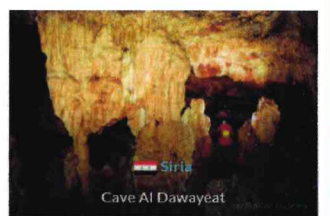
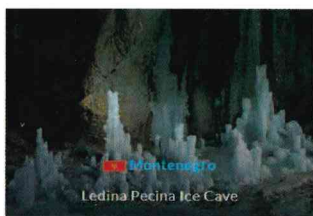
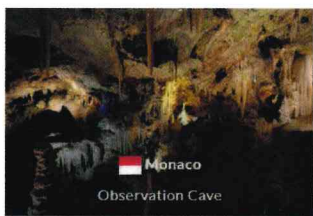
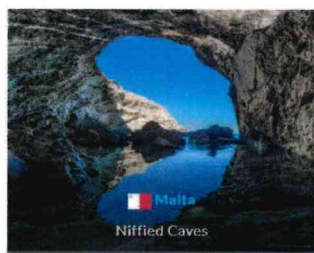
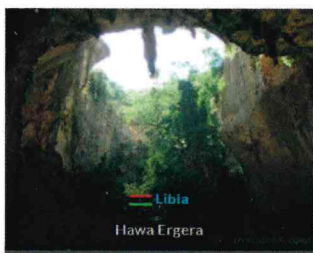
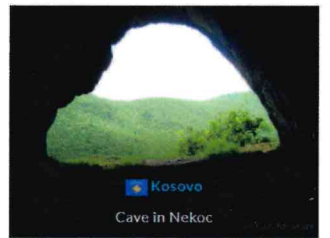
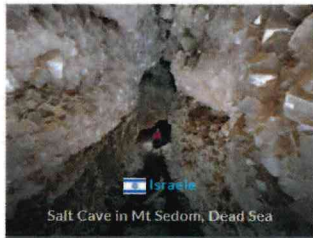
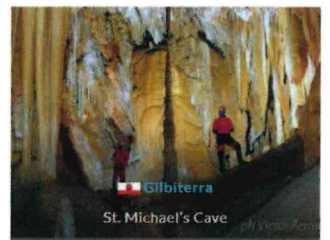
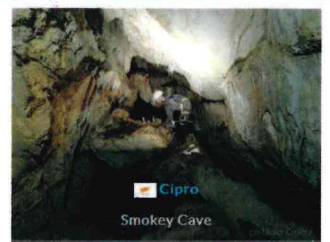


SPELEOMEDIT

Mediterranean SPELEOLOGY



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Panoramic view of caves and karst of Mediterranean countries

Editors

Ferdinando Didonna and Francesco Maurano

**Tetide APS - Marina di Camerota
Società Speleologica Italiana - Bologna**

2021

ITALY



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¹Società Speleologica Italiana



Zubbia Camilleri (Sicily)
Ph. Victor Ferrer

GENERAL INFO

In Italy (surface area 301,338 km²), areas of speleological interest, characterized by types of rocks that favour the formation of natural cavities, make up about one-sixth of the entire land.

All Italian regions have such areas in their territory, although with significant differences in extension and type of caves.

This feature has spurred speleological explorations in the Italian territory for over a century.

Over more than a century of exploration, more than 40,000 caves have been discovered, explored and documented, mainly in carbonate rocks (limestones and dolomites). There are also numerous caves in gypsum and basaltic lava, as well as in other lithotypes (evaporites).

KARST AREAS

All Italian regions include karst areas, with significant differences in terms of size. In the territory of Emilia Romagna karst covers about 1% of the total area, while in Apulia, thanks to the extensive outcrops of limestone, the value reaches 48%. The extensive karstic areas in Italy have encouraged systematic explorations for more than a century, leading to discovery and documentation of over 40,000 caves.

The main karstic systems are developed in sedimentary carbonate rocks (limestone and dolomite) and metamorphic rocks (marble): the *Monte Canin* complex in Friuli Venezia Giulia is the largest know cave system (over 80 km), the *Codula Ilune* in Sardinia (over 70 km), the *Valle del Nosè* system in Lombardy (over 61 km); the *Monte Corchia* complex (about 57 km) in Tuscany; the *Piaggia Bella* system (over 43 km) in Piedmont and the *Piani Eterni* complex (about 37 km) in Veneto. Less extended, but yet really interesting, are the gypsum caves in Sicily and Emilia Romagna, and the cave system developed in the *Montello* conglomerate in Veneto.

