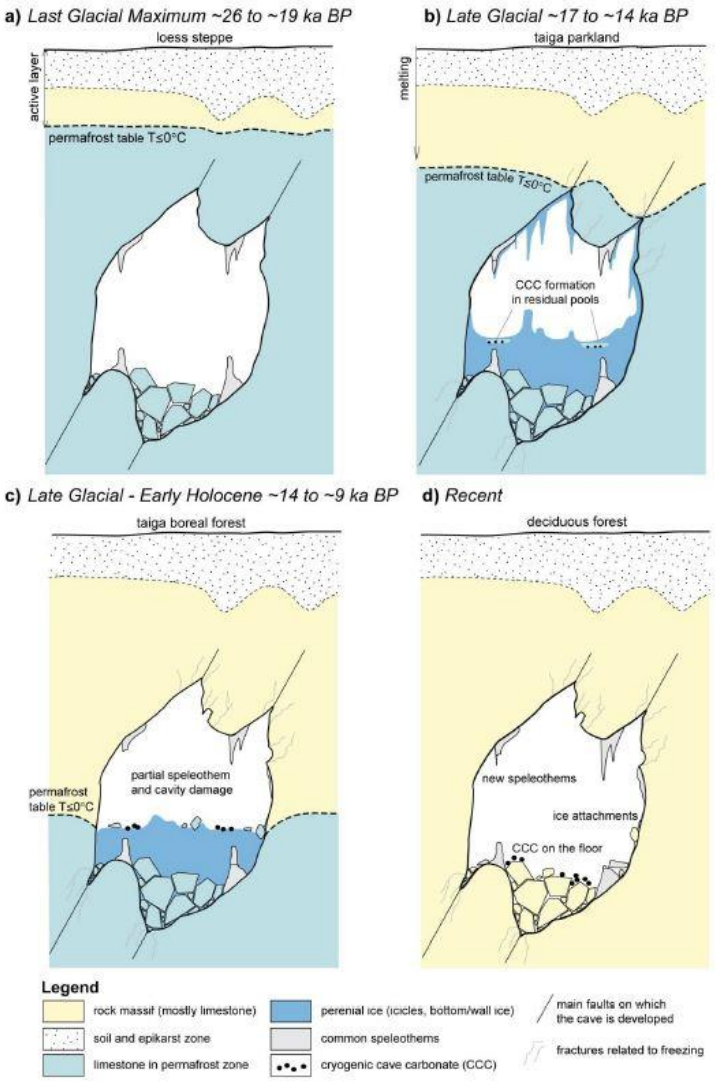
Cryogenic calcite



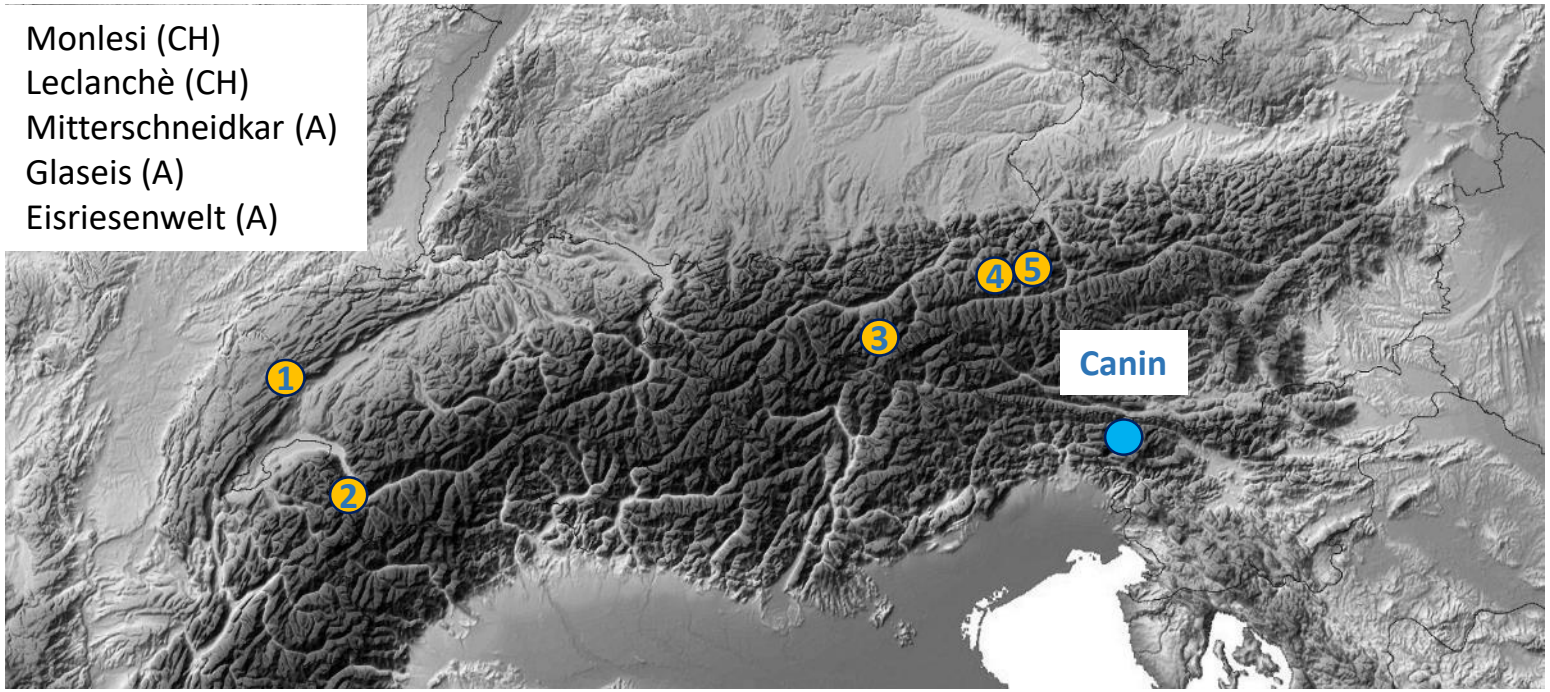
The youngest currently known occurrence is from a cave in the Swiss Alps located at the threshold of modern permafrost and dates from the medieval period
(Luetscher et al., 2013)

