erected at the Grotto of San Lucano (Source: Gleria 1992, 77).

In the *Marche* region, the municipality of Genga (about 68 km southeast of San Marino) is located the Sanctuary of the Madonna di Frasassi. Belonging to the Diocese of Fabriano-Matelica, the Sanctuary is open every day and processions are held on June Sundays. The holy site, located near the Grotto of Frasassi has a small chapel built to house the shrine dedicated to Our Lady (*Santa Maria Infra Saxa*). The chapel was built to house a wooden image considered miraculous and whose age had not been confirmed. The image was burned in a fire caused by a candle in 1947 and, since then, has been replaced by a statue made in white marble (Figure 82).



Figure 82 – A) General view of the location of the Sanctuary in relation to the limestone massif. B) Detail of the stairs which leads to the oratory dedicated to Our Lady. The chapel has a sign dated from the 11<sup>th</sup> century (1029). C) Detail of the oratory in the interior of the small chapel with the image of Santa Maria Infra Saxa (Photo: Luiz E. P. Travassos 2009). D) Detail of the image of Our Lady from a print made by the Diocese of Fabriano-Metelica).

In 1828, as one of the structures of the Sanctuary, an octagonal temple was erected at the behest of Pope Leo XII (Figure 83). Inside, another image of Our Lady made of marble is venerated. In December, the Diocese is responsible for organizing religious festivals, including the organization of a nativity representation with a “living” crib that attracts hundreds of people to the celebrations.





*Figure 83 – General detail of the Sanctuary with the Chapel in the back and the octagonal temple to the left (Photo: Luiz E.P. Travassos 2009).*

In the region of Puglia, Hayes (2005-2009) identifies the Sanctuary of St. Michael the Archangel (Santuario di San Michele Arcangelo), near the San Giovanni Rotondo<sup>107</sup>, province of Foggia. At the site, it is believed that the Archangel Michael had appeared in the years 490, 492, 493 and 1656, establishing the temple himself (Figure 84). Trovatto (1997/2000) states that the existing documents record the sacredness of the site since the first apparition of the Archangel, however, he believes that its ritual use should already exist in remote prehistory.

According to the oral tradition, a nobleman named Elvio Emanuele lost his best bull from his herd. After searching a lot, the noble saw his animal on its knee inside a cave. Unable to approach, Elvio shot an arrow in the direction of the animal. However, the arrow has deviated from the target and hit him. Disorientated and probably bleeding, Elvio went to see the local bishop who ordered three days of prayers and fasting. Since then, the cave is visited by believers from all over the world. Like several cave-sanctuaries, the city has developed from the sacred site.

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<sup>107</sup> Located about 31 km northeast of Foggia.



*Figure 84 – The Cave of Saint Michael the Archangel. It is believed that the Saint would have appeared in 490, 492, 493 and 1656 at Mount Sant’Angelo, Puglia, Italy (Photo: Luiz E. P Travassos 2009).*

Still regarding the region of Puglia, Sammarco, Nobile and Delle Rose (2004) recall the legend of Santa Maria della Ruta, province of Lecce<sup>108</sup>. The sacred site is the result of centuries of pilgrimages. The cave was visited in prehistoric times and then used for Christian worship. The cave is noted for having an impressive epigraphic repertoire of hundreds of inscriptions of the late Byzantine period to the pilgrims of the 18<sup>th</sup> century.

In Sicily it is important to remember the example recorded by Mancini and Forti (2009) who write about the Cave of Santa Rosalia. In this cave, in a mountain not far from Palermo (Mount Pilgrim), there is an elaborate system of water collection and an underground church (Figure 85).

According to Davemport Adams (2006), a clerical legend tells that Santa Rosalia was a member of the family of the first King of Sicily. Another story says that she was the niece of King William, “the Good”, who reigned in the years 1150 to 1154 and who was succeeded by his son, William, “the Bad”. Finally, other stories states that she was simply the daughter of a Sicilian count named Sinibaldi.

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<sup>108</sup> Locality 140 km southeast of Bari.

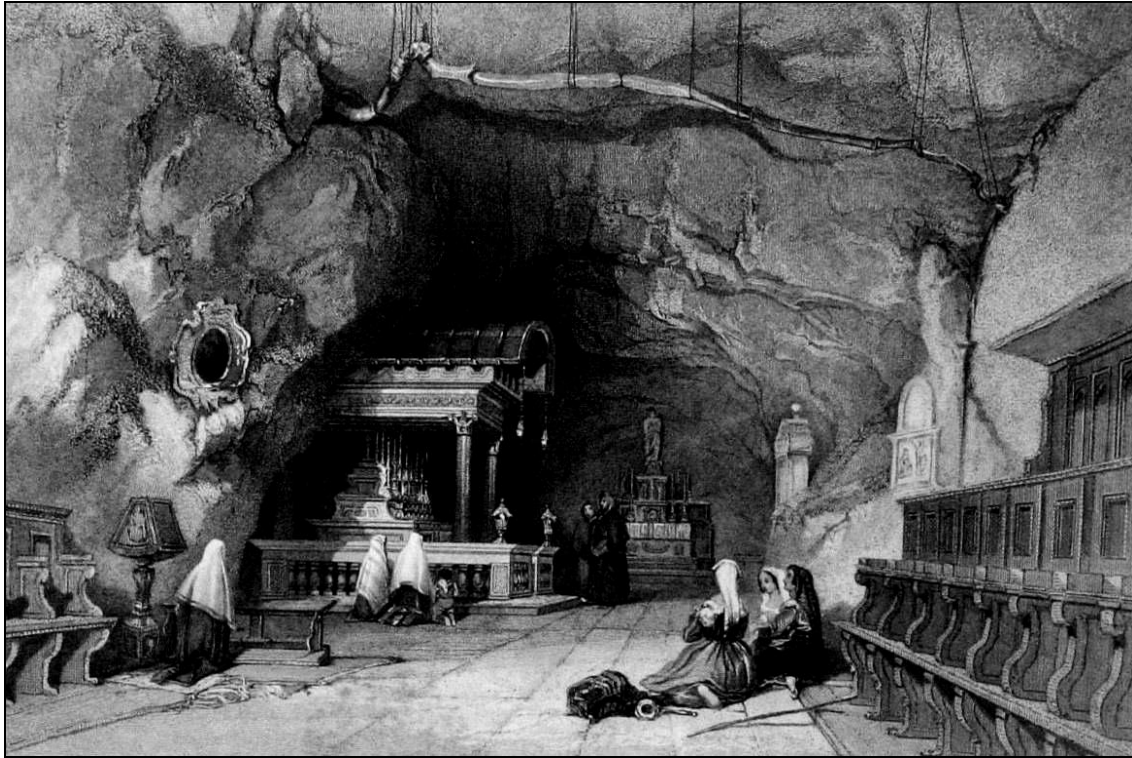


Figure 85 – Interior of the Cave-church of Santa Rosalia, Palermo, Italy (Source: Burri 2007:28).

When 16 years old Rosalia suddenly disappeared in the year 1159. As no trace of her was found, the popular superstition went on to state that she would have been elevated to the heavens. The legend relates her disappearance due to her disapproval of the frivolous habits of the nobility. Since then, she would decide to hide in a cave at Mount Pellegrino where she would stay for many years in solitude. When death surprised Rosalia in her self-imposed retreat, angels would have descended from heaven with a mission to bury her (Davempport Adams 2006).

Although the beauty, the virtues and misfortunes of Rosalia has been erased from the memory of Sicilians for about five centuries, Palermo was devastated by a terrible plague. Its inhabitants begged in vain for mercy at the foot of several altars until one day, when a resident decided to go to the top of the Mount Pellegrino to claim for mercy. When going down the hill, he came to the city to say that heavenly revelation had told him that the bones of Santa Rosalia were in a cave on the mountain. Then, the members of the clergy went to the place where the bones supposed to be. They found some and in the next day, they carried them in a procession around the city walls and the plague died out. In recognition for this achieved grace, Santa Rosalia was chosen to be the patron saint of the city (Davempport Adams 2006).



In the region of Campania, Piciocchi (1988) points out that close to Naples, there are at least 51 caves with evidence of religious use. Most significant, however, is the Grotto of the Seven Churches (Figure 86) with records of religious art dating from the 4<sup>th</sup> century to the late 10<sup>th</sup> century. The first indication of its existence dates from 819 and, according to the author, seven chapels are together in a type of “sacred path” (way of the Cross). Active in the medieval period, currently the services are still held but are limited to a few days in the year.

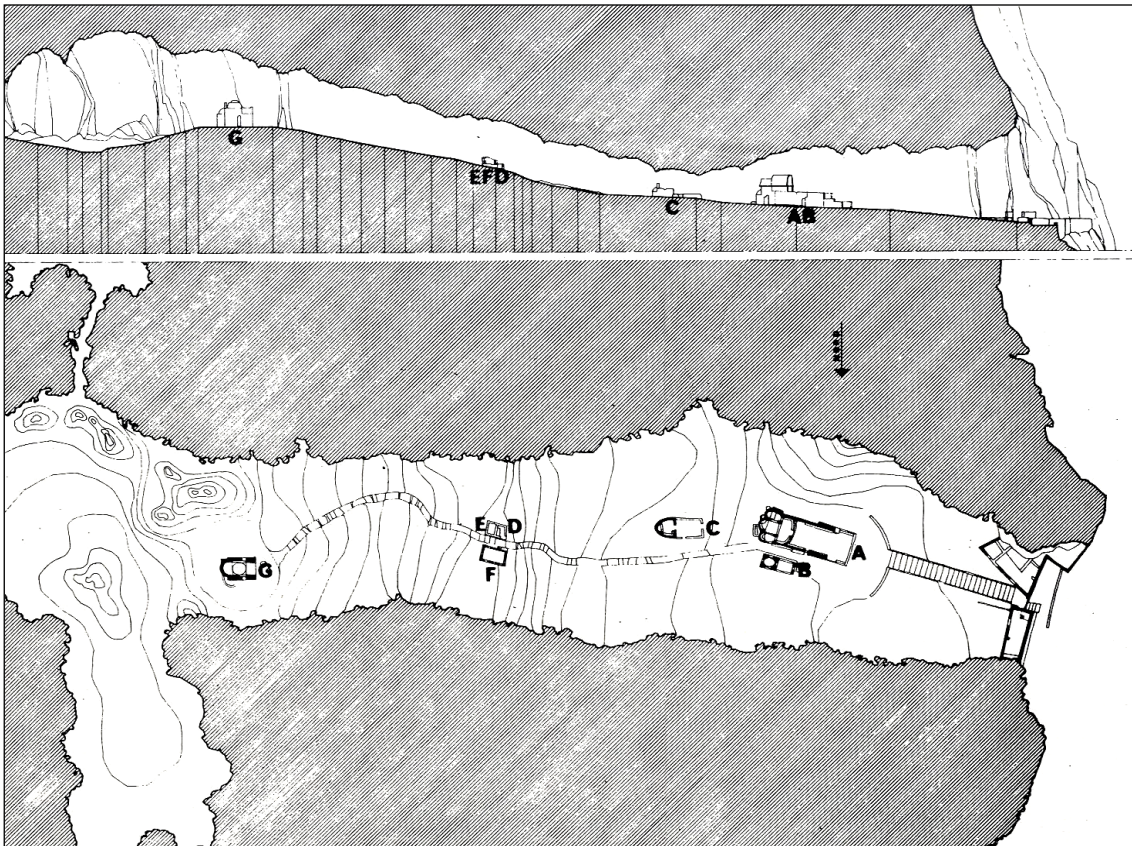


Figure 86 – Profile and plan of the Grotta delle Sette Chiese. It is possible to identify the churches and oratories in the interior of the cave (Source: Piciocchi 1988:09).

In the region of Lazio, south of Rome about an hour and a half, Hayes (2005-2009) reminds us of the Monastery of St. Benedict, located in Subiaco (Figure 87). On the site there is the cave where the saint would have lived as a hermit, the *Sacro Speco*. The region was occupied by the Romans in 304 BC when they managed to build pipelines that would lead ground water to Rome. Abundant in natural resources, the region’s name derives from Sub-lacus.





Figure 87 – A) General view of the St. Benedict Monastery in the Mount Taleo. B) Entrance to the Monastery. C) View of the interior of the Sacro Speco, considered to be the most sacred place of the Monastery. In this cave, Benedict would have lived for three years around the year 500 (Photos: Luiz E. P. Travassos 2009).

Born and raised in Norcia<sup>109</sup> in the year 480, Benedict studied in Rome, where he was amazed at the immorality of the big city. He sought exile on the slopes of the forested Mount Taleo, near Subiaco, where he met a monk called Romanus. A monastery existed in the area, but Benedict has decided to live alone in a cave, the Sacro Speco, where he hid for three years. He was fed only by Romanus who used to give food scraps to the hermit.

Tradition says that Benedict was discovered in his cave and was invited to be the chief monk of a monastery near to Vicovaro. However, the monks considered his principles very harsh and tried to poison him without success. Benedict returned to his cave, but attracted many followers. Since then, he couldn't live his life of reclusion alone.

<sup>109</sup> Locality at about 30 km east of Spoleto.

In Tuscany, in the territory of Vergemoli<sup>110</sup>, is located in the Eremo di Calomini, one of the most characteristic religious monuments in the province of Lucca (Figure 88). Although Trovato (1997/2000) states that the shrine is indeed very old and could not be determined the date of creation, he quotes Fantozzi (1999) who records its creation in the year 1000 but without giving any references.

Dedicated to *Santa Maria ad Martires*, it is commonly called the *Santuario della Madonna dell'Eremita*. According to the regional oral tradition, the sanctuary was built because of the supposed apparition of the Virgin Mary to a shepherd of unknown name. As in other regions of the world, the story of the apparition spread rapidly and in 1300 a small chapel was erected and enlarged later. In 1700, the building of a church was finished. It has two columns as shown in Figure 88. The building was guarded by monks and hermits for about five centuries, until it began to be preserved by the Capuchins of Lucca in 1868.

In the region of Umbria, in the caves of Mount Subasio, on the outskirts of Assisi, St. Francis (1181-1226) and his followers established residence in the Eremo delle Carceri, where used to pray and contemplates life. Hayes (2005-2009) reminds us that St. Francis began to come to this place in 1205. At that time, only a small chapel of the 12<sup>th</sup> century existed. He lived alone in a cave where he prayed and did penitence. Soon other men followed him up to the mountain, where each one found their own individual cave to live in solitude (Figure 89 and 90).

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<sup>110</sup> Localidade a cerca de 80 km a noroeste de Florença.





Figure 88 – A) Location of the Sanctuary in relation to the rock massif. B) Original Chapel dated from 1300 e C) “La prima grotta”, place where Our Lady would have appeared according to the regional legend. D-E) details of the second church dated from 1700 (Photo: Luiz E. P. Travassos 2009). F) Detail of the “Miraculosa Imagem” (Miraculous Image) of Santa Maria (Source: Eremo de Calomini, 2009). G) Panoramic view of the valley in front of the Hermitage (Photo: Luiz E. P. Travassos 2009).





Figure 89 – A e B) Entrance of the Sanctuary Eremito delle Carceri (Photo: Luiz E.P. Travassos 2009). C) View of the Eremito delle Carceri with the traditional tree of the birds of St Francis. D) Outside the Cave of St. Francis exists the “Devil’s Hole”, place where St. Francis would have thrown the Devil. Many visitors throw coins in this place. (Photo: Sacred Destinations 2008).



Figure 90 – View of the entrance of the Cave of Saint Francis of Assisi (Photo: Sacred Destinations 2008).



In the Triassic dolomites of Mount St. Peter (region of Liguria), Chiesa and Castellino (1999) record the Cave Sanctuary of Saint Lucia (Figure 91). In his work the authors write about the geomorphological and historical aspects of caves and say that the sanctuary witness exemplarily and continuous the human occupation from the middle Paleolithic (150,000-40,000 years) to Roman times.

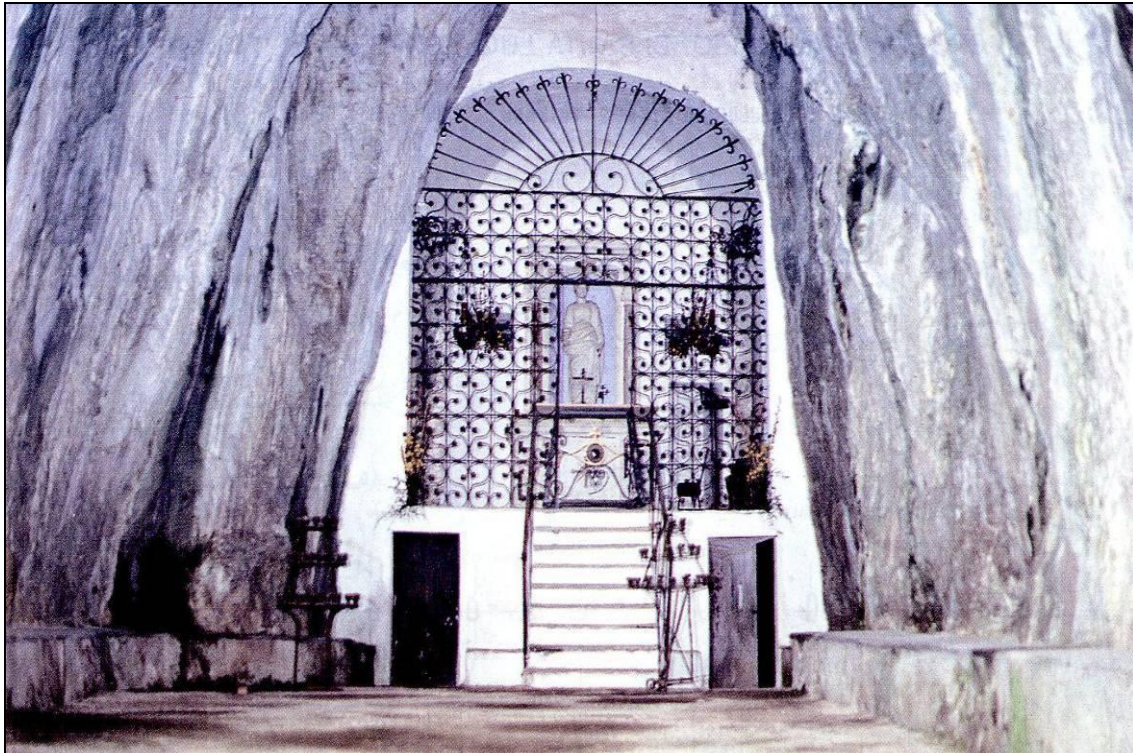


Figure 91 – View of the altar at the Cave Sanctuary of Santa Lucia (Photo: A.Chiesa In: Chiesa & Castellino 1999, 47)

As is common in many places of the world, the legend states that the saint lived in the cave for some time. Then, the space was sanctified, becoming an important place of pilgrimage. Therefore, Chiesa and Castellino (1999) state that the cave has an exceptional historical record: whole sectors of the cave are covered by thousands of signatures of key figures of the 15<sup>th</sup> to the 16<sup>th</sup> century until the present day. During the Second World War the inhabitants of Toirano sought refuge there.

It is common to find numerous small oratories by European roads, specially the Italian ones. Like those in Brazil, these oratories are also called “grottoes” and are build to house sacred as shown in figure (Figura 92).





Figure 92 – It is common to find numerous oratories like these ones in the European roads, specially the Italian ones. As those present in Brazil, these oratories are also called “grottoes” and are build to keep the images. A) Oratory in a Road near Subiaco. B) Oratory in the road that goes to the Monte Cassino Abbey. C) Oratories in a Road in the Apulian Alps. D-E) It is worthy to mention the existence of other artificial “grottoes” in the backyard of houses. (Photos: Luiz E.P. Travassos 2009).





Figure 93 - Location map of sites mentioned in this section.

#### 2.1.4.5 Slovenia

To Kranjc (2008), in Slovenia, the cultural importance of the karst is recorded for the first time by Leonberger (1537) in a poem that mentions the Lake of Cerknica. This occurs only during this period, mainly due to the fact that much of the region was considered to be dangerous, at least from a western perspective. As history shows, the relations between Austria and Venice were often not friendly, and it is proven by the Austro-Venetian wars. Relations between Venice, Dubrovnik and the Ottoman Empire were formally good, however, many small disagreements ended in local conflicts. For this reason the author states that not many travelers were interested in venturing into this territory. Crossing from west to east towards the Dinaric Karst was very difficult. The only exception was the region of Carniola, where a road from Vienna to Trieste crossed the Kras Plateau.

For this reason, some of the most important features of the region such as the Lake of Cerknica, among others, were already described since the 16<sup>th</sup> century. After remembering Leonberger (1537), Kranjc (2008) identifies the works of Wernher (1551), Valvasor (1687, 1689), Nagel (1748), Fortis (1774) and, Hacquet (1785), among many others.

As said by Turk and Velušček (1997), the oldest traces of occupation of the karst region date from between 140,000 and 10,000 years ago, during the Pleistocene (Figure 94). In archaeological terms, this occupation dates to the Paleolithic. Since that time, the occupation has not changed much in the first half of the Holocene and during the Mesolithic (8,000 to 5,500 years BC). Thus, for the authors, the first communities in the Kras Plateau date back to at least 5,500 BC, already in the Neolithic period.

Such “Paleolithic stations” presented no evidence of the use or perception of these spaces beyond the basic needs of survival and daily life. However, in the historical period that follows, in a time of transition between the Neolithic and the Eneolithic, the religious use of a specific cave was confirmed.

Known as *Ajdovska Jama* (jama = cave) or Pagan Cave also receives the name of Giant’s Cave. It is located in the Southeast of the country and, according to evidences discovered inside, it can be considered a burial site. The chambers were arranged in order to perform rituals. Researchers also found other traces of human presence and

activity such as ashes, pottery remains and bones). For this it is almost certain that the cave was used as a cemetery and as a natural temple for funeral ceremonies (Kos 2008).

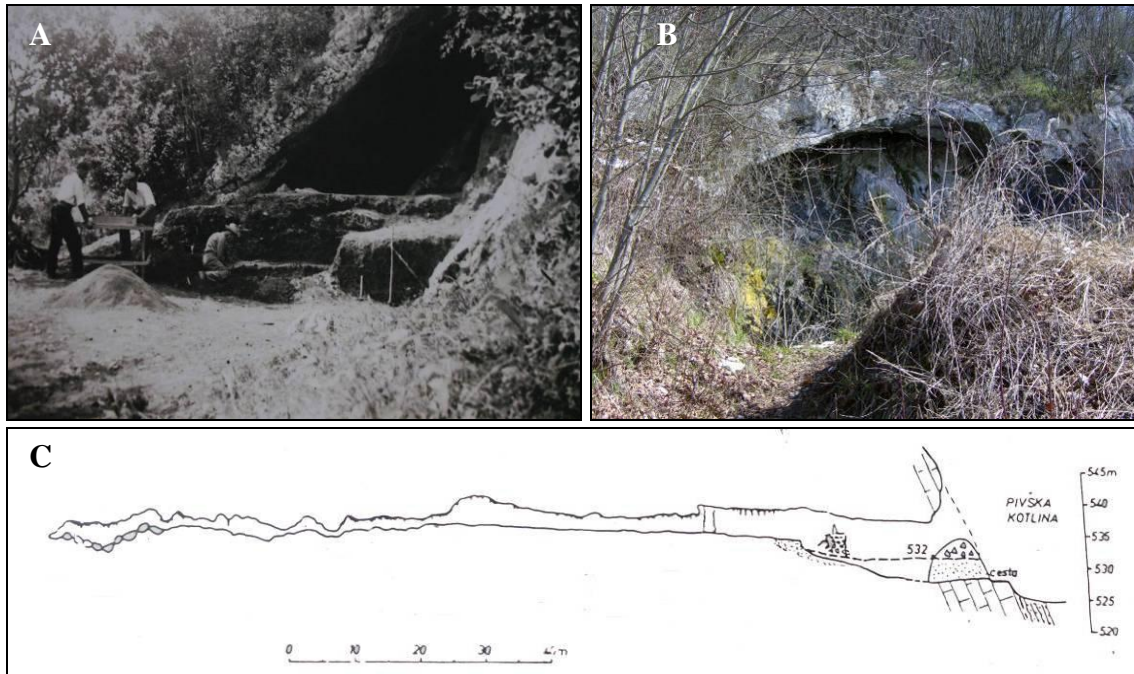


Figure 94 – A) Entrance of the Cave Betalov Spodmol, important site from the Pleistocene (Čuk 2008: 15) B) The entrance of the cave in 2007. C) Cave profile (Photos: Luiz E. P. Travassos 2007-2009).

Debevec et al (2005) point out that the *Škocjan Caves* are among the most important sites of Slovenia, especially due to the archaeological remains found and that is the evidence of the use of the region since the Neolithic Age to the Iron Age, from Antiquity to the Middle Ages and from the latter to present day. The remains of the Bronze Age (Eneolithic) found in the *Mušja Jama* (Figures 95 and 96) and the *Tominčeva Jama* prove that even in prehistoric times, they already had a regional importance. The subsequent use of the Cave of Tomin (*Tominčeva Jama*) occurred as a burial site of Antiquity being also considered a sacred place for Christians of the 4<sup>th</sup> and 5<sup>th</sup> centuries AD. Its use suggests that the cave has more religious significance than as a dwelling place for early hominids.

Inside *Mušja Jama*, below the entrance, at the bottom of the abyss, there is a huge pile of rock blocks. Among them were found hundreds of bronze artifacts which are mostly pieces of weaponry along with shards of pottery. The archaeological study carried out concludes that these artifacts were deliberately broken, twisted and

sometimes melted, leading to believe that they were disposed in funeral pyres and later thrown in the cave.

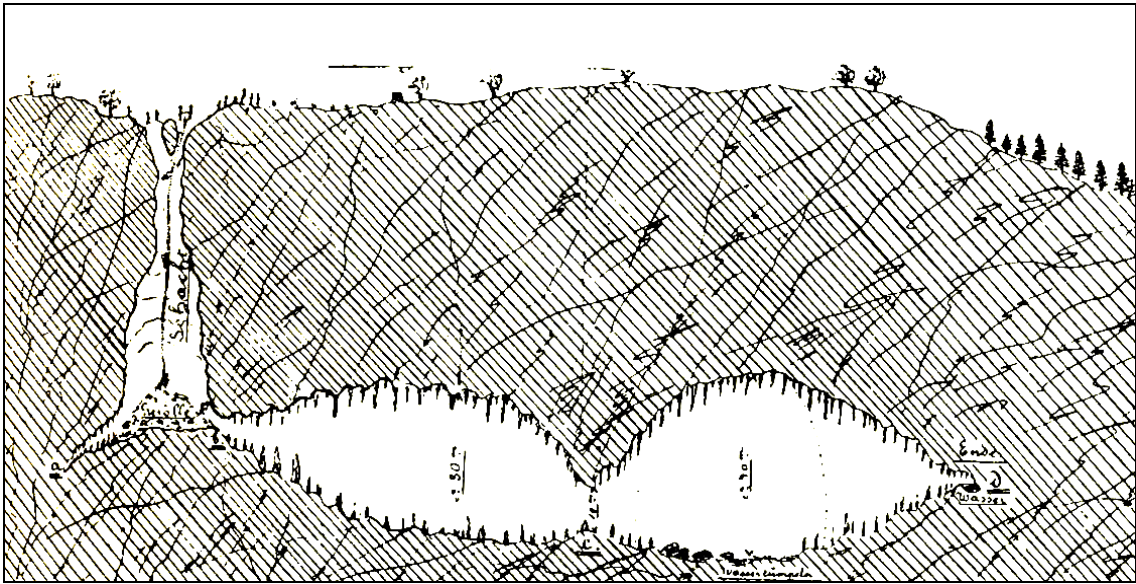


Figure 95 – Longitudinal session of the Mušja Jama in drawing of the French speleologist E.A.Martel in 1894 (Source: Turk & Velušček 1997).



Figure 96 – Picture of Mušja Jama and the location map that shows its regional importance. In this 50 meters deep shaft it was discovered a large number of bronze and iron artifacts. Most of them were weapons dating from the period between the eighth and seventeenth centuries BC. Archaeological evidence points to the use of the site in sacrificial rituals and other cults above the cave. The region is considered a point of religious importance of this period, and the objects were brought from the Pannonian plain to the center of Italy and Greece (Source: Peric & Šturm 2008).



This kind of ceremony was well described in Homer's Iliad, the ancient Greek poet. The artistic reconstruction (Figure 97) recalls the funeral pyre of Patroclus made by Achilles. According to studies conducted on the remains of pottery and spears, these have revealed that they were from a very distant origin (Greece, for example). This finding suggests that *Mušja Jama* would not be a local place of devotion, but a place of regional importance.

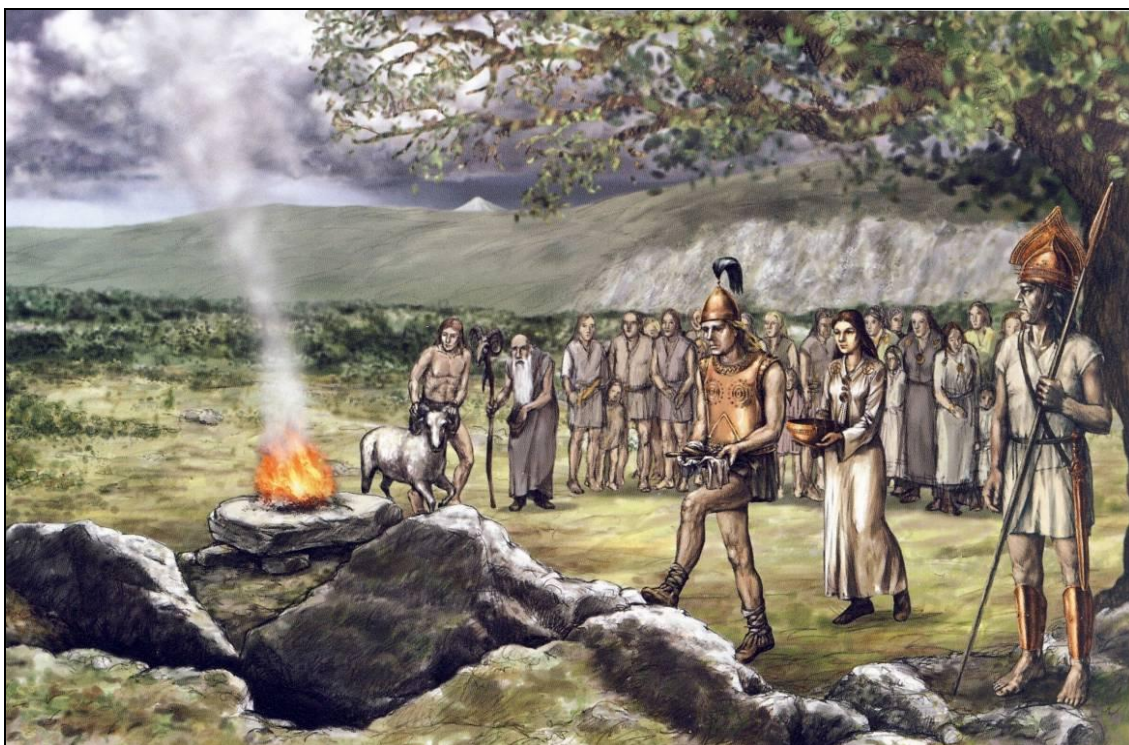


Figure 97 – Artistic reconstitution of a ceremonial burial (1200 – 800 BC) in the shaft of *Mušja jama* (Debevec et al. 2002).

Similar to the ceremony depicted in Figure 97, Galik and Pacher (1994) record the ritualistic use of a cave near Villach, Austria. Although not currently in Slovenian territory, it belonged to the same region during the Hallstatt (between the 8<sup>th</sup> and 6<sup>th</sup> century BC). Accumulated human and animal bones were found at the site. Compared with the amount of bone, the number of archaeological remains is considered low. However, it was still possible for the authors to identify very fragmented ceramics, bronze ornaments and glass beads. About 120 individuals of various ages and classes were identified, ranging from children to adults from both sexes.

The authors affirm that the materials found would be from the Hallstatt period. This happens because it is well known that the cremation of people and ceremonies in



vertical caves (shafts) were typical of this period. The presence of bones from domestic animals was part of the rituals and the same results were found in the Loch Cave (*Liechtenstein*) and the Dietersber Cave (*Egloffstein*, Germany)

Back to Slovenia, Kranjc (2007) reminds us that in *Tominčeva Jama* (Figure 98 and 99) the remains of 10 skeletons were excavated. They date back from at least the Bronze Age (4,300-2,400 BC). The famous Italian archaeologist R. Battaglia concluded that the place where the skeletons were found was intentionally selected to serve as a “crypt” and that the animal bones and traces of ceramic were also related to a burial ceremony.

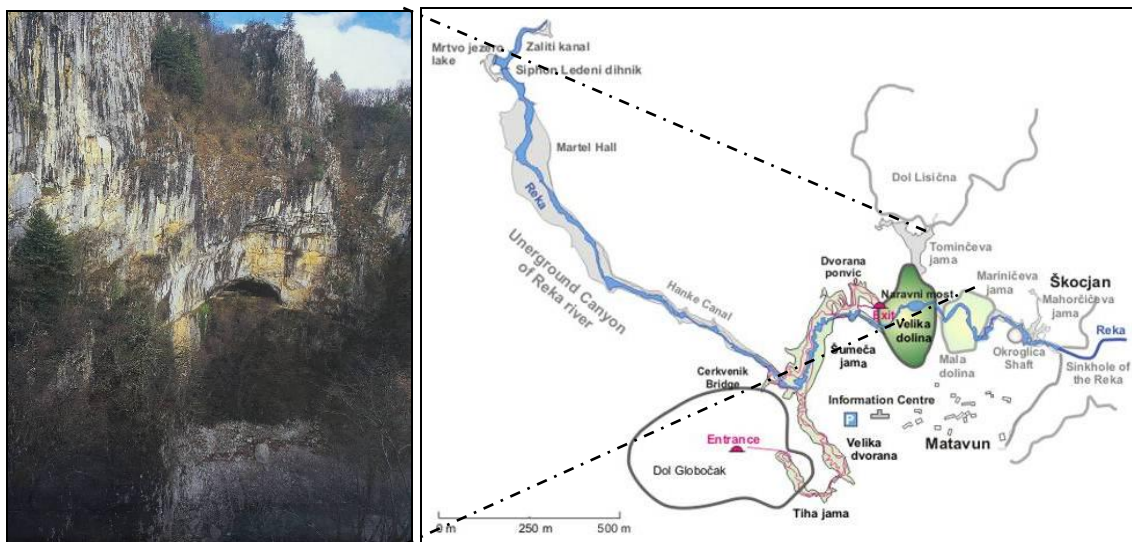


Figure 98 - Location map of the Tomin's Cave (*Tominčeva jama*) in the Škocjan Caves System. The remains of the Bronze Age show that even in prehistoric period the cave was already known. However, its use as a burial site of Antiquity elevates its category to a sacred place for Christians of the fourth and fiftieth century AD (Source: Debevec et al. 2005, 23).

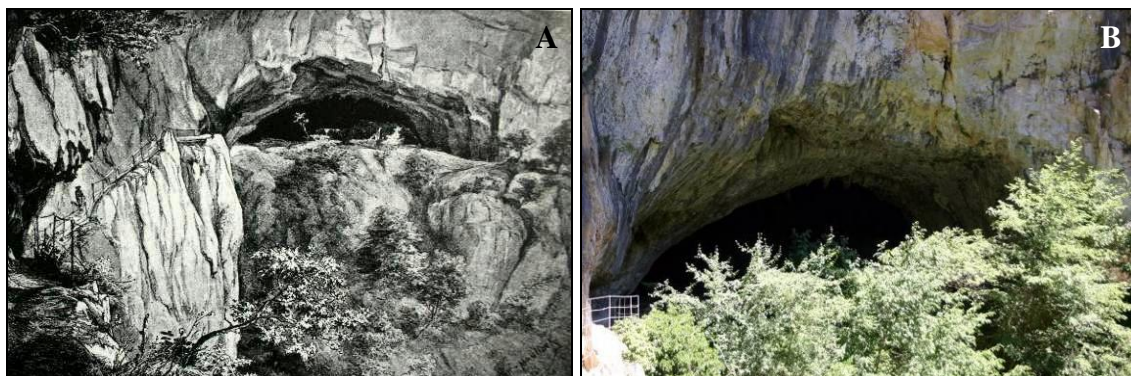


Figure 99 – A) Entrance of the Tomin's Cave in drawing of Pазze (1893) mentioned by Turk e Velušček (1997:138). B) Entrance of the cave how is perceived nowadays (Photo: Luiz E.P.Travassos 2009).

Another interesting record is a cave that was used during the First World War. It is located on Mount Mrzli Vrh, NW Slovenia. Currently is part of a historical path, considered an open air museum, and frequented by tourists. The small chapel is located inside an artificial Austro-Hungarian cave on the northeastern slope of the Mount Mrzli Vrh. The site has a concrete altar dedicated to Our Lady of Lourdes and was erected in 1917 by the 3<sup>rd</sup> Battalion, 46<sup>th</sup> Austro-Hungarian Infantry Regiment. It was restored in 2002 by “The Walks of Peace in the Soča Region Foundation” and it is presented as shown in figure 100.

During the rule of the Roman Empire it can be said that the military service acted as a kind of catalyst to the mixture of people in an ever-increasing scale. Along with this mixture, there is also the spread of eastern cults to the west and between the cults, the worship of the god Mithra. Being an underground deity, its worship took place in temples that mimic natural caves or even adapted them. Records of these places of worship were found in the northwestern Dinaric Karst and in the Italian territory, near Trieste (Figure 101).

In a not too distant past or even nowadays, caves and other karst features were and are still used for religious purposes in the Slovenian ethnic territory. Thus, they appear as places where masses can be performed occasionally or for weddings. They are identified as places still available for mounting traditional cribs (“living” statues in some cases), places for building chapels in rock-shelters or other karst features such as dolines. These are mostly dedicated to Our Lady of Lourdes, St. Anthony or St. Anthony the Hermit (Figures 102, 103 and 104).

In some caves, natural elements were extracted to serve as adornment to small oratories dedicated to Our Lady (Figure 105) and St. Anthony. In other cases, speleothems were used to construct complete altars as the example in a church in the city of *Celje*.





Figure 100 – A) Panoramic view of a plateau which leads to the summit of Mount Mrzli Vrh. In the background one can see the Krn Mount. B) Entrance of the cave-church of the Mt. Mrzli Vrh. C) Detail of the Austro-Hungarian altar dedicated to Our Lady of Lourdes (Photo: Luiz E.P. Travassos 2009).



Figure 101 – Detail of an underground temple dedicated to Mithra, next to Trieste, Italy (Source: Kusch 1993, 151).





Figure 102 – Oratory dedicated to Our Lady of Lourdes. It is located in the village of Kopanj, at about 25 km from the capital Ljubljana. The oratory was erected over a karst spring (Photo: Luiz E.P.Travassos 2008)



Figure 103 – Oratory dedicated to Sv. Anton (St. Antony), next to the town of Kobarid the region is located approximately at 130 km northwest of Ljubljana. Kobarid is one of the most known towns of Slovenia due to its history. It was already occupied in the Hallstatt period and during the Roman Empire. However, the town is much more known because of the Battle of Kobarid, which happened in October 1917, during the First World War. During the Second World War, Kobarid was the center of the liberated territory, the so called Republic of Kobarid (Photo: Luiz E.P.Travassos 2008).





Figure 104 – Cave of St. Anthony the Hermit (Sv. Anton puščavnik) located in Kopaň, about 25 km from capital Ljubljana (Photo: Luiz E.P.Travassos 2008).



Figure 105 – A) Picture of one oratory dedicated to Our Lady of Lourdes. B) Detail of the decoration made with speleothems. Such practice must not be encouraged (Photo: Luiz E.P.Travassos 2009).



One can say that people not only related caves to faith and Christian practices. Often the underground was also regarded as a source of exaggerated superstition. Again, the first author who mentions this type of human relationship with the Slovene underworld was Valvasor (1689), who reported two types of caves: the *thunderstorm caves* and the *blessed caves*, respectively.

The so called storm caves were identified as places where witches could start storms and hailstorms that would emerge from these cavities damaging or destroying crops. Valvasor already referred specifically to the *Coprniška Jama* (Witches' Cave) as it is still called today. Its entrance is located near the summit of Mt Slivnica above *Cerkniško polje* (an extensive karst floodplain). The location of its entry is shown and described in Valvasor's map of the Lake of Cerknica (Figure 106) as "the hole of the storm; the meeting place of witches" (Valvasor 1689).

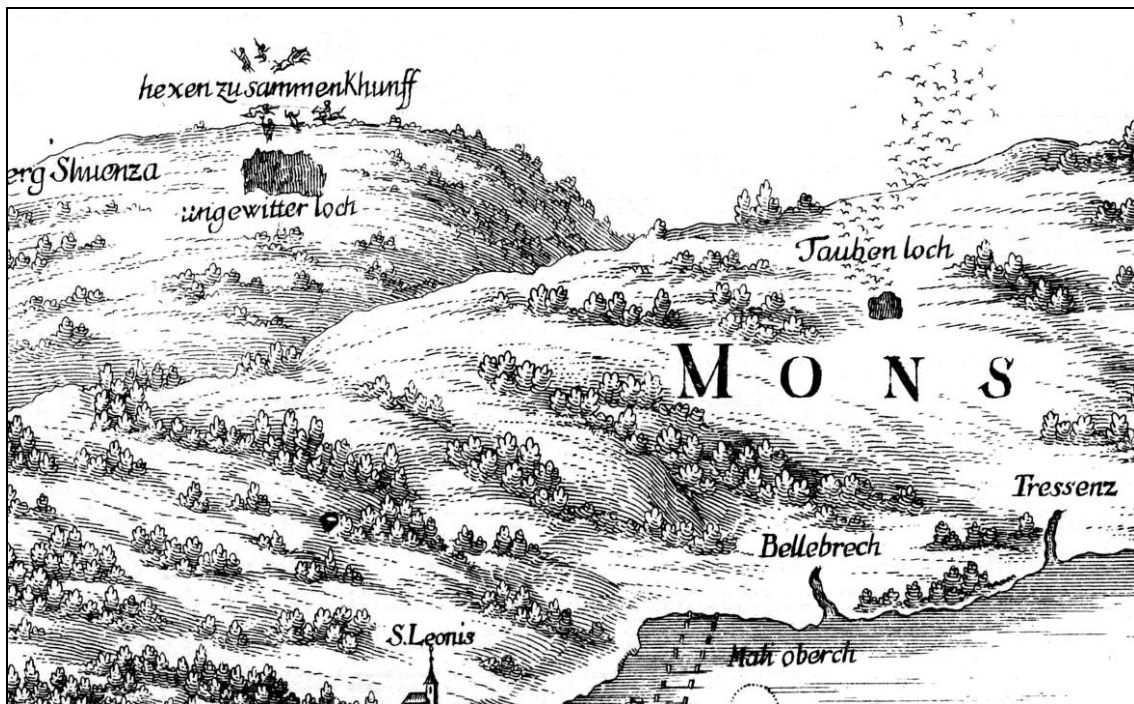


Figure 106 – Illustration of the location of *Coprniška jama* (Witches' Cave) at Mount Silvinica, as perceived by Valvasor (1689).