Mount Etna in Sicily, the largest active volcano in Europe, offers marvellous examples of basalt caves (lava tubes and eruptive fracture).

Italy offers an extremely complex speleological scenario, continuously updated thanks to the unceasing activity of exploration and research throughout its territory.

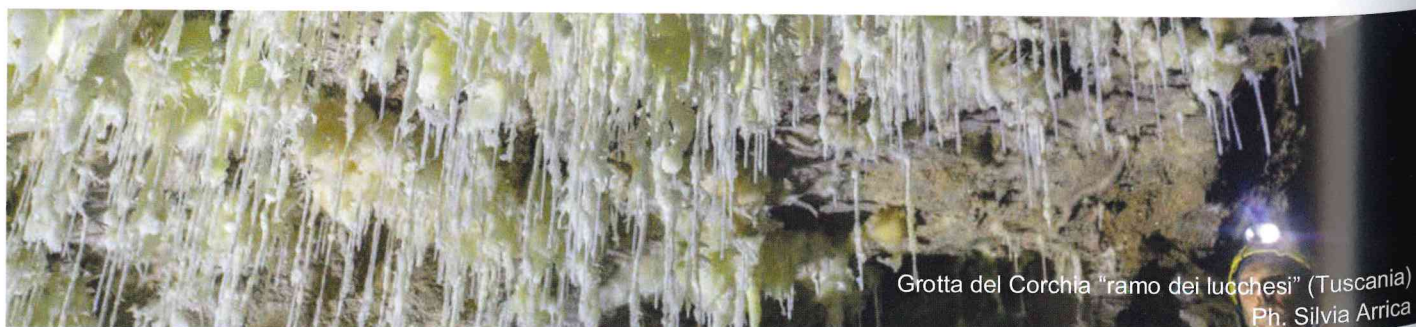
NUMBER OF REGISTERED CAVES: 44362



Map of geological formations of speleological interest

Longest caves

Name	Length (m)
Complesso del Monte Canin (Chiusaforte - Friuli Venezia Giulia)	> 80,000
Complesso carsico della Codula Ilune (Urzulei-Baunei-Dorgali - Sardegna)	> 70,000
Complesso Valle del Nosè (Sormano/Zelbio- Lombardia)	> 61,000
Complesso del Monte Corchia (Stazzema - Toscana)	> 57,000
Complesso di Piaggia Bella (Briga Alta - Piemonte)	43,000



Grotta del Corchia "ramo dei lucchesi" (Toscana)
Ph. Silvia Arrica



Deepest caves

Name	Depth (m)
Abisso Paolo Roversi (Minucciano - Toscana)	- 1,300+50
Abisso Olivifer (Massa - Toscana)	- 1,215
Complesso del Grignone Alfredo Bini (Esino/Mandello Lario - Lombardia)	- 1,190
Complesso del Monte Corchia (Stazzema - Toscana)	- 1,187
Abisso Perestroika (Minucciano - Toscana)	- 1,160



Su Palu (Sardinia)
Ph. Victor Ferrer



Grotta dei Tre livelli, volcanic cave (Etna, Sicily)
Ph. Francesco Maurano

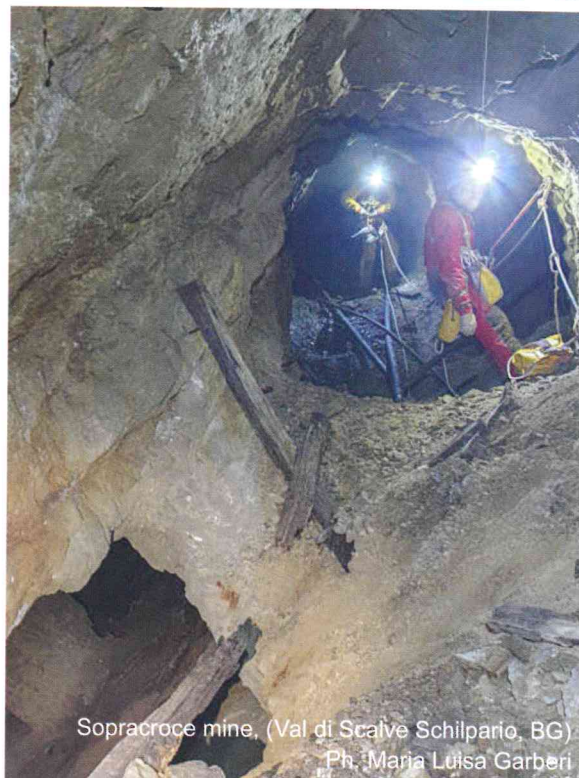
the whole contemporary age; in this wide temporal spectrum, the various cultural realities have devised formidable solutions, both for exploitation of subsoil and water resources, and for the creation of underground spaces that respond to the needs of daily life over the centuries. In 1981, within the Italian Speleological Society (SSI), the "National Commission of Artificial Cavities (CNCA) was established which is committed to promoting the exploration and study of the underground caves, not only among the speleologists but also involving and strictly linked to the national and international scientific and academic world in the network of collaborations.