Characteristic stable isotopic composition with values supporting the model of very slow freezing and concomitant calcite precipitation

LEUPA Ice Cave

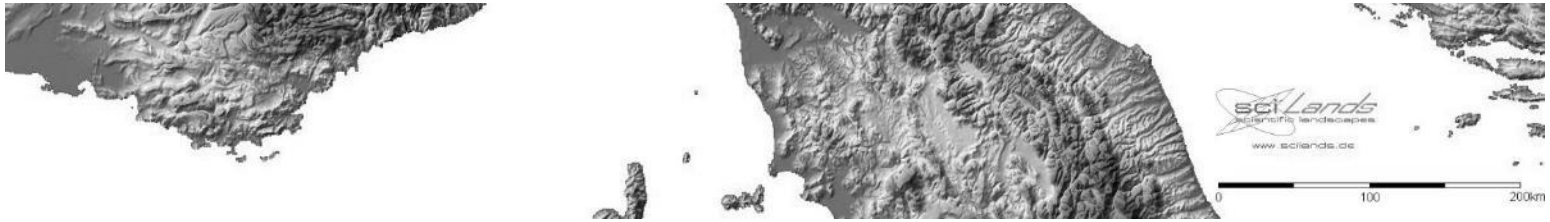
Cryogenic calcite

1) Monlesi (CH)
2) Leclanchè (CH)
3) Mitterschneidkar (A)
4) Glaseis (A)
5) Eisriesenwelt (A)