Nagel (1748) states in his report that Valvasor used a lot of superstition and little reason to explain some phenomena. The most notable for the scope of this dissertation is the affirmation of Valvasor (1689) that the condensed fog coming from the caves represented diabolical smoke.

The same cave is mentioned in the manuscripts of Nagel (1748), as well as in *Oryctographia Carniolica* of Hacquet (1778). Both writers mentioned superstitious habits of people who poured pitch into the cave entrance as a way to appease the devil. In other cases, they feared that such practice would upset the devil or witches who, in retaliation, would cause a storm. In 1778, the Enlightenment scholar Balthasar Hacquet was strongly against the superstitious ideas of the people and invited two priests to the entrance of a cave to show that these events were pure superstition. His “experiment” consisted in throwing a large stone inside the shaft where it was supposed to start a storm or threaten the devil. Of course, none of the two hypotheses were confirmed (Kranjc 2009).

In opposition to the “thunderstorm caves” Kranjc (2009) remembers the “*blessed caves*” (wide and deep shafts) that the popular tradition conceived as portals to hell and places where the devil could ascend to the upper world. In order to prevent such movement, priests used to organize annual processions to many of such caves and used to bless them. During the procession, the participants were encouraged to gather wooden sticks and stones, in order to throw them inside the shafts by the end of the ceremony. By doing this, people thought that this action would block the passage to their world. Perhaps that is why in some Slovenian caves there is a huge amount of rocks, gravel and organic material not related to the cave and its vicinity. One way of identifying a blessed cave is by its name and also, the rocky material in its interior.

In 1982, Ivan Gams proposes the classification of Slovenian caves in the following types: 1) Places of worship, 2) Dwelling places of fabulous creatures, 3) Place of mineral extraction, 4) Thunderstorm caves, 5) Caves of defensive use; 6) Temporary or permanent refuge; 7) Caves used in the fight for national liberation; 8) General deposits, 9) Places of water, snow and ice supply; 10) Tourist caves and 11) Places where sewage, garbage and animal carcasses are discharged.

As described above, one can say that in the popular Slovenian literature (stories, legends and popular anecdotes) caves are often mentioned or even appear as the main scenario of the events as positive or negative landforms. However, nowadays, one cannot say (with rare exceptions) that people have these feelings or show some form of exacerbated superstition regarding caves. What happens with some frequency is its religious use as churches or chapels.

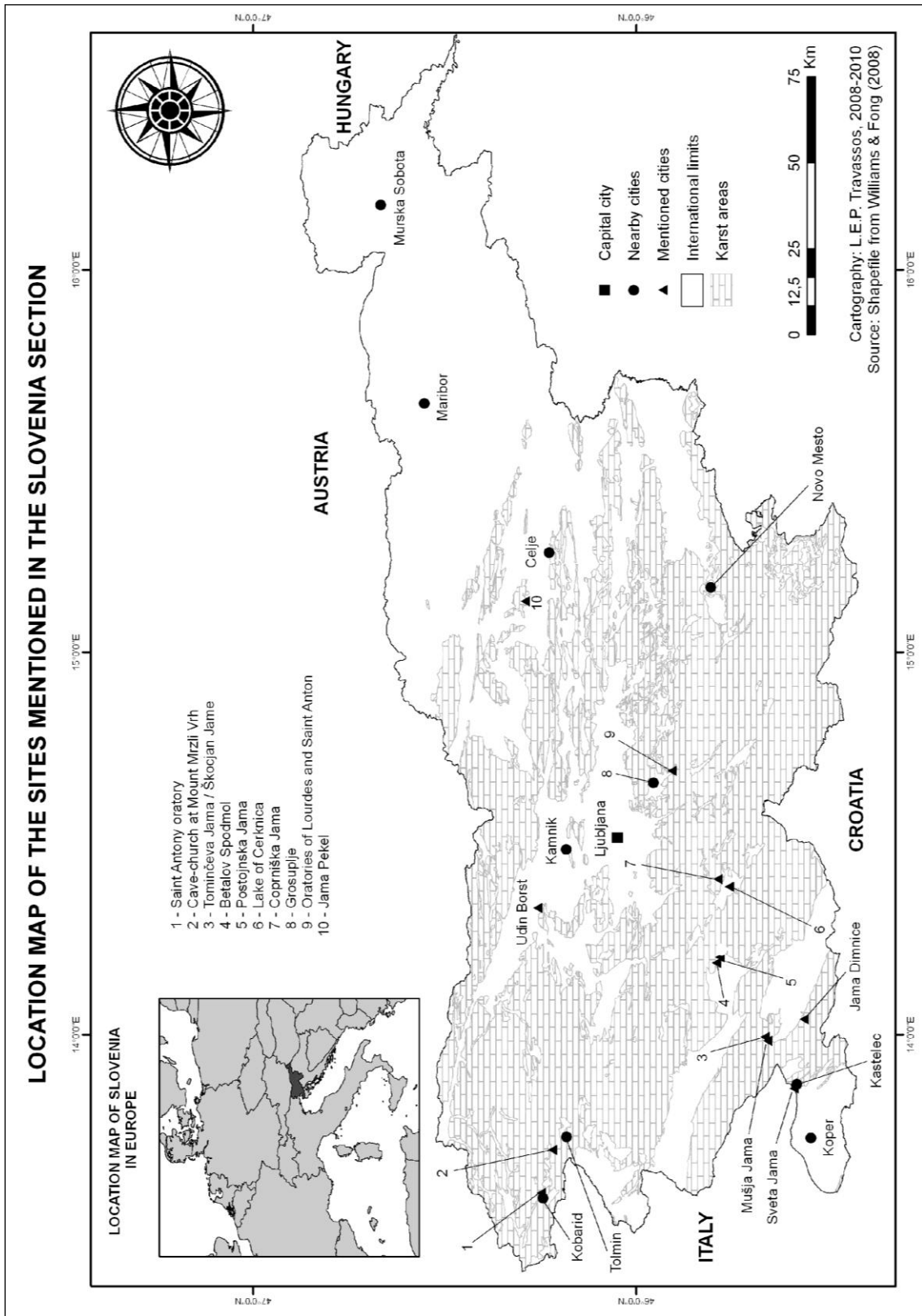
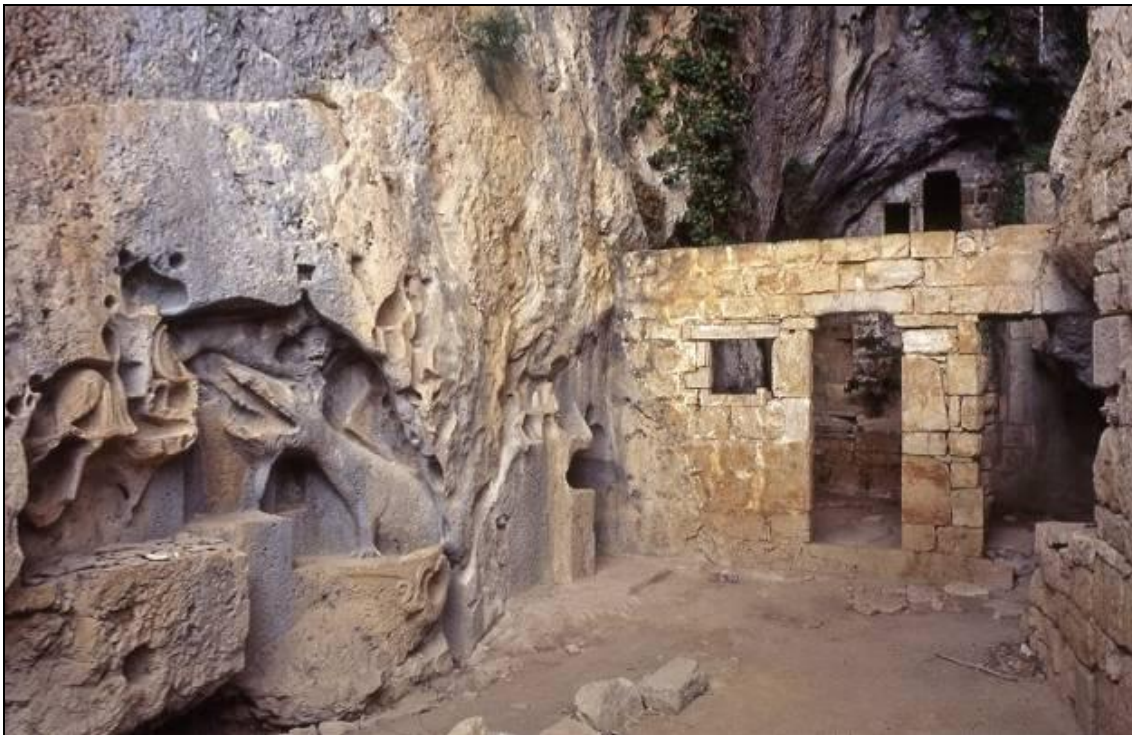


Figure 107 - Location map of sites mentioned in this section.

#### 2.1.4.6 Croatia

This country has many small caves with historical records of religious use. The most interesting caves, perhaps, are those used as hermitages in the Dalmatian islands. In the region, many monks fled to the caves during the Turkish advance in the 17<sup>th</sup> century. An example of this usage is the Dragon's Lair (*Dragonija Jama*) shown in figure 108.



*Figure 108 - Detail of a cave that served as shelter for the hermits during the Turkish invasion of Croatia. one can identify the fortification at the entrance, and a curious panel of sculptures depicting scenes supposedly of the Apocalypse (Photo: Stašo Forenbaher, 1980).*

According to Božić (2008), clergy members contributed significantly to the evolution of caving in the country, especially due to the fact that for centuries they have devoted themselves to tasks related to education and culture. For this reason, many cavers use today the data collected by these individuals.

Consequently Božić (2008) calls Šević (1918) who recorded the fact that the first accounts of Dalmatian caves made by religious figures happened between the years 340-420 AD. A Dominican monk had recorded caves at Cavtat<sup>111</sup> in 1595 and a

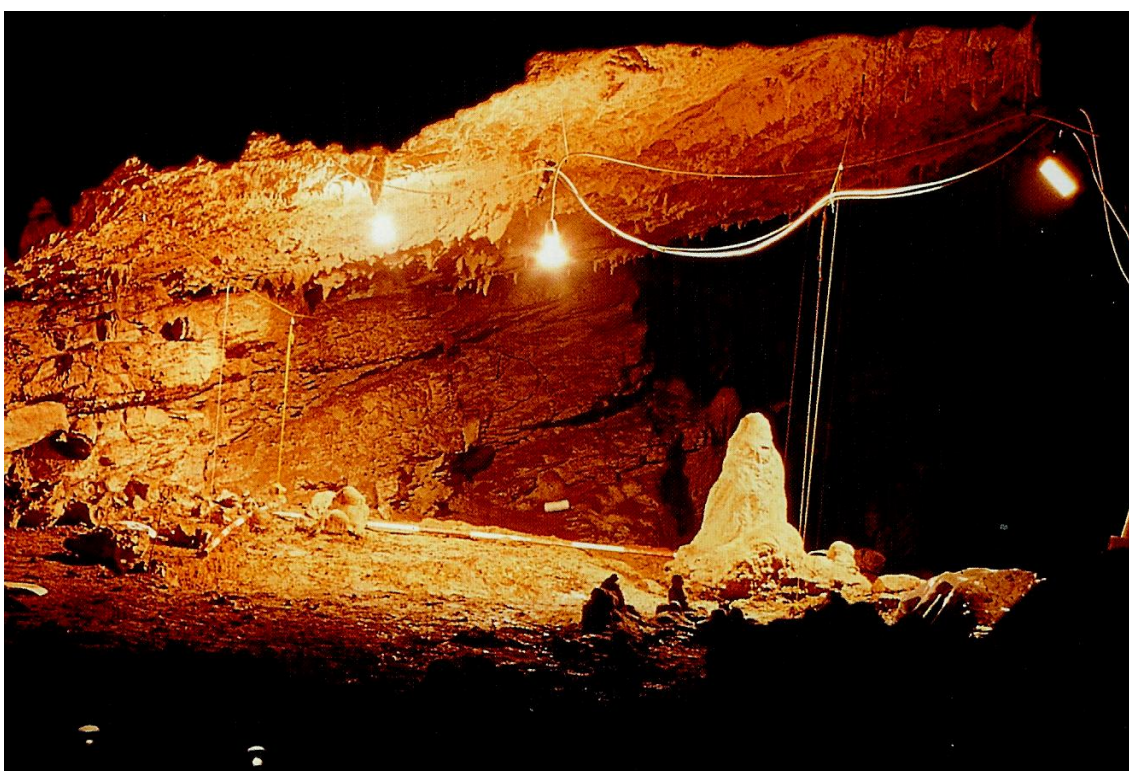
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<sup>111</sup> Located 12 km southeast of Dubrovnik.



Benedictine monk had recorded caves on the island of Lastovo<sup>112</sup> in 1601. Numerous other caves were recorded since then, many of which were used as hermitages.

It should also be acknowledge the work of Kaiser and Forenbaher (2005) who have identified the occupation and ceremonial use of the Nakovana Cave since the Early Neolithic (6,000 BC), continued through the Copper Age (3,500 – 2,300 BC), the Bronze Age (2,300 – 800 BC), and the Iron Age (8<sup>th</sup> – 4<sup>th</sup> centuries BC), and ended during the Hellenistic period (4<sup>th</sup> – 1<sup>st</sup> centuries BC). The authors emphasize the ritual use of a stalagmite as the focus of ritual activities. This hypothesis was drawn due to the presence of ceramics that were organized immediately in front of the stalagmite (Figures 109). Most of the vessels or containers (bowls, jars and dishes) are related to drinking and food and the evidence suggests feasts, a practice used elsewhere by generous leaders to ensure the gratitude of his followers. The remains of animals found were identified as goats and sheep, which typically integrate traditional items for this type of event.



*Figure 109 – Detail of the room where is located the stalagmite, Center of the rituals (Source: Kaiser & Forenbaher 2005).*

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<sup>112</sup> An Island of Dalmatia at 340 km from Zagreb.



For Kaiser and Forenbaher (2005), in the eastern Adriatic, the last centuries BC were problematic and punctuated by wars. The male power and warrior skills were viewed as very important and, indeed, the Illyrian iconography of that period often presents images of men fighting in a state of sexual arousal.

For this reason, the rituals centered on a stalagmite from the Nakovana Cave can symbolize a particular divine association or a more general evocation of the masculine fertility, power and traditional qualities of a warrior such as strength and bravery. Perhaps the benevolence of supernatural forces were to be guaranteed for feasts and gifts by Illyrian leaders and their followers before moving out to risky journeys by sea or land. Or perhaps the offerings were only signs of gratitude after their successful returns.

In any case, Kaiser and Forenbaher (2005) argue that part of the wealth acquired was left behind in the darkness of the cave, marking its ancient celebrations. Since the Illyrians left no written records about their culture, the Nakovana Cave offers an unique and privileged view of their spiritual world during their dynamic end of century.

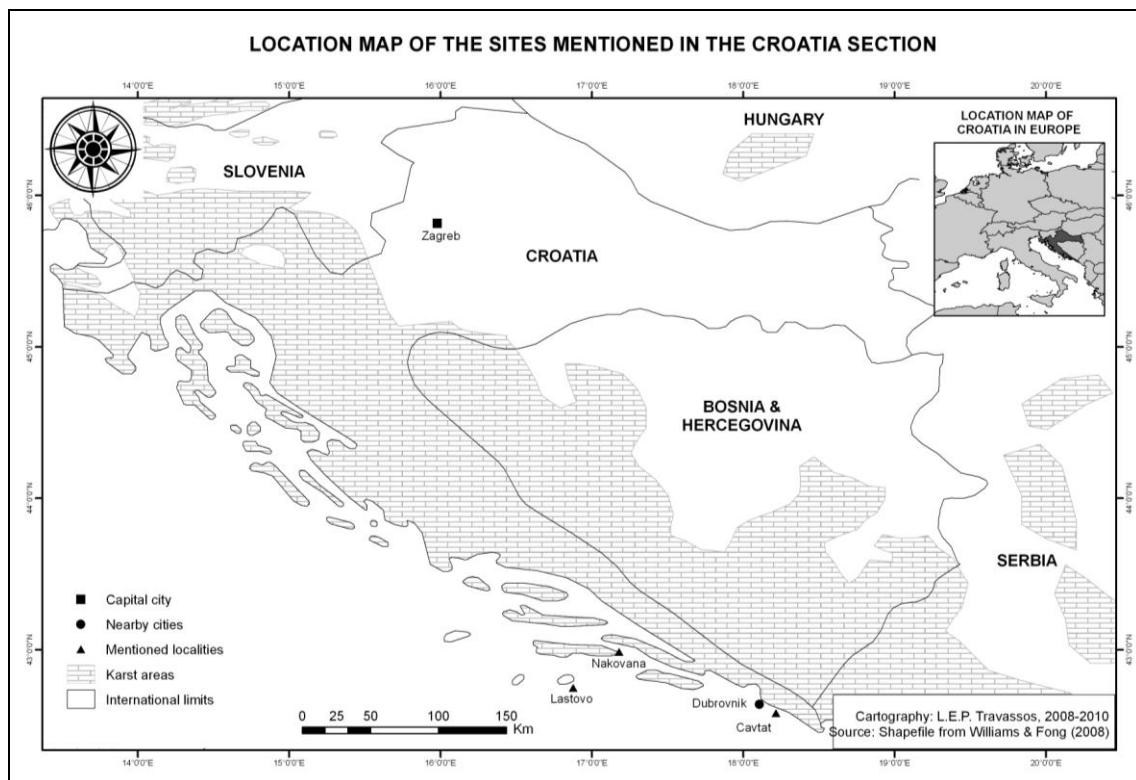


Figure 110 - Location map of sites mentioned in this section.

### 2.1.4.7 Hungary

A country located to the east of Austria and Slovenia, Hungary (Figure 111) stands out in the cultural religious tourism in caves by having in Budapest the Cave Church of St. Istvan. Located on the Gellert Hill near the Bridge of Freedom (Szabadsag Hid) the cave is remembered by Hayes (2005-2009) as the only cave-church under the care of the Order of the Hungarian Pauline monks. Closed during the communist period, it was reopened in 1989 and is much visited today.

It was originally the home of St. Istvan, a hermit monk who claimed to have been cured of diseases with the thermal waters which emanate from the cave. The cave-church was founded in 1926 with the expansion of the hermit's cave. It was again enlarged in 1930 by the Archbishop of Kalocsa in order to accommodate more pilgrims based on the model of the Grotto of Lourdes, France.

In 1951, the Communist Secret Police arrested all the monks of the Pauline Order. The superior, Ferenc Vezer, was sentenced to death and others were sentenced to 5 to 10 years in prison. The chapel was blocked with a concrete wall about 2.25 meters thick for nearly 40 years. With the fall of communism in 1989, the cave returned to the care of the Pauline Order and was immediately reopened (Figures 112, 113, 114 and 115).

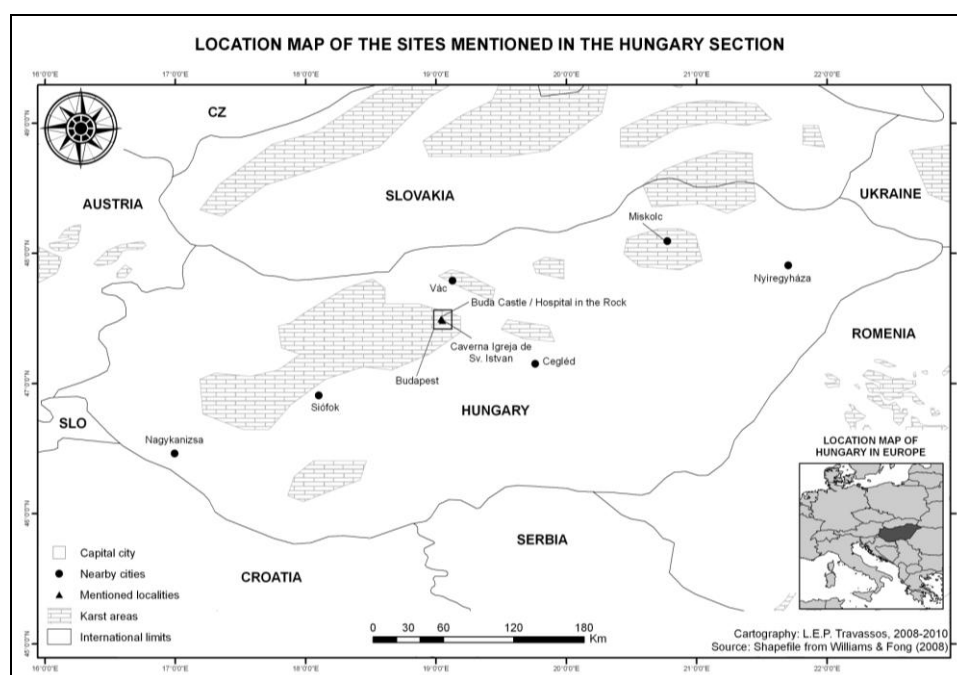


Figure 111 - Location map of sites mentioned in this section.



*Figure 112 – General aspect of the Gellert Hill to the left and a view of the Buda Castle at the back of the Picture. Under the castle is located an underground hospital utilized during the Second World War by civilians and German soldiers. During the Cold War, the place was modified to serve as a nuclear shelter (Photo: Luiz E.P. Travassos 2009).*



*Figure 113 – Aspects of the monastic constructions in the outcrops of the Gellert Hill (Photo: Luiz E.P. Travassos 2009).*



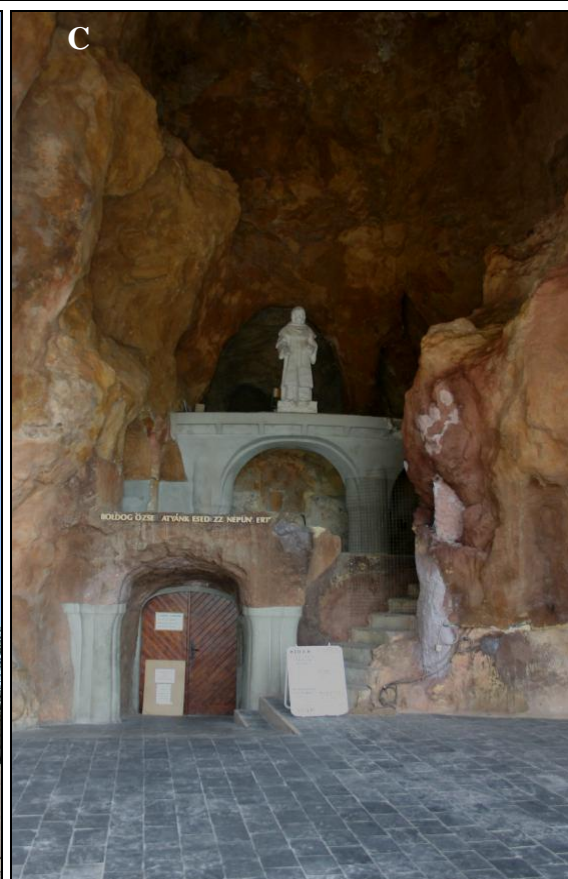


Figure 114 – A) General view of the outcrop where the cave-church is located. B) Entrance to the Cave-church of Budapest. It is possible to see the marks of the concrete wall which closed the cave in the past. C) Images in the entrance of the cave-church (Photo: Luiz E.P.Travassos 2009).



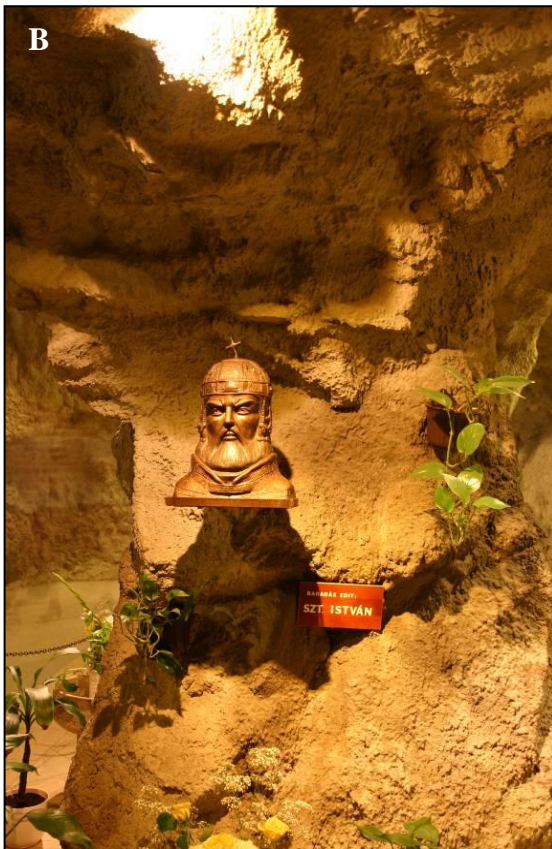


Figure 115 - Details of the interior of the Cave of Saint Istvan. A) Main altar of the cave. B) Detail of the image of Saint Istvan located in the center of the cave just inside the entrance. C) Niche where the image of the Patron and other liturgical items are located. D) Secondary altar and oratory (Photos: Luiz E.P. Travassos 2009).



### 2.1.4.8 Bulgaria

In this country it is interesting to highlight the important cultural site of the Churches of Ivanovo<sup>113</sup>, listed by UNESCO in 1979 (Figure 116). The churches are located on a plateau that extends in N-E direction. Christian monks began excavating the natural caves of the region in the 8<sup>th</sup> century. A monk named Joachim started the digging of the first cave. Later, he became an Archbishop of the Bulgarian Orthodox Church. From the approximately 300 existing cave-churches, the Church of the Holy Virgin (Holy Virgin Church) is the best preserved. With the Ottoman invasion of the region in the late 14<sup>th</sup> century, the churches have been abandoned, however, leaving an important record of Orthodox religious art.

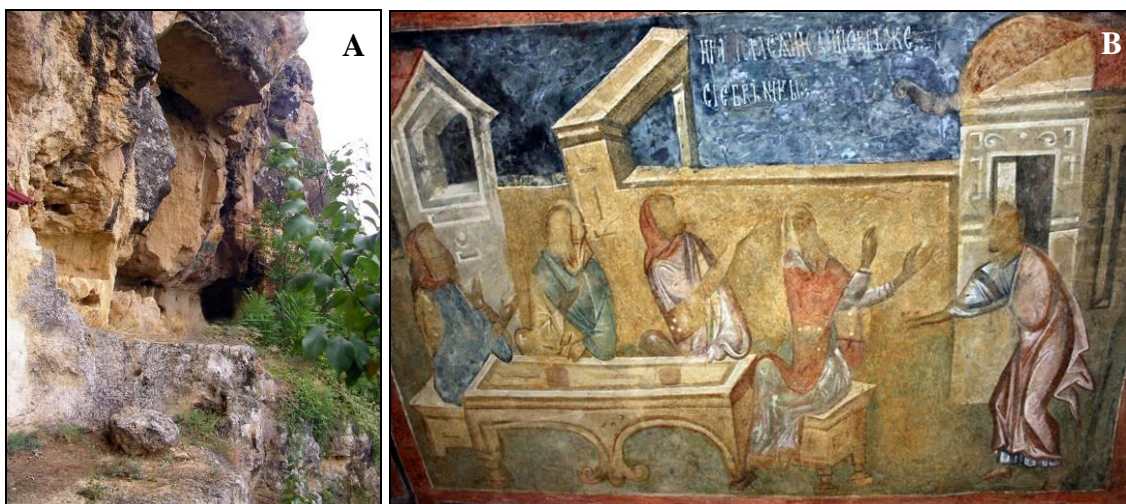


Figure 116 – A) General aspect of one of the Churches of Ivanovo. B) Example of one of the frescoes preserved in the interior of the caves (Photo: [www.explore-bulgaria.net](http://www.explore-bulgaria.net)).

Another important cultural monument is identified by Olsen (2007): The Rila Monastery<sup>114</sup>, located next to the cave where a hermit named Ivan Rilski decided to isolate himself in the beginning of the year 927. The cavity is located not far from where today is the Monastery (Figure 117). Later, after his canonization by the Orthodox Church of the East, Rilski became known as Saint John of Rila.

The construction of the monastery was started by his followers who went to the mountains to receive a Christian education. The site is a recognized as sacred place within the Eastern Orthodox Church, being the most significant Bulgarian sacred place.

<sup>113</sup> Site located 245 km northeast of the capital Sofia.

<sup>114</sup> Site located 70 km from the capital Sofia.

UNESCO recognized the site in 1983 and considers it a monument that symbolizes the Slavic cultural identity that endured and resisted centuries of occupation.



Figure 117 – A) Detail of a sacred spring near the cave. B) Sacred cave near to the Rila Monastery (Photo: Public gallery of Ansen 2007).

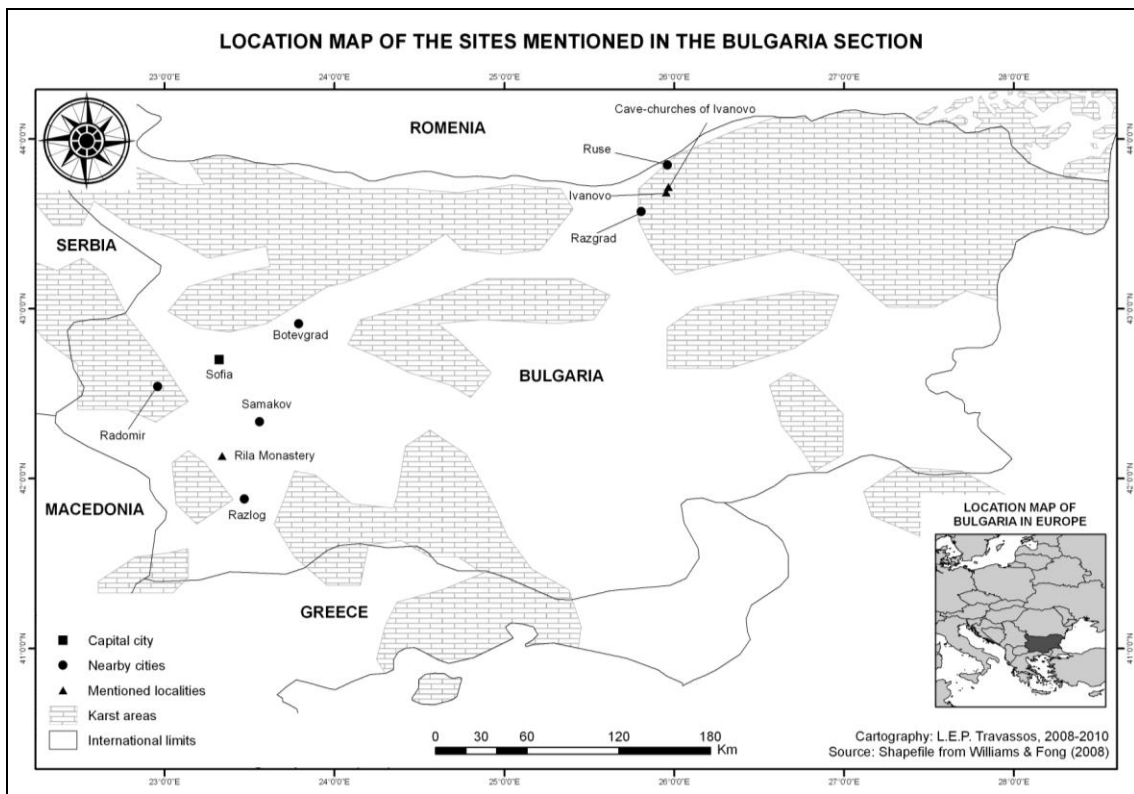


Figure 118 - Location map of sites mentioned in this section.

#### **2.1.4.9 Greece**

Region widely known by the mythology and hence the imaginary associated with caves, Greece also presents interesting examples of cultural and religious use of the underground. Perhaps the region is best known for Mount Olympus, where all the gods of Hellenistic religion supposed to live.

UNESCO registered the Archaeological Site of Delphi in 1987. The region of the sanctuary of Delphi, is considered to be a landscape of great scenic beauty and sacred meaning. Especially in the 6<sup>th</sup> century BC the region was the religious center of Ancient Greece.

Durando (2005) notes that the site is located 570 meters above sea level. It was the place of the legendary victory of Apollo over the Python, the serpent-dragon guardian of the cave, daughter of the Great Mother Earth. According to myth, Apollo inherits the guardianship and powers of the mysterious and primordial natural force that would flourish from the cave (Figure 119). The geographer Strabo said that at Delphi there was a deep cave with a narrow mouth from where the vapors used to produce a divine possession (Hayes 2005-2009).

In the country, UNESCO also list Meteora as a World Heritage site in 1988. In a region of almost inaccessible sandstone peaks, monks established a monastery in the 11<sup>th</sup> century. Other 24 monasteries were built, even with the location difficulties in order to revive the ideal of pursuing isolation in the 15<sup>th</sup> century. At the monasteries, frescoes of the 16<sup>th</sup> century mark the development of a post-Byzantine painting phase. Hayes (2005-2009) highlights the Varlaam Monastery, named after the first monk who built a small chapel in the rock in the 14<sup>th</sup> century (Figure 120).



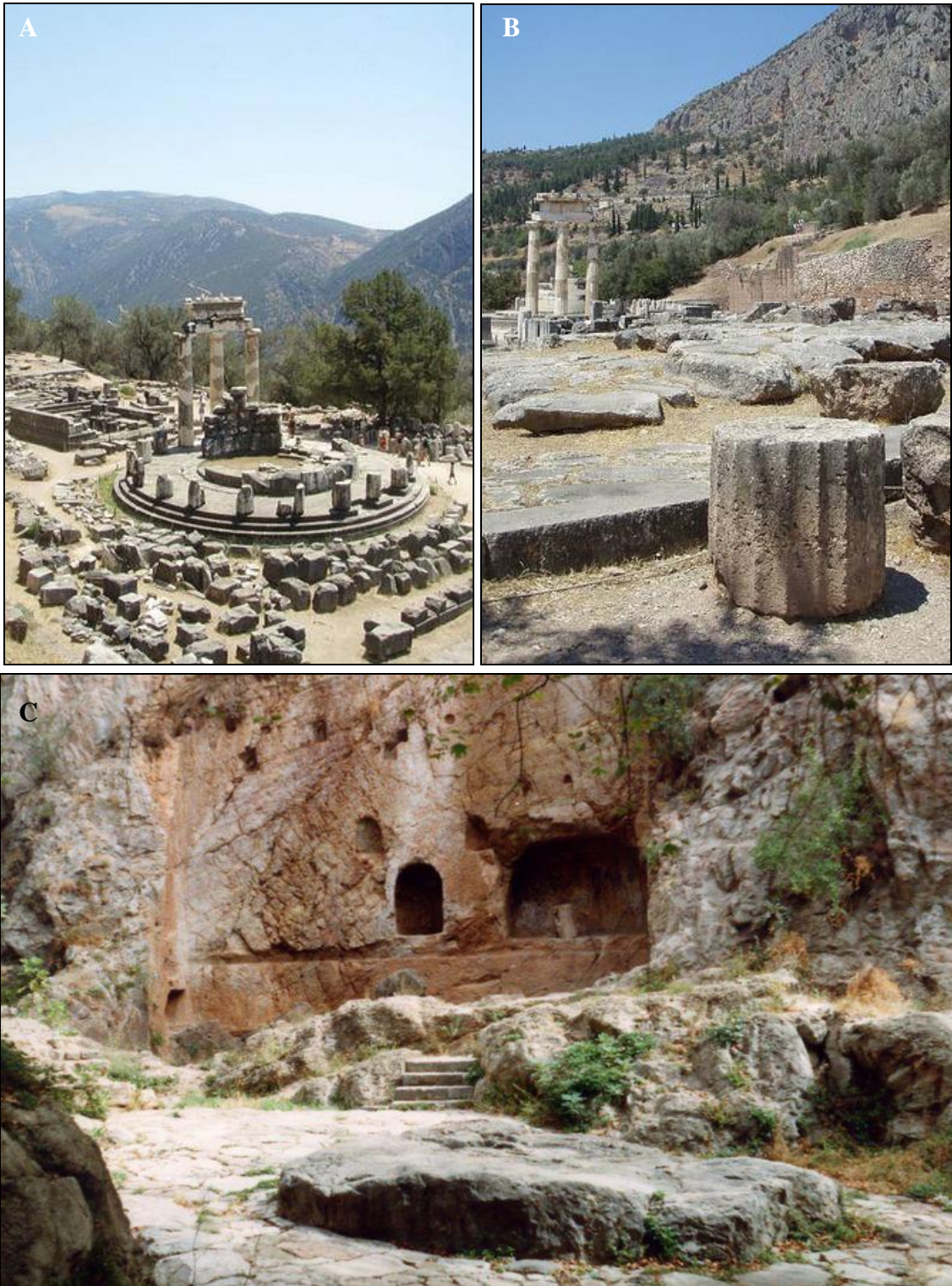


Figure 119 – A-B) Views of Mount Delphi (Photos: Franc Malečkar 2008). C) Picture of the cave where Apollo would have faced Python (Photo: Public Domain quoted by Hayes 2005-2009).





Figure 120 – Details of the region of Meteora and of the Varlaam Monastery (Photos: [A-B] Franc Malečkar 2008 [C-D] UNESCO/B. Doucin & L. Lalité).

From the point of view of the present dissertation it is also important to mention the Cave of the Apocalypse on the island of Patmos. The island is mentioned in the book of Revelations

I, John, your brother and fellow partaker in the tribulation and kingdom and perseverance which are in Jesus, was on the island called Patmos because of the word of God and the testimony of Jesus. I was in the Spirit on the Lord's day, and I heard behind me a loud voice like the sound of a trumpet (Revelations 1: 1-9).

Listed by UNESCO in 1999, tradition says that the Apostle John would have been exiled in Patmos around the year 95 AD and would have received the divine revelations through a voice that came from the rock. Later, a temple and the Monastery



of the Apocalypse were built in the vicinity of the cave where John had received the revelations (Figure 121).



Figure 121 – The Monastery of Saint John and the Cave of the Apocalypse (Photo: Sacred Sites/Martin Gray/Martin Gray cited by UNESCO)

At Crete, also in Greece, Steward (2005) recalls the many caves associated with mythology. Zeus, king of the gods was born in a cave of Mount Aegean known today as *Psychro*. The *Amnisos* Cave, also on the island of Crete, is considered a sanctuary of *Artemis*, the goddess of fertility. The god of the winds and air, *Aeolus*, used to keep the winds in a cave. These were released only when instructed by the gods of the Olympus. To Budin (2004), many of the caves were important sanctuaries since the Neolithic period. Initially they served as places of dwelling residence, ceremonial burial sites and then, as sacred places.



Figure 122 - Location map of sites mentioned in this section.

### 2.1.5 Africa

When discussing the emergence of mankind and the distribution of primitive man in the world, the African continent often is remembered as the “cradle of mankind”. In southern Africa, the oldest archaeological finds of the *Australopithecus africanus* were found in 1924 at the Sterkfontein Cave.

Although not developed in carbonate rocks (“classical karst”), emphasis is given to the site *Tassili n’Ajjer*, Algeria, North Africa. The region, listed by UNESCO as a World Heritage Site in 1982 excels due to weathered sandstone formations that favored the creation of an unique landscape. Furthermore, it is considered one of the largest groupings of prehistoric art with around 15,000 rock carvings and cave paintings from 6,000 BC.

More recently, in 2001, UNESCO recognized the importance of Tsodilo, a site located northwest of Botswana. As in Algeria, the region has a large concentration of rock paintings and is called the “Louvre of the Desert”. Tsodilo has more than 4,500 paintings preserved in an area of 10 km<sup>2</sup> of the Kalahari Desert (Figure 123). Archaeological evidence record human activities and environmental changes from at

least 100,000 years. The local people consider the site as a place of worship frequented by ancestral spirits.

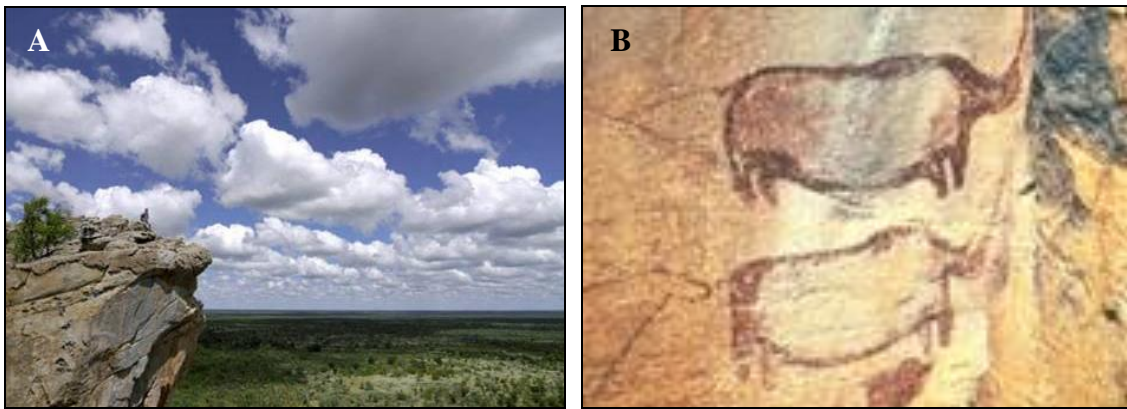


Figure 123 – A) The Mountain of the Gods of the San Bushman culture, Tsodilo. B) Detail of one of the rock panels of the region (Photo: UNESCO/OUR PLACE - The World Heritage Collection).