In 1989 the Commission establishes the "Catasto Nazionale delle Cavit  Artificiali" (National Cadaster of Artificial Cavities), the data base with which the typological catalogue of CA is updated, sharing it also in the context of the International Union of Speleology (UIS); to this end, it conceived the classification of artificial cavities by dividing them both on the basis of the "intended use", identifying seven main types divided in turn into sub-types, and classifying their construction characteristics.

The CNCA analyzes the data acquired by speleologists during research conducted in Italy and abroad, produces the national and international reference symbology and contributes to the updating of the UIS multilingual dictionary for artificial cavities.

It develops typological synthesis projects and thematic censuses such as, for example, "The National Map of the ancient aqueducts" and the "Census of artificial emissaries of endorheic basins". Since 1999 the Commission has edited the publication of the journal "Opera Ipogea - Journal of Speleology in Artificial Cavities", edited by SSI, a unique journal for testimony and memory of the ancient underground works in Italy and in the world. The anthropic cavities, in addition to preserving archaeological finds, may themselves be architectural assets of considerable cultural and scientific value.

To face up with the diversified reality of Italian subsoil, the cavities were classified according to their original intended use, identifying seven important types: **military works**, mainly concentrated at the NE boundary areas of Italy; **hydraulic works**, testifying the capability of ancient civilizations in tapping, transporting, collecting and distributing the water resources; **religious works** are more frequent in southern Italy and are often connected to civil or monastic rock settlements; **civil settlement works**, distributed in all Italian regions, including the islands; **works of communication or transit**, underground infrastructures widespread since ancient times; and, finally, **mining works**, which in recent years have been the subject of important speleological investigation campaigns thanks to innovative techniques and the use of specific equipment. A final typology groups the so-called **other cavities** that do not fall into any of the above-mentioned groups.



Sopracroce mine, (Val di Scalve Schilpario, BG)

Ph. Maria Luisa Garberi



Aqueduct Carolino (Maddaloni, CE)

Ph. Francesco Maurano

NATIONAL CAVING ORGANIZATIONS:

Società Speleologica Italiana www.speleo.it

Club Alpino Italiano CAI www.cai.it/

NUMBER OF SPELEOLOGISTS: ~5500

NUMBER OF SPELEOLOGICAL GROUPS AND ORGANIZATION: 293

NATIONAL MAGAZINE AND MAIN SPELEOLOGICAL PUBLICATION:

"Speleologia" <http://www.speleologiassi.it/> ;

"Opera Ipogea" <http://www.operaipogea.it/>

REFERENCE RESEARCH ORGANIZATIONS FOR CAVES AND KARST:

Società Speleologica Italiana www.speleo.it

SPELEOTECA www.speleoteca.it

Club Alpino Italiano www.cai.it

CAI / Bossea <http://caicsc.it/chi-siamo/gruppi-e-strutture/il-laboratorio-carsologico-di-bossea>



Grotta Guernica (Parco delle Dolomiti Bellunesi)
Ph. Sandro Sedran

BIOSPELEOLOGY

FAUNA CATALOGUE. The catalogue contains more than 5658 cavities (natural and artificial ones); it takes into account 3674 species, 556 subspecies and several other taxa. At least 785 species are regarded as eucavernicolous (i.e. troglobites + eutroglophiles).

The zoological orders with the highest numbers of eucavernicolous species are Coleoptera (382), Pseudoscorpiones (92), Araneae (72), Diplopoda (65), Isopoda (55).