First evidence in Italy

First evidence in the southern Alps

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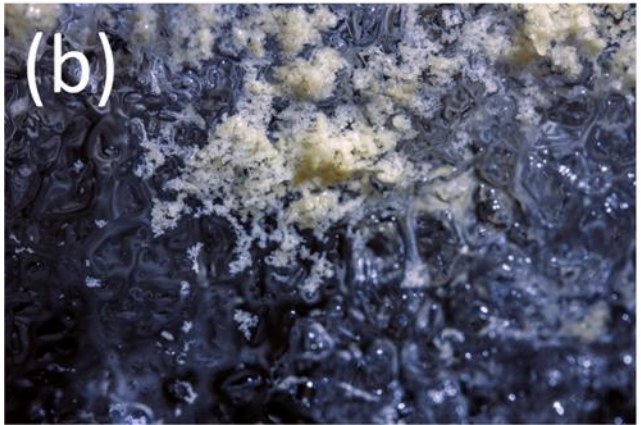
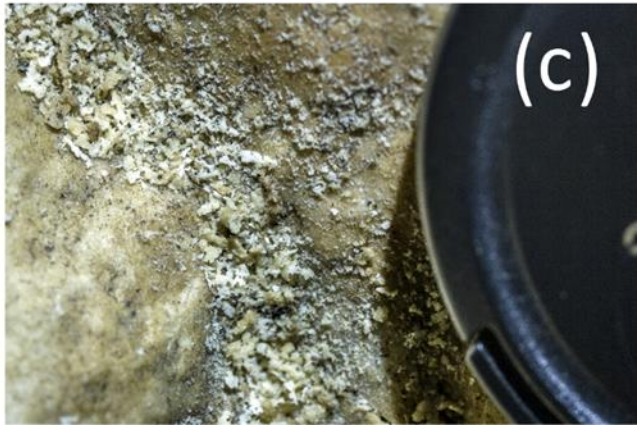




The cavity underneath the permanent ice deposit in the Leupa ice cave.