In Ethiopia, Hayes (2005-2009) highlights the cave-churches of the small town of Lalibela. Listed by UNESCO in 1978, there are altogether 11 churches carved from a single block of granite from the top to the ground level. Dating back to the 13<sup>th</sup> century, the churches have been built to become a “New Jerusalem”, and today they are considered to be an important point of Christian pilgrimage in the country (Figure 124).

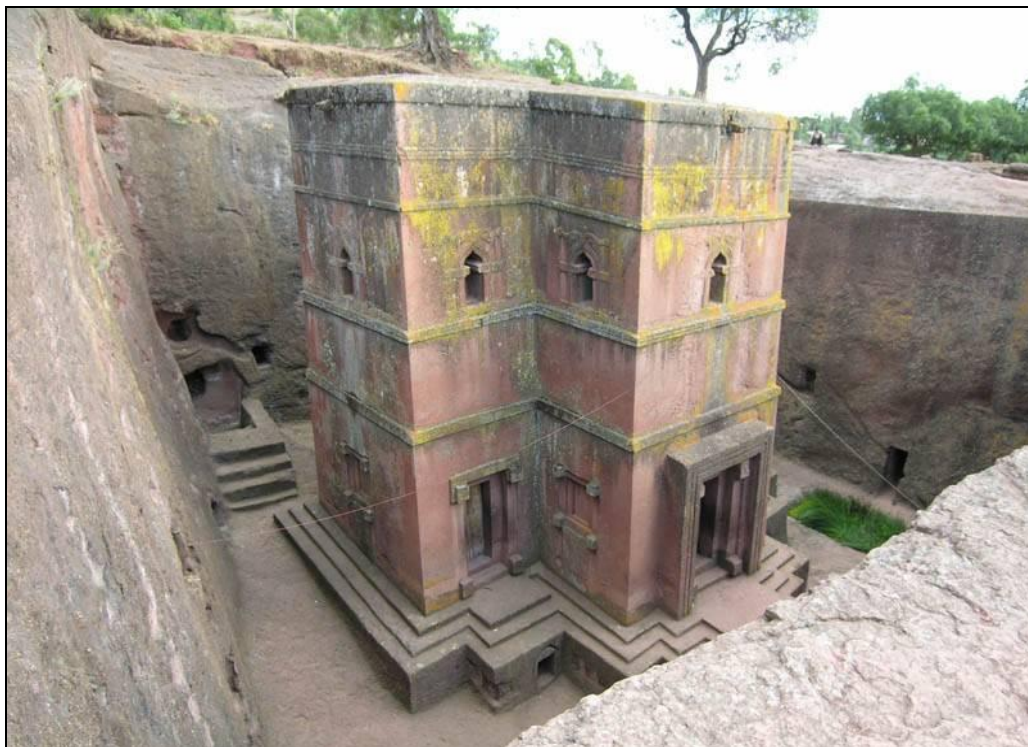


Figure 124 – General aspect of one of the eleven rock caves of Lalibela (Photo: UNESCO/F. Bandarin 2005).



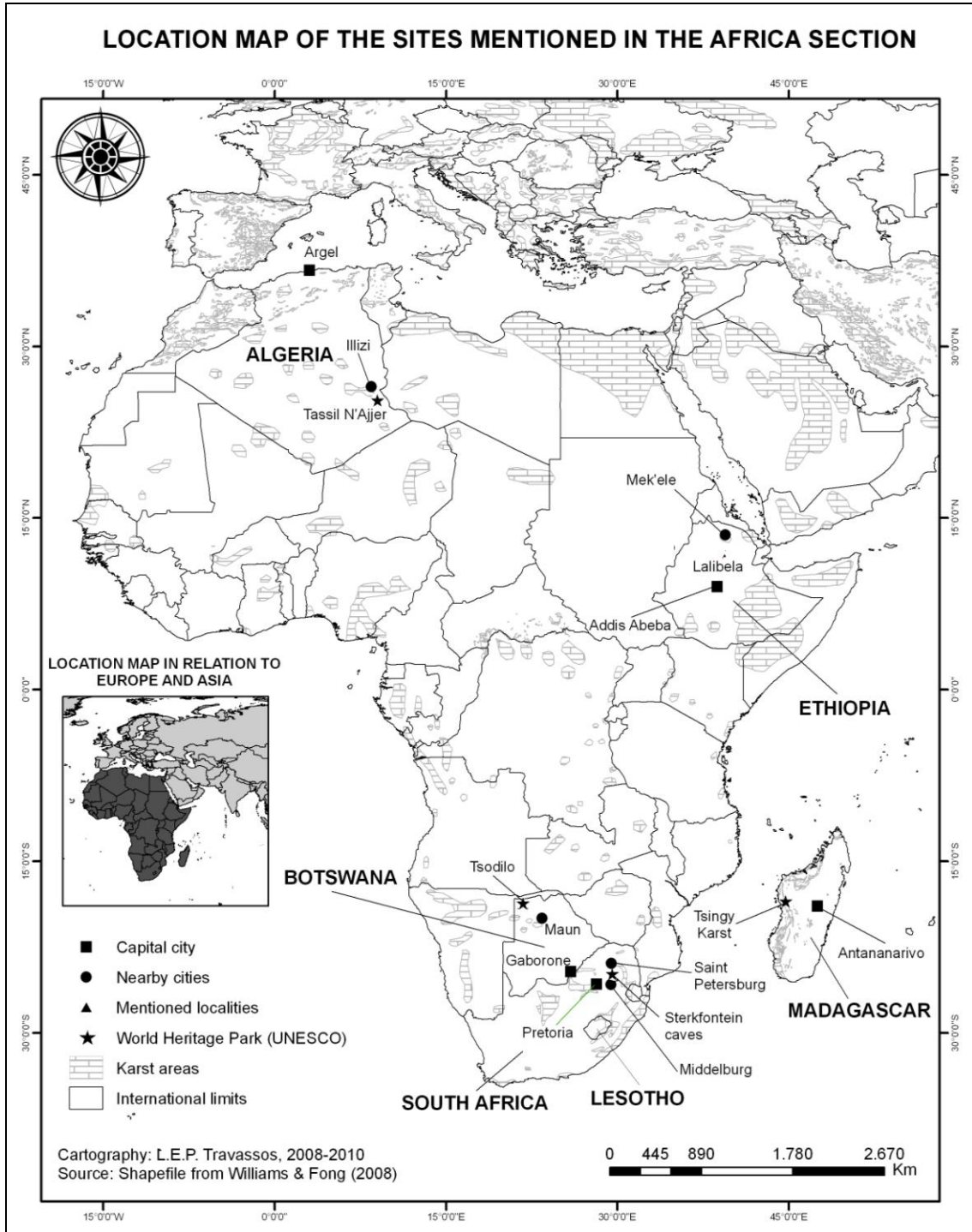


Figure 125 - Location map of sites mentioned in this section.

### 2.1.6 Asia and Middle East

Numerous records of religious use of caves can be identified, especially in China in Southeast Asia. In addition, there are examples in Turkey, Syria, Israel, Jordan, India, Sri Lanka, South Korea and Japan. Caves in the Middle East are remembered by

Goldberg and Bar-Tosef (2005) when they say that many records of human use of these spaces date back from at least 400,000 years.

For this region Golwett (2007) highlights the funeral of a young Neanderthal in a cave in the region of Teshik Tash, Russia. The evidence of a burial ritual is evidenced by the careful arrangement of the skeleton in the center of a circle of wild goat's horns. A fire located near the burial place may be also related to the ritual.

In Iraq, regarding the Cave of Shanidar, Golwett (2007) points out that the discovery of pigmented skeletons and the presence of pollen near the skulls of the individuals suggest a ceremonial or sacred burial.

### 2.1.6.1 Turkey

Hayes (2005-2009) highlights four sacred sites in Turkey. From these, two were listed by UNESCO. The first, Göreme National Park, was registered as World Heritage in 1985 (Figure 126). Located in Cappadocia<sup>115</sup>, it presents a landscape sculpted by natural weathering that was used for the excavation of shrines that are the only evidence of Byzantine art in the region. Moreover, troglodyte villages and underground cities are the vestiges of traditional houses dating from the 4<sup>th</sup> century.

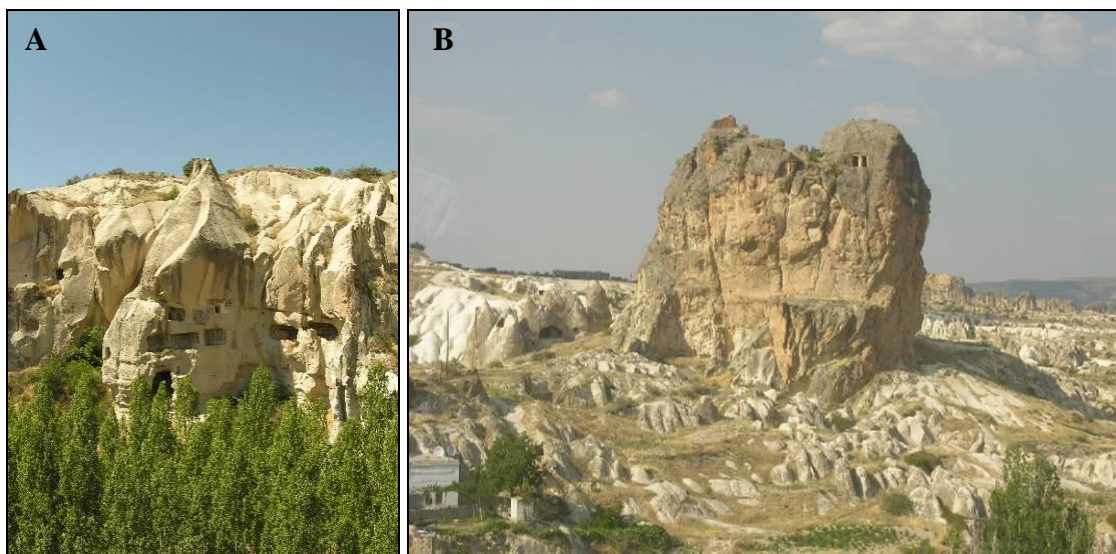


Figure 126 – General aspects of the Göreme Valley with some of the caves transformed in dwelling places or churches (Photo: UNESCO / Francesco Bandarin 2006)

<sup>115</sup> Region about 570 km southeast of Istanbul.



The second site registered by UNESCO in 1988 is the Hierapolis of Pamukkale<sup>116</sup>. Hot springs coming from the limestone cliffs formed travertine dams over the years, making an impressive landscape. Hayes (2005-2009) points out that it is common to say that its foundation is attributed to Eumenes II, King of Pergamun (197 - 159 BC). However, it is more likely that the Hierapolis (“Holy City”) has been established in the 4<sup>th</sup> century BC. For the religious community, the city is mentioned in the book of Colossians (4:13) “*For I testify for him that he has a deep concern for you and for those who are in Laodicea and Hierapolis*”. For this dissertation, one can highlight a cave south of the Temple of Apollo. Known as Plutonium it would be the entrance to the underground, or the domain of the roman god Pluto (Hades in Greek mythology).

In the hills of Ephesus<sup>117</sup> are locate important Christian frescoes and inscriptions, especially at the Grotto of St. Paul (Figure 127). Hayes (2005-2009) states that although it is not known for sure if any church of Ephesus was dedicated to St. Paul one can say that the cave found on the hillside of Bülbüldag is considered to be sacred. The Grotto of St. Paul was named by its discoverers in 1906 because it presents frescoes that highlight this biblical character.



Figure 127 – Details of the frescoes found inside the cave-churches. A) The interior of Apple Church. B) Detail of a nativity scene inside the Dark Church  
(Photo: Dick Osseman, <http://www.pbase.com/dosseman/elmali>).

<sup>116</sup> Site located about 350 km south of Istanbul.

<sup>117</sup> Region located 365 km to southwest of Istanbul. If the reference is Athens, Ephesus is located 320 km to the east after crossing the Aegean Sea.



Figure 128 – Detail of the entrance and interior of the Grotto of St. Peter (Photo: Dick Osseman, <http://www.pbase.com/image/31447412>).

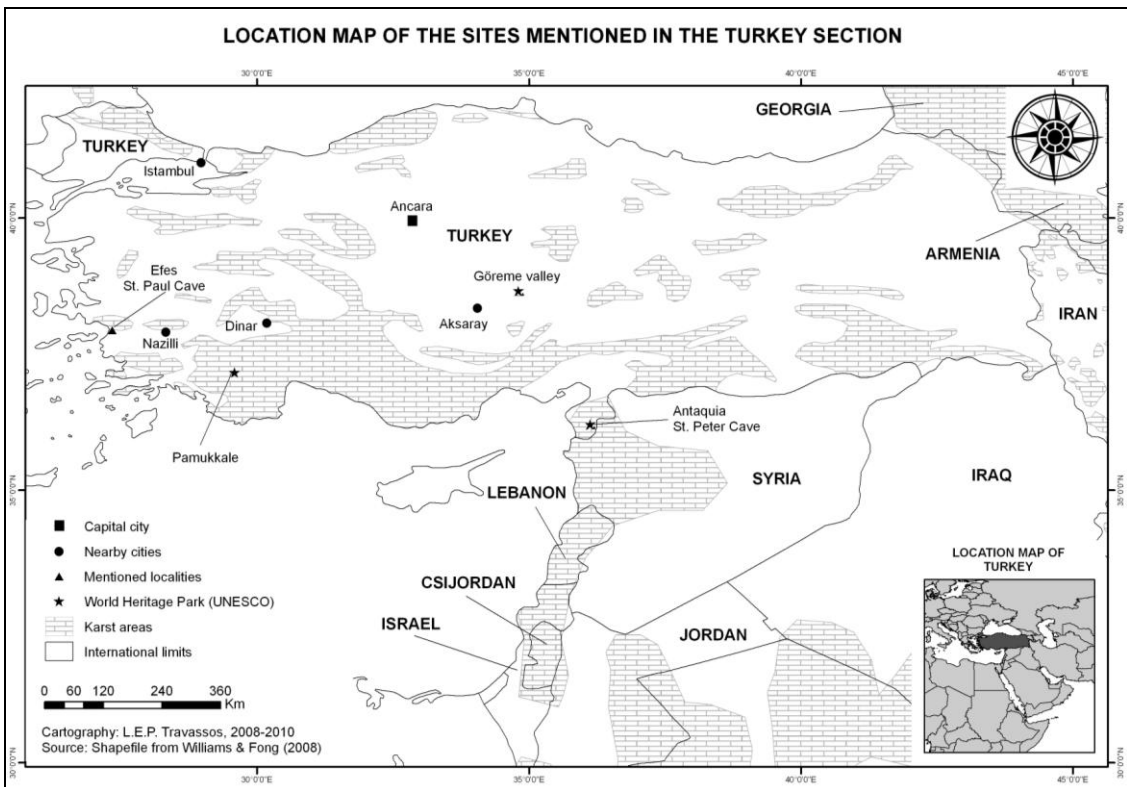


Figure 129 - Location map of sites mentioned in this section.



### 2.1.6.2 Syria

Hayes (2005-2009) identifies the Monasteries of Maalula, located about 50 km from Damascus, towards Lebanon (Figure 130). The author says that Aramaic is still spoken in the region and the name Maalula means “the entrance”, referring to its geographical position in the middle of a gorge. The town is predominantly Christian, but Muslims also seek the region in their pilgrimage.

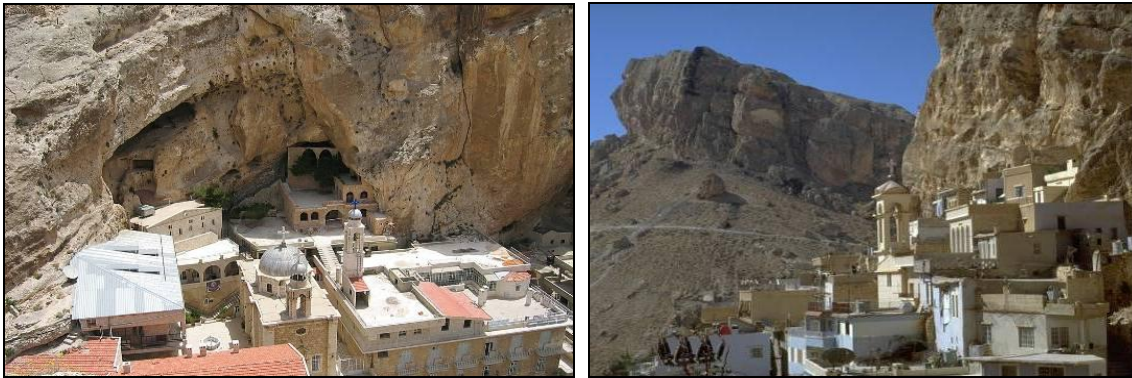


Figure 130 – One of the slopes of the Maalula Monasteries (Photo: Thriol and Public Domain quoted by Hayes 2005-2009).

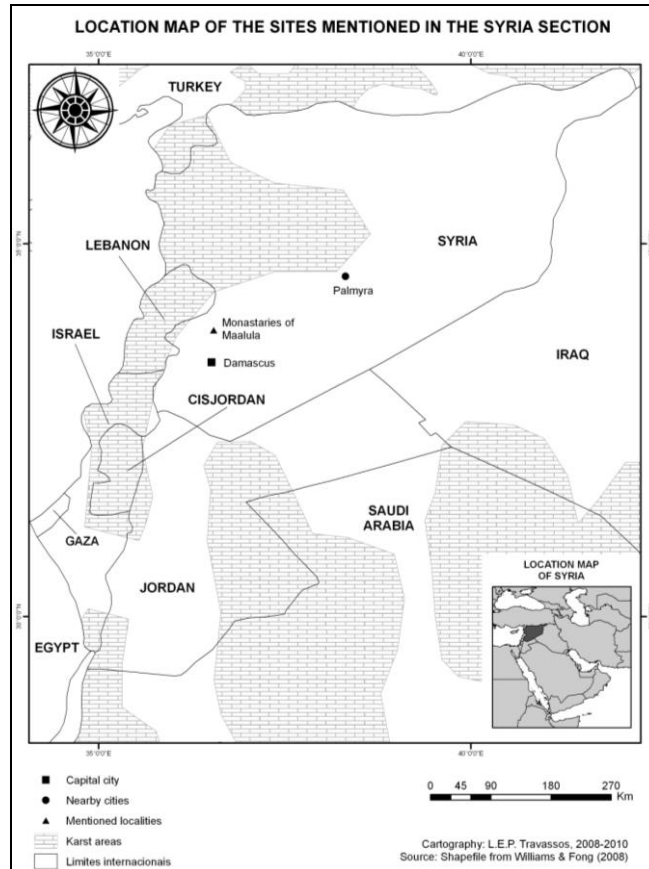


Figure 131 - Location map of sites mentioned in this section.

### 2.1.6.3 Israel

Known as the “Holy Land”, the country has important and numerous records associated to the main focus of this dissertation. One can observe the records in the biblical text itself, as mentioned before, or more scientifically, in almost 40 other records relating to the term cave in the Encyclopedia of the Holy Land, written by Negev and Gibson (2005).

Kochav (2006) recalls the discovery of archaeological remains of prehistoric man from at least 500,000 years in the caves of *Skhul*, *El-Wad*, *Jamal* and *Tabun* on Mount Carmel<sup>118</sup>. The author also points out the use of the underground by the Jews after their expulsion from Jerusalem in 70 AD when they gave settled in Galilee and in the far west of *Izreel* Valley. The region was also known as the catacombs of *Beit Shearim*<sup>119</sup>.

Still considered to be a controversial subject, but important to be mentioned in this section are the Dead Sea Scrolls found in caves of the ancient community of Qumran in the Judean desert, about 25 km east of Jerusalem. According to Gibson (2008:165) members of “*the sect have always waited for an apocalyptic holy war*” and it has been proved by scholars while reading one of its scrolls which talked about a “*battle between sons of light and darkness and it most closely resembled to a military manual*” (Gibson 2008, 165).

Nearly 900 documents were discovered between 1947 and 1956 and are virtually the only biblical documents of the 1<sup>st</sup> century AD (and possibly some of the 3<sup>rd</sup> century BC) that have been preserved until today and they are considered one of the oldest testimonies of the Judaism. It is said that in 1947 a shepherd entered a cave and found a large number of amphorae containing rolls of papyrus. An archaeological investigation later found eleven caves where there were hundreds of manuscripts (Bruce 1959; Malkin 2007).

It is important to emphasize that the religious use of the underground occurred not only in natural cavities. “*In much of the first century of the Christian era, most of the tombs of Jerusalem were man-made caves, dug in massive rocks outside the city*”

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<sup>118</sup> Region located 15 km south of Haifa.

<sup>119</sup> Site located 25 km southeast of Haifa.

walls” (Jacobovici & Pellegrino 2007, 17). The authors also point out that the use of the underground for burials were allowed because,

In Jerusalem, where in most places the soil was only a few inches before the spade struck bedrock, a special dispensation had been made around 430 BC: temporary burial in a cave, or in a tunnel carved into rock, counted as burial in the earth. By the time of Jesus and the apostles, about 30 AD, bodies in Jerusalem were wrapped in linen or woolen shrouds and placed on shelves inside man-made caves (Jacobovici & Pellegrino 2007, 35).

In Israel, Hayes (2005-2009) identified 50 sacred sites. However, for this section, we can highlight five most important sites relate to the religious use of the underground.

The Tomb of the Patriarchs in Hebron<sup>120</sup> is built around the Cave of Machpelah. The temple is an architectural complex built during the reign of Herod (1<sup>st</sup> century BC) with additions made by the Crusaders (12<sup>th</sup> century AD). The cave has been venerated since at least 1,000 BC as the burial place of the Hebrew patriarchs Abraham, Isaac and Jacob and their wives. It is considered to be the second holiest site in the Judaism. It also has a high sacred value to Muslims and Christians who also venerate Abraham as the true prophet of God. Steward (2005) points out that the cave is considered to be the passage to the Garden of Eden.

At Mount Carmel, the Cave of Elijah (Figure 132) is also greatly visited, and is considered an important temple for Jews, Muslims, Christians and Druze. In the cave it is believed that the Prophet lived and spread his teachings. Important events related to the life of Elijah (9<sup>th</sup> century BC) would have occurred there, especially the belief that he lived and meditated here before defeating the pagan prophets of Baal on Mount Carmel. The tradition also states that the Holy Family (Mary, Joseph and Jesus) would have taken shelter in the cave for a night while returning from Egypt.

The Church of the Annunciation in Nazareth is also remembered. The site is now a modern Catholic church built on the remains of Byzantine and Catholic churches at the time of the Crusades. The building incorporated the cave where the Virgin Mary would have received the revelation from angel Gabriel. For centuries the place has been the destination of thousands of pilgrims to the Holy Land. The cave (Figure 133) was identified as the site of the Annunciation in the 4<sup>th</sup> century. It is said that an altar was

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<sup>120</sup> Site located 30 km southwest of Jerusalem.



built in the year 384 and the church was already mentioned in 570. The cave-church often receives tourists and Catholic and Protestant pilgrims.



Figure 132 – Entrance and interior of the Cave of Elijah (Photo: Vad Levin and Francesco cited by Hayes, 2005-2009).

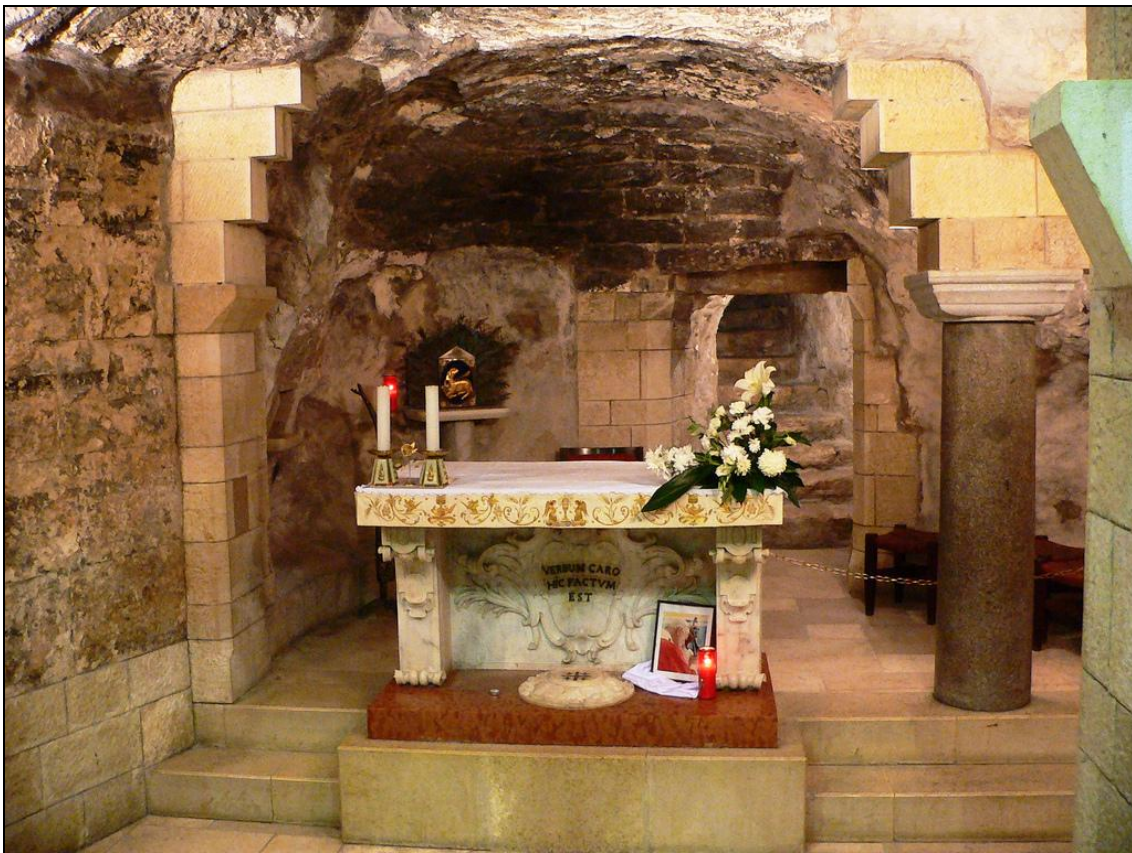


Figure 133 – Altar inside the Cave of Annunciation (Photo: John W. Samples quoted by Hayes 2005-2009)

Another frequently visited site is the Church of the Nativity (Figure 134 and 135) in Bethlehem. Considered the most holy place of Christianity, it represents the traditional site of Christ's birth. It is also one of the oldest Christian churches. Hayes (2005-2009) reminds us that the birthplace of Jesus is narrated in Matthew and Luke. At no time is the word *cave* mentioned in the biblical text. However, it is reasonable to say that the place was actually a cave because in the region these features are common and were used as stables and warehouses.



Figure 134 – A Police officer in front of the entrance of the Church of Nativity (right) and the entrance to the Cave of the Nativity (Photo: Wayne McLean mentioned in Hayes 2005-2009).



Figure 135 – The interior of the Cave of Nativity and the place perceived at the exact point where Jesus was born (Photo: Shira Karp and Lolay cited by Hayes 2005-2009).

The evidence that the cave of Bethlehem was already venerated as the birthplace of Jesus is confirmed in the writings of Justin Martyr, around the year 160 AD. In 326, Constantine and his mother, Saint Helena came up with the idea of building a church over the cave.

Another site, the Church of the Holy Sepulcher, known as the Church of the Resurrection to the East Orthodox Church, is a Christian building in the ancient city of



Jerusalem. It is located at the site of the Calvary and the tomb (cave) where Jesus was buried. The church has been considered an important center of pilgrimage since the fourth century and remains as one of the holiest Christian sites in the world.

Another place mentioned by Hayes (2005-2009) is called the Church of Our Father, built by Constantine at the place where Jesus would have taught his disciples how to pray. The author states that, in the Acts of John, a cave is mentioned on the Mount of Olives and supposed to be associated with the teachings of Jesus.

Still regarding Israel, Gibson (2008) records the discovery of a cave possibly used by St. John the Baptist. According to him, traces of rituals related to the practice of baptism were dated from the time of John the Baptist and his followers. *“The cave is located in the mountains just west of Jerusalem, about ten minutes driving from the modern suburbs of the city”* (Gibson 2008, 27). It was found approximately *“one kilometer after the former colony of Suba, on the top of a hill, a good 15 minutes walk, but close enough”* to connect the two locations (Gibson 2008, 28).

The difference between the Cave of Suba and the other sacred sites in the region lies in the fact that *“it was not a place for an established form of daily liturgical activity such as those run by large groups of pilgrims, but on the contrary, a place of solitude and a place of ritual retreat for an individual (...)”* (Gibson 2008, 70).

#### **2.1.6.4 Jordan**

Perhaps the most famous place of the country is Petra. Listed by UNESCO in 1985, it has been inhabited since prehistoric times. Located between the Red Sea and Dead Sea, the place was an important strategic point between Arabia, Egypt and Syria. Built and carved on the rock, the monastery (Fig. 136) is surrounded by mountains and canyons and became internationally known for introducing the mixture of Hellenistic architectural traditions with those from the east.



*Figure 136 – Entrance of a Monastery at Petra (Photo: UNESCO/Sacred Sites/Martin Gray/Martin Gray)*

**LOCATION MAP OF THE SITES MENTIONED IN THE ISRAEL-JORDAN SECTION**

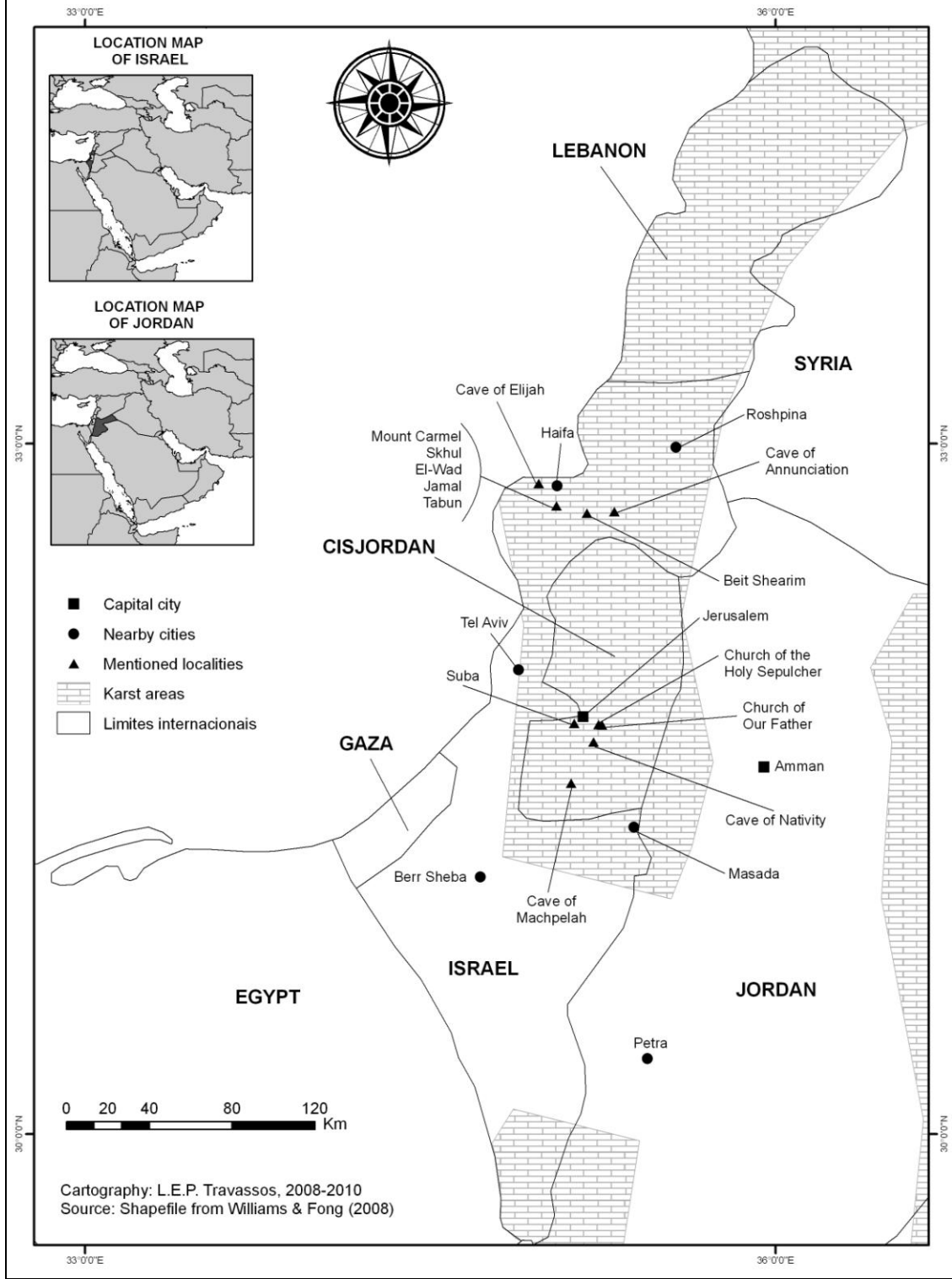


Figure 137 - Location map of sites mentioned in this section.

### 2.1.6.5 India

For Albanese (2006a), caves and mountains have always been the high point of sacred revelations or hierophanies in the Indian world. The first ones refer to Mother Earth and the second to the god Shiva that rises to the sky. The temples of Elephanta and Ellora represent the sacred mountain and its cave and dates from the 6<sup>th</sup> to 8<sup>th</sup> centuries. They belong, therefore, to the Vakataka and Rashtrakuta dynasties, respectively. It is interesting to note that the name Elephanta was given by the Portuguese who found a huge stone elephant on the small island in front of Mumbai.

The Caves of Elephanta (Figure 138), which were designated as a World Heritage Site in 1987, are also known as the “City of Caves”. It contains collections of rock art (paintings and sculptures) linked to the worship of Lord Shiva. The site of Ellora Caves (Figure 139), listed by UNESCO in 1983, has 34 monasteries and temples, extending over 2 km. The set represents an uninterrupted sequence of monuments dating from the years 600 to 1,000 AD. It has sanctuaries devoted to Buddhism, Hinduism and Jainism, illustrating the religious tolerance characteristic of ancient India.

In the mountain range of Western Ghat, for 1,600 km, it is located the largest number of temples and Buddhist monasteries in India. The rock architecture began between the 2<sup>nd</sup> century BC and the 2<sup>nd</sup> century AD. The most famous example is that of the Ajanta Caves (Figure 140). Located approximately 100 km from Aurangabad<sup>121</sup> and carved in basalts, the site is one of the most famous of the country. There are 29 caves that show the importance of Buddhism and illustrates the changes occurred in a space of time between the 2<sup>nd</sup> century BC and the 5<sup>th</sup> century AD (Albanese 2006a). The region was listed by UNESCO as World Cultural Heritage site in 1983 and it is considered to be the first existing example of Buddhist sculptures, dating from the 2<sup>nd</sup> and 1<sup>st</sup> centuries BC. During the Gupta period (5<sup>th</sup> and 6<sup>th</sup> centuries AD), other richly decorated caves were added to the first original. The paintings and sculptures of Ajanta are considered to be masterpieces of Buddhist art.

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<sup>121</sup> Located about 850 km southeast of New Delhi.



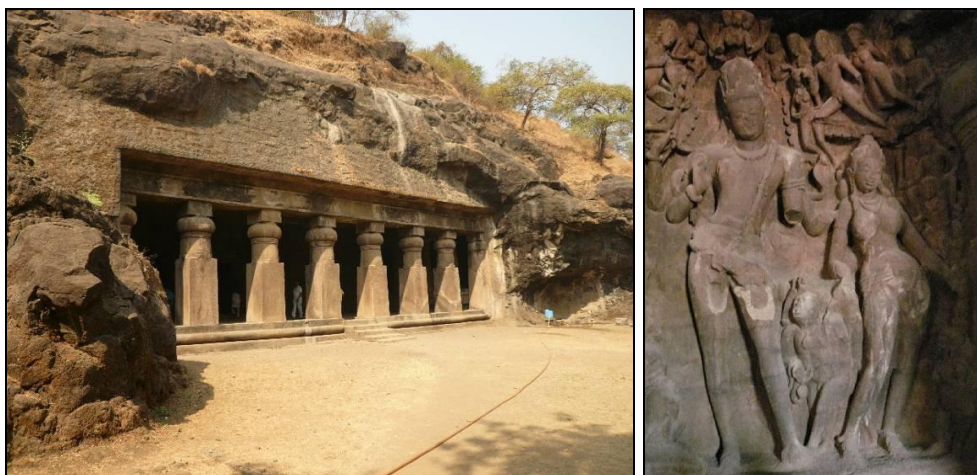


Figure 138 – One of the cave-temples of Elephanta and the representations of Shiva in its interior (Photo: UNESCO / Francesco Bandarin)



Figure 139 – Detail of the cave-temples of Ellora and its sculptures (Photo: © UNESCO E. de Gracia Camara.).

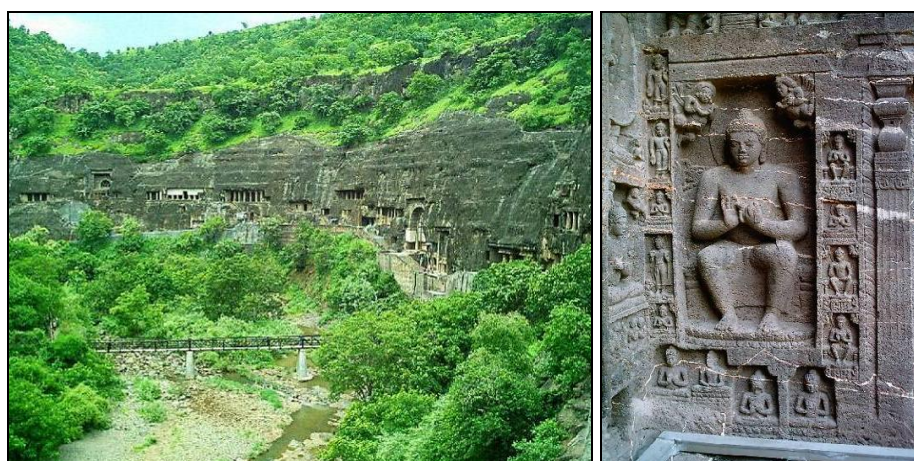


Figure 140 – Detail of the cave-temples of Ajanta and its sculptures (Photo: © UNESCO E. de Gracia Camara).

Besides these famous examples, it is necessary to remember the Amarnath Cave (Figure 141), located 145 km NE of Srinagar<sup>122</sup>, it is at an altitude of 4,000 m in the Himalayas. Steward (2005) points out that at the site, Hindus worship an ice stalagmite which is perceived as the god Shiva. The other minor features are perceived as the gods Ganesha, Parvati and Bhairava. According to the oral tradition, in the cave, Shiva revealed the secrets of creation and immortality to Parvati. It is believed that those who complete the pilgrimage will receive salvation. Chandrasekharam (2007) states that, due to the fact that Shiva is part of Indian life, a large number of pilgrims go to the cave. More than 25,000 pilgrims from across India move to the site between May and July. Because of the heat generated by visitors, the stalagmite melts in July, reducing the size of Shiva. Gypsum powder is distributed to pilgrims as sacred powder (Vibbuti).

Rajendranath Seal (1958) quoted by Chandrasekharam (2007) notes that in the Hinduism, many geological phenomena are considered the evidence of the gods' power. Therefore, hot springs also can be venerated such as the example of Manikaran<sup>123</sup>, among others. The pilgrimage to this sacred site occurs because of the legend that surrounds it. Oral tradition says that the goddess Parvati would have lost her earrings in the River Parvati and then asked Shiva to help retrieve them. Thus, Lord Shiva would have pierced the earth with his third eye only to get hot water along with the earrings. Temples were built near the spring since then.

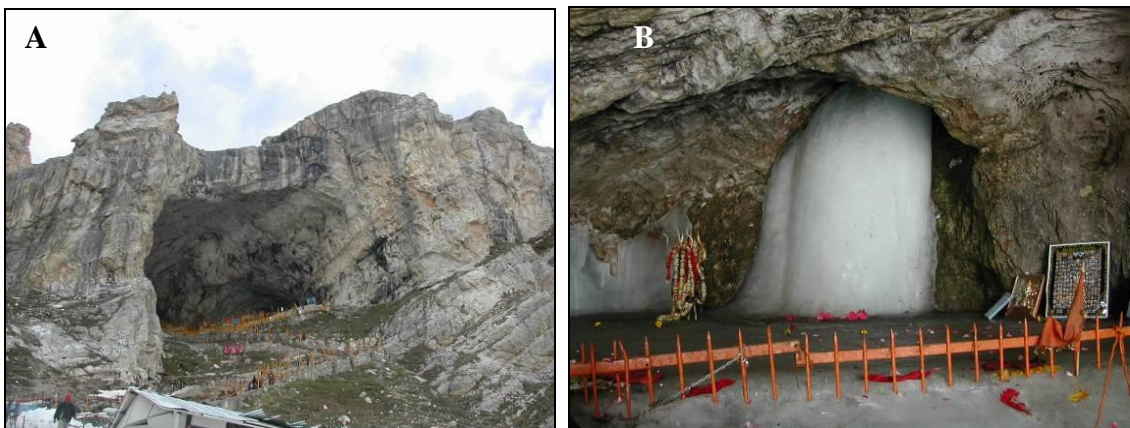


Figure 141 – A) General overview of the entrance of the cave-sanctuary. B) The ice stalagmite perceived as Lord Shiva (Photo: Public Domain).

<sup>122</sup> Locality about 640 km northwest of New Delhi (India) and at about 180 km of Istanbul (Pakistan).