On the other hand, the higher frequency of endemic species is among Coleoptera (317), Diplopoda (105), Isopoda (104), Pseudoscorpiones (86), Araneae (60). As karst is widespread in all Italian regions, we would have expected to obtain, using the acquired information, a list of caves with more or less homogeneous faunistic quotations. The encountered het-

erogeneity in faunistic knowledge is due to the fact that biospeleological research started in different times in different regions.

In the second half of the 19th century faunistic research began to be carried out in particularly important caves, for quantity and diversity of species, in territories not very far from zoological research centers, such as in Veneto and Liguria.

In the first six decades of the 20th century many publications dedicated to the speleofauna were produced for caves in other Italian regions (in order of importance: Lombardy, Apulia, Venetia Julia, Piedmont, Tuscany and Friuli). However, a real leap of quality occurred since the 70s with the intensification, at national level, of speleological explorations, the discovery of many new caves, and the description of many new speleofaunistic entities.

In this context it is particularly interesting to highlight the importance of Sardinia, a region rich in caves where many endemic species are living. Many of these species have significant affinities with others living in caves of eastern Spain, the Balearic Islands, the Pyrenees, Catalonia and Provence. This can easily be explained by the geological history of this Island. Sardinia and Corsica, during the Oligocene, shifted from the Provençal area towards Italy up to the actual position in an anticlockwise roto-translation.

LEGAL STATUS OF CAVES AND PROTECTION RULES

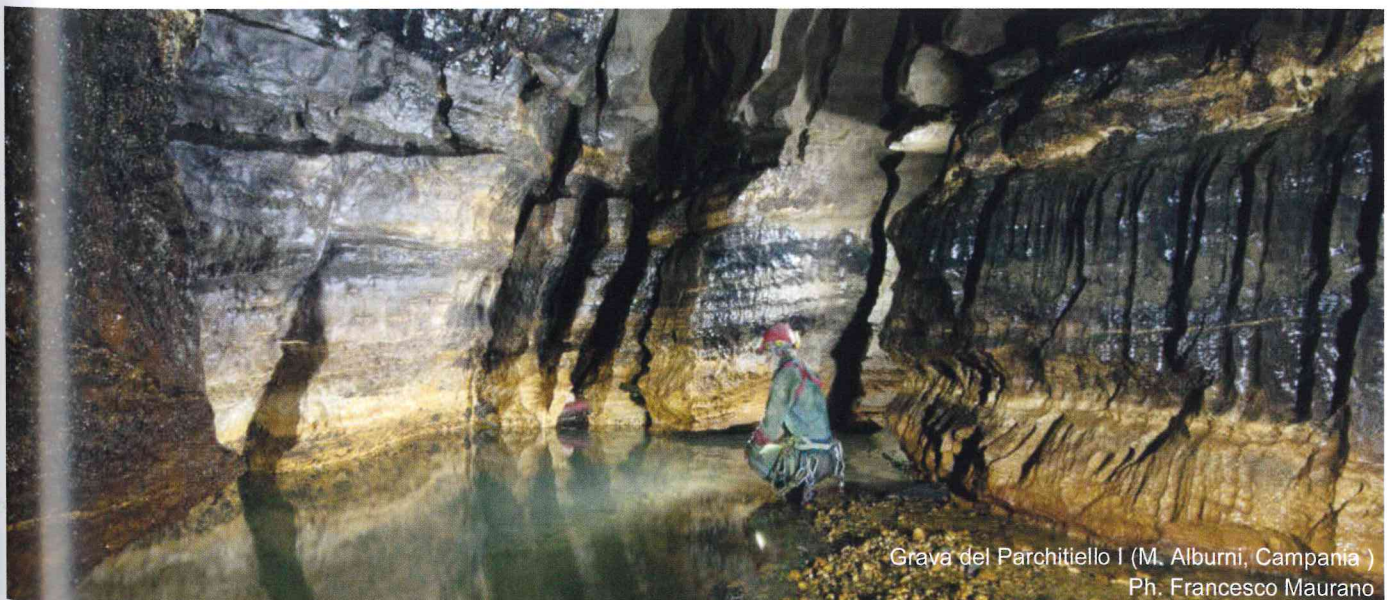
Both natural and artificial caves in Italy are not protected at the origin but only by special laws on extractive activities, mineral waters, archaeology and fine arts, or by Parks, Reserves and regional laws. Specifically, the underground mines stay under the dictates of the D.P.R. no. 128 of 09/04/1959 (Police regulations of mines and quarries, updated with Legislative Decree no. 624/96) while cavities of historical-archaeological interest or of particular geological singularity are protected by the Code of Cultural Heritage and Landscape (Legislative Decree 22.01.2004 no. 42). Finally, almost all Regions have provided rules on the protection of speleological heritage and geodiversity.