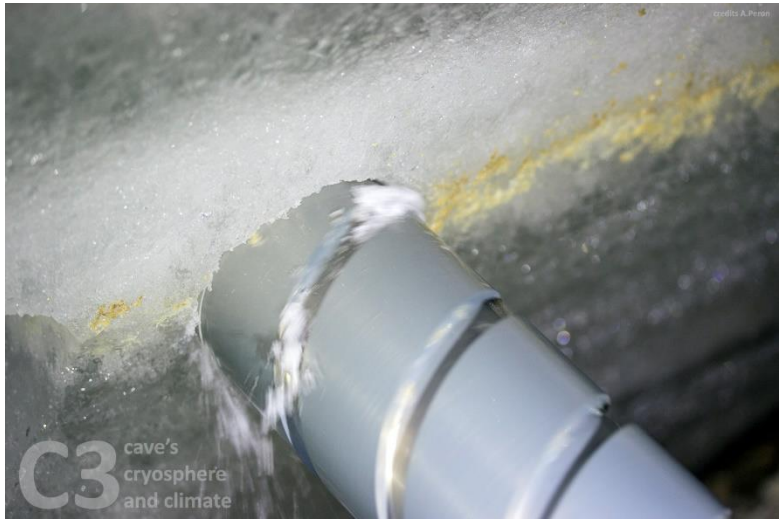
(a) The internal layer of CCCcoarse

(b) Details of the in situ-crystals of coarser cryogenic calcite

(c) loose crystals recently deposited on clastic sediments

LEUPA Ice Cave

LEUPA Ice Cave



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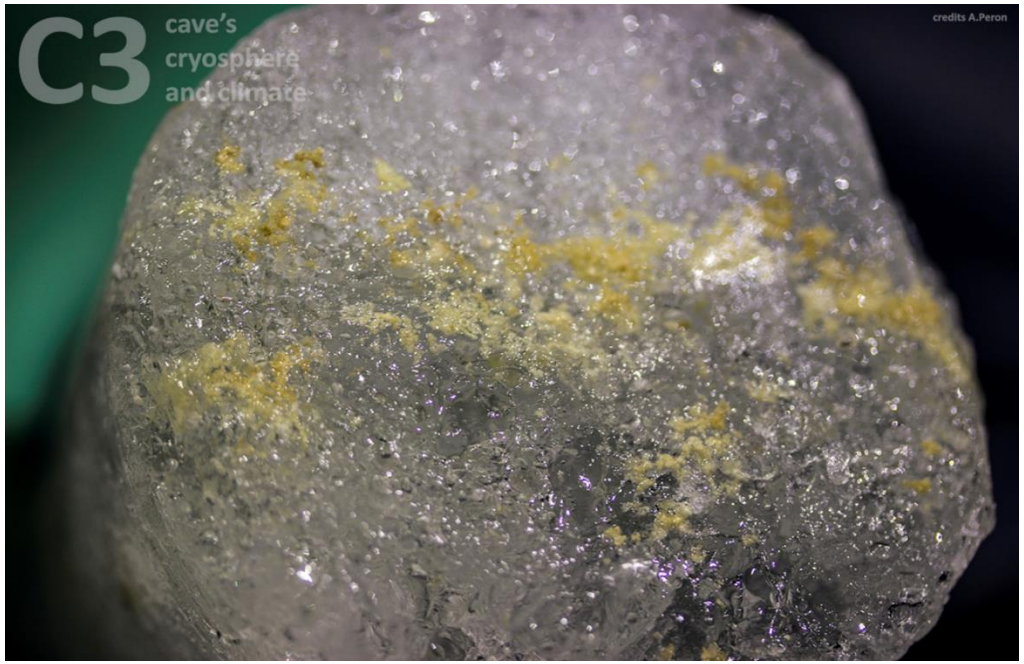