<sup>123</sup> Located about 380 km from New Delhi.



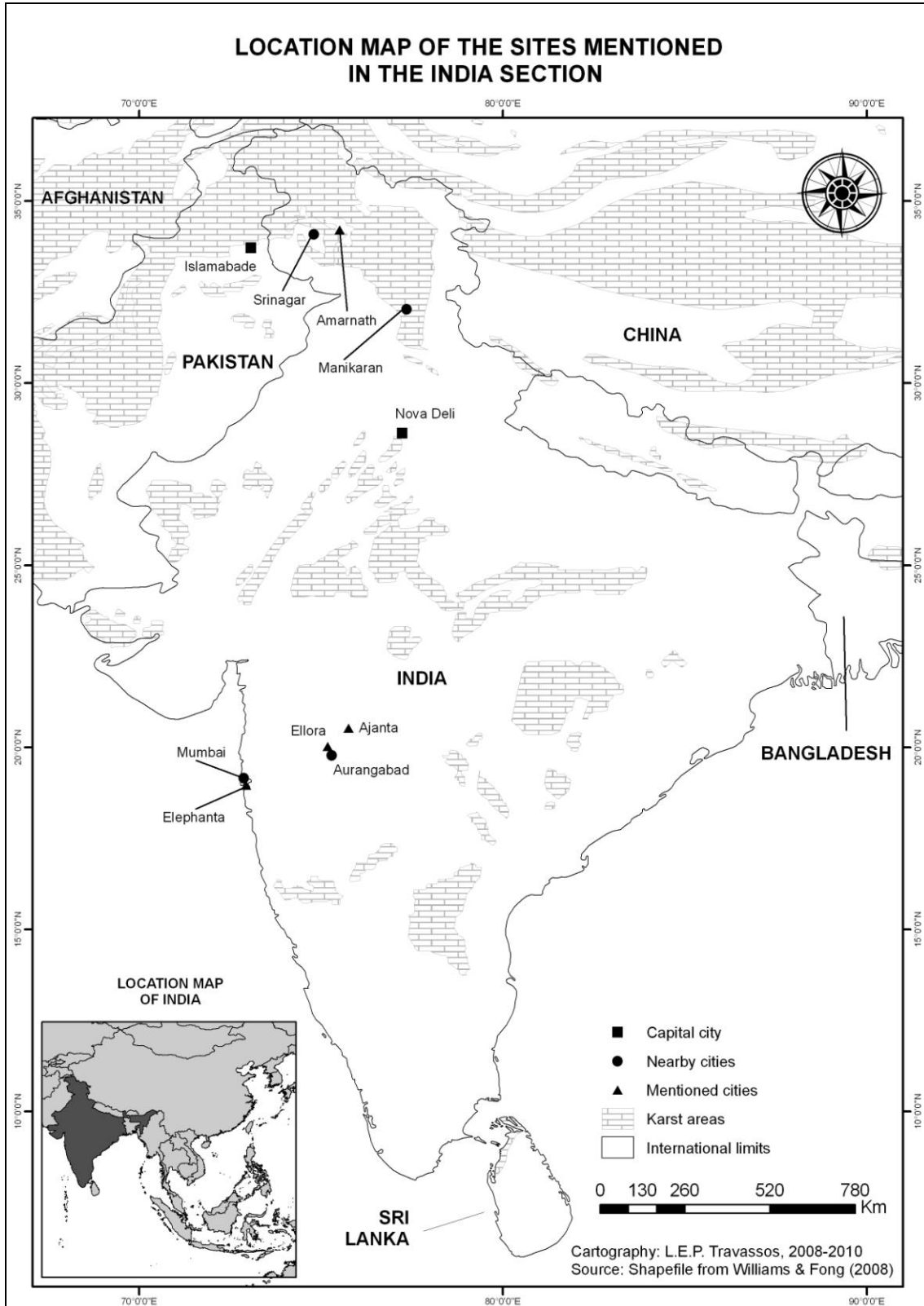


Figure 142 - Location map of sites mentioned in this section.

### 2.1.6.6 China

Two sanctuaries are noteworthy in this country. They were listed by UNESCO in 1987 (the Mogao Caves) and 2000 (the Grottoes of Longmen). Both sites have important examples of Buddhist religion with sculptures and engravings in the rock. The Mogao Caves (Figure 143), also known as the Mogao Grottoes, the Cave of the Thousand Buddhas or the Caves of Dunhuang, they are considered a system of Buddhist temples located in a strategic point along the Silk Road. There are altogether some 492 cave-temples, famous for their statues carved in the rock, and their wall paintings record around 1,000 years of Buddhist art. For Hayes (2005-2006), the oral tradition states that the cave was first inhabited in the year 366 by a Buddhist monk (Lie Zun or Lo-tsun), who had the vision of the Thousand Buddhas. Since then, other caves have been carved.

Scarpari (2006) points out that all the Mogao Grottoes extend for more than a one kilometer on the slopes of Mount Mingsha. After a large number of caves have been destroyed by erosion or by human action, from the 492 existing caves only a few can be visited today. The oldest caves reflect the influence of religious Central Asian and Hindu architecture, being gradually attenuated until it disappears in the Sui and Tang periods. In addition to the rock carvings, some 2400 clay sculptures compose the rich Buddhist pantheon in the underground (Scarpari 2006).



Figure 143 – A) Detail of a small section of the Mogao Caves (Photo: Michael Cross). B) Detail of a wall depicting Buddhists pilgrims from Tang Dynasty, 618 a 712 (Photo: Public Domain apud Hayes 2005-2009)

The Longmen Grottoes (Figure 144) have the largest and most impressive collection of Chinese Art of the Wei and Tang Dynasties (316-907). The work is entirely devoted to Buddhism and represents the peak of the Chinese rock carving tradition. The numbers are impressive: there are 1,350 caves, 750 niches and 40 pagodas and a total of 110,000 sculptures. To Scarpari (2006), the construction of the whole rock complex began in 494 when the installation of the imperial court at Luoyang. Researchers report the presence of 97,306 statues ranging from 2 cm to 17 m high, and 3,608 inscriptions on the walls.



Figure 144 – A) Detail of the Fengxian Cave, sculptured in the year 672. B) Detail of the Great Buddha (Photo: Public Domain apud Hayes 2005-2009)

Even if not recognized by UNESCO and by Hayes (2005-2009), still in China it is possible to add *Majishan* Temple and all the rock complex of Yungang. The first is composed of 194 caves painted and decorated to show a perfect and unique synthesis of different styles and artistic influences between the 5<sup>th</sup> and 11<sup>th</sup> centuries. The Yungang group was carved in sandstone in the year 460 by order of the Emperor Cheng Weng who wanted to turn the site into a symbol of regret for the persecution of Buddhists made by his predecessor in 446. The project was favored by the presence of many families of artists in Pingcheng<sup>124</sup> that, in 439, had been driven out from Dunhuang after working in the Mogao Caves. Some 50,000 statues decorate the caves (Scarpari 2006).

Still in China one can identify the Giant Buddha. Built in the first Chinese Buddhist temple, it is located in the Sichuan province. UNESCO notes that its construction took place in the eighth century in the surroundings of Mount Emei at a confluence of three rivers. With 71 m high, is the largest statue of Buddha in the world.

<sup>124</sup> Located about 915 km northwest from Xangai.



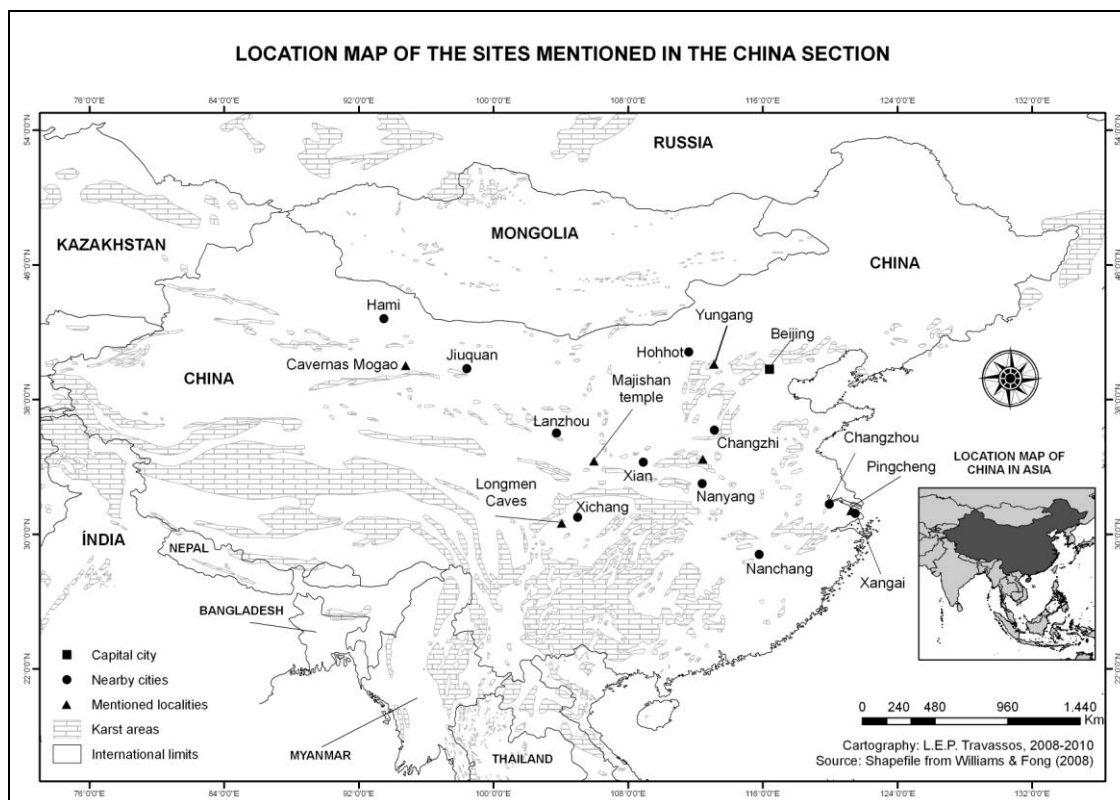


Figure 145 - Location map of sites mentioned in this section.

### 2.1.6.7 Thailand

Across the country one can identify many cave-temples dedicated to Buddha and the Buddhist religion as a whole. Geographically it is possible to identify some sites in the central portion (Erawan Cave), in the southern portion (the Dragon's Cave, the Buddha Cave, the Cave of the Little Tiger and the Cave/Mountain of the Tiger) and in the northern portion (the Chiang Dao Cave and the Khao Yoi Cave), among many other examples. It is worth noting the book of Sidisunthorn, Gradner and Smart (2007) that identify and describe 170 caves during the execution of a project between the years 1998-200. Of these, about 90 caves are geologically important and another 80 have been noted for having great archaeological significance (Figure 146).

Hayes (2005-2009) highlights the temple of Wat Chet Yot, northwest from the city of Chiang Mai. Under the temple visitors can see a cave containing an image of Buddha carved in the mid-fifteenth century.

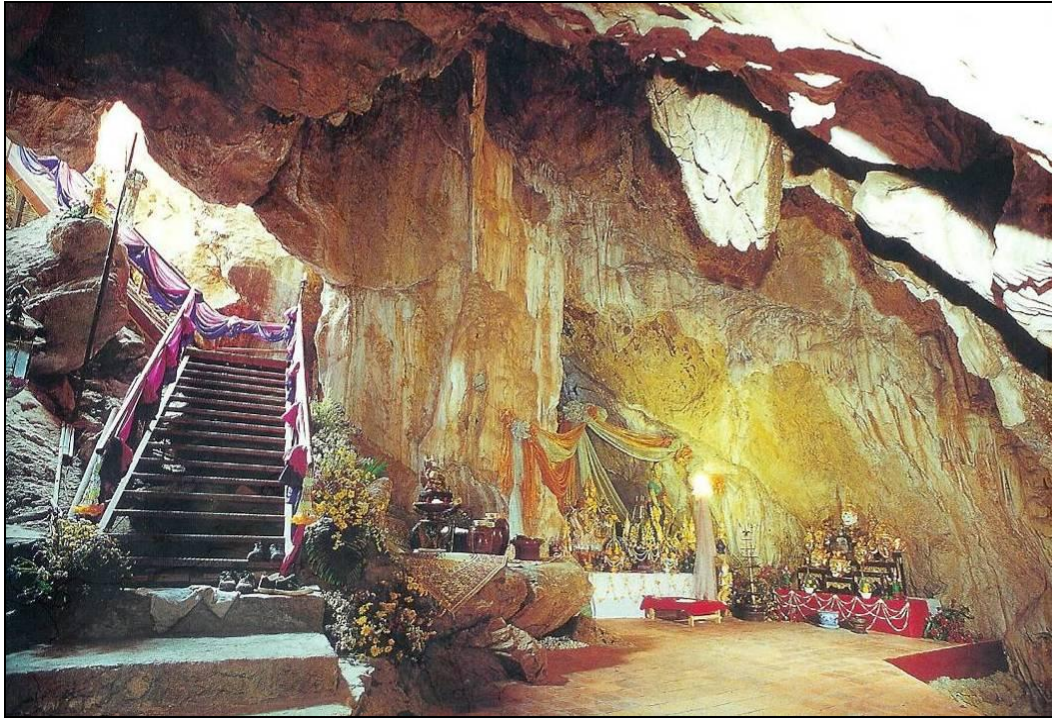


Figure 146 – detail of the cave Tham Tep Ni Mit, which means “built by God”(Source: Sidisunthorn, Gradner & Smart 2007, 314).

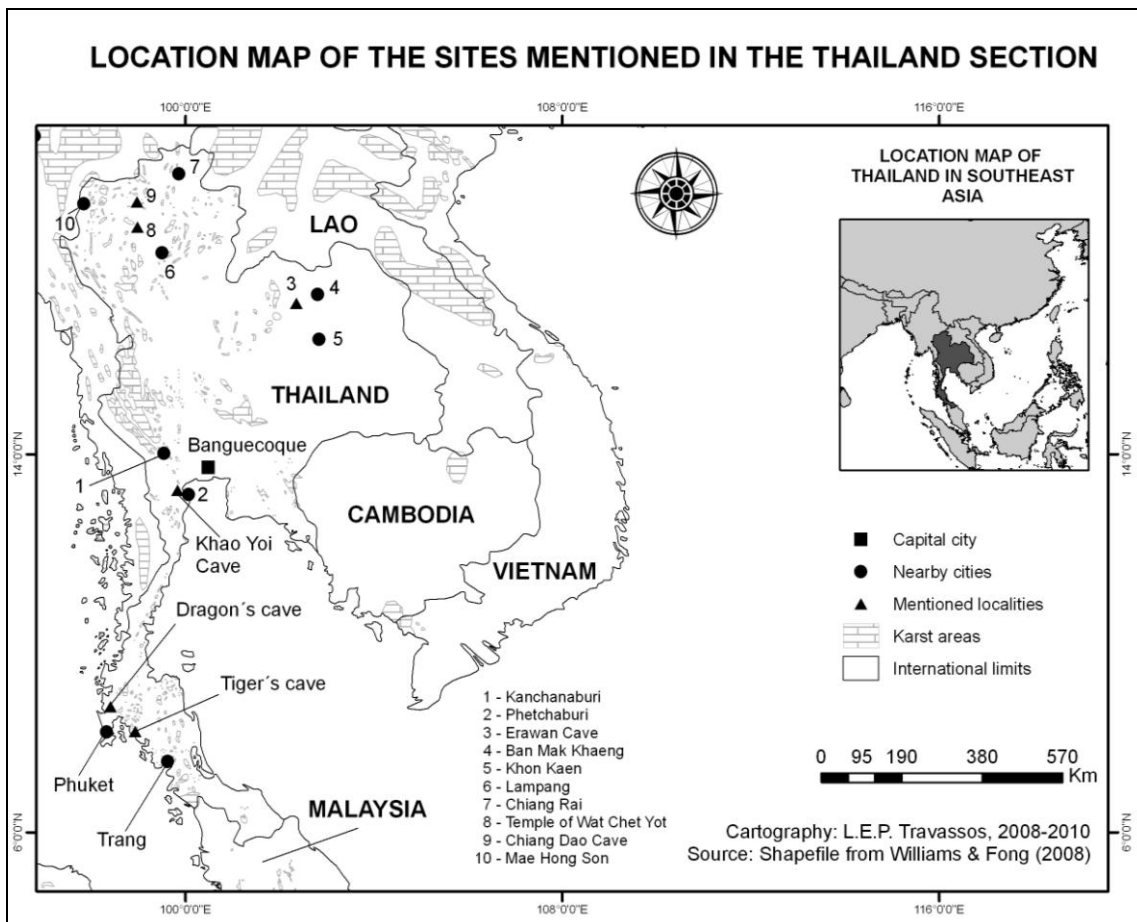


Figure 147 - Location map of sites mentioned in this section.

### 2.1.6.8 South Korea

The representative for the country, listed by UNESCO in 1995, is the Seokguram Cave with the Bulguska Temple. Established on the slopes of the Mount T'oham in the 8<sup>th</sup> century, the cave has a monumental Statute of Buddha, forming a significant architectural complex. Hayes (2005-2009) recalls that the construction of the temple began around the year 750, being completed in 774. The region was abandoned for several centuries and it was rediscovered in 1909. The story says that a local postman sheltered in the cave during a storm. When lighting a candle, he saw the giant statue of Buddha inside the cavity. At that time Korea was under Japanese rule which ordered that the cave should be dismantled and the parts sent to Seoul. Fortunately the authorities refused to do it, in order to preserve the site.



Figure 148 – View of the sacred site of Seokguram. The entrance of the cave is inside the building shown on A (Photo: 5HMartin Röhl apud Hayes 2005-2009). B) Detail of the Buda inside the Seokguram Cave (Photo: Public Domain apud Hayes 2005-2009)

### 2.1.6.9 Japan

Hardacre (1983) emphasizes the ritual of ascension to a cave in the Oku Mountains, considered by many as the pilgrims, return to the “womb of the Earth”. According to Miyake (1978), there are six caves in these mountains and the legend states that a hermit (the founder of the worship of mountains) decided to isolate himself in a cave for about three years. Although it is not known which of the cavities had been

used by him, the oral tradition says that it was one cave of three. These would be: 1) the Pure Land, 2) the Womb of the Earth and 3) the World Diamond. Thus, caves have been acquiring an important role in the process of isolation due to the fact that they are considered places where it would be possible to “absorb” the maximum spiritual power of the mountain and the deities that dwell within it.

Hayes (2005-2009) identifies the Temple of Hase Kannon or the Temple Hase Dera, located in a mountain of Kamakura. The temple is dedicated to the goddess of mercy, Kannon. According to tradition, the location of the temple was chosen by the deity itself. The statue of the temple was carved from a single piece of wood in the eighth century. At the site one can visit a small cave with the image of Benten (or Benzaiten), Shinto goddess of beauty and women’s health. In the cave, visitors or devotees write their names and wishes, leaving them in the cave so that the goddess can grant the requests (Tate 2006).

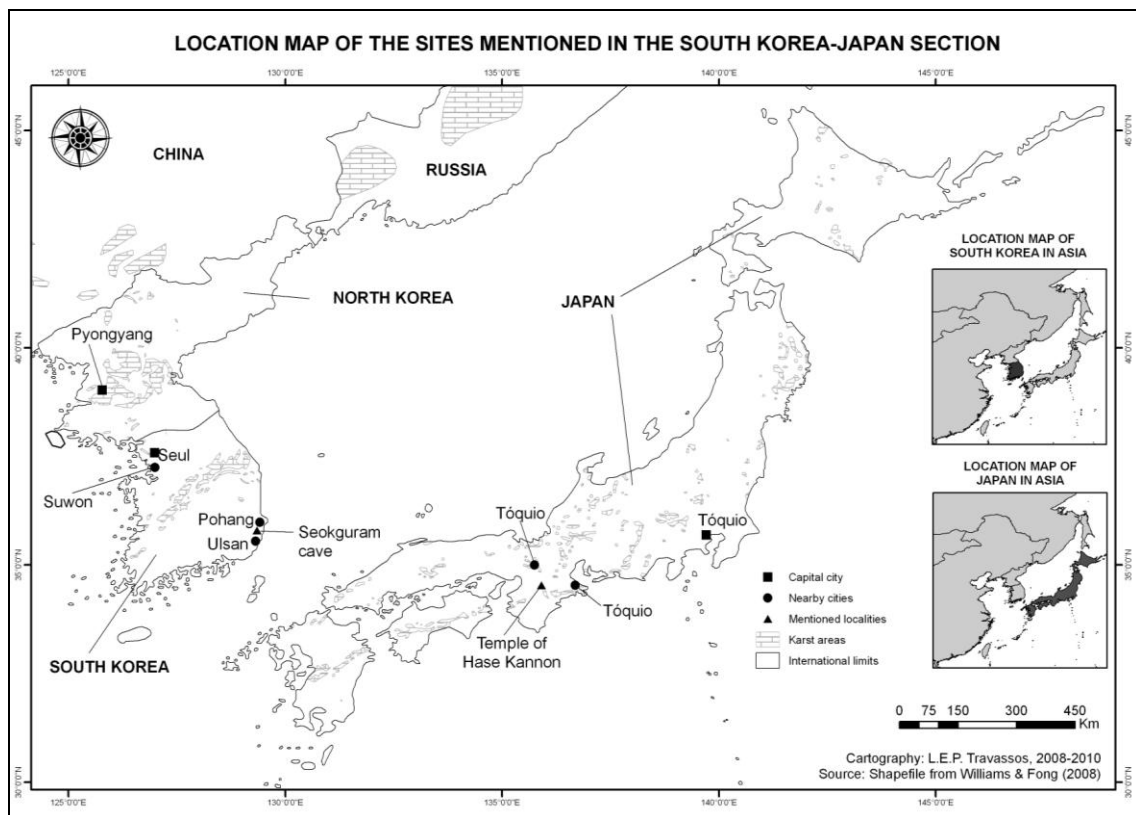


Figure 149 - Location map of sites mentioned in this section.



### 2.1.7 Australasia

Although it is not a single cave, the Australian monolith Uluru (Ayers Rock) is important to mention. UNESCO listed this geological phenomena as a World Heritage Site in 1987. It also made an expansion of the area and the criteria in 1994. To Hayes (2005-2009), Australian aborigines, the Anangu, believe that the central landscape of the continent has been created by ancestral beings. According to this myth of creation, the world was formed and remained without visible forms until the appearance of ancestral beings from an opening in the earth.

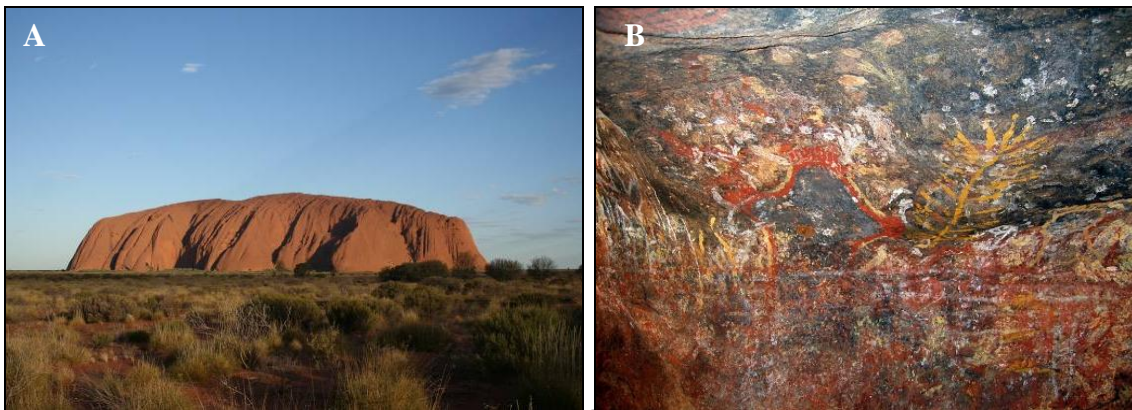


Figure 150 – A) General aspect of the Uluru Monolith (Photo: UNESCO / G. Brehm, 2007). B) Detail of rock paintings in a cave at the sacred site (Photo: Hansjoerg Morandell apud Hayes 2005-2009).

Also, according to the Aboriginal oral tradition, two ancestral tribes would have been invited to festivals in the region, but were distracted by a beautiful Lizard Woman forgetting the invitation. Nervous about the absence of the guests, a great battle between the tribes resulted in the deaths of the two leaders. After that, the land itself would have risen in suffering for the bloodshed, giving rise to the Uluru Monolith. Since then, the sacredness of the place can be confirmed by the numerous cave drawings and rituals performed at the site.

According to Taçon (2005), all over Australia it is possible to come in touch with many stories about spirits associated with caves. It is also probable to hear stories about worlds within rock. In southeast Australia, where there have been much change and disruption of traditional aboriginal societies, stories about ancestral beings, caves, and rock continue to be important.



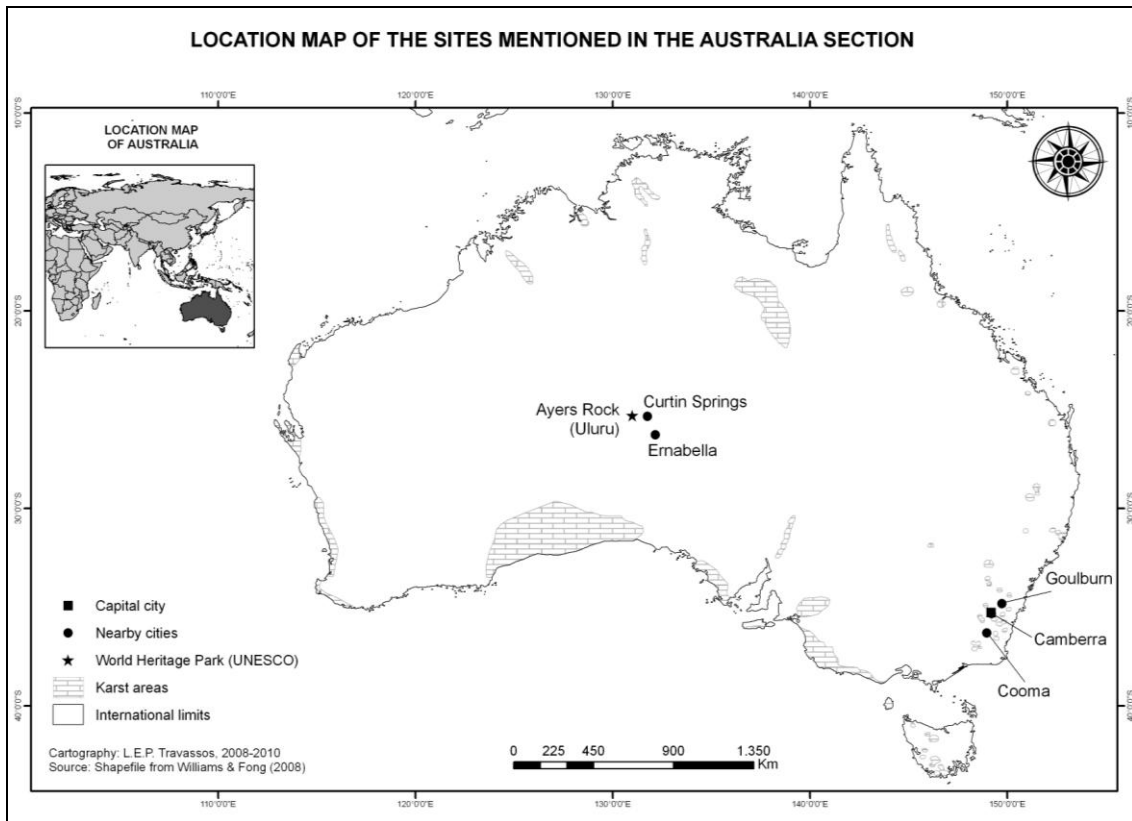


Figure 151 - Location map of sites mentioned in this section.

### 2.1.8 Section conclusions

Finishing this section and after identifying many different sacred sites, it is necessary to remember Barber (1993) who states that it is necessary to separate the visitors who go to these places, into two main categories: 1) pilgrims and 2) tourists.

This occurs because in most cases, we can observe different behaviors in relation to space due to the fact that they perceive differently and in a very particular way. But still, one can see that, in caves considered sacred, one can also observe a kind of “union” of the two categories in tourist-pilgrims.

It also important to remember Nolan and Nolan (1989) cited by Gesler (1996) when they affirm that venerating nature is often part of Christian pilgrimage. Many pilgrimage sites are associated with particular physical features like mountains or caves. Thus, at these sites, the pilgrim may also notice as part of its spiritual journey the water, trees or rocks. The authors also claim that this fact can be connected to the pagan origin of some sites.

With the examples showed before one can affirm that there are little differences in the visitor's attitude at the "center of the world". Equally are also similar are the beliefs of alleged healing powers of water, rocks or of the lace itself.

### 3 CASE STUDIES

*If you are seeking the light, Benedict, why do you choose the dark grotto?  
The grotto does not offer the light you are seeking.  
But continue in the darkness to seek the shining light,  
Because only in a dark night do the stars shine.*

*Entrance inscription on the Monastery wall, 16<sup>th</sup> century*

Pilgrimages to holy places are considered one of the most famous cultural phenomena existing in various societies. This religious and cultural tourism can be identified in Christianity, Buddhism, Hinduism, Judaism and in Islam.

According to Paiva (2007, 184) religion is a worldwide phenomena that has always attracted attention of researchers “*regardless of personal goals to demonstrate the legitimacy or not of religion.*” The term “religion” itself includes the concepts, tasks and stories related to God or gods. It also includes feelings, affections and emotions related to them, and finally, presents places, actions, practices and rituals related to ideas and emotions (Paiva 2007).

It is for these reasons, among others, that the religious man start his pilgrimages. Barber (1993) defines *pilgrimage* as a journey motivated by religious beliefs. It manifests externally towards a sacred site and, internally, for one receives spiritual and inner knowledge. According to Gibson (2008) it is possible to understand these events as a visit to a holy site in order to seek for recognition of where the historical religious events occurred.

Much has been written about the relationship between pilgrimages, geography and tourism; however, there are only a few records that talk about pilgrimages to caves considered to be sacred. Gibson (2004) reminds us that the “Holy Land”, which witnessed the birth, life, crucifixion and resurrection of Jesus and other biblical events, is known the destination of millions of pilgrims every year. In Jerusalem, the discovery of the Tomb of Jesus resulted in the construction of an abbey that is part of the Church of the Holy Sepulcher. In Bethlehem, it is possible to identify the Church of the Nativity, built over the Grotto of the Nativity.

In the studies that deal with festivals and pilgrimages to caves, it is possible to observe some degree of uniformity between the beliefs of pilgrims and tourists, even if they are from different religious systems. Thus, this fact leads Collins-Kreiner and Kliot

(2000) to emphasize that the pilgrimages are a phenomenon that crosses through different religions and cultures with a series of patterns and similar concepts.

This statement can be easily verified by observing festivals or visiting caves considered to be sacred. For many, such spaces have forms that are the testimony of the power of God. Its waters are generally considered sacred and the desecration of such sacred places can result in divine punishment. More recently, such behavior has drawn the attention of researchers, especially geographers, in the field of the Geography of Religion or Cultural Geography.

If caves always attracted the attention of men, the relationship between spaces and cultures can be considered a “*tradition of geographical science, given that their interests were always focused on the exploration and description of the diversity of Earth's surface*” (Correa 2000, 48). Thus, according Claval (1997), one must associate Cultural Geography with the human experience with nature and the environment. Then, one must study the way how humans shape nature to meet their needs, tastes and aspirations (Claval 1997, 89). Applying the concepts of Cultural Geography, it is possible to seek understanding of how places are constructed, especially regarding the cultural/religious use of caves. Therefore it is believed that such researches should be directed to interdisciplinary studies and not only pointed to a single branch of knowledge.

From the four caves mentioned in this chapter, only the Cave of Antonio Pereira presented the conditions for data spatialization on the number of visitors. It also facilitates drawing a first approximation of microclimate information. This fact occurred mainly due to operational issues such as free access to the registry of visitors. Regarding the two international caves registered in this chapter it must be stressed out that they have no visitors' or guest book, but simple records of visits by various scholars, travelers, members of the clergy and royalty throughout its ancient history.

Regarding the *Landarska Jama* it is possible to say that in the year of 2008/2009, the researcher was visitor number 1,808 in December. It is estimated that, currently, the pilgrims and tourists go to the cave sporadically and most of the visitors are students organized into groups for educational excursions. The cave's manager estimated that about 6,000 people visit the cave each year. The researcher had no access to the guest book or any other record different to her statement.

About the *Sveta Jama* it is possible to say that its visitation is controlled by a Caving Group. Information provided by Franc Malečkar, member of the Speleo Dimnice Club, shows that the cave does not have a visitors' book. However, the Group estimates that it receives about 2,000 visitors per year. Of these, about 1,700 are students of various schools and the other 300 are people who participate in Catholic or esoteric ceremonies, which are becoming common.

### 3.1 The Cultural importance of *Sveta Jama* and *Landarska Jama*

#### 3.1.1 *Sveta Jama*

Distant only about 10 km southeast of the city of Trieste (Italy), but away from the centers of speleotourism in the vicinity of Postojna, is located the Cave of Socerb (known as *Socerbska Jama*, *Sveta Jama* or *Grotta di San Servolo*). A few meters from the border of Italy and Slovenia (Figure 152), it has about 150 m of horizontal cave and a main hall of about 28 x 26 m

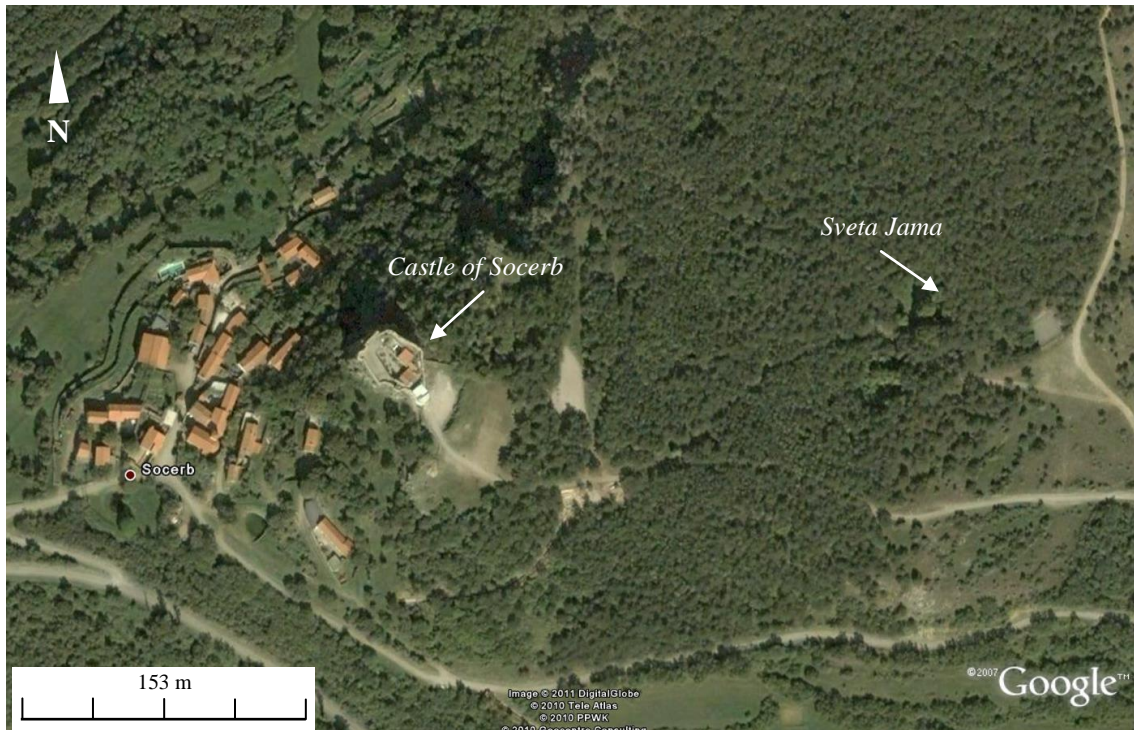


Figure 152 – Location map of the Castle of Socerb and Sveta Jama in a GoogleEarth image.



According to information compiled by Shaw (2000), due to the fact that the Slovenian territory had been part of Austria in the past, both the port of Trieste (Figure 153, 154 and 155) and the cave, the site was visited by many travelers as they waited for the departure of their ships at Trieste. The author further asserts that there were coaches that led those interested to visit the cave. Spix and Martius (1824), cited in Chapter 1, probably would be among its visitors due to the fact that they had to wait at some port to start their visit to Brazil.



Figure 153 – Drawing from Valvasor (1689) which shows the Castle of Socerb and the Grotto of Saint Servolo to the right and back of the picture (Fister, Lah & Štupar-Šumi 1997, 238).

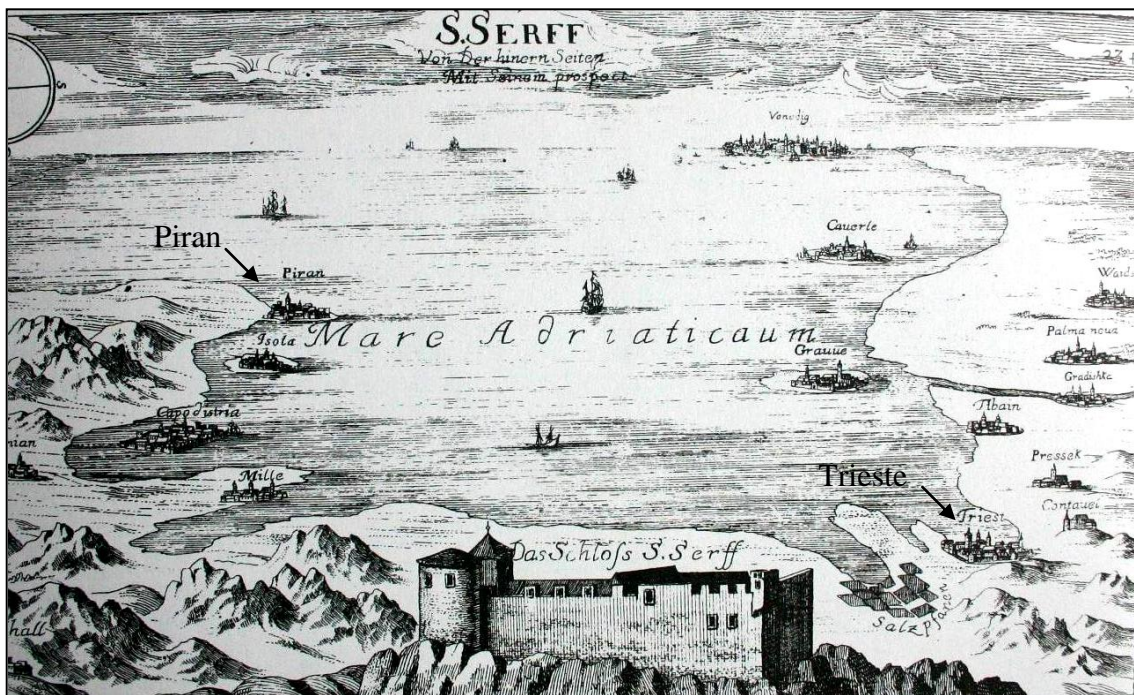


Figure 154 – View the Gulf of Trieste and the Castle of Socerb in a drawing of Valvasor (1689). To the left it is possible to see the city of Piran and to the right, Trieste (Source: Stanič 1994, 114).



Figure 155 – View the Gulf of Trieste and the Castle of Socerb. It is possible to identify the same localities recorded by Valvasor (Photo: Luiz E.P.Travassos 2009).

The region and the cave were also described by Schönleben (1680) and Valvasor (1689), in the 17<sup>th</sup> century. A study of the journal of Giovanni Francesco Miller (1693), Durissini (1998) shows that the Cardinal described his trip to the Diocese of Trieste and, consequently, to the Grotto and to the Castle of San Servolo.

Later, in the 18<sup>th</sup> century, the cave appeared in several works of other naturalists (botanists and geologists) between the years 1730 and 1835. Shaw (2000, 2008) identified them as Johann Georg Keyssler (1730), Richard Pococke and Jeremiah Milles (1737), Frederick Augustus Hervey (1771), Maximilian Fischl and Joseph Georg Wideman (1800), David Heinrich Hoppe and Christian Friedrich Hornschuch (1816) and William John Strickland and Hugh Edwin (1835).

Baucer (1663/1991) states that the oral tradition records the fact that St. Servolo was born in Trieste, being brought up by his parents in the principles of Christianity. When he was 12 years old, in one of his prayers he heard a voice saying to him that, as a servant of God, to him would be given all he needed. With the good news, he left Trieste without telling his parents and began to live in a cave.

The Diocese of Trieste also states that San Servolo was killed on May 24<sup>th</sup> in the year 284 under the orders of Emperor Marcus Aurelius Numerianus. The young Servolo have lived in the cave for about 1 year and nine months when, according to the oral tradition, he returned to the city of Trieste and would have performed miracles: he had freed himself of an enormous reptile only making the sign of the cross, healed a man believed to be possessed, cured a young man with strong fevers and an architect who had fallen from a scaffold. Since then, he started to have followers converted to Christianity and was arrested, being accused of cultivating the arts of magic.

Kranjc and Travassos (2007; 2009) claim that no one knows for sure when the existing altar in the cave was built nor when the cave was transformed into a church.

What is known is that Valvasor (1689) already stated that the altar had existed since a few days after the death of Servolo (Figure 156).

Valvasor (1689) also describes the arrival of pilgrims and the gathering at the place comparing a miraculous water basin (flowstone) of this cave with a similar existing one at the *Sainte Baume*, near Marseilles. According to him, it was miraculous always with water. He tried to empty it, but could not accomplish it.

Other authors after Valvasor (Nagel 1748; Hacquet 1778) and especially the authors from 19<sup>th</sup> century described the cave and the religious events that occurred inside the cave-church. However, during the Second World War the altar was destroyed and the church desecrated. Nowadays the cave still retains some of its original features (Figure 157 and 158). Occasional masses (usually at Christmas) and marriages can occur when requested. Visits on May 24<sup>th</sup>, the day of San Servolo have been recorded.