The framework law on the environment (Legislative Decree 152/2006) does not explicitly mention caves and karst systems, but it leads back to it.

The Habitats Directive (92/43 / CEE) also deals with caves: caves that are not exploited for tourism are habitats of community interest, included in the list of Annex I of the Directive with the code 8310, while submerged or semi-submerged sea caves are present with code 8330. Furthermore, limestone pavements are listed (8240) which constitute "priority"



Italodytes stammeri stammeri (Apulia)
Ph. Giovanni Ragone



Grava del Parchitiello I (M. Alburni, Campania)
Ph. Francesco Maurano

habitat for the European Union. On the basis of the Habitat Directive, therefore, caves are protected within the limits of the network Natura 2000, but the State undertakes to guarantee a certain protection on the whole national territory.

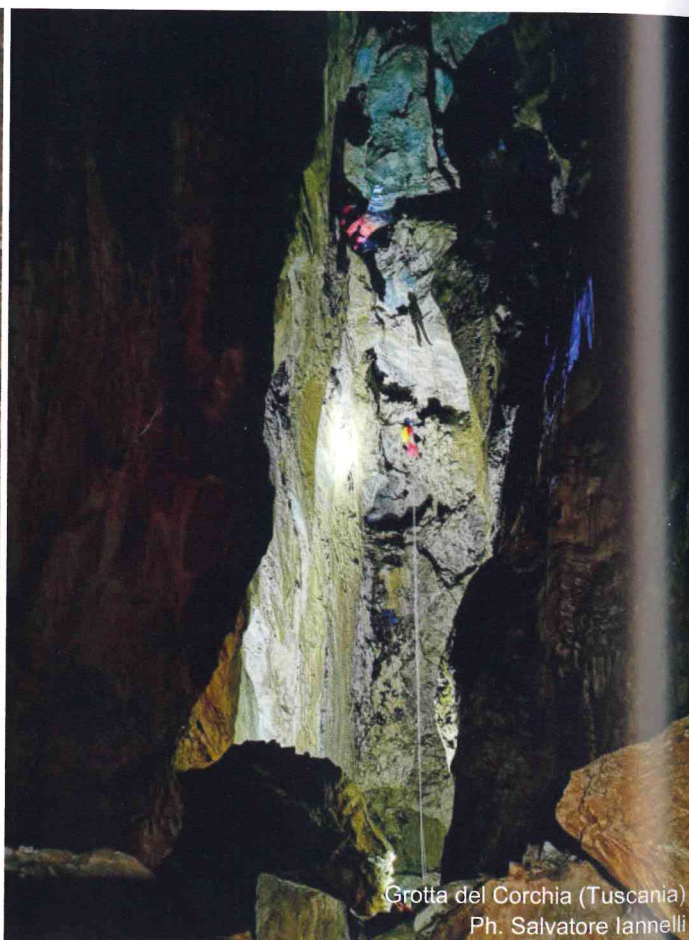
Access to the subsoil follows the same principles as the private ownership of the surface: the entrance and the underlying cavity belong to the owner of the land in which they open, who has the right to prevent access by closing or through other protections. Any free entry implicitly allows exploration of the cave.

Water and Caves: Even before the Urban Code and Legislative Decree 152/2006, groundwater is protected pursuant to Royal Decree no. 1775/1933, a legislation that is still in force and constitutionally valid.

Groundwater is subject to safeguard pursuant to Legislative Decree 152/2006, which provides specific quality objectives for them, in implementation of Directive 2000/60 / EC. The regulation presents however, a deficiency related to groundwaters. Decree 152/06, in fact, deals with underground waters constituting aquifers. Surface waters are subject to other protective measures, but nothing is explicitly referred to groundwaters. In Italy a mosaic of national and European laws and regulations contributes to the protection of the caves; often the creation of parks and reserves constitute the strongest form of protection for caves and karst areas.



Grotte di Castellana (Apulia)
Ph. Francesco Maurano



Grotta del Corchia (Tuscania)
Ph. Salvatore Iannelli

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