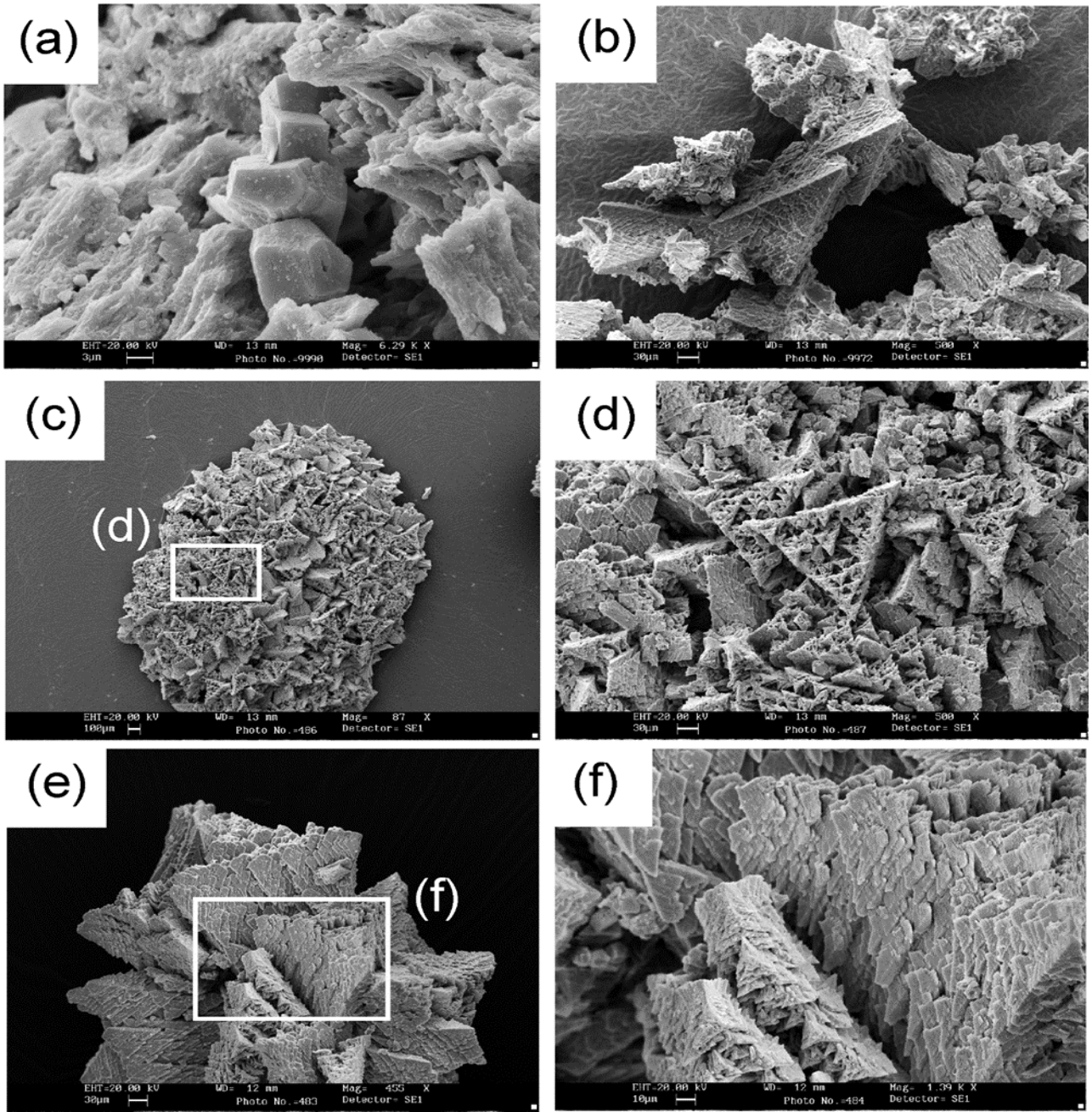
LEUPA Ice Cave

- CCC_{coarse} datings (U/Th)
- C14 datings
- Polline analysis
- Microbiological community → DNA
- High resolution (1mm) chemistry

- others?

Colucci et al., (2017)
First alpine evidence of in situ coarse cryogenic cave carbonates (CCCcoarse) GFDQ

LEUPA Ice Cave



Morphology of calcite crystals as seen under SEM-EDX.

(a) Detail of euhedral (rhombohedral) crystals;

(b) Detail of euhedral (scalenohedral) crystals;

(c) raft-like calcite aggregate consisting of calcite scalenohedra sometimes elongated in the direction of the vertical axis;

(d) close-up of (c) showing a fractal distribution of individual scalenohedral crystals with stepped faces;

(e) fan-like aggregate (calcite rose) with various intergrowths of scalenohedral crystals;

(f) close-up of (e) showing a chevron-type habits of the crystals surface.

The C3 documentary

Work in progress

Stay tuned !!!