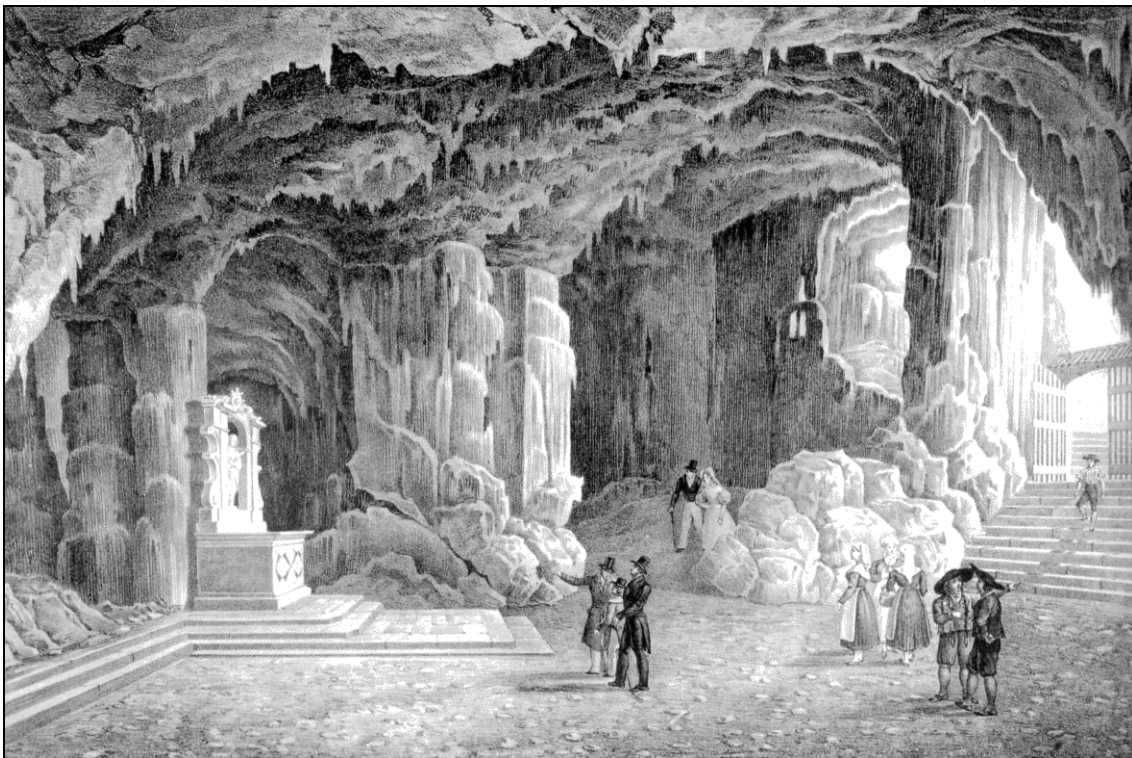


Figure 156 – Illustration of the underground church of Sveta Jama (Holy Cave) at the Kras Plateau, above the city of Trieste how it was centuries before (Radacich 2004).



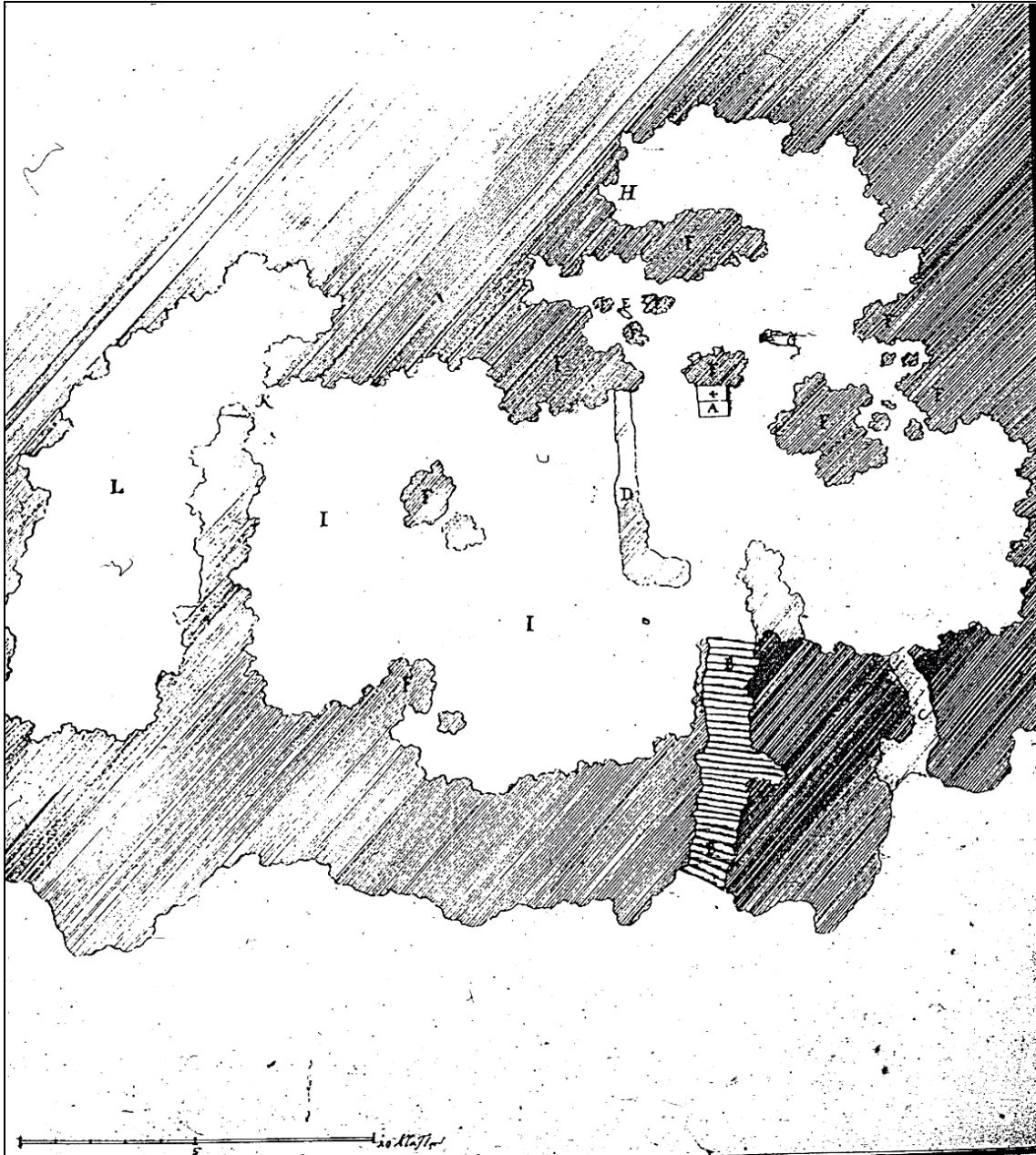


*Figure 157 – Photo of the interior of the Holy Cave. It is possible to see the entrance, stairs and speleothems showed on the previous picture (Photo: Luiz E.P. Travassos 2009)*



*Figure 158 – Entrance of the Sveta Jama and the view of its altar (Photo: Luiz E.P. Travassos 2007)*





**Grund-Riß der Höle bey St. Servolo.**  
 A: Altar. B: Stiegen. C: Öffnung in den fels. D: Brüst. Mauer. E: Stänlein von Tropp. Wasser.  
 F: Pfeiler von Tropp-Stein. G: Schlund, wodurch man in eine tiefer gelegene Höle kommen kan.

Figure 159 – Map of the Sveta Jama made by Nagel (1748). In the legend it is shown the access stairs in “B” and the altar represented by the letter “A”.



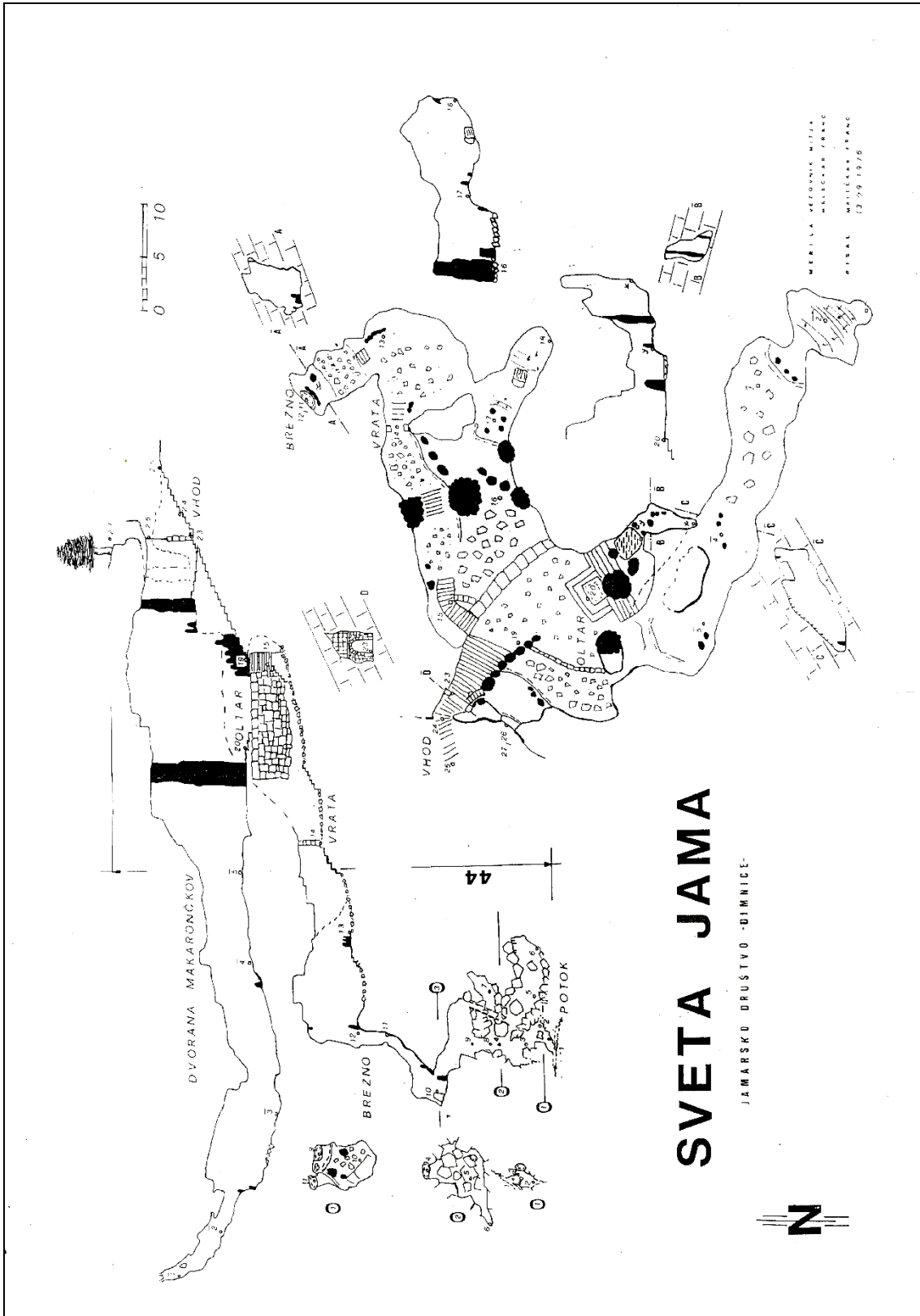


Figure 160 - Plan of the Sveta Jama from the cave cadastre of the Karst Research Institute. Its morphology, scientifically mapped, closely resembles the sketch made by Nagel in 1748

From the authors cited by Shaw (2000; 2008), it is interesting to note, initially, the work of the traveler, scholar and German researcher associate to the Royal Society of London, Keyssler or, as in English, Keyser (1758):

About a German mile of Trieste is the Castle of Servulo situated on a high Mountain, from whence there is an enchanting prospect. Near it is the Mouth or Entrance of a famous cavern in which the lapideous exudations have formed on the top and sides several large pillars and a variety of figures of White and blue colors. This cavern is very spacious and at the entrance into it being on the side of a mountain. For the convenience of those who are fond of natural curiosities between twenty and thirty stone steps have been made to ascend to the entrance. The passages within are, indeed, in some places, in a ruinous condition; and if a person is inclined to take a view of every part of this cavern, and to go through its windings and passages, he will meet with some difficulty. In the first cell you come into, mass is celebrated at certain times, for which purpose it is furnished with an altar (Keyser 1758, 206).

Shaw (2000; 2008) also points out the name of Richard Pococke (1704-1765) and Jeremiah Milles (1714-1784) as travelers more seriously interested in caves. They went through touristic caves, but also explored others not adapted to tourism. In his travel diary, Pococke briefly describes the cave of San Servolo: “*At the Castle of St. Servolo there is a descent to a very curious grotto, which abounds in petrifications*” (Pocock 1745 quoted by Shaw 2000, 68; Shaw 2008, 73). In a more detailed description, Milles says that

About seven Miles east of Trieste, amongst the mountains of Carso one sees the remains of an aqueduct (...). A little beyond this on a very high cliff, is an old Castle, called St. Servolo. Near which is a Grotto to which you enter from the top of the hill. It is small but full of Petrifications, which are almost as clear, and as transparent as alabaster. They pretend that St. Servulus lived here several years, and they have erected an altar in memory of him. On which they say Mass is celebrated every year on his anniversary (MILLES, 17--, *apud* Shaw 2000, 74; SHAW 2008, 78-79).

Shaw (2000) also notes that other travelers, among them, Maximilian Fischl and Joseph Georg Wideman described his journey through the Austrian and Venetian territory through several letters. In them, they recorded a brief visit to Socerb. The German botanists David Heinrich Hoppe and Christian Friedrich Hornschuch also visited the cave “*in the vicinity of the ruins [of the Socerb Castle] where they say the place became a refugee of San Servolo and an altar was erected in his honor*” (Hoppe & Hornschuch 1818 *cited by* Shaw 2000, 108; Shaw 2008, 112).

Shaw (2000) also identifies the travels of the English geologists William John Hamilton and Hugh Edwin Strickland in the region. They left England in 1835 to undertake a journey through the Balkans describing important points of the present-day Slovenia. Regarding the Sveta Jama, Strickland (1858) wrote in his memoirs:

Set out to visit the castle and cave of St. Servolo, six miles from Trieste; in our way we visited the cathedral of Trieste, a small old church on a hill overlooking the town. It is chiefly remarkable for having been built on the site of a Roman temple dedicated to Bacchus. The tower of the church has been built on the portico of the temple, of which five or six columns, and the architrave, are still remaining; the interstices of the columns having been walled up, and the upper part of the tower continued on the top of the architrave. Several Roman inscriptions are built into the wall of the church. In a small enclosure near the church is a monument to Winckelman, the antiquarian, who was buried at Trieste. It has been repaired and adorned by the late Emperor of Austria. In the same enclosure are several very perfect Roman inscriptions, found in the neighborhood of Trieste. We now pursued our walk to St. Servolo; we followed the low ground south of Trieste, between the hills and the sea. All the mountains are of a hard grayish limestone, similar in appearance to the English mountain limestone, though of the same age as the chalk. It resists decomposition to such a degree that the surface of these mountains consists of little but bare rocks, except where a few patches of firs contrive to find a footing. This grey rock gives the country a most desolate appearance. The valleys produce vines, olives and maize. We followed the valley to the village of Dolina, and then ascended the mountain on which St. Servolo stands. It is a bleak and desolate spot, near the summit of the mountain, with a precipitous rock rising above it, crowned with the ruins of an old castle. The staircase which led to the castle is now gone, and it is no easy task to climb up the rock. It is of small extent and much ruined, containing nothing of interest beyond the singularity of its position and the extensive view from it. A few hundred yards from the castle is the cave of St. Servolo. In this damp and dark abode the good saint dwelt for a year and a half, to purify himself from all worldly contaminations. The cave is now a sort of chapel, a shrine having been erected to the saint; it is of no great extent, but contains some good specimens of stalactites. (Strickland 1858, lix).

Whether true or not the stories about the miracles or the supposed healing properties of the Holy Cave, it is right to say that its historical and cultural importance as a place considered to be sacred by the folk tradition is undeniable.

### *3.1.2 Landarska Jama*

At Langobard, original documents preserved record that the king Berengarius donated a parcel of land in the region to a certain deacon Felix. This donation included a cave and its church. The tombstone of the deacon, still preserved, can be found inside the sacred cave. It is known that the donation occurred in the year 888 or 889, and the

cave and its church are located to the west of the Slovenian ethnic territory. Therefore, two original names are identified, one in Slovene and the other in Italian, but with almost the same meaning: *Sveti Ivan v Čelè* (St. John in the Rock) or *San Giovanni d'Antro* (St. John of the Cave), respectively (Figure. 161).

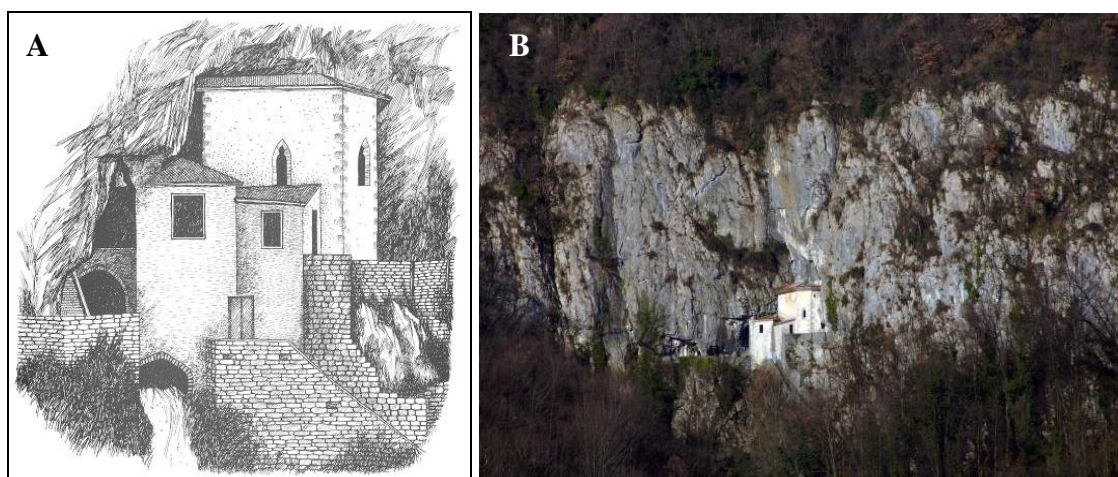


Figure 161 – A) Illustration of the cave-church in Tomasetig (1995). B) General overview of the cave location. The name already says much: *St. John in the Rock* (Photo: Luiz E.P. Travassos 2009)

Montina (1992:204) identifies the site as a “castle”. Its architecture, without doubt, is reminiscent of a fortification. Oral tradition says that during the barbarian invasions, the cave was used as a fortress that guarded the valley of Nadiža (Figure 162) and was part of a larger set of fortifications known as the “*Decima Legio*” from the time when Augustus united the region of Veneto (Italy) with Istria (Slovenia-Croatia) by establishing the supremacy of Aquileia (Anonymous 1992).



Figure 162 – View of the Nadiža Valley guarded by the fortification of the Landarska Jama (Photo: Luiz E.P. Travassos 2009).



Common to many sacred caves, the area was initially used as a hiding place that needed to be fortified against possible invaders. Apparitions or the combination of local religious figures, eventually sacralize the place turning it into a place of worship. In the case of this cave, the oldest document of its existence is carved in the rock in front of the chapel inside the fortress and dates from the 15<sup>th</sup> century (Figure 163).



Figure 163 – A) Detail of the inscription that proves the donation made to the deacon Felix. B) The author in front of the chapel. C) Image assembled to identify and locate the plate that confirms the construction of the chapel by Andreij von Lach in 1477 (Photos: Luiz E.P. Travassos 2009).

According to Bressan and Cergna (2007), the first citation of the cave in the literature was in 1565 and was made by Jacopo Valvasone in his “Description of the cities and lands of Friuli”.

The cave is also called Landarska Jama, because it is near the village of Landar or Antro. It is believed that the church had been built before the time of donation and since then has remained a church with occasional services (Figure 164). For the Slovene population of the mountainous valleys that surrounds the church, it was an important pilgrimage site. It is even portrayed in one song (“Attila and the Slovenian Queen”) made by a famous Slovenian poet (Anton Aškerc) which refers to pseudo-historical events in the cave (Novšak 1955).

Currently in Italian territory, Landarska Jama is developed in Eocene limestone and has a predominantly horizontal development of about 4,000 meters. The tourist path of approximately 300 meters is a conduit predominantly linear, horizontal and illuminated by artificial lights.



Figure 164 – A) The stairs that leads the pilgrim or tourist to the cave of Sv. Ivan v Čele / St. John in the Rock. B) The altar of the cave-church (Luiz E.P. Travassos 2009).

### 3.2 The Lapa de Antonio Pereira (Gruta de Nossa Senhora da Conceição da Lapa)

Antonio Pereira, a district of Ouro Preto, is located at about 70 km southeast of Belo Horizonte (Figure 165). It has significant cultural importance when it comes to the religious use of the underground. In the Paleoproterozoic dolomites of the Gandarela Formation (2.4 Ga), oral tradition talks about the discovery of a cave (called Lapa de Antônio Pereira or Grotto of Our Lady of Conceição of Lapa, cave cadastre SBE MG-1649) in 1722 or 1767 when, after alleged apparitions of Our Lady, pilgrimages began to the place.

Since the time of the alleged apparitions, the surrounding landscape has much changed. Paula et al. (2007) remind us of the presence of simple houses nearby, a soccer field and a quarry of imperial topaz, which is about 400 m from the mouth of the Cave (Lapa). There is also vegetation in the surroundings, especially grasses and small to medium size regional trees, located on the opposite side to the village.

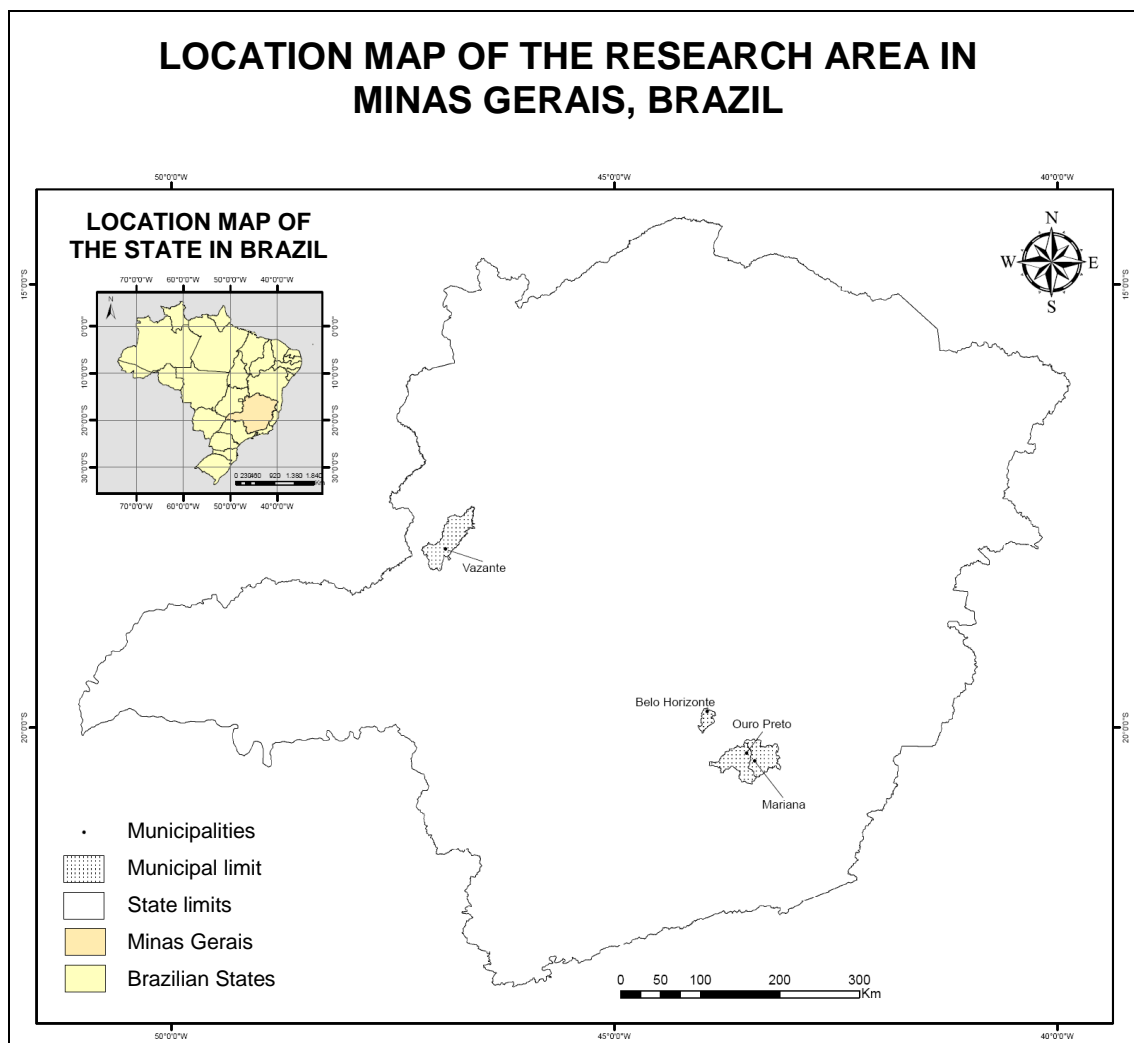


Figure 165 – Location map of the research areas in Minas Gerais (Source: Luiz E. P. Travassos, 2008).

The cave was first identified by Father Manoel Aires de Casal in his work “*Corographia Brasílica*” (1817) and by Spix and Martius (1824) in “*Reise in Brasilien...*” or “*Travels in Brazil...*”. This last book published by the Bavarian naturalists between 1823 and 1837 is the result of their journey to Brazil from 1817 to 1820. It is worth to point out that the cave is also mentioned in the journals of the Brazilian Emperor D. Pedro II on April 18<sup>th</sup>, 1881

From the physical point of view, emphasis is given to the Serra de Antonio Pereira (direction N-S) between Mariana and Ouro Preto. The region is located within the Iron Quadrangle (*Quadrilátero Ferrífero*), a major national mineral region. The Grotto of Our Lady of Lapa stands out for its uniqueness inside this regional context. The region of the *Quadrilátero Ferrífero* (QF) in Minas Gerais, Brazil, is characterized by the presence of iron deposits widely exploited by the mining industry. It is

considered one of the most important mining districts in Brazil due to both the concentration and variety of minerals that are found in the area (e.g. gold, iron and manganese). Iron is in the first place as the most important product.

According to Ruchkys (2007), the region is also a district of rare scenic beauty and unusual topography as a result of the response of a great variety of rocks to weathering and deformation processes occurring throughout its geological evolution. Still according to her, the stratigraphic context of the QF is characterized by large sets of rocks: 1) the complex of metamorphic Archean crystalline rocks; 2) the sequences of Archean greenstone belts represented by the *Rio das Velhas* Supergroup, and 3) the metasedimentary Paleo and Mesoproterozoic sequences represented by the *Minas* Supergroup (*Caraça*, *Itabira* and *Piracicaba* Groups), the *Sabar* Group (primary composed of schists and phyllites, metaconglomerates, quartzite and rare ferriferous formations), the *Itacolomi* Group (consisting mainly of quartzite and conglomerates lenses with *Itabirito* pebbles), and the *Espinha* Supergroup (represented by the quartzite *Serra das Cambotas*).

Historically, exploitation of the region began in 1695, a period in Brazilian history known as the Golden Cycle. In the subsequent years, the exploitation of the region marked Brazilian history and it was leader in the international overall production of gold throughout the 18<sup>th</sup> century.

The cult of Our Lady of Lapa is believed to have started due to the strong Portuguese presence in the region during the Colonial period. In Portugal it started probably in the Serra da Lapa, the central-northern region of Portugal. Thus, it is considered that the region has great historical value as the starting point for the cult that came to be spread over the world from the 15<sup>th</sup> century. In the following lines, elements of the tradition linked to Our Lady of Lapa are described as perpetuated by regional oral tradition and recorded by Amorim (2006) and Forte *et al.* (2008).

According to the tradition, since 1498, it is believed that a mute 12 year old shepherd called Joanna, while returning with her livestock from the pasture she had spotted an image of Our Lady in a rock shelter. After finding the image, she cleaned it and built a small altar adorned with wild flowers found in the region. Since then, she started to visit the improvised shrine daily. Her mother, when she found out, would have asked her to stop these rituals.

One day, after she took the image into her house, her mother got angry and threw the image into the fire. Thereafter, the girl would have screamed, “*Mom, what have you done? It is the Our Lady of the Cave!*” Then, immediately, the child took the image from the fire, but without burning himself. Because of her actions, Joanna’s mother was paralyzed in one arm. They then started to pray to Our Lady of Lapa and the mother’s arm was cured.

Soon the story of the miracle was widespread, starting the pilgrimages and the cult of Our Lady of Lapa. After learning about the miracle, the priest from Quintela suggested that the image should be taken to the local church. However, according to tradition, the image had disappeared from the site, reappearing again in the cave where it was first discovered. When the priest tried to put the image back in the church it disappeared again and this was considered a sign that Our Lady of Lapa wanted to be worshipped in the original place: the cave.

To explain the phenomenon of the emergence of the image in the cave, some historians argue that the original finding of the image of Our Lady dates back to 982. In this period, a Moorish army had advanced through the village of Lamego<sup>125</sup> destroying the Sismiro Convent. At the site they tortured and killed many nuns. Some, however, managed to escape and took the image of Our Lady with them. During the escape they spotted the Serra da Lapa and concealed the image in one of the many rock-shelters in the region.

For Amorim (2006) it was the year of 1576 when the Jesuit Order was given the area in which the Grotto is located. When they realized the amount of pilgrims that used to gather in the cave to worship the image of Our Lady of Lapa discovered by Joanna, the Jesuits began to build the Sanctuary to guard the grotto. It is recognized that the cult of Our Lady of Lapa has originated in this sanctuary, and from there it spread throughout the world together with the dispersion of the Jesuits.

In Minas Gerais, the cult of Our Lady of Lapa is associated with two known alleged historical events propagated by oral tradition. The first event took place in 1722 when some children were looking for firewood in the forest and saw a small rabbit going into a cave. While seeking the animal the children would have sighted Our Lady surrounded by a bright light. Then, they have found the image of the Saint. Tradition

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<sup>125</sup> Locality about 290 km northeast of Lisbon and at about 70 km east of the city of Porto.



also records that the picture had been taken from the cave to the village church, but had returned “alone” to the cave several times before an altar was built there. It is important to note that the return of the Saint’s image to its original shelter is similar to the alleged facts that occurred in Portugal in the 15<sup>th</sup> century.

The second event supposedly occurred in 1767, when a young man was also attracted to the cave by a rabbit. Entering it, he would have seen Our Lady sitting on a rock. After leaving the cave and telling everyone about the incident he have returned and found the image of Our Lady in the same place he had seen the apparition. As in the stories of Portugal and the first version, the image was taken to the village church on the orders of the local priest, but returned several times to the cave until an altar was built there. With the destruction of the church by a fire of unknown origin, this fact also was interpreted as the will of the Saint to return to its place of origin.

Thus, the number of pilgrims which started to go to the cave was intensified and since then every August, about ten to fifteen thousand people visit the grotto of Our Lady of Lapa. This number cannot be accurately stated and is based on estimates of the Military Police that is responsible for the security of the event.

Its historical importance is confirmed in the work of Casal (1817), stating that

in a distance of 2 miles to the north of Mariana, in the Arraial of Antonio Pereira (its founder), a hill, which is located in the end of a pleasant valley is a cave, formed by nature, converted by the devotion in a chapel dedicated to Our Lady of Lapa, where every Saturday there is a mass, and a festival on August 15. On the roof, which is made from limestone, there are many stalactites, or as pieces of glass, are formed by the infiltration of water that freezes (Casal 1817/1976, 170).

As mentioned earlier, in Brazil Spix and Martius (1824, 277) traveled through the interior of the former Portuguese colony through the region of the *Quadrilátero Ferrífero* and recorded the existence of the Lapa of Antonio Pereira:

In the pleasant valley not far from the village a very compact light grey calcareous stone stands out in large masses and extends pretty far up the mountain In this probably primitive limestone which sometimes shows on its rifts a mammillated coating of sulphur there is a cavern with stalactites which has been transformed into a Capella de Nossa Senhora da Lapa (Spix & Martius 1824, 277).

Another traveler, equally important, that recorded the grotto was D. Pedro II:

Lunch at 9 ½. I went at 10 ½. Nice way that commands a broad valley. The view of the Arraial of Antonio Pereira is all smiley because of its verdant plantations. I crossed it and came to the Lapa. There is nothing remarkable. They put a porch in its entrance, and built inside to make it into a chapel. They should enjoy only the natural stones. I saw what I could see from the cave. To see the other three rooms I would have to go creeping into the water. On August 15, which is the pilgrimage, there is no water in the grotto (Dom Pedro II, April 18, 1881).

It is worth noting the apparent lack of interest by the Emperor in relation to the cave. When he said that “*there is nothing remarkable*”, it is interesting to remember his visit to the region occurred after his visit to the Cave of Postojna, Slovenia, on 9<sup>th</sup> of October 1871. With just a little over 230 m of horizontal passage the Cave of Antonio Pereira is very modest compared to the nearly 21 km of the cave he visited in Europe.

The Lapa of Antonio Pereira, with its 239.48 m of horizontal passage, is basically divided into two rooms. One is a main room where the altar and other structures typical of a church or chapel are located. To the right of the altar one can see a speleothem perceived by believers as the image of Our Lady. At the back of the altar, another hall receives candles deposited by pilgrims, especially in the Saint’s day, on August 15<sup>th</sup> (Figures 166 and 167).

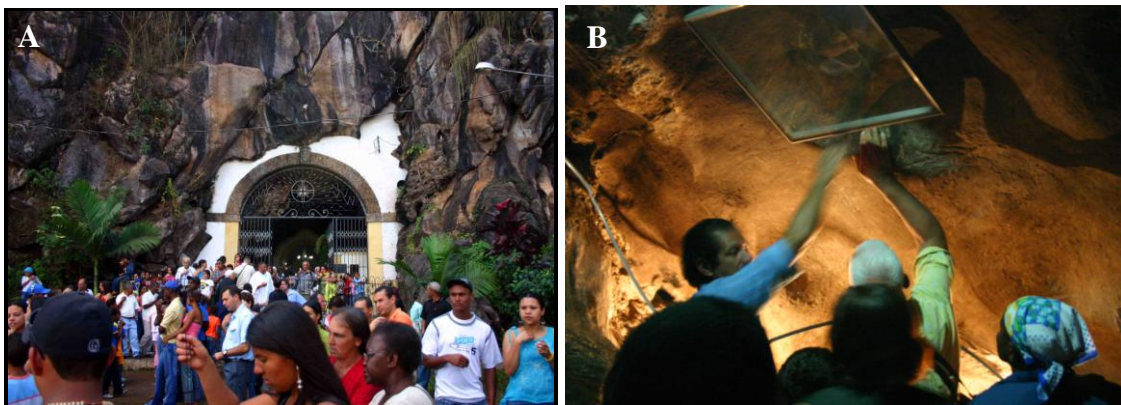


Figure 166 – A) The entrance to the Sanctuary. B) The speleothem perceived as the image of Our Lady - Nossa Senhora da Conceição da Lapa (Photo: Luiz E. P. Travassos 2006).



Figure 167 – Pictures that illustrate the number of visitors during the Fiesta of Our Lady (Photo: Rose Lane Guimarães 2008).

Through analysis of data from the visitors' book during the year 2008, it is possible to classify the cave as a National Sanctuary. However, we must emphasize that the place is much more influential and significant regionally for the State of Minas Gerais. The visits of 825 persons were recorded from this state, mostly individuals originated from municipalities within a radius of about 100 km as shown in the tables and maps that follows.



Figure 168 – A) The main altar dedicated to Our lady of the Cave (Nossa Senhora da Conceição da Lapa). B) Pilgrims laying down candles in honor of Our Lady (Photo: Luiz E. P. Travassos 2007).





Figure 169 – Speleothem perceived by the pilgrims as the image of Our Lady of the Cave (Nossa Senhora da Lapa). The image is now protected by glass that prevents people touching the speleothem. However, the water that drips from the wall is touched by the visitors who consider it sacred (Photo: Luiz E. P. Travassos 2007)

**TABLE 3**  
**NUMBER AND COUNTRY OF ORIGIN OF VISITORS OF**  
**THE LAPA DE ANTÔNIO PEREIRA, MG, IN THE YEAR 2008**

<b>COUNTRY</b>	<b>NUMBER OF VISITORS</b>
<i>Africa</i>	1
<i>Argentina</i>	3
<i>Brazil</i>	2047
<i>Canada</i>	2
<i>England</i>	1
<i>Estonia</i>	1
<i>France</i>	15
<i>Germany</i>	2
<i>Italy</i>	6
<i>Japan</i>	1
<i>Portugal</i>	2
<i>United States</i>	3
<i>Venezuela</i>	1
<b>TOTAL</b>	<b>2085</b>

Source: Visitors' book from 2008 / Compiled by L.E.P. Travassos 2008-2009

**TABLE 4**  
**NUMBER AND STATE OF ORIGIN OF VISITORS OF**  
**THE LAPA DE ANTÔNIO PEREIRA, MG, IN THE YEAR 2008**

<b>STATE</b>	<b>NUMBER OF VISITORS</b>
<i>Acre</i>	2
<i>Amazonas</i>	2
<i>Bahia</i>	17
<i>Ceará</i>	22
<i>Distrito Federal</i>	94
<i>Espírito Santo</i>	48
<i>Goiás</i>	1
<i>Minas Gerais</i>	825
<i>Mato Grosso</i>	2
<i>Mato Grosso do Sul</i>	2
<i>Pará</i>	12
<i>Pernambuco</i>	14
<i>Piauí</i>	1
<i>Paraná</i>	38
<i>Rio de Janeiro</i>	313
<i>Rio Grande do Norte</i>	4
<i>Rio Grande do Sul</i>	65
<i>Santa Catarina</i>	9
<i>Sergipe</i>	9
<i>São Paulo</i>	475
<i>Tocantins</i>	4
<i>Without record</i>	88
<b>TOTAL</b>	<b>2047</b>

Source: Visitors' book from 2008 / Compiled by L.E.P. Travassos 2008-2009

According to Tables 3 and 4, it is possible to categorize the origin of the individuals who visited the Lapa de Antonio Pereira in 2008. The largest number of visitors is from Minas Gerais, followed by Sao Paulo, Rio de Janeiro, Distrito Federal, and Rio Grande do Sul. Goias showed only a visitor and Acre and Amazonas had only two representative each. One cannot say whether they are tourists or pilgrims without further study. Regarding the number of visitors per month (Figure 170), excluding the month of the Saint's Day (August), the highest peak of visitors is the month of July, the period of school holidays. The months of February, March, April and May also showed significant numbers, probably due to the holidays of Carnival, Holy Week, the day of Tiradentes and Labor Day. However, it was observed that the visits did not focus only on these dates. Other informations were placed on maps and can be seen in figures 171, 172, 173 e 174



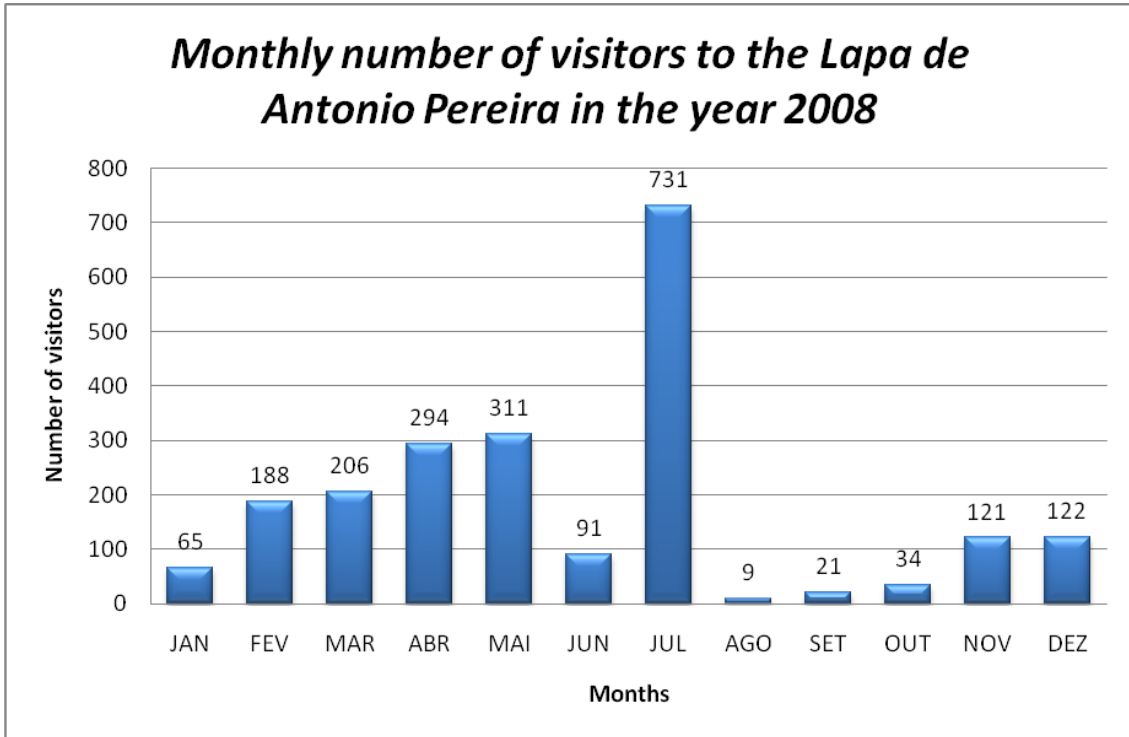


Figure 170 – Graph showing the monthly number of visitors to the Lapa de Antonio Pereira in the year 2008. It is necessary to remember that in August, month of the Saint’s Day , the visitors’ book is not used to register the visits. Thus, the low number registered is not the reality during the festival (Source: Visitors’ book from 2008 / Compiled by L.E.P. Travassos 2008-2009)

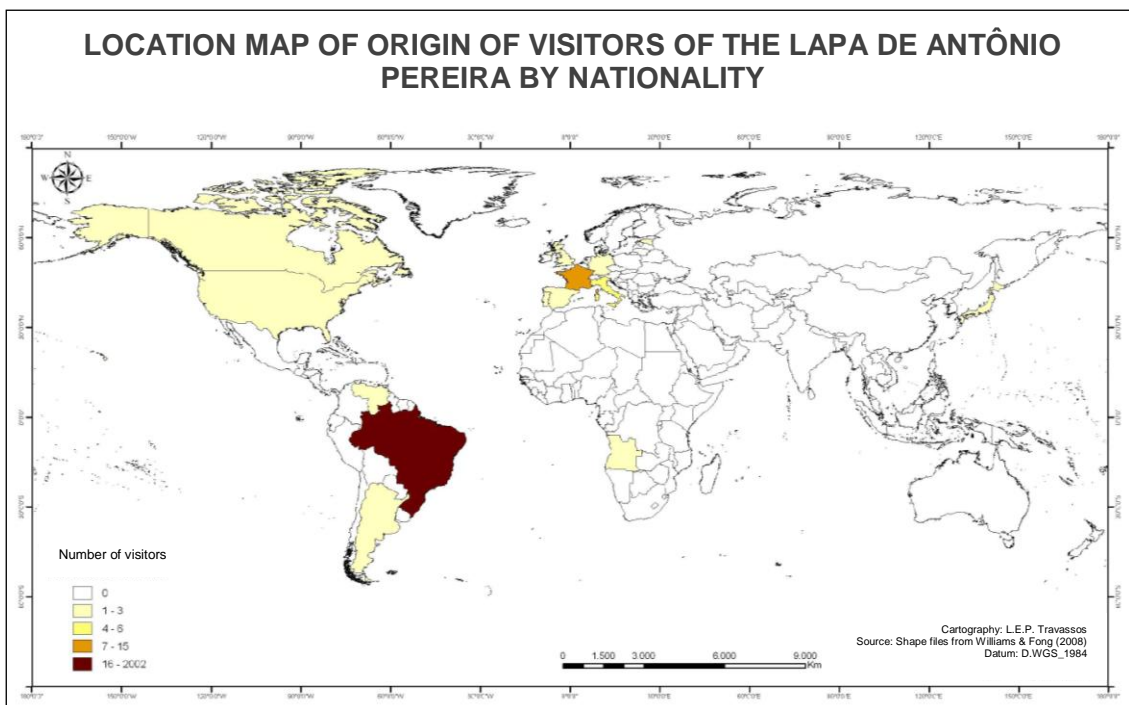


Figure 171 – Location map of origin of visitors of the Lapa de Antônio Pereira by nationality (Source: Visitors’ book from 2008 / Compiled by L.E.P. Travassos 2008-2009)

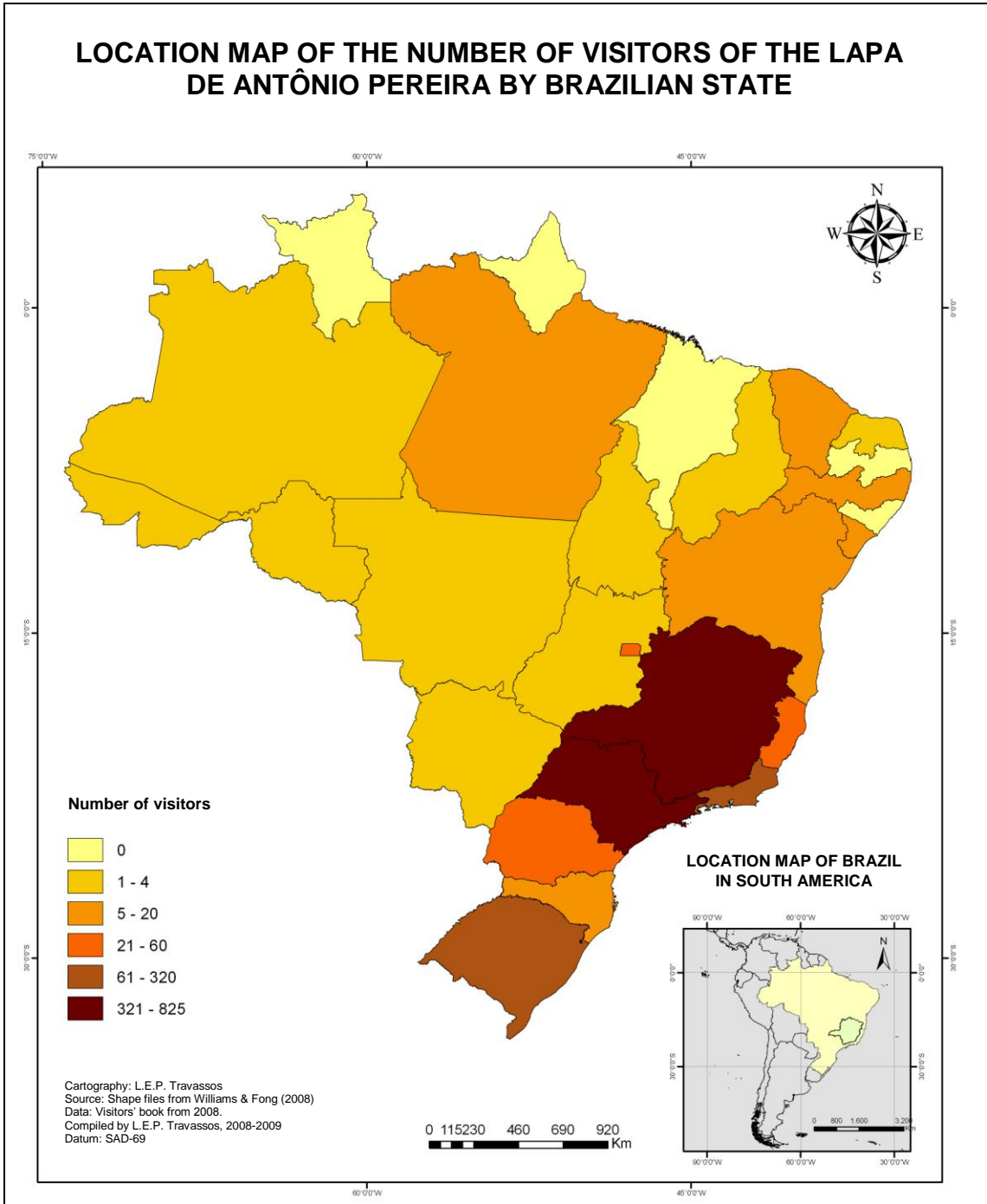


Figure 172 – Location map of the number of visitors of the Lapa de Antônio Pereira by Brazilian State (Source: Visitor book from 2008 / Compiled by L.E.P. Travassos 2008-2009)



Figure 173 – Location map of the number of visitors of the Lapa de Antônio Pereira by municipality (Source: Visitor book from 2008 / Compiled by L.E.P. Travassos 2008-2009)

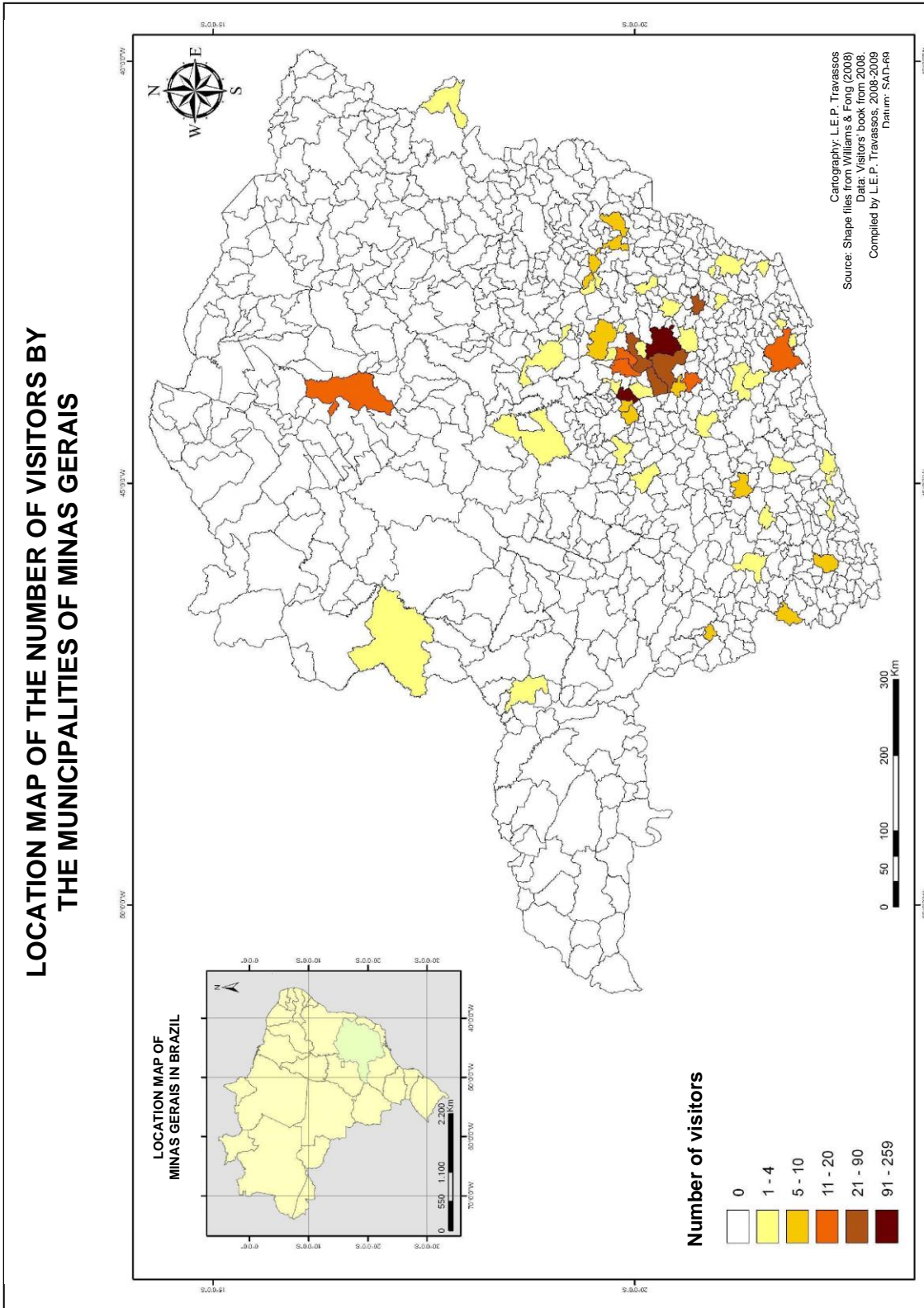


Figure 174 – Location map of the number of visitors by the municipalities of Minas Gerais (Source: Visitor Book From 2008 / Compiled by L.E.P. Travassos 2008-2009)



The cave is being studied by Travassos, who aims to establish a continuous monitoring of temperature and humidity inside it. Although the need for making measurements at least 4 times a day (e.g.: 6:00, 12:00, 18:00 and 24:00) is known, for this work it was only possible to carry out two measurements: one in the period before the festivities and another during the visit of the pilgrims, on August 15, 2008.

By analyzing the map of the cave, it was possible to define the position and distribution of digital thermo-hygrometers in 11 stations (Figure 175) outside and along the cave in order to record temperature and humidity. The instruments were placed at least 1 m away from walls, speleothems and the ground as suggested by Cigna (2002). Even though there were no further measurements, the data allowed the visualization to a first approximation of the impact caused by the visitation, such as the increasing of temperature and relative humidity inside the cave (Table 5 and Figures 176 and 177).

**TABLE 5**  
**TEMPERATURE AND HUMIDITY MEASURED BEFORE AND DURING THE**  
**FEAST OF OUR LADY OF LAPA, ANTONIO PEREIRA, MG**

<b>Station</b>	<b>Temperature without visitors in °C (Temp.1)</b>	<b>Temperature with visitors in °C (Temp.2)</b>	<b>Humidity without visitors in % (Humidity 1)</b>	<b>Humidity with visitors in % (Humidity 2)</b>
A (01)	23	26	50	63
B (02)	27	27	50	63
C (03)	27	27	54	64
D (04)	26	30	51	61
E (05)	25	33	50	64
F (06)	24	33	51	63
G (07)	27	33	57	62
H (08)	27	34	59	64
I (09)	25	30	65	65
J (10)	25	28	69	68
K (11)	25	29	71	67

*Source: Rose Lane Guimarães and Luiz E.P. Travassos 2008*

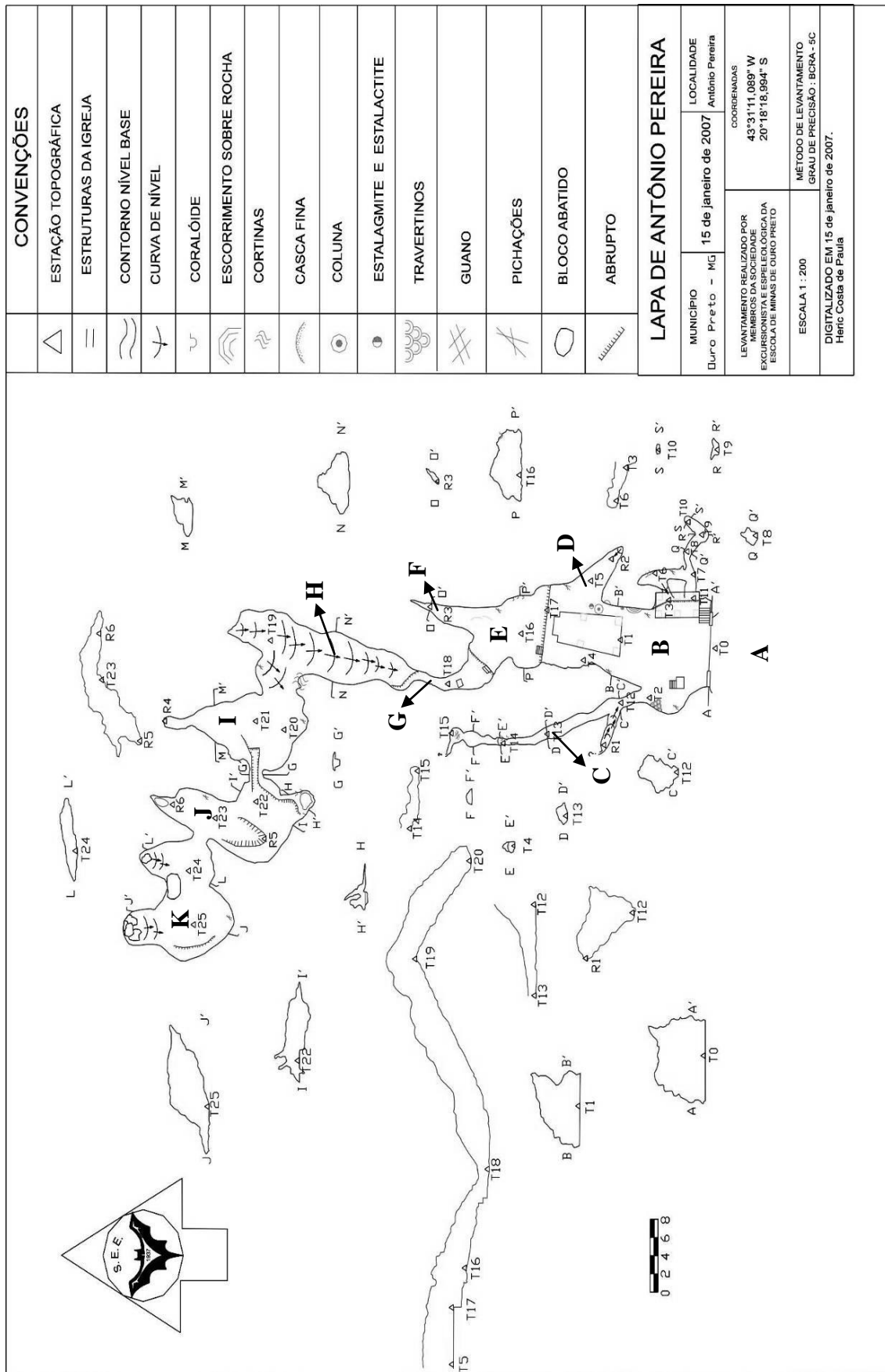


Figure 175 - Map of the Lapa de Antônio Pereira and the places where the measurements took place

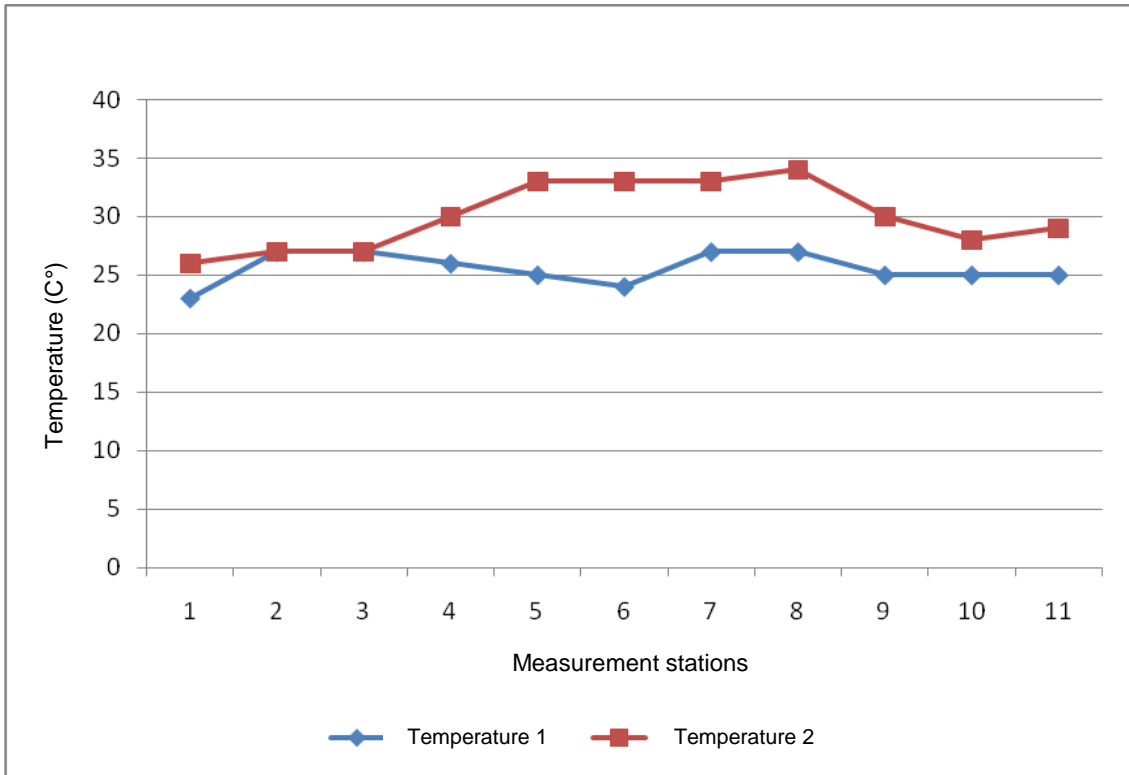


Figure 176 – Graph representing the data of temperature collected outside and inside the cave. Temperature 1 regards the measurements before the Festival. The data called Temperature 2 are the measurements made during the Festival (Source: Rose Lane Guimarães e Luiz E.P. Travassos 2008).

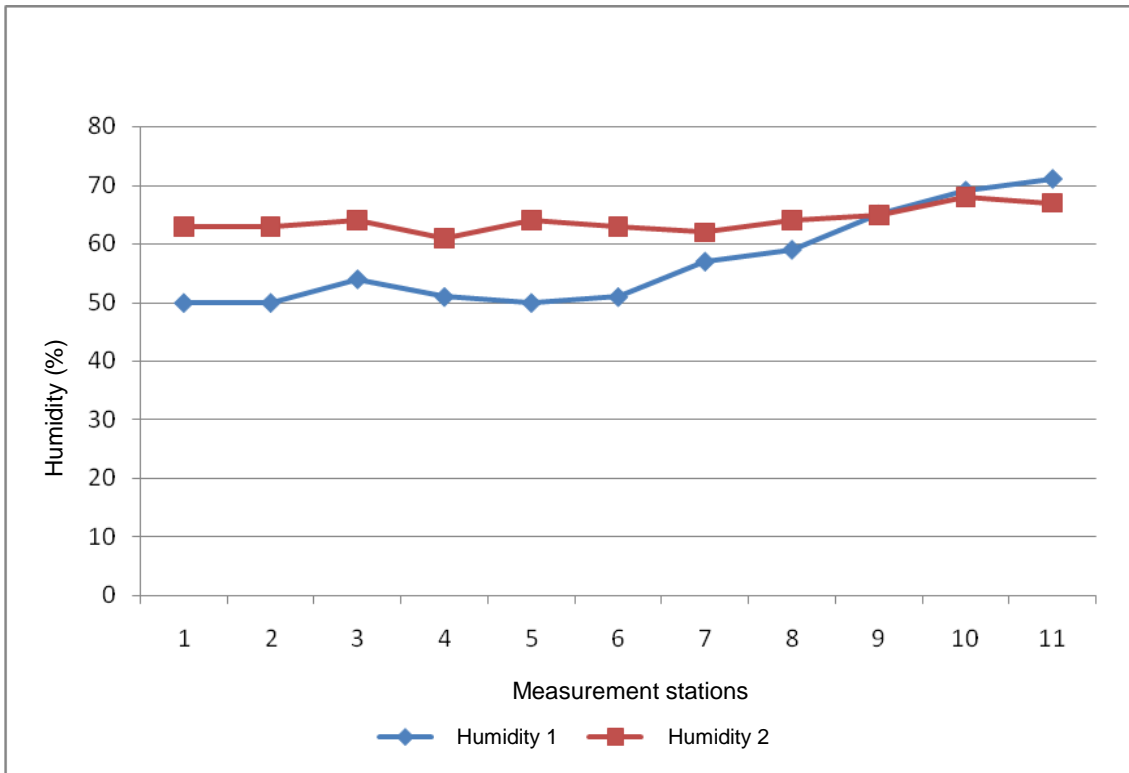


Figure 177 – Graph representing the data of humidity collected outside and inside the cave. Humidity 1 regards the measurements before the Festival. The data called Humidity 2 are the measurements made during the Festival (Source: Rose Lane Guimarães e Luiz E.P. Travassos 2008).

When looking at the table and the data on temperature and humidity measured before and during the Feast of Our Lady of Lapa, one can make some conclusions that are easily drawn by combining the data with the analysis of the morphology of the cave and its use. Indeed, even before taking the measurements one could expect a significant increase of temperature and humidity due to the increased number of visitors inside the cave.

Thus, there was observed the fact that temperature increases from the entrance, reaching a peak at about the middle sector of the cave with a decrease of these parameters at the end. Regarding humidity, one can state that this variable also increases from the entry towards the end of the cave. The increase is noted in two occasions, both before and during the visits.

In “A”, the outer portion of the cave, there was an average increase of 3 degrees in the two variables. At this station, one must stress the accumulation of people in the area, waiting to enter the cave. In “B” and “C” the values of temperature are constant, probably due to the size of the room that allows good circulation of air (B) and the passage (C) that is not visited. In “D” and “E”, there is a significant increase in temperature and humidity, mainly due to the concentration of people in “D” that wait in line to touch the water that flows from the speleothem perceived as the image of Santa and in “E”, where there is the concentration of candles placed by the pilgrims.

In “F”, a small canal near the hall where the candles are deposited, the values remained high, due also to the presence of artificial illumination inside. The conduit identified by “G” connects the initial rooms to the rest of the cave and has a concentration of people due to the narrowing of its walls. In “H”, the peak of temperature and humidity is probably due to the concentration of artificial light. The hall containing the station “I” shows the beginning of the fall in temperature towards the end of the cave. “J” and “K” show reduction in temperature, but register the highest values of humidity.

These data show the impacts of visitation during the Feast of Our Lady of Lapa, however, the amount of visitors during the year is not as concentrated as those who pass through the cave during a religious festival. The impacts on any cave fauna have occurred, probably since the beginning of festivals in the eighteenth century. However, it is believed that fauna present would already be in some way adapted to these impacts.

Thus, this work aims to establish an annual monitoring, with measurements at least once a month as suggested by Cigna (2002). The suggestion of replacing incandescent bulbs by less intensity bulbs to minimize impacts on the cave has been accepted by the custodian of the cave, Mr. Geraldo Cassimiro Dias, who has arranged to exchange some of them. A constant monitoring should serve as an input to the development of management plans that allow the continued use of this space as it has been for at least 250 years.

Therefore, we agree with Forte (2008) by stating that the study of karst geomorphological heritage allows us to create solutions and possibilities that can ensure the preservation of natural heritage and its use, emphasizing their potentialities for the cultural tourism.

Taking into consideration the concepts of the Geography of Religion, the area of the Lapa of Antonio Pereira can be defined according to the scheme shown in Figure 178 and Figure 179.

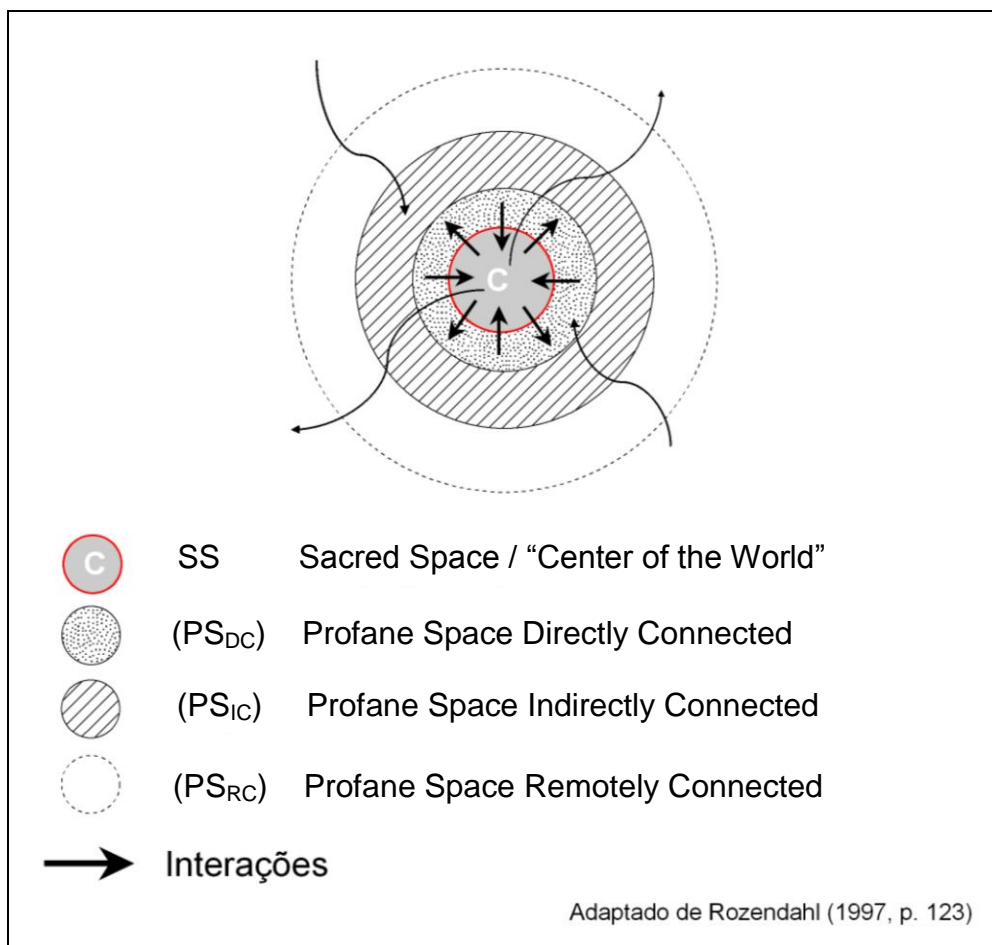


Figure 178 – Scheme of the interactions which exist between the sacred and the profane spaces (adapted from Rosendahl (1997, 123).



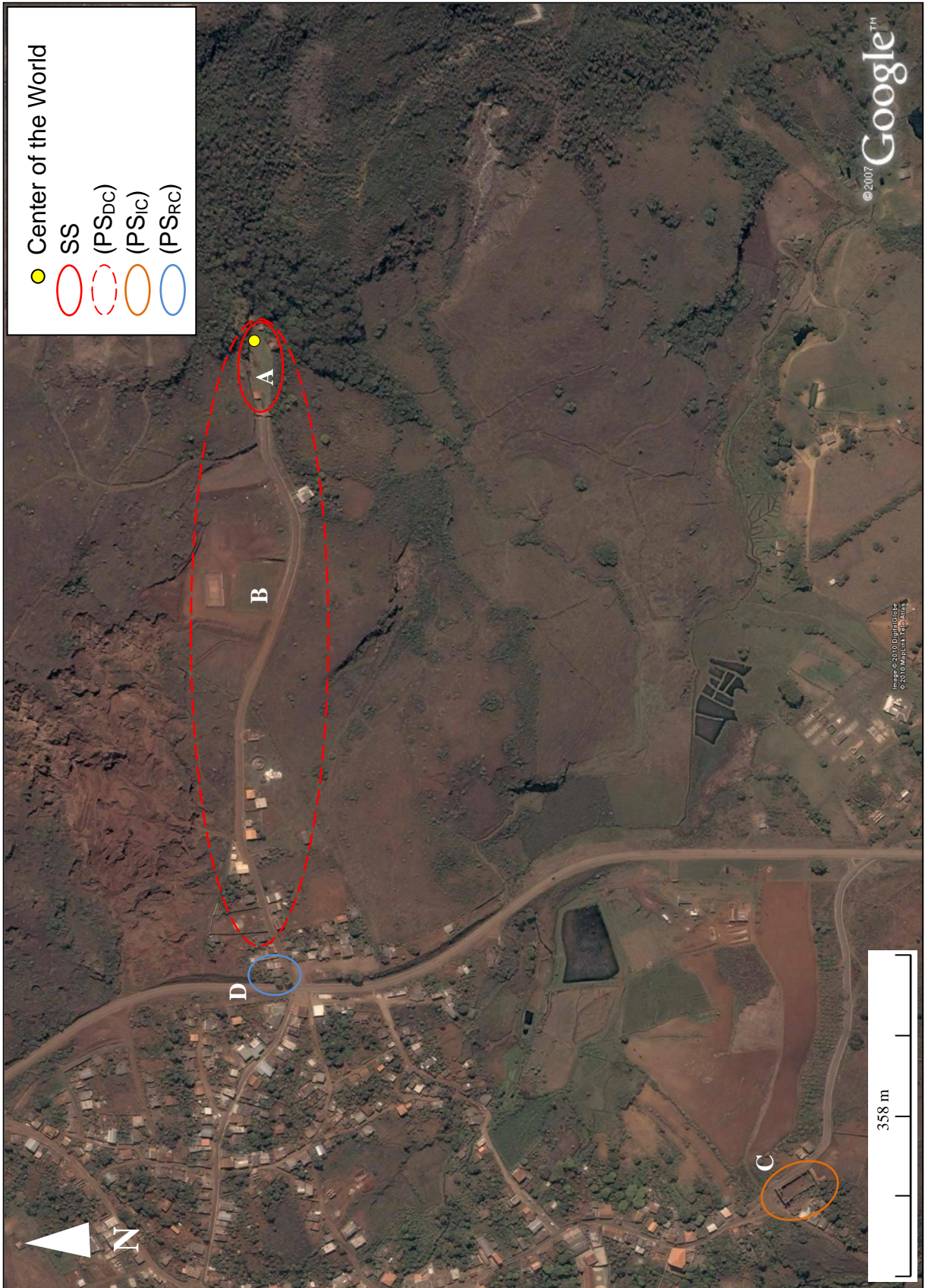


Figure 179 – Representation of the sacred and profane spaces suggested by Rosendahl (1997, 123) over a GoogleEarth image at approximate scale 1:10.000 (Source: Luiz E. P. Travassos 2009)

In figure 179 the researcher applied the scheme of interactions between the sacred and profane space proposed by Rosendahl (1997, 123). Thus one can identify the cave considered to be the *Center of the World*. In this place the pilgrims believe themselves to be in direct contact with the sacred, especially with the Patroness. Consequently, we should remember with Eliade (1996, 55), that the “*real world*” is always in the “*middle*”, in the “*center*” because that is “*where occurs the rupture of the level*”, that is, the communication between Heaven and Earth.

The Sacred Space (SS) is represented also by the letter “A”. In reality it is the walled area that surrounds the cave and where there occurs the commerce associated with the parish. The Profane Space Directly Connected (PS<sub>DC</sub>) is represented by “B”. In this area, there are various commercial booths along the paved access road to the entrance of the Sacred Space. In an open area, a kind of amusement park is set up to entertain the children.

In “C”, about 1.6 km from the entrance of the Sanctuary, one can see an important component of the tradition related to Our Lady of Lapa: the Burned Church (Igreja Queimada). Treated in this work as the Profane Space Indirectly Connected (PS<sub>IC</sub>), the Church is not actually located at the Center of the World, but it is visited by some pilgrims on their way to the Sanctuary, both on arrival and departure. It should, therefore, be regarded as connected to the religious phenomenon, element of the oral tradition.

The Profane Space Remotely Connected (PS<sub>RC</sub>) is identified by the letter “D”. The area is used as a parking place and for the sale of alcoholic beverages. The loud music, its genre, and the way people behave in this space cause discomfort to many pilgrims who go to the Grotto. Necessarily, everyone has to pass through this PS<sub>IC</sub> and many say that they don’t like what they see.

During the festival in August 2009, in an attempt to initiate discussions on the need for systematic research in the area, 130 questionnaires were used (Appendices I) within the limits of the “*Sacred Space*” as shown in figure 179.

The objective was to undertake a first approximation of the public which attends the site on the day of the Patroness. It is important to mention, that there was a reduction in the number of pilgrims at the Festival since 2005. The reason for this reduction, however, is unknown.

With the analysis of the information contained in the questionnaires one can first characterize the pilgrims by gender and age (Table 6).

**Table 6** – Table with the gender and age of pilgrims interviewed in August 15<sup>th</sup> 2009

GENDER			AGE						
Male	Female	Total	> 19	20-29	30-39	40-49	>50	N/A	Total
79	51	130	8	17	27	30	47	1	130

Source: Luiz E.P. Travassos 2009

From the 130 interviewees, 61% are male and 39% female. The majority of them are more than 50 years old (36%) and about 46% are married. Regarding their educational status, most of them (35%) have incomplete elementary education (elementary school) and about 5% reported having completed a university undergraduate degree (Table 7).

Regarding the monthly income of the interviewees, 42% reported receiving between R\$ 466.00 and R\$ 1,396.00 (approximately 183.00 and 552.00 €). About 34% of them claim to have a monthly income of up to 1 minimum wage (R\$ 465.00, approximately 182.00 €). About 6 interviewees (5%) chose not to answer that question in the questionnaire.

**TABLE 7**  
**LEVEL OF EDUCATION OF THE INTERVIEWEES**

LEVEL OF EDUCATION	NUMBER
Illiterate (Analfabeto)	2
Incomplete Elementary School (EF Incompleto)	45
Completed Elementary School (EF Completo)	38
Incomplete High School (EM Incompleto)	10
Complete High School (EM Completo)	26
Incomplete Higher Education (ES Incompleto)	1
Complete Higher Education (ES Completo)	6
Technical Studies (Curso Técnico)	2
<b>TOTAL</b>	<b>130</b>

Source: Luiz E.P. Travassos, 2009

When asked how the interviewees came to know about the Feast of Our Lady of Lapa, many of them used the phrases “*since forever*”, “*from early times*”, “*people always said*”, etc. These phrases are clear expressions of the oral character of the tradition perpetuated by the religious community or families. About 45 respondents said

they were told of miracles and the festival through their families. From the total, about 84 interviewees stated that came to know the Grotto by the “*people*”, thus, by the oral tradition, common in many festivals of this kind. Only 1% of interviewees claimed to have known the Grotto and his festival by looking at the Internet.

Regarding the day of arrival to the Sanctuary, 124 individuals (95%) said they had reached the region on the day of the Patroness. Only 2% came to the area the day before, 1% in the previous week and 2% arrived for about 5 days. Access was made, mostly by bus (43%) and private cars (38%). About 16% reached the area by foot, 2% in trucks or vans, and 1% by bicycle.

When asked whether they participate in the festival alone or in groups, the following were the results: 89% said that they had come to the Grotto with a group of friends of their community and 15% with family members. Only 22 individuals (17%) said that they went to the cave by themselves.

Proving the existence of toponymic feelings of interviewees in relation to the sacred site, 94% of them stated that they intend to stay in the region only for the day of the Patroness. This response confirms the importance of this religious place, along with the 92% who reported not having any interest in visiting other sites. The 8% who reported an interest in visiting other sites said they would like to see the topaz quarry, the main square of Antonio Pereira, the Mina da Passagem (a touristic mine) and the Burned Church. This latest attraction is part of the stories perpetuated by the regional oral tradition and is included in the research as the PS<sub>1c</sub>.

The researcher also asked about the main reason for the visit. About 91% of the interviewees used the words “*faith*”, “*miracle*”, “*religion*”, “*promise*” and “*tradition*”, confirming the sacredness of the place. Some 6% said that they would be in the place just to know it (tourism) and 3% on business. According to Oliveira (2004, 13), the word “*faith*” should be remembered as something “*capable of immediately justifying great journeys in search of something that transcends the everyday*” and together with the *sacrifice*, the motivation of the pilgrimage.

As noted in many places considered sacred, the visits are made usually annually by the believer. In the case of Our Lady of Lapa (*Nossa Senhora da Lapa*), 59% of the interviewees said that they have participated in the festivals between 1 and 10 times. When asked whether they would wish to return the following year, 98% said they want to return specifically for the festival. From these, 3 individuals said that they want to

return for work and 6 for tourism. Only 1 individual said that he/she has not shown interest in returning and 2 said that they did not know if they would return. It is interesting to note that 3 elderly interviewees said they had participated in the festival more than 50 times.

Regarding the impressions on the receptivity of the community, many of those who were interviewed said that they had no complaints. However, in informal discussions not recorded in the questionnaire, several participants of the festival complained about the existence of the bar with extremely loud music and selling of alcoholic beverages, near the highway. From the point of view of the Geography of Religion, such sales occur in the “*Profane Space Remotely Connected*” to the sacred space.

### **3.3 The Cult of Our Lady of Lapa in Vazante, Minas Gerais**

Similar facts to those in Antonio Pereira also would have occurred in another city, about 500 km northwest of the capital of Minas Gerais. Within in the micro-region of Paracatu, the city of Vazante has plateaux with emphasis on carbonate outcrops. According to Amaral (1969) cited by Bittencourt (2008), the region has been the subject of geological studies since the discovery of the first occurrences of minerals and ores in the 1950s.

Karst features, they are well developed with good examples of exokarstic and endokarstic features that go from outcrops, dolines and caves. Also common are sinks and ponors. The caves of Lapa Velha (or Cave of Pamplona) and Lapa Nova are the most noticeable for this research.

The region is part of the Speleological Province of the *Bambui* Group, with the carbonates of the *Vazante* Group. The formations of *Vazante* Group, studied by Bittencourt (2008, 29) were defined by Rigobello *et al.* (1988) and reviewed by Dardenne *et al.* (1998). They are described from the bottom to top as the *Serra do Garrote* Formation (formed by carbonate phyllites and quartz phyllites), *Poço Verde* Formation (formed by slates and marls with dolomitic layers), *Morro do Calcário* Formation (metadolomites, stromatolitic metadolomites and breccias) and the *Lapa* Formation (sequence of sandy-clay metasediments predominantly with phyllites).



Regarding the cultural use of caves, a few studies have been conducted in the region and attention should be given to two books written by Mello (1977; 2003). Although there are no studies focused on the cultural use of the karst, the books recorded the foundation of the city from the alleged apparition of Our Lady.

Mello (2003) recalls Saint-Hillarie who recorded the limestone hills and the waters of the *Vazante* region, referring to the *Serra da Lapa* (or *Morro da Lapa*) and the stream of Pamplona and its surroundings: “*At five leagues from Guarda-Mor there are in the Sierras, mineral waters in (...) which replace the salt for cattle*” (Saint-Hillarie 1944, 251 quoted by Mello 2003, 66).

As in Antonio Pereira, the oral tradition of the region of Vazante, also records two known versions of a legend that also associate the appearance of Our Lady of Lapa in a cave. The first version report that the city was founded because of the vision of the Saint in a local cave. The Cave of Pamplona was already known by plantation workers from the village who used to go inside to find fresh water. To facilitate their work, two brothers built a ranch near the cave so that they could have food and also get some rest, not wasting time while waiting for the next shift. One day, the cook, looking inside the cave saw a woman dressed in a long white dress. Because of this vision she ran out to tell the workers about it. After returning, nothing was found except a stalagmite, supposedly in the shape of Our Lady (Figure 180).

The second version is similar to the first, mainly regarding the surname of the character. Due to the Paraguayan War, also known as the War of the Triple Alliance (1865 to 1870), many Brazilians feared being sent to the front. So they used to move to remote and deserted areas. The city of Vazante fitted these categories and was chosen by Manoel Ribeiro Paixao, escaping from compulsory enlistment. He chose a cave to serve as shelter and hideout. One day, at the shelter’s entrance, he spotted a tall woman dressed in white inside the cave. He went out to the city to tell everyone about it. During wartime the daily difficulties and afflictions were the impetus for the first of the processions to the “holly cave”.

Since then, a number of pilgrims visit the cave, especially in May. In 2008 and 2009, were held the 127<sup>th</sup> and 128<sup>th</sup> Feast of Our Lady of Lapa, respectively.