Cooperations and Sponsors

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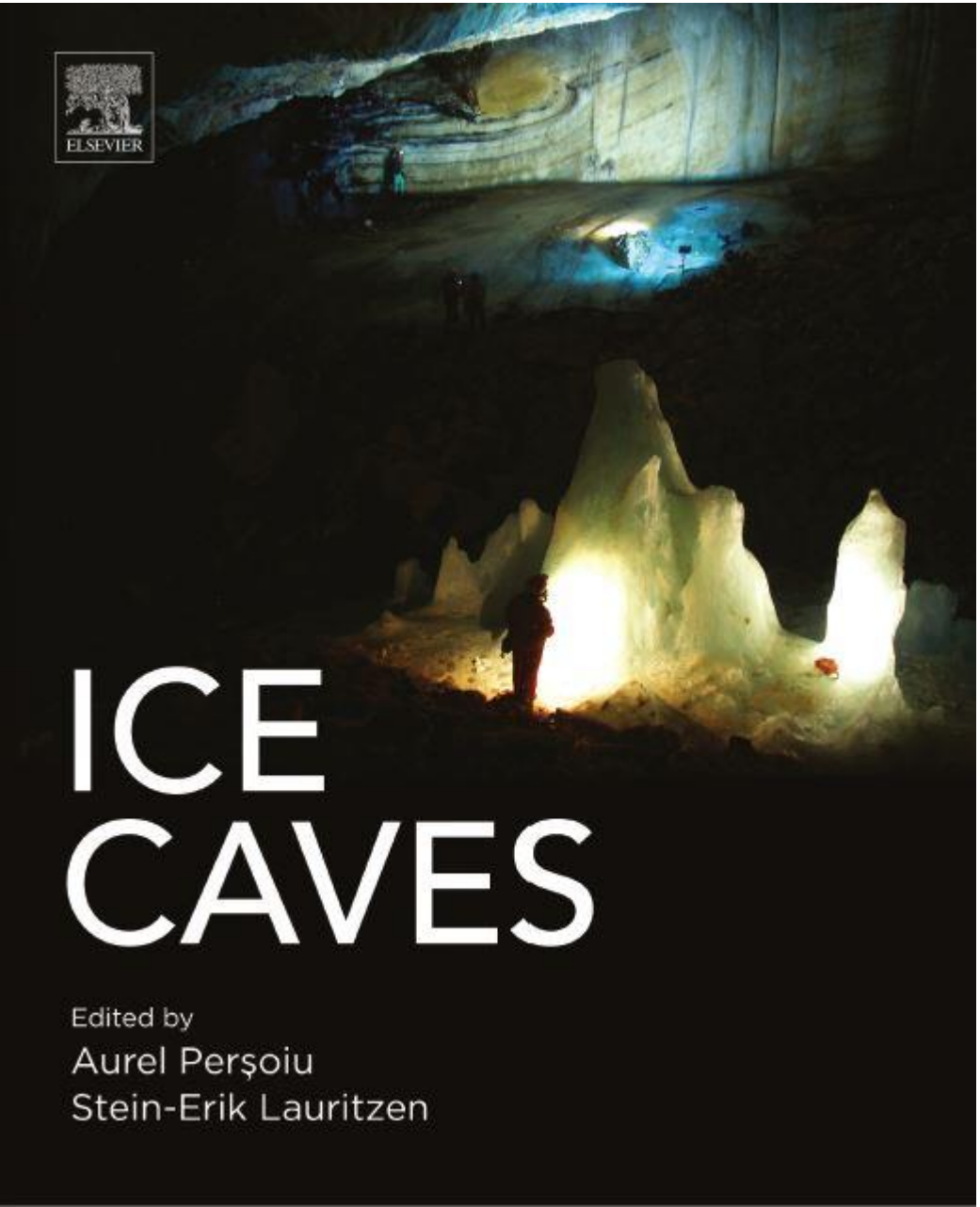
Future challenges

- Timing of underground glaciation

- Relation with thermal conditions of the rock

- Dating methodologies

- Biology of ice caves



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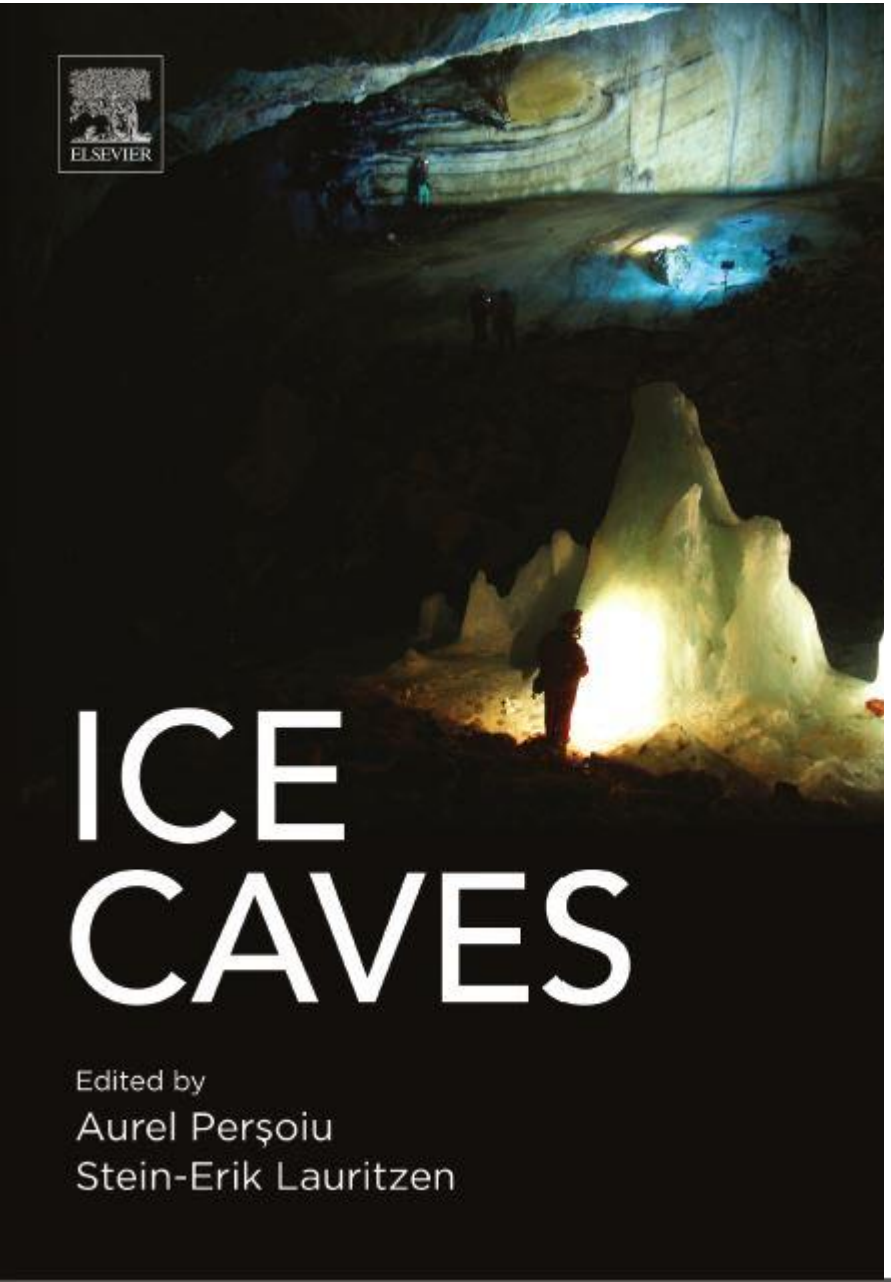
Covers various aspects of ice occurrence in caves, including cave climate, ice genesis and dynamics, and cave fauna

Features an overview of the paleoclimatic significance of ice caves

Includes over 100 color images of ice caves around the world



CHAPTER

ICE CAVES IN ITALY

19

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CHAPTER OUTLINE

19.1 INTRODUCTION

Italy presents one of the largest variabilities of karstic features in the world. There are limestone outcroppings all over the country, from the Alps to Sicily, as well as in the Pantelleria Island, located in the center of the Mediterranean Sea. Karstic features are also present in the evaporates in the Northern Apennines, and in the marbles in the Apuane mountains. However, lava tube systems are also present on Etna Volcano in Sicily, and because it is active, their formation is still ongoing. Officially, 34,669 caves are included in the national speleological database (WISH, www.speleo.it), with development up to 50 km, such as the Corchia System (Apuane Mountains, Tuscany), and depth up to 1313 m, such as the Releccio Alfredo Bini system (Grigna Settentrionale, Lombardy) (Ferrario and Tognini, 2016).

Ice caves are distributed along the entire karstic area, mainly in the Central-Eastern Alps (Lombardy, Veneto, Trentino-Alto Adige-Südtirol, and Friuli Venezia Giulia regions) with probably more than 1600 existing cryo-caves, having within them permanent (multiyear) masses of ice, firn or permanent snow. In such areas, the ice deposits recorded on occasions of speleological surveys or research studies are

Ice Caves. https://doi.org/10.1016/B978-0-12-811739-2.00019-X


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