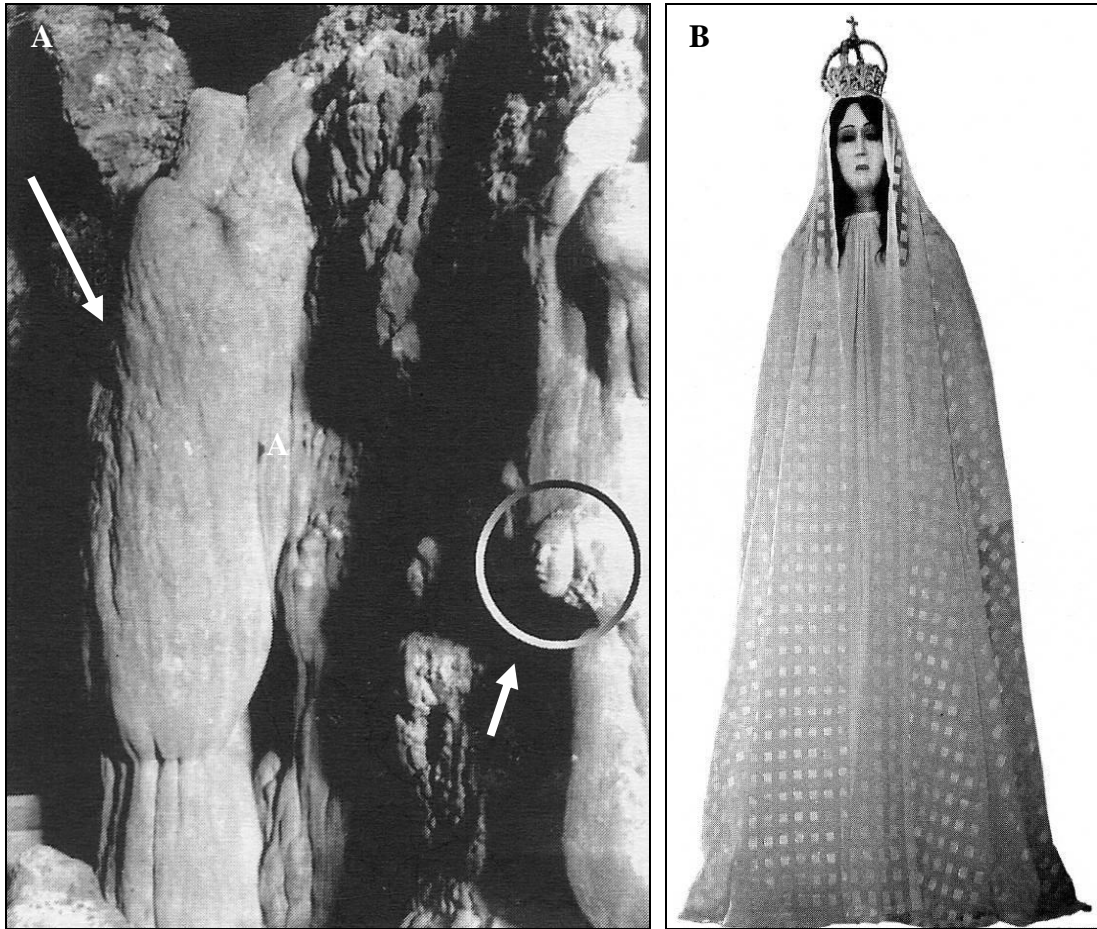


Figure 180 – A) Detail of the stalagmite perceived as the image of Our Lady of the Cave (Nossa Senhora da Lapa). At the side of the stalagmite one can see the face of an Angel artificially created. Pilgrims believe that the sacred power of Our Lady created it (Source: Mello 2003, 71; 75).

In addition to the two stories about the founding of the city, Lott (2005, 161), however without references, states that documentary sources say

that the Province of Paracatu united various paths that led the cowboys (*tropeiros*) of the south to Goiás. In the early eighteenth century, Tomás do Lago Monteiro, coming from Salvador, requested and obtained the rank of Colonel of Paracatu with authority to fight the Indians in the region. Then, in one of the caves in the region, they found a statue of Our Lady, and it soon became known and started to attract pilgrims (...).

Mello (1977, 30) states that the parish of Nossa Senhora da Lapa was officially established on January 25<sup>th</sup>, 1963. However, he states verbally that, its construction had already been ordered in 1956 and now it is located in the Cathedral Square (Figure 181). The author also points out that some call, improperly, the Lapa Nova as the Cave of Our Lady. In the 30's, at this other cave one could see a stalagmite that was perceived as the

image of St. Anthony of Padua holding Jesus in the arms. Before it was destroyed, the believers used to pray and leave coins near the speleothem (Mello 1977, 114).



Figure 181 – Images of the Church of Our Lady of the Cave. A) The first building, next to the cave entrance (1945). B) The Church built in the sixties (Source: Mello 2003, 77)

It is important to note that, at the time of the research of Lott (2005), the idea of closing the cave and prohibiting the cults appeared. In his work, fortunately, it was stated that it would be “a great loss to the municipality, for regional culture and to the strengthening of environmental education” because the grotto (*lapa*) “has several features that turns it into a big classroom” (Lott 2005, 164), referring mainly to the *Lapa Nova*. Currently, the visits to the cave are controlled.

Because the *Lapa Velha* and the *Lapa Nova* receive pilgrimages, one could also apply to the scheme proposed by Rosendahl (1997, 123). However, the researcher chose to suppress it in this section due to the fact that he not attended the festivals in the local as many times as in Antonio Pereira.

### 3.4 Comparison between the cults of Our Lady of Lapa at Antonio Pereira and Vazante, Minas Gerais, Brazil

It is possible to state that both Feasts are, mainly, regional cultural events that aim to involve the local population. The festivities can be considered transient events, but are planned by those involved almost during all the year and the “center of world” is a karst feature.

From the 16<sup>th</sup> to the 19<sup>th</sup> centuries, Brazil was a colony of Portugal. For this reason, the word *Lapa* is used in Brazil to designate a cave or a rock shelter was brought

with the colonizers. Although the Country was composed of a mixture of indigenous groups, Portuguese colonialists and African slaves, Catholicism was very strong among the population and so were the Iberian traditions.

Comparing the images and the names given to each example in Minas Gerais, the strong influence of Portugal can be seen in the appearances of Our Lady of Lapa in Antonio Pereira. The city is a district of Ouro Preto, an important village in the 18<sup>th</sup> century due to the discovery of gold and precious stones. The patroness of Portugal was the Our Lady of *Conceição*. For this reason we believe that the Virgin Mary, who apparently appeared in Antonio Pereira, received its name because of the close relationship between the Portuguese traditions of the colonists and settlers in the region. Therefore, it is called Our Lady of Conceição da Lapa.

Still regarding the Iberian traditions one can highlight the Portuguese belief that on pilgrim can only pass through a crack in the original cave if he/her has no serious sins (Figure 182). At the Sanctuary in Portugal, “*people say that there just one who has no sins can pass trough.*” (Amorim 2006, 09).

In the case of Vazante, far from being strongly and directly influenced by the Portuguese rule during colonial times, the image of Our Lady appears to be unique even in its appearance, even though the records of its alleged appearance have some similarity to the Nossa Senhora da Lapa from Portugal. However, it is worth noting that in 2008 and 2009, the researcher noticed some similar traits to the image of Our Lady from the Iberian country in the image of Our Lady of Lapa from Vazante, Minas Gerais. One example is the image’s mantle and Jesus in Her hands (Figure 183 and 184).

Collins-Kreiner and Kliot (2000) point out that one can say that tourists and pilgrims can be perceived as very different social actors within the cultural and religious tourism. This difference occurs mainly due to the motivation of the trip: *penitence* and *leisure*, respectively. The ultimate purpose of every pilgrim and in some cases, a few tourists, is to know and have access to a place made sacred by historical events and receive probable blessings. According to Gibson (2008) like modern day tourists, past pilgrims wanted to get souvenirs (water, rosaries, prayer cards, etc.), mainly to prove the visit to the sacred place and also to present to those who could not make the trip.

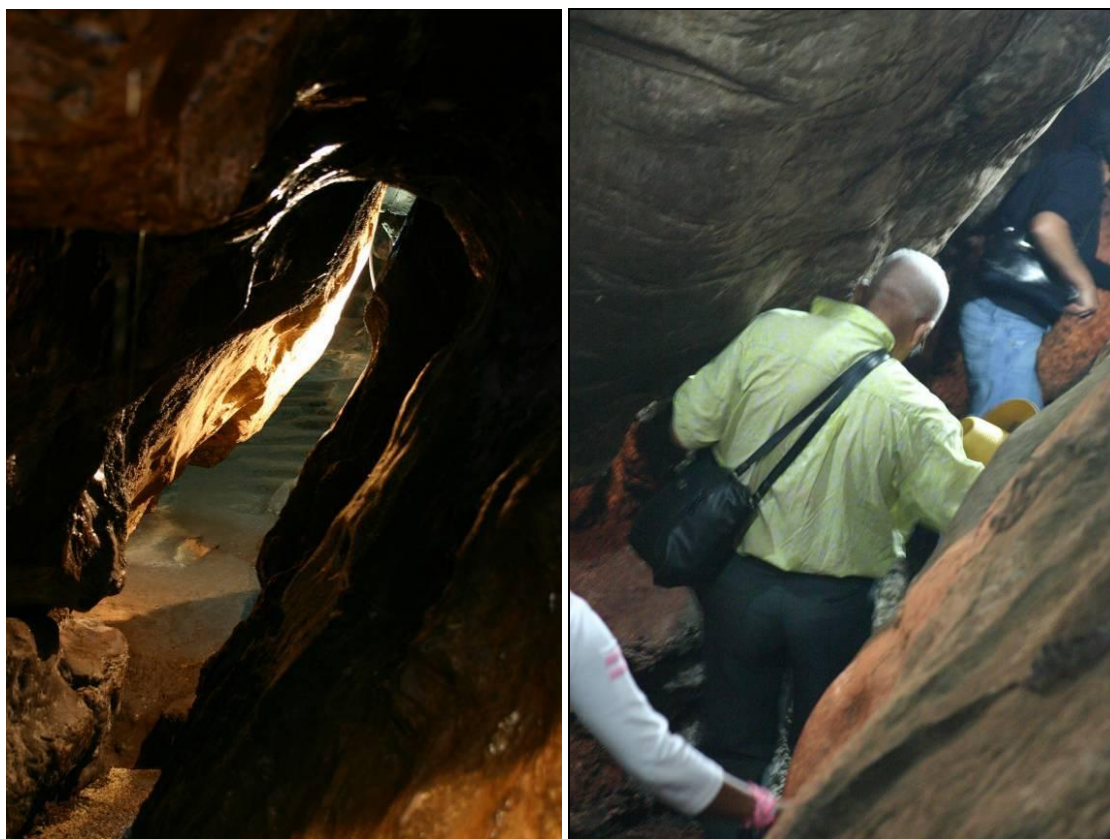


Figure 182 – Detail of the “narrow crack” at the Lapa of Antonio Pereira and the passage of the pilgrims through it (Photo: Luiz E.P. Travasso 2008; 2009)



**NOSSA SENHORA DA LAPA**

TEMA: MARIA, APÓSTOLA DE JESUS CRISTO, MENSAGEIRA DE VIDA PLENA PARA TODOS  
**128ª FESTA - DE 22 DE ABRIL A 03 DE MAIO DE 2009 - VAZANTE MG**

A paróquia Nossa Senhora da Lapa, fiel à sua missão de evangelizar, em comunhão com os objetivos da ação evangelizadora da Igreja no Brasil e da Diocese de Paracatu, convoca os romeiros e devotos de Nossa Senhora da Lapa, para a realização de mais uma grandiosa festa. Venham compartilhar momentos de fraternidade, solidariedade e devoção na cidade nascida da fé.

**AS MISSAS SERÃO SEMPRE ÀS 19 HORAS.**

**NOVENAS RURAIS:**  
 07 DE MARÇO: BAGRES  
 14 DE MARÇO: TAINS  
 21 DE MARÇO: CACHOEIRA  
 28 DE MARÇO: JABURU (Sr. Ubaldino e Zezé)  
 04 DE ABRIL: CLARO DE MINAS

**EVENTOS:**  
**17 DE ABRIL:**  
 BAILE DE CONFRATERNIZAÇÃO  
 NO CENTRO DE PASTORAL NOSSA SENHORA DA LAPA  
**18 DE ABRIL:**  
 GRANDIOSO LEILÃO DE ANIMAIS  
 A PARTIR DAS 15:00 H THATERSAL DO SINDICATO RURAL DE VAZANTE  
**22 DE ABRIL:**  
 OSH ALVORADA FESTIVA,  
 SAÍDA DA PRAÇA DO SANTUÁRIO.  
 PARTICIPAÇÃO ESPECIAL: BANDA DE MÚSICA MUNICIPAL

**OBS.: HAVERÁ CONFISSÕES TODOS OS DIAS DA NOVENA A PARTIR DAS 17 H.**

Figure 183 – Details of the images of Nossa Senhora da Lapa and the aspects which resemble the image from the Sanctuary in Portugal: the mantle, the crown and Jesus (Photo: Luiz E.P. Travassos 2008; 2009)





Figure 184 – Detail of the cover from the book written by Amorim (2006) and the picture of the original image of Our Lady of Lapa from the municipality of Quitela, council of Sernancelhe, Portugal. It is possible to identify the elements that were incorporated in the image from Vazante (Source: Amorim 2006).

### 3.5 Evaluation of sacred caves as Places of Geomorphological Interest (LIGeom): a first proposal

Applying the methodology adapted by Forte (2008) it is possible to suggest a preliminary inventory of one cave highlighted in this chapter. This methodology takes into account variables that go beyond the strictly scientific and physical aspects.

It is the researcher's intention, in the near future, to make an inventory of *LIGeom* (Places of Geomorphological Interest) associated with the caves of religious use in Brazil. According to Brilha (2005) a strategy for the conservation of sites of geomorphological interest must include at least five steps: 1) *inventory*, 2) *quantification*, 3) *classification*, 4) *divulcation* and 5) *monitoring*.

In the present work it was possible to survey and quantify, the basis for future decision-making actions aimed at promotion and dissemination of places of geomorphological interest, especially the caves of cultural use.

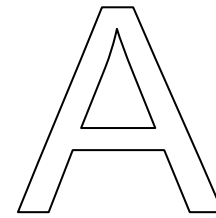
At first, one should proceed to the identification of potential places. After this step, it is necessary make a qualitative assessment as shown on *Form A*. In this phase the degree of knowledge of the area by the researcher is fundamentally important. After filling this Form, the site's characterization should be made in *Form B*. Then *Form C* should be used in order to have a quantitative criterion and to achieve future ranking. Thus, each *LIGeom* are ranked according to their *scientific values* (VCi), *additional*

*values* (VAd), *geomorphological values* (VGm), *values of use* (VUs), *values of protection* (VPr), *values of management* (VGt ) and total values (VT).

For this first approach, the researcher chose only the Lapa of Antonio Pereira to illustrate the application of the concept. It is his intention to continue this project in a near future.

The importance of a geomorphological approach in a site considered to be sacred is proved by Tricart and Silva (1960) who studied the outcrop of Bom Jesus da Lapa, Bahia, considering it an excellent example of the development of tropical karst.

**EVALUATION FORM OF POTENCIAL PLACES OF  
GEOMORPHOLOGICAL INTEREST**



AUTHOR: Luiz E.P.Travassos

Date: June 2009

**Place:** Lapa de Antônio Pereira

**Reference:** LIGeom 01

**Type of place:**  isolated  area  panoramic

**Thematic category:**  granitic  volcanic  karstic  residual  
 tectonic  littoral  fluvial  eolic  
 glacial  slope  geologic  speleological  
 other: \_\_\_\_\_

**Location:** Distrito de Antônio Pereira, Ouro Preto, Minas Gerais, Brazil

**Altitude:** 890m

**Coordinates:** 20°18'18.90"S / 43°28'21.26" W

**Number and name of topographic maps:** Folha SF-23-X-B-I-3 / Mariana

**Scale:** 1:50.000 / 1:25.000

**Evaluation**

**A. Value**

**Scientific:**  low  medium  high  very high  
**Ecologic:**  low  medium  high  very high  
**Cultural:**  low  medium  high  very high  
**Aesthetical:**  low  medium  high  very high

**B. Potentialities of use**

**Accessibility:**  hard  moderated  easy  very easy  
**Visibility:**  weak  moderated  good  very good

**Other values (natural and/or cultural) and present use:**

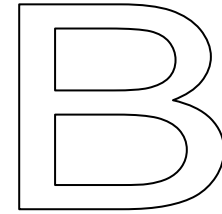
without values and use  with values and without use  with values and use

**C. Necessity of protection**

**Deterioration:**  weak  moderated  advanced  
**Protection:**  adequate  moderated  insufficient

Synthesis: High cultural value due to historical religious use of a cave developed in dolomite inserted in an important area for Geotourism. Unique occurrence in the region. Easy acces by paved roads, although lacking in directional signs.

# EVALUATION FORM OF POTENCIAL PLACES OF GEOMORPHOLOGICAL INTEREST



AUTHOR: Luiz E.P.Travassos

Date: June 2009

**Place:** Lapa de Antônio Pereira

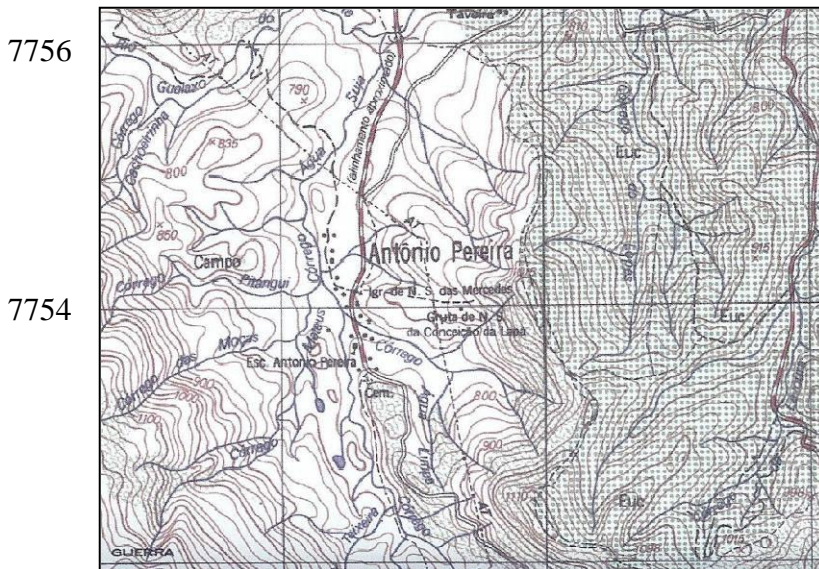
**Reference:** LIGeom 01

**Type of place:**  isolated  area  panoramic

**Thematic category:**  granitic  volcanic  karstic  residual  
 tectonic  littoral  fluvial  eolic  
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 other: \_\_\_\_\_

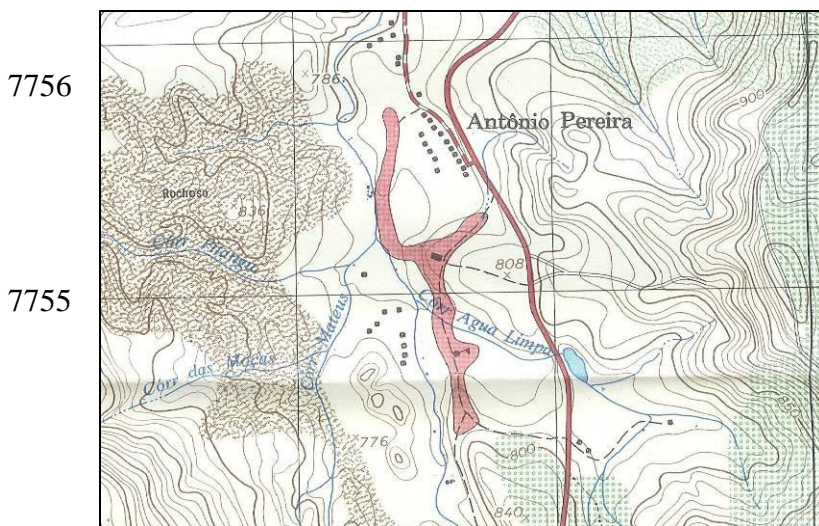
**Location:** Distrito de Antônio Pereira, Ouro Preto, Minas Gerais, Brazil

658 660



**Altitude:** 890 m  
**Coordinates:**  
 20°18'18.90"S / 43°28'21.26" W  
 659519E 7754008S  
**District:** Antônio Pereira  
**Municipality:** Ouro Preto

Sector of the topographic map of Mariana, scale 1:50.000, Folha SF-23-X-B-I-3,



**Altitude:** 890 m  
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 20°18'18.90"S / 43°28'21.26" W  
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**District:** Antônio Pereira  
**Municipality:** Ouro Preto







Sector of the topographic map of Mariana, scale 1:25.000, Folha SF-23-X-B-I-3-NO,

658 659








**BRIEF GEOMORPHOLOGICAL DESCRIPTION  
(AND OTHER IMPORTANT CHARACTERISTICS)**

**Illustration**

	<p>General aspect of the <i>Serra do Ouro Preto</i> (mountain range) viewed E-W from the front of the cave (Lapa de Antônio Pereira).</p>
	<p>General overview of the outcrop of the grotto.</p>
	<p>View of the entrance at the dolomite outcrop.</p>
	<p>Room of the “ex-voto” considered to be an external extension of the “center of the world”, the grotto. At this place pilgrims deposit votive offerings.</p>
	<p>Detail of the sign that attests the inauguration of the artificial illumination in 1973. Since then, the change of some lamp bulbs for other less powerful has already been made.</p>
	<p>General aspect of the visitors in the Day of the Patroness in August 15<sup>th</sup>, 2009. The number of pilgrims this year was lowest since 2005.</p>



	<p>Detail of one graffiti dated from 1917. Such practice is never to be encouraged. However, once they already exist, study is necessary to contextualize the history of the cave.</p>
	<p>General overview of the altar in the interior of the cave.</p>
	<p>Detail of the altar and the image of Our Lady of Conceição of Lapa (Nossa Senhora da Conceição da Lapa). The image located in the cave is a replica of the original from the 18<sup>th</sup> century.</p>
	<p>Detail of a room that has a rimstone pool, coralloids and a possible structural alignment. From this place some pilgrims take the water that is considered to be sacred.</p>
	<p>Detail of another room with artificial lights and natural broken blocks.</p>

## SYNTHESIS

<b>Brief description</b>	Place located to the District of Antonio Pereira, Ouro Preto. The landform is a natural underground cavity developed in Paleoproterozoic dolomites from the Gandarela Formation. It is used for religious purposes the eighteenth century.
<b>Lithologies</b>	Cave in dolomites from the Gandarela Formation (2.4 Ga). According to Ribeiro-Kwitko and Oliveira (2004:120) it is characterized by metric and decametric intercalations of dolomite, ferruginous dolomite, siliclastic, manganiferous or carbonate <i>itabiritos</i> . Levels of gray quartzite and phyllites appear in a very secondary form.
<b>Main geomorphological interests</b>	<i>Geocultural</i> interest due to its historical religious use since the eighteenth century. Interest due to the development of a cave in carbonate rocks.
<b>Geomorphological evolution</b>	Few records of the processes of its speleogenesis in a region where one can see a vast literature about the metalogenetic province ( <i>Quadrilátero Ferrífero</i> ).

## PATRIMONIAL INTEREST

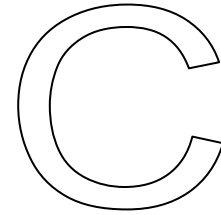
<b>Types of value</b>	<i>Cultural</i> interest due to its use throughout the history; <i>Scientific</i> due to the occurrence of a dolomite cave in one of the world's largest metalogenetic provinces.
<b>Degree of importance</b>	Location importance with high value, since it is inserted in the <i>Quadrilátero Ferrífero</i> and is the only occurrence of a cave used for religious purposes in the region.

## USE AND MANAGEMENT

<b>Accessibility</b>	Easy access. Access made by paved highway from the state capital to the city of Ouro Preto. From Ouro Preto, one can go toward the direction of the city of Mariana, accessing the highway MG-129 to the district of Antonio Pereira. At the entrance of the district, one must turn right at the street <i>Rua da Lapa</i> , rising by about 600 meters to the entrance of the Sanctuary.
<b>Visibility</b>	From the cave entrance, looking at E-W direction, one can have a good view of the <i>Serra do Ouro Preto</i> range. The site itself has good visibility due to the artificial lighting inside the cave.
<b>Other types and values</b>	Place of Geomorphological Interest (LIGeom). Cultural tourism.
<b>Present-day use</b>	Information of the site as of high cultural interest, but with few references to its geological and geomorphological features. The site is visited and known also as the Church of Our Lady of the Cave ( <i>Igreja de Nossa Senhora da Conceição da Lapa</i> ). It belongs to the Parish of Mariana. There is a representative who organizes access to the cave.

<b>Conservation status</b>	Satisfactory if one remember its antiquity of use. A former graffiti dates from 1917.
<b>Vulnerability</b>	During the visitation the pilgrimsare requested not to write on the walls or to take speleothems. The same occurs during the Feast of Our Lady. The site is currently protected by a gate and its visitation is controlled by the Parish.
<b>Legal statute</b>	Caves as Union Heritage according to the Brazilian Constitution from 1988. Article 20 - X.
<b>Settlements and equipments</b>	District of Antonio Pereira. A quarry of imperial topaz is approximately 400 meters from the cave. Small bar near the road.
<b>Necessary and/or possible intervention</b>	Need for a greater and better publicizing regarding the regional and local history. Need to advertise the site as a place of cultural and historical interest. The existing sign near the highway is not in good condition and is not easily visible by the tourist

**EVALUATION FORM OF POTENCIAL PLACES OF  
GEOMORPHOLOGICAL INTEREST**



AUTHOR: Luiz E.P.Travassos

Date: June 2009

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 glacial  slope  geologic  speleological  
 other: \_\_\_\_\_

**Location:** District of Antonio Pereira, Ouro Preto, Minas Gerais, Brazil

**VGm (Geomorphologic Value) = V<sub>Ci</sub> + V<sub>Ad</sub>**

**5.96**

**V<sub>Ci</sub> = Scientific Value: 3,33**

- Ar** Abundance/Relative rarity inside the study area
- I** Integrity, regarding its deterioration
- R** Representativeness, as educational resource and geomorphological processes
- D** Diversity of geomorphologic elements
- G** Geological elements in the geomorphological control or as patrimonial value
- K** Existence of scientific knowledge associated to the site
- An** Abundance/Relative rarity to a national level

**V<sub>Ad</sub> = Additional Value: 2,63**

- Cult** Cultural value
- Estet** Aesthetic value
- Ecol** Ecologic value

**VGt (Management Value) = V<sub>Us</sub> + V<sub>Pr</sub>**

**6.04**

**V<sub>Us</sub> = Values of Use: 5,04**

- Ac** Conditions of Accessibility
- V** Conditions of Visibility
- Ug** Present day use of the geomorphological site
- U** Other interests, natural and cultural, and present day uses
- P** Official protection and limitations of use
- E** Equipments and services for supporting the use

**V<sub>Pr</sub> = Preservation Value: 1,0**

- Ip** Integrity regarding deterioration (impacts until present)
- Vu** Vulnerability to anthropogenic deterioration (impacts by the use of the site as place of geomorphological interests)

**Scientific Value (V<sub>Ci</sub> = Ar + I + R + D + G + K + An)**

<b>Ar</b>	0	It is not one of the 5 most important sites and/or the largest occurrences in the area	
	0,25	It is not one of the 3 most important sites and/or the largest occurrences in the area	
	0,50	It is one of the 3 most important sites and/or the largest occurrences in the area	
	0,75	It is the most important site and/or the largest occurrence in the area	
	<b>1,00</b>	<b>Unique occurrence in the area *</b>	
<b>I</b>	0	Very deteriorated, as a result of the exploitation of its resources, vandalism or harmful use	
	0,25	Very deteriorated, as a result of natural process	
	<b>0,50</b>	<b>With deterioration, but preserving essential geomorphological elements *</b>	
	0,75	Slightly deteriorated, preserving essential geomorphological elements	
	1,00	No deterioration	
<b>R</b>	0	Reduced representativeness of process with no educational interest	
	0,33	With some representativeness but with few educational interest	
	<b>0,67</b>	<b>Good example of geomorphological evolution but hard to explain to the layman*</b>	
	1,00	Good example of geomorphological evolution and/or good educational resource	
<b>D</b>	<b>0</b>	<b>Only one element/them with geomorphological interest *</b>	
	0,33	Two elements/themes with geomorphological interest	
	0,67	Three elements/themes with geomorphological interest	
	1,00	More the three elements/themes with geomorphologic interest	
<b>G</b>	0	With no other distinct geologic elements	
	0,17	Geological elements, with no association to the geomorphological elements	
	<b>0,33</b>	<b>Geological elements, with association to the geomorphological elements *</b>	
	0,50	Occurrence of other(s) place(s) of geological	
<b>K</b>	0	With no scientific production or publicizing regarding geomorphologic interest	
	0,25	Object of moderate scientific production (communications, national papers, etc...)	
	<b>0,50</b>	<b>Object of relevant scientific production (thesis, dissertations, international papers, etc...)*</b>	
<b>An</b>	0	More than 5 occurrences/similar situations in a national level	
	0,17	Between 2 to 5 occurrences/similar situations in a national level	
	<b>0,33</b>	<b>Up to 2 occurrences/similar situations in a national level *</b>	
	0,50	Unique occurrences/similar situations in a national level	

**Additional Value (V<sub>Ad</sub> = Cult + Estet + Ecol)**

<b>Cult</b>	0	Without cultural elements, or with these deteriorating the site		
	0,25	Occurrences of cultural aspects, but with no connection with the geo-formations		
	0,50	Occurrences of important cultural aspects, but with no connection with the geo-formations		
	0,75	Non-material cultural aspects associated to the morphology		
	1,00	Physical cultural aspects associated to the geo-formations		
	<b>1,25</b>	<b>Physical cultural aspects of high value associated to the geo-formations *</b>		
	1,50	Distinct geomorphological elements with anthropogenic origin		
<b>Estet</b>	0-0,5	Reduced	Consider the unique visual elements of geomorphology, panoramic quality, diversity of elements, lithologies, and tonalities, presence of vegetation and water, absence of anthropogenic deterioration, height and proximity in relation to the observed objects	
	0,5-1	Moderate		<b>1</b>
	1-1,5	High		
<b>Ecol</b>	0	Without connection to biological elements		
	<b>0,38</b>	<b>Occurrence of fauna and/or flora without interest*</b>		
	0,75	One of the best places to observe fauna and/or flora with interest		
	1,12	Geomorphological characteristics regulate the ecosystem(s)		
	1,50	Geomorphological characteristics determine the ecosystem(s)		



**Values of Use (VUs = Ac + V + Ug + U + P + E)**

<b>Ac</b>	0	Very difficult accessibility, only possible with special equipments
	0,21	On foot, more than 500 meters on a path only possible for 4 x 4 vehicles
	0,43	On foot, more than 500 meters on a path possible for normal vehicles
	0,64	On foot, less than 500 meters on a path possible for normal vehicles
	0,86	In 4 x 4 vehicle, less than 100 meters from the place
	1,07	In normal vehicle, up to 50 meters from the places
	<b>1,29</b>	<b>By regional road, in bus of 50 seats, up to 50 meters from the place *</b>
	1,50	By national Road, in a bus of 50 seats, less than 50 meters from the place
<b>V</b>	0	Without conditions or very difficult condition of observation
	0,30	Only visible with the aid of special gear (artificial light, ropes, etc...)
	0,60	Reasonable, but limited by trees
	0,90	Good, but movement needed
	1,20	Good for all the important geomorphological elements
	<b>1,50</b>	<b>Excellent for all important geomorphological elements *</b>
<b>Ug</b>	0	Without publicity and without use
	0,33	Without publicity, but with use
	<b>0,67</b>	<b>Publicized/used as place of aesthetic interest*</b>
	1,00	Publicized/used as place of geological/geomorphological interest
<b>U</b>	0	Without other types of value, without publicity and/or use
	0,33	With other types of value, without publicity and/or use
	0,67	With other types, with publicity
	<b>1,00</b>	<b>With other types of values, with publicity and use *</b>
<b>P</b>	0	With total protection obstructing its use
	<b>0,33</b>	<b>With protection, restricting its use*</b>
	0,67	Without protection and with no use restriction
	1,00	With protection, but with some or no restriction to its use
<b>E</b>	0	Various hotels and services offered more than 25 km away from the site
	<b>0,25</b>	<b>Various hotels and services offered between 10 to 25 km away from the site *</b>
	0,50	Various hotels and services offered between 05 to 10 km away from the site
	0,75	Hotels or services less than 05 km away from the site
	1,00	Hotels and services less than 05 km away from the site

**Protection Value (VPr = Ip + Vu)**

<b>Ip</b>	0	Very much deteriorated, as a result of the exploitation of its resources, vandalism or harmful use
	0,25	Very much deteriorated, as a result of natural processes
	<b>0,50</b>	<b>With deterioration, but preserving essential geomorphological elements*</b>
	0,75	Slightly deteriorated, preserving essential geomorphological elements
	1,00	No deterioration
<b>Vu</b>	0	Very vulnerable. The use as a "LIGeom" may completely deteriorate the site
	<b>0,50</b>	<b>Geomorphological elements and others can be deteriorated*</b>
	1,00	Other elements may be affected, but not the geomorphological ones
	1,50	Deterioration may occur only in the access structures
	2,00	Not vulnerable with use as a "LIGeom"

## FINAL CONSIDERATIONS

This study is intended to demonstrate the cultural use of caves from the perspective of ritual and religious use. We also try to show how such practices in the underground exhibit similar characteristics in different cultures.

Divided into three chapters, this dissertation attempts to identify the use of karst and caves through the analysis of works from classical geographers from the German and French School as well as the identification of works which demonstrate the cultural/religious use of the underground. Case studies were conducted in order to illustrate the concepts and mentioned initially seeking to focus the caves as the “center of the religious world” for the pilgrims.

It is not the objective of the dissertation to generalize the worldwide phenomenon of the religious use of caves but, to identify their points of convergence with the concepts treated especially in the Geography of Religion. It observes a wide spatial distribution of caves considered sacred, but with similar facts in relation to its sacredness, position on the terrain, a central position in one region and also an area of convergence for people.

The researcher does not attempt, in this study, to make a detailed study of the flow of pilgrims and tourists to these sites. However, it is desirable that an expansion of this work towards the knowledge fields such as anthropology and tourism, for example.

Although the academic studies of the Geography of Religion associated with caves are relatively new, Rosendahl (2002) notes that interest in the religious dimension of Geography is much older. Originated in Antiquity, followed by the studies of Vidal de La Blache and of the Sauer's Cultural Geography, at the beginning of the twentieth century until the 60's.

More recently Forti (2009b) reminds us that the social sciences, especially Theology, became more and more interested in caves. Most religions consider the underground as a sacred place which gives life but also can be profane places that need to be sacralized. Leaving aside the religious dimension, Forti (2009b) also states that the underground has an important social role in the legends of a social group, as mentioned before in chapter 1.

As remembered by several authors, the act of pilgrimage is motivated by the ideas of *faith* and *sacrifice* present in the origin of the religious actions (Oliveira 2004).

Thus, one can say that the search for caves that are in high positions in the terrain or which provide some kind of effort or sacrifice to visit. In this case, besides the obvious physical sacrifice, on a personal level one can identify even an economic sacrifice or an individual effort to go into the darkness of the cave and overcome fears by being now protected by the sacred.

Equally important is the fact that one should not confuse the interest for the cultural imprints in these areas, with religious faith or belief. It is interesting to remember Vilhena (2003) cited by Oliveira (2004) who claims that religious tourism a kind of tourism that has not lost its pilgrimage root, being continually motivated by the exercise of mystical celebration.

One should apply this concept to the theme of the research, stating that the religious tourism in caves, also with an old root, is constantly motivated by the desire to overcome the fear of the mystic darkness of the “ancient gates of hell of Antiquity” and also the popular attempt to explain a phenomena not easily explained by the layman. Still, the religious tourism in caves should be perceived as the rescue (even if unconscious), of the connection between human beings and the “Mother Earth”.

To satisfy those who are dedicated to the environmental cause, one can remember Oliveira (2004) who claims that it is necessary to treat contemporary tourism as an array of environmental, social, cultural, and economic development, even having an educational role.

From the geographical point of view, Rosendahl (2002, 197) highlights the interdependence of the specific agenda of human geography, which were introduced in the Geography of Religion: “1) *faith, space and time*, 2) *centers of convergence and irradiation*, 3) *religion, territory and territoriality*, and 4) *space and sacred place (experience, perception and symbolism)*.”

In the sites studied and visited, the researcher observed the possibility of study of all these agendas throughout the development work. The space of the sacred caves turned into sacred places by faith over the years. They became, by tradition, centers of convergence of pilgrims, tourists and capital flow.

Also noteworthy is the fact that the cultural heritage of karst landscapes has become a source of interest to the international and national scientific community, although there are still few studies that address the theme in Brazil. Equally recent are the works that present the cultural importance of karst and caves. For this reason, are

even more scarce the works that deal with the inventory of geomorphosites which show significant physical and human (cultural) qualities in Brazil. Remembering Forte (2008), one can state that the study of the geomorphologic heritage is an actual theme, especially in karst.

Applying this statement to the Brazilian and Slovene karst areas, and also to the caves of religious use, we can say that their inventory and quantification as possible geomorphosites is null and this thesis provides a first approach for future work. The issues that have been treated in the work, briefly, should be seen as a contribution to Geography and Karstology, both considered to be plural science.

The identification and characterization of the *Cave of Antonio Pereira* (MG) through the Forms elaborated by Pereira (2006) and first applied to the karst by Forte (2008) should be understood as a way to allow a preliminary assessment in speleological sacred sites. With this methodology, the author of this dissertation shows that, instead of using methodologies purely or mostly qualitative, it is possible to use methods that also address the Places of Geomorphological Interest also with a qualitative approach (Forms A and B). After completing these two Forms, Pereira (2006) has proposed filling out the Form C, allowing the quantification of each of the sites and also their ranking.

To view the information and to enable ranking, one can use the concept of *total values* (VT) of each of the LIGeom, obtained by the sum of the *geomorphological values* (VGm) and the *values of management* (VGT). Data should be placed on a table for better viewing.

If Silva (2002) argues that the humanistic studies are concerned with the relations that individuals establish among themselves, the feelings, perceptions and attitudes of human beings on space and place from the experience, this dissertation is presented as an important contribution in the field of Brazilian geography and karstology while it works with the relationship between human and caves.

If Abreu *et al.* (2003) cited by Forte (2008, 32) consider the natural underground cavities as a “*poor relative of the geomorphologic patrimony*”, for the Brazilian reality, and perhaps the international one, it is possible to say that caves of cultural and religious use are those that normally are at the margins of the scientific community. It is believed that a necessary change of attitude is needed. It is then necessary to recall again the many examples of caves that were objects of prehistoric and proto-historic cults. In

them it is believed that primitive man performed “magic” rituals, often expressed himself through art, and buried their dead in these places.

These human “imprints” in the underground space have a close relationship with the Cultural Geography, and even share the same late development in Brazil. When Corrêa and Rosendahl (2008) claim that Cultural Geography in Brazil had a late development and that it was increasingly placed as a neglected sub-field within geography, the same is possible to say about the cultural studies of Brazilian karst and caves. Since the first national speleological congresses one can observe a predominance of physical works to the detriment of humanistic studies of caves and karst. In 2001, with the organization of the 13<sup>th</sup> International Congress of Speleology in Brasília, the number of papers that addressed the cultural use of these spaces was much more significant. It was noted in this event the influence of the international community by demonstrating the importance of combining the physical and human studies. Thus, karstology and speleology, as well as geography should be considered plural, not entirely physical nor entirely human.

The importance given to the cultural use of the karst is so important, especially in Europe, that it is possible to identify numerous works. Between the various publications organized in the references of this dissertation, the works of Christophe Gauchon (1997) and Gianfranco Trovato (1997/2000) on the use of caves in France and Italy, respectively, need to be mentioned.

There are countless records where pagan cults were made in caves and then eternalized after Christianity. Caves were places of refuge for hermits and other religious figures also in several other traditions. Thus it was possible to demonstrate the various uses of caves throughout the history of mankind, especially as places for ritualistic manifestations in prehistoric times (externalized by the rock art, among other indicators), as sepulchral caves and as places of worship for various pagan, Hindu, Buddhist and Christian deities.

According to Travassos and Varela (2009), if one takes into account the principle that, in Brazil, the environment is constitutionally well protected (Article 225 CF/88), such cultural and religious manifestations can be seen as something that should be suppressed. It is precisely over this principle that one should have a more open understanding of the social reality. If from one side there is the existence of environmental protection, on the other, there is also the protection of freedom of beliefs



which guarantees the free exercise of religious cults and the protection of these sites and rites (Art. 5, VI CF / 88). Consequently, one can see the protection of two goods that in theory does not conflict, but in practice can come into shock.

Thus, it is considered that the protection of the environment or the protection of the freedom of religious belief depends on the situation. The interpreters of constitutional law say that, in the case of conflict of goods protected by the Constitution, one should take into account the principle of agreement or the practice of harmonization. Canotilho (2003) cited by Travassos and Varela (2009), remember that this principle provide the coordination and combination of the interests in conflict in order to avoid a total sacrifice of some in detriment to others.

It is argued that, in the case of environmental protection and freedom of belief, the overlap of one and the other must be examined case by case. In one area where religious practices are traditionally held, it is believed that total environmental protection should not prevail, because that place has acquired a social value throughout history and may even be managed for tourism. However, there must be a minimum of protection that does not obstruct the practice of faith.

In places where there is no evidence of the traditional historical practice of religious manifestations, the environmental protection must prevail. If the interpreter of the law does not understand the social and historical processes that surround a site, this can lead to and misguided decision by the absolute predominance of only one of the principles. What researchers must never forget is the importance of the human variable in their analysis. Therefore, one should consider the social reality as the base foundation of all legal interpretation or as guidance to any scientific research. Its segregation generally excludes these activities from the consistent legal application (Travassos & Varela 2009).

This fact reminds us of the controversial Brazilian Decree n° 6640 of November 7<sup>th</sup>, 2008 that gives new wording to the articles 1, 2, 3, 4 and 5 and adds the articles 5a and 5b to the Decree n° 99556 of October 1<sup>st</sup>, 1990, which used to provide the protection of natural underground cavities in the country. With the modification of the articles 1, 2, 3, 4 and 5 one can see the new reading of the Article 1: *“the natural underground cavities existing in the national territory should be protected to allow studies and technical-scientific researches as well as cave exploration, ethnic, cultural,*

*tourist, recreational and educational activities.*”(Brasil 2008). An unadvised reader may not notice any problem when reading that first article.

However, the fact of being considered controversial by much of the national and international speleological community occurs due to the fact that the Decree establishes a pattern of classification for Brazilian caves in accordance with “*the degree of relevance as maximum, high, medium or low, determined by the analysis of ecological, biological, geological, hydrological, paleontological, scenic, historical, cultural and socioeconomic attributes, evaluated under regional and local focus.*”(Brasil 2008).

Much has been discussed about the fact of classifying a natural underground cavity of being of low relevance, for example. The paragraph 5 of Article 4 states that “*in the case of development of an enterprise that would cause irreversible negative adverse impact on a natural underground cavity with low degree of relevance, the entrepreneur is not obliged to take measures and actions to ensure the preservation of other natural underground cavities*” (Brasil 2008). That text has caused concern in the speleological community just by believing that in a complex system such as the karst, it is not possible to consider that there is no need to preserve other caves that may be affected by an enterprise.

At least regarding the subject matter of this dissertation, Article 2 in its paragraph 4 states that a natural underground cavity with a maximum degree of relevance should have at least one of the eleventh attributes listed. Among them, “*outstanding historical- cultural or religious relevance*” as shown in Marra (2008:183) when identifying the criteria of historical and cultural relevance of a cavity for its conservation.

In support of the Decree n° 6640 of November 7<sup>th</sup> 2008, the Ministry of the Environment has published in 2009, a Normative Instruction August 20<sup>th</sup>. This legal document contains the main attributes to classify Brazilian caves. Of the eleven items from the Article 3, the last one emphasizes the “*historical-cultural or religious relevance*” of the cave to be considered of maximum relevance. In the Appendix I of the Normative Instruction n°2, it is stated that this attribute should be considered in “*cavities presenting evidence of archaeological interest of Brazilian paleo-indigenous culture, such as rock inscriptions, sepulchral shafts, (...) rest sites, evidence of human presence through worship and other not specified here, but with identical meaning under the opinion of the competent authority.*” (Brasil 2009).

This reminds us of the procedures for regularization and licensing of caves with touristic purposes in Brazil made by the Working Group for Touristic Caves (GTCavTur) of the National Center for Study, Protection and Management of Caves (CECAV). The report states that the environmental licensing of a business that is in operation and involves *historical, touristic* or *religious* use of the underground and does not have the regularization procedure at the IBAMA must comply with the procedures described at the GTCavTur (2008, 11-12).

As one can see in the document, it is possible to identify the licensing procedures that must be made by an entrepreneur. However, the researcher understands that one cannot use the same processes to caves of religious use, especially due to the high costs involved in the technical studies necessary for receiving of the Operating License (LO). Still, if it is necessary to obtain the LO, it is believed to be necessary the participation of larger companies aiding the Parishes responsible for the religious caves (e.g.: mining companies and other companies from the productive sector). Therefore, large companies can afford the costs of interdisciplinary environmental studies as compensatory measures of their activities. Moreover partnerships between universities can be made.

In almost two years ahead of the Section of History of Speleology of the Brazilian Speleological Society (SHE/SBE), it is possible to mention the creation of a monthly electronic publication with the intention of bringing quick facts and news to readers regarding the various uses of karst areas and caves in a national and international level. The main idea of this publication is the dissemination of the humanistic and historical use of caves. During the year of 2008, the *SBE Antropoespeleologia* [SBE Anthropospeleology] was sent via email directly to around 500 active members. It was also downloaded 6,919 times on its webpage from 01/01/2008 to 31/12/2008. This shows the importance of such studies and that how they attract people's attention.

Several authors agree that the sacred and the profane were two modalities of being taken over by man during its historical development, placing it in front of his own existence. Although the manifestations of the sacred are separated by a unique historical context within each society, they have scales of scope that ranges from the local to the universal (Gil Filho nd).

Throughout the development of this dissertation it was possible to establish that karst and caves can illustrate the previous statement. From a historical perspective, one can see that caves (carbonatic one or not) were sacralized throughout history by distinct hierophanies, but with similar traces between them. In these places tourists are attracted by aesthetic characteristics as the pilgrims are attracted by personal and spiritual individual experiences. It is interesting to note, however, that the “aesthetic” sought by the ordinary tourist is also magnified by the “imprint” over the years, of the personal and private experiences of the pilgrims who act collectively in the space.

The landscape is not just a simple space. Some may be considered special places, from the moment that people add them different meanings according to historical and social issues such as religion. This is considered one of the most important cultural elements of a country (Norton 2002).

The landscape is not only a simple location. People convey different meanings to it depending on the social matters such as religion. Religion is one of the most important cultural elements of a Country (Norton 2002). Religion and spirituality are still among the most common motivations for travel. Many major touristic destinations have developed largely as a result of their connections to sacred places and events. Every year millions of people travel to pilgrimage sites around the world, both ancient and modern in origin (Dallen & Olsin 2006). Vukonić (1996) also affirms that pilgrimage has been defined as a physical journey in search of truth and of what is sacred or holy.

When performing a pilgrimage and participating in an act of collective celebration, an individual may externalize his or her faith through the worship of a myth. In it, they deposit their life experiences and religious desires. In this sense, Steil (1996) states that in some cases, besides the sacred, true historical characters co-exist with the imaginary ones. For this reason, many members of the clergy and spiritual leaders do not wish to break with the folk traditions and myths associated with the sacred sites. Instead of breaking with the traditions, normally they reinterpret and incorporate them to the Catholic orthodoxy.

Many European cultural elements found in Brazil were assimilated throughout the country's history, working together with the local aspects, as the examples of the alleged apparitions of Our Lady of Lapa in Minas Gerais.

For Nolan and Nolan (1989), quoted by Collins-Kreiner and Kliot (2000), the combination of a natural site with a sacred figure has always been present in Catholic pilgrimages and, perhaps, may have some connection with a pagan past.

The use of caves cannot be understood as punctual or limited to the period of the religious festivals. The faith of the people goes beyond the domain of specialists and corresponds to the direct contact between the pilgrims and the holy places, with a language entirely understood only by the individuals of a particular social group.

The folk tradition survives today, especially in rural areas. It can also survive between groups linked by a distinct cultural background, such as in the examples regarding cave-churches. This particular use tends to resist changes and remain connected by attitudes and behaviors more traditional and less subject to change (Norton 2007). Both Festivals briefly described in this dissertation resist harsh changes for at least two hundred years.

It is also believed that religious tourism can act as an educational experience. So if religious tourism is well oriented, pilgrims or tourists may be able to learn something beyond the rituals. From the 16<sup>th</sup> to the 19<sup>th</sup> centuries, Brazil was a colony of Portugal. For this reason, the word *Lapa* to designate a cave or a rock shelter was brought with the colonizers. Although the Country was composed of a mixture of indigenous groups, Portuguese colonialists and African slaves, Catholicism was very strong among the population and so were the Iberian traditions.

We believe that even though the use of caves for religious purposes causes negative environmental impacts, one cannot deny its enormous cultural significance. Thus, it is not possible to admit the simple banishment of the cults since this kind of use usually has a positive impact on the regional economy and quality of life of the pilgrims. In this case, one should seek, therefore, strategies to mitigate the impacts on the valoration of the cultural heritage of such sites, discouraging the use of other caves for this purpose.

In both Europe and Brazil, and elsewhere in the world, caves were used as shelters in times of war and as sanctuaries, for example. Many of the cave-churches (not so numerous in the number of caves known in Brazil), are “sacrificed” but not likely to be left to other caves. Once a space is sacralized, having experienced alleged hierophanies, the tradition will probably resist for centuries, reducing the majority of



impacts in these areas. These will be minimized or not in accordance with the development of environmental education strategies.

Thus, we believe that cave-churches (or cave-temples) should continue to exist because they do not seriously affect the karst and caves as a whole. In Brazil, from the nearly 5,000 known caves, very few can be considered of significant religious use. Citing an European example, from the nearly 9,000 caves of Slovenia, just a few have been or are used for religious purposes. In that country, the patron Saint of groundwater is St. Canzian and many churches were built near water sources. Would it be a good opportunity for the natural resource protection? Therefore, we believe that interventions to prohibit or simply force a discipline that goes against centuries of tradition would not be the most appropriate and certainly not be the most efficient action.

What one must seek is dialogue with the various social actors and discourage the use of other caves for this purpose. This seems to be the most correct and most simple, because as said before, when a space becomes a sacred place, the “migration” to other places hardly (or never) occurs. One can mention the example of Bom Jesus da Lapa, a cave which has been used as a church since 1691, and the Grotto of Lourdes in France since 1854, among many other temples around the world. Thus, it is noticeable a characteristic common to many sacred sites: they are perceived as the center of the cultural activity and the destination of pilgrims.

Although Gibson (2008) affirms that the oral tradition endures over the centuries, Duarte (2007:135-144) states that in some societies there is a natural tendency of disappearance of folk culture, mainly because of the “lack of systematic, careful and objective inventory carried out in time.” (Duarte 2007:135-144).

The literature review and the visits to many caves considered sacred, allows us to state that the adoption of these spaces to ritual practices occurs mainly due to the existence of a strong oral tradition linked to the place. Even with the advance of time, they remain in the collective memory of the social group.

It is reasonably true that the oral tradition related to the religious use of caves is very rich in Brazil. However, its formal study is still scarce and this dissertation was written to continue opening a path amidst a field of study still little studied in the country. We sought to highlight further the historical, scientific, educational and cultural importance of karst and caves. Moreover, it is necessary to emphasize Cigna (2005)

which reminds us that approximately 100,000,000 people receive salaries from activities directly or indirectly related to the use of karst and caves.

It also important to remember that, currently, much value has been given to the “*middle-sized cities*” due to its importance in the regional development. What many authors have forgotten, especially in the state of Minas Gerais, is that many of these urban sites are developed on carbonate rocks and, consequently, in karst terrains, the central object of this dissertation.

Perhaps here is the opportunity to advise about this fact and instigate further research regarding the relationship between these sites and the availability of strategic natural resources. One wonders whether such middle-sized cities have emerged due to their position in relation to natural resources (e.g: limestone, water, etc.) or due to their easy “*appropriation*” of a more flat relief (karstic plains) and consequently more favorable to their development. Perhaps these two variables (and possibly others), together, have favored such a development.

What is certain is that, just in these middle-sized cities, one can register serious environmental problems and, in most cases, neglected ones. Among these problems one can notice, especially, the unplanned use of water resources and groundwater contamination by improper waste disposal, as well as domestic and industrial sewage.

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## APPENDICE I

### INFORMATION COMPILED FROM THE VISITORS' BOOK (2008) LAPA DE ANTÔNIO PEREIRA, MINAS GERAIS

MONTH	CITY	STATE	COUNTRY	# VISITORS	LAT	LONG
JAN	Brasilia	DF	Brasil	3	-15,776125	-47,930086
JAN	Campinas	SP	Brasil	1	-22,906554	-47,060344
JAN	Alfenas	MG	Brasil	2	-21,428715	-45,947638
JAN	Antônio Pereira	MG	Brasil	2	-20,302983	-43,486242
JAN	Barao de Cocais	MG	Brasil	4	-19,936875	-43,472175
JAN	Belo Horizonte	MG	Brasil	4	-19,815623	-43,953772
JAN	Paracatu	MG	Brasil	3	-17,223092	-46,871565
JAN	Pouso Alegre	MG	Brasil	7	-22,234253	-45,932930
JAN	Santa Barbara	MG	Brasil	6	-19,960400	-43,414227
JAN	Rio de Janeiro	RJ	Brasil	5	-22,901633	-43,209509
JAN	Volta Redonda	RJ	Brasil	3	-22,524851	-44,103595
JAN	Petrópolis	RJ	Brasil	3	-22,505101	-43,181330
JAN	Santa Barbara	RS	Brasil	4	-19,960400	-43,414227
JAN	Chapecó	RS	Brasil	2	-27,096896	-52,618631
JAN	Joinville	SC	Brasil	1	-26,304184	-48,847544
JAN	Sao Bernardo do Campo	SP	Brasil	2	-23,694645	-46,566328
JAN	São Paulo	SP	Brasil	11	-23,681532	-46,813733
JAN	Campinas	SP	Brasil	2	-22,906554	-47,060344
FEV		BA	Brasil	2		
FEV	Brasilia	DF	Brasil	2	-15,776125	-47,930086
FEV	Serra	ES	Brasil	2	-20,129682	-40,308293
FEV		ES	Brasil	3		
FEV	Vila Velha	ES	Brasil	2	-20,330377	-40,291798
FEV	Barao de Cocais	MG	Brasil	2	-19,936765	-43,472175
FEV	Belo Horizonte	MG	Brasil	6	-19,815623	-43,953772
FEV	Caeté	MG	Brasil	9	-19,880825	-43,669804
FEV	Cel. Fabriciano	MG	Brasil	1	-19,520058	-42,628105
FEV	Conselheiro Lafaiete	MG	Brasil	2	-20,659645	-43,785056
FEV	Cruzilia	MG	Brasil	4	-21,839441	-44,812520
FEV	Ipatinga	MG	Brasil	2	-19,468470	-42,536744
FEV	Itabira	MG	Brasil	2	-19,665699	-43,211905
FEV	Lagoa Santa	MG	Brasil	3	-19,639976	-43,893567
FEV	Lavras	MG	Brasil	3	-21,245249	-44,999150
FEV	Mariana	MG	Brasil	12	-20,377786	-43,416370
FEV	Poços de Caldas	MG	Brasil	1	-21,788606	-46,561788
FEV	Ponte Nova	MG	Brazil	2	-20,411239	-42,897021

<b>MONTH</b>	<b>CITY</b>	<b>STATE</b>	<b>COUNTRY</b>	<b># VISITORS</b>	<b>LAT</b>	<b>LONG</b>
<b>FEV</b>	Maringá	PR	Brasil	2	-23,427605	-51,937834
<b>FEV</b>	Rio de Janeiro	RJ	Brasil	18	-22,901633	-43,209509
<b>FEV</b>	Esteio	RS	Brasil	2	-29,860991	-51,180944
<b>FEV</b>	Gramado	RS	Brasil	1	-29,368792	-50,878389
<b>FEV</b>	Não-Me-Toque	RS	Brasil	1	-28,457975	-52,821944
<b>FEV</b>	Porto Alegre	RS	Brasil	2	-30,026502	-51,229660
<b>FEV</b>	Aracaju	SE	Brasil	6	-10,908737	-37,074773
<b>FEV</b>	Estiva Gerbi	SP	Brasil	4	-22,272481	-46,946043
<b>FEV</b>	Fernandópolis	SP	Brasil	2	-20,283447	-50,246597
<b>FEV</b>	Ibitinga	SP	Brasil	12	-21,758506	-48,829403
<b>FEV</b>	Itatiba	SP	Brasil	3	-23,006845	-46,838993
<b>FEV</b>	Jacareí	SP	Brasil	2	-23,305252	-45,967575
<b>FEV</b>	Palmital	SP	Brasil	1	-22,791796	-50,204648
<b>FEV</b>	Pedrinhas Paulista	SP	Brazil	2	-22,813595	-50,791131
<b>FEV</b>	São Paulo	SP	Brazil	17	-23,681532	-46,813733
<b>FEV</b>	Sorocaba	SP	Brazil	3	-23,506229	-47,455910
<b>FEV</b>	Taguaí	SP	Brazil	2	-23,446728	-49,409344
<b>FEV</b>	Palmas	TO	Brazil	2	-10,167118	-48,333518
<b>FEV</b>	Stuttgart		Alemanha	2	48,777276	9,181027
<b>FEV</b>	Buenos Aires		Argentina	1	-34,611508	-58,416820
<b>FEV</b>			Brazil	40		
<b>FEV</b>			Estônia	1		
<b>FEV</b>			França	4		
<b>MAR</b>	Prado	BA	Brasil	2	-17,332438	-39,230825
<b>MAR</b>	Brasília	DF	Brasil	22	-15,776125	-47,930086
<b>MAR</b>	Vitória	ES	Brasil	2	-20,356733	-40,389607
<b>MAR</b>		ES	Brasil	3		
<b>MAR</b>	Belo Horizonte	MG	Brasil	16	-19,815623	-43,953772
<b>MAR</b>	Bicas	MG	Brasil	2	-21,729044	-43,067273
<b>MAR</b>	Caratinga	MG	Brasil	2	-19,790250	-42,138719
<b>MAR</b>	Catas Altas	MG	Brasil	1	-20,073936	-43,398590
<b>MAR</b>	Mariana	MG	Brasil	21	-20,377786	-43,416370
<b>MAR</b>	Matias Barbosa	MG	Brasil	3	-21,872724	-43,321059
<b>MAR</b>	Ouro Preto	MG	Brasil	2	-20,386237	-43,502170
<b>MAR</b>	Recreio	MG	Brasil	1	-21,526900	-42,467587
<b>MAR</b>	Rio Casca	MG	Brasil	4	-20,211560	-42,659137
<b>MAR</b>	Rio de Janeiro	MG	Brasil	3	-22,901633	-43,209509
<b>MAR</b>	Santa Barbara	MG	Brasil	4	-19,960400	-43,414227
<b>MAR</b>	Viçosa	MG	Brasil	8	-20,754794	-42,881868
<b>MAR</b>	Arcoverde	PE	Brasil	10	-8,419387	-37,065457
<b>MAR</b>	Recife	PE	Brasil	3	-8,054278	-34,881256

<b>MONTH</b>	<b>CITY</b>	<b>STATE</b>	<b>COUNTRY</b>	<b># VISITORS</b>	<b>LAT</b>	<b>LONG</b>
MAR	Colombo	PR	Brasil	3	-25,292909	-49,223827
MAR	Macaé	RJ	Brasil	1	-22,374389	-41,784286
MAR	Niteroi	RJ	Brasil	1	-22,880766	-43,104335
MAR	Paraty	RJ	Brasil	3	-23,216708	-44,717729
MAR	Rio de Janeiro	RJ	Brasil	10	-22,901633	-43,209509
MAR	São Gonçalo	RJ	Brasil	17	-22,827337	-43,054379
MAR	São Pedro da Aldeia	RJ	Brasil	4	-22,835619	-42,103394
MAR	Saquarema	RJ	Brasil	2	-22,931002	-42,496742
MAR	Porto Alegre	RS	Brasil	31	-30,026502	-51,229660
MAR	São Bento do Sul	RS	Brasil	4	-26,250738	-49,379781
MAR	Araras	SP	Brasil	2	-22,357399	-47,384586
MAR	Catanduva	SP	Brasil	2	-21,138255	-48,973183
MAR	Jundiaí	SP	Brasil	2	-23,187211	-46,884453
MAR	São José do Rio Preto	SP	Brasil	2	-20,901467	-49,457887
MAR	São Paulo	SP	Brasil	6	-23,681532	-46,813733
MAR	Araguaína	TO	Brasil	1	-7,186182	-48,210760
MAR	Santa Fé	TO	Brasil	1	-7,706528	-48,097712
MAR			Brasil	3		
MAR	Acari		Itália	2	39,490616	16,386656
ABR	Itaigara	BA	Brasil	2	-12,992823	-38,466610
ABR	Barao de Cocais	MG	Brasil	4	-19,936765	-43,472175
ABR	Belo Horizonte	MG	Brasil	58	-19,815623	-43,953772
ABR	Caratinga	MG	Brasil	4	-19,790250	-42,138719
ABR	Congonhas	MG	Brasil	3	-20,485062	-43,838579
ABR	Conselheiro Lafaiete	MG	Brasil	4	-20,659645	-43,785056
ABR	Fortaleza de Minas	MG	Brasil	1	-20,840723	-46,723469
ABR	Itabira	MG	Brasil	2	-19,665699	-43,211905
ABR	Juiz de Fora	MG	Brasil	9	-21,764834	-43,348227
ABR	Maria da Fé	MG	Brasil	2	-22,296048	-45,384601
ABR	Mariana	MG	Brasil	12	-20,377786	-43,416370
ABR	Muriaé	MG	Brasil	1	-21,130739	-42,366670
ABR	Nova Lima	MG	Brasil	1	-19,987594	-43,846311
ABR	Ouro Preto	MG	Brasil	16	-20,386237	-43,502170
ABR	Piranga	MG	Brasil	1	-20,665335	-43,299448
ABR	Ponte Nova	MG	Brasil	2	-20,411239	-42,897021
ABR	Resende Costa	MG	Brasil	1	-20,898237	-44,243087
ABR	Santa Barbara	MG	Brasil	9	-19,960400	-43,414227
ABR	Timóteo	MG	Brasil	1	-19,584607	-42,644428
ABR	Recife	PE	Brasil	1	-8,054278	-34,881256
ABR	Bandeirantes	PR	Brasil	2	-23,105335	-50,360301
ABR	Angra dos Reis	RJ	Brasil	2	-23,011494	-44,317338



<b>MONTH</b>	<b>CITY</b>	<b>STATE</b>	<b>COUNTRY</b>	<b># VISITORS</b>	<b>LAT</b>	<b>LONG</b>
<b>ABR</b>	Barra do Piráí	RJ	Brasil	1	-22,471235	-43,826838
<b>ABR</b>	Barra Mansa	RJ	Brasil	5	-22,545742	-44,168579
<b>ABR</b>	Belford Roxo	RJ	Brasil	1	-22,764382	-43,398843
<b>ABR</b>	Búzios	RJ	Brasil	4	-22,747895	-41,881118
<b>ABR</b>	Macaé	RJ	Brasil	3	-22,374389	-41,784286
<b>ABR</b>	Niteroi	RJ	Brasil	5	-22,880766	-43,104335
<b>ABR</b>	Petrópolis	RJ	Brasil	3	-22,505101	-43,181330
<b>ABR</b>	Resende	RJ	Brasil	1	-22,463169	-44,454994
<b>ABR</b>	Rio de Janeiro	RJ	Brasil	35	-22,901633	-43,209509
<b>ABR</b>	Volta Redonda	RJ	Brasil	32	-22,524851	-44,103595
<b>ABR</b>	Natal	RN	Brasil	2	-5,794478	-35,210609
<b>ABR</b>		RS	Brasil	1		
<b>ABR</b>	Bebedouro	SP	Brasil	8	-20,948904	-48,479217
<b>ABR</b>	Poá	SP	Brasil	4	-23,525737	-46,344053
<b>ABR</b>	Queluz	SP	Brasil	1	-22,537335	-44,774823
<b>ABR</b>	Rio de Janeiro	SP	Brasil	1	-22,901633	-43,209509
<b>ABR</b>	São Bernardo do Campo	SP	Brasil	2	-23,694645	-46,566328
<b>ABR</b>	São Paulo	SP	Brasil	26	-23,681532	-46,813733
<b>ABR</b>	Suzano	SP	Brasil	1	-23,541120	-46,310480
<b>ABR</b>			Brasil	34		
<b>ABR</b>			França	1		
<b>ABR</b>			Itália	2		
<b>MAI</b>		BA	Brasil	2		
<b>MAI</b>		Delaware	Estados Unidos	2	38,477649	-76,103178
<b>MAI</b>	Brasília	DF	Brasil	8	-15,776125	-47,930086
<b>MAI</b>	Vila Velha	ES	Brasil	3	-20,330377	-40,291798
<b>MAI</b>	Belo Horizonte	MG	Brasil	13	-19,815623	-43,953772
<b>MAI</b>	Cachoeira do Campo	MG	Brasil	2	-20,333366	-43,666643
<b>MAI</b>	Congonhas	MG	Brasil	4	-20,485062	-43,838579
<b>MAI</b>	Conselheiro Lafaiete	MG	Brasil	1	-20,659645	-43,785056
<b>MAI</b>	Curvelo	MG	Brasil	3	-18,749166	-44,446755
<b>MAI</b>	Divinópolis	MG	Brasil	2	-20,218610	-45,031558
<b>MAI</b>	Ipatinga	MG	Brasil	1	-19,468470	-42,536744
<b>MAI</b>	Itabirito	MG	Brasil	1	-20,326640	-43,876217
<b>MAI</b>	Mariana	MG	Brasil	6	-20,377786	-43,416370
<b>MAI</b>	Nanuque	MG	Brasil	2	-17,829122	-40,348327
<b>MAI</b>	Viçosa	MG	Brasil	74	-20,754794	-42,881868
<b>MAI</b>		PI	Brasil	1		
<b>MAI</b>	Curitiba	PR	Brasil	2	-25,491975	-49,334277
<b>MAI</b>	Campos	RJ	Brasil	9	-21,754383	-41,334918

MONTH	CITY	STATE	COUNTRY	# VISITORS	LAT	LONG
MAI	Niteroi	RJ	Brasil	10	-22,880766	-43,104335
MAI	Rio de Janeiro	RJ	Brasil	2	-22,901633	-43,209509
MAI	Três Rios	RJ	Brasil	1	-22,179926	-43,255113
MAI	Varre-Sai	RJ	Brasil	1	-21,013923	-41,940005
MAI	Porto Alegre	RS	Brasil	2	-30,026502	-51,229660
MAI	Campinas	SP	Brasil	3	-22,906554	-47,060344
MAI	Guarulhos	SP	Brasil	5	-23,579048	-46,642771
MAI	Mococa	SP	Brasil	2	-21,549150	-47,104892
MAI	São José do Rio Preto	SP	Brasil	15	-20,901467	-49,457887
MAI	São Paulo	SP	Brasil	5	-23,681532	-46,813733
MAI			Brasil	2		
MAI			Canada	2		
MAI	Sevilla		Espanha	1	37,382640	-5,996815
JUN	Caculé	BA	Brasil	3	-14,504003	-42,220370
JUN	Vitória	ES	Brasil	5	-20,356733	-40,389607
JUN	Belo Horizonte	MG	Brasil	29	-19,815623	-43,953772
JUN	Betim	MG	Brasil	1	-19,967566	-44,198630
JUN	Caeté	MG	Brasil	5	-19,880825	-43,669804
JUN	Contagem	MG	Brasil	2	-20,012446	-44,124304
JUN	Mariana	MG	Brasil	4	-20,377786	-43,416370
JUN	Belém	PA	Brasil	4	-1,455020	-48,502368
JUN	Curitiba	PR	Brasil	2	-25,491975	-49,334277
JUN	Londrina	PR	Brasil	2	-23,559651	-51,381423
JUN	Rio de Janeiro	RJ	Brasil	2	-22,901633	-43,209509
JUN	Chapecó	SC	Brasil	4	-27,096896	-52,618631
JUN	Florianópolis	SC	Brasil	2	-27,730864	-48,702224
JUN	Bauru	SP	Brasil	4	-22,459074	-49,215549
JUN	Campinas	SP	Brasil	9	-22,906554	-47,060344
JUN	Pirassununga	SP	Brasil	2	-22,107578	-47,515540
JUN	Ribeirão Preto	SP	Brasil	2	-21,283525	-47,920967
JUN	São Paulo	SP	Brasil	4	-23,681532	-46,813733
JUN			Brasil	5		
JUL	Feira de Santana	BA	Brasil	2	-12,473511	-39,120719
JUL	San Francisco	Califórni a	Estados Unidos	1	37,726614	-22,483379
JUL	Crato	CE	Brasil	10	-7,354537	-39,572268
JUL	Brasília	DF	Brasil	12	-15,776125	-47,930086
JUL	Guarapari	ES	Brasil	6	-20,767467	-40,605989
JUL	Serra	ES	Brasil	4	-20,129682	-40,308293
JUL	Vitória	ES	Brasil	7	-20,356733	-40,389607
JUL	Goiânia	GO	Brasil	1	-16,800112	-49,351688

<b>MONTH</b>	<b>CITY</b>	<b>STATE</b>	<b>COUNTRY</b>	<b># VISITORS</b>	<b>LAT</b>	<b>LONG</b>
JUL	Amarantina	MG	Brasil	6	-20,319422	-43,720702
JUL	Antônio Carlos	MG	Brasil	4	-21,317630	-43,755228
JUL	Antônio Pereira	MG	Brasil	3	-20,302983	-43,486242
JUL	Barbacena	MG	Brasil	2	-21,340849	-43,914523
JUL	Belo Horizonte	MG	Brasil	98	-19,815623	-43,953772
JUL	Betim	MG	Brasil	5	-19,967566	-44,198630
JUL	Cel. Fabriciano	MG	Brasil	2	-19,520058	-42,628105
JUL	Contagem	MG	Brasil	6	-20,012446	-44,124304
JUL	Fortaleza de Minas	MG	Brasil	4	-20,840723	-46,723469
JUL	Ipatinga	MG	Brasil	4	-19,468470	-42,536744
JUL	Itanhandu	MG	Brasil	2	-22,300586	-44,929718
JUL	Itatiaiuçu	MG	Brasil	13	-20,309235	-44,505262
JUL	João Monlevade	MG	Brasil	1	-19,857038	-43,169584
JUL	Juiz de Fora	MG	Brasil	8	-21,764834	-43,348227
JUL	Lagoa Santa	MG	Brasil	4	-19,639976	-43,893567
JUL	Lavras	MG	Brasil	1	-21,245249	-44,999150
JUL	Mariana	MG	Brasil	35	-20,377786	-43,416370
JUL	Monte Carmelo	MG	Brasil	2	-18,892122	-47,675517
JUL	Ouro Preto	MG	Brasil	23	-20,386237	-43,502170
JUL	Pará de Minas	MG	Brasil	1	-19,962049	-44,714181
JUL	Santa Barbara	MG	Brasil	4	-19,960400	-43,414227
JUL	Santa Luzia	MG	Brasil	4	-19,842276	-43,955476
JUL	Varginha	MG	Brasil	4	-21,645421	-45,542296
JUL	Visconde do Rio Branco	MG	Brasil	2	-21,020052	-42,840115
JUL	Campo Grande	MS	Brasil	2	-21,069909	-55,320425
JUL	Carajás	PA	Brasil	5	-2,954054	-51,863923
JUL	Santarém	PA	Brasil	1	-2,349175	-55,741344
JUL	Castro	PR	Brasil	4	-25,014558	-50,291160
JUL	Castrolanda	PR	Brasil	5	-24,773728	-20,011024
JUL	Curitiba	PR	Brasil	12	-25,491975	-49,334277
JUL	Ponta Grossa	PR	Brasil	2	-25,354525	-50,404631
JUL	Barra Mansa	RJ	Brasil	9	-22,545742	-44,168579
JUL	Campos	RJ	Brasil	4	-21,754383	-41,334918
JUL	Casimiro de Abreu	RJ	Brasil	3	-22,559642	-42,272549
JUL	Irajá	RJ	Brasil	4	-22,847925	-43,334196
JUL	Niteroi	RJ	Brasil	11	-22,880766	-43,104335
JUL	Resende	RJ	Brasil	3	-22,463169	-44,454994
JUL	Rio de Janeiro	RJ	Brasil	78	-22,901633	-43,209509
JUL	Natal	RN	Brasil	2	-5,851208	-35,273670
JUL	Joinville	SC	Brasil	2	-26,304184	-48,847544
JUL	Araraquara	SP	Brasil	5	-21,846590	-48,201534

MONTH	CITY	STATE	COUNTRY	# VISITORS	LAT	LONG
JUL	Assis	SP	Brasil	3	-22,779365	-50,553737
JUL	Campinas	SP	Brasil	53	-22,906554	-47,060344
JUL	Carapicuíba	SP	Brasil	4	-23,552081	-46,861911
JUL	Guarulhos	SP	Brasil	2	-23,579048	-46,642771
JUL	Hortolândia	SP	Brasil	5	-22,890991	-47,252310
JUL	Jacareí	SP	Brasil	1	-23,305252	-45,967575
JUL	Limeira	SP	Brasil	1	-22,680258	-47,517810
JUL	Limeira	SP	Brasil	5	-22,680258	-47,517810
JUL	Linhares	SP	Brasil	4		
JUL	Piedade	SP	Brasil	4	-23,849246	-47,566271
JUL	Poá	SP	Brasil	2	-23,525737	-46,344053
JUL	Ribeirão Preto	SP	Brasil	2	-21,283525	-47,920967
JUL	Rio Claro	SP	Brasil	3	-22,515467	-47,711214
JUL	Sá	SP	Brasil	2		
JUL	Santa Adélia	SP	Brasil	6	-21,327713	-48,921458
JUL	Santana de Parnaíba	SP	Brasil	3	-23,496934	-46,986082
JUL	São Bernardo do Campo	SP	Brasil	10	-23,694645	-46,566328
JUL	São José dos Campos	SP	Brasil	3	-23,290844	-46,006602
JUL	São Paulo	SP	Brasil	112	-23,681532	-46,813733
JUL	São Vicente	SP	Brasil	6	-24,078943	-46,523592
JUL	Taubaté	SP	Brasil	2	-23,156884	-45,709482
JUL	Valinhos	SP	Brasil	2	-23,029862	-47,049034
JUL	Vinhedo	SP	Brasil	2	-23,075577	-47,038440
JUL	Votuporanga	SP	Brasil	3	-20,514757	-50,077852
JUL		SP	Brasil	7		
JUL	Cordoba		Argentina	2	-31,484843	-64,289690
JUL			Brasil	32		
JUL	Bordeaux		França	2	44,553802	5,094634
JUL	Paris		França	2	48,815338	2,291658
JUL			França	6		
JUL			Inglaterra	1		
JUL	Vicenza		Italia	2	45,510682	11,486068
JUL			Japão	1		
JUL	Caracas		Venezuela	1	10,425564	-66,973601
AGO	Ouro Preto	MG	Brasil	4	-20,386237	-43,502170
AGO			Brasil	5		
SET	Vitória	ES	Brasil	3	-20,356733	-40,389607
SET	Belo Horizonte	MG	Brasil	7	-19,815623	-43,953772
SET	Conselheiro Lafaiete	MG	Brasil	7	-20,659645	-43,785056
SET	Itabira	MG	Brasil	3	-19,665699	-43,211905
SET	Mariana	MG	Brasil	1	-20,377786	-43,416370

MONTH	CITY	STATE	COUNTRY	# VISITORS	LAT	LONG
OUT		BA	Brasil	1		
OUT	Antônio Pereira	MG	Brasil	5	-20,302983	-43,486242
OUT	Belo Horizonte	MG	Brasil	4	-19,815623	-43,953772
OUT	Ouro Preto	MG	Brasil	7	-20,386237	-43,502170
OUT	Duque de Caxias	RJ	Brasil	2	-22,922209	-43,499695
OUT	Rio de Janeiro	RJ	Brasil	2	-22,901633	-43,209509
OUT	Santana do Livramento	RS	Brasil	1	-31,255688	-56,064828
OUT	Porto Alegre	RS	Brasil	7	-30,026502	-51,229660
OUT	Santa Maria	RS	Brasil	5	-29,870685	-54,018645
NOV	Salvador	BA	Brasil	1	-13,055688	-38,542002
NOV	Guarapari	ES	Brasil	2	-20,767467	-40,605989
NOV	Maratáízes	ES	Brasil	1	-21,125738	-40,910886
NOV	Vitória	ES	Brasil	2	-20,356733	-40,389607
NOV		ES	Brasil	1		
NOV	Amarantina	MG	Brasil	1	-20,319422	-43,720702
NOV	Antônio Pereira	MG	Brasil	6	-20,302983	-43,486242
NOV	Barao de Cocais	MG	Brasil	4	-19,936765	-43,472175
NOV	Belo Horizonte	MG	Brasil	1	-19,815623	-43,953772
NOV	Catas Altas	MG	Brasil	1	-20,073936	-43,398590
NOV	Conceição do Mato Dentro	MG	Brasil	2	-19,046284	-43,422105
NOV	Itabira	MG	Brasil	3	-19,665699	-43,211905
NOV	Itabirito	MG	Brasil	21	-20,326640	-43,876217
NOV	Itamonte	MG	Brasil	2	-22,291769	-44,871637
NOV	Lagoa Santa	MG	Brasil	2	-19,639976	-43,893567
NOV	Lavras	MG	Brasil	2	-21,245249	-44,999150
NOV	Mariana	MG	Brasil	21	-20,377786	-43,416370
NOV	Montes Claros	MG	Brasil	15	-17,045393	-44,192585
NOV	Ouro Preto	MG	Brasil	8	-20,386237	-43,502170
NOV	Viçosa	MG	Brasil	1	-20,754794	-42,881868
NOV	Marabá	PA	Brasil	2	-6,456558	-50,508307
NOV	Itatiaia	RJ	Brasil	1	-22,576609	-44,658805
NOV	Nova Iguaçu	RJ	Brasil	1	-22,895763	-43,615889
NOV	Rio de Janeiro	RJ	Brasil	5	-22,901633	-43,209509
NOV	Três Rios	RJ	Brasil	4	-22,179926	-43,255113
NOV	Aracaju	SE	Brasil	3	-10,908737	-37,074773
NOV	Campinas	SP	Brasil	2	-22,906554	-47,060344
NOV	Osasco	SP	Brasil	2	-23,567276	-46,819957
NOV			Brasil	1		
NOV	Barcelona		Espanha	1	41,338593	2,119253
NOV			Portugal	2		



<b>MONTH</b>	<b>CITY</b>	<b>STATE</b>	<b>COUNTRY</b>	<b># VISITORS</b>	<b>LAT</b>	<b>LONG</b>
<b>DEZ</b>	Rio Branco	AC	Brasil	2	-10,661002	-68,634462
<b>DEZ</b>	Manaus	AM	Brasil	2	-3,731680	-60,814569
<b>DEZ</b>	Salvador	BA	Brasil	2	-13,055688	-38,542002
<b>DEZ</b>	Fortaleza	CE	Brasil	1	-3,815282	-38,620440
<b>DEZ</b>	Vitória	ES	Brasil	2	-20,356733	-40,389607
<b>DEZ</b>	Belo Horizonte	MG	Brasil	18	-19,815623	-43,953772
<b>DEZ</b>	Bom Jesus do Amparo	MG	Brasil	4	-19,703356	-43,480903
<b>DEZ</b>	Divinópolis	MG	Brasil	1	-20,218610	-45,031558
<b>DEZ</b>	Mariana	MG	Brasil	2	-20,377786	-43,416370
<b>DEZ</b>	Monsenhor Horta	MG	Brasil	7	-20,336133	-43,303219
<b>DEZ</b>	Ouro Preto	MG	Brasil	17	-20,386237	-43,502170
<b>DEZ</b>	Poços de Caldas	MG	Brasil	4	-21,788606	-46,561788
<b>DEZ</b>		MT	Brasil	2		
<b>DEZ</b>	Curitiba	PR	Brasil	2	-25,491975	-49,334277
<b>DEZ</b>	Rio de Janeiro	RJ	Brasil	2	-22,901633	-43,209509
<b>DEZ</b>	Pelotas	RS	Brasil	2	-31,623822	-52,598041
<b>DEZ</b>	Americana	SP	Brasil	13	-22,803720	-47,424666
<b>DEZ</b>	Itu	SP	Brasil	2	-23,366887	-47,415665
<b>DEZ</b>	Piracicaba	SP	Brasil	5	-22,919014	-47,798277
<b>DEZ</b>	Santos	SP	Brasil	3	-24,077935	-46,472203
<b>DEZ</b>	São Paulo	SP	Brasil	25	-23,681532	-46,813733
<b>DEZ</b>	Angola		Africa	1	-11,190873	17,885221
<b>DEZ</b>			Brasil	2		
<b>DEZ</b>	Belo Horizonte	MG	Brasil	1	-19,815623	-43,953772

Source: Visitors' book from 2008 / Compiled by L.E.P. Travassos, 2008-2009

## APPENDICE II

### MODEL OF THE QUESTIONNAIRE USED DURING THE RELIGIOUS FIEST OF THE LAPA DE ANTONIO PEREIRA, MINAS GERAIS, IN 2009

#### Part I – Socio-economic profile

Name: \_\_\_\_\_

Resident \_\_\_\_\_ Visitor \_\_\_\_\_

1- Gender:

- a) Female
- b) Male

2 – Age

- a) to 19 years old
- b) from 20 to 29 years old
- c) from 30 to 39 years old
- d) from 40 to 49 years old
- e) more than 50 years old

3 – Civil Status Civil:

- a) Single
- b) Married
- c) Widow
- d) Divorced

4 - Education

- a) Incomplete Elementary School (Fundamental Incompleto)
- b) Complete Elementary School (Fundamental Completo)
- c) Incomplete High School (Ensino Médio Incompleto)
- d) Complete High School (Ensino Médio Completo)
- e) Incomplete Undergraduate School (Ensino Superior Incompleto)
- f) Complete Undergraduate School (Ensino Superior Completo)
- g) Others \_\_\_\_\_

5 – Family Income

- a) Up to 1 minimum wage (< R\$ 465,00 / aprox. < 184,00 €)
- b) Between 1 to 3 minimum wage (R\$ 466,00 a R\$ 1.395,00 / aprox. 185,00 up to 552,00 €)
- c) Between 3 to 6 minimum wage (R\$1.396,00 à R\$2.790,00 / aprox. 553,00 up to 1104 €)
- d) Between 6 to 9 minimum wage (R\$2.791,00 à 4.185,00 / aprox. 1105,00 up to 1656,00 €)
- e) More than 9 minimum wage (> R\$ 4.185 / aprox. > 1656,00 €)

#### Part II – Perception towards the region and touristic activity

1. How did you find out about the Grotto of Our Lady of the Cave?
2. When you arrived in the region?
3. What kind of transportation did you use to come to the place?
4. How you came to the Cave? (Group, alone, etc.)
5. For how long do you plan to stay in the region?
6. Are you interested to see any other touristic attraction besides the Cave?  
 Yes  
 No
7. What is the main purpose of the visit?
8. How many times you came to this festival or to the cave?
9. Do you plan to return to the cave? For what reason?
10. Reception from the Community
  - a) Excellent
  - b) Very good
  - c) Good
  - d) Regular
  - e) Bad
  - f) Very bad
  - g) Other \_\_\_\_\_